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January 13, 2025

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VIA ELECTRONIC FILING

Hon. David Jones, Chairman
c/o Ectory Lawless, Docket Room Manager
Tennessee Public Utility Commission
502 Deaderick Street, 4th Floor
Nashville, TN 37243
TPUC.DocketRoom@tn.gov

RE: ***Petition of Limestone Water Utility Operating Company, LLC to Increase Charges, Fees and Rates and for Approval of a General Rate Increase and Consolidated Rates,*** **TPUC Docket No. 24-00044**

Dear Chairman Jones:

Attached for filing please find *Limestone Water Utility Operating Company, LLC's Rebuttal Testimony for (1) Dylan D'Ascendis; (2) Clare Donovan; (3) Mike Duncan; (4) Aaron Silas; (5) Brent Thies; and (6) Todd Thomas* in the above-captioned matter.

Hard copies will follow. Should you have any questions concerning this filing, or require additional information, please do not hesitate to contact me.

Very truly yours,

BUTLER SNOW LLP

Melvin J. Malone

clw
Attachments
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STATE OF TENNESSEE
BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION

IN RE:

LIMESTONE WATER UTILITY OPERATING COMPANY

DOCKET NO. 24-00044

REBUTTAL TESTIMONY

OF

DYLAN W. D'ASCENDIS

ON

CAPITAL STRUCTURE; COST OF DEBT; RETURN ON EQUITY

SPONSORING PETITIONER'S EXHIBITS:

DWD-1R through DWD-6R

FILED: JANUARY 13, 2025

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I. INTRODUCTION, PURPOSE, AND OVERVIEW

Q. Please state your name, affiliation and business address.

A. My name is Dylan W. D'Ascendis. I am employed by ScottMadden, Inc. as Partner. My business address is 1820 Chapel Avenue W, Suite 300, Cherry Hill, NJ 08003.

Q. Did you submit Direct Testimony in this Proceeding?

A. Yes, I did.

Q. What is the purpose of your Rebuttal Testimony in this proceeding?

A. The purpose of my testimony is to respond to the direct testimony of Mr. Aaron L. Rothschild, witness for the Office of the Tennessee Attorney General (the "AG") concerning the appropriate capital structure and corresponding cost rates that Limestone Water Utility Operating Company, LLC ("Limestone Water" or the "Company") should be given the opportunity to earn on its jurisdictional rate base.

Q. Please provide an overview of your Rebuttal Testimony.

A. First, I update the analyses in my Direct Testimony to reflect current data. Second, I address the inadequacy of Mr. Rothschild's recommended return on common equity ("ROE") of 8.04% for Limestone Water. The inadequacy of Mr. Rothschild's position is apparent when comparing his recommendation to authorized ROEs for water utilities around the country and the Company's sister companies' and corporate parent's recent debt issuances.

Mr. Rothschild's recommendation is unreasonable and unrealistic due to his misapplication of the discounted cash flow ("DCF") model and capital asset pricing model ("CAPM") and his various inputs to those models. For example, Mr. Rothschild's significant reliance on option-implied growth rates and Beta coefficients ("beta") serve to substantially lower his indicated results. Further, Mr. Rothschild does not reflect the Company's unique risks relative to his proxy group.

In view of Mr. Rothschild's flawed and unsupported analysis, the Tennessee Public Utility Commission ("Commission") should reject his analysis and adopt my recommended ROE of 11.90%, which properly reflects the Company's cost of capital and its unique risks as compared to the Proxy Groups.

I also respond to Mr. Rothschild's proposed hypothetical capital structure which also fails to consider the impact of the Company's unique risks.

Q. Have you prepared Exhibits which support your Rebuttal Testimony?

A. Yes. I have prepared Petitioner's Exhibits DWD-1R through DWD-6R, which were prepared by me or under my direct supervision.

II. UPDATED ANALYSES

Q. Have you updated your cost of common equity analyses for your Rebuttal Testimony?

A. Yes, I have. Due to the passage of time since my Direct Testimony analysis (data as of April 30, 2024), I have updated my analysis using data as of December 2, 2024.

Q. Have you applied any of your ROE models differently in your updated analyses?

A. While my application of the models remains unchanged, Yahoo! Finance no longer provides projected five-year earnings per share ("EPS") growth rates.

Q. Have you updated your utility proxy groups for your updated analyses?

A. Yes, I have. Because Yahoo! Finance no longer reports projected five-year EPS growth rates for Artesian Resources Corporation ("ARTNA") and The York Water Company ("YORW"), they no longer pass my selection criteria, as they do not have a published EPS growth estimate from either Zacks, S&P Capital IQ or *Value Line Investment Survey* ("*Value Line*"). Because ARTNA and YORW do not have a published EPS growth estimate from at least one source, I have eliminated them from my updated U.S. Water Universe (now comprised of a proxy group of seven water utilities).

Q. What are the results of your updated analyses?

A. Using data as of December 2, 2024, my updated results are presented in page 2 of Petitioner's Exhibit DWD-1R and in Table 1, below:

Table 1: Summary of Updated Common Equity Cost Rate

	Utility Proxy Group	U.S. Water Universe
Discounted Cash Flow Model	9.73%	10.26%
Risk Premium Model	10.74%	10.92%
Capital Asset Pricing Model	10.79%	11.07%
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	11.23%	11.47%
Indicated Range of Common Equity Cost Rates Before Adjustments for Company-Specific Risk	9.73% - 11.47%	
Business Risk Adjustment	1.50%	
Indicated Range of Common Equity Cost Rates After Adjustment	11.23% - 12.97%	
Recommended Cost of Common Equity	11.90%	

In view of the adjusted range of ROEs, my updated analyses demonstrate the reasonableness of my original ROE recommendation of 11.90%. I maintain that the Commission should adopt this rate as the Company's authorized ROE.

III. RESPONSE TO MR. ROTHSCHILD

Q. Please provide a summary of Mr. Rothschild's testimony and recommendation.

A. Mr. Rothschild's indicated ROE range of 6.65% to 8.04% is based on his DCF model results, which range from 6.84% to 8.04%, and his CAPM results, which range from 6.61% to 7.28%.[1] Based on those results, Mr. Rothschild recommends an ROE of 8.04% which is at the upper end of his DCF model results. Mr. Rothschild attempts to support his recommended ROE by comparing it to expected overall market returns by various financial institutions and pension funds.[2]

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[1] *Pre-filed Testimony of Consumer Advocate Witness Aaron L. Rothschild*, pp. 12-13, TPUC Docket No. 24-00044 (Dec. 19, 2024) (hereinafter "*Rothschild Pre-filed*").

[2] *Id*. at 9.

Regarding capital market conditions, Mr. Rothschild claims that since May 2024, the cost of capital for water utility companies has declined relative to the overall market, relying on derivative-based models to conclude that volatility expectations and Beta coefficients have decreased during that timeframe.[3] Mr. Rothschild also states that the downward sloping yield curve indicates investors are expecting short-term interest rates to decrease, putting downward pressure on the cost of common equity.[4]

Q. Do you have any concerns with Mr. Rothschild's analyses and ultimate recommendation?

A. Yes, I have several: (1) his ultimate ROE recommendation violates the "Corresponding Risk" standard embodied in the *Hope* and *Bluefield* U.S. Supreme Court decisions; (2) his significant reliance on derivatives throughout his analyses is flawed and undermines the accuracy of his model results; (3) his recommended ROE does not recognize capital market conditions; (4) his recommended hypothetical capital structure does not reflect the Company's risk as compared to his proxy group; (5) his misapplication of the DCF model; (6) his misapplication of the CAPM; and (7) his failure to apply adjustments to reflect the Company's unique risks as compared to his proxy group.

A. <u>INADEQUACY OF RECOMMENDATION</u>

Q. In your opinion, does Mr. Rothschild's recommended ROE pass the criteria for a fair return set by the *Hope* and *Bluefield* U.S. Supreme Court cases?

A. No, it does not. As discussed in my Direct Testimony,[5] the U.S. Supreme Court determined that an authorized return for a utility must be: (1) adequate to attract capital at reasonable

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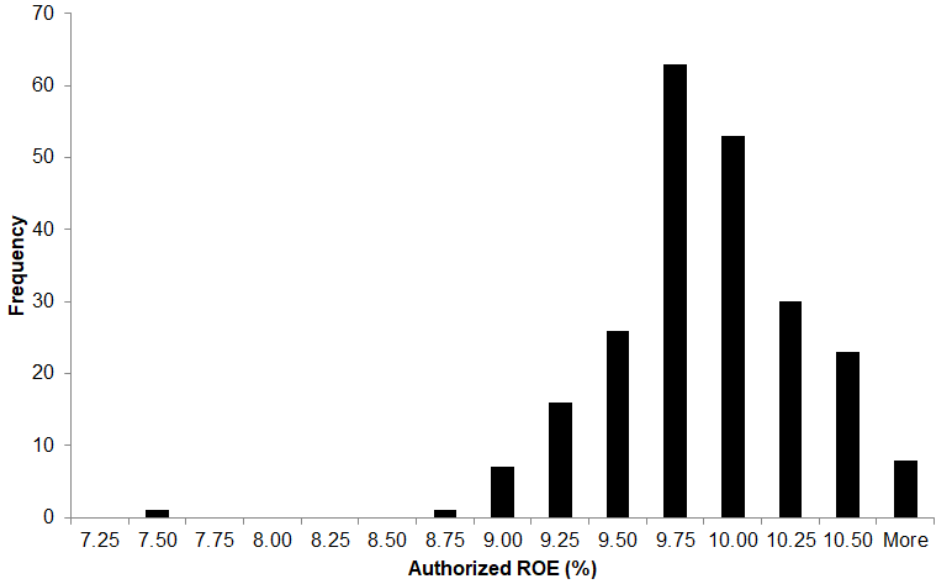
3 *Id*. at 30.
4 *Id*. at 28-29.
5 *Pre-filed Direct Testimony of Limestone Witness Dylan D'Ascendis*, pp. 6-7, TPUC Docket No. 24-00044 (July 16, 2024) (hereinafter "*D'Ascendis Direct*").

cost and terms; (2) sufficient to ensure their financial integrity; and (3) commensurate with returns on investments in enterprises with corresponding risks. While the first two measures are difficult to predict until after the fact, the third measure is relatively easy to observe by monitoring ROEs that regulatory commissions set for water utilities.

Q. How does Mr. Rothschild's recommended ROE of 8.04% compare with authorized ROEs for other water utilities?

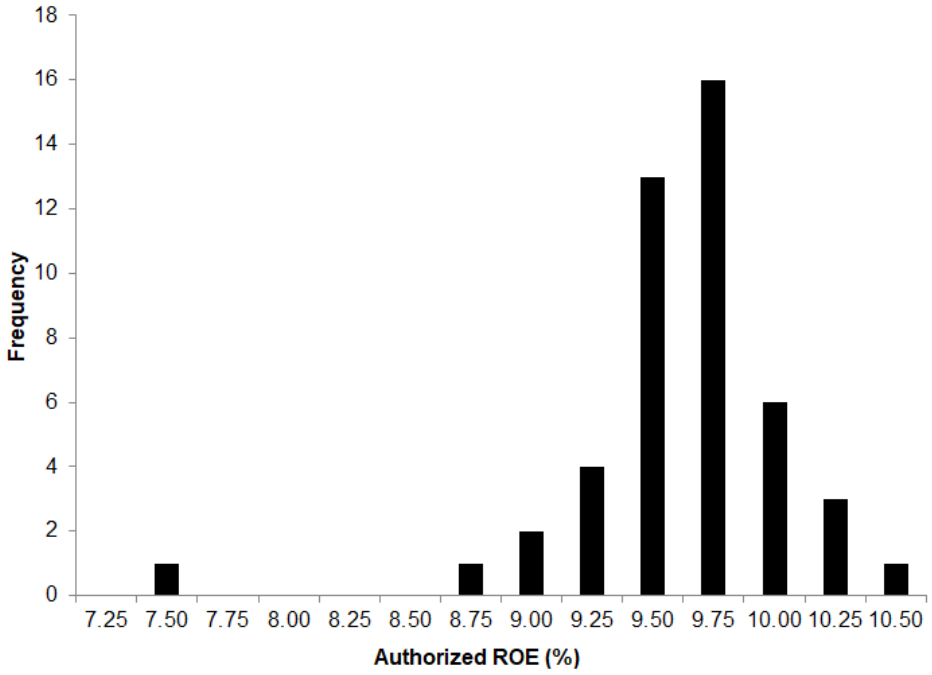
A. It doesn't. Mr. Rothschild's recommended ROE of 8.04%, if authorized by the Commission, would be the lowest non-punitive ROE set from 2010 to the present. In Charts 1 and 2, below, I compiled the authorized ROEs for water utilities as monitored by Regulatory Research Associates ("RRA") for the periods 2010 through 2024Q3 and 2020 through 2024Q3, respectively. As shown, Mr. Rothschild's recommended ROE significantly departs from *Hope* and *Bluefield's* "Corresponding Risk" standard when considering either the short or long-term horizons.

Chart 1: Histogram of Authorized ROEs for Water Companies 2010 through Q3 2024[6]



[6] Regulatory Research Associates.

Chart 2: Histogram of Authorized ROEs for Water Companies 2020 through Q3 2024[7]



Q. On page 14 of his direct testimony, Mr. Rothschild specifically refers to an authorized ROE of 7.46% for Blue Granite Water Company (which can be seen on Charts 1 and 2 above as the outlier value). Is that proceeding applicable to the instant proceeding?

A. No, it is not. Mr. Rothschild fails to mention that the ROE for Blue Granite Water Company authorized by the South Carolina Commission was a penalty for poor performance (i.e., a policy decision rather than an economic one). In reviewing that decision, the South Carolina Supreme Court observed:

> Finally, the PSC specifically stated it set the ROE at the low end of the proffered ranges in an effort to incentivize Blue Granite to improve its admittedly-poor business practices, evidenced by extensive customer complaints at the PSC hearings.[8]

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[7] Regulatory Research Associates.

[8] *In re: Application of Blue Granite Water Company for Approval to Adjust Rate Schedules and Increase Rates*, 862 S.E. 2d 887, 893 (S.C. 2021).

Q. Mr. Rothschild does not believe that historical observed ROEs need to be consistent with his recommendation.[9] Do you agree?

A. I agree with Mr. Rothschild that ROEs are snapshots of the investor required return at a moment in time and that historical commission-authorized ROEs are not determinative of the cost of capital in the future. I also agree that ROEs should be market-based and not reliant on authorized returns in other jurisdictions. In this case, however, the substantial difference between Mr. Rothschild's recommendation and the range of ROEs approved by regulatory commissions should not be ignored.

Q. Has the Commission previously considered authorized returns from other jurisdictions in its assessment of the appropriate ROE?

A. Yes, it has. In Docket No. 18-00017, the Commission stated:

> The panel determined that CGC's recommended ROE is clearly inconsistent with decisions related to companies in the natural gas business from other states. Such incomparability violates the canon principles of the *Hope* and *Bluefield* decisions, which prohibit returns that are incomparably low and incomparably high.[10]

Q. Mr. Rothschild states that the market-based cost of equity for water utilities is less than the authorized ROEs because market-to-book ratios of water utility stocks are above 1.0.[11] Is this true?

A. No. Market values can diverge from book values for a myriad of reasons including earnings per share ("EPS") and dividends per share ("DPS") expectations, merger / acquisition expectations, interest rates, etc. As noted by Phillips[12]:

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9 *Rothschild Pre-filed* at 20-21.

10 *Amended Order*, p. 64, TPUC Docket No. 18-00017 (Jan. 15, 2019).

11 *Rothschild Pre-filed* at 25. (Mr. Rothschild's pre-filed testimony on this subject includes a footnote (number 31), seemingly indicating a supporting citation, but there is no footnote and no authority provided on which the Commission could rely.)

12 Charles F. Phillips, The Regulation of Public Utilities – Theory and Practice (Public Utility Reports, Inc., 1993) at 395.

> Many question the assumption that market price should equal book value, believing that 'the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies.'

In addition, Bonbright[13] states:

> In the first place, commissions cannot forecast, except within wide limits, the effect their rate orders will have on the market prices of the stocks of the companies they regulate. In the second place, *whatever the initial market prices may be, they are sure to change not only with the changing prospects for earnings, but with the changing outlook of an inherently volatile stock market.* In short, market prices are beyond the control, though not beyond the influence of rate regulation. Moreover, even if a commission did possess the power of control, any attempt to exercise it ... would result in harmful, uneconomic shifts in public utility rate levels. (italics added)

Q. How does Mr. Rothschild's recommended ROE of 8.04% compare with the recent debt issuance from Limestone's parent company, Central States Water Resources ("CSWR")?

A. Limestone's parent company recently issued debt in November 2024 at a rate of 8.50%, meaning that Mr. Rothschild's recommended ROE is below the return that is required by debtholders. Mr. Rothschild stated, "investors face more risk when they buy equity than when they buy debt."[14] I agree with his statement. The fact that Limestone Water cannot raise debt capital on any terms should indicate that both debt and equity investors require returns that greatly exceed the 8.50% debt cost rate applicable to CSWR and Mr. Rothschild's recommended ROE of 8.04%.

Q. Mr. Rothschild refers to expected market returns as published by "investment professionals" to support his ROE recommendation. Is his comparison valid?

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[13] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates (Public Utilities Reports, Inc., 1988) at 334.

[14] *Rothschild Pre-filed* at 33.

A. No, it is not. This is acknowledged by Mr. Rothschild on pages 7 - 8 of his direct testimony when stating that they "have nothing to do with this proceeding". Expected market returns from pension funds or investment houses try to predict what the market's earned return will be, not the return that investors require in order to invest, which is the subject of this proceeding. For example, a benefit plan asset manager will match the **expected returns** available from various asset classes to the expected liabilities that must be funded. An investor seeking to maximize their risk-adjusted return will only invest in a security if the expected return is equal to or greater than the **required return**. Because *expected* returns may or may not equal *required* returns, one cannot assume pension funding assumptions or expected returns from investment houses (that is, expected returns) may be viewed as a measure of investors' required returns.

Benefit plan managers develop asset allocation and investment decisions based on expected risks and returns for various asset classes subject to the investment objective or expected timing and nature of the liabilities being funded by those investments. In the U.S., they must consider: (1) the diversification of the portfolio; (2) the liquidity and current return of the portfolio relative to the expected cash flow requirements under the plan; (3) the portfolio's projected return relative to the plan's funding objective; and (4) the return expected on alternative investments with similar risks.[15] Pension asset managers, therefore, are concerned with investing funds at an expected return to meet expected liabilities. As to the documents cited by Mr. Rothschild, several contain clearly stated limiting assumptions and disclaimers, which call into question their use for the purpose of setting the ROE in this proceeding. For example, Horizon Actuarial Services, LLC notes:

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[15] *Interpretive Bulletin Relating to Investing in Economically Targeted Investments*, 29 CFR 2509.08-1 (2008).

> The ranges of expected annualized returns were constructed using basic, often simplified, formulas and methodologies. More sophisticated investment models – which may consider various economic scenarios, non-normal distributions, etc. – could produce significantly different results.[16]

Similarly, Charles Schwab notes:

> All expressions of opinion are subject to change without notice in reaction to shifting markets or other conditions. Data contained herein from third-party providers is obtained from what are considered reliable sources. However, its accuracy, completeness or reliability cannot be guaranteed.
>
> Examples provided are for illustrative purposes only and not intended to be reflective of results you can expect to achieve.
>
> **Past performance is no guarantee of future results**.[17]

Lastly, JP Morgan states:

> Assumptions, opinions and estimates are provided for illustrative purposes only. They should not be relied upon as recommendations to buy or sell securities. Forecasts of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. We believe the information provided here is reliable, but do not warrant its accuracy or completeness.[18]

Q. Do investors rely on expected returns published by "investment professionals"?

A. No, they do not. Some of the expected returns on the market published by market professionals and presented by Mr. Rothschild were surveys (e.g., Horizon Actuarial Services "Survey of Capital Market Assumptions"). Academic literature supports the conclusion that market returns and market risk premiums ("MRP") using surveys are not widely used by practitioners. Damodaran, who was cited by Mr. Rothschild in his direct testimony, states the following about the applicability of survey MRPs, which is also applicable to the market return:

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[16] Horizon Actuarial Services, LLC, Survey of Capital Market Assumptions, 2024 Edition, at 9.

[17] Schwab's 2025 Long-Term Capital Market Expectations, https://www.schwab.com/learn/story/schwabs-long-term-capital-market-expectations (Jan. 3, 2025) (emphasis in original).

[18] J.P. Morgan Asset Management 2023 Long-Term Capital Market Assumptions, at 124.

While survey premiums have become more accessible, very few practitioners seem to be inclined to use the numbers from these surveys in computations and there are several reasons for this reluctance:

1. Survey risk premiums are responsive to recent stock prices movements, with survey numbers generally increasing after bullish periods and decreasing after market decline. Thus, the peaks in the SIA survey premium of individual investors occurred in the bull market of 1999, and the more moderate premiums of 2003 and 2004 occurred after the market collapse in 2000 and 2001.

2. Survey premiums are sensitive not only to whom the question is directed at but how the question is asked. For instance, individual investors seem to have higher (and more volatile) expected returns on equity than institutional investors and the survey numbers vary depending upon the framing of the question.[footnote omitted]

3. In keeping with other surveys that show differences across sub-groups, the premium seems to vary depending on who gets surveyed. Kaustia, Lehtoranta and Puttonen (2011) surveyed 1,465 Finnish investment advisors and note that not only are male advisors more likely to provide an estimate but that their estimated premiums are roughly 2% lower than those obtained from female advisors, after controlling for experience, education and other factors.[footnote omitted

4. Studies that have looked at the efficacy of survey premiums indicate that if they have any predictive power, it is in the wrong direction. Fisher and Statman (2000) document the negative relationship between investor sentiment (individual and institutional) and stock returns.[footnote omitted] In other words, investors becoming more optimistic (and demanding a larger premium) is more likely to be a precursor to poor (rather than good) market returns.

As technology aids the process, the number and sophistication of surveys of both individual and institutional investors will also increase. However, it is also likely that these survey premiums will be more reflections of the recent past rather than good forecasts of the future.[19]

Widely used finance texts recommend the use of multiple models in estimating the ROE, in particular the DCF, CAPM, and the risk premium model. To determine whether the use of broad market expected returns for the purposes of pension asset management is

[19] Aswath Damodaran, Stern School of Business, Equity Risk Determinants, Estimation and Implications – The 2022 Edition, updated March 23, 2022, at 27-28.

also an approach recommended by finance texts, I reviewed articles published in financial journals, as well as additional texts that speak to the methods used by analysts to estimate the ROE. An article published in Financial Analysts Journal surveyed financial analysts to determine the analytical techniques that are used in practice.[20] Regarding stock price valuation and cost of capital estimation, the author asked respondents to comment only on the DCF, CAPM, and Economic Value-Added models. Nowhere in that article did the author consider asking whether surveys of expected returns or pension fund assumptions are relevant to the determination of the cost of common equity.

Q. Mr. Rothschild also points to Kroll's expected market return of 8.50%.[21] What is your position on Kroll's estimate?

A. The determination of the market returns as calculated by Kroll is not transparent, especially in view of the historical returns presented by Kroll, which are already well known by investors. Further, because Kroll does not reveal how they derive their estimates, we do not know if they are indeed based on market measures.

Q. Did you conduct a study to determine the forecast accuracy of the Kroll recommended market return relative to the historical market returns they publish?

A. Yes, I did. I have calculated the forecast bias[22] of the long-term historical average return, and the implied market returns from Kroll from 2008-2023.[23] For example, the long-term average market return from 1926-2008 was used to determine the forecasted return for 2009. The result of this analysis is shown in Petitioner's Exhibit DWD-2R and Table 2, below:

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[20] Stanley B. Block, *A Study of Financial Analysts: Practice and Theory*, Financial Analysts Journal, July/August, 1999.

[21] *Rothschild Pre-filed* at 16.

[22] Forecast bias can be described as a tendency to either over-forecast or under-forecast a given variable.

[23] 2008 was selected as the starting year as it is the first year Kroll published its recommended MRP and risk-free rate.

Table 2: Comparison of Forecast Bias for Various Measures 2009-2023

Year	Observed Market Return	Long-Term Average Return	Kroll Forecasted Market Return
2009	26.46%	11.67%	10.50%
2010	15.06%	11.85%	10.08%
2011	2.11%	11.88%	9.63%
2012	16.00%	11.77%	10.00%
2013	32.39%	11.82%	9.50%
2014	13.69%	12.05%	9.00%
2015	1.38%	12.07%	9.00%
2016	11.96%	11.95%	9.00%
2017	21.83%	11.95%	9.00%
2018	-4.38%	12.06%	8.50%
2019	31.49%	11.88%	9.00%
2020	18.40%	12.09%	8.00%
2021	28.71%	12.16%	8.00%
2022	-18.11%	12.33%	8.00%
2023	26.61%	12.02%	9.00%
Sum	223.60%	179.55%	136.21%
Forecast Bias[24]		80.30%	60.92%

As shown in Table 2, while all of these measures understate the actual return (both forecast bias values are under 100%), the Kroll forecasted market return significantly and consistently understates the actual return. The Kroll projected market return is a less accurate predictor of the actual return than the historical average return. These findings are consistent with Campbell, who states that when returns are serially uncorrelated, the arithmetic average represents the best forecast of future returns in any randomly selected future year.[25]

Q. Please summarize this section.

A. Mr. Rothschild's recommended ROE of 8.04% violates the "Corresponding Risk" standard embodied in the *Hope* and *Bluefield* U.S. Supreme Court cases. I have demonstrated the inadequacy of Mr. Rothschild's recommendation as compared to authorized ROEs for other water utilities around the country and debt cost rates applicable to the Company and

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[24] Calculated by dividing the sum of the forecast returns by the sum of the actual returns.

[25] John Y. Campbell, "Forecasting US Equity Returns in the 21st Century," Social Security Administration, July 2001.

its parent. Mr. Rothschild's attempt to use expected returns from "financial professionals" as justification for his recommendation confuses the terms "expected" and "required" returns, which are not comparable and should not be considered by the Commission. In view of the above, Mr. Rothschild's ROE recommendation is detached from returns for companies with corresponding risk, and therefore should be rejected by the Commission.

B. USE OF DERIVATIVES

Q. Is Mr. Rothschild's recommended ROE significantly influenced by his use of derivatives in his ROE models?

A. Yes, it is.

Q. Please summarize Mr. Rothschild's use of derivatives in his various analyses.

A. Mr. Rothschild uses derivatives in the following analyses/calculations:

- The calculation of his option-implied DCF model;
- The calculation of the forward beta in his CAPM analysis;
- His market return calculation in his CAPM analysis;
- His cumulative probability of return analysis;
- His CAPM-implied cost of equity calculation;
- The calculation of the term structure of utility beta and market returns;
- The term structure of volatility for the market;
- Volatility expectations for utilities;
- The calculation of 'SKEW' indices for utilities and the market; and
- The calculation of option implied ROEs for the market.

Q. Are Mr. Rothschild's derivative-based analyses of any value?

A. No, they are not.

Q. Why?

A. An evaluation of the quality of results from analyses would include the availability and liquidity of underlying data. I have reviewed Mr. Rothschild's workpapers and have determined that the data he relied on does not have the requisite amount of information to make an informed analysis.

It is also worth considering the intended purpose of a derivative security. As noted by the CFA Institute:

> Financial derivatives are used for two main purposes to speculate and to hedge investments. A derivative is a security with a price that is dependent upon or derived from one or more underlying assets. The derivative itself is a contract between two or more parties based upon the asset or assets.[26]

An investor purchasing a derivative to hedge or speculate is not the same as an investor purchasing a share of common stock to make a long-term investment (i.e., options eventually expire, while a company's investment horizon is understood to be into perpetuity). As a result, the amount of information that can be gleaned from derivatives for estimating the cost of common equity is extremely limited.

Q. What are your main concerns with Mr. Rothschild's workpapers?

A. My main concerns with Mr. Rothschild's workpapers are the availability and consistency of data within his proxy company sample, and the relative liquidity of the derivatives that he used in his analyses, as compared to the securities they are based on. Simply, Mr. Rothschild's derivative-based analysis for his proxy group used a fraction of the companies in his group, and the paucity of derivatives traded for the proxy group and for the S&P 500 do not reflect investor sentiment.

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[26] CFA Institute Research and Policy Center, *Derivatives,* https://rpc.cfainstitute.org/policy/positions/derivatives (Oct. 29, 2019).

Another concern is that Mr. Rothschild's workpapers are a confusing web of worksheets referencing other worksheets, and in several instances inconsistent formulas are used to measure the same output (e.g., implied growth for the DCF model and betas used in the CAPM) that directly affect Mr. Rothschild's model results. The opacity of Mr. Rothschild's supporting documents should also be considered by the Commission when assigning weight to his analyses.

Q. Please discuss the availability of data as it relates to Mr. Rothschild's proxy group.

A. As noted briefly above, Mr. Rothschild used derivatives based on his proxy group in his option-implied growth DCF model, forward beta calculation in his CAPM analysis, historical volatility, 'SKEW' Index calculation, and CAPM-implied cost of equity.

A review of Mr. Rothschild's workpapers revealed that during his study period, an average of two of five of his proxy group companies are used to calculate his data points for his analyses. In several instances (e.g., November 26, 2024, November 20, 2024, or November 19, 2024), only one single data point informs his calculation. Using limited and variable data points in a cost of equity analysis is not a robust analysis and should not be relied upon.

Further, the market data used to calculate his values in his various analyses are sparse. As shown on Table 3, below, the put and call option volume and open interest of these stocks as of November 26, 2024 indicate an illiquid market.

Table 3: Volume and Open Interest Data as of November 26, 2024 for Mr. Rothschild's Proxy Group[27]

	AWR	AWK	CWT	MSEX	SJW
Call Volume	0	81	0	0	0
Put Volume	0	116	0	0	0
Call Open Interest	154	3,729	99	201	3
Put Open Interest	37	1,661	14	0	9

Conversely, the trading volumes of those companies' common stock as presented in Table 4 indicate a highly liquid market. Given that liquid common stocks would reflect investor sentiments better than their illiquid options, the Commission should reject Mr. Rothschild's option-implied analyses based on his proxy group.

Table 4: Trading Volume of Mr. Rothschild's Proxy Group Companies for November 26, 2024[28]

	AWR	AWK	CWT	MSEX	SJW
Trading Volume	303,400	1,332,800	354,700	211,500	312,600

Q. Are there any other factors the Commission should be aware of regarding Mr. Rothschild's option-implied growth rates and betas?

A. Yes. Mr. Rothschild's option-implied growth rates and beta calculations are only estimates for the next six months and would not be representative of a long-term expectation. Given that cost of capital is a long-term concept (i.e., the investment horizon of the Company as a going concern is theoretically infinite), expected values for six months from now are inconsistent in the underlying principles of the DCF and CAPM, and as such, would provide no value.

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27 *See Rothschild Pre-filed,* "2024.11 - RFC Water Proxy Group OptIVA Results."
28 Exhibit DWD-3R.

Q. Are option-implied betas applicable to Mr. Rothschild's proxy group or the cost of capital in general?

A. No. In the article used by Mr. Rothschild to derive his option-implied beta coefficients *"Option-Implied Measures of Equity Risk*", the authors state:

> A key strength of our approach is that betas can be computed using closing prices of options observed only on a single day. This may be an important advantage when a company experiences major changes in its operating environment or capital structure, in which case historical return data do not constitute a reliable source for estimating betas. Examples include firms involved in mergers and acquisitions, reorganized firms emerging from Chapter 11, firms undertaking initial public offerings of seasoned equity offerings, as well as firms undertaking large scale expansions and / or major changes in the composition of debt and equity.[29]

As can be gleaned from the above, the advantage of option-implied betas are when companies are undergoing fundamental change, which is hardly the case for Mr. Rothschild's proxy group companies. Also, the authors state that option-implied betas have relative difficulty when the ex-post (*i.e.,* historical) betas are far from unity and perform better with higher beta stocks.[30] Mr. Rothschild's proxy group's average unadjusted beta is just 0.5195,[31] which would be considered both far from unity and not a high beta stock.

Third, the study was based on stocks that had liquid options and concluded that the options-implied beta calculations will improve as options markets become more liquid.[32] As discussed above and presented in Tables 3 and 4, the options of the Utility Proxy Group are not liquid and therefore not meaningful, which would call the beta values calculated by Mr. Rothschild into question.

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29 Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, "Option-Implied Measures of Equity Risk", Review of Finance, March 1, 2011, at 386 (hereinafter "Chang, Review of Finance").

30 *Id*. at 417.

31 *See Rothschild Pre-filed*. Average raw beta on November 26, 2024.

32 Chang, Review of Finance at 410.

Fourth, the authors do not endorse the use of option-implied betas as calculated by Mr. Rothschild for cost of capital purposes. The authors in their concluding remarks state:

> The main focus in this paper has been on forecasting 180-day ex-post betas, which are relevant for certain applications such as abnormal returns. For other applications, *such as cost of capital applications*, longer horizon betas may be needed.[33](italics added)

Lastly, his beta calculations are not readily available to investors and, therefore, not relevant to the investor-required return. Moreover, Mr. Rothschild provides no evidence to support his reliance on betas calculated over six months or his unequal weighting of his historical beta results.

Q. Why is it important for information to be readily available to investors for it to be considered in an ROE analysis?

A. The importance of using readily available information in an ROE analysis refers to the Efficient Market Hypothesis ("EMH"). According to Eugene F. Fama,[34] a market in which prices always "fully reflect" available information is called "efficient." There are three forms of the EMH, namely:

(1) The "weak" form asserts that all past market prices and data are fully reflected in securities prices. In other words, technical analysis cannot enable an investor to "outperform the market."

(2) The "semi-strong" form asserts that all publicly available information is fully reflected in securities prices. In other words, fundamental analysis cannot enable an investor to "outperform the market."

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[33] *Id*. at 421.

[34] Eugene F. Fama. "Efficient Capital Markets: A Review of Theory and Empirical Work", *The Journal of Finance*, Vol. 25, No. 2. (May 1970), at 383-417.

(3) The "strong" form asserts that all information, both public and private, is fully reflected in securities prices. In other words, even insider information cannot enable an investor to "outperform the market."

The "semi-strong" form is generally considered the most realistic because the illegal use of insider information can enable an investor to "beat the market" and earn excessive returns, thereby disproving the "strong" form. The semi-strong form of the EMH assumes that all relevant information is available to the investor. The relevance of the EMH as it relates to Mr. Rothschild's calculated betas is that they are not readily available to investors and, therefore, not considered by them in calculating their required returns. For that reason, as well as the issues raised above, option-implied betas should be discarded by the Commission in this proceeding.

Q. Do you have any concerns with Mr. Rothschild's use of market derivatives to calculate expected returns on the market?

A. Yes, I do. I was not able to find his sources of market growth or the basis of his dividend yield in his option-implied market return. Because of this, I was not able to verify his data, nor could I determine whether his expected return data represented a long-term return on the market or a return over the next five years. What I did discover was at several points throughout his workpapers, Mr. Rothschild had an "Option Investors' Expected Return" of 12.0%, which is over 400 basis points higher than his expected market return used in his CAPM, or in his option-implied cost of equity term structure. As a result, one can conclude that Mr. Rothschild's option-implied expected market return is dramatically understated.

Q. Do you have any observations on the market data provided by Mr. Rothschild for the S&P 500?

A. Yes, I do. Generally, there are three different ways to classify the status of derivative contracts: (1) in the money: the strike price is above/below the market price, enabling the

investor to sell the contract at a profit; (2) out of the money: the strike price is below/above the market price, where the investor will not exercise their contract, and will lose the value of the contract; and (3) at the money: the strike price and the market price are at parity. Generally, options contracts either deep in, or deep out of, the money are not affected by volatility. Therefore, those market data may understate the investor-required return. As shown on Petitioner's Exhibit DWD-3R, approximately 81.77% of options traded on the S&P 500 on November 26, 2024, were either deep in or deep out of the money[35], leading to the conclusion that any implied market return produced from this data would understate investors' required return on the market.

In view of the above, the Commission should ignore Mr. Rothschild's calculation of the expected market return.

Q. Please summarize this section.

A. Mr. Rothschild's use of derivatives in his various analyses is misplaced due to the lack of availability of market data and the illiquidity of utility options. The lack of data leads to an inaccurate measurement of the cost of capital and should not be relied upon.

C. CAPITAL MARKET CONDITIONS

Q. Please summarize Mr. Rothschild's position regarding capital market conditions.

A. Mr. Rothschild uses data from the capital markets to support the position that his recommended ROE of 8.04% is sufficient for the Company to raise capital. His conclusions are based on factors he deems important to the cost of capital: (1) inflation and interest rates; (2) relative risk for water utility stocks; (3) the cost of common equity for the overall market; (4) stock volatility; and (5) perceived downside risk:

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[35] Deep in or out of the money being calculated as a $100 difference in strike price and the current price.

- Regarding inflation and interest rates, Mr. Rothschild believes that investors expect the Federal Reserve ("Fed") to continue lowering the Federal Funds Rate ("Fed Funds Rate"), putting downward pressure on interest rates and the cost of capital;[36]
- Regarding relative risk, Mr. Rothschild states that both investors' expectations for volatility and beta coefficients for water utilities have declined in recent months relative to the overall market;[37]
- Regarding the cost of common equity for the overall market, Mr. Rothschild compares his proxy group's performance to the performance of the S&P 500, observing that water utilities have underperformed due to increased prices that had become unsustainable for the industry;[38]
- Regarding stock volatility, Mr. Rothschild observes that expected volatility for the proxy group has remained above the market since the onset of COVID-19, but that one must also consider the correlations between the groups before reaching any conclusions;[39]
- Regarding perceived downside risk, Mr. Rothschild observes that as of the end of 2023, the chances of water utilities suffering a significant price decline was much less than that of the overall market.[40]

Q. Do you agree with Mr. Rothschild's capital market observations?

A. While I agree with some of his observations, I take issue with those observations based on his use of derivatives as discussed above. More importantly, I disagree with his conclusion that the capital markets support an ROE of 8.04%.

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36 *Rothschild Pre-filed* at 22-23.
37 *Id*. at 30.
38 *Id*. at 32.
39 *Id.* at 38-39.
40 *Id*. at 41-42.

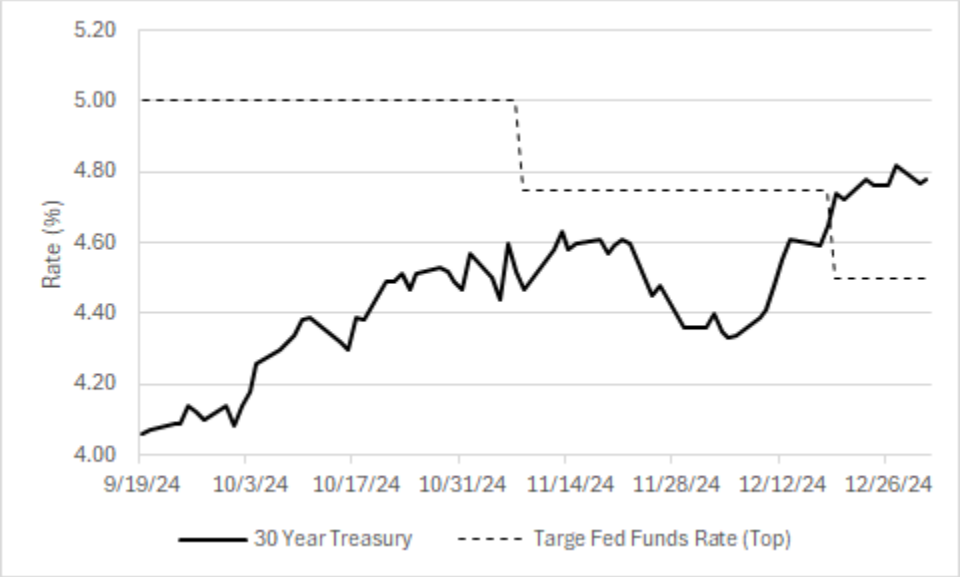
Q. As a preliminary matter, are 30-year Treasury yields at levels not experienced in over a decade?

A. Yes, they are. 30-year Treasury bonds are now yielding over 4.75%. The last time 30-year Treasury yields were at current levels was in 2010. The 10 ROEs authorized for water utilities in that period averaged 10.18%, with a median value of 10.20%. While I do not recommend that the Commission use this data directly in its determination of the ROE for Limestone Water in this proceeding, it is another directional indicator that the ROE should be set at a higher level than what has recently been approved and that Mr. Rothschild's ROE recommendation is inadequate.

Q. Do you agree with Mr. Rothschild that the Fed is putting downward pressure on interest rates and the cost of capital?

A. Long-term interest rates do not necessarily move in lock step with Fed Funds Rate decisions. As shown in Chart 3 below, the Fed has cut the Fed Funds Rate by 100 basis points since September 17, 2024, and since that time, 30-year Treasury yields increased from approximately 3.95% to approximately 4.80%.

Chart 3: Federal Funds Rate and 30-Year Treasury Yield Relationship[41]



During this period, the correlation between the Fed Funds Rate and 30-year Treasury bonds was -0.71, indicating a strong negative relationship. Given this, Mr. Rothschild's position on relative movements of the Fed Funds Rate and the cost of capital is misplaced.

Q. Do you agree with Mr. Rothschild that utilities are less volatile than the overall market?

A. No. As shown on Petitioner's Exhibit DWD-4R, since the onset of the COVID-19 pandemic, the companies comprising the Proxy Groups have been more volatile (as measured by annualized volatility)[42] and returned less than the S&P 500. Investments with higher risk and lower return than the market should not qualify as an attractive investment. The relative return data is confirmed by Mr. Rothschild's Chart on page 32 of his direct testimony.

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41 Federal Reserve Data Download Program. See also Effective Federal Funds Rate, Federal Reserve Bank of New York, https://www.newyorkfed.org/markets/reference-rates/effr (last visited Jan. 13, 2025).

42 Defined as the standard deviation of returns over the period multiplied by the square root of the number of trading days in a year (i.e., 252).

Q. Do you agree with Mr. Rothschild that the underperformance of the Utility Proxy Group relative to the overall market is largely attributable to water utilities stock prices reaching unsustainable levels?

A. No, I do not. Mr. Rothschild is unnecessarily complicating the fact that increases in the cost of capital have put downward pressure on water utilities, causing their stock prices to underperform the overall market. As discussed throughout this section thus far, all indications suggest that the cost of capital for water utilities has increased, whether relative to the overall market or not.

D. CAPITAL STRUCTURE

Q. Please summarize Mr. Rothschild's position regarding the appropriate capital structure for Limestone Water.

A. Mr. Rothschild recommends a capital structure consisting of 51.82% equity and 48.18% long-term debt for the Company, based on the average common equity ratio of his proxy group.[43]

Q. How does the requested common equity ratio of 57.00% compare to the common equity ratios maintained by the Proxy Groups?

A. The Company's requested common equity ratio of 57.00% falls within the upper range of common equity ratios maintained by the Proxy Groups, which range from 31.60% to 57.59% for the fiscal year 2023.

Q. Is the average equity ratio of the proxy companies an appropriate benchmark for assessing Limestone Water's capital structure?

A. No, it is not. While I agree that it is reasonable to review the capital structures of the proxy companies when the Company's capital structure is out of line with industry standards, the

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[43] *Rothschild Pre-filed* at 74.

range of common equity ratios for the proxy companies depict the range of typical or proper equity ratios maintained by comparable risk companies. However, as discussed by Messrs. Duncan and Freeman, Limestone Water is not a typical water utility. As noted in the Direct Testimony of Michael Duncan, Limestone Water has invested $9.6 million to acquire, upgrade and improve the systems it currently operates, in addition to $2.6 million in operating losses.[44] Given the significant risk facing Limestone Water in updating and operating its systems, an equity ratio towards the higher end of the ratios maintained by the proxy companies is appropriate.

Q. Is the operating risk of CSWR's other operating companies reflected in their capital structures?

A. Yes. As shown in Table 3 in my Direct Testimony, CSWR operating entities in Missouri, Kentucky, Louisiana, and Mississippi have all have issued long-term debt. The common equity ratios maintained by Limestone Water's sister companies that have issued debt range from 79.94% to 84.51%. While these operating companies have issued debt, the common equity levels reflect their significant operating risks. Given that those levels reflect significantly higher levels of common equity, my proposed common equity ratio of 57.00% for Limestone Water is appropriate and conservative.

E. APPLICATION OF THE DISCOUNTED CASH FLOW MODEL

Q. Please describe Mr. Rothschild's application of the DCF model.

A. Mr. Rothschild performs three DCF analyses: (1) a constant growth DCF using sustainable growth rates; (2) a constant growth DCF using option-implied growth rates; and (3) a non-constant growth DCF, where an investor purchases a share of each stock on November 30,

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[44] *Pre-filed Direct Testimony of Limestone Water Witness Mike Duncan*, p. 4, TPUC Docket No. 24-00044 (July 16, 2024).

2024 and sells that stock on November 30, 2028. The results of Mr. Rothschild's DCF models are shown on Table 5, below:

Table 5: Summary of Mr. Rothschild's DCF Results[45]

	Low Result	High Result
Constant Growth – Sustainable	8.03%	8.04%
Constant Growth – Option Implied	6.84%	7.25%
Non-Constant Growth	6.85%	6.89%

Q. Do you have any initial comments regarding Mr. Rothschild's application of the DCF?

A. Yes. Mr. Rothschild cites J.P. Morgan's 2019 Long-term Capital Market Assumptions for support of his sustainable growth DCF model, but ignores that the 2023 edition no longer uses the sustainable growth DCF model and instead relies on dividend yields and forecasted EPS growth rates, which are consistent with my analysis.[46] Notwithstanding this observation, as discussed previously, J.P. Morgan's analysis is subject to clearly stated limiting conditions, which limits the report's usefulness.

Q. Do you have any concerns with Mr. Rothschild's applications of the DCF model?

A. Yes, I do. I am concerned with (1) Mr. Rothschild's use of sustainable growth rates; (2) his use of option-implied growth rates; and (3) his five-year holding period DCF model. I discussed in detail why Mr. Rothschild's option-implied growth rates are of no value previously in this testimony and will not repeat that discussion here.

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45 *Rothschild Pre-filed* at Exhibit ALR-4.

46 J.P. Morgan 2023 Long-term Capital Market Assumptions, at 69-70.

1. Application of the Sustainable Growth DCF

Q. Do you agree with Mr. Rothschild's reliance on sustainable growth in his constant-growth DCF model?

A. No, I do not. Mr. Rothschild's Constant-Growth DCF growth rate utilizes the BR + SV methodology for determining the growth rate component.[47] Mr. Rothschild calculates sustainable growth based on expected retention of earnings as well as the increase in common shares.

In Exhibit ALR-5, it is clear that the ROE used in Mr. Rothschild's growth rate analysis is based, in part, on expectations by *Value Line* as well as Zacks five-year forecasts of earnings per share ("EPS") growth. His allowance for growth caused by the sale of new common stock above book value is based in part on the expected five-year growth in shares from 2019 through 2026 – 2028 from *Value Line*. Hence, Mr. Rothschild's sustainable growth methodology is not only a short-term forecast, no longer than the security analysts' five-year forecasts of EPS growth used in my DCF analysis, but it also relies on analysts' growth forecasts, a practice Mr. Rothschild has criticized.

Mr. Rothschild's sustainable growth methodology is inherently circular because: (1) it relies on an expected ROE on book common equity; (2) that expected ROE on book common equity is then used in a DCF analysis to establish an ROE cost rate related to the market value of the common stock; and (3) that market-related ROE, if authorized as the allowed ROE in this proceeding, will become the expected ROE on book common equity. Put simply, the ROEs Mr. Rothschild uses in the derivation of his sustainable growth rate, which are used in a Constant-Growth DCF analysis (the results of which he recommends) become the regulatory outcome of this proceeding and are themselves based on regulatory

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[47] *Rothschild Pre-filed* at 49.

outcomes. In addition, the resultant average DCF derived ROE based on sustainable growth of 8.04% is significantly lower than the expected average / median *Value Line* ROE of 11.00% / 11.00%[48] for his very own proxy group.

The circularity and inconsistency of Mr. Rothschild's use of the sustainable growth methodology is recognized in the academic literature. Specifically, Morin[49] states the following:

> There are three problems in the practical application of the sustainable growth method:
>
> (1) It may be even more difficult to estimate what b, r, s and v investors have in mind than it is to estimate what g is they envisage. It would appear far more economical and expeditious to use available growth forecasts and obtain g directly instead of relying on four individual forecasts of the determinants of such growth. *It seems only logical that the measurement and forecasting errors inherent in using four different variables to predict growth far exceed the forecasting error inherent in the direct forecast of growth itself.*
>
> (2) There is an element of circularity in estimating g by a forecast of b and ROE for the utility being regulated, since ROE is determined in large part by regulation. To estimate what ROE resides in the minds of investors is equivalent to estimating the market's assessment of the outcome of regulatory hearings. Expected ROE is exactly what regulatory commissions set in determining an allowed rate of return. In other words, the method requires an estimate of return on equity before it can even be implemented. Common sense would dictate the inconsistency of a return on equity recommendation that is different than the expected ROE that the method assumes the utility will earn forever.
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> For example, using an expected return on equity of 11% to determine the growth rate and using that same growth rate to recommend a return on equity of 9% is inconsistent. It is not reasonable to assume that this regulatory utility company is expected to earn 11% forever, but estimate a 9% return on equity. The only way this utility can earn 11% is that rates be set by the regulator so that the utility will in fact earn 11%....
>
> (3) The empirical finance literature discussed earlier demonstrates that the sustainable growth method of determining growth is not as significantly correlated to measures of value, such as stock price and price/earnings

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[48] *Rothschild Pre-filed* at Schedule ALR-5, page 1, Note [C].

[49] Roger A. Morin, Modern Regulatory Finance (2021), at 383-384 (hereinafter "Morin").

ratios, as other historical growth measures or analysts' growth forecasts. *Other proxies for growth, such as historical growth rates and analysts' growth forecasts, outperform retention growth estimates*. (italics added)

Lastly, Mr. Rothschild's BR + SV sustainable growth model assumes that increasing retention ratios are associated with increasing future growth. The underlying premise is that future earnings will increase as the retention ratio increases. There are several reasons, however, why that may not be the case. Consequently, it is appropriate to determine whether the data supports the assumption that higher earnings retention ratios necessarily are associated with higher future earnings growth rates.

Q. Does independent research support the finding that future earnings and the retention ratio are not positively related?

A. Yes. In 2006, for example, two articles in Financial Analysts Journal addressed the theory that high dividend payouts (i.e., low retention ratios) are associated with low future earnings growth.[50] Both articles cite a 2003 study by Arnott and Asness,[51] who found that over the course of 130 years of data, future earnings growth is associated with high, rather than low, payout ratios.[52] In essence, the findings of all three studies found that there is a negative, not a positive, relationship between the two.

Q. Did you perform any analyses to test that assumption?

A. Yes, I did. Using EPS and DPS from *Value Line*, I calculated the historical dividend payout ratio, retention ratio, and subsequent five-year average earnings Electric, Natural Gas, and Water Utilities. I then performed a regression analysis in which the dependent variable

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[50] *See* Ping Zhou, William Ruland, *Dividend Payout and Future Earnings Growth*, Financial Analysts Journal, Vol. 62, No. 3, 2006. *See also,* Owain ap Gwilym, James Seaton, Karina Suddason, Stephen Thomas, *International Evidence on the Payout Ratio, Earnings, Dividends and Returns*, Financial Analysts Journal, Vol. 62, No. 1, 2006.

[51] *See* Robert Arnott, Clifford Asness, *Surprise: Higher Dividends = Higher Earnings Growth*, Financial Analysts Journal, Vol. 59, No. 1, January/February 2003.

[52] Because the payout ratio is the inverse of the retention ratio, the authors found that future earnings growth is negatively related to the retention ratio.

was the five-year earnings growth rate, and the explanatory variable was the earnings retention ratio. The purpose of that analysis was to determine whether the data empirically supports the assumption that higher retention ratios necessarily produce higher earnings growth rates.

Q. What did that analysis reveal?

A. As shown in Petitioner's Exhibit DWD-5R, and Table 6, below, there was a statistically significant negative relationship between the five-year average earnings growth rate and the earnings retention ratio. That is, based on *Value Line* data, earnings growth actually decreased as the retention ratio increased. Those findings clearly call into question Mr. Rothschild's use of the retention growth rate as a proxy for the long-term growth rate in his analysis.

Table 6: Retention Ratio / Earnings Growth[53]

	Coefficient	Standard Error	t-Statistic
Intercept	0.156	0.011	14.517
Retention Ratio	-0.272	0.021	-12.685

Q. Do those results make practical sense?

A. Yes, they do. As a practical matter, dividend-paying companies (such as utilities) are reluctant to reduce dividends, given the often-disproportionate stock price reaction. Consequently, a higher than expected dividend increase may signal management's confidence in higher future earnings and cash flow. That is, a near-term reduction in the retention ratio supporting a higher dividend increase may provide information or "signaling" content regarding future growth prospects.[54] In view of the foregoing, Mr.

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53 Exhibit DWD-5R.

54 *See,* Eugene F. Brigham, Louis C. Gapenski, Financial Management, Theory and Practice, Seventh Ed., 1994, at 618.

Rothschild's use of a sustainable growth rate in his DCF model is an exercise in circularity which ignores the basic principle of rate base/rate of return regulation. The model ignores the fact that the cost of equity which will be authorized in this proceeding will be applied to the jurisdictional book value rate base of Limestone Water and become the allowed future earned return on book common equity, *i.e.*, the expected ROE component of the sustainable growth method.

Q. Mr. Rothschild opines that sustainable growth rates are superior to projected EPS growth rates.[55] Please respond.

A. First, Mr. Rothschild provides no academic support on his decision to use sustainable growth rates. The cost of equity is forward-looking in nature, as is the growth component of the constant growth DCF model. To the extent historical growth influences investors' expectations of future growth, it already will be reflected in analysts' consensus earnings estimates. Carleton and Vander Weide found "overwhelming evidence that consensus analysts' forecast of future growth is superior to historically oriented growth measures in predicting the firm's stock price."[56] Consequently, only forecasted growth rates are appropriate for the constant growth DCF model.

As earnings expectations have a more significant, but not sole, influence on market prices than dividend expectations, the use of earnings growth rates in a DCF analysis provides a better match between investors' market appreciation expectations implicit in market prices and the growth rate component of the DCF. Consequently, earnings expectations have a significant influence on market prices which affect market price appreciation and hence, the "growth" experienced by investors. This should be evident

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55 *Rothschild Pre-filed* at 49-50.

56 Vander Weide and Carleton, *Investor Growth Expectations: Analysts vs. History*, The Journal of Portfolio Management (Spring 1988).

even to relatively unsophisticated investors just by listening to financial news reports on radio, TV, or reading newspapers. In fact, Morin states:

> Because of the dominance of institutional investors and their influence on individual investors, analysts' forecasts of long-run growth rates provide a sound basis for estimating required returns. Financial analysts exert a strong influence on the expectations of many investors who do not possess the resources to make their own forecasts, that is, they are a cause of g. The accuracy of these forecasts in the sense of whether they turn out to be correct is not at issue here, as long as they reflect widely held expectations. As long as the forecasts are typical and/or influential in that they are consistent with current stock price levels, they are relevant. The use of analysts' forecasts in the DCF model is sometimes denounced on the grounds that it is difficult to forecast earnings and dividends for only one year, let alone for longer time periods. This objection is unfounded, however, because it is present investor expectations that are being priced; it is the consensus forecast that is embedded in price and therefore in required return, and not the future as it will turn out to be.
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> * * *
>
> Published studies in the academic literature demonstrate that growth forecasts made by security analysts represent an appropriate source of DCF growth rates, are reasonable indicators of investor expectations and are more accurate than forecasts based on historical growth. These studies show that investors rely on analysts' forecasts to a greater extent than on historic data.[57]

However, while EPS is a significant factor influencing market prices, it is by no means the only factor that affects market prices; a fact recognized by Bonbright with regard to public utilities as discussed previously.

In addition, studies performed by Cragg and Malkiel demonstrate that analysts' forecasts are superior to historical growth rate extrapolations. They state:

> Efficient market hypotheses suggest that valuation should reflect the information available to investors. Insofar as analysts' forecasts are more precise than other types we should therefore expect their differences from other measures to be reflected in the market. It is therefore noteworthy that our regression results do support the hypothesis that analysts' forecasts are needed even when calculated growth rates are available. As we noted when we described the data, security analysts do not use simple mechanical

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[57] Morin, at 371-373.

> methods to obtain their evaluations of companies. The growth-rate figures we obtained were distilled from careful examination of all aspects of the companies' records, evaluation of contingencies to which they might be subject, and whatever information about their prospects the analysts could glean from the companies themselves of from other sources. It is therefore notable that the results of their efforts are found to be so much more relevant to the valuation than the various simpler and more "objective" alternatives that we tried.[58]

In addition, Vander Weide and Carleton conclude:

> . . . our studies affirm the superiority of analyst's forecasts over simple historical growth extrapolations in the stock price formation process. Indirectly, this finding lends support to the use of valuation models whose input includes expected growth rates.[59]

Second, by relying on sustainable growth in preference to analyst projected EPS growth, Mr. Rothschild's analysis assumes the historical relationship between the earned ROE and the retention ratio is a more accurate indicator of future growth than the fundamental research performed by the utility analysts that provide earnings growth projections. Transcripts of utility earnings conference calls demonstrate that analysts focus on issues relating to M&A activity, maintenance expenses, capital expenditure recovery, decoupling mechanisms, and other factors that affect the earned returns on common equity and, therefore, the sustainable growth estimate.[60] Quite simply, the level of fundamental research performed by analysts regarding issues and factors that directly bear on long-term growth far exceeds Mr. Rothschild's calculation of sustainable growth estimates.

Q. What is your conclusion of the appropriate growth rate for use in the DCF model?

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[58] John G. Cragg and Burton G. Malkiel, Expectations and the Structure of Share Prices (University of Chicago Press, 1982) Chapter 4.

[59] James H. Vander Weide and Willard T. Carleton, *Investor Growth Expectations: Analysts vs. History,* (The Journal of Portfolio Management, Spring 1988) 78-82.

[60] *See* American Water Works FQ3 2024 Earnings Call Transcript, October 31, 2024, American States Water Company FQ2 2024 Earnings Call Transcript, August 7, 2024, California Water Service Group FQ3 2024 Earnings Call Transcript, October 31, 2024, Essential Utilities FQ3 2024 Earnings Call Transcript, November 5, 2024, Global Water Resources, Inc. FQ2 2024 Earnings Call Transcript, August 8, 2024, and SJW Group FQ3 2024 Earnings Call Transcript, October 28, 2024.

A. In view of the above, I recommend the Commission rely solely on projected EPS growth rates when determining the indicated ROE for Limestone Water using the DCF model.

Q. Do you agree with Mr. Rothschild's position that analysts' earnings growth projections are biased?

A. No, I do not. As a practical matter, the October 2003 Global Research Analyst Settlement required financial institutions to insulate investment banking from analysis, prohibited analysts from participating in "road shows," and required the settling financial institutions to fund independent third-party research.[61] I have reviewed the Letters of Acceptance, Waiver, and Consent signed by financial institutions that were party to the Global Settlement, and found no reference to misconduct by analysts following the utility sector.

Moreover, pursuant to Regulation AC, which became effective in April 2003, analysts must certify that " . . . the views expressed in the report accurately reflect his or her personal views, and disclose whether or not the analyst received compensation or other payments in connection with his or her specific recommendations or views."[62] I further understand industry practice is to avoid conflicts of interest by ensuring that compensation is not directly or indirectly linked to the opinions contained in those reports. Mr. Rothschild has not explained why any of the analysts covering our respective proxy companies, or the S&P 500 companies used in my market DCF, would bias their projections despite those certification requirements. Considering that The Regulation Fair Disclosure and Global Analysts Research Settlements were more than 20 years ago,

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[61] The 2002 Global Financial Settlement resolved an investigation by the U.S. Securities and Exchange Commission and the New York Attorney General's Office of a number of investment banks related to concerns about conflicts of interest that might influence the independence of investment research provided by equity analysts.

[62] *Regulation Analyst Certification*, Securities and Exchange Commission, 17 CFR 242 (2003).

investors have been fully aware since then of the steps that have been taken to eliminate and prevent analysts' bias.

In addition, there is no empirical evidence that investors would disregard analysts' estimates of growth in EPS. *Do Analyst Conflicts Matter? Evidence from Stock Recommendations* examines whether conflicts of interest with investment banking "IB" and brokerage businesses induced sell-side analysts to issue optimistic stock recommendations and whether investors were misled by such biases. They conclude:

> Overall, our findings do not support the view that conflicted analysts are able to systematically mislead investors with optimistic stock recommendations.

Agrawal and Anup state:

> Overall, our empirical findings suggest that while analysts do respond to IB and brokerage conflicts by inflating their stock recommendations, the market discounts these recommendations after taking analysts' conflicts into account. These findings are reminiscent of the story of the nail soup told by Brealey and Myers (1991), except that here analysts (rather than accountants) are the ones who put the nail in the soup and investors (rather than analysts) are the ones to take it out. Our finding that the market is not fooled by biases stemming from conflicts of interest echoes similar findings in the literature on conflicts of interest in universal banking (for example, Kroszner and Rajan, 1994, 1997; Gompers and Lerner 1999) and on bias in the financial media (for examples, Bhattacharya et al. forthcoming; Reuter and Zitzewitz 2006). Finally, while we cannot rule out the possibility that some investors may have been naïve, our findings do not support the notion that the marginal investor was systematically misled over the last decade by analysts' recommendations.[63]

In view of the foregoing, the use of analysts' forecasts of EPS growth should be used exclusively when estimating the cost rate of common equity capital, whether it be for my Proxy Groups or the market as a whole

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[63] Anup Agrawal and Mark A. Chen, *Do Analysts' Conflicts Matter? Evidence from Stock Recommendations*, Journal of Law and Economics, August 2008, Vol. 51.

2. Application of the Non-Constant Growth DCF

Q. Do you agree with the premise behind Mr. Rothschild's five-year holding period DCF model?

A. No, I do not. The major component of Mr. Rothschild's non-constant growth DCF is the projected price at the end of the holding period. In this model, Mr. Rothschild predicts prices for each of his proxy group companies approximately four years in the future. Additionally, Mr. Rothschild's calculation of expected sale price (projected book value multiplied by their market-to-book ("M/B") ratio) is overly simplistic and does not consider other measures in *Value Line* that could also be used to calculate future prices (i.e., price-to-earnings ("P/E") ratio multiplied by projected EPS).

Regarding M/B ratios, it cannot be assumed that the M/B ratio for each company will stay constant over the hypothetical investor's four-year holding period. As shown on Chart 4, below, the M/B ratio of the Utility Proxy Group has varied widely for the past ten years and should not be assumed to remain constant.

Chart 4: M/B Ratios of the Utility Proxy Group Compared with Ten-Year Average

Alternatively, the M/B ratio could also regress to their long-term average M/B ratios. To explore these possibilities, I performed regression analyses on each company's historical M/B ratios to determine M/B ratios at the end of the holding period, and then applied those M/B ratios to the 2028 projected book value for each company for prospective prices. I also determined the long-term (ten-year) average M/B ratio for each company and applied those ratios to their prospective book value to determine another set of prospective prices. Table 7 contains the possible prices and resulting DCFs for each assumption of prospective market prices.

Table 7: Possible Projected Market Prices and Associated ROEs Using Projected Book Value and M/B Ratios[64]

Scenario	AWR	AWK	CWT	MSEX	SJW
Current M/B (Price)	$106.14	$161.63	$64.49	$62.66	$61.28
Regression M/B (Price)	$151.90	$264.16	$94.41	$104.20	$72.61
LT Avg M/B (Price)	$117.61	$193.18	$89.31	$76.07	$90.28
Current M/B (ROE)	7.99%	6.70%	8.31%	1.18%	5.50%
Regression M/B (ROE)	17.74%	20.11%	18.75%	14.40%	9.84%
LT Avg M/B (ROE)	10.68%	11.37%	17.17%	6.02%	15.71%

As presented above, a wide range of prices and ROEs can be predicted by changing only one assumption. Also as indicated above, I calculated prospective prices and resultant ROEs from using P/E ratios and 2028 projected earnings per share from *Value Line*. I made three similar assumptions regarding the P/E ratios as I did with the prospective M/B ratios, specifically, staying constant, continuing on their current trend, or reverting to their long-term average throughout the holding period for each company. Table 8 contains the possible prices and resultant ROEs using P/E ratios and projected EPS in 2028:

64 *Value Line Investment Survey*; Bloomberg Professional Services.

Table 8: Possible Projected Market Prices and Associated ROEs Using Projected EPS and P/E Ratios[65]

Scenario	AWR	AWK	CWT	MSEX	SJW
Current P/E (Price)	$112.10	$189.92	$48.08	$103.03	$70.97
Regression P/E (Price)	$146.42	$286.59	$137.58	$154.54	$150.29
LT Avg P/E (Price)	$124.73	$218.46	$107.43	$100.82	$102.01
Current P/E (ROE)	9.41%	10.90%	0.95%	14.08%	9.25%
Regression P/E (ROE)	16.69%	22.51%	30.15%	25.91%	30.85%
LT Avg P/E (ROE)	12.26%	14.72%	22.54%	13.48%	19.16%

Again, changing one assumption creates wide ranges of prices and resulting ROEs, and therefore provides little to no value in the determination of the ROE for Limestone Water in this proceeding.

Finally, as discussed previously, the cost of capital is meant to reflect a long-term horizon, commensurate with the long-life nature of an equity investment. A 5-year holding period is much too short to be useful in estimating a long-life equity investment.

F. APPLICATION OF THE CAPITAL ASSET PRICING MODEL

Q. Please briefly describe Mr. Rothschild's application of the CAPM.

A. Mr. Rothschild conducts a traditional CAPM analysis for two different time periods (three months ending November 2024 and a spot analysis as of November 30, 2024) using the following data: (1) three-month Treasury bills and 30-year Treasury bonds as the risk-free rates; (2) a historical "blended" and option-implied beta; and (3) option-implied returns on the market.

Q. Do you have any concerns with Mr. Rothschild's application of the CAPM?

A. Yes, I have concerns with the following: (1) Mr. Rothschild's use of three-month Treasury bills as a risk-free rate; (2) his failure to use projected interest rates in his analysis; (3) his use of calculated historical betas instead of widely available published betas; (4) his use of

[65] *Value Line Investment Survey*; Bloomberg Professional Services.

option-implied betas; (5) his use of option-implied market returns; and (6) his failure to employ the empirical CAPM ("ECAPM").

I have previously discussed in detail why Mr. Rothschild's option-implied betas and projected market returns are of no value and will not repeat those discussions here. Likewise, I have discussed the applicability of the ECAPM in my Direct Testimony[66] and the academic support provided therein remains unrebutted.

Q. Is the use of three-month Treasury bills as a risk-free rate appropriate for cost of capital purposes?

A. No, it is not. As discussed below, the tenor of the risk-free rate used in the CAPM should match the life (or duration) of the underlying investment. As noted by Morningstar:

> The traditional thinking regarding the time horizon of the chosen Treasury security is that it should match the time horizon of whatever is being valued. When valuing a business that is being treated as a going concern, the appropriate Treasury yield should be that of a long-term Treasury bond. Note that the horizon is a function of the investment, not the investor. If an investor plans to hold stock in a company for only five years, the yield on a five-year Treasury note would not be appropriate since the company will continue to exist beyond those five years.[67]

Morin also confirms this when he states:

> [b]ecause common stock is a long-term investment and because the cash flows to investors in the form of dividends last indefinitely, the yield on very long-term government bonds, namely, the yield on 30-year Treasury bonds, is the best measure of the risk-free rate for use in the CAPM (footnote omitted)… The expected common stock return is based on long-term cash flows, regardless of an individual's holding time period.[68]

As found in Mr. Rothschild's supporting workpapers, Brealey, Myers, and Allen state:

> The CAPM is a short-term model. It works period by period and calls for a short-term interest rate. But could a .03% three-month risk-free rate give

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66 *D'Ascendis Direct* at 36-39.

67 Morningstar, Inc., 2013 Ibbotson Stocks, Bonds, Bills and Inflation Valuation Yearbook, at 44.

68 Morin, at 169.

> the right discount rate for cash flows 10 or 20 years in the future? Well, now that you mention it, probably not.[69]

Pratt and Grabowski recommend a similar approach to selecting the risk-free rate: "In theory, when determining the risk-free rate and the matching ERP you should be matching the risk-free security and the ERP with the period in which the investment cash flows are expected."[70] As a practical matter, equity securities represent a perpetual claim on cash flows; 30-year Treasury bonds are the longest-maturity securities available to match that perpetual claim. Mr. Rothschild's use of a short-term Treasury bond does not match the life of the assets being valued, and he provides no academic or empirical evidence to support his use of the short-term Treasury bond. The use of a 30-year Treasury bond is the more appropriate risk-free rate.

Q. Why is it appropriate to rely on projected interest rates in the CAPM model?

A. Using current measures, like interest rates, is inappropriate for cost of capital and ratemaking purposes because both cost of capital and ratemaking are prospective in nature. The cost of capital, including the cost rate of common equity, is expectational in that it reflects investors' expectations of future capital markets, including an expectation of interest rate levels, as well as future risks. As Morningstar observes:

> It is important to note that the expected equity risk premium, as it is used in discount rates and cost of capital analysis, is a forward-looking concept. That is, the equity risk premium that is used in the discount rate should be reflective of what investors think the risk premium will be going forward.[71]

Ratemaking is also prospective in that the rates set in this proceeding will be in effect for a period in the future. Mr. Rothschild's use of option-implied data in his analysis,

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69 Brealey, Myers, and Allen, Principles of Corporate Finance, 12th edition, at 226.

70 Shannon Pratt and Roger Grabowski, Cost of Capital: Applications and Examples, 3rd Ed. (Hoboken, NJ: John Wiley & Sons, Inc., 2008), at 92. "ERP" is the Equity Risk Premium.

71 Morningstar, Inc., 2013 Ibbotson Stocks, Bonds, Bills and Inflation Valuation Yearbook, at 53.

while incorrect for the reasons stated above, implicitly acknowledges the prospective nature of the determination of the investor required return.

Q. Is Mr. Rothschild's calculation of his own betas relevant to the investor-required return?

A. No. As discussed above, his beta calculations are not readily available to investors and, therefore, not relevant to the investor-required return. Moreover, Mr. Rothschild provides no evidence to support his reliance on betas calculated over six months or his unequal weighting of his historical beta results.

G. OTHER CONSIDERATIONS

Q. Does Mr. Rothschild adjust his ROE for Limestone Water due to company-specific factors?

A. No, he does not.

Q. Does Mr. Rothschild adjust his ROE due to the Company's smaller size as compared to his proxy group?

A. No, he does not. He references a number of articles that cannot confirm the reasons why the size effect exists (SBBI and Damodaran) or claim that the size premium diminished soon after its discovery (AQR Capital Management) that he believes support his position.[72] I disagree. In response to SBBI and Damodaran, just because those entities cannot deduce why the size effect exists, it exists and should be reflected in the ROE. Addressing AQR Capital Management, while over certain time periods, larger stocks can outperform smaller stocks, the true issue is the volatility of those returns. As shown on page 137 of the Kroll 2023 SBBI® Yearbook ("SBBI-2023"), the standard deviation of total returns on large capitalization stocks is 19.8% and the standard deviation of total returns on small

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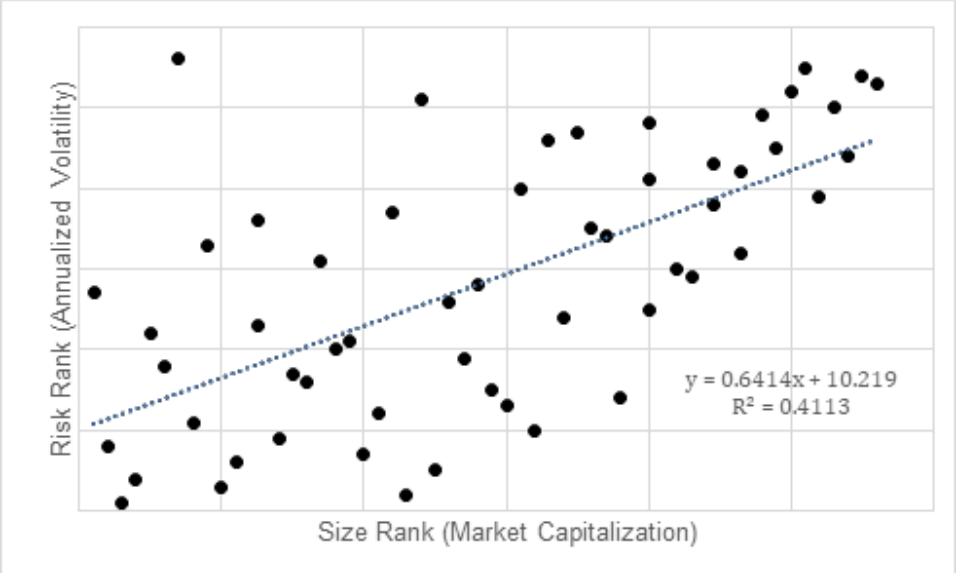
[72] *Rothschild Pre-filed* at 92-94.

capitalization stocks is 31.2%. The exclusion of companies that were de-listed from the exchanges used in the SBBI-2023 study would most likely reduce the standard deviation of the returns of the smaller companies and understate the risk faced by smaller companies as compared to larger ones. The increased risk borne by smaller companies as compared to larger companies must be reflected in the cost of common equity.

Q. Have you conducted studies linking size and risk for utilities?

A. Yes, I have. I have performed two studies which link size and risk for utilities. The first study included the universe of electric, gas, and water companies included in *Value Line* Standard and Small and Mid-Cap Editions. For each of the utilities, I calculated the annualized volatility (a measure of risk) and current market capitalization (a measure of size) for each company. After ranking the companies by size (largest to smallest) and risk (least risky to most risky), I made a scatter plot of the data, as shown on Chart 5, below:

Chart 5: Relationship Between Size and Risk for the *Value Line* Universe of Utility Companies[73]



[73] *Value Line*.

As shown in Chart 5 above, as company size decreases (increasing size rank), the annualized volatility increases, linking size and risk for utilities, which is significant at 95.0% confidence level.

The second study used the same universe of companies, but instead of using annualized volatility, I used the *Value Line* Safety Ranking, which is another measure of total risk.[74] After ranking the companies by size and Safety Ranking, I made a scatterplot of those data, as shown on Chart 6, below.

Chart 6: Relationship Between Size and Safety Ranking for the *Value Line* Universe of Utility Companies

Similar to the first study, as company size decreases, Safety Ranking degrades, indicating a link between size and risk for utilities. This study is also significant at the 95% confidence level.

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[74] *Value Line* also ranks stocks for Safety by analyzing the total risk of a stock compared to the approximately 1,700 stocks in the *Value Line* universe. Each of the stocks tracked in the *Value Line Investment Survey* is ranked in relationship to each other, from 1 (the highest rank) to 5 (the lowest rank). Safety is a quality rank, not a performance rank, and stocks ranked 1 and 2 are most suitable for conservative investors; those ranked 4 and 5 will be more volatile. Volatility means prices can move dramatically and often unpredictably, either down or up. The major influences on a stock's Safety rank are the company's financial strength, as measured by balance sheet and financial ratios, and the stability of its price over the past five years.

Q. Mr. Rothschild claims that you consider the Company's regulatory risk in the determination of your business risk adjustment.[75] Do you?

A. No, I do not. My business risk adjustment is based on Limestone Water's relative size and operational risk as discussed in my Direct Testimony,[76] I do not specifically discuss or consider the Company's regulatory risk in my Direct Testimony.

Q. Do lenders recognize the Company's extraordinary operating risk?

A. Yes, they do. As put forth in Table 9, below, the details of Limestone Water's sister companies and CSWR's debt issuances are compared with concurrent yields on A-rated utility debt. As shown, the premium paid by the Company's sister companies and parent are generally in excess of my proposed 1.50% adjustment. Because business risk needs to be reflected in both debt and equity cost rates, my 1.50% business risk adjustment to the indicated range of ROEs is appropriate.

Table 9: Comparison of Limestone Water Sister Companies and Parent Debt Costs to A-Rated Utility Bonds[77]

Company	Issuance Date	Interest Rate	A-Rated Utility	Spread
Confluence Rivers Utility Operating Company, Inc.	Dec. 2022	6.60%	4.83%	1.53%
Bluegrass Water Utility Operating Company, LLC	Nov. 2022	6.70%	5.07%	1.64%
Magnolia Water Utility Operating Company, LLC	Dec. 2022	6.35%	4.83%	1.78%
Magnolia Water Utility Operating Company, LLC	Oct. 2023	7.07%	5.75%	1.33%
Great River Utility Operating Company, LLC	May 2024	6.68%	5.13%	1.55%
Central States Water Resources	Nov. 2024	8.50%	4.83%	3.68%

H. RESPONSE TO CRITIQUES OF DIRECT TESTIMONY

Q. Does Mr. Rothschild have any concerns regarding your Direct Testimony?

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75 *Rothschild Pre-filed* at 92-94.
76 *D'Ascendis Direct* at 46-50.
77 Company-Provided, Bloomberg Professional Services.

A. Yes, he does. Mr. Rothschild expresses concerns with the following: (1) that I use non-price regulated proxy groups; (2) that I do not use sustainable growth rates in my DCF analyses; (3) that my risk premium model result is not reasonable based on his option-based models and publications of expected returns from investment professionals; (4) that the MRP in my CAPM is not reasonable; (5) the Beta coefficients I apply are not representative of current investor expectations; and (6) that I adjust my Proxy Groups-based indicated ROE for Company-specific risk factors. I have previously addressed concerns (2), (3), (5), and (6) in this testimony and will not address them again here. I will respond to Mr. Rothschild's remaining concerns in turn.

Q. Mr. Rothschild states that your Non-Price Regulated Proxy Groups are not comparable in risk to Limestone Water.[78] Please respond.

A. Mr. Rothschild is mistaken. As discussed in my Direct Testimony, the selection criteria for my Non-Price Regulated Proxy Groups was based on ranges of two measures of risk, the unadjusted beta of the proxy group, which measures systematic, or market risk, and the standard error of the regression which gave rise to those betas, which measures non-systematic, or diversifiable risk.[79] Systematic plus non-systematic risk is one definition of total risk.[80] Each company selected for the Non-Price Regulated Proxy Group was required to have an unadjusted beta and a standard error of the regression within the ranges generated by the Proxy Groups.[81] Business and financial risks may vary between companies and proxy groups, but if the collective average betas and standard errors of the regression of the group are similar, then the total, or aggregate, non-diversifiable market

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78 *Rothschild Pre-filed* at 94-95.
79 *D'Ascendis Direct* at 42-43.
80 Business risk plus financial risk is a second definition of total risk.
81 *D'Ascendis Direct* at 42-43.

risks and diversifiable risks are similar, but not necessarily identical, as noted in "Comparable Earnings: New Life for an Old Precept".[82] Thus, because the non-price regulated companies are selected based on collective measures of total risk, they are comparable in total risk (even though individual risks may vary) to my Proxy Groups. This is demonstrated clearly by Jack C. Francis who demonstrated that total risk can be "partitioned into its systematic and unsystematic components."[83] Essentially, companies that have similar betas and standard errors of regression have similar total investment risk.

In addition, the use of non-price regulated companies is consistent with the comparable risk standard inherent in *Bluefield* as cited previously in this testimony. *Hope* builds on the *Bluefield* decision in the excerpt below:

> From the investor or company point of view it is important that there be enough revenue not only of operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock… By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks.[84]

Therefore, it can be established that the Non-Price Regulated Proxy Groups are comparable in risk to Limestone Water, and it is entirely appropriate to rely on the results of the application of the DCF, RPM and CAPM analyses to the Non-Price Regulated Proxy Groups.

Q. Have you conducted any additional analyses to determine whether your Proxy Groups and Non-Price Regulated Proxy Groups are of comparable risk?

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82 Frank J. Hanley & Pauline M. Ahern, "Comparable Earnings: New Life for an Old Precept," American Gas Association, Financial Quarterly Review, Summer 1994.

83 Jack C. Francis, Investments: Analysis and Management 5th (McGraw-Hill, 1991) at 273.

84 *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944).

A. Yes, I have. I compared the average and median *Value Line* Safety Ranking,[85] the annualized volatility[86] of stock returns, and the Coefficient of Variation ("CoV")[87] of net profit for the Proxy Groups and Non-Price Regulated Proxy Groups, as shown on Table 10, below:

Table 10: Comparison of Safety Rankings, CoV of Net Profit, and Annualized Volatility of Mr. D'Ascendis' Proxy Groups and Non-Price Regulated Proxy Groups

Group	Average Safety Ranking	Median Safety Ranking	Average CoV Net Profit	Median CoV Net Profit	Average Annualized Volatility	Median Annualized Volatility
Utility Proxy Group	1.80	2.00	0.22	0.25	31.33%	31.26%
Non-Price Regulated Proxy Group	1.85	2.00	0.22	0.19	29.24%	29.25%
U.S. Water Universe	2.00	2.00	0.29	0.26	32.07%	31.26%
Non-Price Regulated Proxy Group	1.98	2.00	0.22	0.19	29.66%	29.67%

As shown, the Safety Rankings, annualized volatility of their stock returns, and CoV of net profit of the Proxy Groups and the Non-Price Regulated Proxy Groups are comparable, indicating comparable total risk. This, in addition to all of the above, should lead the Commission to consider the results of my Non-Price Regulated Proxy Groups in its determination of Limestone Water's ROE in this proceeding.

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85 *Value Line* also ranks stocks for Safety by analyzing the total risk of a stock compared to the approximately 1,700 stocks in the *Value Line* universe. Each of the stocks tracked in the *Value Line Investment Survey* is ranked in relationship to each other, from 1 (the highest rank) to 5 (the lowest rank). Safety is a quality rank, not a performance rank, and stocks ranked 1 and 2 are most suitable for conservative investors; those ranked 4 and 5 will be more volatile. Volatility means prices can move dramatically and often unpredictably, either down or up. The major influences on a stock's Safety rank are the company's financial strength, as measured by balance sheet and financial ratios, and the stability of its price over the past five years.

86 Annualized volatility equals the standard deviation of returns over the period multiplied by the square root of 252, or the approximate number of trading days in a year.

87 The CoV, which is a measure of relative volatility, equals the standard deviation divided by the average.

Q. Please summarize Mr. Rothschild's position that your MRP is overstated.[88]

A. Mr. Rothschild relies on his own MRP and studies by Damodaran and Hammond and Leibowitz to suggest that my MRP is overstated. I have already addressed the issues with both his MRP and term structure of beta previously in this testimony.

Q. Please respond to Mr. Rothschild's reference to the Damodaran 4.06% MRP.

A. Damodaran's method, which is a two-stage form of the DCF model, calculates the present value of cash flows over the five-year initial period, together with the terminal price (based on the Gordon Model), to be received in the last (i.e., fifth) year. The model's principal inputs include the following assumptions:

- Over the coming five years, the S&P 500 Index (the "Index") will appreciate at a rate equal to the compound growth rate in "Operating Earnings";
- Cash flows associated with owning the Index will be equal to the historical average Earnings, Dividends, and Buyback yields, applied to the projected Index value each year; and
- Beginning in the terminal year, the Index will appreciate, in perpetuity, at a rate equal to the 30-day average yield on 30-year Treasury securities.

In terms of historical experience, over the long-term the broad economy has grown at a long-term compound average growth rate of 6.12%.[89] Considered from another perspective, Kroll reports the long-term rate of capital appreciation on Large Company stocks to be 7.90%.[90] Using current data as of September 2024,[91] Damodaran's model

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88 *Rothschild Pre-filed* at 88-91.

89 Bureau of Economic Analysis for the years 1929 to 2023. *See also Gross Domestic Product (Third Estimate), Corporate Profits (Revised Estimate), and GDP by Industry, Third Quarter 2024,* www.bea.gov/data/gdp/gross-domestic-product (last visited Jan. 13, 2025).

90 SBBI-2023 at 137.

91 From Damodaran Online, ERPSept24 Spreadsheet.

assumes, however, that the market index will grow by just 3.60% over the coming five years.[92]

Mr. Rothschild has not explained why growth beginning five years in the future, and extending in perpetuity, will be less than two-thirds of long-term historical growth. Nowhere in his testimony has Mr. Rothschild explained the fundamental, systemic changes that would so dramatically reduce long-term economic growth, or why they are best measured by the 30-day average long-term Treasury yield.

Further, research by the Federal Reserve Bank of San Francisco calls into question the relationship between interest rates and macroeconomic growth. As the authors noted, "[o]ver the past three decades, it appears that private forecasters have incorporated essentially no link between potential growth and the natural rate of interest: The two data series have a zero correlation."[93] In view of this, the Commission should not consider the Damodaran MRP a valid data point.

Q. Mr. Rothschild refers to a document apparently authored by P. Brett Hammond and Martin L. Leibowitz as support for an MRP in the 4.00% range.[94] What did you discover when you reviewed the document?

A. First, Messrs. Hammond and Leibowitz did not author the document referred to by Mr. Rothschild, but wrote the introduction to the document. Second, their conclusion of an MRP of 4.00% is based on a 10-year forecast, not on the long-term MRP, which is the subject of this proceeding. Messrs. Hammond and Leibowitz recognize the difference between a 10-year MRP and the long-term MRP as they state:

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92 From Damodaran Online, ERPSept24 Spreadsheet. Five-year growth rate = (Expected Terminal Value / Intrinsic Value) ^ (1/5) – 1 = (6,741.47 / 5,648.4) ^ (1/5) - 1 = 3.60%.

93 FRBSF Economic Letter, *Does Slower Growth Imply Lower Interest Rates?*, November 10, 2014, at 3.

94 *Rothschild Pre-filed* at 91.

> Second, although the third Equity Risk Premium Forum required participants to use a 10-year horizon, most institutions and individual retirement savers are in it for the longer haul, in cases, multiple decades… We could add that one of the most difficult practical problems in estimating returns is to link the short-term with the long-term. Specifically, if our shorter-term risk premium estimate differs significantly from a long-term equilibrium estimate, it raises the question of how to model the time-varying nature of the premium.

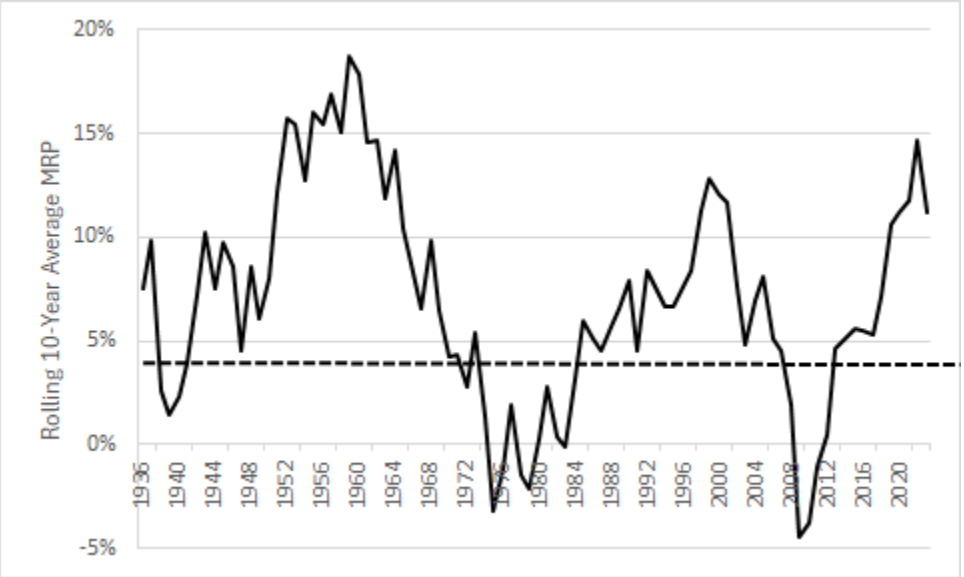
Finally, the slide shown on page 90 of Mr. Rothschild's direct testimony was based on a survey of 19 people at the 2001 Equity Risk Premium Forum in which six of 19 analysts (31%) chose 4.00% to be the expected MRP over the next 10 years. While I have discussed the applicability of surveys for cost of capital purposes, the opinion of six analysts in 2001 regarding the MRP from 2001-2012 has no bearing on investor requirements today.[95]

Q. Do you agree with Mr. Rothschild's position as it relates to the MRP?

A. No, I do not. Chart 7 below presents the 10-year rolling average MRP since 1936 and is measured by the returns on large stocks less the income return on long-term government bonds as compiled by Kroll. As shown, the rolling 10-year MRP exceeded 4.00% in 67 of 88 periods (76%), averaging 7.12%.

[95] The same survey in 2021 had 11 respondents, three of which (27%) expected an MRP of 4.00% for the next 10 years.

Chart 7: Historical 10-year Rolling Average MRP from 1928-2023[96]

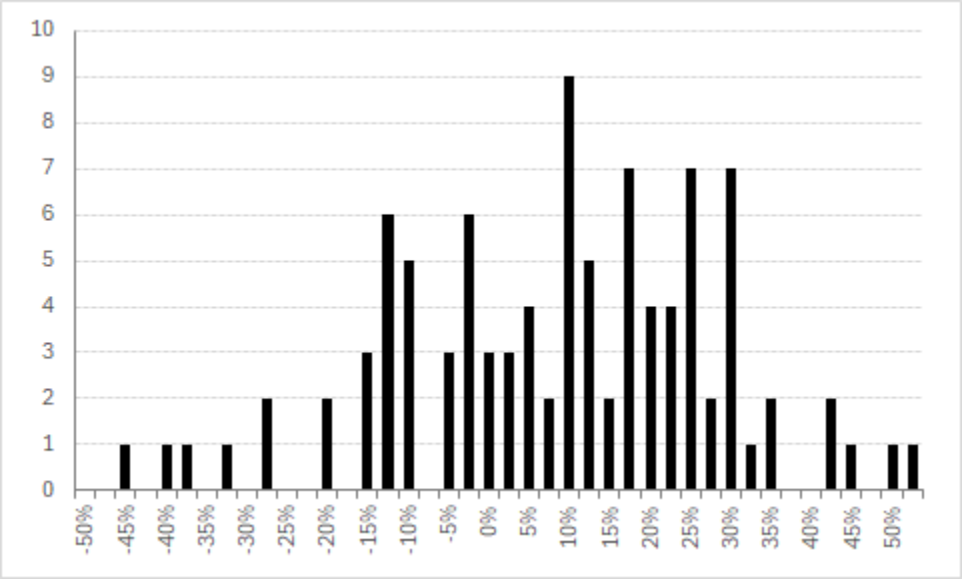


Q. Do observed MRPs support your derived MRP?

A. Yes, they do. The average MRP of 8.58% for my Direct Testimony and 8.23% for my Rebuttal Testimony, represent approximately the 49th and 50th percentiles, respectively of actual realized MRPs observed from 1926 to 2023, as shown on page Petitioner's Exhibit DWD-6R and in Chart 8, below. As discussed previously, multiple measures give greater insight into the investor-required return than a limited number of measures.

[96] SBBI-2023, Kroll.

Chart 8: Frequency Distribution of Observed MRPs, 1926 - 2023[97]



Also, the average implied market return for my Direct and Rebuttal Testimonies are 12.89% and 12.62% which are comparable to the average historical market return of approximately 12.17%. Moreover, because market returns historically have been volatile, my market return estimates are statistically indistinguishable from the long-term arithmetic average market data.[98]

Q. Mr. Rothschild similarly states that the equity risk premium ("ERP") for utilities can be higher or lower than 4.00% depending on market conditions. Do you agree with his statement?[99]

A. No. As shown on Chart 9, below, the historical rolling 10-year ERP for utilities as measured by the return on the S&P Utilities Index less the income return on long-term government bonds averaged 5.99% and exceeded 4.00% in 59 of 86 periods (69%).

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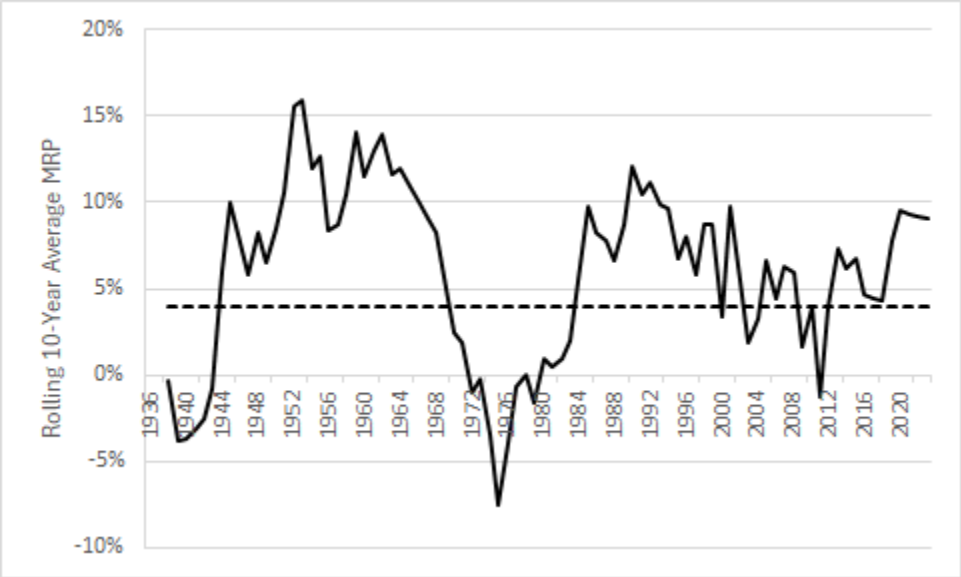
97 Exhibit DWD-6R.
98 SBBI-2023 at 248-250.
99 *Rothschild Pre-filed* at 33.

Chart 9: Historical 10-year Rolling Average ERP from 1928-2023



Q. Can you observe the indicated ERP using authorized ROEs?

A. Yes. The implied ERPs based on the difference between water authorized ROEs and the risk-free rate since 2008 averaged 6.19%, and out of the 228 water rate cases since 2008, no implied ERP was at or below 4.00%.

IV. CONCLUSION AND RECOMMENDATIONS

Q. What are your overall conclusions and recommendations?

A. Based on the analyses discussed throughout my Rebuttal Testimony, and given current capital market conditions, I continue to believe that the reasonable range of ROE estimates is from 11.23% to 12.97% and within that range, 11.90% continues to be an appropriate estimate of the Company's cost of equity and that Mr. Rothschild's recommended ROE does not provide a return commensurate with investments in enterprises with corresponding risks.

I also continue to recommend the Company be authorized a capital structure consisting of 57.00% equity and 43.00% long-term debt, which is consistent with the range

maintained by the Proxy Groups, and is appropriate given the Company's extraordinary operating risk.

Q. Does this conclude your Rebuttal Testimony?

A. Yes, it does.

Limestone Water Utility Operating Company, LLC
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to Mr. Dylan W. D'Ascendis' Rebuttal Testimony and Schedules

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THE STATE OF SOUTH CAROLINA
In The Supreme Court

In re Application of Blue Granite Water Company for Approval to Adjust Rate Schedules and Increase Rates, Appellant.

Appellate Case No. 2020-001283

Appeal from the Public Service Commission

Opinion No. 28055
Heard June 15, 2021 – Filed September 1, 2021

AFFIRMED IN PART, REVERSED IN PART AND REMANDED

Frank R. Ellerbe III and Samuel J. Wellborn, both of Robinson Gray Stepp & Laffitte, LLC, of Columbia, for Appellant Blue Granite Water Company.

Andrew M. Bateman, Alexander W. Knowles, Christopher M. Huber, and Steven W. Hamm, all of Columbia, for Respondent South Carolina Office of Regulatory Staff; Carri Grube Lybarker, Roger P. Hall, and Connor J. Parker, all of Columbia, and Richard L. Whitt, of Whitt Law Firm, LLC, of Irmo, all for Respondent South Carolina Department of Consumer Affairs; Michael K. Kendree Sr., of York, for Respondent York County; S. Jahue Moore, of Moore Taylor Law Firm, P.A., of West Columbia, for Respondent Town of Irmo; John Julius Pringle Jr., of Columbia, for Respondent Building Industry Association

of South Carolina; and Laura P. Valtorta, of Valtorta Law Office, of Columbia, for Respondent Forty Love Point Homeowners' Association.

JUSTICE KITTREDGE: This is an appeal from the South Carolina Public Service Commission (PSC). The PSC is a quasi-judicial body established by the South Carolina General Assembly. The legislature has delegated to the PSC the "power and jurisdiction to supervise and regulate the rates and service of every public utility in this State and to fix just and reasonable standards, classifications, regulations, practices, and measurements of service to be furnished, imposed, or observed, and followed by every public utility in this State." S.C. Code Ann. § 58-3-140(A) (2015). Part of this power includes the authority "to create incentives for utilities to improve their business practices." *Utils. Servs. of S.C., Inc. v. S.C. Office of Regul. Staff*, 392 S.C. 96, 105, 708 S.E.2d 755, 760 (2011) ("The PSC [has the] power[] . . . to fix just and reasonable standards, classifications, regulations, practices, and measurements of service. Pursuant to these powers, the PSC is entitled to create incentives for utilities to improve their business practices. Accordingly, the PSC may determine that some portion of an expense actually incurred by a utility should not be passed on to consumers." (citations omitted) (internal quotation marks omitted)). The PSC's order on appeal here is primarily focused on providing incentives to the utility to improve its business practices.

The appellant, Blue Granite Water Co. (Blue Granite), is a utility that provides water and sewer services. Blue Granite was formerly known as Carolina Water Service (CWS). CWS changed its name to Blue Granite as part of a rebranding campaign, for the utility had earned an unfavorable reputation throughout the state. In rejecting Blue Granite's request for an approximate 50% rate increase, and in an effort to incentivize Blue Granite to improve its business practices, the PSC set a lower return on equity (ROE) than requested and allowed only certain portions of Blue Granite's requested costs, citing to the utility's known, poor reputation and service problems. On appeal, Blue Granite contends the PSC's attempts to incentivize the utility actually unfairly punished the company in violation of law.

While Blue Granite raises nine specific concerns, we have condensed those concerns to four primary issues on appeal: whether the PSC erred in (1) setting the permissible ROE; (2) using a ten-year average—rather than a five-year average—to calculate typical storm costs; (3) disallowing all costs associated with Blue

Granite moving its headquarters from West Columbia to Greenville, including any office rental expenses; and (4) staying Blue Granite's ability to implement its new, higher rates under bond during the course of the appeal. We reverse in part and affirm in part. As to the issues involving the ROE, storm costs, and bond, we find the PSC's decision was not unfairly punitive, not arbitrary or capricious, and not clearly erroneous. However, as to the Greenville office expenses, we find the PSC's decision to *completely* deny yearly rental expenses was arbitrary and capricious. We therefore remand to the PSC for additional proceedings.

I.

Blue Granite is a relatively small-size utility providing water and sewer services to approximately 28,000 customers in South Carolina. In October 2019, Blue Granite filed an application for ratemaking with the PSC. Prior to that application, Blue Granite received annual rate revenues of almost $24 million. It sought to increase those rates by nearly $12 million per year, an approximate 50% increase.

Unsurprisingly, Blue Granite (and former CWS) customers from all over the state protested such a large increase, and, at the affected customers' requests, the PSC scheduled six hearings to receive testimony from customers. At those hearings, customers complained extensively about Blue Granite's relatively-high rates compared to other utilities in the area and the impact Blue Granite's proposed flat fees would have on low-income customers. Likewise, many of the customers who testified reported "incidents of poor water quality, unresponsive customer service, inaccurate meter readings, billing errors, and unwarranted cut-offs, among other problems." For example, one of the customers testified Blue Granite had wrongfully plugged his sewer line, resulting in his house being flooded with sewage. Another testified to a similar event in her neighborhood, resulting in raw sewage running through the entire neighborhood, including the community park and pool. Due to the extensive service problems, a number of the customers requested the PSC deny Blue Granite's application outright, particularly because of the number of rate increases Blue Granite had been granted in the recent past, and the dollar amounts associated with those past increases.[1]

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[1] One customer testified, "Blue Granite is applying for a 50 percent average rate increase, only two years after a 30 percent rate increase, which is unreasonable for their consumers. Add to that their statement to Representative Chris Wooten that they intend to pursue additional rate cases every two years following this one."

Ultimately, the PSC granted Blue Granite a rate increase of approximately $5 million, an amount comparable to the increases granted to other similarly-sized utilities in the state. Notably, in its final order, the PSC found the customer testimony "very compelling and indicative of persistent, widespread, and pervasive problems consistent with those which have frustrated customers of this utility for many years." However, the PSC explained,

> Giving effect to [*Utilities Services of South Carolina*,] as we must, we are legally foreclosed from denying Blue Granite's application for a rate increase in its entirety. . . . We have further considered all the customer [] hearing testimony and used it to guide us in creating incentives for Blue Granite to improve its business practices, cut costs, improve efficiency, and enhance quality of service.

Blue Granite filed a petition for rehearing, but the PSC denied the petition in large part. Blue Granite then directly appealed to this Court pursuant to Rule 203(d)(2)(A), SCACR.

II.

In reviewing a decision from the PSC, this Court employs a deferential standard of review. *S.C. Energy Users Comm. v. S.C. Pub. Serv. Comm'n*, 388 S.C. 486, 490, 697 S.E.2d 587, 589 (2010). As set forth in section 1-23-380 of the South Carolina Code, the Court may not substitute its own "judgment for the judgment of the [PSC] as to the weight of the evidence on questions of fact," but may reverse or modify the decision if the PSC's findings are "clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record" or "arbitrary or capricious or characterized by abuse of discretion or clearly unwarranted exercise of discretion." S.C. Code Ann. § 1-23-380(5)(e)–(f) (Supp. 2020). "A decision by the [PSC] is arbitrary if it is without a rational basis, is based not upon any course of reasoning and exercise of judgment, is made at pleasure, without adequate determining principles, or is governed by no fixed rules or standards." *Daufuskie Island Util. Co. v. S.C. Office of Regul. Staff*, 427 S.C. 458, 464, 832 S.E.2d 572, 575 (2019) (internal alteration and quotation marks omitted) (citation omitted). Likewise, substantial evidence is "something less than the weight of the evidence, and the possibility of drawing two inconsistent conclusions from the evidence does not prevent an administrative agency's finding from being supported by substantial evidence." *Lark v. Bi-Lo, Inc.*, 276 S.C. 130, 136, 276 S.E.2d 304, 307 (1981) (citation omitted). "Because the [PSC's] findings are presumptively correct, the party challenging the [PSC's] order bears the burden of convincingly proving the

decision is clearly erroneous, or arbitrary or capricious, or an abuse of discretion, in view of the substantial evidence of the record as a whole." *S.C. Energy Users Comm.*, 388 S.C. at 491, 697 S.E.2d at 590 (citation omitted).

III.

Return on Equity

a. Underlying Facts

Three witnesses testified about the proper ROE before the PSC: (1) David Parcell on behalf of the South Carolina Office of Regulatory Staff (ORS, one of the two respondents here); (2) Aaron Rothschild on behalf of the South Carolina Department of Consumer Affairs (the Department, the second respondent); and (3) Dylan D'Ascendis on behalf of Blue Granite. According to Parcell, the ROE is the "most difficult" portion of the rate of return to estimate, and experts therefore employ various analytical models to attempt to narrow down what an appropriate ROE might be. Thus, here, each witness used three models to calculate a reasonable ROE for Blue Granite. The results of their analyses under each model resulted in an ROE range, rather than a single number. Averaging the low results for each model and the high results for each model, Parcell calculated an overall ROE range of 7.7% to 8.36%; Rothschild calculated an ROE range of 7.46% to 8.75%; and D'Ascendis calculated an ROE range of 10.2% to 10.7%.[2]

In Blue Granite's previous ratemaking applications, the PSC had expressed concern that the utility's relatively-small size could make it a riskier investment and, therefore, required a higher ROE in order to attract investors. However, both Parcell and Rothschild strongly disagreed Blue Granite's small size automatically required a higher ROE.[3] Nonetheless, both witnesses based the remainder of their

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[2] Following Parcell's and Rothschild's criticism of his calculations, D'Ascendis later revised his ROE range to 9.75% to 10.25%.

[3] For example, Parcell explained many small water utilities were subsidiaries of larger companies, and those smaller water utilities did not raise equity capital directly from their individual investors, but rather as part of a consolidated entity from the investors in the larger parent company. Thus, according to Parcell, smaller water utilities were not riskier merely because of their size, and did not require a correspondingly larger ROE to compensate for their small size because they were not a truly risky investment. Of note, Blue Granite is a wholly-owned

calculations on the high ends of the ranges for each model in recognition of the PSC's prior concerns.

More specifically, in generating his particular ROE recommendation, Parcell used the high values from two of his three models "in order to give some consideration to any perceived unique attributes of" Blue Granite, specifically, its relatively small size—although, as stated, he disagreed the size of the utility should affect its ROE. Likewise, Parcell discounted the results from his third model because they appeared "to be somewhat low at this time, relative to the" results from the other two models. Consequently, Parcell recommended an ROE range between 8.9% (the high result from one model) and 10% (the high result from the other model), ultimately selecting 9.45% as the midpoint of that range.

In contrast, Rothschild considered the results of all three of his selected models, using the high values of the ranges "primarily because this Commission expressed concern in [Blue Granite's 2018] rate case . . . regarding its size" and whether its relatively-small size made it a riskier investment, therefore requiring a higher ROE to attract investors. However, Rothschild recommended a slightly lower ROE than the average high result of his three chosen models (8.75%) because (1) Blue Granite had less financial risk than other water utilities due to having "more equity in its capital structure" following its recent reorganization; and (2) "its business risk ha[d] declined since its last rate case and therefor[e] its cost of capital ha[d] decreased as well."[4] As a result, Rothschild recommended an ROE of 8.65%.

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subsidiary of Corix Regulated Utilities, Inc. (formerly known as Utilities, Inc.), one of the three largest private water and wastewater utility operators in the United States.

Additionally, Parcell acknowledged that, on an overall market basis, it was true that smaller companies tended to be riskier investments. However, he stated that was "not the case for regulated utilities." Specifically, Parcell asserted that "*all public utilities operate in an environment with regional monopolistic power . . . . As a result, the business and financial risks are very similar among the utilities regardless of their size*." (Emphasis added.)

[4] Moreover, according to Rothschild, "the cost of equity for utility companies [was] decreasing." Parcell similarly testified the current low-equity returns were "reflective of a decline in investor expectations of equity returns and risk

Rothschild further explained the 8.65% figure was "on the high end of results to account for *the possibility* that [Blue Granite's] small size impact[ed] the return expectations required by investors." (Emphasis added.) Rothschild reiterated several times that he had seen no evidence—and, in fact, there seemed to be evidence to the contrary—that smaller companies had a higher cost of equity. Nonetheless, Rothschild stated, "*to be conservative*, to recognize *the possibility* that that's [the case,] I went to the higher end of my range." (Emphasis added.)

Before Rothschild was excused from the witness stand, one PSC Commissioner questioned why Rothschild had picked a specific number for his recommended ROE, rather than a range. Rothschild said he had provided ranges to other public utilities commissions in the past, but he was then usually asked to provide a single, specific number. Nonetheless, Rothschild explained, "to assume that [] this exercise is that precise is an excellent question, so I think you generally can't say it's 8.65 or 8.61. So there are various ranges that I do show in my testimony that I hope would help understand a range that's reasonable."

Rothschild additionally provided data from other major financial institutions that indicated returns on stock market investments generally ranged from 5.25% to 8.75% at the time. According to Rothschild, investments in the overall stock market were much riskier than investments in a utility of any size and, therefore, generally earned a higher ROE than an investment in a utility. He concluded, "It is unlikely that investors would expect to earn a higher return of equity for a cost[-]of[-]service regulated utility company than the overall stock market."

In its final order, the PSC considered and rejected D'Ascendis's testimony and ROE recommendation.[5] The PSC further found Rothschild to be the most credible witness, placing special emphasis on the fact that his analysis "was unique in that

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premiums."

[5] There is ample basis supporting the rejection of D'Ascendis's testimony. For example, after summarizing Parcell's and Rothschild's testimony in which they thoroughly discredited D'Ascendis, the PSC found D'Ascendis's calculations lacked "analytical transparency" and "statistical coherence." Having reviewed the record, the evidence firmly supports the PSC's extensive criticism of D'Ascendis's testimony, and we thus do not discuss the specifics of that testimony any further. *See* S.C. Code Ann. § 1-23-380(5) ("The court may not substitute its judgment for the judgment of the agency as to the weight of the evidence on questions of fact.").

he included the use of both historical and forward-looking, market-based data." The PSC explained Rothschild's results from his three chosen analytical models "provide[d] an ROE in the range of 7.46% to 8.75%." Noting it was "[c]onsidering the quality of service issues known to exist with Blue Granite," the PSC concluded the "recommended ROE of 7.46% proposed by witness Rothschild" was appropriate.

b. Analysis

Blue Granite now argues an ROE of 7.46% is unsupported by the evidence in the record because Parcell and Rothschild both recommended a higher ROE. We disagree with the suggestion that the PSC was foreclosed as a matter of law from selecting an ROE within the range provided by the evidence. While the PSC was, of course, empowered to select a higher ROE in accordance with the witnesses' precise recommendations, the question before us is whether the ROE actually selected (7.46%) is supported by substantial evidence.

We find there is substantial evidence in the record supporting the PSC's decision. Specifically, the PSC found Rothschild's testimony to be the most credible, including when Rothschild testified there was no reason to artificially inflate the ROE simply because Blue Granite was a smaller utility—an opinion, we note, with which Parcell completely agreed. Thus, although Rothschild *and* Parcell testified they selected the high values of their ranges in deference to the PSC's prior concern that Blue Granite's size *could* affect its level of risk, the PSC apparently reevaluated and discarded that prior concern after hearing Rothschild's and Parcell's explanations for why such a concern was unwarranted. *See S. Bell Tel. & Tel. Co. v. Pub. Serv. Comm'n*, 270 S.C. 590, 610, 244 S.E.2d 278, 288 (1978) (Ness, J., concurring in part and dissenting in part) (noting the PSC is "not bound by its prior decisions, and it may re-examine and alter its previous findings as to reasonableness when conditions warrant"); 73A C.J.S. *Public Administrative Law and Procedure* § 352 (June 2021 Update) (explaining administrative agencies are not bound by stare decisis and may reevaluate their prior decisions so long as they rationally justify their change of position). Once the PSC's prior concern—that Blue Granite's small size could impact its cost of equity—was diminished, the testimony suggested the low end of the range from Rothschild's three models (7.46%) was equally justifiable to the high end of the range (8.75%).

Blue Granite contends the PSC had no authority to select an ROE other than the ones specifically recommended by either Rothschild (8.65%) or Parcell (9.45%). However, the precise number selected by the PSC need not come from a witness's

specific recommendation, but may instead be determined from the totality of the evidence in the record before the agency. Here, the record supports the 7.46% ROE determination, as it is within the stated range calculated by Rothschild. Moreover, Rothschild testified selecting an ROE is not a precise exercise. Given the fact that, regardless of which model was used, Rothschild and Parcell calculated an ROE range rather than a precise number, and those numbers did not always overlap even when both experts used the same model, we see no reason to doubt Rothschild's testimony that selecting an ROE is not an exercise in precision. *Cf. In re Permian Basin Area Rate Cases*, 390 U.S. 747, 790 & n.59 (1968) ("[N]either law nor economics has yet devised generally accepted standards for the evaluation of rate-making orders.").

Finally, the PSC specifically stated it set the ROE at the low end of the proffered ranges in an effort to incentivize Blue Granite to improve its admittedly-poor business practices, evidenced by the extensive customer complaints at the PSC hearings. As we previously stated in *Utilities Services of South Carolina*, the PSC is empowered to do so in appropriate circumstances, and there is nothing inherently wrong or punitive in the PSC choosing to follow that path here. *See Utils. Servs. of S.C., Inc.*, 392 S.C. at 105, 708 S.E.2d at 760. Rather, a utility's business practices and reputation are two of a number of factors the PSC may consider in selecting an appropriate ROE.[6]

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[6] Additionally, there were other factors present here that supported the PSC's decision to impose a lower ROE, including: (1) the ROEs and overall rate increases allowed to other similarly-sized utilities in the same general time frame; (2) the ROEs expected by investors in the overall (i.e., riskier) stock market; (3) the apparent lack of a need to artificially inflate the ROE of relatively-smaller utilities such as Blue Granite; (4) Blue Granite's decreased financial risk following its reorganization due to now having more equity in its capital structure; (5) Blue Granite's decrease in business risk since its last rate case, resulting in a decreased cost of capital; (6) the overall decreased cost of equity for utility companies; and (7) a "decline in investor expectations of equity returns and risk premiums." *See generally Fed. Power Comm'n v. Hope Nat. Gas Co.*, 320 U.S. 591, 603 (1944) ("[T]he return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks."); *Bluefield Waterworks & Improvement Co. v. Pub. Serv. Comm'n*, 262 U.S. 679, 692–93 (1923) ("A public utility . . . has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures,"

As a result, because there is a basis on which a reasonable person could find a 7.46% ROE appropriate, the PSC's decision is supported by substantial evidence in the record, and we therefore affirm. *See Parker v. S.C. Pub. Serv. Comm'n*, 281 S.C. 22, 24, 314 S.E.2d 148, 149 (1984) ("We recognize that the [PSC's] interpretation of the evidence on this issue is not indisputable, but we cannot substitute our judgment for that of the [PSC] upon a question as to which there is room for a difference of intelligent opinion." (internal alteration and quotation marks omitted) (citation omitted)); *see also Hamm v. S.C. Pub. Serv. Comm'n*, 294 S.C. 320, 323, 364 S.E.2d 455, 456 (1988) ("This Court is without authority to set aside an agency's judgment on a factual issue where there is evidence of record to support the agency's decision." (citation omitted)).

IV.

Storm Costs

a. Underlying Facts

Blue Granite sought allowance of $51,802 per year in costs associated with anticipated future storm damage—the amount incurred during the test year. ORS reviewed Blue Granite's storm costs for the past ten years and found the average yearly storm costs were only $28,320.51.[7] As a result, ORS proposed a downward adjustment to account for the unusually-high storm costs incurred in the test year.

In response, Blue Granite stated it was "not opposed to using a multi-year historical average of costs," but that it believed the average storm costs should be calculated from the last five years of data, rather than the ten years proposed by ORS.[8] However, ORS rejected using a five-year average, explaining:

> ORS has consistently used a ten [] year average when proposing normalization of storm costs in past rate proceedings . . . . This is a more representative method to ensure enough data is gathered and

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such as those earned in the overall stock market.).

[7] ORS excluded the highest and lowest values from the past ten years to account for the possibility that those extremes were statistical outliers.

[8] Were the PSC to adopt the five-year average, the allowed amount would have been $42,494, rather than the $28,320.51 proposed by ORS.

> used over a reasonable period of time to form an accurate view of storm costs. Using a five [] year average as proposed by [Blue Granite] would not allow for significant outliers that occur due to fluctuations in annual costs to be determined and removed from the average. Using a ten [] year average allows for a more complete assessment of costs over time. Therefore, ORS recommends the Commission reject [Blue Granite's] proposal to use a five [] year average for the normalization of storm costs.

The PSC found use of a ten-year average more accurately reflected storm costs for each year than use of a five-year average. Additionally, the PSC found it had previously used a ten-year average in normalizing storm costs from a test year. Therefore, the PSC adopted ORS's proposed downward adjustment, finding the adjustment to be "just and reasonable."

b. Analysis

Blue Granite contends the PSC's decision to apply a ten-year average, rather than a five-year average, was arbitrary and capricious and unsupported by substantial evidence. We disagree. As explained by the PSC and ORS, using a larger sample size more accurately establishes the true average cost of storm damages to Blue Granite's system in any given year, thus providing a more accurate forecast in setting prospective rates for anticipated storm damages in years to come.

Moreover, in adopting the ten-year average, the PSC did not foreclose Blue Granite from seeking a deferred account for unusually high storm damages in future years. For example, in 2018, South Carolina was hit in back-to-back months with Hurricanes Florence and Michael, resulting in substantial costs to Blue Granite due to storm damages above and beyond the amount granted in its prior ratemaking proceeding. However, the PSC allowed Blue Granite to create a deferred account and recover those additional, unexpected expenses from its customers. Thus, even though the PSC used the ten-year average here, Blue Granite can request deferred accounting treatment in the event of unusually high storm costs in the future. *See Porter v. S.C. Pub. Serv. Comm'n*, 328 S.C. 222, 231–32, 493 S.E.2d 92, 97–98 (1997) (explaining that in the event a utility experiences expenses that are truly "extraordinary," i.e., "unanticipated and non-recurring," the PSC should allow the utility to create a deferred account for those expenses and amortize the expenses in calculating the rate base in the utility's next ratemaking application).

Accordingly, we find the PSC's decision to use a ten-year average to normalize storm costs was neither arbitrary nor capricious, nor unsupported by substantial evidence. We therefore affirm the PSC's decision as to this issue.

V.

Greenville Office Expenses

a. Underlying Facts

Until 2018, Blue Granite/CWS owned an office building located in an industrial park in West Columbia. That office building cost ratepayers $27,260 annually for things such as water, sewer, electric, gas, landscaping, and property taxes. However, according to Blue Granite, the location had no other office buildings or amenities nearby, so it was not a "viable location" to retain highly-qualified employees. Likewise, Blue Granite conceded that "[a]ttracting talent in the [West] Columbia market [was] extremely difficult [for the utility] due to the legacy brand issues in that market," including CWS's abysmal reputation for customer service and wastewater leaks. Therefore, in 2018, when changing its name from CWS to Blue Granite, the utility decided to relocate its headquarters, selling the West Columbia building and removing the $27,260 in annual expenses from its rate base.

Blue Granite then explored three alternate locations for its headquarters: Greenville, Columbia, and West Columbia. In selecting the new location, Blue Granite analyzed the labor statistics (also known as CBRE data[9]) in all three cities. According to Blue Granite, the CBRE data was the most favorable in Greenville, and the utility therefore opted to locate its new headquarters there, renting prime office space downtown at the historic Family Court building on South Main Street.

The yearly rent for Blue Granite's new Greenville office space was $73,665—almost triple the $27,260 annual cost of office space in West Columbia. Moreover, the $73,665 annual rent in Greenville's prime real estate market stood in stark contrast to the $11,174 in yearly, combined rental expenses for Blue Granite's other five locations throughout the state.[10] Equally perplexing, the new Greenville

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[9] CBRE stands for Coldwell Banker Richard Ellis Group, Inc., an American commercial real estate services and investment firm.

[10] These locations included an office and warehouse in Rock Hill, an office in

office required extensive upgrades to make it a functional office space, including things such as new drywall, paint, telephone ports, wiring, and office furniture. While Blue Granite repeatedly claimed that its new office was "not luxurious or gold-plated," the upfit expenses totaled approximately $500,000 for an office space intended to house only ten employees.

At the PSC hearing, ORS contested the Greenville office upfit and rental expenses. As to the $500,000 in upfit expenses, ORS contended the amount was unreasonably incurred by Blue Granite. In particular, ORS pointed to a letter from the utility to its customers explaining the name change from CWS to Blue Granite. In that letter, Blue Granite stated it was "refreshing [its] brand *at no cost to [its] customers* to reflect [its] legacy and to showcase [its] new direction." (Emphasis added.) ORS explained:

> [Blue Granite] reasons that legacy brand issues diminished the Company's ability to acquire talented workers in the [West] Columbia market. The Company asserts its rebranding and relocation were aimed to alleviate the Company's talent acquisition issues. The Company represented to its customers that the refreshing of the Company's brand would be at no cost to them and is now contradicting that representation by attempting to pass on to customers relocation and office upgrade costs that were part of its rebranding.
>
> The long-term issues that caused the Company's brand to hinder talent acquisition in the [West] Columbia area [are] not the fault of customers. Nor is the former location of the Company's headquarters in [West] Columbia the cause of any talent acquisition problems. Such problems were caused by the Company, not its location.

ORS pointed out the new office space "contain[ed] many amenities for employees such as the premium location in a historic building, luxury office finishes and appointments, high-end office furniture, large communal spaces, and an overall large footprint relative to the small number of employees." Thus, ORS concluded,

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Anderson, a Water Service Corporation public storage unit, and a Water Service Corporation office.

the upfit expenses were unreasonable and "difficult to explain to customers that struggle[d] to pay their water and sewer bills."

Likewise, as to the rental expenses, ORS argued (1) the rental expenses were for a "premium" space in the most expensive area of town, rather than a merely functional space in a more modestly-priced area; and (2) the PSC should "thoroughly review[]" the costs associated with "office relocation and office rent . . . to ensure [Blue Granite] took steps to minimize cost[s]" to the ratepayers.

Additionally, ORS took issue with the rental expenses due to inconsistencies in the CBRE data relied upon by Blue Granite in selecting Greenville for its new headquarters location, rather than Columbia or West Columbia. In particular, CBRE scores are inverted, such that a score above 100 indicates a market with overall lower costs than the national average. ORS stated the CBRE scores provided by Blue Granite for all three prospective locations were above 100, with Greenville scoring 105, Columbia scoring 103, and West Columbia scoring 101. Critically, however, in generating the CBRE scores, Blue Granite used different criteria for Greenville and Columbia as compared to West Columbia. Specifically, Blue Granite "used a 20-mile radius to evaluate market metrics for Columbia and Greenville, whereas [it] used a 10-mile radius for West Columbia." Blue Granite made no attempt to explain why it used different criteria to evaluate the labor market around West Columbia, stating only it "no longer had access to the CBRE database." ORS admitted it would be difficult to say how the different radii would impact the scores, although the smaller 10-mile radius excluded the potential workforces in Blythewood, Chapin, and portions of Lexington, among other municipalities that would have been included if Blue Granite had used a 20-mile radius as it did with Greenville and Columbia. Likewise, ORS stated "that the 2- to 4- point difference in [s]cores d[id] not justify the high cost to relocate [] and upfit the Company's new office [or pass those costs along to Blue Granite's] customers."

Finally, ORS pointed out the incongruity of locating the new office in Greenville, where only 2.6% of Blue Granite's customers lived, rather than in Lexington County or York County, where 43% and 38.6% of Blue Granite's customers lived, respectively. Moreover, apparently, Blue Granite did not even evaluate the CBRE scores for Rock Hill or Anderson, despite already having offices in those locations. Likewise, even in comparing only Greenville, Columbia, and West Columbia, Blue Granite witnesses could not say whether the utility had considered or compared office space prices in the three locations, or only labor statistics.

Ultimately, the PSC concluded that "the Greenville move and its resulting rent and upfit costs are directly and ca[us]ally related to Blue Granite rebranding itself," not mere talent acquisition issues. The PSC cited the testimony of a Blue Granite witness who stated "Blue Granite's relocation and lease of Greenville office space was due to legacy brand issues which were caused by the Company itself," and "attracting talent in the Columbia market has been extremely difficult due to the legacy brand issues in that market." Thus, the PSC found the upfit expenses were unreasonably incurred, stating "Blue Granite's customers should not have to pay the cost to upfit the Greenville office, given the move was necessitated by legacy brand problems the Company created."

The PSC additionally disallowed all rental expenses for the Greenville office ($73,665), explaining those expenses also stemmed from Blue Granite's legacy brand issues. The PSC therefore concluded the rental expenses were unreasonable and denied them in their entirety.

b. Analysis

Blue Granite now argues the PSC's disallowance of upfit and rental expenses was arbitrary and capricious and unsupported by substantial evidence in the record. Regarding the upfit expenses, we disagree. However, we agree the complete disallowance of rental expenses amounts to reversible error.

As to the upfit expenses, there is a wealth of evidence in the record supporting the PSC's finding that the headquarters relocation was caused by Blue Granite's self-created "legacy brand issues," and not merely by its employee-retention problems. In fact, as quoted in the PSC's order, Blue Granite itself conceded that its employee-retention problems were caused, at least in part, by the utility's poor reputation in the community. We therefore hold the PSC's finding—that "Blue Granite's customers should not have to pay the cost to upfit the Greenville office, given the move was necessitated by legacy brand problems the Company created"—is supported by substantial evidence.

Similarly, we find the PSC's decision to deny the upfit costs was not arbitrary or capricious, and that the upfit costs were unreasonably incurred. First, Blue Granite promised its customers its rebranding would come at no cost to them. Because there is substantial evidence in the record tending to show the rebranding required moving the utility's headquarters, the upfit costs associated with that headquarters relocation also directly stemmed from the rebranding. The PSC's decision to hold

Blue Granite to its promise not to pass along rebranding costs to its customers was in no way whimsical or irrational.

Second, we find the amount of upfit costs incurred was entirely unreasonable, particularly for a small utility such as Blue Granite. Blue Granite chose to move to a historic building that required extensive modernization to turn it into a functional office space. The utility produced no evidence that it attempted to evaluate the cost of other potential office locations in Greenville, much less that other potential locations would have required similar upfit expenses.[11] It is, of course, not unreasonable for Blue Granite to want to provide its executives opulent offices as a job perk. However, as the PSC found, it is unacceptable to pass the costs associated with that opulence on to ratepayers, who receive no quantifiable benefit from an expenditure of that type. We therefore find the PSC's decision to deny the upfit expenses was not arbitrary or capricious.

As to the rental expenses, we first express our concern that, upon realizing it might be necessary to relocate the utility's headquarters, Blue Granite's management made the decision to rent some of the highest-priced real estate in Greenville—and did so after trying to disassociate itself from the poor public perception of CWS and its business practices. The decision to rebrand the company while simultaneously moving into an unnecessarily-expensive office location is yet another example of Blue Granite self-inflicting wounds to its reputation and requesting its customers reimburse it for the associated expense. We find there is overwhelming evidence in the record to support the PSC's refusal to allow the full amount of the rental expenses requested, as the rental expenses—like the upfit costs—stemmed directly from Blue Granite's poor reputation and subsequent effort to rebrand itself.

However, notwithstanding Blue Granite's regrettable reputation in the community, we find it was arbitrary and capricious for the PSC to entirely deny *all* rental expenses. While the decision of the PSC to disallow the requested $73,665 for rental expenses is supported by the evidence, Blue Granite is entitled to collect from ratepayers some reasonable amount for its headquarters office rental. After

[11] Likewise, it is unclear from the record why, for example, the office furniture from the West Columbia office could not be reused in the new Greenville office, rather than buying new "high-end office furniture."

all, neither ORS nor the Department object to allowing Blue Granite some sort of reasonable rental rate.

We therefore reverse the PSC's decision to deny all rental expenses for the Greenville office and remand for additional proceedings to determine what a reasonable amount of yearly office rental expenses would be. The burden remains on Blue Granite to establish a reasonable rental allowance. Should Blue Granite continue to rely on CBRE data, Blue Granite must produce comparable CBRE data for Greenville, Columbia, West Columbia, Rock Hill, and Anderson—the three original, prospective locations plus the locations of its two existing offices—including using an identical geographical radii for each city. Moreover, it is incumbent upon Blue Granite to present evidence of reasonable rental amounts for similarly-sized offices, regardless of their location in Greenville or throughout the state. We find it highly likely there are a number of alternate office locations—in Greenville and elsewhere—that would demand significantly less in yearly rental expenses than a historic building on South Main Street.[12] Such a consideration is crucial for a utility that serves the public, and for whom the public ordinarily is required to pay for office expenses, rent or otherwise.

We therefore affirm the PSC's disallowance of upfit expenses, but reverse and remand the PSC's disallowance of office rental expenses. On remand, the PSC shall determine a reasonable rental allowance for Blue Granite's headquarters.

VI.

Stay of Bond

a. Underlying Facts

Following the PSC's denial of Blue Granite's motion for reconsideration, the utility filed a motion pursuant to section 58-5-240(D) of the South Carolina Code (2015),

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[12] We find this to be particularly true given that the Greenville office rental expenses are six to seven times the amount of rental expenses for all of Blue Granite's other office locations combined. Additionally, although not directly relevant to the rental expenses issue, it seems equally likely that many alternate office locations in Greenville would have required significantly less in upfit costs as well, demonstrating again that the PSC's decision to deny the upfit expenses was not arbitrary or capricious.

which provides, in relevant part, that if the PSC issues a ruling,

> and the utility shall appeal from the order, by filing with the Commission a petition for rehearing, the utility may put the rates requested in its schedule [(i.e., its original application to the PSC for ratemaking)] into effect under bond only during the appeal and until final disposition of the case. *Such bond must be in a reasonable amount approved by the Commission*, with sureties approved by the Commission, conditioned upon the refund . . . to the persons . . . entitled to the amount of the excess, if the rate or rates put into effect are finally determined to be excessive; *or there may be substituted for the bond other arrangements satisfactory to the Commission for the protection of parties interested*. . . .

(Emphasis added.) Via directive—rather than formal, written order—the PSC unanimously voted to approve Blue Granite's proposed appellate bond.

Shortly thereafter, the Department filed a letter with the PSC seeking clarification as to whether Blue Granite was permitted to implement the rates under bond the following month, as the utility had informed its customers it intended to do. Specifically, the Department was concerned the bond had only been approved via directive, rather than a written order, and therefore the decision might not be final. The Department also raised concerns about the impact the new rates-under-bond would have on Blue Granite's customers during the coronavirus pandemic, and offered alternatives to the immediate implementation of the bond.

The PSC subsequently issued an order staying Blue Granite's ability to implement the higher rates under bond until further notice and scheduled oral arguments on the matter. Three days before the arguments, Blue Granite filed a Conditional Petition for Approval of an Accounting Order. In that petition, Blue Granite stated denying it the ability to implement higher rates under bond would constitute an unconstitutional taking. However, according to Blue Granite,

> *There are two possible remedies to avoid an unconstitutional taking*. The preferred remedy, which would result in the least customer confusion and future rate impact, is to lift the stay and permit the Company to implement the rates under bond for which the Company's customers are on notice. *An alternative remedy is to grant the instant deferral request*.

(Emphasis added.) More specifically, Blue Granite proposed the PSC allow the utility to create a deferred account for a regulatory asset that would increase at a rate of $5,970 per day—the difference between the rates approved in the PSC's order on reconsideration and the rates originally requested in Blue Granite's application. Then, assuming Blue Granite prevailed on appeal, it would be able to recover the amount in the deferred account in a future ratemaking case.

Following oral arguments, the PSC maintained the stay on Blue Granite's ability to implement the higher rates under bond, but granted the utility's alternative request for the creation of a deferred account. Blue Granite moved for reconsideration, arguing:

> Establishment of the regulatory asset authorized by the Commission in the August 31, 2020 directive is an inadequate remedy. . . . [U]nlike implementing rates under bond, future recovery of a regulatory asset is not guaranteed, and it is therefore not a substitute for implementing rates under bond. . . . While the regulatory asset was necessary to protect the Company's potential ability to recover the revenues to which it is entitled, there is no adequate substitute for the Commission issuing final approval of the bond and permitting the Company to implement rates under bond.

The PSC denied the motion for reconsideration, noting "Blue Granite offered the accounting order as a[n] alternative to putting rates in effect under bond, while at the same time, waiving any objection to the continuing Stay."

b. Analysis

Blue Granite now raises a number of arguments as to why the PSC's decision to stay the bond was improper. However, we find the issue is moot and, therefore, decline to address the merits of the utility's arguments.

Blue Granite proposed two remedies that it originally contended would prevent an unconstitutional taking: (1) implement the rates under bond, or (2) grant the deferred accounting request. The PSC chose the second option. Blue Granite therefore received the relief it requested, and there is nothing further for the Court to decide as to the propriety of one remedy over the other. *See, e.g.*, *State v. Parris*, 387 S.C. 460, 465, 466, 692 S.E.2d 207, 209, 210 (Ct. App. 2010) ("When the defendant receives the relief requested from the trial court, there is no issue for the appellate court to decide." (citing *State v. Sinclair*, 275 S.C. 608, 610, 274

S.E.2d 411, 412 (1981))). The fact that Blue Granite has now changed its mind and decided the deferred accounting option is an "inadequate remedy" is of no consequence. *Cf. McLeod v. Starnes*, 396 S.C. 647, 657, 723 S.E.2d 198, 204 (2012) ("A party may not argue one ground at trial and an alternate ground on appeal." (citation omitted)). We therefore affirm the PSC's decision as to this issue.

VII.

The Victory Tweet

As a final matter, Blue Granite discusses a social media post on the PSC's official Twitter account. Specifically, following the issuance of the PSC's final order, the Department posted a "victory tweet" on Twitter, sharing its excitement that Blue Granite failed to prevail on its request for a substantial rate increase, and that the decision was a win for consumers during the midst of the coronavirus pandemic. A gloating victory tweet by a prevailing party may be unbecoming, but it is understandable. Regrettably, the PSC then retweeted the victory tweet on its own official account, reveling in the defeat of Blue Granite's requested rate increase. As a quasi-judicial body, the PSC's retweet was inappropriate. The PSC must not only be fair and impartial, it must be diligent in its duty to avoid the appearance of impropriety. While we are confident that no commissioner of the PSC sanctioned the publication of the victory tweet, we trust the PSC will give more care and consideration to its social media posts in the future. Regardless, we have thoroughly reviewed the record and find the PSC's extensive questioning and diligence throughout Blue Granite's ratemaking proceeding reflects its commitment to fairly and impartially decide this application for a rate increase. When we consider the conscientious manner in which the PSC handled this complicated proceeding, together with its proper and detailed order, we commend the PSC. We therefore do not find the retweet a basis to reverse the PSC's entire final decision.

VIII.

In conclusion, we affirm the PSC's decision in part and reverse in part. Specifically, we affirm the PSC's decisions as to the ROE, storm costs, Greenville office upfit expenses, and stay of an appellate bond.[13] We reverse the PSC's

[13] While Blue Granite also initially raised a question as to the PSC's treatment of the allowance for non-revenue water, the utility conceded the issue at oral argument. We therefore affirm the PSC's decision as to Blue Granite's non-

decision to deny all rental expenses for Blue Granite's new headquarters and remand to the agency for further consideration of what a reasonable rental allowance should be.[14]

AFFIRMED IN PART, REVERSED IN PART, AND REMANDED.

BEATTY, C.J., HEARN, FEW and JAMES, JJ., concur.

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revenue water allowance.

[14] Blue Granite challenges three additional issues that were not contested by either respondent before the PSC or on appeal: whether the PSC erred in (1) amortizing its annual water and wastewater service expenses that it purchased in the test year from third parties; (2) disallowing recovery of legal expenses incurred in prior cases filed and then later voluntarily withdrawn by Blue Granite; and (3) disallowing recovery of legal expenses related to administrative law court proceedings dealing with Blue Granite's I-20 system. The PSC's order does not contain sufficient findings of fact or analysis to allow us to evaluate the merits of these issues on appeal. As a result, we reverse and remand these issues as well.

BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION

NASHVILLE, TENNESSEE

January 15, 2019

IN RE:	)	
	)	
PETITION OF CHATTANOOGA GAS	)	
COMPANY FOR APPROVAL OF AN	)	
ADJUSTMENT IN RATES AND TARIFF; THE	)	**DOCKET NO.**
TERMINATION OF THE AUA MECHANISM	)	**18-00017**
AND THE RELATED TARIFF CHANGES AND	)	
REVENUE DEFICIENCY RECOVERY; AND AN	)	
ANNUAL RATE REVIEW MECHANISM	)	

AMENDED ORDER

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This matter came before Chair Robin L. Morrison, Vice Chair Kenneth C. Hill and Commissioner David F. Jones of the Tennessee Public Utility Commission (the "Commission" or "TPUC"), the voting panel assigned to this docket, during a regularly scheduled Commission Conference held on October 15, 2018, for consideration of the *Chattanooga Gas Company Petition for Approval of an Adjustment in Rates and Tariff; the Termination of the AUA Mechanism and the Related Tariff Changes and Revenue Deficiency Recovery; and an Annual Rate Review Mechanism* ("*Petition*") filed on February 15, 2018 by Chattanooga Gas Company ("CGC" or "Company"). In its *Petition*, CGC seeks Commission approval to adjust rates for natural gas service, terminate the AUA mechanism and reinstitute the WNA mechanism for R-1 and C-1 customers and recover an associated customer revenue deficiency, and opt in to an annual rate review under the alternative regulatory methods statute.

I. BACKGROUND AND *PETITION*

CGC is a public utility authorized to transport, distribute and sell natural gas in the Chattanooga area, Cleveland, Tennessee, and other areas within Hamilton and Bradley counties.[1] CGC serves over 57,000 residential households and approximately 8,500 commercial and industrial customers.[2] CGC is a wholly-owned subsidiary of Southern Company Gas, a natural gas company offering service in Florida, Georgia, Illinois, New Jersey, Maryland and Virginia.[3] CGC's parent company, Southern Company Gas, which was formerly known as AGL resources, was acquired by the Southern Company in 2016. Overall, the Southern Company provides natural gas and electric services to more than 9 million customers in 18 states.[4]

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[1] *Chattanooga Gas Company Petition for Approval of an Adjustment in Rates and Tariff; the Termination of the AUA Mechanism and the Related Tariff Changes and Revenue Deficiency Recovery; and an Annual Rate Review Mechanism*, p. 2 (February 15, 2018).
[2] CGC Monthly Report, on file with Commission (May 31, 2018).
[3] *Petition*, p. 2 (February 15, 2018).
[4] *Id.*

Prior to the instant case, CGC's most recent rate case was Docket No. 09-00183, filed in 2009.[5] The Company states that without the relief sought, it projects to realize a rate of return of 4.61%. Further, CGC desires to meet new growth and continue providing adequate natural gas in compliance with state and federal compliance standards. CGC specifically requests in its *Petition*, a rate of return of 7.83% and revenue increase of $6,995,194 based on an Attrition Year of July 1, 2018 to June 30, 2019.[6] CGC states that the growth in Hamilton and Bradley counties, such as the addition of Volkswagen, Wacker, and Amazon facilities, along with the commercial districts and residential developments that follow them, support the requested 29.8 million in capital budget expenditures. The Company also states that these capital expenditures will allow it to meet Commission safety compliance requirements and to improve the reliability of its system.[7] The *Petition* also states that all known and measurable impacts of the Tax Cuts and Jobs Act ('the Act"), which became effective January 1, 2018, are incorporated into the filing and that the Commission's directives in Docket 18-00001[8] are accomplished by incorporation of the tax effects into this proceeding.[9]

CGC also requests in its *Petition* to terminate the Alignment and Usage Adjustment ("AUA") and revert the R-1 and C-1 AUA customers back to the Weather Normalization Adjustment ("WNA"). As part of this request, the Company seeks to recover nearly $2 million[10] of unrecovered customer AUA revenue through the Interruptible Margin Credit Rider

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[5] *Id.* at 5.
[6] *Id.* at 3-5.
[7] *Id.* at 5-8.
[8] The Commission placed certain requirements on the five largest utilities, which includes CGC, following its investigation of the impacts of Federal Tax reform on public utility revenues. *See, In Re: Tennessee Public Utility Commission Investigation of Impacts of Federal Tax Reform on the Public Utility Revenue Requirements*, Docket No. 18-00001, Order Approving Staff Report and Recommendations, (October 1, 2018).
[9] *Petition*, at 8-9.
[10] The amount of the deficiency at the time of filing of the *Petition* was $1.9 million, but at the time of the Hearing, the deficiency had been reduced to $1.4 million before interest. *See* Transcript of Hearing, Vol. II C, p. 209 (August 21, 2018).

("IMCR").[11]

CGC also requests in its *Petition* to opt into an annual rate review under the alternative regulatory methods ("ARM") statute, pursuant to Tenn. Code Ann. § 65-5-103(d)(1)(A).[12] Subsequently, however, the Company gave notice of its withdrawal of its request for approval of its ARM.[13]

Along with its *Petition*, CGC filed Minimum Filing Guidelines, a revised Tariff and the pre-filed direct testimony and exhibits of CGC's witnesses: Wendell Davis, Heath Brooks, Rachel Johnson, James Vander Weide, Dan Yardley, Dane Watson, Michael Adams, Archie Hickerson, Gregory Becker and John Cogburn. The Company also filed a *Proposed Protective Order* and a *Proposed Procedural Schedule* on the same date as the filing of its *Petition.*

II. TRAVEL OF THE CASE

The Consumer Protection and Advocate Division of the Attorney General ("Consumer Advocate") filed a *Petition to Intervene* on March 9, 2018. The Chattanooga Regional Manufacturers Association ("CRMA") filed a *Petition for Leave to Intervene* on March 8, 2018. The Consumer Advocate also filed a *Proposed Agreed Protective Order* on March 2, 2018 and a *Proposed Procedural Schedule* on March 9, 2018.

The Hearing Officer issued the *Agreed Protective Order* on March 13, 2018. Subsequently, the Hearing Officer entered an *Order Granting the Petition to Intervene Filed By the Consumer Advocate*, an *Order Granting the Petition to Intervene Filed By the Chattanooga Regional Manufacturers Association*, and an *Order Establishing Procedural Schedule* on March 23, 2018. The parties commenced the submission of discovery requests and responses. During

[11] *Petition*, p. 8-16.
[12] *Id.* at 16-19.
[13] *Chattanooga Gas Company Notice of Withdrawal from Further Consideration in this Docket of its Requests for Approval of its Proposed Alternative Regulatory Methods* (April 10, 2018).

the discovery process, CGC submitted revised testimony for John M. Cogburn, Archie R. Hickerson and Wendell Dallas. In addition, CGC submitted the pre-filed testimony of Gary Tucker in substitution for the pre-filed testimony of Rachel Johnson.[14] In responding to certain discovery requests submitted by the Consumer Advocate, CGC identified errors on certain schedules and subsequently in late May 2018 submitted revised schedules correcting these errors. This revision maintains the requested overall return of 7.83% with a revised rate increase of approximately $6.2 million.[15]

The Consumer Advocate submitted pre-filed testimony of its rebuttal witnesses, Christopher C. Klein, Ph.D., David Dittemore and William H. Novak. CRMA filed the direct testimony of its witnesses, Randy Carter and David Klinger on July 3, 2018. CGC submitted rebuttal testimony of Wendell Dallas, Dr. James H. Vander Weide, Michael J. Morely, Michael J. Adams, John M. Cogburn, James Barvie, Jacob A. Ziliak, Heath J. Brooks, Gregory Macleod, Gary A. Tucker, Deborah A. Santolin, Daniel P. Yardley, Christopher Bellinger and Archie R. Hickerson on August 3, 2018. In addition, CGC submitted the pre-filed direct testimony of Deborah Santolin, substituting for the pre-filed direct testimony of Gregory Becker on the same date.

On July 26, 2018, the Hearing Officer issued a *Notice of Public Comment* providing members of the public an opportunity to provide oral comment in a public meeting presided by the Commission Chair at the University Center at the University of Tennessee-Chattanooga. An *Amended Notice of Public Comment* was filed on August 3, 2018 to correct the address of the University Center. An additional notice was provided upon the filing of the *Re-Notice of Public*

[14] Gary Tucker substituted as a witness for Rachel D. Johnson, who had originally submitted pre-filed direct testimony but subsequently left the employment of CGC. Mr. Tucker worked with Ms. Johnson and was able to adopt Ms. Johnson's testimony and thereby substitute for her as a witness. *See* Transcript of Hearing, Vol. I C, pp. 214-215 (August 20, 2018).
[15] Transcript of Hearing, Vol. I C, p. 219 (August 20, 2018).

Comment on August 7, 2018. At the Public Comment Meeting held by the Commission on August 9, 2018, customers of CGC provided statements regarding their experiences with CGC, the services provided by the Company, and the rates proposed in the *Petition.* Additionally, written comments were filed by members of the public. On August 15, 2018, CGC filed copies of the legal notices concerning the Hearing date and the proposed rate changes that were published in appropriate newspapers of general circulation, as required by TPUC Rule 1220-4-1-.05. CGC filed additional published legal notices concerning the Hearing date and proposed rate changes on August 28, 2019.

III. THE HEARING AND POST HEARING FILINGS

The Hearing on the merits of the *Petition* commenced in Nashville and was held on August 20, August 21 and August 22, 2018, as noticed by the Commission on August 10, 2018. Participating in the Hearing were the following parties and their respective counsel:

> Chattanooga Gas Company – **J.W. Luna**, Esq., Luna Law Group, PLLC, 333 Union Street, Suite 300, Nashville, Tennessee 37201; **Floyd R. Self**, Esq., Berger Singerman LLP, 313 North Monroe Street, Suite 301, Tallahassee Florida 32301.
>
> Consumer Protection and Advocate Division – **Wayne M. Irvin**, Esq. and **Daniel P. Whitaker, III**, Esq., Office of the Tennessee Attorney General, Public Protection Section, Consumer Protection and Advocate Division, P.O. Box 20207, Nashville, Tennessee 37202-0207.
>
> Chattanooga Regional Manufacturers Association – **Henry Walker**, Esq., Bradley Arant Boult Cummings, LLP, 1600 Division Street, Suite 700, Nashville, Tennessee 37203.

The panel heard testimony from CGC witnesses, Wendell Dallas, Dr. James H. Vaner Weide, Gregory Macleod, Dane Watson, Michael Adams, Heath Brooks, Gary Tucker, Michael J. Morley, Deborah Santolin, Jacob A. Ziliak, Christopher Bellinger, Daniel P. Yardley, Archie Hickerson, John Cogburn, and James Garvie. The Consumer Advocate presented witness testimony from William H. Novak, David Dittemore, and Dr. Christopher C. Klein. The parties

stipulated to the testimony of CRMA witnesses David Klinger and Randy Carter, who were made available for questions from the Commissioners or Commission Staff.[16] On each day of the Hearing, the panel solicited comments from the public, but no member of the public sought to be heard.[17]

The parties waived closing arguments at the Hearing in favor of filing Post-Hearing Briefs. The Hearing Officer issued an *Order Establishing Post-Hearing Procedural Schedule* on August 27, 2018. CGC filed updated information requested by Commission Staff during the Hearing on August 28, 2018. CGC, the Consumer Advocate and CRMA filed their Post-Hearing Briefs on September 10, 2018.

The Commission convened on October 15, 2018, during a regularly scheduled Commission Conference, which was duly noticed on October 5, 2018. The voting panel assigned to this matter deliberated, announced findings and conclusions upon consideration of the entire record, including all exhibits and the testimony of witnesses, and voted unanimously in favor of the finding and conclusions.[18]

IV. CRITERIA FOR ESTABLISHING JUST AND REASONABLE RATES

The Commission has jurisdiction to set the rates of public utilities operating in the State of Tennessee.[19] In setting rates for public utilities, the Commission balances the interests of the utilities subject to its jurisdiction with the interests of Tennessee consumers, i.e., it is obligated to fix just and reasonable rates.[20] A public utility possesses the burden of proof on a petition to approve an adjustment of its rates.[21]

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[16] Transcript of Hearing, Vol. III A, pp. 17-18 (August 22, 2018).
[17] Transcript of Hearing, Vol. I A, p. 7 (August 20, 2018); Transcript of Hearing, Vol. II A, p. 5, (August 21, 2018); Transcript of Hearing, Vol. III A, p. 70 (August 22, 2018).
[18] Transcript of Commission Conference, pp. 50-58 (October 15, 2018).
[19] Tenn. Code Ann. §§ 65-4-101(6); 65-4-104; 65-5-101, *et seq.*
[20] Tenn. Code Ann. § 65-5-101 (2018).
[21] Tenn. Code Ann. § 65-5-103(a) (2018).

The Commission must also approve a rate that provides the regulated utility an opportunity to earn a just and reasonable return on its investments.[22] The Commission considers petitions for a rate increase, filed pursuant to Tenn. Code Ann. § 65-5-103, in light of the following criteria:

1. The investment or rate base upon which the utility should be permitted to earn a fair rate of return;

2. The proper level of revenues for the utility;

3. The proper level of expenses for the utility; and

4. The rate of return the utility should earn.

There is no single, precise measure of the fair rate of return a utility is allowed an opportunity to earn. Therefore, the Commission must exercise its judgment in making an appropriate determination. The Commission, however, is not without guidance in exercising its judgment:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[23]

In addition, the United States Supreme Court has determined that regulated utilities are entitled to a return that is "just and reasonable."[24] The rate a utility is permitted to charge should enable it "to operate successfully, to maintain its financial integrity, to attract capital, and to

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[22] *Bluefield Water Works and Improvement Company v. Public Service Commission of the State of West Virginia*, 262 U.S. 679, 43 S.Ct. 675 (1923).
[23] *Id.* at 692-693; *see also Duquesne Light Co. v. Barasch*, 488 U.S. 299, 310 (1989).
[24] *Federal Power Comm'n v. Hope Natural Gas Co.* 320 U.S. 591, 605 (1944).

compensate investors for the risks assumed."[25]

The general standards to be considered in establishing the fair rate of return for a public utility are financial integrity, capital attraction and setting a return on equity that is commensurate with returns investors could achieve by investing in other enterprises of corresponding risk.[26] Thus, rates established must allow a company to cover its operating expenses and provide an opportunity to earn a fair rate of return on a company's investment used to provision service. Further, a rate should be reasonable not only when it is first established, but also for a reasonable time thereafter.[27]

The Commission has wide discretion with regard to setting rates. The Commission may "utilize an historical test period, a forecast period, a combination of these where necessary, or any other accepted method of rate making necessary to give a fair rate of return."[28] The Supreme Court noted in *Powell Tel. Co. v. Tennessee Pub. Serv. Comm'n* that, "there is no statutory nor decisional law that specifies any particular approach that must be followed by the Commission. Fundamentally, the establishment of just and reasonable rates is a value judgment to be made by the Commission in the exercise of its sound regulatory judgment and discretion."[29] Accordingly, the Commission is not limited to adopting any particular approach or to adopting a specific test period in making known and measurable adjustments to produce just and reasonable rates.[30]

Applying these principles and criteria, and upon consideration of the entire record, including all exhibits and the testimony of the witnesses, the panel made the following findings and conclusions.

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[25] *Id.*
[26] *Id.* at 603.
[27] *McCardle v. Indianapolis Water Co.*, 272 U.S. 400, 408-409, 47 S.ct 144, 148 (1926); *Southern Bell Telephone & Telegraph Co. v. Tennessee Pub. Serv. Comm'n*, 304 S.W2d 640, 647 (1944).
[28] *Powell Tel. Co. v. Tennessee Pub. Serv. Comm'n,* 660 S.W.2d 44, 46 (Tenn.1983); *Am. Ass'n of Retired Persons v. Tennessee Pub. Serv. Comm'n,* 896 S.W.2d 127, 133 (Tenn.Ct.App.1994).
[29] *Powell*, 660 S.W.2d at 46.
[30] *CF Industries v. Tennessee Pub. Serv. Comm'n,* 599 S.W.2d 536, 543 (Tenn. 1980).

V. FINDINGS AND CONCLUSIONS

A. TEST PERIOD AND ATTRITION PERIOD

In a rate case, the Commission must decide the appropriate test period and attrition period to be utilized in the calculation of rates. Selecting the test period has the stated purpose of providing an indication of the rate of return that will be produced during the period under the existing rate structure in the reasonably foreseeable future. The test period takes into consideration the estimated effect of calculations related to revenues, expenses, and investments. As previously stated, the Commission has wide discretion with regard to this decision.

The Company selected a historical test period of the twelve months ending June 30, 2017 and an attrition period of the twelve months ending June 30, 2019. CGC utilizes a combination of historical booked amounts with normalizing adjustments and historical growth rates, plus its annual budgeted process for forecasting attrition period revenue, expense, and rate base amounts.

The Consumer Advocate chose a test period of the twelve months ending December 31, 2017 and an attrition period of the twelve months ending December 31, 2019. The Consumer Advocate develops its attrition period revenue, expense and rate base amounts based on historical test period averages of booked amounts with normalizing adjustments. The Consumer Advocate then applies historical growth rates along with a national consumer price index to arrive at attrition period amounts.

The Commission noted that, in general, the most recent normalized test period is the most appropriate base to be used in forecasting because recent results are generally more reflective of future outcomes. Applying this principle to the instant case, the panel found the later test period of the twelve months ending December 31, 2017 utilized by the Consumer Advocate was the appropriate test period and, accordingly, voted unanimously to adopt it. The panel also voted

unanimously to adopt the Company's attrition period of the twelve months ending June 30, 2019, finding that the evidence in the record better supports this attrition period.

B. Revenues (Including Cost of Gas and Margin Calculation)

Total Operating Margin consists of the sum of Base Revenues, Other Revenues and Allowance for Funds Used during Construction (AFUDC), less the Cost of Gas. Table 1 below summarizes the differences between the Company's and the Consumer Advocate's forecasted Attrition Period Total Operating Margin, as well as that adopted by the voting panel of the Commission. A discussion of each component follows.

Table 1

	Company[31]	Consumer Advocate[32]	Commission Panel
Operating Revenues:			
Gas Sales Revenue	$69,644,006	$74,740,093	$70,473,655
Other Revenue	612,767	675,121	675,121
AFUDC	900,355	340,214	823,951
Total Operating Revenues	**$71,157,128**	**$75,755,428**	**$71,972,727**
Less Cost of Gas	37,973,978	42,765,421	38,611,525
Total Operating Margin	**$33,183,150**	**$32,990,007**	**$33,361,202**

B(1). Gas Sales Revenues

Gas sales revenues are forecasted by adjusting the test period billing determinants for the impacts of normal weather, annualized customer usage, and customer growth to arrive at the attrition period billing determinants. Attrition period billing determinants are then multiplied by the current (existing) base tariff rates and the appropriate Purchased Gas Adjustment rate to produce the attrition period gas sales revenues at current rates.

[31] CGC's Updated Response to TPUC's Workbook Request, Schedule 3 (August 28, 2018).
[32] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule7 (August 24, 2018).

CGC used the twelve months ended June 30, 2017 as its test period, forecasting gas sales revenues through its chosen attrition period, the twelve months ending June 30, 2019. The Company's Witness Heath Brooks testified that the weather normalization adjustment is computed by using a multi-linear regression methodology[33] to determine heating degree days and then another regression analysis to compute the appropriate WNA formula factors. Annualized customer usage and customer growth for the homogenous residential and commercial customer classes is based on consumption equations, using a multi-step process. Mr. Brooks uses a residential growth factor of 1.27% and a commercial growth factor of 0.46%. Other customer classes are analyzed based on a customer's foreseeable usage and demand requirements through the attrition period.[34] The Company then multiplies the forecasted attrition period billing determinants by the current tariff rates to arrive at its gas sales revenue forecast.[35]

The Consumer Advocate elected to use the twelve months ended December 31, 2017 as its test period, citing the fact that it contains more recent information than the test period used by the Company. The Consumer Advocate then forecasts gas sales revenues through its attrition period, the twelve months ending December 31, 2019. Consumer Advocate Witness William Novak uses a simple linear regression calculation of heating degree days to sales per bill to normalize usage.[36] Mr. Novak testified that this is the same weather normalization methodology historically adopted by this Commission in prior rate cases.[37] Mr. Novak used this same methodology to compute the proposed WNA formula factors. Mr. Novak computed customer growth for the residential and commercial classes by calculating the 2-year historical average of

[33] This methodology uses the Company's proprietary software program Forecast Pro.
[34] Heath J. Brooks, Pre-filed Direct Testimony, p. 3 (February 15, 2018).
[35] *Id.* at 4-5.
[36] Normal weather is determined based on a thirty (30) year average. The Consumer Advocate uses the 30-year period ended December 31, 2017, the end of its test period.
[37] William H. Novak, Pre-filed Direct Testimony, p. 8 (July 3, 2018).

added customers. For industrial customers, Mr. Novak utilized the test period numbers as representative of the attrition period. Customer usage for the residential and commercial classes were normalized, while industrial customer sales volumes were individually analyzed. Mr. Novak then multiplies his forecasted attrition period billing determinants by the current tariff rates to arrive at his gas sales revenue forecast. [38]

After reviewing the record and parties' calculations, the panel applied its adopted test period of the twelve months ended December 31, 2017 and the twelve months ending June 30, 2019 for the forward looking attrition period. Further, the panel adopted the average normalized usage per customer as calculated by the Consumer Advocate for the residential and commercial classes and the Consumer Advocate's individual customer analysis of forecasted usage for the industrial customers, finding both to be reasonable, particularly since the factors were based on historical data.

In addition, the panel found that the weather normalization adjustment methodology utilized by the Consumer Advocate is the more appropriate methodology, as it is a simple regression that is straight forward and can be easily replicated and is a methodology that has been historically adopted and utilized by the Commission. The WNA methodology utilized by CGC consists of a multi-step regression analysis using proprietary software that cannot be verified or recomputed without use of the software.

The voting panel voted unanimously to terminate the Alignment and Usage Mechanism (AUA) as recommended by the parties and to reinstate the Weather Normalization Adjustment (WNA) for the R-1 and C-1 rate classes, consistent with the simple regression methodology proposed by the Consumer Advocate and adjusted for the attrition period ending June 30, 2019. Thereafter, the panel voted unanimously to adopt attrition period Gas Sales Revenues of

[38] *Id.* at 10-11. *See also* Willian H. Novak Revenue Workpapers.

$70,473,655. The panel arrived at $70,473,655 based on the sum of amounts it unanimously adopted for:

Residential Revenues	$34,303,189;
Multi-Family Housing Revenues	$ 66,956;
Commercial C-1 Revenues	$ 7,594,595;
Commercial C-2 Revenues	$20,503,715;
Industrial F-1/T-2 Revenues	$ 3,085,648;
Industrial I-1 Revenues	$ 185,059;
Industrial T-1 Revenues	$ 1,082,153;
Industrial T-1/T-2 Revenues	$ 1,709,871;
Industrial T-3 Revenues	$ 1,800,158; and,
Special Contract Revenues	$ 142,310.

B(2). OTHER REVENUES

Other Revenues is a category consisting primarily of forfeited discounts and miscellaneous service charges. CGC forecasts Other Revenues based upon its budget and historical trends, resulting in a total of $612,767 for the attrition period.[39] The Consumer Advocate used a historical four year average as its forecast, resulting in an attrition period amount of $675,121.[40]

The panel found that the use of an historical four year average is a reasonable methodology for calculation of Other Revenues, as it uses known amounts as its basis as opposed estimated amounts. Thereafter the panel unanimously voted to adopt $675,121 for attrition period Other Revenues.

B(3). ALLOWANCE FOR FUNDS USED DURING CONSTRUCTION

Allowance for Funds Used during Construction ("AFUDC") is a component of construction costs representing the net cost of funds borrowed and a reasonable return on those funds used during construction. The calculation of AFUDC is a function of the forecasted

[39] Heath J. Brooks, Pre-filed Direct Testimony, pp. 13-14 and Workpapers, (February 15, 2018).
[40] William H. Novak, Pre-filed Direct Testimony, p. 11, (July 3, 2018).

balance of Construction Work in Progress ("CWIP") for the attrition period multiplied by the proposed weighted average cost of capital for the attrition period.

CGC estimated AFUDC by multiplying its forecasted balance of CWIP for the attrition period by the Company's proposed weighted average cost of capital for the attrition period.[41] The Consumer Advocate forecasted AFUDC using a five year average of AFUDC from 2013 to 2018.[42]

The panel applied its determined weighted cost of capital of 7.12% to its calculated thirteen month average direct CWIP balance of $11,576,245, exclusive of allocated CWIP of $881,194. Therefore, the panel unanimously adopted $823,951 for Allowance for Funds Used During Construction for the attrition period.

B(4). Cost of Gas

Since Gas Costs are recovered through the Purchased Gas Adjustment mechanism, they are not included in the calculation of the Revenue Requirement. It is therefore necessary to deduct the computed cost of gas sales projected for the attrition period from Total Revenues to arrive at Total Operating Margin.

CGC used the wholesale futures price of natural gas as reported by NYMEX on January 3, 2018 as the basis to project an attrition period PGA rate, and using a regression equation developed with historical NYMEX prices and historical CGC retail prices. This rate is then applied to the attrition period billing determinants.[43] The Consumer Advocate prices out gas costs by multiplying its attrition period billing determinants by CGC's approved December 31, 2017 PGA tariff rate.[44]

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[41] Gary Tucker, Pre-filed Direct Testimony, p. 6 (May 11, 2018).
[42] Transcript of Hearing, Vol. III A, pp. 29-30 (August 22, 2018).
[43] Heath J. Brooks, Pre-filed Direct Testimony, p. 14 (February 15, 2018).
[44] William H. Novak, Pre-filed Direct Testimony, pp. 11-12 (July 3, 2018).

The panel found that the preferred methodology is to use an actual PGA tariff rate to project PGA gas costs. In this case, the panel utilized the PGA tariff rate submitted by CGC which became effective July 1, 2018. As a result, the attrition period gas cost amount adopted unanimously by the panel was $38,611,525.

B(5). TOTAL OPERATING MARGIN

Thereafter, the panel voted unanimously to adopt a Total Operating Margin of $33,361,202 for the attrition period. The panel arrived at the sum of the amounts it adopted for the Base Revenues in the amount of $70,473,655, Other Revenues in the amount of $675,121, and AFUDC in the amount of $823,951, less the Cost of Gas in the amount of $38,611,525.

C. OPERATIONAL AND MAINTENANCE EXPENSES

Operational and Maintenance ("O&M") Expenses are comprised of expenses associated with services necessary to run the business operations of CGC. The majority of these expenses are variable and dependent upon items such as the number of customers and employees, revenues, assets, etc. CGC budgets an annual total of $13,453,586 for O&M expenses[45] while the Consumer Advocate forecasts $10,964,177[46] – a difference of $2,489,409. The main differences between the Company and the Consumer Advocate relate to payroll expense and allocated expenses from CGC's parent company, Atlanta Gas and Light ("AGL").

The panel unanimously voted to adopt annual O&M expenses of $11,478,640 for the attrition period. Below is a table summarizing the O&M attrition period and O&M Expenses as advocated by CGC and the Consumer Advocate and as adopted by the Commission panel. Following the table is a discussion of each expense component.

[45] CGC's Updated Response to TPUC's Workbook Request, Schedule 4 (August 28, 2018).
[46] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9 (August 24, 2018).

O&M Expenses	CGC	Consumer Advocate	Commission Panel
	Attrition Year End 6/30/19	Attrition Year End 12/31/19	Attrition Year End 6/30/19
Payroll expense	$3,525,350	$2,983,448	$3,216,717
Employee Benefits	632,861	728,437	716,680
Benefits Capitalized	(59,357)	(103,075)	(92,484)
Fleet Services & Facilities Expense	728,185	822,931	810,419
Outside Services	2,087,933	1,878,336	1,849,778
Other Distribution & Storage Expense	804,148	597,294	588,213
Bad Debt Expense	127,970	121,863	121,863
Sales Promotion Expense	71,891	52,574	0
Customer Service & Account Expense	6,482	4,831	4,859
Administration & General Expense	712,523	829,853	951,611
Admin. & Gen. Salaries Exp. Capitalized	(66,719)	(69,690)	(60,878)
AGL Service Company Allocations	4,822,218	3,117,375	3,371,863
Total	**$13,453,585**	**$10,964,177**	**$11,478,640**

C(1). PAYROLL EXPENSE

The Company based its payroll expense upon its 2018 budget which includes the anticipated hiring of ten new employees. This increase from forty to fifty employees represents a 25% increase over existing employee levels.[47] The payroll expense for these budgeted fifty employees multiplied by the average annual merit increase of 3% yields the attrition year payroll expense of $3,525,350.[48] Wendell David testified that, "these new employees are very necessary to improve the operational integrity and safety of our new systems due to new regulations, better training, system expansions and growth, and improved customer services and responsiveness".[49]

The Consumer Advocate based its payroll expense on the actual dollar amount for payroll expense for the twelve months ending December 31, 2017, adjusted by removing the amount of

[47] *Chattanooga Gas Company Responses and Objections to Consumer Advocate First Discovery Requests*, Response No. 1-122, (April 10, 2018). *See also* Transcript of Hearing, Vol. I A, p. 50, Hearing Exhibit 2 (August 20, 2018).
[48] Gary Tucker, Pre-filed Direct Testimony, pg. 8 (May, 11, 2018).
[49] Wendell Dallas, Pre-filed Rebuttal Testimony, p. 14 (August 3, 2018).

allocated Annual Incentive Performance Pay associated with direct CGC's labor cost.[50] The Consumer Advocate then utilized a compounded growth rate of 7.25%, based upon a two year average in labor costs growth, to calculate attrition year payroll expense of $2,983,448.[51] The Consumer Advocate disagrees with the Company's assumption that it will increase its Tennessee-Based employee count by 25% between the Test Period and Attrition Period. Mr. Dittemore testified, "[h]istory suggests the 25% increase in CGG labor is an unrealistic assumption and one that appears to be an attempt to increase the revenue requirement without any real substance."[52] As a result, the Consumer Advocate maintained the employee count from the test year of 39 through the attrition year.

The panel found that CGC consistently over-budgeted the number of employees between 2008 and 2017, having between 37 and 42 employees during that time period.[53] Upon cross examination during the hearing, Mr. Dallas confirmed that the budgeted number of employees was never achieved for 2017 and that the number of employees fluctuates throughout the year such that the Company can be three to five employees under budget at a given time.[54] The Company's approach is based upon an assumption that new hires will be in place prior to the position becoming vacant,[55] while the Company being under the budgeted number of employees may be due to new hires coming in only after a position becomes vacant. While CGC charges that the Consumer Advocate's approach "has no basis in fact or reality,"[56] it is the Company's approach that appears to be based mostly on assumptions. Therefore, while the panel found that,

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[50] David Dittemore, Pre-filed Direct Testimony, p. 6, (July 3, 2018).
[51] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachment DD 9-1, (August 24, 2018).
[52] David Dittemore, Pre-filed Direct Testimony, p. 15, (July 3, 2018).
[53] *Chattanooga Gas Company Responses and Objections to Consumer Advocate First Discovery Requests*, Response No. 1-135, (April 10, 2018).
[54] Transcript of Hearing, Volume I A, pp. 51-52, (August 20, 2018).
[55] Wendell Dallas, Pre-filed Direct Testimony, p. 13, (February 15, 2018).
[56] *Post-Hearing Brief of Chattanooga Gas Company*, p. 19 (September 10, 2018).

as the Consumer Advocate asserts, it is highly unlikely the Company will increase its employee count to 50 in the attrition period, especially based on the historical employee levels. Nevertheless, the panel found that it is reasonable to expect the employee count to increase during the attrition period.

Based upon CGC's response to the Consumer Advocate Data Request No. 1-135, the Company had 39 employees in June 2017[57] and Mr. Dallas' testimony at the Hearing confirmed that Chattanooga Gas had approximately 42 employees throughout 2017.[58] Utilizing an eighteen month Compounded Salary and Wage Rate Change Factor of 5.388%, calculated based upon the CGC's response to the Consumer Advocate's Discovery Request 1-345,[59] the panel applied this factor to the test period employee count of 42 to arrive at an attrition period employee count of 44.

CGC and the Consumer Advocate also differed on how incentive compensation was treated in their calculations. The term "incentive compensation" is also referred to as "at-risk compensation."[60] James Garvie testified on behalf of CGC that employee fixed salaries are based upon the median of the market and the incentive portion is the compensation that is at-risk contingent upon meeting pre-determined targets.[61] CGC reiterates in its Post-Hearing Brief that base salaries are set at 50% of the market and that the compensation structure should be considered in the context of the present day labor market, in which most successful businesses offer a compensation program that includes at-risk pay.[62] The Consumer Advocate adjusted its

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[57] *Chattanooga Gas Company Responses and Objections to Consumer Advocate First Discovery Requests*, Response No. 1-135, (April 10, 2018).
[58] Transcript of Hearing, Vol. 1 A, pg. 52 (August 20, 2018).
[59] *Chattanooga Gas Company Responses and Objections to Consumer Advocate Supplement to First Discovery Requests*, Response No. 1-345, (April 20, 2018).
[60] Transcript of Hearing, Vol. 1 A, pg. 12 (August 20, 2018).
[61] James Garvie, Pre-filed Rebuttal Testimony, pp. 6-10, (August 3, 2018). *See also* Transcript of Hearing, Vol. III A, pp. 8-10 (August 22, 2018).
[62] *Post-Hearing Brief of Chattanooga Gas Company*, p. 10 (September 10, 2018).

attrition forecast of payroll expense to remove $228,786 of incentive compensation, asserting that such "payouts are driven by corporate and business unit financial performance that directly benefits The Southern Company shareholders and therefore such costs should not be borne by CGC ratepayers."[63]

The panel found the Consumer Advocate's 2019 forecasted incentive pay exclusion to be reasonable, grounded upon historical operations and consistent with the long-standing policy established by the Commission regarding incentive pay. Moreover, the Company provided no convincing evidence justifying its deviation from established Commission policy. In addition, as Consumer Advocate witness Dittemore testified[64] and CGC witness Garvie acquiesced,[65] short-term incentive compensation is partially paid out based upon enhancing the earnings per share ("EPS") of the Southern Company stock price. CGC and the Consumer Advocate agreed that while ratepayers may benefit from efficiency, stockholders will also benefit from increased EPS. The panel found the compensation to be fair, with annual merit increases through the attrition period. For the foregoing reasons, the panel unanimously voted to disallow 50% of the short term incentive compensation.

The panel voted unanimously to adopt a payroll expense of $3,216,717 for the twelve month attrition period ending June 30, 2019. The panel arrived at this amount applying its findings on CGC payroll expense, beginning with the test period (twelve months ending December 31, 2017) payroll expense, removing 50% of the short term incentive compensation to arrive at an adjusted test period payroll, calculating the average employee pay using the December 31, 2017 employee count, and then multiplying the average employee pay by the

[63] David Dittemore, Pre-filed Direct Testimony, p. 7, (July 3, 2018).
[64] *Id.* at 7-8.
[65] Transcript of Hearing, Vol. III A, p. 11, (August 22, 2018).

attrition period employee count. Utilizing this calculation, the panel arrived at the adopted payroll expense of $3,216,717.

C(2). EMPLOYEE BENEFITS

Employee benefits includes the costs associated with 401(k) benefits, group health benefits, pension expense, and post-retirement benefits other than pensions. CGC based its employee benefit expense upon its 2018 budget to achieve attrition year employee benefit expense of $632,861. The 401(k) costs were based on the 2018 budget and increased by the average annual merit increase of 3%. Group health and other benefits were based upon data collected relative to medical, prescription drug and behavioral health claims. According to Mr. Tucker, changes to enrollment, plan changes and administrative costs were also considered in developing the attrition period estimate. The post retirement and pension expense was based upon an estimate from the Company's actuary. [66]

The Consumer Advocate based its employee benefits expense on the actual amount of $728,437 for the twelve months ending December 31, 2017.[67] Mr. Dittemore testified that this amount was adjusted by removing accrued pension and Other Post-Employment Benefits ("OPEB") and capitalized pensions, and cash pension contributions were added[68] for a total negative adjustment of $66,775.[69] The resulting amount was then multiplied by the compounded growth factor of 7.25% to arrive at employee benefits expense of $728,437.[70]

The panel found that, based upon review of budgeting process documents provided by CGC, employee benefits are budgeted by the Human Resource Department and no benefits are

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[66] Gary Tucker, Pre-filed Direct Testimony, pp. 8-9, (May 11, 2018).
[67] David Dittemore, Pre-filed Direct Testimony, p. 5, (July 3, 2018).
[68] Consumer Advocate Data Request 1-308 only identified cash contributions to the pension plan and none to its OPEB plan.
[69] David Dittemore, Pre-filed Direct Testimony, p. 8, (July 3, 2018).
[70] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, (August 24, 2018).

budgeted for incremental employees. Further, the panel found that the budgeting process makes no mention of the Company comparing its forecasted budget to the latest actual 12 months to identify any abnormalities or the reasonableness of the budgeted amounts or that CGC will no longer pay Dental and Vision Premiums.

Based upon a review of the actuarial report cited by the Company, the panel found that there is no required contribution amount provided in the report. Therefore, the panel found CGC's assertion that pension expense was based upon the actuarial report to be unsubstantiated. Further, CGC makes no argument that the cash approach utilized by the Consumer Advocate is incorrect; but rather argues the GAAP method "makes better sense."[71]

Based upon analysis of the evidence, the panel voted unanimously to adopt employee benefits expense for the twelve month attrition period ending June 30, 2019 of $716,680. The panel arrived at that amount for employee benefits expense based upon the December 31, 2017 test period with the recommended adjustments of ($66,775) as described by the Consumer Advocate, and removal of Dental and Vision Premiums, for a total of $688,801. The panel then grew this amount to the projected 44 employees and applied the compounded composite growth factor of 3.7% to arrive at the adopted $716, 680 for the attrition year.

C(3). BENEFITS CAPITALIZED

As with other O&M expenses, the Company forecasted its attrition period Benefits Capitalized of ($59,257) as the budgeted amount for the calendar year 2018 and then grew that amount through the attrition period ending June 30, 2019.[72] The Consumer Advocate applied a

[71] *Post-Hearing Brief of Chattanooga Gas Company*, p. 13 (September 10, 2018).
[72] CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018).

compounded growth rate of 5.3% to the test period amount of ($97,884) to arrive at ($103,075) for benefits capitalized.[73]

The panel found that it could accept neither of the expense figures asserted by the parties, as the attrition year adopted by the panel is forecasting fewer employees than CGC and more employees than the Consumer Advocate. Therefore, the panel calculated a percentage of benefits capitalized using the December 31, 2017 test period amount of benefits expensed plus the benefits capitalized in total to the benefits capitalized and subsequently grossed up employee benefit expense by the inverse to arrive at a total employee benefit amount for the attrition year ending December 31, 2019. The benefits capitalized percentage was applied to the total employee benefit amount $809,164 to arrive at employee benefits capitalized of ($92,484). Therefore, the panel voted unanimously to adopt an operation and maintenance expense of Benefits Capitalized of ($92,484) for the attrition year ending December 31, 2019.

C(4). Fleet Services and Facilities, Outside Services, Other Distribution and Storage

The Company based its fleet services, facilities, outside services and other distribution expense upon the 2018 budget to achieve attrition year expense of $728,185 for fleet services, $2,087,933 for outside services and $804,148 for other distribution and storage expense.[74] According to Mr. Tucker all of these expenses were forecasted for the 2018 year and increased by a monthly average CPI percentage of 3% for six months through the end of the attrition period.[75]

The Consumer Advocate arrived at attrition period expenses of $822,931 for fleet services, $1,878,336 for outside services and $597,294 for other distribution and storage

[73] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachment DD 9-3, (August 24, 2018).
[74] CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018).
[75] Gary Tucker, Pre-filed Direct Testimony, p. 9, (May 11, 2018).

expenses by utilizing the actual amounts per the trial balance at December 31, 2017.[76] Using these beginning balances, the Consumer Advocate applied an average two year compounded annual growth factor of 5.30% based on the CPI for 2018 and 2019.[77]

The panel found that CGC's budget process fails to compare the forecasted budget to the latest actual 12 months ending to identify any abnormalities between historical expenditures and budgeted upcoming expenditures. Further, the panel found that expenses should be aligned with the operations of the Company and should trend with previous expenditures and therefore, should be based upon historical amounts rather than a forecast which is not based on a realistic foundation. The panel also noted the different starting point used by the Company and the Consumer Advocate as the basis to determine the attrition period amounts.

Based upon calculations utilizing the actual test period amounts at December 31, 2017 and growing them by a compounded growth factor of 3.7%, the panel arrived at balances for the attrition period ending June 30, 2019 for Fleet Services and Facilities of $810,419, Outside Services of $1,849,778 and Other Distribution and Storage of $588,213. The panel unanimously voted to adopt operation and maintenance expenses for the attrition year ending June 30, 2019 for the following categories: Fleet Services and Facilities, $810,419; Outside Services, $1,849,778; and, Other Distribution and Storage, $588,213.

C(5). BAD DEBT (UNCOLLECTIBLE EXPENSE)

The Company forecasted $127,970 for bad debt expense by taking its projected December 31, 2018 budget and increasing the amount by monthly average CPI percentages[78]

[76] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, (August 24, 2018).
[77] David Dittemore, Pre-filed Direct Testimony, p. 14, (July 3, 2018). *See also* Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, (August 24, 2018).
[78] CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018).

from the end of test period through the end of the attrition period.[79] In its Post-Hearing Brief the Company states this expense is partially based upon its proposed rate increase.[80] The Consumer Advocate took an actual five year average (2013-2017) of uncollectible expense of $100,904 and added an actual five year average of uncollectible expense-damages of $20,958 to arrive at an attrition period bad debt expense of $121,863.[81]

The panel found that the use of actual data for determining bad debt expense rather than forecasted budget based in part on a requested rate increase is reflective of the widely accepted policy of the Commission of historical forecasting which is grounded on actual results. Therefore, the panel found the Consumer Advocate's amount for bad debt expense to be reasonable. The panel voted unanimously to adopt the amount of $121,863 as bad debt expense for the attrition period ending June 30, 2019.

C(6). SALES PROMOTION

The Company forecasted $71,891 for sales promotion expenses.[82] This amount was calculated by taking CGC's forecasted 2018 budget for sales promotion expense and growing the amount by a CPI index to arrive at an amount for attrition period ending June 30, 2019.[83] The Consumer Advocate calculated sales promotion expense by taking the amount of such expense on CGC's December 31, 2017 trial balance of $51,996 and applying a growth factor derived from the growth in labor costs from 2015-2017. The Consumer Advocate arrived at a resulting sales promotion expense is $52,574 for the attrition period ending December 31, 2019.[84]

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[79] Gary Tucker, Pre-filed Direct Testimony, p. 10, (May 11, 2018).
[80] *Post-Hearing Brief of Chattanooga Gas Company*, p. 34, (September 10, 2018).
[81] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, (August 24, 2018).
[82] CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018).
[83] Gary Tucker, Pre-filed Direct Testimony, p. 9, (May 11, 2018).
[84] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachment DD 9-6, (August 24, 2018).

While both parties include sales promotion as recoverable expenses, the panel found that Commission Rule 1220-04-05.45 on Advertising applied to this expense. The Rule provides:

> 1220-04-05-.45 ADVERTISING.
>
> (1) A utility may not recover from any person other than their shareholders (or other owners) any direct or indirect expenditure for promotional or political advertising.
> (a) The term "advertising" means the commercial use of any media, including newspaper, printed matter, radio, and television, in order to transmit a message to a substantial number of members of the public or to gas customers.
> (b) The term "political advertising" means any advertising for the purpose of influencing public opinion with respect to legislative, administrative, or electoral matters, or with respect to any controversial issue of public importance.
> (c) The term "promotional advertising" means any advertising for the purpose of encouraging any person to select or use gas service or additional gas service or the selection or installation of any appliance or equipment designed to use gas service.
> (d) The terms "political advertising" and "promotional advertising" do not include:
>
> 1. Advertising which informs gas customers how they can conserve energy or can reduce peak demand for gas;
> 2. Advertising required by law or regulation, including advertising required under Part 1 of Title II of the National Energy Conservation Policy Act;
> 3. Advertising regarding service interruptions, safety measures or emergency conditions;
> 4. Advertising concerning employment opportunities;
> 5. Advertising which promotes the use of energy efficient appliances, equipment, services, or which informs customers that natural gas is cheaper and/or more efficient than other fuels; or
> 6. Any explanation or justification of existing or proposed rate schedules or notification of hearings thereon.

Upon review and verification of the Uniform System of Accounts ("USOA") in which CGC's sales promotion was accounted booked, the panel found the accounts to be clearly defined in USOA as advertising and activities promoting sales. Therefore, based upon Commission rules that clearly prohibit expenses related to sales activities from being recovered

in consumer rates, the panel voted to exclude sales promotion expense from attrition period expenses.

C(7). CUSTOMER SERVICE AND ACCOUNT

CGC forecasted $6,482 for the attrition period ending June 30, 2019 utilizing the Company's forecasted budget and grown by the annual CPI growth factor to arrive at an amount for June 30, 2019 attrition period.[85] The Consumer Advocate took the December 31, 2017 ending trial balance amount of $4,775 and applied a customer related growth factor, arriving at a resulting customer service and account promotion expense of $4,831 for the attrition period.[86]

The panel found that the use of historical data as a starting point for calculations provides more credibility and verifiable evidence than the use of budgeted amounts for the attrition period. However, upon review of the Consumer Advocate's calculation for customer service and account expense, the panel found that the growth factor applied by the Consumer Advocate was not compounded for the correct growth time frame. Applying the compounded customer growth factor of 1.76% to the test period amount of $4,775 yields an attrition period expense of $4,859. Accordingly, the panel voted unanimously to adopt $4,859 in customer service and account expense for the attrition period ending June 30, 2019.

C(8). ADMINISTRATIVE AND GENERAL

According to Mr. Tucker, administrative and general expenses were forecasted by taking the 2018 budget amounts and increasing them by monthly average CPI percentages from the end of test period through the end of the attrition period.[87] To this amount, the Company added an annual deferred rate case amortization expense of $248,333 ($1,241,665 in total rate case

[85] Gary Tucker, Pre-filed Direct Testimony, p. 9, (May 11, 2018); CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018).
[86] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachment DD 9-7, (August 24, 2018).
[87] Gary Tucker, Pre-filed Direct Testimony, p. 9, (May 11, 2018).

expenses amortized over a five year period). In total, the Company forecasted $712,523 for administrative and general expenses for the attrition period.[88] CGC urges that its rate case expenses are just and reasonable and presented testimony from Mr. Dallas, Mr. Hickerson, Mr. Yardley and Mr. Tucker concerning the prudency and necessity of the expenses.[89] Mr. Dallas testified that the filing of the case was delayed because of the passage of the Tax and Jobs Act in December of 2017 which caused CGC to redo its case due to reduction in corporate tax rates.[90]

The Consumer Advocate took the actual amount of administrative and general expenses per the trial balance at December 31, 2017 and applied an average two year compounded growth factor of 5.30% based on the CPI for 2018 and 2019 to calculate its attrition period amount.[91] The Consumer Advocate then added an annual deferred rate case amortization expense of $115,718, which is calculated by taking the Consumer Advocate's recommended total rate case expense of $347,153 and amortizing it over three years.[92] The difference in the rate case expense is due to the Consumer Advocate eliminating the recovery of consultant costs related to the class cost of service study, which Mr. Novak testified has never been accepted by Commission, nor on which has the Commission set utility rates.[93] The Consumer Advocate stated the legal expenses to prepare and try the case were much higher than anticipated and "seemed duplicative and imprudent."[94] Therefore, the Consumer Advocate eliminated one-half the estimated legal

[88] CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018).
[89] *Post-Hearing Brief of Chattanooga Gas Company*, p. 14, (September 10, 2018).
[90] Wendell Dallas, Pre-filed Rebuttal Testimony, p. 3, (August 3, 2018); *See also* Gary Tucker, Pre-filed Rebuttal Testimony, p. 5, (August 3, 2018).
[91] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachments DD 9-8 and 10-2, (August 24, 2018).
[92] *Id.*
[93] William H. Novak, Pre-filed Direct Testimony, p. 24, (July 3, 2018); Transcript of Hearing, Vol. III A, p. 32, (August 22, 2018). *See also Consumer Advocate's Post-Hearing Brief*, p. 28-29 (September 10, 2018).
[94] *Id.*

expenses from recovery in rates. The Consumer Advocate's resulting calculation of administrative and general expenses for the attrition period is $829,853.[95]

As discussed more fully in section J(4) herein below, the panel notes its concern regarding the high level of rate case expenses, acknowledging the benefit that both ratepayers and stockholders receive from the rate increases that generally follow the completion of rate cases. The panel found that in this case, the documentation and evidentiary record are not sufficiently detailed to determine a reasonable apportionment of rate case expense between ratepayers and shareholders based on their relative benefits from the proceeding. Without such proof, the panel determined that exclusion of a percentage or specific amount of rate case expense would be unsupported and potentially arbitrary. Accordingly, the panel found CGC's proposed rate expenses and proposed five-year amortization to be reasonable and acceptable.

The panel arrived at total administrative and general expenses of $951,611 for the twelve month attrition period ending June 30, 2019. This amount is calculated by taking the December 31, 2017 trial balance of administrative and general expenses and growing that amount by a composite 3.7% growth factor, and then adding $248,333 of amortized of rate case expenses. The panel voted unanimously to adopt $951,611 in administrative and general expenses for the attrition period.

C(9). Administrative & General Salaries (Payroll) Capitalized

Consistent with other O&M expenses, CGC forecasted its attrition period administrative and general salaries capitalized of ($66,719) as the budgeted amount for the calendar year 2018, grown to the attrition period ending June 30, 2019.[96] The Consumer Advocate applied a

[95] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachment DD 9-8, (August 24, 2018).
[96] CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018); Gary Tucker, Pre-filed Direct Testimony, p. 9, (May 11, 2018).

compounded growth rate of 5.3% to the December 31, 2017 test period amount of ($66,180) to arrive at ($69,690) for administrative and general salaries capitalized.[97]

Since the panel previously found that 44 employees are adopted for the attrition period, which is fewer employees than the Company and more employees than Consumer Advocate, it found that it could not accept the recommendation of either party. A percentage of payroll expense capitalized was calculated using CGC's forecasted payroll capitalized as a percentage of total payroll expense. The panel applied this percentage to the adopted payroll expense to arrive at administrative and general salaries capitalized of ($60,878). The panel voted unanimously to adopt the Administrative and General Salaries Capitalized of ($60,878) for the attrition period.

C(10). AGL Service Company Allocations

CGC forecasts attrition year allocations attributed to AGL Services of $4,882,218.[98] The Company allocated AGL services pursuant to the allocation methodology contained in the service agreement between the companies.[99] Mr. Morley testified that CGC began using this methodology in 2000 and included AGL cost allocations in Tennessee rate proceedings in 2004, 2006 and 2009 as well as in proceedings in five other states.[100]

Mr. Dittemore provided testimony expressing concern with the "significant lack of transparency and documented processes supporting the cost allocation methodology that I would expect from a very large regulated entity such as The Southern Company."[101] Mr. Dittemore further testified regarding the Consumer Advocate's recommendation that the Commission

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[97] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachment DD 9-9, (August 24, 2018); David Dittemore, Pre-filed Direct Testimony, p. 14, (July 3, 2018).
[98] CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018).
[99] Michael J. Morley, Pre-filed Rebuttal Testimony, pp. 15-16, (August 3, 2018).
[100] *Id.* at 12-13; *Post-Hearing Brief of Chattanooga Gas Company*, p. 14, (September 10, 2018).
[101] David Dittemore, Pre-filed Direct Testimony, p. 31, (July 3, 2018).

require future filings to be fully supported with a Cost Allocation Manual ("CAM") to determine corporate allocations.[102]

Absent a CAM, the Consumer Advocate uses the Company's 2017 year end amount for allocations of $4,457,091 and adjusts the test year amount by removing $1,316 of benefits, $1,139,788 of short-term and long-term incentive compensation, $273,467 of lobbying expense, and $82,136 in corporate allocated expense.[103] This adjusted test year amount of $2,960,385 is then grown using a compound attrition factor of 5.30% to arrive at $3,117,375. The Consumer Advocate's forecasted amount is $1,764,843 less than that of the Company.[104]

The Consumer Advocate argues that because there is no direct Long-Term Incentive Compensation paid by Chattanooga Gas, a significant portion of the Short Term Incentive Compensation is driven by the corporate and business unit performance, directly benefiting The Southern Company. Therefore, The Consumer Advocate asserts these costs should not be recovered from CGC ratepayers.[105] The Consumer Advocate questioned Mr. Dallas about why CGC ratepayers should pay him a bonus when the earnings per share of the Southern Company go up, but Mr. Dallas gave no response.[106]

The panel noted that while CGC argues it has been utilizing a consistent methodology since 2000, the Company fails to address the fact that The Southern Company acquired AGL in July 2016.[107] Therefore, a different Company is allocating cost. The panel also noted that the majority of the $1,764,843 difference between the Company and the Consumer Advocate for the

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[102] *Id.* at 31-32.
[103] *Id.* at 8-14; Transcript of Hearing, Vol. III A, pp. 51-52, (August 22, 2018); Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachment DD 9-11, (August 24, 2018).
[104] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 9, Consumer Advocate Workpaper, Attachment DD 9-11, (August 24, 2018).
[105] *Consumer Advocate's Post-Hearing Brief*, p. 40, (September 10, 2018).
[106] Transcript of Hearing, Vol. I A, p. 74-75, (August 20, 2018).
[107] Wendell Dallas, Pre-filed Direct Testimony, p. 14, (May 11. 2018).

attrition period relates to the adjustments made by the Consumer Advocate to remove Bonuses, Short and Long Term Incentives, Allocated Supplemental Executive Retirement Plan expenses ("SERP"), Government Relations, Legal and Lobbying Expenses totaling $1,496,707.

The panel found that that removal of expenses related to SERP, lobbying expense, certain pension benefits, and organization dues, as recommended by the Consumer Advocate, is reasonable and consistent with previous rulings of the Commission. The panel removed said expenses from the trial balance test period amount as of December 31, 2017, and then removed 50% of short-term incentive compensation and 100% of long-term incentive compensation (consistent with the methodology used for payroll expense and pursuant to established Commission precedent for recovery of incentive compensation) and applied a customer growth factor of 3.7%. This calculation results in $3,371,863 of AGL allocated service expenses for the attrition period ending June 30, 2019, which the panel voted unanimously to adopt.

D. PURCHASED GAS EXPENSE

As discussed in section B(4) herein, the voting panel found that the preferred methodology to determine purchased gas expense is to use an actual PGA tariff rate to project PGA gas costs. Therefore, the panel unanimously adopted $38,611,525 in purchased gas expense for the attrition period based upon CGC's July 1, 2018 PGA tariff rate.

E. DEPRECIATION EXPENSE

Depreciation expense is discussed in the paragraphs herein below addressing Utility Plant in Service, Depreciation and Accumulated Depreciation. Accordingly, for the reasons set out more fully in the discussion in the subsequent section of this order, the panel unanimously voted to adopt depreciation expense of $8,035,649 for the attrition period ending June 30, 2019.

F. INTEREST ON CUSTOMER DEPOSITS

TPUC Rule 1220-4-5.14 allows gas utilities to accrue interest on Customer Deposits. Such interest is refunded to the customer along with the security deposit after a specified time period when the customer demonstrates credit-worthiness. CGC forecasted $96,740 for the attrition period Interest on Customer Deposits.[108] The Consumer Advocate forecasted $114,315 for the attrition period Interest on Customer Deposits.[109] The panel multiplied the adopted accrued interest on customer deposits by the tariffed interest rate of 6.0% per annum and arrived at the amount forecasted by the Company. Therefore, the panel voted unanimously to adopt $96,740 for Interest on Customer Deposits for the attrition year ending June 30, 2019.

G. TAXES OTHER THAN INCOME TAXES

G(1). PROPERTY TAX

The Company forecasted $1,975,518 for property tax by growing its 2018 budgeted amount by the Company's monthly average CPI percentages.[110] The Consumer Advocate started with actual property tax per book amounts for the twelve months ending December 31, 2017, and then reclassified $4,484 of allocated property tax to allocated taxes other than income. The Consumer Advocate then used a compound growth factor of 7.11% to arrive at attrition period property taxes of $2,039,886.[111]

As opposed to strictly using a budgeted amount as proposed by the Company, the panel found that historical amounts provide more credible evidence of future outcomes in this instance. For this reason, the panel determined a property tax percentage by comparing the Consumer

[108] CGC's Updated Response to TPUCs Workbook Request, Schedule 3, (August 28, 2018).
[109] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 6, Consumer Advocate Rate Base Workpaper R-50-1.00, (August 24, 2018).
[110] CGC's Updated Response to TPUCs Workbook Request, Schedule 5, (August 28, 2018).
[111] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 10, Consumer Advocate Workpaper, Attachment DD 10-1, (August 24, 2018).

Advocate's December 31, 2017 test year amount for property tax with the Company's thirteen month average of the combined direct plant and allocated plant in service. The panel applied this percentage to the plant in service for the attrition period ending June 30, 2019 to arrive at property taxes of $2,093,447, which the panel voted unanimously to adopt.

G(2). COMMISSION INSPECTION FEE

The Company forecasted $315,074 for Commission inspection fees based on a 2018 budget amount grown by the Company's monthly average CPI percentages.[112] The Consumer Advocate forecasted $391,525 by applying a composite ratio of 5.30% to actual booked amounts for the twelve months ending December 31, 2017.[113]

The panel calculated Commission Inspection Fee by applying statutory rates set forth in Tenn. Code Ann. § 65-4-303. Consistent with statutory language, attrition period gas revenue, AFUDC, and Other Revenues less Uncollectibles were summed for a total of $71,850,864. This revenue amount was then reduced by the statutory $5,000 exemption to arrive at a taxable revenue base for inspection fees. The panel unanimously voted to adopt $305,345 for the attrition period ending June 30, 2019, having applied the statutory rate of 0.425% to the remaining balance to arrive at the adopted inspection fee.

G(3). PAYROLL TAXES

The Company forecasted $214,815 for the attrition period based on a 2018 budgeted amount increased by a 3% merit increase.[114] According to Mr. Tucker's rebuttal testimony, "the

[112] CGC's Updated Response to TPUCs Workbook Request, Schedule 5, (August 28, 2018).
[113] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 10, Consumer Advocate Workpaper, Attachment DD 10-1, (August 24, 2018).
[114] CGC's Updated Response to TPUCs Workbook Request, Schedule 5, (August 28, 2018).

forecast for 2019 should be based on the 2018 budget as this more closely aligns with the Company's planned business operations."[115]

The Consumer Advocate disagrees with the Company's assertion and based payroll taxes on the 2017 year end amount of $187,647. The Consumer Advocate then reclassified $144,265 to allocated taxes other than income. The Consumer Advocate forecasted the test year using a labor composite attrition factor of 7.25% to arrive at the total of $355,971 resulting in a $141,156 difference from the Company. [116]

The panel found that in this instance, the historical amounts provide more credible evidence of future outcomes than the budgetary data provided by the Company. For this reason, the panel calculated a percentage for payroll tax using the Consumer Advocate's test year booked payroll tax as a percentage of booked payroll expense. The panel applied this percentage to the difference between the adopted payroll expense and the booked test year payroll expense for a total of $46,135.66. This incremental payroll tax amount (payroll tax for additional payroll expense) was then added to the December 31, 2017 booked payroll tax amount to arrive at attrition period payroll taxes of $383,805. The panel thereafter voted unanimously to adopt $383,805 in payroll taxes for the attrition year ending June 30, 2019.

G(4). FRANCHISE TAX

CGC forecasted $409,287 for franchise tax based on a 2018 budget amount grown by the Company's monthly average CPI percentages.[117] The Consumer Advocate forecasted $141,050

[115] Gary Tucker, Pre-filed Rebuttal Testimony, p. 29, (August 3, 2018).
[116] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 10, Consumer Advocate Workpaper, Attachment DD 10-1, (August 24, 2018).
[117] CGC's Updated Response to TPUCs Workbook Request, Schedule 5, (August 28, 2018).

based on the Company's actual year end December 31, 2017 amount of $124,028 multiplied by a two year revenue growth factor of 13.72%.[118]

The panel found that the Company provided no documentation of how it calculated budgeted Franchise Taxes other than a budgeted total. Based on the absence of documentation indicating reliability of the Company's amount, the panel determined it more reasonable and prudent to base its forecast on historical data utilized by the Consumer Advocate. Accordingly, the panel calculated a Franchise Fee percentage based upon the Company's thirteen month average of the combined direct plant and allocated plant in service to Consumer Advocate's test period Franchise Tax. The panel applied this percentage to the adopted Plant in Service to determine the Franchise Tax. The panel unanimously adopted Franchise Tax in the amount of $136,334 for the attrition period ending June 30, 2019.

G(5). GROSS RECEIPT TAX

The Company forecasted $451,841 of gross receipt tax for the attrition year ending June 30, 2019 based upon its budgeted amounts multiplied by monthly average CPI percentages.[119] The Consumer Advocate forecasted gross receipt taxes of $904,986 for the attrition year end December 31, 2019, utilizing the actual year end December 31, 2017 booked amount and applying a 13.72% revenue growth factor.[120]

The panel found that use of historical amounts provides more credible evidence of future outcomes than budgetary data in this instance. Based upon this finding, the panel calculated Gross Receipts Tax using the Tennessee Gross Receipts Tax Form. Gas Revenue, AFUDC, and Other Revenues were totaled and Uncollectibles were deducted to arrive at a taxable amount of

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[118] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 10, Consumer Advocate Workpaper, Attachment DD 10-1, (August 24, 2018).
[119] CGC's Updated Response to TPUCs Workbook Request, Schedule 5, (August 28, 2018).
[120] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 10, Consumer Advocate Workpaper, Attachment DD 10-1, (August 24, 2018).

$71,850,864. The $5,000 exemption was deducted and the statutory 1.50% tax rate was applied resulting in a gross tax of $1,077,688. Forecasted Franchise and Excise Taxes were then deducted, pursuant to the statute. The voting panel unanimously adopted the resulting Gross Receipts Tax of $862,580 for the attrition period ending June 30, 2019.

G(6). ALLOCATED & OTHER TAXES

The Company forecasted $157,412 for allocated & other taxes for the attrition period ending June 30, 2019.[121] The Consumer Advocate forecasted a December 31, 2019 balance of $0 by reclassifying the test period amount of $148,755 to their corresponding accounts: Property Taxes, Payroll Tax, and State Franchise Tax.[122]

The panel found that it is more prudent and reasonable to reclassify the amounts to their corresponding accounts. Reclassification of the amounts to their appropriate accounts will ensure that appropriate growth factors are applied to each individual account, providing more accurate data. Therefore, the panel voted unanimously that $0 in Allocated and Other Taxes be adopted for the attrition period ending June 30, 2019.

H. INCOME TAXES

The Company and the Consumer Advocate each presented its schedules as exhibits for its calculations on the proper amount of income tax. Income Taxes include both the Tennessee Excise Tax and the Federal Income Tax. Income Tax is calculated based on operating margin and expense calculations and applying statutory tax rates. Both CGC and the Consumer Advocate accounted for the impact of the significant changes resulting from the Tax Cut & Jobs

[121] CGC's Updated Response to TPUCs Workbook Request, Schedule 5, (August 28, 2018).
[122] Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 10, Consumer Advocate Workpaper, Attachment DD 10-1, (August 24, 2018).

Act, which became effective January 1, 2018 in their respective calculations and schedules.[123] Based upon the statutory rates and the other items decided in this rate case, the panel unanimously adopted Net State Excise Tax of $373,213 for the attrition period and Net Federal Income Tax of $264,062, which includes Excess Deferred Tax Liability Amortization of $918,724.

I. NET OPERATING INCOME

Net Operating Income ("NOI") represents the earnings of the Company under present rates that are available after all items of the cost of providing utility service have been considered. The NOI of CGC is the total operating revenue minus total operating expense based upon the determinations of revenues and expenses adopted by the panel.

The summation of operating revenues (i.e., gas sales and transportation, AFUDC and other), results in total operating revenue in the amount of $71,972,727. Thereafter, the operation and maintenance expenses totaling $50,090,166 are subtracted. In addition, depreciation expense, interest on customer deposits, taxes other than income taxes, state excise taxes and federal income taxes are also subtracted. These subtractions result in the removal of a total operating expense in the amount of $62,346,902. Calculation of NOI by subtracting total operating expense from total operating revenue arrives at the net operating income of $9,625,826 which was unanimously adopted by the panel for the attrition period ending June 30, 2019.

J. RATE BASE

Rate Base is the total of the investor funded or supplied plant, facilities, and other investments used by the utility in provisioning service to its customers. The rate base is the investment base to which a fair rate of return is applied to arrive at the net operating income

[123] CGC's Updated Response to TPUCs Workbook Request, Schedule 6, (August 28, 2018); Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 11, (August 24, 2018).

requirement. The Company recommends a rate base of $157.8 million while the Consumer Advocate maintains that a rate base of $139.1 million should be approved. For the reasons set forth below, the panel unanimously voted to adopt a rate base of $149,739,716 for the attrition year ending June 30, 2019.

Below is a chart summarizing the differences between the rate base components advocated by the Company, those advocated by the Consumer Advocate, and the adopted rate base for the attrition year adopted by the voting panel of the Commission. Following the chart is a discussion of the rate base components.

Additions:	Company	Consumer Advocate	Staff
Utility Plant in Service	$ 301,415,025	$ 301,241,411	$ 301,415,025
Construction Work in Progress	12,457,439	6,580,878	12,457,439
Pension and OPEB Assets	9,009,690	-	-
Working Capital - Lead/Lag	1,519,251	149,625	350,066
Materials & Supplies	403,477	300,612	343,442
Prepayments	46,418	40,653	46,803
Gas Inventory	9,710,633	10,168,496	9,425,959
Deferred Rate Case Expense	1,117,499	260,365	1,117,499
Total Additions	$ 335,679,432	$ 318,742,040	$ 325,156,233
Deductions:			
Accumulated Depreciation	$ 127,903,439	$ 131,951,410	$ 127,903,439
Accumulated Deferred Income Tax	25,514,266	22,678,112	23,114,266
Regulatory Liability-Excess Deferrals	22,177,646	22,074,305	22,177,646
Regulatory Liability - Deferred Tax Savings	-	428,512	-
Customer Advances for Construction	-	-	-
Reserve for Uncollectibles	239,893	180,584	169,708
Reserve for Health Insurance	31,616	33,852	33,409
Other Reserves - Uncliamed Credits	72,013	76,668	72,774
Customer Deposits	1,612,342	1,875,733	1,612,342
Accrued Interest on Customer Deposits	332,933	332,933	332,933
Total Deductions	$ 177,884,147	$ 179,632,109	$ 175,416,517
Rate Base	$ 157,795,285	$ 139,109,931	$ 149,739,716

J(1). UTILITY PLANT IN SERVICE, DEPRECIATION AND ACCUMULATED DEPRECIATION

Utility Plant in Service ("UPIS") represents the original investment cost to the Company of the assets used in providing utility service. The parties' competing forecasts of UPIS and related accumulated depreciation result in a net rate base difference of $4.2 million. The Company bases its UPIS calculations on a starting balance at June 30, 2017, and then adjusts for actual capital expenditures for 2017 and planned capital expenditures for 2018 and 2019.[124] Plant retirements were estimated based on the average retirements for the four years ended June 30, 2017. With regard to indirect plant, the Company used a 1.90% factor to allocate common plant to Chattanooga Gas, which is based on the percentage of expenses charged to Chattanooga Gas relative to total expenses allocated to all affiliates.[125] To compute related depreciation expense and accumulated depreciation reserve amounts, the Company utilizes the depreciation rates recommended by the depreciation study sponsored its witness, Dane Watson.[126] The depreciation rates were applied to CGC's forecasted UPIS balances to compute attrition year depreciation expense of $8,035,069.[127] The depreciation expense, including estimated and recommended plant retirements, were then applied to the balance as of December 31, 2017, to arrive at the attrition year accumulated depreciation reserve balance.[128]

To project its attrition year UPIS, however, the Consumer Advocate began with the test period ending balance at December 31, 2017, and then increased the plant amounts by the five-year historical average of net plant additions (i.e., the net of additions and retirements over the

[124] Gary Tucker, Pre-filed Direct Testimony, pp. 11-12, (May 11, 2018).
[125] *Id.* at 12.
[126] Dane Watson, Pre-filed Direct Testimony, p. 3, Exhibit DAW-2 (February 15, 2018).
[127] CGC's Updated Response to TPUCs Workbook Request, Schedule 3, (August 28, 2018).
[128] Gary Tucker, Pre-filed Direct Testimony, pp. 15-16, (May 11, 2018).

five-year period).[129] With regard to allocations of common plant, the Consumer Advocate developed an indirect plant allocation factor of 1.63% based on an average of the service company affiliate's throughput volumes and number of customers for 2016 and 2017.[130] The Consumer Advocate accepted and applied the depreciation rates recommended by the Company's depreciation study to its net UPIS balances to compute its attrition year depreciation expense, which then allows for calculation of the Consumer Advocate's accumulated depreciation amount.[131]

In a traditional rate case such as this one, the panel found that known and measurable changes should be applied to normalized test year amounts to determine utility plant and related depreciation and accumulated reserve balances for a forward-looking attrition year. The panel found CGC's methodology for determining plant additions through budgeted capital expenditures to be a reasonable, forward-looking procedure for calculating service rates. Mr. Ziliak testified that CGC's budgeting process considers a number of factors, including: historical spend, known strategic projects, projected impacts of new regulations, labor market and contract bid pricing adjustments, and any other known items affecting the work to be done.[132] He further testified that the Company's budgeting process allows for the greatest accuracy in predicting future spending requirements and is highly reliable.[133] CGC witness Morley testified that its approach is the more appropriate method to calculate the allocation factor for common plant because the service company affiliate's plant is predominantly general plant related to broad functions (e.g., accounting, human resources, supply chain, computer services, etc.).[134] The panel

[129] William H. Novak, Pre-filed Direct Testimony, p. 17, (July 3, 2018).
[130] *Id.*
[131] *Id.* at 26-27; Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 11, (August 24, 2018).
[132] Jacob A. Ziliak, Pre-filed Rebuttal Testimony, pp. 4-5, (August 3, 2018).
[133] *Id.* at 5.
[134] Michael J. Morley, Pre-filed Rebuttal Testimony, pp. 22-23, (August 3, 2018).

found Mr. Morley's testimony persuasive and unanimously adopted the Company's allocation factor for common plant.

Mr. Novak notes, in his testimony on behalf of the Consumer Advocate, that the Company's anticipated capital expenditures are greater than historical spends.[135] However, the panel found that the Company's forecast should not be rejected merely because capital expenditures are expected to increase, especially in light of Company testimony supporting the capital projects proposed in this case.[136] Use of historical averages would not recognize planned major projects, such as a two-phase project to connect the Company's existing LNG facility to Red Bank and Signal Mountain by late 2020 at a total cost of $18 million.[137] Moreover, the panel found that the capital budgeting approach used by the Company is consistent with the methodology for determining appropriate levels of UPIS for rate-setting purposes by the Commission in prior rate cases. Therefore, the voting panel unanimously voted to adopt CGC's thirteen-month average of UPIS of $301,415,025 for the attrition year.

As stated above, the parties agreed that the updated depreciation rates recommended by CGC's depreciation study should be applied to plant balances to compute depreciation expense in this case. Because the panel adopted the Company's UPIS balance, based in part on its forward-looking forecast of capital projects and related expenditures, which is also consistent with prior rate case procedures, the panel likewise unanimously adopted CGC's calculation of attrition year annual depreciation expense of $8,035,649. Further, since the accumulated depreciation reserve is a mathematical function of plant balances and associated annual

[135] William H. Novak, Pre-filed Direct Testimony, pp. 18-19 (July 3, 2018).
[136] Mr. Ziliak gave testimony about the Red Bank and Signal Mountain LNG connection pipeline project, the Lookout Mountain pressure improvement project, the Middle Valley PRIM project, and completion of the bare steel project. Jacob A. Ziliak, Pre-filed Rebuttal Testimony, pp. 6-8, (August 3, 2018); Transcript of Hearing, Vol. II A, p. 93, (August 21, 2018).
[137] Jacob A. Ziliak, Pre-filed Rebuttal Testimony, pp. 6-7, (August 3, 2018); Transcript of Hearing, Vol. II A, p. 93, (August 21, 2018).

depreciation charges, the panel voted unanimously to adopt the Company's thirteen-month average forecast of accumulated depreciation of $127,903,439 for the attrition period ending June 30, 2019.

J(2). CONSTRUCTION WORK IN PROGRESS

Construction Work in Progress ("CWIP") represents the cost of investment that is currently under construction and will be transferred to Plant in Service when completed. The $5.9 million dollar difference in CWIP results from the parties' differing forecasting methodologies. Like the forecast for UPIS, CGC bases its CWIP calculations on a starting balance at June 30, 2017, with adjustments for the level of capital spending and project timing outlined in the Company's capital budget for 2018 and 2019.[138] Contributions in aid of construction ("CIAC") is included as a reduction to plant balance and netted with CWIP.[139] Alternatively, the Consumer Advocate uses a five-year historical average of annual balances to project its attrition year CWIP forecast.[140]

The panel found that because CWIP is determined by plant construction projects and activities, the CWIP forecast should be aligned with the capital expenditure projections used to compute UPIS. Accordingly, and for the same reasons the panel adopted CGC's forward-looking forecast of UPIS, the panel unanimously voted to adopt the Company's thirteen-month average CWIP balance of $12,457,439 for the attrition year in this case.

J(3). PENSION AND OPEB ASSETS

The Company forecasts a rate base addition of $9.0 million related to pension and other post-retirement benefit ("OPEB") assets whereas the Consumer Advocate did not include any

[138] Gary Tucker, Pre-filed Rebuttal Testimony, pp. 9-10, (August 3, 2018).
[139] Gary Tucker, Pre-filed Direct Testimony, p. 17, (May 11, 2018).
[140] William H. Novak, Pre-filed Direct Testimony, p. 18, (July 3, 2018).

provision for pension and OPEB assets in its rate base forecast.[141] In this case, CGC proposes a change to how pension and OPEB expenses and related accruals are treated by this Commission. Mr. Tucker offered testimony recommending the usage of the accounting standards for pensions and OPEBs issued by the Financial Accounting Standards Board ("FASB") to determine the amount of pensions and OPEB costs for ratemaking purposes.[142] The Consumer Advocate, however, states that pension and OPEB expenses should be limited to cash contributions only, which results in no accrued assets in this case.[143] Mr. Novak correctly testified that the Commission has a long-established ratemaking policy of only allowing rate recovery of the minimum required contribution for pension and OPEB expenses.[144] Further, Mr. Novak pointed out that there is no requirement for the Commission to follow the accounting principles established by other authorities, including the "generally accepted accounting principles" promulgated by FASB, as requested by the Company in this case.[145]

The panel concurred with the Consumer Advocate's position on this issue. For decades this Commission has recognized the expense of pension and post-retirement benefits in service rates in accordance with the actuarially-determined minimum contribution requirement, as opposed to the FASB accounting standards proposed by the Company. The panel found that this long-standing ratemaking policy should be maintained going forward. Further, the panel agreed with the Consumer Advocate that determining service rates based on minimum required contributions for pensions and post-retirement benefits is appropriate policy, because it: (1) applies consistently to all utilities, (2) most closely matches today's costs with today's

[141] CGC's Updated Response to TPUCs Workbook Request, Schedule 2, (August 28, 2018); Revised Exhibit of the Consumer Protection and Advocate Division of the Tennessee Attorney General's Office, Schedule 2, (August 24, 2018).
[142] Gary Tucker, Pre-filed Direct Testimony, p. 13, (May 11, 2018).
[143] William H. Novak, Pre-filed Direct Testimony, p. 19, (July 3, 2018).
[144] *Id.* at 20.
[145] *Id.* at 20-21.

customers, (3) is not subject to the same changes in assumptions for market conditions as the actuary's recommended contribution, and (4) is a more stable and consistent amount for setting rates in the near-term.[146] Therefore, the panel voted unanimously to adopt pension and OPEB assets of zero for the attrition year in this case, consistent with established Commission precedent.

J(4). WORKING CAPITAL

Working Capital is the amount of funds necessary for daily expenditures and a variety of non-plant investments that are necessary to sustain ongoing operations of the utility until those expenditures can be recovered through revenues received from customers. CGC projected a cash working capital requirement based on a lead/lag study sponsored by Company witness Adams.[147] Application of the lead/lag study results to CGC's revenues and expenses requiring operating funds results in a net lag of 8.14 days, which, when multiplied by the Company's estimated average daily cost of service, produces a working capital requirement of $1.5 million.[148] The Consumer Advocate applied the Company's lead/lag study, but with three adjustments made to the study's calculation. Mr. Dittemore testified that the Consumer Advocate adjusted the Company's study to: (1) exclude the return on equity from estimated average daily cost of service; (2) reduce the lag days for salaries and wages from 39.02 to 14.01 to reflect the exclusion of the incentive compensation lag; and (3) incorporate the test period average balance of withholdings (i.e., accrued liabilities) for franchise, excise and use taxes.[149] With these adjustments, the Consumer Advocate computes a net lag of 3.46 days, which, when multiplied

[146] *See* William H. Novak, Pre-filed Direct Testimony, p. 21, (July 3, 2018).
[147] Michael J. Adams, Pre-filed Direct Testimony, Exhibit MJA-2 (February 15, 2018).
[148] Gary Tucker, Pre-filed Direct Testimony, pp. 13-17, Exhibits RDJ 2-3, (May 11, 2018).
[149] David Dittemore, Pre-filed Direct Testimony, p. 17, (July 3, 2018).

by the Consumer Advocate's estimated average daily cost of service, produces a working capital requirement of $0.2 million, which is $1.3 million less than the Company's projection.

The Consumer Advocate argues that the exclusion of the return on equity from working capital is appropriate because it is a non-cash expense that does not generate a cash requirement on behalf of the Company, [150] CGC counters that exclusion of the return on equity would fail to account for the timing of the receipt of such return.[151] Further, Mr. Dittemore testified that payment of dividends is optional, and if paid, are paid in arrears with a significant expense lag as opposed to the zero lag days included in the study.[152] Finally, both the Company and the Consumer Advocate point to cases in which both this Commission and other jurisdictions have determined whether the return on equity component should be excluded from the cash working capital computation in favor of their respective positions.[153] The panel found that return on equity is a non-cash expense not generating a cash requirement for the Company, and therefore, exclusion from working capital calculation is appropriate.

Further, based upon the panel's finding concerning disallowance of incentive compensation for rate-setting purposes, the panel finds that the Consumer Advocate's adjustment to reduce the salaries and wages lag to reflect the removal of incentive compensation is appropriate.

Finally, Mr. Dittemore explains that the Consumer Advocate adjusted the cash working capital requirement to reflect the advanced collection of franchise, excise and use taxes by the average balance of these accounts for the test year, because prior to remittance to taxing authorities, these collected funds provide a source of ongoing working capital for the

[150] *Id.* at 18
[151] Michael J. Adams, Pre-filed Rebuttal Testimony, (August 3, 2018).
[152] David Dittemore, Pre-filed Direct Testimony, p. 18, (July 3, 2018).
[153] *See* David Dittemore, Pre-filed Direct Testimony, pp. 18-19, (July 3, 2018); Michael J. Adams, Pre-filed Rebuttal Testimony, pp. 3-7, (August 3, 2018).

Company.[154] Mr. Adams counters in his rebuttal testimony that he agrees that these taxes should be considered in the working capital calculation, and in fact, were reflected in a reduction for the working capital requirement.[155] The panel found that recognition of these advanced collections is appropriate, and that the test period average balances of these tax liabilities accounts are reasonable approximations of the funds available to the Company for purposes of computing cash working capital.

As the panel found the Consumer Advocate's adjustments to the Company's lead/lag study to be reasonable and appropriate, the panel unanimously adopted the Consumer Advocate's lag days for computing cash working capital in this case. When weighted and applied to attrition year operating expenses, taxes and interest the panel adopted, the panel determined that a net lag of 4.75 days should be applied to a computed average daily cost of service of $180,221, which, when reduced for tax collections withheld of $506,569, results in a calculated cash working capital of $350,066. Therefore, the panel unanimously voted to adopt working capital for the attrition period in the amount of $350,066.

J(5). DEFERRED RATE CASE EXPENSE

The Company is requesting recovery of rate case expenses totaling $1,241,665, to be amortized over five years.[156] As discussed above, this results in an attrition year rate case expense of $248,333 and a thirteen-month average deferred rate case expense addition to rate base of $1,117,499[157] for the attrition year. In contrast, as discussed briefly in section C(8) herein, the Consumer Advocate estimates a much lower amount of rate case expense of

[154] David Dittemore, Pre-filed Direct Testimony, pp. 19-20 (July 3, 2018).
[155] Michael J. Adams, Pre-filed Rebuttal Testimony, pp. 9-10, (August 3, 2018).
[156] *Post-Hearing Brief of Chattanooga Gas Company*, p. 14, (September 10, 2018); CGC's Updated Response to TPUCs Workbook Request, Schedule 4, (August 28, 2018).
[157] *Post-Hearing Brief of Chattanooga Gas Company*, p. 39, (September 10, 2018); CGC's Updated Response to TPUCs Workbook Request, Schedule 2, (August 28, 2018).

$347,152, with a three-year amortization period to arrive at an attrition year amortization expense of $115,718 and a thirteen-month attrition year average of deferred rate case expense of $260,365.[158]

The Consumer Advocate eliminates certain expenses from CGC's proposed rate case expense, classifying the eliminated expenses as unreasonable.[159] Mr. Novak testified that he excluded consultant's costs related to the class cost of service study ("CCOSS") from recovery because CCOSS studies have never been approved by the Commission.[160] Mr. Novak also gave testimony that he eliminated other consultants' costs because CGC had not supported by records or testimony that costs were a necessity.[161] The Consumer Advocate eliminated 50% of estimated legal expenses asserting that the hiring of two separate law firms for this case is duplicative and imprudent and also contending that a portion of legal expenses should be paid by stockholders since the stockholders also receive benefits from the rate case.[162] Mr. Novak testified that he included only $200,000 as appropriate legal costs for this case in rate case expense.[163]

The Company, however, disagreed with the Consumer Advocate's adjustments to rate case expense. The Company asserted that consultants are needed to organize and manage the case, and that legal expertise is necessary in order to assure the case stays on course.[164] Rate case costs also include items not routinely undertaken, such as lead-lag and depreciation studies, which if not recovered for outside consultants, would force the Company to hire employees to

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[158] William H. Novak, Pre-Filed Direct Testimony, pp. 23, 25 (July 3, 2018).
[159] *Consumer Advocate's Post-Hearing Brief*, p. 27 (September 10, 2018); William H. Novak, Pre-filed Direct Testimony, pp. 23-25, (July 3, 2018).
[160] William H. Novak, Pre-filed Direct Testimony, p. 24, (July 3, 2018).
[161] *Id.*; *See also Consumer Advocate's Post-Hearing Brief*, p. 27 (September 10, 2018).
[162] William H. Novak, Pre-filed Direct Testimony, pp. 24-25, (July 3, 2018); *Consumer Advocate's Post-Hearing Brief*, p. 27 (September 10, 2018).
[163] William H. Novak, Pre-filed Direct Testimony, p. 25, (July 3, 2018).
[164] Gary Tucker, Pre-filed Rebuttal Testimony, pp. 21-24 (August 3, 2018).

perform these functions internally at costs that could potentially exceed the outside costs incurred.[165] Further, the Company argued that the $200,000 the Consumer Advocate allowed for legal costs was arbitrary, as it was not supported by any reference or documentation on how the amount was calculated.[166] CGC also argued that some of the high case expenses of this rate case are related to unanticipated delays in filing the case relating to the passage of the Tax and Jobs Act in December of 2017 requiring the Company to redo it case, the extremely high number of discovery requests from the Consumer Advocate, and the need to put together a rebuttal case that required more rebuttal witnesses than direct witnesses.[167]

As previously indicated, the panel noted its concern with regard to the high amount of rate case expenses. It is evident that both ratepayers and stockholders receive a benefit from the rate increases that generally result from the completion of rate cases. The ratepayers receive the benefit of the facility repairs and upgrades ensuring a safe and reliable system and the resources necessary to cover reasonable operating expenses to ensure efficient operations from the Company's increase revenue. At the same time, the stockholders receive the benefit of higher equity returns which leads to increased stock prices as a result of the increased revenues. CGC acknowledges the benefit of rate cases to both ratepayers and stockholders in the testimony of Mr. Dallas.[168]

The Company bears the burden of proving its just and reasonable expenses pursuant to Tenn. Code Ann. § 65-5-103(a). The panel found that CGC provided sufficient testimony and documentation to justify its rate case expenses as reasonable. Further, while the panel noted its concern about the high rate case expense and noted the benefit of rate increases to both

[165] *Id.* at 23-24.
[166] *Id.* at 23.
[167] *Post-Hearing Brief of Chattanooga Gas Company*, pp. 14-15, (September 10, 2018).
[168] Transcript of Hearing, Vol. I A, pp. 79-80, (August 20, 2018).

ratepayers and stockholders, it found that there is insufficient evidence in the record to determine the relative benefits of this proceeding to ratepayers and stockholders by which to apportion the rate case among the ratepayers and shareholders. Absent such evidence, the panel determined that any exclusion from rate case expense based upon this distinction is unsupported and potentially arbitrary. Therefore, the panel unanimously voted to approve the rate case expense of $1,241,665 be recovered over a five-year period as proposed by the Company, resulting in a thirteen-month average of deferred rate case expense of $1,117,499 for the attrition period.

J(6). OTHER RATE BASE ADDITIONS

The remaining items, materials & supplies, prepayments and gas inventory are addressed collectively, the same calculation methodology applying to each of these accounts which represent an investment on which the Company should be allowed to earn a reasonable return. CGC utilized the thirteen-month average for the test period ended December 31, 2017 to project materials & supplies and prepayments for the attrition year. The Company forecasted $9,710,633 for gas inventory for the attrition year.[169] The Company started with the actual balances in stored gas inventory at December 31, 2017, and made projections based on the Company's planned business operations through the attrition year.[170] The Company used forecasted monthly volumes of stored gas inventory and projected NYMEX prices through the attrition year to estimate the dollar amount of its injections and withdrawals, also including the cost of liquefaction in the calculation for the LNG storage facility.[171] Alternatively, the Consumer Advocate forecasted attrition year materials & supplies, prepayments and gas inventories based on five-year historical

[169] Gary Tucker, Pre-filed Direct Testimony, p. 14 and Exhibit RDJ-2, (May 11, 2018); *See also Post-Hearing Brief of Chattanooga Gas Company*, pp. 38-39, (September 10, 2018).
[170] Gary Tucker, Pre-filed Rebuttal Testimony, p. 20 (August 3, 2018).
[171] Gary Tucker, Pre-filed Direct Testimony, p. 14 (May 11, 2018).

averages of each account, which the Consume Advocate claims represents a normalized level of activity for the attrition year. [172]

The panel found that utilizing the test year average is too limited because of the upward and downward variations of the monthly and annual balances of these accounts caused by the activities and operational needs of the Company. In addition, the panel found that while a multi-year average should be examined to capture a trend of normalized activity for ratemaking purposes, a three-year average, as opposed to the five-year average proposed by the Consumer Advocate, provides a more accurate reflection of the recent operational trends in these accounts. Therefore, the panel utilized a three-year, thirteen-month historical average to estimate materials & supplies, prepayments and gas inventories for the attrition year. Using this method, the panel arrived at an estimated thirteen-month average attrition year balance of $343,442 for materials & supplies, $46,803 for prepayments, and $9,425,959 for gas inventory and voted unanimously to adopt these amounts.

J(7). ACCUMULATED DEFERRED INCOME TAX AND REGULATORY LIABILITY FOR EXCESS DEFERRALS

Accumulated Deferred Income Tax represents the accumulated differences between accounting or book income and taxable income. While some of these differences are permanent, others involve temporary or timing matters that reverse in subsequent years. CGC computed accumulated deferred income tax ("ADIT") by using the booked amounts as of December 31, 2017, and then forecasting through June 2019.[173] Existing property, plant and equipment balances with known changes were used to estimate the tax and book depreciation, with the difference multiplied by the income tax rates to arrive at ADIT. The effect of the newly enacted Tax Cuts and Jobs Act was also included in the determination of ADIT, with tax depreciation

[172] William H. Novak, Pre-filed Direct Testimony, pp. 21-22 (July 3, 2018).
[173] Gary Tucker, Pre-filed Direct Testimony, p. 16, (May 11, 2018).

using the Modified Accelerated Cost Recovery System ("MACRS") for 2018 and 2019, without bonus depreciation, except for approximately $3.6 million of assets acquired during the fourth quarter of 2017 that are expected to be placed into service during the first quarter of 2018. The balance of excess deferred income tax ("EDIT") was also calculated and included with the ADIT forecast as a regulatory liability.[174] Mr. Tucker testified that the ADIT amount related to its computed pension asset is $1.7 million, and ADIT related to the OPEB asset is $0.7 million, and that these amounts should be deducted from ADIT if its pension and OPEB assets are excluded from rate base.[175]

With regard to amortization of EDIT, Mr. Tucker testified on behalf of CGC that amortization of the protected EDIT related to depreciable property must be amortized over the life of the related property in accordance with the average rate assumption method, which is one of the amortization methods approved by the IRS. Further, Mr. Tucker stated that compliance with the tax code required the amortization of the protected EDIT to begin with the income tax rate reduction effective January 2018 without delay.[176] The Company proposes to amortize its calculated unprotected EDIT over five years, aligning with its recommended amortization of rate case costs.[177]

The Consumer Advocate agreed with CGC's calculation of ADIT, as well as the protected and unprotected computations of EDIT.[178] However, Mr. Dittemore testified on behalf of the Consumer Advocate that he disagreed with the five-year amortization periods proposed by the Company. Mr. Dittemore recommends that EDIT amortization not commence until the effective date of the rate change ordered in this docket, but he does not object to the Company's

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[174] *Id.* at 16-17.
[175] Gary Tucker, Pre-filed Rebuttal Testimony, pp. 18, 20, (August 3, 2018).
[176] *Id.* at 38-39.
[177] *Id.* at 38.
[178] David Dittemore Pre-Filed Direct Testimony, pp. 24-27 (July 3, 2018).

amortization of protected EDIT over the life of the related depreciable property.[179] Mr. Dittemore, however, recommends that the unprotected EDIT be amortized over three years rather than the five-year period proposed by the Company because "these amounts belong to the ratepayers..."[180]

The most significant portion of ADIT relates to differences in the methods used for computing depreciation expense for tax purposes versus ratemaking purposes. As the voting panel adopted CGC's Utility Plant In Service and associated depreciation expense amounts and the Consumer Advocate does not object to CGC's computation of ADIT, the panel found that the Company's ADIT calculation of $25,514,266[181] be reduced by $2.4 million[182] to reflect the ADIT associated with removal of the Company's proposed pension and OPEB assets from rate base. Using this calculation, the voting panel arrived at an ADIT of $23,114,266 for the attrition year, which it voted unanimously to adopt. Further, the panel voted unanimously to adopt the Company's amortization periods for both protected and unprotected, and to adopt an EDIT regulatory liability of $22,177,646 for the attrition year. In addition, the voting panel ordered CGC to accrue into a regulatory liability account all amortized amounts of EDIT for the period from January 2018 to the effective date of the rate change ordered in this docket, with the disposition of the regulatory liability to be determined in Docket No. 18-00035.

J(8). RESERVES FOR UNCOLLECTIBLES, HEALTH INSURANCE AND UNCLAIMED CREDIT

Reserves for uncollectibles, health insurance and other/unclaimed credits represent non-investor supplied funds available to the Company and should therefore be deducted from rate base. The Company forecasted the reserve for uncollectibles by calculating the average historical

[179] *Id.* at 25-26.
[180] *Id.* at 26.
[181] CGC's Updated Response to TPUCs Workbook Request, Schedule 2, (August 28, 2018).
[182] Gary Tucker, Pre-filed Rebuttal Testimony, pp. 18, 20, (August 3, 2018).

reserve from January 2016 through December 2017 and then applying that ratio to the estimated operating margin for the attrition period; and it used the thirteen-month average balance of the test year ending December 31, 2017 to forecast the reserves for unclaimed credits and health insurance.[183] The Consumer Advocate forecasted all of these reserve balance accounts for the attrition year by computing a five-year historical average of the annual balances in these accounts.[184]

As it found with regard to materials & supplies, prepayments and gas inventory, the panel found that utilizing a test year average does not allow for the upward and downward variations of the monthly and annual balances of these accounts caused by the activities and operational needs of the Company. Further, the volatility in the uncollectible reserve account suggests that this reserve has not been in correlation with associated annual revenues. In addition, the panel found that while a multi-year average should be examined to capture a trend of normalized activity for ratemaking purposes, a three-year average, as opposed to the five-year average proposed by the Consumer Advocate, provides a more accurate reflection of the recent operational trends in these accounts. Therefore, the panel utilized a three-year, thirteen-month historical average to estimate the reserves for uncollectibles, health insurance and unclaimed credits for the attrition year. Using this method, the voting panel unanimously voted to adopt the amounts calculated for these reserve balance accounts: an estimated thirteen-month average attrition year balance of $169,708 for the reserve for uncollectibles; $33,409 for the reserve for health insurance; and $72,774 for the reserve for unclaimed credits.

[183] Gary Tucker, Pre-filed Direct Testimony, p. 15, (May 11, 2018); *See also* Gary Tucker, Pre-filed Rebuttal Testimony, pp. 20-21 (August 3, 2018); CGC's Updated Response to TPUCs Workbook Request, Schedule 2, (August 28, 2018)..
[184] William H. Novak, Pre-filed Direct Testimony, pp. 29-30 (July 3, 2018).

J(9). CUSTOMER DEPOSITS AND ACCRUED INTEREST ON CUSTOMER DEPOSITS

Customer deposits are amounts advanced by customers to the Company and therefore represent a source of non-investor supplied funds which the Company has available to finance a portion of its utility investment. Likewise, accrued interest on customer deposits held by the Company represent non-investor supplied funds. Thus, customer deposits and associated accrued interest should be deducted from the rate base on which investor returns are computed.

The Company forecasted customer deposits for the attrition year by applying the most recent three-year average growth rate to the deposits held on December 31, 2017.[185] The Company states that this approach captures a new system that was implemented in December 2017 called Customer Care and Billing ("CC&B") which allows for more frequent review of customer deposit accounts and more timely refunds of the customer deposits.[186] Mr. Tucker testified that the CC&B system results in continued lower balances of the customer deposits account in the future. As a result of the recent system change, CGC utilized the interest accrued for the test year ended December 31, 2017 to estimate attrition year accrued interest.[187] Consistent with its other rate base calculations, the Consumer Advocate used a five-year historical average of the annual balances to forecast customer deposits for the attrition year, but it agreed with the Company's forecast for accrued interest on customer deposits.[188]

The panel found that the implementation of the CC&B program in December 2017 should result in better management and more-timely refunding of customer deposits going forward. Based upon the Company's detailed information on the CC&B program and its implementation, the voting panel found that CGC's methodology for forecasting customer

[185] Gary Tucker, Pre-filed Direct Testimony, p. 15 (May 11, 2018).
[186] Gary Tucker, Pre-filed Rebuttal Testimony, p. 25, (August, 3, 2018).
[187] *Id.*
[188] William H. Novak, Pre-filed Direct Testimony, pp. 29-30 (July 3, 2018).

deposits and related accrued interest is reasonable. Therefore, the panel unanimously voted to adopt $1,612,342 for customer deposits and $332,933 for accrued interest on customer deposits for the attrition year.

K. REVENUE CONVERSION FACTOR

The Revenue Conversion Factor represents the adjustment factor necessary to translate any surplus or deficiency in NOI into a Revenue Deficiency or Surplus that rates will be designed to produce. To produce a certain amount of revenue several factors are considered. In order to determine the proper amount of revenue needed for the Company to have the opportunity to earn a fair rate of return, it is necessary to apply a revenue conversion factor to Net Income Deficiency or the NOI. After this amount is calculated, it is necessary to add forfeited discounts and subtract uncollectibles, state excise tax, and federal income tax. Based upon a Forfeited Discounts Factor of 0.008796, an Uncollectible Ratio of 0.003825, State Excise Tax rate of 6.5%, and a Federal Income Tax rate of 21%, the panel arrived at and unanimously voted to adopt an overall Revenue Conversion Factor of 1.347169.

L. RATE OF RETURN

The goal of regulatory rate setting is to ensure a fair rate of return on a company's investments while ensuring the safety and reliability of the service provided. Fair rate of return standards developed from the United States Supreme Court decisions in *Bluefiled Water Works & Improvement Company* v. *P.S.C. of West Virginia*[189] and *Federal Power Commission v. Hope Natural Gas Company.*[190] A fair rate of return is achieved when (1) the return is comparable to other businesses that bear similar risks; (2) the allowed return is sufficient to ensure financial

[189] *Bluefield Water Works & Improvement Co. v. P.S.C. of West Virginia*, 262 U.S. 679 (1923).
[190] *F.P.C. v. Hope Natural Gas Co.*, 320 U.S. 591 (1944).

integrity; and (3) the company can attract, at reasonable cost, credit to meet its capital requirements.

The process of determining the cost of capital involves three steps. First, the capital structure of the firm must be established. In this proceeding, the Commission must determine whether to adopt a double leverage capital structure methodology, as proposed by the Consumer Advocate. Second, the cost of each component of the capital structure – debt and equity – must be calculated. Finally, the overall return is computed by calculating the weighted cost of capital.

The current authorized 7.41% rate of return for CGC was established in Docket No. 09-00183. The currently authorized return on equity established in Docket No. 09-00183 is 10.3%.[191] In the instant proceeding, CGC proposes an 11.25% equity return[192] and an overall rate of return of 7.83%.[193] The Consumer Advocate proposes an equity return of 9.0% and an overall rate of return of 5.93%.[194]

L(1). CAPITAL STRUCTURE

The Company's proposed capital structure is based upon the consolidated capital structure of its parent, Southern Company Gas, and is composed of 44.47% long-term debt, 6.3% short-term debt and 49.23% equity.[195]

The Consumer Advocate's capital structure is based upon the "double leverage" approach to account for the parent-subsidiary relationship between CGC, its parent Southern Company Gas (SCG), and SCG's parent holding company The Southern Company (TSC).[196] Essentially,

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[191] *In Re: Petition of Chattanooga Gas Company for a General Rate Increase, Implementation of the Energysmart Conservation Programs and Implementation of a Revenue Decoupling Mechanism*, Docket No. 09-00183, *Order*, p. 66, (November 8, 2010).
[192] James H. Vander Weide, Ph.D., Pre-filed Direct Testimony, p. 52, (February 15, 2018).
[193] Gary Tucker, Pre-filed Direct Testimony, p. 5-6, (May 11, 2018).
[194] Christopher C. Klein, Ph.D., Pre-filed Direct Testimony, p. 22, (July 3, 2018).
[195] Gary Tucker, Pre-filed Direct Testimony, p. 18 (May 11, 2018).
[196] Dr. Klein defined double leverage in his testimony as follows: "Double leverage 'usually refers to a situation where a holding company raises debt and downstreams it as equity capital, or subordinated debt, to a subsidiary, i.e.,

the double leverage calculation proposed by Dr. Klein applies the weighted cost of capital of TSC to the equity portion of SCG's capital structure. When computing his double leverage capital structure, Dr. Klein accepts the capital structure for SGC proposed by the Company, noting "... I find Mr. Tucker's recommended capital structure of SCG and its cost rates to be reasonable, except for ignoring the parent-subsidiary relationship between SCG and TSC."[197] The Consumer Advocate's proposed double leverage capital structure, broadly measured, is composed of 35% equity and 65% debt.[198] Dr. Klein Further testified that when using his proposed 9% equity return, the double leverage methodology reduces overall cost of capital by approximately 70 basis points.[199]

The Consumer Advocate correctly observes that this Commission and its predecessors have recognized the importance of the parent-subsidiary relationship when determining capital structure. In addition, the Consumer Advocate is also correct to note that this agency has used the double-leverage methodology in prior cases. However, the prior decisions of the agency do not mandate the use and application of double-leverage in this proceeding. Previous CGC rate cases, TPUC Docket No. 09-00183 and TPUC Docket No. 04-00034 utilized the capital structure of AGLR, the parent company of CGC, when determining CGC's capital structure.[200] The agency

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it is the use of debt by both the parent company and the subsidiary, in combination with the company's equity capital, to finance the assets of the subsidiary.' [citation omitted] In the regulatory context, 'double leverage...as commonly propounded instructs that the weighted average cost of capital of the parent company of a subsidiary be used as a measure of the cost of equity of a subsidiary.' [citation omitted]." Dr. Klein further states that the purpose of the double-leverage approach is to recognize the parent-subsidiary relationship by sharing some of the benefits of that relationship with ratepayers. Christopher C. Klein, Ph.D., Pre-filed Direct Testimony, p. 9, (July 3, 2018).

[197] *Id.* at 8.

[198] The specific values for the components of the Consumer Advocate's capital structure are found in the Confidential Exhibits attached to Dr. Klein's Testimony. Christopher C. Klein, Ph.D., Pre-filed Direct Testimony, Confidential Exhibits, p. 11, (July 3, 2018).

[199] Christopher C. Klein, Ph.D.. Pre-filed Direct Testimony, p. 11, (July 3, 2018).

[200] *In Re: Petition of Chattanooga Gas Company for a General Rate Increase, Implementation of the Energysmart Conservation Programs and Implementation of a Revenue Decoupling Mechanism*, TPUC Docket No. 09-00183, *Order,* pp. 41-43, (November 8, 2010); *In Re: Petition of Chattanooga Gas Company for Approval of Adjustment of its Rates and Chares and Revised Tariff*, TPUC Docket No. 04-00034, *Order*, pp. 41-44, (October 20, 2004). *See also* Gregory Macleod, Pre-filed Rebuttal Testimony, p. 2 (August 3, 2018).

specifically declined to use double-leverage methodology in Docket No. 04-00034[201] and is unable to cite the use of double-leverage by the agency to calculate the capital structure or rate of return in a deliberated gas case since 2005.

The panel found that the use of double-leverage in this proceeding would result in a rate of return that is not comparable to similar companies and therefore rejected the application of double-leverage in this case. The use of the double-leverage approach generally leads to capital structures with smaller equity ratios. As equity is the most expensive form of capital, smaller equity ratios result in a lower weighted cost of capital. The Consumer Advocate presented an exhibit during the Hearing, Trial Exhibit 5, which shows that the average rate of return in the first quarter of 2018 for gas utilities was 7.14% and 6.89% for electric utilities during the same period.[202] Further, Company witness Dr. Vander Weide provides a study that shows the average overall return for natural gas utilities in 2017 through year-to-date 2018 is 7.33%.[203] The Consumer Advocate's witness recommends a rate of return that is over 120 basis points beneath the average return for gas utilities and almost 100 basis points beneath the average rate of return set for electric utilities.[204] Given the large difference between Consumer Advocate witness Dr. Klein recommended double-leverage based rate of return of 5.93% and the average recent rates of return decisions for other companies, the panel found that adopting the Consumer Advocate's methodology would run counter to the comparability requirement of the *Hope* and *Bluefield* decisions. As such, the panel rejected the double leverage capital structure and rate of return proposed by the Consumer Advocate.

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[201] *In Re: Petition of Chattanooga Gas Company for Approval of Adjustment of its Rates and Chares and Revised Tariff*, TPUC Docket No. 04-00034, *Order*, p. 44, (October 20, 2004).
[202] S&P Global Market Intelligence, RRA Regulatory Focus Major Rate Case Decisions – January – March 2018, www.spglobal.com/marketintelligence, p. 7, (April 17, 2018). Transcript of Hearing, Vol. I B, Trial Exhibit 5, p. 120, (August 20, 2018).
[203] James Vander Weide, Ph.D., Pre-filed Rebuttal Testimony, p. 23, (August 3, 2018).
[204] Christopher C. Klein, Ph.D.. Pre-filed Direct Testimony, p. 22, (July 3, 2018).

This rate case presents a matter of first impression for the Commission, being the first proceeding in which a natural gas company is ultimately a subsidiary of a holding company that owns both other natural gas companies and electric companies. As a result of this novel issue, the panel was required to determine whether the cost of capital for CGC should stand on the basis of its role as a natural gas distribution company or on the basis of its ultimate owner, The Southern Company, an energy conglomerate with both electric and gas companies. As discussed above, the Consumer Advocate's approach to place emphasis on CGC's' ties to the electric industry using its double-leverage method results in a rate of return that is not comparable to recent decisions for either natural gas or electric utilities. Therefore, the panel found that the Company should be valued relative to other natural gas utilities. In part, the decision to determine the cost of capital in this case relies on its financial relationship to its immediate parent Southern Company Gas and its need to secure capital in competition with its other gas distribution subsidiaries of Southern Company Gas.

The panel found that adoption of the capital structure of Southern Company Gas proposed by Company is reasonable and appropriate. The capital structure proposed by CGC witness Gary Tucker is composed of 44.47% long-term debt, 6.3% short-term debt and 49.23% equity and is comparable in composition to capital structures adopted by the agency. The Consumer Advocate witness, Dr. Klein accepted this capital structure for use in his double leverage calculation. Further, the panel found that using the capital structure for Southern Company Gas is analogous to its treatment in prior agency proceedings as CGC's capital structure is set by using a parent company's capital structure that is engaged in the natural gas business. Therefore, the panel adopted the capital structure proposed by the Company containing 44.47 long-term debt, 6.3% short-term debt and 49.23% equity.

L(2). COST OF DEBT

The panel adopted the short-term and long-term debt costs proposed by The Company, which were also accepted by the Consumer Advocate as part of its capital recommendation. Therefore the panel found that the costs of short-term debt and long-term debt for SCG are 3.01% and 4.73%, respectively.

L(3). RETURN ON EQUITY

The final piece of information needed to determine the weighted cost of capital is the appropriate equity return. There is no simple single-step process for setting the appropriate equity return. There are a number of factors used to determine the equity return, including: the results of the parties' models, prevailing economic conditions, rulings of other state commissions, and other factors that may provide evidence about the risk of investing in CGC or SCG. The Company requested an 11.25% equity return.[205] The Consumer Advocate proposes a 9.0% equity return.[206] The currently authorized return on equity established in Docket No. 09-00183 is 10.3%.[207]

Determination of the return on equity utilizes "estimation" techniques that rely on comparable companies. This estimation process provides useful information about the equity cost for a company in the same industry where inputs to models used to determine the cost of equity are difficult to measure. While CGC and SCG present especially acute problems with regard to the difficulty in measuring inputs due to the non-public trade of their stock, the uncertainty in the estimate of the cost of equity for any individual company can be greatly reduced by applying cost of equity methods to a sample of comparable companies.

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[205] James H. Vander Weide, Ph.D., Pre-filed Direct Testimony, p. 52, (February 15, 2018).
[206] Christopher C. Klein, Ph.D.. Pre-filed Direct Testimony, p. 6, (July 3, 2018).
[207] *In Re: Petition of Chattanooga Gas Company for a General Rate Increase, Implementation of the Energysmart Conservation Programs and Implementation of a Revenue Decoupling Mechanism*, TPUC Docket No. 09-00183, *Order,* p. 45, (November 8, 2010).

In the present case, the determination of comparable companies is an important distinction. As discussed above, the panel found that the cost of equity capital employed by CGC should be valued relative to other gas companies. The comparable companies used by the Company are a set of natural gas companies.[208] The Consumer Advocate relies on comparable companies that blend ownership of electric and gas utilities.[209] Based upon its finding, the panel placed greater emphasis on the results of valuation models using the natural gas company comparable companies provided by the Company. The panel found, based upon the testimony of Dr. Klein, that the equity return using gas-electric utility companies is less than comparable returns from a sample of gas companies. Using the zone of reasonableness concept, the panel found the Consumer Advocate's 9% equity return recommendation as a useful lower bound on the return on equity in this proceeding.

While the panel agreed with the use of the Company's choice of comparable companies, it rejected the Company's recommended 11.25% equity return, finding that the Company's recommendation is out of line with the average equity returns for natural gas utilities in 2017 and the first quarter of 2018 and exceeds the highest awarded equity return for the same time period.[210] The panel determined that CGC's recommended ROE is clearly inconsistent with decisions related to companies in the natural gas business from other states. Such incomparability violates the canon principles of the *Hope* and *Bluefield* decisions, which prohibit returns that are incomparably low and incomparably high.

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[208] James H. Vander Weide, Ph.D., Pre-filed Direct Testimony, p. 6, (February 15, 2018).
[209] Christopher C. Klein, Ph.D.. Pre-filed Direct Testimony, p. 12, (July 3, 2018).
[210] The average awarded equity return in rate cases for natural gas utilities, in 24 cases, was 9.72%. The average equity return awarded in rate cases for natural gas utilities during the first quarter of 2018 was 9.68%. The highest awarded equity return for a natural gas utility during the first quarter of 2018 was 10.19% awarded to a Florida utility in March, 2018. S&P Global Market Intelligence, RRA Regulatory Focus Major Rate Case Decisions – January – March 2018, www.spglobal.com/marketintelligence, pp. 9-10, (April 17, 2018). Transcript of Hearing, Vol. I B, Trial Exhibit 5, p. 120, (August 20, 2018).

In addition, CGC based its recommended ROE upon an adjustment accounting for the difference in the after tax market weighted capital structure of the Company relative to its comparable companies.[211] Dr. Klein testified on behalf of the Consumer Advocate:

> There are several practical issues in a regulatory context. First, this approach to the cost of equity has never been adopted in Tennessee before. The companies regulated by the TPUC and its predecessors remain financially viable despite this. Hence, there seems to be no necessity for taking into account a common WACC and calculating an adjusted cost of equity as Dr. Vander Weide proposes. Secondly, his calculation of the WACC for his comparable firms requires some estimation of the capital structure and debt costs of these firms. To the extent these approximations are not accurate, his estimates of the WACC for his comparable firms may be inaccurate or biased. Consequently, his adjusted cost of equity for CGC is also inaccurate.[212]

Following the guidance of *Hope* and *Bluefield* with regard to comparable decisions on returns and the analysis concerning the adjustment taken by the Company, the panel found a sufficient basis to reject the Company's 11.25% proposed equity return.

The Company's 11.25% percent equity return recommendation is based upon an adjustment to the determination that the return on equity should be set at 10.3%, based upon the implementation of an ensemble of valuation models.[213] This 10.3% return is based on models implemented utilizing methods that are inconsistent with prior decisions of the agency. First, Dr. Vander Weide used the ex ante and ex post risk premium models which this agency has not adopted on the basis of the results not being specific to the company or the set of comparable companies.[214] Next, Dr. Vander Weide used quarterly DCF models, which the agency has not adopted, finding that the annual model is a more accurate model, as it does not inflate the return

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[211] James H. Vander Weide, Ph.D., Pre-filed Direct Testimony, pp. 4-5, (February 15, 2018).
[212] Christopher C. Klein, Ph.D., Pre-filed Direct Testimony, pp. 21-22, (July 3, 2018).
[213] James H. Vander Weide, Ph.D., Pre-filed Direct Testimony, p. 4, (February 15, 2018).
[214] *In Re: Petition of Tennessee American Water Company For A General Rate Increase*, TPUC Docket 10-00189, *Final Order*, p. 128 (April 27, 2012).

on equity, unlike the quarterly model.[215] Finally, the agency has rejected the addition of floatation costs when there is no accompanying issuance of stock.[216] The Company indicated that there are no planned stock issuances for Chattanooga Gas or Southern Company Gas for the next five fiscal years.[217] The panel found that given these observations, it is reasonable to recast Dr. Vander Weide's analysis to reflect the previous decisions of the agency, the end result being an upper bound equity return of 9.9%.[218]

The panel chose to implement the Capital Asset Pricing Model ("CAPM") using information provided by the parties to assist in the determination of the equity return. The fundamental idea underlying the CAPM is that investors demand higher returns for assuming additional risk. The CAPM produces a quantitative measure of the additional return required for bearing additional risk. The additional return needed to induce an investor to engage in a riskier investment is known as the risk premium.

To understand the results of the CAPM based upon economic conditions expected during the attrition period, the panel performed its own analysis. The formal representation of the CAPM is:

$$K = R_f + \beta(R_m - R_f)$$

Where:
K = expected return
R_f = risk-free return
R_m = overall market return
β = measure of asset risk relative to market risk.

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[215] *Id.*
[216] *Id.*
[217] Gary Tucker, Pre-filed Direct Testimony, p. 3, (May 11, 2018). *See also* MFG-95, (February 15, 2018).
[218] The 9.9% figure is derived by eliminating the ex ante and ex post risk premium models from the results summarized in Table 2 in Dr. Vander Weide's Direct testimony and subtracting 15 basis points from the remaining model results to reflect the elimination of floatation costs. The results of the discounted cash flow model were not recalculated to reflect annual payments, thus the panel determined the 9.9% estimate to be an upper bound of the equity return for capital used by CGC.

For overall market risk, the Parties both used a 6.9% long-run risk premium.[219] For the other inputs, the panel considered the values used by each party and made a determination about its utilization in the CAPM calculation.

The panel first utilized a risk-free return of 3.04% for use in the CAPM calculation, based upon the then-current yield on the 20 year Treasury bond used by Dr. Klein in his CAPM implementation.[220] However, upon completion of calculations, the panel arrived at equity return values lower than and not comparable to the CAPM result listed in the recent decisions reflected in Trial Exhibit 5. As a result, the panel noted that it shares the concern expressed by Company witness Dr. Vander Weide, that the low interest rate environment that has been evident since CGC's last rate proceeding has produced CAPM equity returns that biased low.[221] Similarly, due to anticipated action by the Federal Reserve with regard to interest rates, the panel noted that that using current interest rates as a measure for the risk-free rate will be unrepresentative of rates in the near term. Therefore, the panel implemented calculations of the CAPM with the 4.2% risk free rate used by Dr. Vander Weide.[222] However, to buffer against uncertainty in the interest rate forecast used by Dr. Vander Weide, the panel also implemented the CAPM using the average of the 4.2% forecast and the 3.04% then-current 20 year Treasury rate used by Dr. Klein.

Finally, the panel initially used a BETA value of 0.74 derived as the average of ValueLine BETAs for the comparable gas companies identified by the Company.[223] However, as with the initially used risk-free return value, this BETA value resulted in incomparably low CAPM results. Both witnesses accept that when companies have BETA statistics that are less than one, that CAPM equity return may be understated. To correct for this, Dr. Vander Weide

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[219] *Id.*; James H. Vander Weide, Ph.D., Pre-filed Direct Testimony, p. 40, (February 15, 2018).
[220] Christopher Klein, Ph.D., Pre-filed Direct Testimony, Exhibit p. 4, (July 3, 2018).
[221] James H. Vander Weide, Ph.D., Pre-filed Rebuttal Testimony, pp. 10-11, (August 3, 2018).
[222] *Id.* at 39.
[223] James H. Vander Weide, Pre-filed Direct Testimony, p. 39 & Exhibit JVW-1, Schedule 6, (February 15, 2018).

sets BETA = .9, while Dr. Klein implements his CAPM on his electric company comparable using BETA = 1.[224] While this agency has not adjusted for BETA statistics less than 1 in previous cases,[225] in the present case, such adjustment is useful as it assists in the counteraction of the abnormally low current interest rate environment, and both parties agree the practice is acceptable.[226]

Implementing the CAPM with BETA = .9, risk premium = 6.9%, and risk free return of 3.62% yields an equity return of 9.8%. The panel found that the calculation is a reasonable implementation of the CAPM. Further, the panel found the equity return to be similar to the average first quarter gas rate case ROE of 9.68% found in Trial Exhibit 5. In addition, the panel found the equity return to be comparable to the 9.8% which was awarded to NICOR, an affiliate of CGC, in its rate case in Illinois.[227] Finally, the recast results of Dr. Vander Weide's analysis supported a 9.9% equity return. Therefore, the panel found that a 9.8% equity return is supported by the record and leads to a comparable return for the equity capital deployed by CGC and unanimously voted to adopt 9.8% as the appropriate equity return for use in this proceeding.

L(4). OVERALL RATE OF RETURN

Based upon the above findings for relevant debt and equity costs, the panel calculated an overall cost of capital of 7.12% for CGC. The average rate of return for gas utilities awarded in the first quarter of 2018 is 7.14%, as shown in Trial Exhibit 5. The voted unanimously to adopt overall cost of capital of 7.12%, finding, based upon comparison with the Parties proposals and recent decisions in other states that it is within the zone of reasonableness.

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[224] *Id.* at 42-48; Christopher C. Klein, Ph.D., Pre-filed Direct Testimony, pp. 15-16, (July 3, 2018).
[225] *In Re: Petition of Tennessee American Water Company For A General Rate Increase*, TPUC Docket 10-00189, *Final Order*, p. 127-128 (April 27, 2012).
[226] James Vander H. Weide, Ph. D., Pre-Filed Direct Testimony, pp. 42-49, (February 15, 2018). Christopher C. Klein, Ph.D., Pre-filed Direct Testimony, p.16 (July 3, 2018).
[227] *See* CGC's Updated Responses to MFG 17, (August 28, 2018). The decision was reached by the Illinois Commission to keep the previously authorized 9.8% equity return. *See Northern Illinois Gas Company d/b/a Nicor Gas Company*, Ill C.C. Docket No. 17-0124, *Order*, (January 31, 2018).

M. REVENUE DEFICIENCY

Based upon the rate base, net operating income, fair rate of return, and the revenue conversion factor adopted by the panel, the panel determined that the revenue deficiency for CGC is $1,390,347 for the attrition period.

N. RATE DESIGN

The goal of overall rate design is to establish a system of rates that will enable a utility to generate sufficient revenues to cover expenses needed to operate the utility, plus an equity return for investors. There are often, however, many factors that are taken into consideration when designing rates, including those related to economics and social considerations. Social considerations may require affordable rates for certain customer classes that are less reflective of the actual cost of service. Economic considerations may include federal and state legislation that has been enacted to encourage energy efficiency and energy conservation and tasked state commissions with exploring rate design alternatives to align the conservation interests of consumers, while providing utilities with the proper financial incentive for promoting energy efficiency and energy conservation.

The Company proposed recovery over $4 million of its requested $6.2 million increase from residential customers and nearly $1 million from small commercial customers.[228] In total, the Company's proposed rate design seeks to recover $5 million of its requested $6.2 increase from these two customer classes. CGC's rate proposal represents a 28.21% increase in residential base rates and small commercial rates. The remaining revenue increase is apportioned to large

[228] CGC has reduced its requested rate increase from $7.0 million to $6.1 million through several modifications, though the latest rate design provided by the Company is based upon a requested revenue increase of 6.2 million. Daniel P. Yardley, Pre-filed Rebuttal Testimony, pp. 8-9, (August 3, 2018).

commercial, commercial transportation and industrial customers in CGC's proposed rate design.[229]

Specifically, CGC proposed a $5.00 increase to the Residential monthly fixed charge for November through April and a $5.50 increase to the same charge for May through October. For Small Commercial monthly rates, both the winter and summer fixed rates would increase by $10.00 per month. The other customer classes will retain their current fixed monthly rate.[230]

In addition, CGC would increase the fixed demand charge for Medium Commercial and Industrial customers by $1.5 per dekatherm, and the seasonally differentiated declining block variable distribution charge will increase by $0.01093 per therm. Further, the larger Industrial customer's fixed monthly demand charge would also increase by $1.50 per dekatherm, and the partial standby monthly demand charge will increase by $0.40 per month. The declining block variable distribution charges will increase by $0.00022 per therm.[231]

Company witness Daniel Yardley recommends these rates based upon a class cost of service study ("ACOSS") he performed.[232] His cost of service study indicates that residential and small commercial customers' rates do not cover their respective costs. Mr. Yardley testified that the rate design should be reflective of the service received in order to promote efficient energy consumption and to prevent overuse of a natural resource due to availability subsidized by other customers. In order to provide more intra-class fairness, Mr. Yardley proposed to allocate the largest portion of the requested revenue increase to Residential and Small Commercial rate classes.[233]

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[229] *Id.*
[230] Daniel P. Yardley, Pre-filed Direct Testimony, p. 17 (February 15, 2018).
[231] *Id.* at 19.
[232] *Id.* at 2.
[233] *Id.* at 3, 12-16.

Mr. Yardley also testified that when the variable portion of the rate is set to recover fixed costs, the Company is encouraged to promote increased consumption by customers. He stated that CGC rates currently follow the traditional throughput rate design, and a significant portion of base distribution revenues are derived from the variable portion of the rate.[234] Accordingly, CGC proposed allocating its proposed revenue increase predominantly to fixed monthly charges, explaining that the fixed customer charge is an important element of customer rates for three reasons: (1) it sends a price signal to the customer about the cost of connecting to the gas system; (2) it results in fairness to all customers; and (3) it provides revenue stability to the Company to recover the fixed cost to serve.[235]

The Consumer Advocate argued that the Company's Class Cost of Service Study ("CCOSS") is one factor to consider when evaluating the rates for each customer class as it established a cost for serving each of the separate customer classes and offered an allocation method to distribute the cost to the classes without providing evidence to explain rationale for allocations.[236] Mr. Novak challenged the impartiality of the Company's CCOSS and contended that distribution of the 41 allocation factors is "inherently judgmental."[237] Mr. Novak also pointed out, as an example, that many of the allocation factors are based on peak day consumption, instead of total throughput, which will assign almost all of these costs to residential and small commercial customers. He further stated that the Company has not substantiated the appropriateness of the factors used and asserted that other factors that should be considered when allocating costs to customer classes, such as the value of service that cannot be mathematically

[234] *Id.* at 4-5.
[235] *Id.* at 15-17.
[236] William H. Novak, Pre-filed Direct Testimony, pp. 31-32, (July 3, 2018).
[237] *Id.* at 32.

quantified. Mr. Novak also testified that a CCOSS should not be directly converted into rates and such studies have never been adopted by the Commission for the purpose of setting rates.[238]

Rather than utilize a cost of service study on which to base rates, the Consumer Advocate instead recommended that its proposed rate reduction be allocated evenly across-the-board to each customer class, including special contract customers, based on the ratio of each customer class' attrition period margin to the total attrition period margin.[239] The Consumer Advocate argued that across-the-board changes in rates more equitably spreads the benefit or burden of rate changes and is preferable to the basing rates upon a CCOSS as CGC proposed. Based upon the Consumer Advocate's recommended rate reduction, the across-the-board rate decrease would be 8.9% to all customer classes.[240]

Although the panel considered CGC's cost of service study to be a useful tool, the panel agreed with the concerns raised by the Consumer Advocate with regard to the lack of an in-depth analysis of the Company's cost of service study and the allocations within the study. The panel noted that the peak day allocations relied upon by the Company have been the subject of much debate among state commissions, gas utilities and consumer advocacy groups. Without a full analysis of all inputs and assumptions used in cost of service model, the panel cannot rely upon the results of the Company's cost of service study as being truly representative of actual costs for customer classes. However, the panel found the Company's cost of service study to provide some generalities that have merit, such as residential and small commercial classes providing less margin than large commercial, industrial and transportation classes. The panel found that by themselves, the generalities supported by the cost of service study are not a just and reasonable basis for the shifting of approximately 82% of cost recovery to the residential and small

[238] *Id.* at 32-33.
[239] *Id.* at 33.
[240] *Id.* at 34.

commercial classes with much smaller increases to large industrial and interruptible customers as proposed by CGC. For this reason, the panel rejected the Company's rate design methodology which is based upon its class cost of service study.

The panel observed that with a significant portion of revenues collected through volumetric charges, along with the fact that customer usage is declining, it has become increasingly difficult for all local distribution gas companies, including CGC, to maintain a revenue stream sufficient to earn its authorized rate of return. In addition, the panel found that CGC has no incentive to encourage customers to use less gas and, in fact, CGC is actually incentivized to sell more gas in order to generate additional revenues to increase earnings. In order to break the link of fixed cost recovery through volumetric charges, the panel determined it is necessary to approve and implement a rate design consisting of rate increases to fixed monthly charges and fixed demand charges. Such a design allows recovery of fixed costs through revenues that are more stable and predictable than those revenue streams collected via volumetric usage, which may vary greatly depending on weather and overall decline in customer usage due in part to more efficient appliances and homes, programmable thermostats and improving general customer awareness.

Based upon the panel's decisions regarding rate design, the panel voted unanimously to increase: the Residential R-1 Class fixed monthly rate from $13.00 to $14.00 in the summer and from $16.00 to $17.00 in the winter; the Residential R-4 Class fixed summer and winter monthly rates from $6.00 to $6.25; the Commercial C-1 fixed monthly rate from $25.00 to $26.80 in the summer and from $29.00 to $31.00 in the winter; and, the Firm Demand Charge from $5.50 to $6.35 for the Commercial C-2 Class, the Commercial Transportation Class, and the Industrial Transport with Full Standby and Partial Standby Classes. The panel found that these rate changes

for revenue recovery are consistent with state and federal legislation regarding aligning the financial interest of the utility with the consumer interests of energy conservation and energy efficiency.

O. SPECIAL CONTRACT CHARGES

As indicated in above the Consumer Advocate argued for a rate design that allocated an evenly proportioned reduction (or increase) across-the-board for all classes, including special contracts.[241] The Consumer Advocate presented evidence that subsequent to Commission approval of a Special Contract between Chattanooga Gas and E.I. DuPont de Nemours in TPUC Docket No. 99-00908,[242] the Company has given these rates to subsequent owners of this plant by assignment of the special contract without seeking approval from the Commission.[243] The Company responded indicating approval was not necessary, the special contract contained language binding successors, and the Commission was aware of the assignment through subsequent dockets.[244] While the panel did not adopt a rate change applicable to the special contract, the panel voted unanimously to direct the Company, if the special contract is to be renewed or extended, to file for approval of this contract no less than 90 days prior to its current expiration, and to provide documentation that such contract is consistent with Commission Rules and remains in the public interest.

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[241] William H. Novak, Pre-filed Direct Testimony, pp. 31-32, (July 3, 2018).
[242] *In Re: Application of Chattanooga Gas Company for Approval of Negotiated Contract with E.I. Du Pont De Nemours Company*, TPUC Docket No. 99-00908, *Order Approving Application for Approval of Negotiated Contract with E.I. Du Pont De Nemours Company*, (July 18, 2000).
[243] *Id.* at 12-13.
[244] Archie R. Hickerson, Pre-filed Rebuttal Testimony, pp. 10-12, (August 3, 2018). *See also* Transcript of Hearing, Vol. II C, pp. 227-228, (August 21, 2018).

P. TARIFF CHANGES

P(1). MISCELLANEOUS CHANGES

The Company proposed certain changes to the current tariff through its witness Archie Hickerson. First, CGC proposes to replace the 12 page standard line extension provision and its 28 page Appendix with a simpler provision more in-line with other gas companies in Tennessee.[245] As another revision to the tariff, a new residential customer using gas for central heat and water heating will now qualify for up to 100 feet of service line installed at no charge. The Company will not be changing how they determine the amount of investment needed based on projected revenue; however, the tax gross-up factor has been revised to 17.25% to reflect the new 21% corporate tax rate and is on sheet 51 on Commission Tariff No. 1 and sheet 8 on Commission Tariff No. 2.[246]

Mr. Hickerson also testified that several deletions are needed in the current rate schedules to eliminate classes that are unused or see little use. CGC proposed elimination of the special R-1 Air Conditioning, as there are no Residential Air Conditioning customers.[247] Similarly, Rate Schedule SF-1 would be deleted, as there no customer has ever been provided service under this schedule.[248] Finally, CGC would also eliminate the Standby Demand Charge for Rate Schedules R-1, R-4, and C-1, as there are only 11 customers currently being billed this charge, making the billing process cost ineffective administratively.[249]

In addition, CGC proposed revising its tariff to add language for the protection of its employees and agents. This revision would authorize the Company to discontinue service to a customer if the Company has reasonable evidence that there may be a danger from the customer,

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[245] Archie R. Hickerson, Pre-filed Revised Direct Testimony, pp. 4-5, (May 1, 2018).
[246] *Id.*
[247] *Id.* at 5.
[248] *Id.* at 6.
[249] *Id.* at 5.

or anyone on the customer's premises, to Company personnel or agents who are on the premises on Company business.[250]

CGC is also proposing a revision that will allow the Company to determine the receipt point when the Company is not able to deliver gas directly to the customer and a solution cannot be found through displacement.[251] Mr. Hickerson also described revisions to the Performance Based Ratemaking provision of the tariff concerning the separate reporting of certain gas purchases and the replacement of certain benchmarks and indexes.[252]

The panel found that there was no opposition testimony to these proposed tariff changes from either the Consumer Advocate or the CRMA. Further, the panel found that these changes had little or no impact to customers and that the proposed tariff change concerning contributions for aid in construction is consistent the 2017 Tax Cuts and Jobs Act. Accordingly, the panel voted unanimously to approve each of the above described tariff revisions.

P(2). UNAUTHORIZED GAS USE PENALTY TARIFF

The Company also proposed increasing the Unauthorized Gas Use Penalty to make it significant enough to deter customers from continuing to use gas beyond the amount delivered to the Company for them or beyond their contracted volumes. CGC would also revise the tariff to state that the Company may terminate services to the customer that continues the excessive use of gas beyond their allotted amount.[253]

Randy Carter, manager of Talley Construction Company ("Talley"), presented testimony on behalf of CRMA expressing concern over the proposed change in the Company's Unauthorized Gas Use Penalty, stating the changes would result in "unreasonable hardship" for

[250] *Id.* at 8.
[251] *Id. at 7.*
[252] *Id.* at 7-8.
[253] *Id.* at 6-7.

Talley's three asphalt facilities in Chattanooga and Cleveland, which are billed under class Chattanooga T-1.[254] Mr. Carter testified that the variable nature of the day to day demand for natural gas coupled with a recent change in CGC's practices on the issuance of daily balancing orders has made it very difficult for Talley to avoid penalties despite its efforts to anticipate usage requirements.[255] Mr. Carter gave testimony concerning one specific instance wherein an unusually warm December day in 2017 resulted in larger than normal demand for asphalt. As a result, Talley overdrew 437.7 (Dth) at a penalty rate of $15.00, for a total penalty charge of $6,565.50, on a day when the gas price was relatively low at only $2.73.[256] Further, Mr. Carter objected to the CGC's discontinuance of the sale of incremental gas to interruptible customers as an alternative to paying penalty rates, as the Company did not seek agency approval for such discontinuance.[257]

The panel found that the testimony presented by the CRMA provides evidence that the significant increase found in proposed revision to the Unauthorized Gas Use Penalty Tariff is not reasonable. Further, the panel found that the Company failed to provide sufficient justification for the amount of the increase of the penalty. Therefore, the panel unanimously voted to deny approval of the proposed revision to the Unauthorized Gas Use Penalty Tariff.

Q. LNG Accounting Methodology

The Consumer Advocate discovered a change in accounting methodology for the sales of Liquefied Natural Gas ("LNG") from the facility in Chattanooga. Mr. Novak testified that the Company's Interruptible Margin Credit Rider ("IMCR") allows the margin from off-system sales to be shared on a 50/50 basis with its customers. While the margin of these sales was recorded on

[254] Randy Carter, Pre-filed Direct Testimony, pp. 2-3, (July 3, 2018).
[255] *Id.* at 4.
[256] *Id.* at 4-5.
[257] *Id.* at 5-6.

the Company's books up until July of 2010, subsequent to that date, Mr. Novak stated the Company made an accounting change where only the gas cost of LNG is recorded on the books and the margin is kept on an affiliate's books to be shared with customers through the IMCR.[258] Mr. Novak testified that because the affiliate may not always be the asset manager of the LNG sales the Commission should require the Company to record both the gas cost and the margin from LNG sales on its books.[259] Further, he recommended that the 50% that is shared from this margin with the customers should be increased to 75%, as the customers should receive a larger portion of the benefits since they cover all of the cost from the LNG sales and the Commission has approved[260] the same percentage in another docket.[261]

Company witness Hickerson rebutted that the Commission did not adopt a 25/75 sharing percentage in TPUC Docket No. 07-00224[262] involving CGC.[263] Mr. Hickerson further testified that changing the sharing ratio risks loss of the LNG sales to another facility, and hence reduction of or loss of refunds to CGC's on-system customers.[264]

The panel found that a docket establishing base rates is not the appropriate venue to resolve this particular issue. Therefore, the panel voted unanimously to direct Commission Staff and any interested party to fully analyze and investigate this matter during an appropriate future proceeding.

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[258] William H. Novak, Pre-filed Direct Testimony, pp. 13-14, (July 3, 2018).
[259] *Id.* at 15.
[260] *In Re: Review of Nashville Gas Company's Incentive Plan Account Relating to Asset Management Fees*, TPUC Docket No. 05-00165, *Order Approving Settlement*, p. 2, (December 14, 2007).
[261] *Id.* at 14-15.
[262] *In Re: Docket to Evaluate Chattanooga Gas Company's Purchaes and Related Sharing Incentives*, TPUC Docket No. 07-00224, *Order*, (September 23, 2009).
[263] Archie R. Hickerson, Pre-filed Revised Rebuttal Testimony, p. 17, (May 1, 2018).
[264] *Id.*

R. ELIMINATION OF THE AUA AND REINSTATEMENT OF THE WNA

R(1). PROCEDURAL HISTORY OF THE IMPLEMENTATION AND EXPERIMENTAL PERIOD OF THE AUA

In its 2009 rate case in TPUC Docket 09-00183, CGC requested a rate design that incorporated the effects of weather and other factors of customer use, including energy conservation.[265] The Alignment and Usage Adjustment ("AUA") mechanism was a "revenue decoupling" mechanism intended to allow CGC the opportunity to earn a fair rate of return while promoting energy conservation. The AUA was proposed by the Company in tandem with an energy conservation program to educate and encourage energy conservation and provide tools, such as programmable thermostats, to Tennessee customers to help them use less natural gas. The Company sought to eliminate the WNA, as the AUA would account for any change in customer usage for all factors, including weather.[266]

The Company's proposal was an attempt to answer the call of the Tennessee General Assembly to align the financial interests of public utilities with energy conservation.

> The general assembly declares that the policy of this state is that the Tennessee public utility commission will seek to implement, in appropriate proceedings for each electric and gas utility, with respect to which the commission has rate making authority, a general policy that ensures that utility financial incentives are aligned with helping their customers use energy more efficiently and that provides timely cost recovery and a timely earnings opportunity for utilities associated with cost-effective measurable and verifiable efficiency savings, in a way that sustains or enhances utility customers' incentives to use energy more efficiently.

Tenn. Code Ann. § 65-4-126. While there was general consensus regarding the importance of energy conservation among the parties in the Company's 2009 rate case, there was considerable

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[265] *In Re: Petition of Chattanooga Gas Company for a General Rate Increase, Implementation of the EnergySmart Conservation Programs and Implementation of a Revenue Decoupling Mechanism*, Docket 09-00183, (hereafter "*2009 Chattanooga Gas Rate Case*"), *Final Order*, pp. 50-52, (November 8, 2010) (hereafter "*2009 Rate Case Order*").
[266] *Id.* at 58-59.

debate as to how to implement the requirements of General Assembly's policy with respect to aligning the financial interests of the Company with crafting energy conservation programs that were cost efficient and able to produce verifiable and measurable savings.[267]

Ultimately, the Commission approved the AUA rider after making the following modifications: (1) the rider only applied to R-1 and C-1 customers; (2) the rider was approved on a three-year experimental basis; and (3) the AUA adjustments were limited, as recommended by the Consumer Advocate, to a cap of 2% of margin revenue annually.[268] In addition, as part of the rate design decision in the 2009 rate case, the Commission determined it was appropriate to allow for approximately 70% of the Company's fixed costs to be recovered via fixed monthly charges and the remainder recovered via volumetric charges, thereby providing a greater amount of revenues that are less dependent upon volumetric billing.[269] In recognition of the reduced business risk inherent in such rate design changes, the Commission adopted a twenty-five basis point reduction in the return on equity.[270]

The Commission also approved a portion of the Company's energy conservation program, consisting of providing programmable thermostats to customers as well as an education and outreach program.[271] The bulk of the conservation measures were funded by consumers.[272] Finally, in an effort to comply with legislative directives that energy conservation programs be cost-effective and provide measurable and verifiable savings, the Commission directed the Commission Staff to work with the National Regulatory Research Institute ("NRRI") to develop a set of measurements to evaluate the approved energy conservation programs. The three-year

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[267] *Id.* at 50-55.
[268] *Id.* at 57.
[269] *Id.* at 56.
[270] *Id.* at 45.
[271] *Id.* at 61.
[272] *Id.*

experimental period was to be followed by a review of the impact of both the AUA and the approved energy conservation programs.[273]

As the end of the initial three-year experimental period was coming to a close, on April 25, 2013, the Company filed a motion in TPUC Docket 09-00183 requesting an extension of the experimental period of up to three additional years for the AUA and the energy conservation programs before a review could take place.[274] In addition to the extension, the Company sought to modify the 2% annual cap. The Company claimed that the cap prevented the collection of over $1 million in revenue that would have been collected had the WNA been in effect. The Company asserted an extension was necessary, as the AUA was scheduled to end on May 31, 2013, before the Commission's review. Without an extension of the AUA, the Company's revenues would be impacted by any variance in usage, including weather.[275] The Company also asserted NRRI had not yet completed its work with respect to developing measurements and standards to the energy conservation programs and provided a report to the Commission. The Consumer Advocate opposed any extension without a review of the AUA and the energy conservation programs and argued that the Company may be earning more than its authorized return.[276] On May 16, 2013, Commission Party Staff intervened to participate in the review.[277]

On June 17, 2013, the Commission hearing panel assigned to the docket extended the AUA on an interim basis pending an evidentiary review of the AUA and energy conservation programs.[278] The Commission denied the Company's request to consider modifying the cap

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[273] *Id.* at 57.
[274] *2009 Chattanooga Gas Rate Case, Chattanooga Gas Company's Motion to Extend the Alignment and Usage Adjustment and Conservation Programs Approved by the Authority*, (April 25, 2013).
[275] *Id.* at 2-3.
[276] *2009 Chattanooga Gas Rate Case, Order Extending Alignment and Usage Adjustment Mechanism, Convening a Contested Case Proceeding and Appointing a Hearing Officer*, p. 4 (November 6, 2013).
[277] *2009 Chattanooga Gas Rate Case, Memorandum*, (May 16, 2013).
[278] *Id.* at 5-6.

without an evidentiary hearing.[279] A procedural schedule was established based on a joint proposal by the parties.[280] The schedule was to be triggered by the filing of the Commission's Party Staff report.

After NRRI completed its work and report, the Commission Party Staff analyzed the results and filed its report on September 19, 2017.[281] The scope of the Staff Report was limited to an evaluation of the energy conservation programs, and neither the NRRI nor the Party Staff made any recommendations with respect to the AUA.[282] On October 20, 2017, the Company filed a request to terminate the AUA trial mechanism and reinstatement of the WNA.[283] The Company offered that it was willing to defer consideration of its proposal to address funds deferred under the AUA.[284] On October 24, 2017, the Consumer Advocate submitted the pre-filed testimony of William H. Novak. The Consumer Advocate noted the content of the Staff's Report and NRRI's conclusions that the energy conservation programs were reasonable in intent, but short sighted and difficult to assess and measure any resulting customer savings.[285] The Consumer Advocate opposed reinstatement of the WNA outside of a rate case proceeding and recovery of any deferred AUA amounts captured by the 2% cap.[286]

The parties mutually agreed that the energy conservation programs expired after the end of the three-year experimental period and that the outstanding issues in the 2009 rate case docket

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[279] *Id.*
[280] *2009 Chattanooga Gas Rate Case, Order Entering Amended Procedural Schedule*, (August 9, 2013).
[281] *2009 Chattanooga Gas Rate Case, Staff Report*, (September 19, 2017).
[282] *Id.*; *TPUC Party Staff Response Regarding Chattanooga Gas Company's Report and Recommendations on the Trial AUA*, (October 26, 2017).
[283] *2009 Chattanooga Gas Rate Case, Chattanooga Gas Company Request to Terminate the Trial AUA Mechanism and Reinstate the WNA*, October 20, 2017.
[284] *Id.* at 7.
[285] *2009 Chattanooga Gas Rate Case*, William H. Novak, Pre-filed Direct Testimony, p. 6, (October 24, 2017).
[286] *Id.*

should be moved into the Company's next rate case expected in early 2018.[287] Thereafter, the issues of whether the AUA should be terminated, whether the WNA should be reinstated, and whether CGC is entitled to any recovery of the AUA deferral under-recovery were placed in the present docket for resolution.[288]

R(2). THE AUA AND RELATED ISSUES IN THIS DOCKET

In the present rate case, the Company requested to eliminate the AUA, to reinstate the WNA for residential R-1 and commercial C-1 customers, and to recover approximately $1.9 million of accumulated and deferred AUA adjustments that exceeded the tariff rider's adjustment cap.[289] The Company claimed that, because of the warmer winters experienced over the past few years, coupled with the 2% margin cap on AUA adjustments, R-1 and C-1 customers have received approximately $1.9 million in gas that has not been recouped since inception of the rider.[290] For this reason, the Company has asked to terminate the AUA and return the R-1 and C-1 customers to the WNA, or alternatively, to continue the AUA with the weather normalization recovery moved to the WNA tariff. In either scenario, however, the Company has also requested to recover the $1.9 million of accumulated and deferred AUA adjustments through the Interruptible Margin Credit Rider ("IMCR").[291]

The Company stated that the AUA was meant to allow recovery of costs while encouraging customers to conserve energy. The calculation for the AUA was based on the average revenues per customer for R-1 and C-1 customers each month using approved rates and billing determinants.[292] Monthly averages became benchmarks to which actual revenue amounts

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[287] *2009 Chattanooga Gas Rate Case, Order Moving Outstanding Issues into the New Docket and Administratively Closing the Docket*, pp. 3-4, (January 5, 2018).
[288] *Id.* at 5-6.
[289] Archie R. Hickerson, Revised Pre-filed Direct Testimony, p. 3, (May 1, 2018).
[290] Wendell Dallas, Revised Pre-filed Direct Testimony, pp. 22-23, (May 11, 2018).
[291] *Id.* at 24.
[292] Archie R. Hickerson, Revised Pre-filed Direct Testimony, p. 9-10, (May 1, 2018).

were compared. Amounts collected (actual billed non-gas revenue divided by the number of customers) over the benchmark were subject to be refunded back to customers, and conversely, amounts collected under the benchmark could be surcharged. This calculation was performed monthly and any over/under collected amounts were then recorded in the deferred AUA revenue account.[293]

Mr. Hickerson testified that each year, the deferred AUA revenue account (as of May 31) is evaluated for both the R1 and C1 rate schedules to ascertain the amount of over or under collected funds for the year. Funds under or equal to the 2% margin cap, either to the positive or negative, are then divided by the total therms of gas consumed by the customers in the R-1 and C-1 rate schedule. The result, the AUA factor, is then billed or credited monthly to customers over the next 12 months, called the recovery period. The accumulated balance over the 2% cap is carried over into the next year's AUA factor calculation.[294] Mr. Hickerson stated that the accumulated balance over the 2% cap is approximately $1.9 million as of May 31, 2017.[295]

Mr. Hickerson asserted that the AUA mechanism has not met its objectives or served the best interest of customers or the Company. The Company contended that there is a revenue recovery shortfall for both rate schedules R-1 and C-1.[296] The Company also asserted the funds collected through the AUA for rate schedule R-1 are significantly out of sync each year with the authorized margin. In other words, the difference between the benchmarks and the actual revenues is significant, with large swings from positive to negative in some years. As a result of the 2% cap, the Company is unable to recoup all of its costs each year, which the Company argued is unfair. Finally, Mr. Hickerson also testified that although the C-1 rate schedule AUA

[293] *Id.* at 10-11.
[294] *Id.*
[295] Archie R. Hickerson, Pre-filed Rebuttal Testimony, p. 24, (August 3, 2018).
[296] Archie R. Hickerson, Revised Pre-filed Direct Testimony, p. 13-15, (May 1, 2018

balances have been steadier, the Company still is unable to recover the full cost of service due to the 2% cap.[297]

Consumer Advocate witness Novak addressed the Company's proposal to terminate the AUA and recover the approximately $1.9 million deferred cumulative AUA balance in his testimony. Mr. Novak asserted that, from December 2011 to December 2014, the Company earned about $3.3 million more than its authorized rate of return.[298] He testified that CGC would have continued to exceed its authorized rate in 2015 and 2016 if there had not been a dramatic increase in its rate base of about $14 million. Additionally, Mr. Novak testified that the Commission has not given any authorization for the Company to recover the deferred AUA balance.[299] Therefore, Mr. Novak recommends that the Commission deny the Company's request to recover the deferred AUA balance and conduct an audit of the AUA surcharges and collections.[300]

There is consensus among the parties that the AUA should be terminated. Therefore, the panel voted unanimously to terminate the AUA and reinstate the WNA for the R-1 and C-1 rate classes consistent with the simple regression methodology proposed by the Consumer Advocate. With respect to the Company's request for recovery of the balance of the deferred AUA account, the panel voted unanimously to deny the request.

In considering utility proposals for energy conservation programs and related incentive rate designs, the Commission seeks for a balance in aligning the interests of utilities and customers with the goals of energy conservation.[301] The AUA was designed to adjust for all

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[297] *Id.* at 15-16.
[298] William H. Novak, Pre-filed Direct Testimony, p. 39 (July 3, 2018).
[299] *Id.*
[300] *Id.* at 40.
[301] *In Re: Petition of Piedmont Natural Gas Company, Inc. to Implement a Margin Decoupling Tracker (MDT) Rider and Related Energy Efficiency and Conservation Programs*, TPUC Docket 09-00104, *Order Denying Margin Decoupling Tracker Rider*, pp. 11-18 (June 9, 2010).

factors that impacted the usage volumes and the resulting revenue collected. Gas usage can be impacted by a number of factors, including price volatility in the natural gas commodities market. The AUA looks solely at revenue on a per customer average and ignores any changes in the Company's expenses which can lead to an unreasonable mismatch between revenues and expenses. Without some measure of moderation and protection, revenue decoupling can impact the bills of customers unreasonably beyond policy incentives and the compensation required to offset the effects of an energy conservation program.

In approving the AUA in 2010, the Commission specifically adopted one of the consumer protections proposed by the Consumer Advocate; a 2% annual cap on margin accruals within the AUA mechanism.

> ....At the end of the three year trial period, the Company shall provide a report to the Authority[302] on the AUA mechanism, including its impact and effect on both consumer classes and the Company. The report shall provide recommendations as to whether the AUA mechanism should be continued. Further, the panel voted unanimously to adopt the 2.0% annual cap on margin accruals within the AUA mechanism for the R-1 and C-1 classes, as recommended by the Consumer Advocate.[303]

Thus, concerned with the potential of passing on higher costs associated with the program's conservation and decoupling initiatives, the Commission approved the cap on annual adjustments to limit the impact of the program's costs on customers' bills. The purpose of the cap was to restrict the amount of cost recovery available under the AUA program to an amount deemed reasonable by the Commission.

While the AUA has remained in effect since 2010, the energy conservation programs which were the policy rationales underlying the implementation of the AUA were not extended in 2013 and fell short of the goals set by the legislature. Moreover, review of the Company's

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[302] The Tennessee Public Utility Commission was previously known as the Tennessee Regulatory Authority ("Authority").
[303] *2009 Rate Case Order*, at 57.

earnings since the inception of the AUA program shows that the AUA rider and related cap had little, if any, effect on the Company's ability to achieve its authorized rate of return. Finally, as pointed out by the Consumer Advocate, the Commission specifically prohibited CGC from accruing margin shortfalls above the 2% cap, much less authorizing the recovery of AUA adjustment amounts over the annual 2% cap.[304] The Company never petitioned or obtained an accounting order which would have authorized deferral of these amounts into a regulatory asset for consideration of recovery in a future proceeding. The Company's request in 2013 to enlarge the cap was denied.[305] The record before the panel does not support the retroactive elimination of the cap. Therefore, the panel found that the Company is not entitled to recovery of the balance of the deferred AUA account and as previously indicated hereinabove, the panel unanimously voted to deny the Company's request to recover the deferred AUA balance.

IT IS THEREFORE ORDERED THAT:

1. The rates filed by Chattanooga Gas Company on February 15, 2018 are denied;

2. For purposes of the rates herein, the annual test period shall be the historical test period for the twelve months ending December 31, 2017, with adjustments for attrition for the twelve month period ending June 30, 2019;

3. For purposes of the rates herein, the rate base is $149,739,716 and the net operating income is $9,625,826;

4. For purposes of the rates herein, the capital structure is composed of 44.47% long-term debt, 6.3% short-term debt and 49.23% equity. The cost of capital rates consist of long-term debt cost of 4.73%, short-term debt cost of 3.01% and an equity return of 9.8%;

5. For purposes of the rates herein, the overall rate of return shall be 7.12%;

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[304] The Commission Order states, "The margin accruals within the AUA mechanism for R-1 and C-1 classes shall have a 2.0% annual cap." *Id.* at 66.

[305] *2009 Chattanooga Gas Rate Case, Order Extending Alignment and Usage Adjustment Mechanism, Convening a Contested Case Proceeding and Appointing a Hearing Officer*, p. 5 (November 6, 2013).

6. For purposes of the rates herein, the Revenue Conversion Factor is 1.347169, resulting in a Revenue Deficiency of $1,390,347, the amount needed for the Company to earn a fair return on its investment during the attrition year;

7. The Residential R-1 Class fixed monthly rate shall be $14.00 in the summer and $17.00 in the winter;

8. The Residential R-4 Class fixed summer and winter monthly rates shall be $6.25;

9. The Commercial C-1 Class fixed monthly rate shall be $26.80 in the summer and $31.00 in the winter;

10. The Firm Demand Charge shall be $6.35 for the Commercial C-2 Class, the Commercial Transportation T-3 Class, the Industrial Transport with Full Standby F-1/T-2 Class, and the Industrial Transport with Partial Standby F-1/T-2+T-1Class;

11. The revision to the line extension provisions of the Chattanooga Gas Company Tariff is approved as filed;

12. The revision of the Tariff by deletion of provisions relating to the Air Conditioning Rate, Standby Demand Charge and Rate Schedule SF-1 Experimental Semi Firm Sales Service are approved as filed;

13. The revision of the tariff concerning the determination of the eligible receipt point is approved as filed;

14. The revision of the Performance Based Ratemaking tariff provision is approved as filed;

15. The revision of the Tariff to add language concerning Employee Protection is approved as filed;

16. The revision of the Tariff to increase the Unauthorized Gas Penalty rate is denied;

17. The Alignment and Usage Adjustment is eliminated for Residential R-1 and Commercial C-1 customers;

18. The Weather Normalization Adjustment is reinstated for Residential R-1 and Commercial C-1 customers;

19. If the special contract approved in TPUC Docket No. 99-00908 is to be renewed or extended, Chattanooga Gas Company is directed to file for approval of extension or renewal of the contract no less than ninety (90) days prior to the date of expiration and provide documentation that such consistent with Commission Rules and remains in the public interest;

20. Commission Staff is instructed to, along with any interested party, fully analyze and investigate the accounting methodology for the sales of Liquefied Natural Gas from the facility in Chattanooga during an appropriate future proceeding;

21. Chattanooga Gas Company's request to recover the deferred balance of the Alignment and Usage Adjustment Mechanism is denied;

22. If Chattanooga Gas Company petitions for an alternative regulatory mechanism, the forward-looking methodologies adopted in this Order should be reviewed for appropriateness in the determination of service rates pursuant to such annual rate-setting mechanism;

23. Any person who is aggrieved by the Commission's decision in this matter may file a Petition for Reconsideration with the Commission within fifteen days from the date of this Order; and

24. Any person who is aggrieved by the Commission's decision in this matter has the right to judicial review by filing a Petition for Review in the Tennessee Court of Appeals, Middle Section, within sixty days from the date of this Order.

Chair Robin L. Morrison, Vice Chair Kenneth C. Hill and Commissioner David F. Jones concur. None dissent.

ATTEST:

Earl Taylor

Earl R. Taylor, Executive Director

ATTACHMENT 1
(Commission Exhibit)

CHATTANOOGA GAS COMPANY
INDEX TO SCHEDULES
For the 12 Months Ending June 30, 2019

	Schedule
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Docket No. 18-00017
Commission Exhibit
Schedule 1

CHATTANOOGA GAS COMPANY
Revenue Deficiency (Surplus)
For the 12 Months Ending June 30, 2019

Line No.		Attrition Year	
1	Rate Base	$ 149,739,716	A/
2	Operating Income At Current Rates	9,625,826	B/
3	Earned Rate Of Return	6.43%	
4	Fair Rate Of Return	7.12%	C/
5	Required Operating Income	10,657,877	
6	Operating Income Deficiency (Surplus)	1,032,051	
7	Gross Revenue Conversion Factor	1.347169	D/
8	**Revenue Deficiency (Surplus)**	$ **1,390,347**	

A/ Commission Exhibit, Schedule 2.
B/ Commission Exhibit, Schedule 5.
C/ Commission Exhibit, Schedule 11.
D/ Commission Exhibit, Schedule 12.

Docket No. 18-00017
Commission Exhibit
Schedule 2

CHATTANOOGA GAS COMPANY
Rate Base
For the 12 Months Ending June 30, 2019

Line No.		Attrition Year A/
	Additions:	
1	Utility Plant in Service	$ 301,415,025
2	Construction Work in Progress	12,457,439
3	Pension & OPEB Assets	0
4	Materials & Supplies	343,442
5	Prepayments	46,803
6	Gas Inventory	9,425,959
7	Deferred Rate Case Expense	1,117,499
8	Working Capital	350,066 B/
9	**Total Additions**	$ **325,156,233**
	Deductions:	
10	Accumulated Depreciation	$ 127,903,439
11	Accumulated Deferred Income Taxes	23,114,266
12	Regulatory Liability - Excess Deferrals	22,177,646
13	Regulatory Liability - Deferred Tax Savings	0
14	Customer Advances for Construction	0
15	Reserve for Uncollectibles	169,708
16	Reserve for Health Insurance	33,409
17	Other Reserves	72,774
18	Customer Deposits	1,612,342
19	Accrued Interest on Customer Deposits	332,933
20	**Total Deductions**	$ **175,416,517**
21	**Rate Base**	$ **149,739,716**

A/ Commission Staff Workpaper - Rate Base Summary
B/ Commison Exhibit, Schedule 3.

CHATTANOOGA GAS COMPANY
Lead Lag Results
For the 12 Months Ending June 30, 2019

Line No.		Commission Staff	
1	Revenue Lag	43.76	**A/**
2	Expense Lag	39.01	**B/**
3	Net Lag	4.75	
4	Daily Cost of Service	$ 180,221	**B/**
5	**Lead Lag Study**	$ **856,635**	
6	Tax Collections Withheld	(506,569)	**C/**
7	**Net Cash Working Capital Provided**	$ **350,066**	

A/ CGC Response to MFG #72 All Attachments Rev 5-31-2018, tab MJA-1, Schedule 1, Column B
B/ Commission Exhibit, Schedule 4.
C/ CGC Response to CPAD Discovery Request 1-0002(a) revised (April 10, 2018)

Docket No. 18-00017
Commission Exhibit
Schedule 4

CHATTANOOGA GAS COMPANY
Working Capital Expense Lag
For the 12 Months Ending June 30, 2019

Line No.		Amount		Lag	E/	Dollar Days
	Operating & Maintenance Expenses:					
1	Purchased Gas Expense	$ 38,611,525	A/	40.94		$ 1,580,755,852
2	O&M Labor	3,216,717	B/	14.01	F/	45,066,202
3	Pension Expense	22,964	B/	0.00		0
4	Post-Retirement Benefits Other Than Pension	0	B/	0.00		0
5	Miscellaneous Employee Benefits	(312)	B/	4.47		(1,393)
6	401K Benefits	120,978	B/	12.07		1,460,201
7	Health/Life Insurance Expense	573,050	B/	8.98		5,145,989
8	Allocated Cost	3,371,863	B/	21.94		73,978,669
9	Uncollectible Expense	121,863	B/	43.76		5,332,708
10	Other Operating Expense	4,051,519	B/	31.49		127,582,320
	Taxes:					
11	Taxes Other Than Income Tax	3,488,071	C/	171.16	G/	597,018,264
12	State Income Tax - Current	0		37.88		0
13	State Income Tax Deferred	372,213	D/	0.00		0
14	Federal Income Tax - Current	0		37.88		0
15	Federal Income Tax - Deferred	264,062	D/	0.00		0
	Other:					
16	Depreciation Expense	8,035,649	H/	0.00		0
17	Interest on Customer Deposits	96,740	I/	0.00		0
18	Interest Expense - Short Term Debt	283,951	J/	(51.36)		(14,583,745)
19	Interest Expense - Long Term Debt	3,149,672	J/	45.76		144,128,973
20	**Total Working Capital Requirement**	$ **65,780,525**		**39.01**		$ **2,565,884,040**
21	**Daily Working Capital Requirement** $ **180,221**					
22	Return on Equity	6,192,203				
23	**Total Cost of Service**	$ **71,972,727**				

A/ Commission Exhibit, Schedule 6.
B/ Commission Exhibit, Schedule 7.
C/ Commission Exhibit, Schedule 8.
D/ Commission Exhibit, Schedule 9.
E/ CGC Response to MFG #72 All Attachments Rev 5-31-2018, tab MJA-1, Schedule 1, Column B
F/ CGC Response to MFG 72-1; Base Payroll lag, excludes consideration of Incentive Compensation lag.
G/ CGC Response to MFG 72 Revised; "TOT Summary Calculation" tab.
H/ CGC Response to MFG #25-1
I/ CGC Response to MFG #69-6
J/ Commission Exhibit, Schedule 11.

CHATTANOOGA GAS COMPANY
Income Statement at Current Rates
For the 12 Months Ending June 30, 2019

Line No.		Attrition Amount	
	Operating Revenues:		
1	Gas Sales & Transportation Revenues	$ 70,473,655	A/
2	Other Revenues	675,121	B/
3	AFUDC	823,951	B/
4	**Total Operating Revenue**	$ **71,972,727**	
	Operating & Maintenance Expenses:		
5	Purchased Gas Expense	$ 38,611,525	A/
6	Operations & Maintenance - Labor	3,216,717	C/
7	Operations & Maintenance - NonLabor	8,261,924	C/
8	**Total Operating & Maintenance Expenses**	$ **50,090,166**	
	Other Expenses:		
9	Depreciation Expense	$ 8,035,649	D/
10	Interest on Customer Deposits	96,740	E/
11	General Taxes	3,488,071	F/
12	State Excise Taxes	372,213	G/
13	Federal Income Taxes	264,062	G/
14	**Total Other Expenses**	$ **12,256,736**	
15	**Total Operating Expenses**	$ **62,346,902**	
16	**Utility Operating Income**	$ **9,625,826**	

A/ Commission Exhibit, Schedule 6.
B/ Commission Staff Workpaper - Revenue Summary
C/ Commission Exhibit, Schedule 7.
D/ CGC Response to MFG #25-1
E/ CGC Response to MFG #69-6
F/ Commission Exhibit, Schedule 8.
G/ Commission Exhibit, Schedule 9.

CHATTANOOGA GAS COMPANY
Revenue Summary
For the 12 Months Ending June 30, 2019

Line No.	Customer Class	Commission Staff A/
	Sales & Transportation Margin:	
1	Residential (R-1)	$ 14,251,629
2	Multi-Family Housing (R-4)	28,029
3	Commercial (C-1)	3,495,831
4	Commercial (C-2)	8,254,355
5	Industrial (F-1/T-2)	2,004,732
6	Industrial (I-1)	36,274
7	Industrial (T-1)	1,082,153
8	Industrial (T-1/T-2)	1,290,946
9	Industrial (T-3)	1,276,880
10	Special Contract	141,302
11	**Total Margin**	$ **31,862,130**
12	Gas Cost	38,611,525
13	**Total Revenue**	$ **70,473,655**

A/ Commission Staff Workpaper - Revenue Summary

Docket No. 18-00017
Commission Exhibit
Schedule 7

CHATTANOOGA GAS COMPANY
O&M Expense Summary
For the 12 Months Ending June 30, 2019

Line No.	Expense	Commission Staff	
1	Payroll Expense	$ 3,216,717	B/
2	Employee Benefits	$ 716,680	
3	Benefits Capitalized	$ (92,484)	C/
4	Fleet Services & Facilities Expense	$ 810,419	
5	Outside Services	$ 1,849,778	
6	Bad Debt Expense	$ 121,863	
7	Sales Promotion Expense	$ -	D/
8	Customer Service & Account Expense	$ 4,859	
9	Administrative & General Expense	$ 951,611	
10	Admin & Gen. Salaries & Exp. Capitalized	$ (60,878)	
11	Other Distribution & Storage Expense	$ 588,213	
12	AGL Service Company Allocations	$ 3,371,863	
13	**Total O&M Expense**	$ **11,478,640**	

A/ Commission Staff Workpaper - Expense Summary
B/ Payroll Worksheet 44 Employees, 50% Incentive Comp disallowed
C/ Used CAPD Test period Capitalized percentage applied to Staff Total Benefit amount
D/ Commission Rule 1220-04-05-.45 prohibits the recovery of Advertising and Promotional Expense

Docket No. 18-00017
Commission Exhibit
Schedule 8

CHATTANOOGA GAS COMPANY
Taxes Other than Income Income Taxes
For the 12 Months Ending June 30, 2019

Line No.		Commission Staff	A/
1	Property Taxes	$ 2,093,447	
2	Commission Inspection Fee	305,345	
3	Payroll Taxes	383,805	
4	Franchise Tax	136,334	
5	Gross Receipts Tax	569,140	
6	Allocated & Other Taxes	0	
7	**Total**	$ **3,488,071**	

A/ Commission Staff Workpaper - TOTI Summary

CHATTANOOGA GAS COMPANY
Excise and Income Taxes
For the 12 Months Ending June 30, 2019

Line No.		Commission Staff	
1	**Operating Revenues**	$ **71,972,727**	A/
	Operating Expenses:		
2	Purchased Gas Expense	$ 38,611,525	A/
3	O&M Expenses	11,478,640	A/
4	Depreciation Expense	8,035,649	A/
5	Interest on Customer Deposits	96,740	A/
6	General Taxes	3,488,071	A/
7	**Total Operating Expenses**	$ **61,710,626**	
8	**NOI Before Excise and Income Taxes**	$ **10,262,101**	
9	AFUDC	(823,951)	A/
10	Interest Expense	(3,433,623)	B/
11	**Net Income Before Income Taxes**	$ **6,004,527**	
	Tennessee Excise Tax Calculation:		
12	Net Income Before Income Taxes	$ 6,004,527	
13	Excise Tax Rate	6.50%	
14	**Excise Tax Expense**	$ **390,294**	
15	Less After-Tax Excess Deferred Tax Liability Amortization	18,081	D/
16	**Net Excise Tax Expense**	$ **372,213**	
17	**Excise Tax - Current**	$ **0**	E/
18	**Excise Tax - Deferred**	$ **372,213**	E/
	Federal Income Tax Calculation:		
19	Net Income Before Income Taxes	$ 6,004,527	
20	Net Excise Tax Expense	372,213	
21	**Net Income Before Federal Income Tax**	$ **5,632,314**	
22	FIT Rate	21.00%	
23	**Federal Income Tax Expense**	$ **1,182,786**	
24	Less After-Tax Excess Deferred Tax Liability Amortization - Protected	(21,351)	C/
25	Less After-Tax Excess Deferred Tax Liability Amortization - Tax Cut & Jobs Act	(897,373)	F/
26	Less 2018 Tax Savings Amortization		
27	**Net Federal Income Tax Expense**	$ **264,062**	
28	**Federal Income Tax - Current**	$ **0**	E/
29	**Federal Income Tax - Deferred**	$ **264,062**	E/

A/ Commission Exhibit, Schedule 5.
B/ Commission Exhibit, Schedule 11.
C/ MFG 61-2 Line 28 State
D/ MFG 61-2 Line 28 Federal
E/ All Pre-tax book income assumed to be deferred.
F/ MFG 69 Rev 5-31-2018

CHATTANOOGA GAS COMPANY
Income Statement at Proposed Rates
For the 12 Months Ending June 30, 2019

Line No.		Current Rates A/	Rate Increase	Proposed Rates
	Operating Revenues:			
1	Gas Sales & Transportation Revenues	$ 70,473,655	$ 1,390,347 B/	$ 71,864,002
2	Other Revenues	675,121	12,230	687,351
3	AFUDC	823,951	0	823,951
4	**Total Operating Revenue**	$ **71,972,727**	$ **1,402,577**	$ **73,375,304**
	Operating & Maintenance Expenses:			
5	Purchased Gas Expense	$ 38,611,525	$ 0	$ 38,611,525
6	Operations & Maintenance - Labor	3,216,717	0	3,216,717
7	Operations & Maintenance - NonLabor	8,261,924	5,364	8,267,288
8	**Total Operating & Maintenance Expenses**	$ **50,090,166**	$ **5,364**	$ **50,095,530**
	Other Expenses:			
9	Depreciation Expense	$ 8,035,649	$ 0	$ 8,035,649
10	Interest on Customer Deposits	96,740	0	96,740
11	General Taxes	3,488,071	0	3,488,071
12	State Excise Taxes	372,213	90,819	463,032
13	Federal Income Taxes	264,062	274,344	538,406
14	**Total Other Expenses**	$ **12,256,736**	$ **365,163**	$ **12,621,898**
15	**Total Operating Expenses**	$ **62,346,902**	$ **370,527**	$ **62,717,428**
16	**Utility Operating Income**	$ **9,625,826**	$ **1,032,050**	$ **10,657,876**

A/ Commission Exhibit, Schedule 5.
B/ Commission Exhibit, Schedule 1.

CHATTANOOGA GAS COMPANY
Rate of Return Summary
For the 12 Months Ending June 30, 2019

Line No.	Class of Capital	Commission Staff Percent of Total	Commission Staff Cost Rate	Commission Staff Weighted Cost Rate A/
1	CGC Short-Term Debt	6.30%	3.01%	0.19%
2	CGC Long-Term Debt	44.47%	4.73%	2.10%
3	Common Equity	49.23%	9.80%	4.82%
4	**Total**	**100.00%**		**7.12%**

	Interest Expense Short-Term Debt:		
7	Rate Base		$ 149,739,716 B/
8	Short-Term Debt Cost		0.19%
9	**Short-Term Debt Interest Expense**		$ **283,951**
	Interest Expense Long-Term Debt:		
10	Rate Base		$ 149,739,716 B/
11	Long-Term Debt Cost		2.10%
12	**Long-Term Debt Interest Expense**		$ **3,149,672**
13	**Total Interest Expense**		$ **3,433,623**

A/ Commission Staff Workpaper - Rate of Return Summary
B/ Commission Exhibit, Schedule 2.

Docket No. 18-00017
Commission Exhibit
Schedule 12

CHATTANOOGA GAS COMPANY
Revenue Conversion Factor
For the 12 Months Ending June 30, 2019

Line No.		Amount	Balance
1	Operating Revenues		1.000000
2	Add: Forfeited Discounts	0.008796 **A/**	0.008796
3	Balance		1.008796
4	Uncollectible Ratio	0.003825 **B/**	0.003858
5	Balance		1.004938
6	State Excise Tax	0.065000 **C/**	0.065321
7	Balance		0.939617
8	Federal Income Tax	0.210000 **C/**	0.197320
9	Balance		0.742298
10	Revenue Conversion Factor (Line 1 / Line 9)		**1.347169**

A/ Commission Staff Workpaper - Other Revenues
B/ Commission Staff Workpaper - Uncollectible Ratio.
C/ Statutory Rates.

CHATTANOOGA GAS COMPANY
Commission Proposed Margin Change
For the 12 Months Ending June 30, 2019

Line No.	Customer Class	Current Rates A/	Proposed Rates	Margin Change B/	Percent Change
1	Residential (R-1)	$ 14,251,629	$ 14,945,883	$ 694,254	4.87%
2	Multi-Family Housing (R-4)	28,029	28,579	550	1.96%
3	Commercial (C-1)	3,495,831	3,648,001	152,170	4.35%
4	Commercial (C-2)	8,254,355	8,592,933	338,578	4.10%
5	Industrial (F-1/T-2)	2,004,732	2,114,123	109,391	5.46%
6	Industrial (I-1)	36,274	36,274	0	0.00%
7	Industrial (T-1)	1,082,153	1,082,153	0	0.00%
8	Industrial (T-1/T-2)	1,290,946	1,333,342	42,396	3.28%
9	Industrial (T-3)	1,276,880	1,329,837	52,957	4.15%
10	Special Contract	141,302	141,302	0	0.00%
11	**Total Sales & Transportation Margin**	**$ 31,862,130**	**$ 33,252,477**	**$ 1,390,297**	**4.36%**
12	Other Revenues	675,121	687,351	12,230	1.81%
13	**Total Margin**	**$ 32,537,251**	**$ 33,939,828**	**$ 1,402,577**	**4.31%**

A/ Commission Exhibit, Schedule 6.
B/ Commission Exhibit, Schedule 10.

ATTACHMENT 2
(Rate Design)

Commission Rate Design Exhibit
Page 1

Description	Post Test Year Billing Units Winter Nov-April	Summer May-Oct	Total	Present Winter Rates Nov - April Rate	Revenue	Present Summer Rates May - Oct Rate	Revenue	Present Total Revenue	Proposed Winter Rates Nov - April Rate	Revenue	Proposed Summer Rates May - Oct Rate	Revenue	Proposed Total Revenue
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
Residential (R-1)													
Number of Bills	350,470	343,784	694,254	$16.00	$5,607,520	$13.00	$4,469,192	$10,076,712	$17.00	$5,957,990	$14.00	$4,812,976	$10,770,966
Distribution Charges			36,018,609	$0.11591		$0.11591		$4,174,917	$0.11591	$0	$0.11591	$0	$4,174,917
Total Residential (R-1) Margin					$5,607,520		$4,469,192	$14,251,629		$5,957,990		$4,812,976	$14,945,883
										Residential R-1 Revenue Increase			**$694,254**
										Total % R-1 Increase			**4.87%**
Residential (R-4)													
Number of Bills	1,095	1,107	2,202	$6.00	$6,570	$6.00	$6,642	$13,212	$6.25	$6,844	$6.25	$6,919	$13,763
Distribution Charges	53,177	16,749	69,926	$0.21768	$11,576	$0.19350	$3,241	$14,817	$0.21768	$11,576	$0.19350	$3,241	$14,817
Total Residential (R-4) Margin					$18,146		$9,883	$28,029		$18,419		$10,160	$28,579
										Residential R-4 Revenue Increase			**$551**
								$14,279,657					
										Total % R-4 Increase			**1.93%**

Commission Rate Design Exhibit
Page 2

	Post Test Year Billing Units			Present Winter Rates		Present Summer Rates		Present	Proposed Winter Rates		Proposed Summer Rates		Proposed
	Winter	Summer		Nov - April		May - Oct		Total	Nov - April		May - Oct		Total
	Nov-April	May-Oct	Total	Rate	Revenue	Rate	Revenue	Revenue	Rate	Revenue	Rate	Revenue	Revenue
Commercial (C-1)													
Number of Bills	40,822	39,181	80,003	$29.00	$1,183,838	$25.00	$979,525	$2,163,363	$31.00	$1,265,482	$26.80	$1,050,051	$2,315,533
Distribution Charges	6,471,362	891,247	7,362,609	$0.18581	$1,202,444	$0.14589	$130,024	$1,332,468	$0.18581	$1,202,444	$0.14589	$130,024	$1,332,468
Total Commercial (C-1) Margin					$2,386,282		$1,109,549	$3,495,831		$2,467,926		$1,180,075	$3,648,001
										Total C-1 Revenue Increase			**$152,170**
										Total % C-1 Increase			**4.35%**
Commercial (C-2)													
Number of Bills	10,746	10,540	21,286	$75.00	$805,950	$75.00	$790,500	$1,596,450	$75.00	$805,950	$75.00	$790,500	$1,596,450
DDDC (Firm) Demand (C-2) in Dths			395,134	$5.50		$5.50		$2,173,235	$6.35		$6.35		$2,509,098
Distribution Charges													
0 - 3000 therms	14,754,450	5,357,351	20,111,801	$0.18744	$2,765,574	$0.14717	$788,441	$3,554,015	$0.18744	$2,765,574	$0.14717	$788,441	$3,554,015
3,001 - 5,000 therms	1,754,660	637,118	2,391,778	$0.17109	$300,205	$0.11683	$74,434	$374,639	$0.17109	$300,205	$0.11683	$74,434	$374,639
5,001 - 15,000 therms	2,291,486	832,040	3,123,526	$0.16666	$381,899	$0.10892	$90,626	$472,525	$0.16666	$381,899	$0.10892	$90,626	$472,525
over 15,000 therms	733,407	266,301	999,708	$0.08623	$63,242	$0.08623	$22,963	$86,205	$0.08623	$63,242	$0.08623	$22,963	$86,205
Economic Development Discounts								-$2,714		$0		$0	$0
Total Commercial (C-2) Margin					$4,316,870		$1,766,965	$8,254,355		$4,316,870		$1,766,965	$8,592,933
										Total C-2 Revenue Increase			**$338,578**
										Total % C-3 Increase			**4.10%**
Commercial Transportation (T-3)													
Number of Bills	287	289	576	$75.00	$21,525	$75.00	$21,675	$43,200	$75.00	$21,525	$75.00	$21,675	$43,200
DDDC (Firm) Demand (T-3) in Dths			62,302	$5.50		$5.50		$342,663	$6.35		$6.35		$395,620
Distribution Charges													
0 - 3000 therms	1,023,915	581,256	1,605,171	$0.18744	$191,923	$0.14717	$85,543	$277,466	$0.18744	$191,923	$0.14717	$85,543	$277,466
3,001 - 5,000 therms	536,975	304,830	841,805	$0.17109	$91,871	$0.11683	$35,613	$127,484	$0.17109	$91,871	$0.11683	$35,613	$127,484
5,001 - 15,000 therms	1,567,229	889,684	2,456,913	$0.16666	$261,194	$0.10892	$96,904	$358,099	$0.16666	$261,194	$0.10892	$96,904	$358,099
over 15,000 therms	946,638	537,387	1,484,025	$0.08623	$81,629	$0.08623	$46,339	$127,967	$0.08623	$81,629	$0.08623	$46,339	$127,967
Revenue Adjustment													$0
Total Commercial Transportation (T-3) Margin					$648,142		$286,075	$1,276,880		$648,142		$286,075	$1,329,837
										Total T-3 Revenue Increase			**$52,957**
										Total % T-3 Increase			**4.15%**

Commission Rate Design Exhibit
Page 3

	Post Test Year Billing Units			Present Winter Rates		Present Summer Rates		Present	Proposed Winter Rates		Proposed Summer Rates		Proposed
	Winter	Summer		Nov - April		May - Oct		Total	Nov - April		May - Oct		Total
	Nov-April	May-Oct	Total	Rate	Revenue	Rate	Revenue	Revenue	Rate	Revenue	Rate	Revenue	Revenue
Industrial Transport with Full Standby (F-1/T-2)													
Number of Bills	188	186	374	$300.00	$56,400	$300.00	$55,800	$112,200	$300.00	$56,400	$300.00	$55,800	$112,200
DDDC (Firm) Demand (T-2) in Dths			128,696	$5.50		$5.50		$707,827	$6.35		$6.35		$817,219
Distribution Charges													
0 - 15,000 therms			5,425,197	$0.08064		$0.08064		$437,488	$0.08064		$0.08064		$437,488
15,001 - 40,000 therms			6,104,799	$0.06891		$0.06891		$420,682	$0.06891		$0.06891		$420,682
40,001 - 150,000 therms			7,250,462	$0.03908		$0.03908		$283,348	$0.03908		$0.03908		$283,348
over 150,000 therms			1,797,936	$0.02402		$0.02402		$43,186	$0.02402		$0.02402		$43,186
Revenue Adjustment													$0
Total Industrial Transport with Full Standby Margin								$2,004,732		$56,400		$55,800	$2,114,123
											Total F-1/T-2 Revenue Increase		**$109,392**
											Total % F-1/T-2 Increase		**5.46%**
Industrial Transport with Partial Standby (F-1/T-2+T-1)													
Number of Bills	84	84	168	$300.00	$25,200	$300.00	$25,200	$50,400	$300.00	$25,200	$300.00	$25,200	$50,400
Demand in Dths													
DDDC (Firm) Demand (T-2)			49,878	$5.50		$5.50		$274,329	$6.35		$6.35		$316,725
Capacity (Non-Firm) Demand (T-1)			51,584	$1.35		$1.35		$69,639	$1.35		$1.35		$69,639
Total Demand													
Distribution Charges													
0 - 15,000 therms			2,474,062	$0.08064		$0.08064		$199,508	$0.08064		$0.08064		$199,508
15,001 - 40,000 therms			3,433,970	$0.06891		$0.06891		$236,635	$0.06891		$0.06891		$236,635
40,001 - 150,000 therms			7,926,817	$0.03908		$0.03908		$309,780	$0.03908		$0.03908		$309,780
over 150,000 therms			6,272,062	$0.02402		$0.02402		$150,655	$0.02402		$0.02402		$150,655
Revenue Adjustment													
sub-Total Industrial Transport with Partial StandbyMargin								$1,290,946					$1,333,342
											Total F-1/T-2+T-1 Revenue Increase		**$42,396**
											Total % F-1/T-2+T-1 Increase		**3.28%**

Commission Rate Design Exhibit
Page 4

	Post Test Year Billing Units			Present Winter Rates Nov - April		Present Summer Rates May - Oct		Present Total	Proposed Winter Rates Nov - April		Proposed Summer Rates May - Oct		Proposed Total
	Winter Nov-April	Summer May-Oct	Total	Rate	Revenue	Rate	Revenue	Revenue	Rate	Revenue	Rate	Revenue	Revenue
Interruptible Sales (I-1)													
Number of Bills	6	6	12	$300.00	$1,800	$300.00	$1,800	$3,600	$300.00	$1,800	$300.00	$1,800	$3,600
Distribution Charges													
0 - 15,000 therms			180,000	$0.08064		$0.08064		$14,515	$0.08064		$0.08064		$14,515
15,001 - 40,000 therms			255,454	$0.06891		$0.06891		$17,603	$0.06891		$0.06891		$17,603
40,001 - 150,000 therms			14,212	$0.03908		$0.03908		$555	$0.03908		$0.03908		$555
over 150,000 therms			0	$0.02402		$0.02402		$0	$0.02402		$0.02402		$0
Revenue Adjustment													$0
Total Interruptible Sales (I-1) Margin								$36,274		$1,800		$1,800	$36,274
										Total I-1 Revenue Increase			**$0**
Interruptible Industrial Transportation (T-1)													
Number of Bills	106	107	213	$300.00	$31,800	$300.00	$32,100	$63,900	$300.00	$31,800	$300.00	$32,100	$63,900
Capacity (Non-Firm) Demand (T-1)			106,079	$1.35		$1.35		$143,207	$1.35		$1.35		$143,207
Distribution Charges													
0 - 15,000 therms			2,671,708	$0.08064		$0.08064		$215,447	$0.08064		$0.08064		$215,447
15,001 - 40,000 therms			3,693,480	$0.06891		$0.06891		$254,518	$0.06891		$0.06891		$254,518
40,001 - 150,000 therms			6,082,145	$0.03908		$0.03908		$237,690	$0.03908		$0.03908		$237,690
over 150,000 therms			6,968,859	$0.02402		$0.02402		$167,392	$0.02402		$0.02402		$167,392
Revenue Adjustment													
sub-Total Interruptible Industrial Transport Margin								$1,082,153		$31,800		$32,100	$1,082,153
										Total I-1 Revenue Increase			**$0**
						Total Margin all Classes		$31,720,828					$33,111,124
						Other Revenues		$675,121					$675,121
						AFUDC		$823,951					$823,951
						Special Contract Revenues		$141,302					$141,302
						Total		$33,361,202					$34,751,498
											Total Revenue Increase		**$1,390,297**
											Revenue Deficiency		**$1,390,347**
													$50

The Regulation of Public Utilities

Theory and Practice

CHARLES F. PHILLIPS, JR.

Robert G. Brown
Professor of Economics
Washington and Lee University

1993
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Arlington, Virginia

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an appropriate allowance for underpricing in connection with sales of additional shares, including allowance for market pressure and for costs of flotation and underwriting. The capitalization rate before the allowance for underpricing is the discount rate that equates all expected dividends in the future plus the market price that investors eventually expect to realize to the present market price. While this is a simple enough concept, it is difficult to measure since measurement requires the estimation of the expectations of the investors who determine the present market price. Such estimates, of course, involve the exercise of informed judgment.[102]

The DCF model represents an attempt to estimate the equity investors' capitalization rate. Mathematically,

$$K = \frac{d}{p} + g$$

where: k is the investor's capitalization or discount rate (i.e., the cost of capital)
d is the current dividend per share
p is the current market price per share
g is the expected rate of growth in dividends per share.[103]

Thus, if the stock of a particular utility pays a $3 dividend, which is expected to grow at a rate of 4.5 percent per year, and if investors are willing to pay $38 for the stock, the required return on common equity (assuming a 5 percent allowance for flotation costs) is 12.81 percent.[104] However, use of the DCF model for regulatory purposes involves both theoretical and practical difficulties.

The theoretical issues include the assumption of a constant retention ratio (i.e., a fixed payout ratio) and the assumption that dividends will continue to grow at rate g in perpetuity. Neither of these assumptions has any validity, particularly in recent years. Further, the investors' capitalization rate and the cost of equity capital to a utility for application to book value (i.e., an original cost rate base) are identical only when market price is equal to book value.[105] Indeed, DCF advocates assume that if the market price of a utility's common stock exceeds its book value, the allowable rate of return on common equity is too high and should be lowered — and vice versa.[106] Many question the assumption that market price should equal book value, believing that "the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies."[107]

Most frequently, the major practical issue involves the determination of the growth rate, a determination that is highly complex and that requires

Principles of Public Utility Rates

Second Edition

by
JAMES C. BONBRIGHT
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with assistance of
JOHN B. LEGLER

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Arlington, Virginia

CHAPTER 14

THE FAIR RATE OF RETURN

INTRODUCTION
Basic Controversies
Added Complexity

THE FAIR RATE OF RETURN ON AN ORIGINAL-COST RATE BASE
Cost of Capital as the Basic Standard of a Fair Rate of Return
Derivation of the Weighted Average Cost of Capital
Capital Structure Issues
Double Leverage Issue
Average or Year-end Capital Structure
Modigliani-Miller: Myth or Reality?

ESTIMATION OF THE COST OF CAPITAL
Determination of the Cost of Senior Capital
Short-term Debt Debate
Actual Versus Hypothetical Cost
Derivation of the Cost of Equity Capital
Legal Framework: Bluefield *and* Hope *Cases*
Two Principles
Two Major Methods
Discounted Cash Flow Approach
Basic Formula
Three Methods of Estimating the Growth Rate
Adjustment for Quarterly Dividend Payout
Risk Premium Approach
Conceptual and Measurement Problems
Expected Premiums Methodology
Capital Asset Pricing Model
Basic Formula
Criticism
Arbitrage Pricing Model
Multi-beta Model
Basic Formula

the literature with some commissions totally disregarding the new issue to those that apply an adjustment to the entire equity balance.

The Market to Book Ratio Issue

Introduction. One ongoing critical issue is whether the allowed rate of return should be designed to prevent the market prices of public utility stocks from rising to substantially above book value or falling to substantially below book value? A rigorous and literal application of a cost-of-capital-measure of a fair rate of return as outlined above would indicate that a commission should attempt to regulate rates so as to maintain the market value of a utility's stock on a par with its book value (or rate-base value) plus some allowance for underpricing. Yet such an attempt may be impractical or even impossible.

In the first place, commissions cannot forecast, except within wide limits, the effect their rate orders will have on the market prices of the stocks of the companies they regulate. In the second place, whatever the initial market prices may be, they are sure to change not only with the changing prospects for earnings, but with the changing outlook of an inherently volatile stock market. In short, market prices are beyond the control, though not beyond the influence, of rate regulation. Moreover, even if a commission did possess the power of control, any attempt to exercise it in the manner just suggested would result in harmful, uneconomic shifts in public utility rate levels. In addition, many utilities are regulated by more than one jurisdiction. Even if one commission were to attempt to regulate on the basis of market to book ratios, the commissions in the other jurisdictions would not be bound by its actions. Finally, even if regulators could put them in parity it may be undesirable following the theory of the second best if the comparable earnings exceed the cost of capital (see Kahn, 1970, pp. 52-53).

Two Facts. This situation is recognized even by supporters of a cost-of-capital standard of a fair rate of return, who undertake to meet the difficulty in two ways. First, the current cost of equity capital is rarely identified as a spot cost. Instead, it is taken to mean a normal or average capital-attracting rate of return characteristic of the recent market and typical of the market anticipated in the not distant future. Secondly, the estimated weighted average cost of capital resulting from the application of this normalized estimate of the current cost of equity may be characterized as a minimum allowance, subject to a

any statement of proxy voting policy, before they are allowed to invest, which may help to avoid such potential conflicts. As with investment policies originating from named fiduciaries, a policy initiated by an investment manager and adopted by the participating plans would be regarded as an instrument governing the participating plans, and the investment manager's compliance with such a policy would be governed by ERISA Sec. 404(a)(1)(D).

(3) Shareholder Activism

An investment policy that contemplates activities intended to monitor or influence the management of corporations in which the plan owns stock is consistent with a fiduciary's obligations under ERISA where the responsible fiduciary concludes that there is a reasonable expectation that such monitoring or communication with management, by the plan alone or together with other shareholders, will enhance the economic value of the plan's investment in the corporation, after taking into account the costs involved. Such a reasonable expectation may exist in various circumstances, for example, where plan investments in corporate stock are held as long-term investments or where a plan may not be able to easily dispose such an investment. Active monitoring and communication activities would generally concern such issues as the independence and expertise of candidates for the corporation's board of directors and assuring that the board has sufficient information to carry out its responsibility to monitor management. Other issues may include such matters as consideration of the appropriateness of executive compensation, the corporation's policy regarding mergers and acquisitions, the extent of debt financing and capitalization, the nature of long-term business plans, the corporation's investment in training to develop its work force, other workplace practices and financial and non-financial measures of corporate performance that are reasonably likely to affect the economic value of the plan. Active monitoring and communication may be carried out through a variety of methods including by means of correspondence and meetings with corporate management as well as by exercising the legal rights of a shareholder. In creating an investment policy, a fiduciary shall consider only factors that relate to the economic interest of participants and their beneficiaries in plan assets, and shall not use an investment policy to promote myriad public policy preferences.[4]

(4) Socially-Directed Proxy Voting, Investment Policies and Shareholder Activism.

Plan fiduciaries risk violating the exclusive purpose rule when they exercise their fiduciary authority in an attempt to further legislative, regulatory or public policy issues through the proxy process. In such cases, the Department would expect fiduciaries to be able to demonstrate in enforcement actions their compliance with the requirements of section 404(a)(1)(A) and (B). The mere fact that plans are shareholders in the corporations in which they invest does not itself provide a rationale for a fiduciary to spend plan assets to pursue, support, or oppose such proxy proposals. Because of the heightened potential for abuse in such cases, the fiduciaries must be prepared to articulate a clear basis for concluding that the proxy vote, the investment policy, or the activity intended to monitor or influence the management of the corporation is more likely than not to enhance the economic value of the plan's investment before expending plan assets.

The use of pension plan assets by plan fiduciaries to further policy or political issues through proxy resolutions that have no connection to enhancing the economic value of the plan's investment in a corporation would, in the view of the Department, violate the prudence and exclusive purpose requirements of section 404(a)(1)(A) and (B). For example, the likelihood that the adoption of a proxy resolution or proposal requiring corporate directors and officers to disclose their personal political contributions would enhance the economic value of a plan's investment in the corporation appears sufficiently remote that the expenditure of plan assets to further such a resolution or proposal clearly raises compliance issues under section 404(a)(1)(A) and (B).[5]

Signed at Washington, DC, this 9th day of October, 2008.

Bradford P. Campbell,

Assistant Secretary, Employee Benefits Security Administration, Department of Labor.

[FR Doc. E8–24552 Filed 10–16–08; 8:45 am]

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[4] See Advisory Opinion No. 2008–05A (June 27, 2008) and letter from Department of Labor to Jonathan P. Hiatt, General Counsel, AFL–CIO (May 3, 2005).

[5] *See* Advisory Opinion No. 2007–07A (December 21, 2007).

DEPARTMENT OF LABOR

Employee Benefits Security Administration

29 CFR Part 2509

RIN 1210–AB29

Interpretive Bulletin Relating to Investing in Economically Targeted Investments

AGENCY: Employee Benefits Security Administration, Labor.

ACTION: Interpretive bulletin.

SUMMARY: This document sets forth the views of the Department of Labor concerning the legal standards imposed on fiduciaries of employee benefit plans by sections 403 and 404 of Title I of the Employee Retirement Income Security Act (ERISA) when considering investments in ''economically targeted investments.'' These guidelines affect fiduciaries of employee benefit plans, including trustees, investment managers and others responsible for the management of employee benefit plan assets.

DATES: This interpretive bulletin is effective on October 17, 2008.

FOR FURTHER INFORMATION CONTACT: Office of Regulations and Interpretations, Employee Benefits Security Administration, (202) 693–8500. This is not a toll free number.

SUPPLEMENTARY INFORMATION: On June 23, 1994, the Department of Labor (the Department) published Interpretive Bulletin § 2509.94–1 (29 CFR 2509.94–1) addressing the limited circumstances under which fiduciaries, consistent with the requirements of sections 404 and 404 of Title I of the Employee Retirement Income Security Act (ERISA), may, in connection with investment decisions, take into account factors other than the economic interests of the plan. The guidance provided in this document, Interpretive Bulletin § 2509.08–1, clarifies, through explanation and examples, that fiduciary consideration of non-economic factors should be rare and, when considered, should be documented in a manner that demonstrates compliance with ERISA's rigorous fiduciary standards. This guidance modifies and supersedes the guidance provided in interpretive bulletin 94–1.

List of Subjects in 29 CFR Part 2509

Employee benefit plans, Pensions.

■ For the reasons set forth in the preamble, the Department is amending Subchapter A, Part 2509 of Title 29 of

the Code of Federal Regulations as follows:

Subchapter A—General

PART 2509—INTERPRETIVE BULLETINS RELATING TO THE EMPLOYEE RETIREMENT INCOME SECURITY ACT OF 1974

■ 1. The authority citation for part 2509 continues to read as follows:

Authority: 29 U.S.C. 1135. Secretary of Labor's Order No. 1–2003, 68 FR 5374 Feb. 3, 2003). Sections 2509.75–10 and 2509.75–2 are also issued under 29 U.S.C. 1052, 1053, 1054. Section 2509.75–5 is also issued under 29 U.S.C. 1002.

§ 2509.94–1 [Removed]

■ 2. Part 2509 is amended by removing § 2509.94–1.

■ 3. Part 2509 is further amended by adding new § 2509.08–1 to read as follows:

§ 2509.08–1 Supplemental guidance relating to fiduciary responsibility in considering economically targeted investments.

This Interpretive Bulletin sets forth the Department of Labor's interpretation of sections 403 and 404 of the Employee Retirement Income Security Act of 1974 (ERISA), as applied to employee benefit plan investments in ''economically targeted investments,'' that is, investments selected for the economic benefits they create apart from their investment return to the employee benefit plan. The guidance set forth in this interpretive bulletin modifies and supersedes the guidance set forth in interpretive bulletin 94–1 (29 CFR 2509.94–1).

ERISA requires that a fiduciary act solely in the interest of the plan's participants and beneficiaries and for the exclusive purpose of providing benefits to their participants and beneficiaries. The Act specifically states, in relevant part, that:

• ''[A]ssets of a plan shall never inure to the benefit of any employer and shall be held for the exclusive purposes of providing benefits to participants in the plan and their beneficiaries.* * *'' [1]

• ''[A] fiduciary shall discharge his duties with respect to a plan solely in the interest of the participants and beneficiaries and for the exclusive purpose of providing benefits to participants and their beneficiaries.'' [2]

ERISA's plain text thus establishes a clear rule that in the course of discharging their duties, fiduciaries may never subordinate the economic interests of the plan to unrelated objectives, and may not select investments on the basis of any factor outside the economic interest of the plan except in very limited circumstances enumerated below.

With regard to investing plan assets, the Department has issued a regulation, at 29 CFR 2550.404a–1, interpreting the prudence requirements of ERISA as they apply to the investment duties of fiduciaries of employee benefit plans. The regulation provides that the prudence requirements of section 404(a)(1)(B) are satisfied if (1) the fiduciary making an investment or engaging in an investment course of action has given appropriate consideration to those facts and circumstances that, given the scope of the fiduciary's investment duties, the fiduciary knows or should know are relevant, and (2) the fiduciary acts accordingly. This includes giving appropriate consideration to the role that the investment or investment course of action plays (in terms of such factors as diversification, liquidity and risk/return characteristics) with respect to that portion of the plan's investment portfolio within the scope of the fiduciary's responsibility.

Other facts and circumstances relevant to an investment or investment course of action would, in the view of the Department, include consideration of the expected return on alternative investments with similar risks available to the plan. It follows that, because every investment necessarily causes a plan to forgo other investment opportunities, an investment will not be prudent if it would be expected to provide a plan with a lower rate of return than available alternative investments with commensurate degrees of risk or is riskier than alternative available investments with commensurate rates of return.

ERISA's plain text does not permit fiduciaries to make investment decisions on the basis of any factor other than the economic interest of the plan. Situations may arise, however, in which two or more investment alternatives are of equal economic value to a plan. The Department has recognized in past guidance that under these limited circumstances, fiduciaries can choose between the investment alternatives on the basis of a factor other than the economic interest of the plan. The Department has interpreted the statute to permit this selection because (1) ERISA requires fiduciaries to invest plan assets and to make choices between investment alternatives, (2) ERISA does not itself specifically provide a basis for making the investment choice in this circumstance, and (3) the economic interests of the plan are fully protected by the fact that the available investment alternatives are, from the plan's perspective, economically indistinguishable.

Given the significance of ERISA's requirement that fiduciaries act ''solely in the interest of participants and beneficiaries,'' the Department believes that, before selecting an economically targeted investment, fiduciaries must have first concluded that the alternative options are truly equal, taking into account a quantitative and qualitative analysis of the economic impact on the plan. ERISA's fiduciary standards expressed in sections 403 and 404 do not permit fiduciaries to select investments based on factors outside the economic interests of the plan until they have concluded, based on economic factors, that alternative investments are equal. A less rigid rule would allow fiduciaries to act on the basis of factors outside the economic interest of the plan in situations where reliance on those factors might compromise or subordinate the interests of plan participants and their beneficiaries. The Department rejects a construction of ERISA that would render the Act's tight limits on the use of plan assets illusory, and that would permit plan fiduciaries to expend ERISA trust assets to promote myriad public policy preferences.[3]

A plan fiduciary's analysis is required to comply with, but is not necessarily limited to, the requirements set forth in 29 CFR 2550.404a–1(b). In evaluating the plan portfolio, as well as portions of the portfolio, the fiduciary is required to examine the level of diversification, degree of liquidity, and the potential risk/return in comparison with available alternative investments. The same type of analysis must also be applied when choosing between investment alternatives. Potential investments should be compared to other investments that would fill a similar role in the portfolio with regard to diversification, liquidity, and risk/return.

In light of the rigorous requirements established by ERISA, the Department believes that fiduciaries who rely on factors outside the economic interests of the plan in making investment choices and subsequently find their decision challenged will rarely be able to demonstrate compliance with ERISA absent a written record demonstrating that a contemporaneous economic

[1] Sec. 403(c)(1), 29 U.S.C.A. 1103(c)(1).

[2] Sec. 404(a)(1)(A)(i), 29 U.S.C.A. 1104(a)(1)(A)(i).

[3] See letters from the Department of Labor to Jonathan Hiatt dated May 3, 2005; to Thomas Donahue dated December 21, 2007 (A.O. 2007–07A); and to David Chavern dated June 27, 2008 (A.O. 2008–05A).

analysis showed that the investment alternatives were of equal value.

Examples:

A plan owns an interest in a limited partnership that is considering investing in a company that competes with the plan sponsor. The fiduciaries may not replace the limited partnership investment with another investment based on this fact unless they prudently determine that a replacement investment is economically equal or superior to the limited partnership investment and would not adversely affect the plan's investment portfolio, taking into account factors including diversification, liquidity, risk and expected return. The competition of the limited partnership with the plan sponsor is a factor outside the economic interests of the plan, and thus cannot be considered unless an alternative investment is equal or superior to the limited partnership.

A multiemployer plan covering employees in a metropolitan area's construction industry wants to invest in a large loan for a construction project located in the same area because it will create local jobs. The plan has taken steps to ensure that the loan poses no prohibited transaction issues. The loan carries a return fully commensurate with the risk of nonpayment. Moreover, the loan's expected return is equal to or greater than construction loans of similar quality that are available to the plan. However, the plan has already made several other loans for construction projects in the same metropolitan area, and this loan could create a risk of large losses to the plan's portfolio due to lack of diversification. The fiduciaries may not choose this investment on the basis of the local job creation factor because, due to lack of diversification, the investment is not of equal economic value to the plan.

A plan is considering an investment in a bond to finance affordable housing for people in the local community. The bond provides a return at least as favorable to the plan as other bonds with the same risk rating. However, the bond's size and lengthy duration raises a potential risk regarding the plan's ability to meet its predicted liquidity needs. Other available bonds under consideration by the plan do not pose this same risk. The return on the bond, although equal to or greater than the alternatives, would not be sufficient to offset the additional risk for the plan created by the role that this bond would play in the plan's portfolio. The plan's fiduciaries may not make this investment based on factors outside the economic interest of the plan because it is not of equal or greater economic value to other investment alternatives.

A plan sponsor adopts an investment policy that favors plan investment in companies meeting certain environmental criteria (so-called ''green'' companies). In carrying out the policy, the plan's fiduciaries may not simply consider investments only in green companies. They must consider all investments that meet the plan's prudent financial criteria. The fiduciaries may apply the investment policy to eliminate a company from consideration only if they appropriately determine that other available investments provide equal or better returns at the same or lower risks, and would play the same role in the plan's portfolio.

A collective investment fund, which holds assets of several plans, is designed to invest in commercial real estate constructed or renovated with union labor. Fiduciaries of plans that invest in the fund must determine that the fund's overall risk and return characteristics are as favorable, or more favorable, to the plans as other available investment alternatives that would play a similar role in their plans' portfolios. The fund's managers may select investments constructed or improved with union labor, after an economic analysis indicates that these investment options are equal or superior to their alternatives. The managers will best be able to justify their investment choice by recording their analysis in writing. However, if real estate investments that satisfy both ERISA's fiduciary requirements and the union labor criterion are unavailable, the fund managers may have to select investments without regard to the union labor criterion.

Signed at Washington, DC, this 9th day of October 2008.

Bradford P. Campbell,

Assistant Secretary, Employee Benefits Security Administration, Department of Labor.

[FR Doc. E8–24551 Filed 10–16–08; 8:45 am]

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DEPARTMENT OF VETERANS AFFAIRS

38 CFR Part 3

RIN 2900–AM28

Accrued Benefits; Correction

AGENCY: Department of Veterans Affairs.

ACTION: Correcting amendment.

SUMMARY: This document contains a minor correction to the final regulations that the Department of Veterans Affairs (VA) published in 71 FR 78368 on December 29, 2006. The regulation relates to the Payment of Benefits to Survivors of Estates of Deceased Beneficiaries. No substantive change to the content of the regulation is being made by correcting this amendment.

DATES: *Effective Date:* October 17, 2008.

FOR FURTHER INFORMATION CONTACT: Denise Kemp-Nichols, Regulations Staff (211D), Compensation and Pension Service, Veterans Benefits Administration, Department of Veterans Affairs, 810 Vermont Avenue, NW., Washington, DC 20420, (202) 461–9724.

SUPPLEMENTARY INFORMATION: VA published a final rule in the **Federal Register** on December 29, 2006 (See 71 FR 78368) revising its final rule eliminating the 2-year limitation on accrued benefits. In that document, VA failed to amend 38 CFR 3.816(f)(2). This document corrects that error by removing the entire first sentence of 38 CFR 3.816(f)(2) and in the second sentence, by removing the word ''also'' after words ''accrued benefits.''

List of Subjects in 38 CFR Part 3

Administrative, practice and procedures, Claims, Disability benefits, Health care, Pensions, Veterans, Vietnam.

Approved: October 10, 2008.

William F. Russo,

Director of Regulations Management.

■ For the reason set out in the preamble, VA is correcting 38 CFR part 3 as follows.

PART 3—ADJUDICATION

■ 1. The authority citation for part 3, subpart A continues to read as follows:

Authority: 38 U.S.C. 501(a), unless otherwise noted.

§ 3.816 [Corrected]

■ 2. In § 3.816, paragraph (f)(2) is amended by removing the entire first sentence and in the second sentence removing the word ''also''.

[FR Doc. E8–24650 Filed 10–16–08; 8:45 am]

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August 2024

Survey of Capital Market Assumptions

2024 Edition

HORIZONactuarial®

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Horizon Actuarial Services, LLC is proud to serve as the actuary to over 100 multiemployer defined benefit pension plans across the United States and across various industries. As actuary to these plans, we must develop assumptions regarding future investment returns on plan assets. We then use those assumptions as we determine the actuarial values of the benefits promised by these plans to their participants and beneficiaries, as well as to project plan funding and solvency levels years into the future.

At Horizon Actuarial, we are retirement and healthcare actuaries, not investment professionals. Therefore, when developing assumptions as to what returns a pension plan's assets might be expected to earn in the future, we seek input from our colleagues in the investment advisory community. Each year, as part of this survey, we ask different investment firms to provide their "capital market assumptions" – their expectations for future risk and returns for different asset classes in which pension plans commonly invest. The information gathered from this survey can help answer the common question: "Are my plan's investment return assumptions reasonable?"

There are many factors to consider when evaluating a plan's investment return assumptions, such as its asset allocation, the maturity of its participant population, and the purpose of the measurement. Any of these factors can make the expected return for one plan very different from others. Therefore, this report does not opine on the reasonableness of any one plan's investment return assumptions. Nevertheless, we hope this report will be a useful resource for trustees, actuaries, and investment professionals alike.

Horizon Actuarial sincerely thanks the 41 investment advisors who participated in this survey.

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Survey of Capital Market Assumptions: 2024 Edition

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Horizon Actuarial Services, LLC is an independent consulting firm specializing in providing actuarial and consulting services to multiemployer benefit plans. Horizon Actuarial does not provide investment, legal, or tax advice. Please consult with your investment advisor, legal counsel, or tax advisor for information specific to your plan's investment, legal, or tax implications.

Summary

Horizon Actuarial first conducted this survey in 2010, and it included 8 investment advisors. In 2012, we first published a report on the survey results, which included 17 advisors. The survey has expanded considerably in recent years; this 2024 edition of the survey includes assumptions from 41 different investment firms.

Readers of this survey are aware that expected returns declined significantly for all but a few asset classes from 2016 to 2022. The steepest declines were for fixed income investments such as US corporate bonds and Treasuries, whose return expectations fell more than 100 basis points from 2019 to 2021. We saw a reversal of this trend in 2023 resulting from increases in interest rates and lower equity valuations at the end of 2022. This 2024 edition of the survey brings only modest change versus 2023, with slightly higher return expectations for some asset classes and slightly lower expectations for other asset classes.

As we have seen in prior surveys, expected returns are generally lower over the short term than over the long term, though short-term expected returns are higher than long-term expected returns for selected asset classes such as US Treasuries for the second straight year. This is likely the result of an inverted yield curve at the time when many of the advisors developed their assumptions.

For less mature ongoing pension plans without solvency issues, we believe a horizon of 20 years or more is appropriate for evaluating the reasonableness of the long-term investment return assumption. A shorter horizon, such as 10 years, may be more appropriate for evaluating the return assumption for a plan whose duration of liabilities is shorter such as a plan that is more mature or has solvency issues. Even for plans with long-term investment horizons, it is important to understand the potential impact of lower expected returns over the short term. Therefore, this survey shows return expectations over horizons of both 10 years and 20 years.

For illustration, this report also constructs an asset allocation for a hypothetical multiemployer pension plan and uses the results from the survey to develop a range of reasonably expected returns for the plan. The expected returns for this 2024 edition were ***16 basis points lower over a 10-year horizon than they were last year***, and 62 basis points *higher* than they were in 2019. ***Over a 20-year horizon, expected returns are 16 basis points lower than last year***, and the exact same as they were five years ago in the 2019 edition of the survey.

If you have questions about how the results of this survey relate to your multiemployer plan, please contact your consultant at Horizon Actuarial or visit the "contact us" page on our website, www.horizonactuarial.com. For questions about the survey itself, please contact Ben Ablin at ben.ablin@horizonactuarial.com.

Survey of Capital Market Assumptions: 2024 Edition

Survey Participants

Exhibit 1 below lists the 41 investment advisors whose capital market assumptions are included in the 2024 survey. This report does not attribute specific assumptions to individual firms, which is a precondition of the survey.

Originally, this survey was exclusive to the multiemployer plan community; it included assumptions only from investment advisors to multiemployer pension plans. The survey has expanded over the years, and it now includes assumptions from investment advisors outside of the multiemployer plan community.

A complete listing of the firms participating in the survey is provided below.

Exhibit 1

2024 Survey Participants	
AJ Gallagher	Merrill
Alan Biller	Milliman
Aon	Morgan Stanley
The Atlanta Consulting Group	NEPC
Bank of New York Mellon*	PFM Asset Management, LLC
BlackRock*	PIMCO
Callan Associates	Principal
Cambridge Associates	Research Affiliates, LLC*
CapTrust	Royal Bank of Canada
Envestnet	RVK
Goldman Sachs Asset Management	Segal Marco Advisors
Graystone Consulting	SEI
Invesco*	Sellwood Consulting
Investment Performance Services, LLC (IPS)	Sterling Capital Management, LLC
Janney Montgomery Scott, LLC	Truist Investment Advisory
J.P. Morgan Asset Management*	UBS
Mariner	The Vanguard Group*
Marquette Associates	Verus
Meketa Investment Group	Voya Investment Management*
Mercer	Willis Towers Watson
	Wilshire

**Assumptions obtained from published white paper.*

Investment Horizons

When evaluating the expected return assumption for an active, ongoing multiemployer pension plan, actuaries often consider investment returns over a long-term investment horizon of 20 years or more. A shorter time horizon, say over the next 10 years, may be more appropriate when evaluating the return assumption for a more mature plan whose liabilities have a shorter duration, a plan that has high negative cash flows, or a plan that is projected to become insolvent.

It is also important to understand the sensitivity of plan funding to changes in future investment returns. For example, the actuary for an active, ongoing pension plan will typically set the plan's investment return assumption based on expectations over a long-term horizon. However, evaluating the sensitivity of funding results to short-term investment returns that are expected to be higher or lower than the long-term assumption also plays an integral role in the decision-making process.

Advisors provided their most recent capital market assumptions: expected returns for different asset classes, standard deviations (i.e., volatilities) for those expected returns, and a correlation matrix. The advisors also indicated the investment horizon(s) to which their assumptions apply. If the advisor develops separate assumptions for different time horizons, they provided multiple sets of assumptions, one for each time horizon.

In the 2024 edition of the survey, 15 advisors provided one set of assumptions, of which all 15 specified a time horizon of 10 years. The remaining 26 advisors provided assumptions over both shorter-term (5 to 10 years) and longer-term (20 years or more) horizons. Note that two of the advisors rely on the same assumptions as other survey participants. Each assumption set was only counted once, even if it was provided by more than one advisor. Each unique assumption set was given equal weight in the survey.

Exhibit 2 below summarizes the time horizons specified by each advisor.

Exhibit 2

Investment Time Horizons	
Time Horizon	**Total**
10 Years	15
Both Short- and Long-Term	26
Total	41

Survey of Capital Market Assumptions: 2024 Edition

Short-Term vs. Long-Term

As noted in the previous section, survey participants provided expected returns over different time horizons. Given current market conditions, many investment advisors may expect returns for certain asset classes to be different in the short term versus over the long term.

For comparability, this survey groups expected returns into two time horizons: 10 years and 20 years. As pension plan actuaries, we often refer to the 10-year expected returns as "short-term" and the 20-year expected returns as "long-term." Note, however, that many investment firms consider 10-year expectations to be "long-term."

When comparing the expected returns for the 26 advisors who provided both short-term and long-term assumptions,[1] we see some interesting differences. See Exhibit 3 below. The expected returns shown below are annualized (geometric) over the indicated time horizons.

Exhibit 3

Average Expected Returns: Short-Term vs. Long-Term
Subset of 26 Survey Respondents

Asset Class	10-Year Horizon	20-Year Horizon	Difference
US Equity - Large Cap	6.39%	6.96%	0.57%
US Equity - Small/Mid Cap	7.13%	7.50%	0.37%
Non-US Equity - Developed	7.26%	7.52%	0.26%
Non-US Equity - Emerging	7.97%	8.24%	0.27%
US Corporate Bonds - Core	4.82%	4.88%	0.06%
US Corporate Bonds - Long Dur.	4.97%	5.16%	0.18%
US Corporate Bonds - High Yield	6.22%	6.36%	0.14%
Non-US Debt - Developed	3.50%	3.71%	0.21%
Non-US Debt - Emerging	6.29%	6.28%	-0.01%
US Treasuries (Cash Equivalents)	3.66%	3.43%	-0.23%
TIPS (Inflation-Protected)	4.28%	4.27%	-0.01%
Real Estate	5.77%	6.17%	0.40%
Hedge Funds	6.07%	6.17%	0.10%
Commodities	5.27%	4.95%	-0.32%
Infrastructure	7.08%	7.36%	0.28%
Private Equity	9.26%	9.71%	0.44%
Private Debt	8.49%	8.44%	-0.06%
Inflation	2.43%	2.44%	0.01%

The 10-year and 20-year returns shown above are the averages for the 26 advisors who provided both short-term and long-term assumptions.
Expected returns are annualized (geometric).

The consensus among these 26 advisors is that returns for most asset classes are expected to be lower in the short term compared to the long term. In general, the difference between long-term and short-term returns is more pronounced for equity type investments. Short-term expected returns are higher than long-term expected returns for some fixed income investments for the second straight year, likely due to a flat or inverted yield curve.

As noted earlier, the results shown in Exhibit 3 are based on a subset of 26 advisors. If we include all 41 survey advisors, the results do not change dramatically for most asset classes. See Exhibit 4 below.

Exhibit 4

Average Expected Returns: Short-Term vs. Long-Term
All Survey Respondents

Asset Class	10-Year Horizon	20-Year Horizon	Difference
US Equity - Large Cap	6.46%	6.96%	0.49%
US Equity - Small/Mid Cap	7.07%	7.50%	0.43%
Non-US Equity - Developed	7.08%	7.52%	0.44%
Non-US Equity - Emerging	7.70%	8.24%	0.53%
US Corporate Bonds - Core	4.93%	4.88%	-0.05%
US Corporate Bonds - Long Dur.	5.05%	5.16%	0.10%
US Corporate Bonds - High Yield	6.13%	6.36%	0.23%
Non-US Debt - Developed	3.66%	3.71%	0.04%
Non-US Debt - Emerging	6.17%	6.28%	0.12%
US Treasuries (Cash Equivalents)	3.68%	3.43%	-0.25%
TIPS (Inflation-Protected)	4.38%	4.27%	-0.11%
Real Estate	6.06%	6.17%	0.11%
Hedge Funds	5.90%	6.17%	0.27%
Commodities	4.92%	4.95%	0.03%
Infrastructure	7.26%	7.36%	0.10%
Private Equity	9.09%	9.71%	0.61%
Private Debt	8.32%	8.44%	0.11%
Inflation	2.42%	2.44%	0.01%

10-year horizon results include all 41 survey respondents.
20-year horizon results include a subset of 26 survey respondents.
Expected returns are annualized (geometric).

The 10-year expected returns shown above include assumptions from all 41 advisors, while the 20-year expected returns include assumptions from only the 26 advisors who provided longer-term assumptions.

The differences between short- and long-term expectations are the smallest they have been since we first conducted this survey using two separate time horizons. Nonetheless, it remains important for actuaries to illustrate the effects of near-term underperformance on their clients' pension funds. Furthermore, it may be appropriate for actuaries to attribute more weight to nearer term expectations when setting the investment return assumption for more mature plans or plans whose liabilities have a shorter duration.

[1] In cases where an advisor indicated a time horizon shorter than 10 years, the shorter-term expected returns were combined with the longer-term expected returns to achieve a 10-year horizon. Similarly, if an advisor indicated a time horizon longer than 20 years, the longer-term expected returns were combined with the shorter-term expected returns to achieve a 20-year horizon.

Survey of Capital Market Assumptions: 2024 Edition

Differing Opinions

Exhibit 5 below shows the distribution of expected returns and standard deviations (i.e., volatilities) for each asset class in the survey, as provided by the 41 individual advisors in the survey. The expected returns shown are geometric.

Note that the exhibit below focuses on a 10-year horizon in order to include assumptions from all 41 advisors. See Exhibits 17 and 18 in the appendix to this report for a more detailed look at the distribution of expected returns and standard deviations over both 10- and 20-year horizons. The ranges of expected returns by asset class can be found in the appendix as Exhibits 19 and 20.

A summary of the average survey assumptions can be found in the appendix to this report as Exhibit 16. This summary includes expected returns, standard deviations, and a correlation matrix.

The exhibit below shows that there are significant differences in expected returns and standard deviations among investment advisors. As the saying goes, "reasonable people may differ."

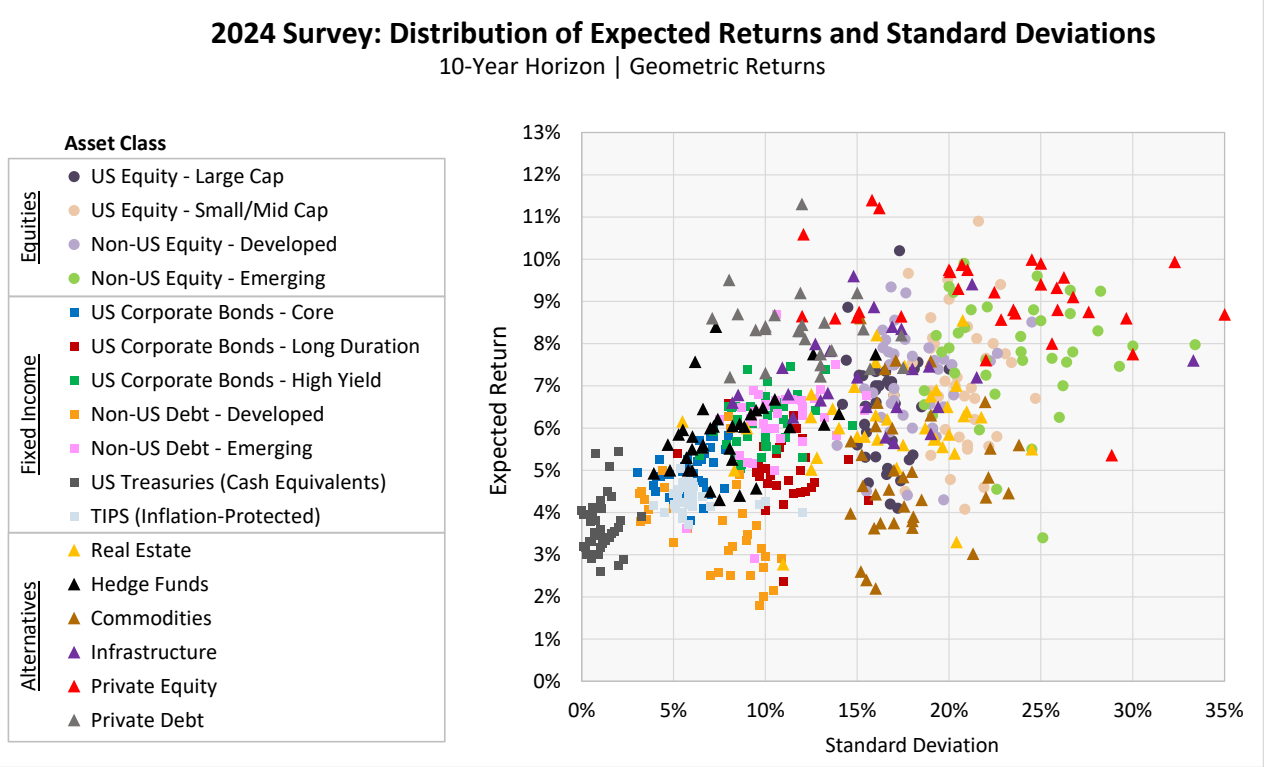
The differences in assumptions are more pronounced for alternative investments such as real estate, hedge funds, and private equity. A contributing factor may be differences in the underlying strategies different advisors apply to these alternative investments.

To contrast, the differences in expected returns and volatilities are smaller for more traditional investments, such as US equity and US fixed income.

Another reason for the significant differences among investment advisors may be the effective date of the assumptions. Ideally, this survey would compile and compare assumptions that all have the same effective date. However, this is not feasible when aggregating results from 41 advisors who update their assumptions on different schedules.

The vast majority of advisors specified effective dates on or around January 1, 2024. However, a few specified effective dates as early as October 1, 2023 and a few specified dates as late as March 31, 2024.

Exhibit 5



Survey of Capital Market Assumptions: 2024 Edition

Changing Outlooks: 2020 to 2024

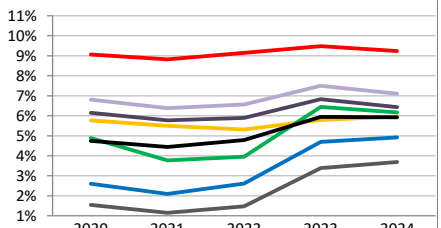
In recent years, there has been much discussion about whether it is reasonable to expect that future investment returns will be as high as they have been historically. Citing various reasons such as increased equity prices, tightening credit spreads, and the persistence of historically low interest rates, many advisors lowered their expectations gradually from year-to-year before reducing them considerably from 2019 to 2021.

With interest rates on the rise and lower equity valuations at the end of 2022, we saw a sharp reversal of this trend, with markedly higher expectations across asset classes in 2023. For 2024, we see continued increases in expectations for fixed income alongside lower expectations for equities.

Exhibit 6 below shows average expected returns over a 10-year horizon for selected asset classes each year from 2020 to 2024. For consistency, this exhibit includes only the 38 advisors who provided short-term assumptions in each of these years.

Exhibit 6

Average Expected Returns (10-Year Horizon)



	2020	2021	2022	2023	2024
Private Equity	9.1%	8.8%	9.1%	9.5%	9.2%
Non-US Eq. (Dev)	6.8%	6.4%	6.6%	7.5%	7.1%
US Eq. (Large Cap)	6.2%	5.8%	5.9%	6.8%	6.4%
Real Estate	5.8%	5.5%	5.3%	5.8%	6.0%
US Bonds (HY)	4.9%	3.8%	4.0%	6.4%	6.2%
Hedge Funds	4.7%	4.4%	4.8%	5.9%	5.9%
US Bonds (Core)	2.6%	2.1%	2.6%	4.7%	4.9%
US Treasuries	1.6%	1.2%	1.5%	3.4%	3.7%

Figures are average geometric returns for selected asset classes for the 38 advisors who provided short-term assumptions in each of the surveys from 2020 through 2024.

For this subset of advisors, average expected returns over a 10-year horizon declined for most asset classes from 2020 to 2021, then increased slightly in 2022 before increasing dramatically in 2023. The sharpest increases in 2023 were for fixed income classes, such as US Treasuries, core US bonds, and high-yield US bonds.

The increases in expectations continued from 2023 to 2024 in the fixed income space with the exception of high yield US bonds. Conversely, return expectations have declined for equity-type investments since last year.

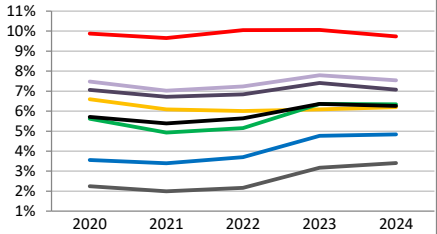
Despite their ups and downs, expectations for all of the asset classes shown increased from 2020 to 2024.

Exhibit 7 below shows how average expected returns have changed for the same asset classes for a subset of 18 advisors who provided assumptions each year from 2020 to 2024 over a 20-year horizon.

Note that the expected returns shown in Exhibits 6 and 7 are not directly comparable with those in other sections or previous surveys because we include only a subset of advisors who participated in each of the last 5 years.

Exhibit 7

Average Expected Returns (20-Year Horizon)



	2020	2021	2022	2023	2024
Private Equity	9.9%	9.7%	10.1%	10.1%	9.7%
Non-US Eq. (Dev)	7.5%	7.0%	7.2%	7.8%	7.5%
US Eq. (Large Cap)	7.1%	6.7%	6.8%	7.4%	7.1%
Real Estate	6.6%	6.1%	6.0%	6.1%	6.2%
US Bonds (HY)	5.6%	4.9%	5.2%	6.4%	6.3%
Hedge Funds	5.7%	5.4%	5.6%	6.4%	6.3%
US Bonds (Core)	3.6%	3.4%	3.7%	4.8%	4.8%
US Treasuries	2.2%	2.0%	2.2%	3.2%	3.4%

Figures are average geometric returns for selected asset classes for the 18 advisors who provided long-term assumptions in each of the surveys from 2020 through 2024.

Although the expected returns are generally higher over a 20-year horizon than a 10-year horizon, the trends over the period from 2020 to 2024 are similar. Namely, declines in return expectations for fixed income investments from 2020 to 2021, followed by a dramatic increase in 2023 and continuing increases into 2024. Overall, expectations for fixed income investments remain elevated when compared to their 2020 levels as a result of rising interest rates during the period.

On the equity side, the increases in return expectations that we saw from 2021 to 2023 were pared back modestly in 2024. While there was significant volatility in expected returns over the 5-year period, expected returns for equity-type investments in 2024 are largely the same as they were in 2020 for this subset of advisors.

Return expectations for hedge funds have increased significantly over both 10- and 20-year horizons as evidenced by the black line in the graphs above.

Survey of Capital Market Assumptions: 2024 Edition

Evaluating the Return Assumption

Multiemployer pension plans are usually invested in a well-diversified mix of stocks, bonds, real estate, and alternative investments structured to meet the goals of the Trustees. This typically involves maximizing returns over the long term while minimizing return volatility.

The actuary of a multiemployer pension plan must consider the plan's asset allocation and, based on expectations of future returns, develop an assumption for what plan assets are projected to earn over the long term. This assumption is then used (along with others) to determine the actuarial present value of the benefits promised by the plan to its participants and beneficiaries.

The actuary will often seek input on future return expectations from the plan's investment advisor in developing the plan's investment return assumption. However, as noted earlier, different investment advisors often have widely differing opinions on what future returns will be. Therefore, it can be beneficial to keep in mind other advisors' expectations when setting the investment return assumption.

In the following exhibits, we will evaluate the investment return assumption for a hypothetical multiemployer pension plan. Exhibit 8 below shows the asset allocation for this hypothetical plan. The asset allocations are arbitrary, except for the fact that we made sure to include at least a small allocation to every asset class in the survey.

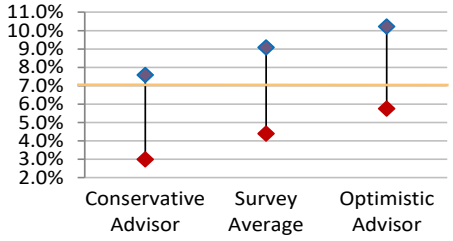
Exhibit 8

Asset Class - Hypothetical Plan	Weight
US Equity - Large Cap	20.0%
US Equity - Small/Mid Cap	10.0%
Non-US Equity - Developed	7.5%
Non-US Equity - Emerging	5.0%
US Corporate Bonds - Core	7.5%
US Corporate Bonds - Long Duration	2.5%
US Corporate Bonds - High Yield	5.0%
Non-US Debt - Developed	5.0%
Non-US Debt - Emerging	2.5%
US Treasuries (Cash Equivalents)	5.0%
TIPS (Inflation-Protected)	5.0%
Real Estate	7.5%
Hedge Funds	5.0%
Commodities	2.5%
Infrastructure	2.5%
Private Equity	5.0%
Private Debt	2.5%
TOTAL PORTFOLIO	**100.0%**

Exhibit 9 shows expected annualized (geometric) returns for the hypothetical plan over a 10-year horizon. These results may be appropriate for modeling sensitivities of future funding results to short-term investment returns, or for evaluating the return assumption for a plan with a shorter duration of liabilities or solvency issues.

Exhibit 9

Annualized Expected Returns
Hypothetical Multiemployer Pension Fund
10-Year Horizon

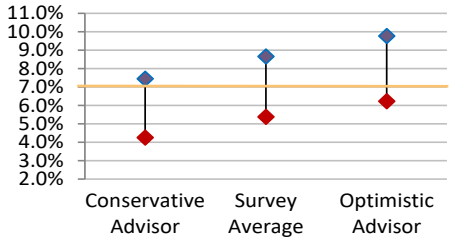


	Conservative Advisor	Survey Average	Optimistic Advisor
75th percentile	7.57%	9.07%	10.22%
25th percentile	2.98%	4.39%	5.75%
Probability of Meeting or Exceeding:			
7.50% per Year	25.7%	41.2%	55.8%
7.00% per Year	30.6%	46.9%	61.7%
6.50% per Year	36.0%	52.7%	67.3%

Exhibit 10 shows expected annualized (geometric) returns for the hypothetical plan over a 20-year horizon based on assumptions from the 26 advisors who provided longer-term assumptions. These results may be more appropriate for evaluating the return assumption for a less mature plan with no projected solvency issues.

Exhibit 10

Annualized Expected Returns
Hypothetical Multiemployer Pension Fund
20-Year Horizon



	Conservative Advisor	Survey Average	Optimistic Advisor
75th percentile	7.45%	8.65%	9.76%
25th percentile	4.25%	5.38%	6.22%
Probability of Meeting or Exceeding:			
7.50% per Year	24.3%	42.1%	57.4%
7.00% per Year	31.4%	50.2%	64.7%
6.50% per Year	39.2%	58.4%	71.5%

Survey of Capital Market Assumptions: 2024 Edition

Evaluating the Return Assumption (cont.)

It is important to keep in mind that the expected returns shown in Exhibits 9 and 10 apply only to the hypothetical asset allocation shown in Exhibit 8. The expected returns will be different – perhaps significantly – for different asset allocations. The following are points to consider when reviewing the results in Exhibits 9 and 10:

Range of Reasonable Assumptions: When setting the investment return assumption for pension valuations, actuaries traditionally constructed a range of reasonable assumptions and then selected a best-estimate point within that range. Actuaries would often consider the reasonable range to be the middle 50 percent of possible results, bounded by the 25th and 75th percentiles.

The applicable actuarial standards of practice were updated in 2013, and the updated standards de-emphasize use of the reasonable range when setting the investment return assumption. Nevertheless, considering this range remains instructive; it may be difficult for an actuary to justify an assumption outside of this range.

Based on the average assumptions in this 2024 survey, the middle 50 percent range for this hypothetical pension plan is very wide: 5.38% to 8.65% over the next 20 years. Note that the range is even wider for a 10-year horizon: 4.39% to 9.07%. This is due to the fact that, while returns may be volatile from one year to the next, deviations will be lower when returns are annualized (in other words, smoothed out) over longer horizons.

Probability of Meeting/Exceeding the Benchmark: For example, say that the actuary for this hypothetical pension plan expects its investment returns to be 7.00% per year, represented by the gold lines in Exhibits 9 and 10. Based on the average assumptions in this 2024 survey, there is a 50.2% probability the plan will meet or beat its 7.00% benchmark on an annualized basis over a 20-year period. The probability is lower, 46.9%, that the plan will meet or beat its benchmark over the next 10 years.

Also note that over a 20-year period, the probability that the annualized investment return will exceed 7.50% (arbitrarily, 50 basis points above the benchmark return) is 42.1%. The probability that the annualized return will exceed 6.50% (50 basis points below the benchmark) is 58.4%. These probabilities are a bit lower when focusing on a 10-year horizon rather than a 20-year horizon.

Purpose of the Measurement: It is important to note that this survey focuses on the investment return assumption, which may (or may not) be the same as the assumption used to discount a plan's projected benefit payments to measure its liabilities. The applicable standards of practice emphasize that the actuary should consider the purpose of the measurement (e.g., contribution budgeting, defeasance or settlement, market measurements, pricing) as a primary factor in choosing a discount rate.

Optimistic and Conservative Assumptions: As previously noted, different investment advisors may have widely varying future capital market expectations. Therefore, it may also be interesting to consider the range of expected returns based on the assumptions provided by the most conservative and most optimistic advisors in the survey.

For this hypothetical asset allocation, the assumptions from the most conservative advisor indicate that the probability of beating the 7.00% benchmark assumption over the next 20 years is 31.4%. Using assumptions from the most optimistic advisor results in a probability of 64.7%. Again, reasonable people may differ.

Limitations: The following are some important limiting factors to keep in mind when reviewing these results.

- The asset classes in this survey do not always align perfectly with the asset classes provided by the investment advisors. Adjustments were made to standardize the different asset classes provided.
- Many of the advisors develop their future assumptions based on investment horizons of no more than 10 years, and returns are generally expected to be lower in the short term. The typical multiemployer pension plan will have an investment horizon that is longer than 10 years.
- The return expectations are generally based on market returns. In other words, they do not reflect any additional returns that may be earned due to active asset managers outperforming the market ("alpha").
- The return expectations do not adjust for plan size. Specifically, they do not take into account the fact that certain investment opportunities are more readily available to larger plans, as well as the fact that larger plans may often receive more favorable investment fee arrangements than smaller plans.
- The ranges of expected annualized returns were constructed using basic, often simplified, formulas and methodologies. More sophisticated investment models – which may consider various economic scenarios, non-normal distributions, etc. – could produce significantly different results.

Use of the Survey: This survey is not intended to be a substitute for the expectations of individual portfolio managers, advisors, or actuaries performing their own independent analyses. The actuarial standards of practice provide for various methods of selecting and supporting the investment return assumption. This survey is intended to be used in conjunction with these methods, with appropriate weighting of various resources based on the plan actuary's professional judgment.

Survey of Capital Market Assumptions: 2024 Edition

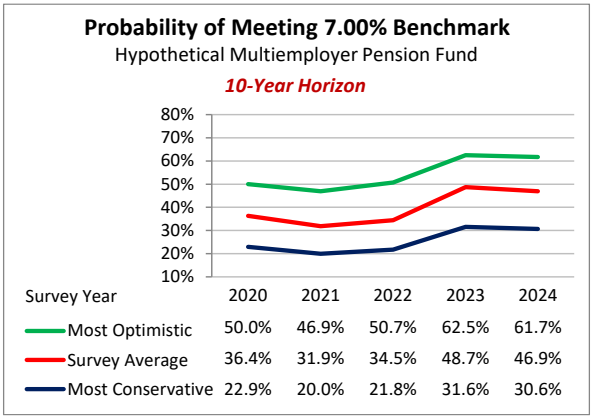
Comparison with Prior Surveys

Exhibits 6 and 7 showed how expected returns for certain asset classes have changed over the past few years. Similarly, Exhibits 11 and 12 below show how return expectations for the hypothetical multiemployer pension plan whose asset allocation is shown in Exhibit 8 have changed from 2020 to 2024.

Both exhibits show the probabilities that the hypothetical pension plan will meet or exceed its 7.00% benchmark return on an annualized basis over the given time horizon. Exhibit 11 focuses on expected returns over a 10-year period and Exhibit 12 focuses on expected returns over a 20-year period. Probabilities are shown for the survey average for each year from 2020 through 2024. For comparison, probabilities are also shown for the most conservative and optimistic advisors in each survey.

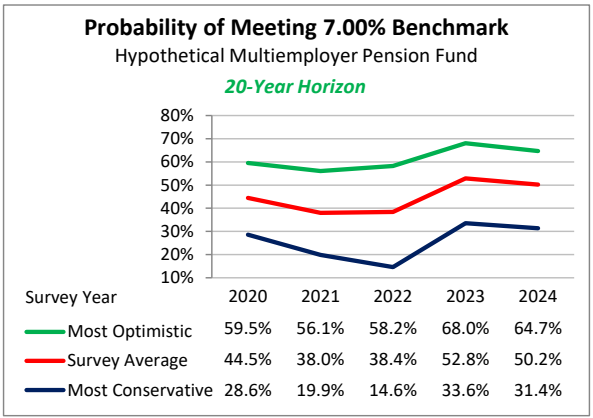
See Exhibit 14 in the appendix for a more complete range of expected returns over a 20-year horizon for each survey from 2015 through 2024.

Exhibit 11



Survey Year	2020	2021	2022	2023	2024
Most Optimistic	50.0%	46.9%	50.7%	62.5%	61.7%
Survey Average	36.4%	31.9%	34.5%	48.7%	46.9%
Most Conservative	22.9%	20.0%	21.8%	31.6%	30.6%

Exhibit 12



Survey Year	2020	2021	2022	2023	2024
Most Optimistic	59.5%	56.1%	58.2%	68.0%	64.7%
Survey Average	44.5%	38.0%	38.4%	52.8%	50.2%
Most Conservative	28.6%	19.9%	14.6%	33.6%	31.4%

As shown in Exhibit 11, the probability that this hypothetical pension plan would meet or beat a benchmark return of 7.00% over a 10-year horizon stayed relatively flat from 2020 to 2022, increased sharply in 2023, and remained level from 2023 to 2024. Exhibit 12 shows that the probability this hypothetical pension plan would meet or beat a benchmark return of 7.00% over a 20-year horizon declined from 2020 to 2022 before rebounding in 2023 and declining slightly in 2024.

For example:

- Based on the average assumptions from the 2024 survey, the probability of this hypothetical plan meeting or exceeding an annualized return of 7.00% over the next 10 years is 46.9%. The probability was considerably lower (36.4%) five years ago when the 2020 survey was conducted.
- Based on the average assumptions from the 2024 survey, the probability of this hypothetical plan meeting or exceeding an annualized return of 7.00% over the next 20 years is 50.2%. This represents a slight decline from last year when the probability was 52.8% but remains higher than 2020 when the probability was 44.5%. The sharp increase from 2022 to 2023 was driven by increases in expectations across asset classes, with fixed income expectations rising the most.

Other points of note when comparing the results from the 2024 survey to those from prior years:

- The results for the most conservative advisor over a 10-year horizon hovered just above 20.0% from 2020 to 2022 before increasing to over 30.0% in 2023 and 2024. Over a 20-year horizon, the results for the most conservative advisor reached a low of 14.6% in 2022, before rebounding to over 30.0% in 2023 and 2024. In other words, the most conservative advisor in 2022 projected a mere 1 in 7 chance of meeting the 7.00% benchmark over a 20-year horizon while the most conservative advisors in 2023 and 2024 projected a 1 in 3 chance of meeting the same benchmark return.
- The results for the most optimistic advisor over a 10-year horizon remained level at about 62.0% in 2024. Over a 20-year horizon, the results for the most optimistic advisor dropped a few percentage points to 64.7% but still represent an approximately 2 in 3 chance of meeting the 7.00% benchmark.
- Note that the most conservative and most optimistic advisors are not necessarily the same from year to year or for different time horizons.

Survey of Capital Market Assumptions: 2024 Edition

Glossary

The following are basic definitions of some of the investment terminology used in this report.

Expected Return

The *expected return* is the amount, as a percentage of assets, that an investment is expected to earn over a period of time. Expected returns in this survey are generally market returns that do not reflect value added or fees due to active management. Returns for asset classes where passive investments are not available (e.g., hedge funds and private equity) are generally net of fees.

Arithmetic vs. Geometric Returns

An *arithmetic* return is the average return in any one year. A *geometric* return is the annualized return over a multi-year period. In general, it is more appropriate to focus on geometric returns when evaluating expected returns over multi-year horizons. However, arithmetic returns are also important. For example, the expected return of a portfolio is calculated as the weighted average of arithmetic returns, not geometric returns.

This survey focuses on geometric returns. Many advisors provide both arithmetic and geometric expected returns. For advisors who provided expected returns only on an arithmetic basis, we converted them to geometric returns for consistency. The following formula was used to make this conversion.

$$E[R_G] = ((1 + E[R_A])^2 - VAR[R])^{1/2} - 1$$

In this formula, $E[R_G]$ is the expected geometric return, $E[R_A]$ is the expected arithmetic return, and VAR[R] is the variance of the expected annual (arithmetic) return.

Standard Deviation

The *standard deviation* is a measure of the expected volatility in the returns. Generally, the standard deviation expresses how much returns may vary in any one year. Assuming that returns are "normally distributed," there is about a 68% probability that the actual return for a given year will fall within one standard deviation (higher or lower) of the expected return. There is about a 95% probability that the actual return will fall within two standard deviations of the expected return.

Correlation

The degree to which the returns for two different asset classes move in tandem with one another is their *correlation*. For example, if two asset classes are perfectly correlated, their correlation coefficient will be 1.00; in other words, if one asset class has a return of X% in a given market environment, then the other asset class is expected to also have a return of X%. A portfolio becomes better diversified as its asset classes have lower (or even negative) correlations with each other.

Methodology

The following is a high-level description of the methodology used in compiling the survey results.

Standardized Asset Classes

Not all investment advisors use the same asset classes when developing their capital market assumptions. Some are very specific (more asset classes), while others keep things relatively simple (fewer asset classes).

We exercised judgment in classifying each advisor's capital market assumptions into a standard set of asset classes. In the event that an advisor did not provide assumptions for a given asset class, the average assumptions from the other advisors was used when developing expected returns for that advisor.

Investment Horizons

This survey considers "short-term" expected returns to apply to a 10-year investment horizon, and "long-term" expected returns to apply to a 20-year horizon.

In this 2024 edition of the survey, 15 of the 41 advisors provided only short-term assumptions, indicating a horizon of no more than 10 years. Included in this group is one advisor who provided assumptions over a horizon of seven years.

All 26 advisors who provided long-term assumptions over horizons of 20 years or more also provided short-term assumptions. In cases where such an advisor indicated a horizon shorter than 10 years, the shorter-term expected returns were combined with the longer-term expected returns to achieve a 10-year horizon. If an advisor indicated a time horizon longer than 20 years, the longer-term expected returns were combined with the shorter-term expected returns to achieve a 20-year horizon.

No Adjustment for Alpha

No adjustment was made to reflect the possible value added by an active investment manager outperforming market returns (earning "alpha").

Normally-Distributed Returns

This survey assumes that investment returns will be normally distributed according to the capital market assumptions provided. The survey also assumes that the investment return in one year does not affect the investment return in the following year.

Equal Weighting

Each unique assumption set was given equal weight in developing the average assumptions for the survey, regardless of factors such as total assets under advisement, research methodology, etc.

Survey of Capital Market Assumptions: 2024 Edition APPENDIX

Exhibit 13

The following exhibit evaluates the investment return assumption for a hypothetical multiemployer pension plan. It reflects the same hypothetical asset allocation as shown in Exhibit 8, and it provides more detail than Exhibits 9 and 10. Note that the most conservative and optimistic advisors for the 10-year horizon are not necessarily the same as the most conservative and optimistic advisors for the 20-year horizon. This hypothetical pension plan has a benchmark return of 7.00% per year, which is indicated by the gold line in the exhibit below.

Hypothetical Multiemployer Plan
2024 Survey of Capital Market Assumptions

		Average Survey Assumptions		
Asset Class	Portfolio Weight	10-Year Horizon	20-Year Horizon	Standard Deviation
US Equity - Large Cap	20.0%	6.46%	6.96%	16.52%
US Equity - Small/Mid Cap	10.0%	7.07%	7.50%	20.57%
Non-US Equity - Developed	7.5%	7.08%	7.52%	18.06%
Non-US Equity - Emerging	5.0%	7.70%	8.24%	23.61%
US Corporate Bonds - Core	7.5%	4.93%	4.88%	5.90%
US Corporate Bonds - Long Duration	2.5%	5.05%	5.16%	10.98%
US Corporate Bonds - High Yield	5.0%	6.13%	6.36%	9.94%
Non-US Debt - Developed	5.0%	3.66%	3.71%	7.33%
Non-US Debt - Emerging	2.5%	6.17%	6.28%	10.76%
US Treasuries (Cash Equivalents)	5.0%	3.68%	3.43%	1.10%
TIPS (Inflation-Protected)	5.0%	4.38%	4.27%	6.10%
Real Estate	7.5%	6.06%	6.17%	16.61%
Hedge Funds	5.0%	5.90%	6.17%	8.03%
Commodities	2.5%	4.92%	4.95%	17.81%
Infrastructure	2.5%	7.26%	7.36%	16.02%
Private Equity	5.0%	9.09%	9.71%	22.57%
Private Debt	2.5%	8.32%	8.44%	12.00%
Inflation	N/A	2.42%	2.44%	1.86%
TOTAL PORTFOLIO	**100.0%**	*Expected returns are geometric.*		

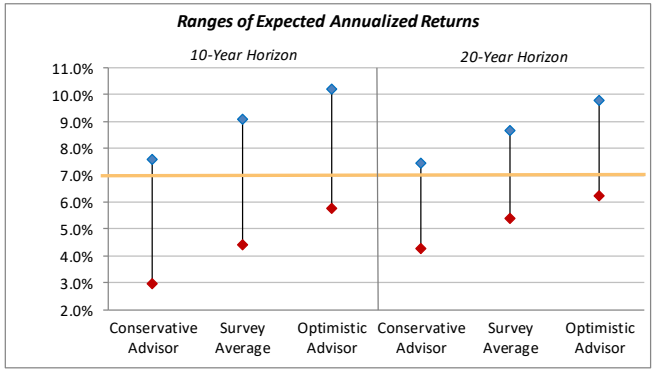
	10-Year Horizon			*20-Year Horizon*		
	Conservative Advisor	**Survey Average**	**Optimistic Advisor**	**Conservative Advisor**	**Survey Average**	**Optimistic Advisor**
Expected Returns						
Average Annual Return (Arithmetic)	5.83%	7.29%	8.49%	6.38%	7.56%	8.63%
Annualized Return (Geometric)	5.28%	6.73%	7.98%	5.85%	7.01%	7.99%
Annual Volatility (Standard Deviation)	10.77%	10.98%	10.49%	10.59%	10.87%	11.74%
Range of Expected Annualized Returns						
75th Percentile	7.57%	9.07%	10.22%	7.45%	8.65%	9.76%
25th Percentile	2.98%	4.39%	5.75%	4.25%	5.38%	6.22%
Probabilities of Exceeding Certain Returns						
7.50% per Year, Annualized	25.7%	41.2%	55.8%	24.3%	42.1%	57.4%
7.00% per Year, Annualized	30.6%	46.9%	61.7%	31.4%	50.2%	64.7%
6.50% per Year, Annualized	36.0%	52.7%	67.3%	39.2%	58.4%	71.5%

Considerations and Limitations

- Allocations may be approximated if certain asset classes are not included in the survey.
- Many investment advisors provided only shorter-term assumptions (10 years or less).
- Assumptions are generally based on indexed returns and do not reflect anticipated alpha.
- Assumptions do not reflect investment opportunities or fee considerations available to larger funds.

SOURCE: Horizon Actuarial 2024 Survey of Capital Market Assumptions

Expected returns over a 10-year horizon include all 41 survey participants.
Expected returns over a 20-year horizon are based a subset of 26 survey participants who provided long-term assumptions.



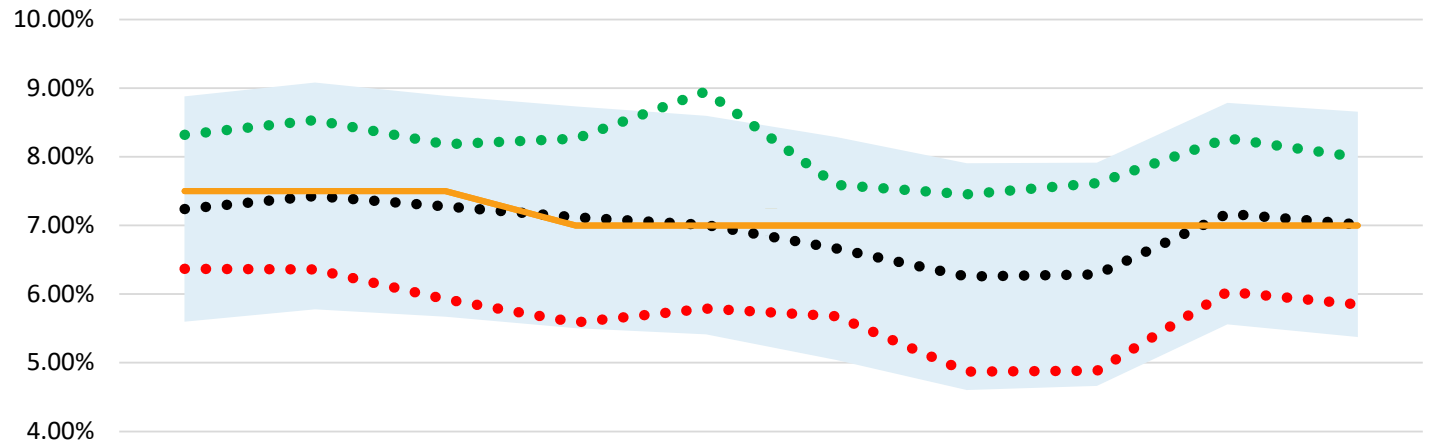
Survey of Capital Market Assumptions: 2024 Edition APPENDIX

Exhibit 14

The following exhibit shows the range of expected annualized returns for each of the surveys from 2015 to 2024 over a 20-year horizon. The results for 2019 through 2024 reflect the same hypothetical asset allocation as shown in Exhibit 13. Note that the hypothetical asset allocation was modified slightly in 2019 to include a small allocation to private debt. Please refer to the 2018 survey for the hypothetical asset allocation used to develop the results for 2015 through 2018. Similar to Exhibit 13, the benchmark return for this hypothetical plan is indicated by the gold line. The most conservative advisor in each survey is indicated by the red dotted line and the most optimistic advisor in each survey is indicated by the green dotted line. The black dotted line shows the survey average return and the blue shaded region shows the 25th – 75th percentile of returns assuming a normal distribution using the survey average return and survey average standard deviation.

Range of Expected Annualized Returns: 2015 - 2024 Surveys

Hypothetical Multiemployer Plan | Geometric Returns | 20-Year Horizon



Survey Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Benchmark Return	7.50%	7.50%	7.50%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
Survey Average	7.24%	7.43%	7.28%	7.12%	7.01%	6.66%	6.25%	6.29%	7.17%	7.01%

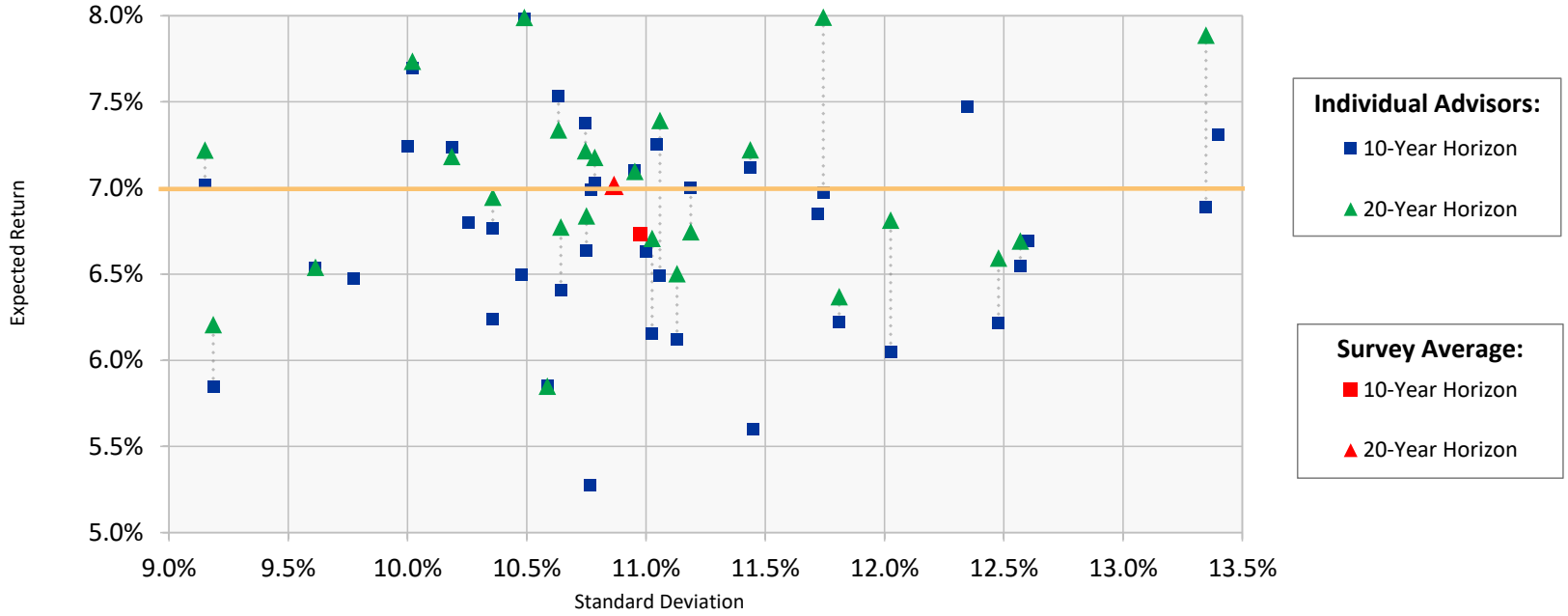
25-75th Percentile | Survey Average | Benchmark Return | Conservative Advisor | Optimistic Advisor

SOURCE: Horizon Actuarial 2024 Survey of Capital Market Assumptions
Expected returns over a 20-year horizon are based a subset of 26 survey participants who provided long-term assumptions.

Survey of Capital Market Assumptions: 2024 Edition APPENDIX

Exhibit 15

The following exhibit shows the distribution of expected annualized returns and annual standard deviations for the same hypothetical asset allocation that is shown in Exhibit 13. The expected annualized return and annual standard deviation of the hypothetical asset allocation are shown separately for each advisor who participated in the survey. Individual advisors are shown separately by investment horizon, and the short- and long-term assumptions for advisors who provided both are connected by a dotted line. The survey average assumptions are shown in red. Similar to Exhibit 13, the benchmark return of 7.00% for this hypothetical plan is indicated by the gold line. The exhibit shows that there are a wide variety of investment return assumptions that could be considered to be reasonable for any given asset allocation.



SOURCE: Horizon Actuarial 2024 Survey of Capital Market Assumptions
Expected returns over a 10-year horizon include all 41 survey participants.
Expected returns over a 20-year horizon are based a subset of 26 survey participants who provided long-term assumptions.

Survey of Capital Market Assumptions: 2024 Edition APPENDIX

Exhibit 16

The following exhibit provides the average capital market assumptions for all 41 investment advisors in the 2024 survey. Each unique assumption set was given equal weight in determining the average assumptions. For reference, expected returns are shown over 10-year and 20-year horizons. Expected returns are also provided on both an arithmetic basis (one-year average) and geometric basis (multi-year annualized). The standard deviations (volatilities) and correlations apply to both arithmetic and geometric expected returns.

Horizon Actuarial 2024 Survey of Capital Market Assumptions

Average Survey Assumptions

		Expected Returns					***Correlation Matrix***														
		10-Year Horizon		20-Year Horizon		Standard															
	Asset Class	Arith.	Geom.	Arith.	Geom.	Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	US Equity - Large Cap	7.74%	6.46%	8.25%	6.96%	16.52%	1.00																
2	US Equity - Small/Mid Cap	9.04%	7.07%	9.50%	7.50%	20.57%	0.90	1.00															
3	Non-US Equity - Developed	8.61%	7.08%	9.08%	7.52%	18.06%	0.81	0.76	1.00														
4	Non-US Equity - Emerging	10.31%	7.70%	11.00%	8.24%	23.61%	0.70	0.67	0.79	1.00													
5	US Corporate Bonds - Core	5.10%	4.93%	5.04%	4.88%	5.90%	0.28	0.23	0.26	0.24	1.00												
6	US Corporate Bonds - Long Duration	5.64%	5.05%	5.71%	5.16%	10.98%	0.27	0.22	0.25	0.23	0.88	1.00											
7	US Corporate Bonds - High Yield	6.61%	6.13%	6.86%	6.36%	9.94%	0.68	0.67	0.64	0.62	0.49	0.43	1.00										
8	Non-US Debt - Developed	3.95%	3.66%	4.00%	3.71%	7.33%	0.21	0.17	0.32	0.28	0.61	0.59	0.30	1.00									
9	Non-US Debt - Emerging	6.73%	6.17%	6.89%	6.28%	10.76%	0.53	0.50	0.57	0.63	0.58	0.54	0.66	0.49	1.00								
10	US Treasuries (Cash Equivalents)	3.69%	3.68%	3.44%	3.43%	1.10%	(0.03)	(0.06)	(0.02)	(0.02)	0.14	0.08	(0.03)	0.14	0.06	1.00							
11	TIPS (Inflation-Protected)	4.57%	4.38%	4.48%	4.27%	6.10%	0.17	0.13	0.17	0.19	0.66	0.59	0.33	0.49	0.43	0.13	1.00						
12	Real Estate	7.43%	6.06%	7.38%	6.17%	16.61%	0.57	0.57	0.50	0.45	0.27	0.25	0.49	0.20	0.40	(0.03)	0.21	1.00					
13	Hedge Funds	6.24%	5.90%	6.52%	6.17%	8.03%	0.71	0.70	0.68	0.66	0.26	0.24	0.63	0.20	0.50	(0.01)	0.18	0.45	1.00				
14	Commodities	6.45%	4.92%	6.56%	4.95%	17.81%	0.34	0.35	0.42	0.42	0.06	0.03	0.37	0.13	0.28	(0.00)	0.20	0.25	0.40	1.00			
15	Infrastructure	8.56%	7.26%	8.56%	7.36%	16.02%	0.66	0.63	0.64	0.60	0.29	0.32	0.60	0.30	0.52	(0.01)	0.21	0.50	0.57	0.42	1.00		
16	Private Equity	11.55%	9.09%	12.33%	9.71%	22.57%	0.75	0.96	0.66	0.61	0.18	0.21	0.55	0.16	0.43	(0.07)	0.11	0.48	0.62	0.29	0.56	1.00	
17	Private Debt	9.02%	8.32%	9.09%	8.44%	12.00%	0.55	0.55	0.52	0.50	0.17	0.20	0.66	0.10	0.41	(0.08)	0.09	0.37	0.55	0.33	0.48	0.58	1.00
	Inflation	2.43%	2.42%	2.44%	2.44%	1.86%																	

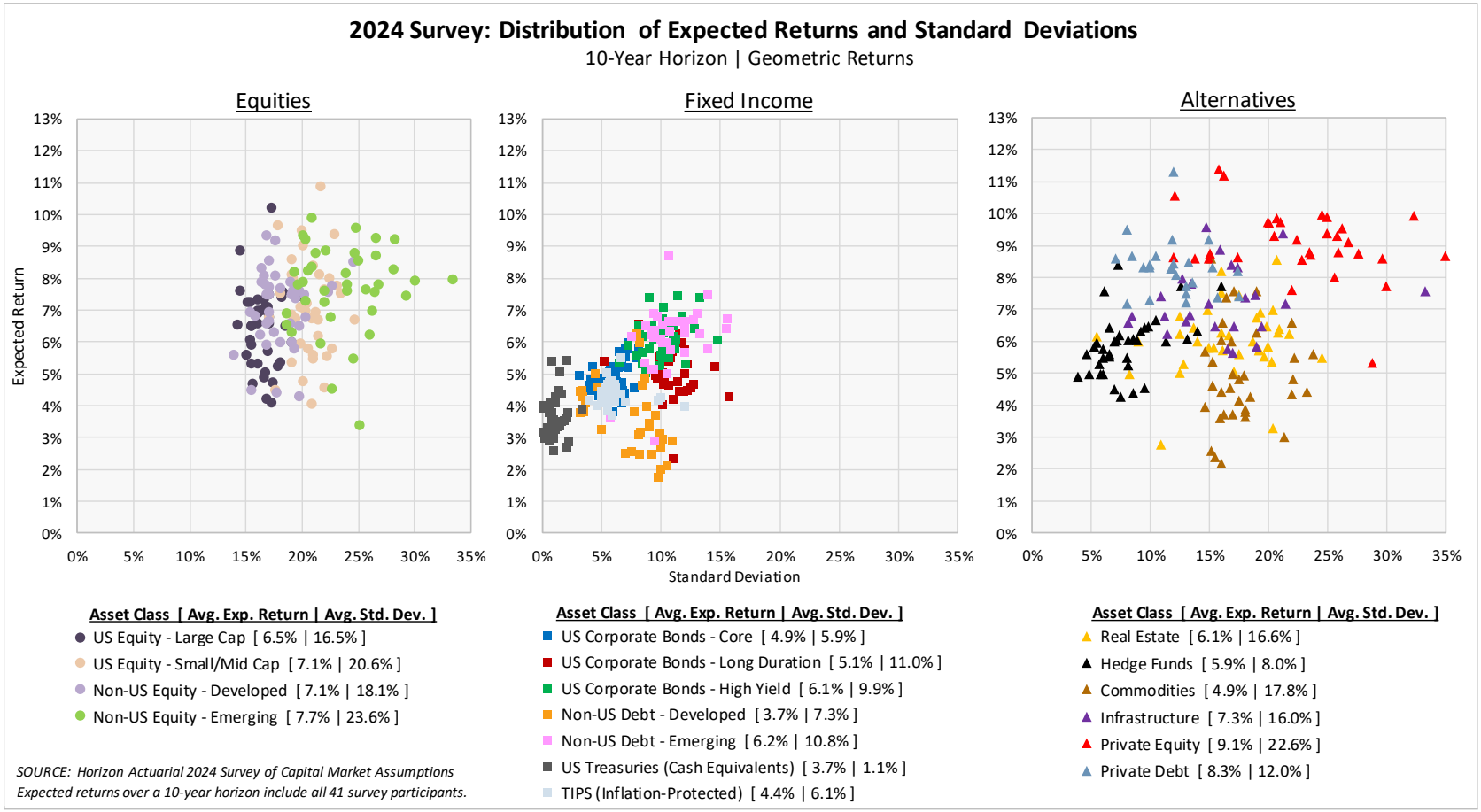
Expected returns over a 10-year horizon include all 41 survey participants.

Expected returns over a 20-year horizon are based a subset of 26 survey participants who provided long-term assumptions.

Survey of Capital Market Assumptions: 2024 Edition APPENDIX

Exhibit 17

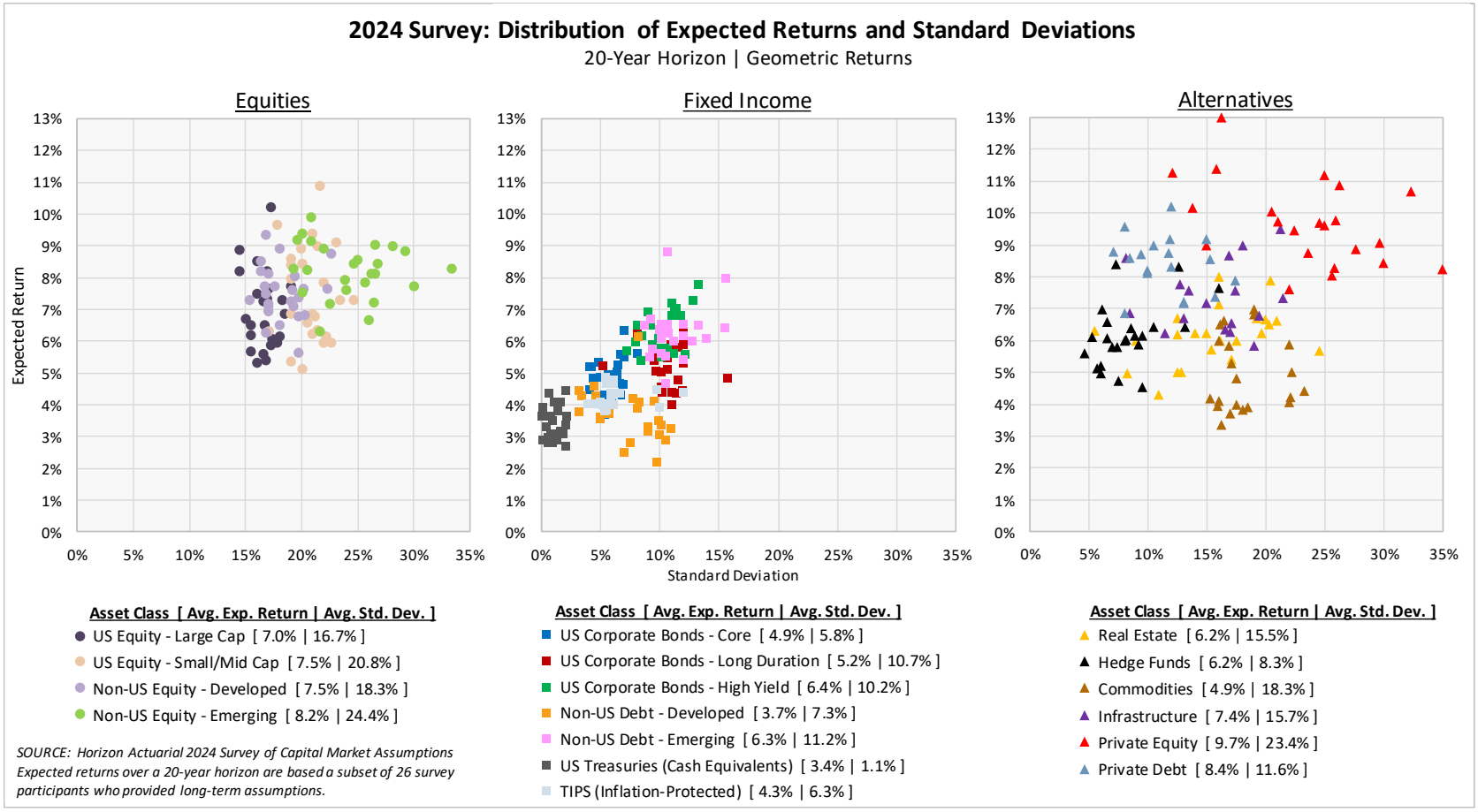
Earlier in this report, Exhibit 5 showed the distribution of expected returns and standard deviations for all 41 advisors who provided short-term assumptions. The exhibit below shows the same distribution, broken out by asset type: equities, fixed income, and alternatives. Note that the average expected return and standard deviation from the 2024 survey are listed in brackets for each asset class. Also note that not every advisor provided expectations for every asset class.



Survey of Capital Market Assumptions: 2024 Edition APPENDIX

Exhibit 18

Exhibit 17 showed the distribution of expected returns and standard deviations over an investment horizon of 10 years. The exhibit below shows the same distribution, but for a horizon of 20 years. Note that while Exhibit 17 included all 41 advisors in the survey, the exhibit below only includes assumptions for the 26 advisors who provided longer-term assumptions (horizons of 20 years or more). Also note that not every advisor provided expectations for every asset class.

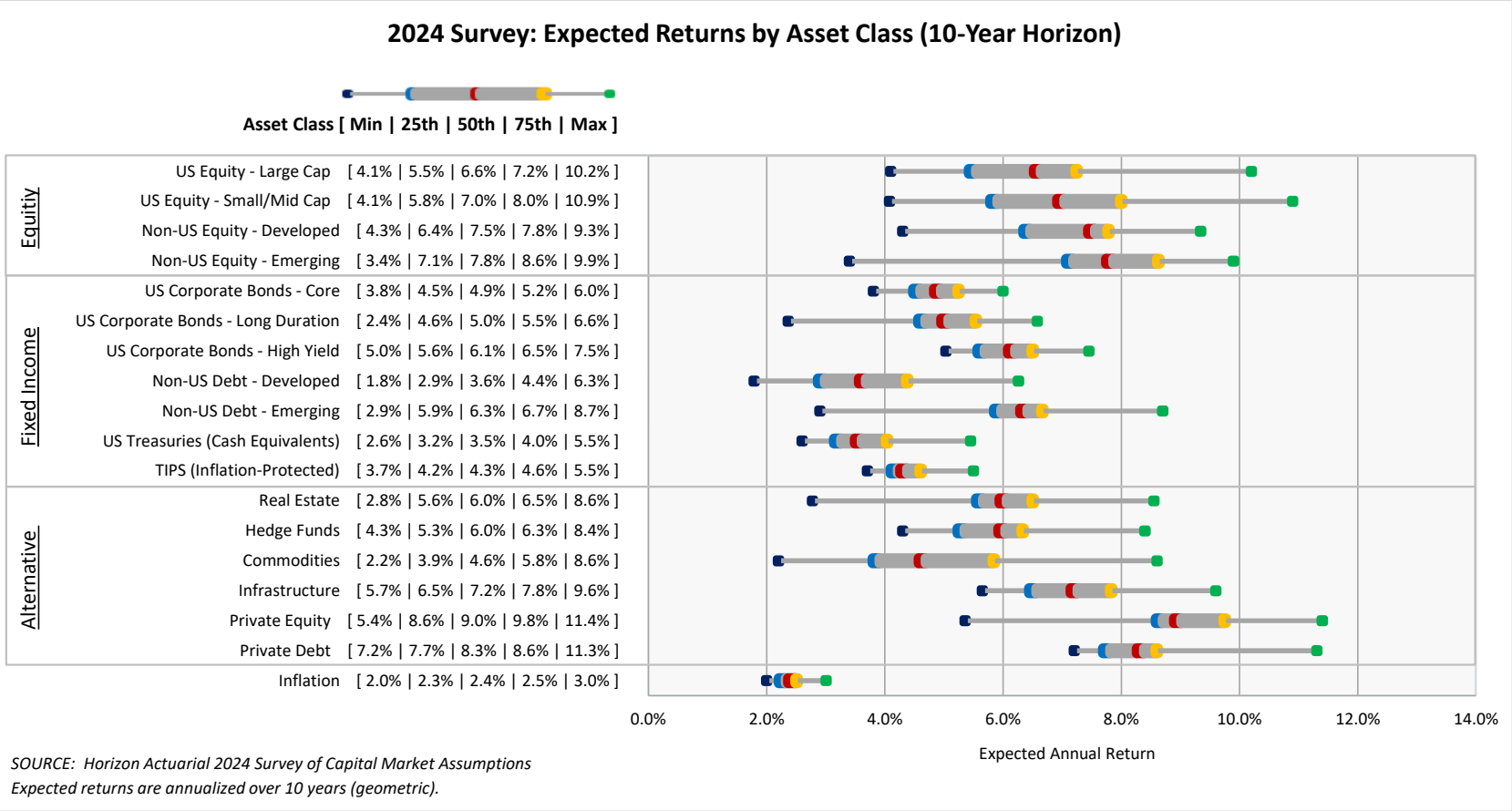


Survey of Capital Market Assumptions: 2024 Edition APPENDIX

Exhibit 19

The exhibit below shows the ranges of expected annual returns for different asset classes over a 10-year investment horizon. The ranges shown below include assumptions for all 41 advisors in the 2024 survey. Expected returns shown below are annualized (geometric).

To illustrate the distribution of expected returns, the exhibit shows the range of the middle 50 percent of results: the range between the 25th and 75th percentiles. It also shows the median expected return for each asset class: the 50th percentile. Note that the expected returns for the *median* advisor shown below are not the same as the *average* expected returns shown elsewhere in the report. In most cases, however, the differences between median and average expected returns are relatively small.



SOURCE: Horizon Actuarial 2024 Survey of Capital Market Assumptions
Expected returns are annualized over 10 years (geometric).

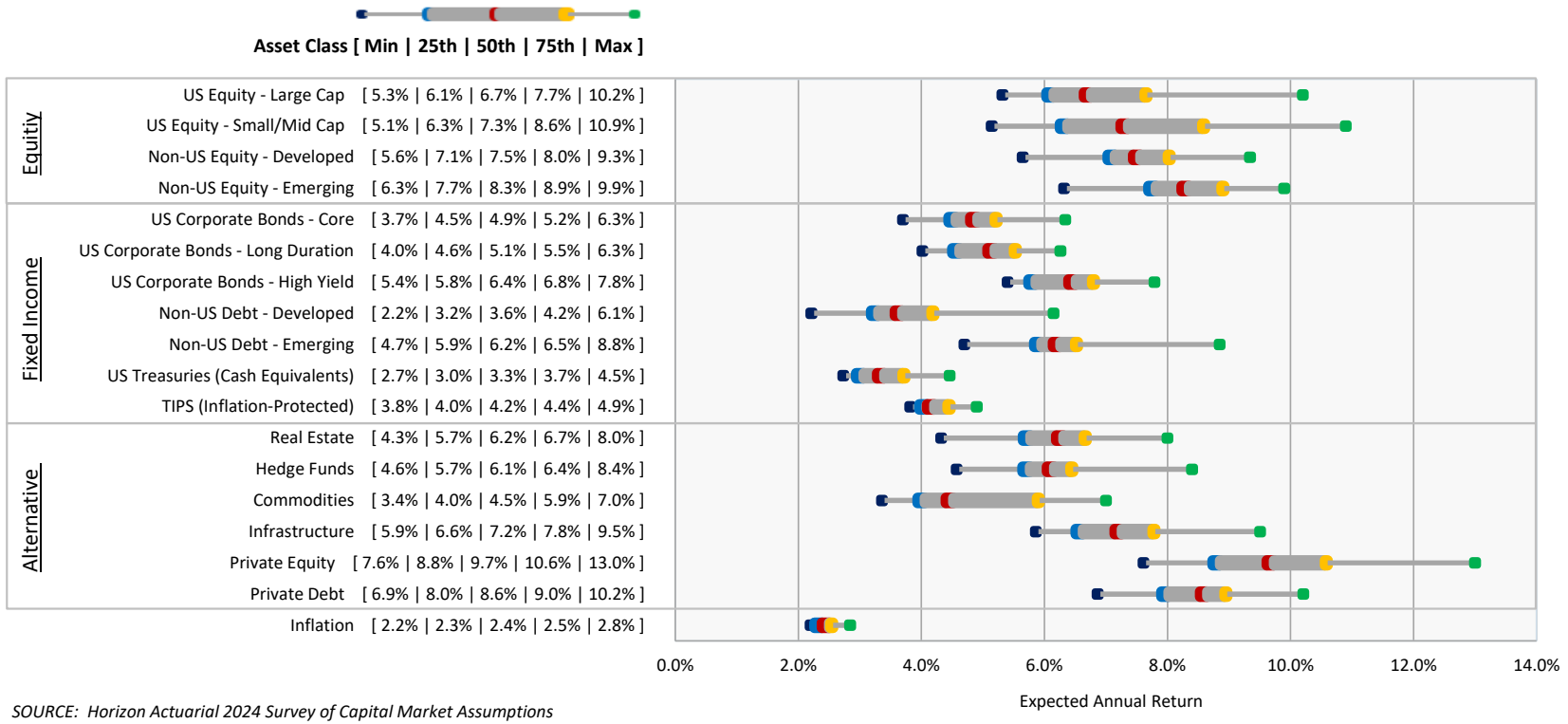
Survey of Capital Market Assumptions: 2024 Edition APPENDIX

Exhibit 20

The exhibit below shows the ranges of expected annual returns for different asset classes over a 20-year investment horizon. The ranges shown below are based on the assumptions for 26 advisors who provided longer-term assumptions (horizons of 20 years or more). Expected returns shown below are annualized (geometric). Note that the ranges of expected returns are somewhat narrower when the investment horizon is longer.

To illustrate the distribution of expected returns, the exhibit shows the range of the middle 50 percent of results: the range between the 25th and 75th percentiles. It also shows the median expected return for each asset class: the 50th percentile. Note that the expected returns for the *median* advisor shown below are not the same as the *average* expected returns shown elsewhere in the report. In most cases, however, the differences between median and average expected returns are relatively small.

2024 Survey: Expected Returns by Asset Class (20-Year Horizon)



SOURCE: Horizon Actuarial 2024 Survey of Capital Market Assumptions

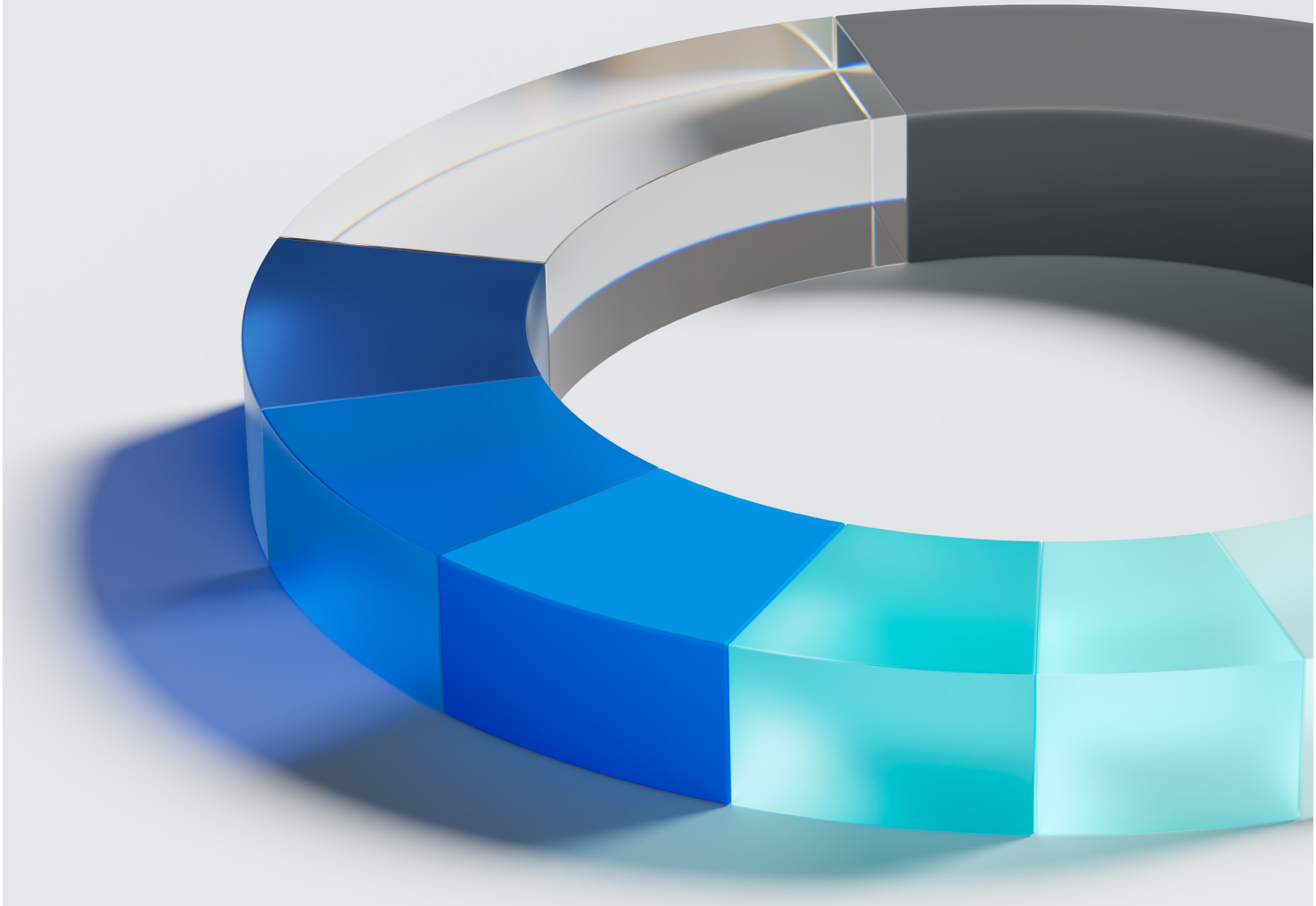
Expected returns are annualized over 20 years (geometric), based on a subset of 26 advisors who provided longer term assumptions.

Portfolio Insights

27th annual edition

2023 Long-Term Capital Market Assumptions

Time-tested projections to build stronger portfolios



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J.P.Morgan
ASSET MANAGEMENT

Foreword

By nearly any measure, the early 2020s have been a period of extraordinary challenge. The worst pandemic in over a century triggered a short but severe recession and enduring supply disruptions. A generous fiscal response, facilitated by unusually easy monetary policy, fueled the highest levels of inflation since the early 1980s. Russia's brutal invasion of Ukraine created a devastating humanitarian crisis and further supply disruptions and inflation. Central banks, led by the Federal Reserve, then aggressively tightened policy in response to inflation. And in 2022, financial markets around the world and across all major asset classes incurred sharp losses. Amid these cascading crises, many of the past year's losses have created significant opportunities.

Against this backdrop, we're pleased to launch the 2023 edition of J.P. Morgan Asset Management's Long-Term Capital Market Assumptions (LTCMAs).[1] In our 27th year of producing capital market estimates, we incorporate more than 200 asset and strategy classes; our return assumptions are available in 17 base currencies. Over the years, many investors and advisors have come to depend on our assumptions to inform their strategic asset allocation, build more resilient portfolios and establish reasonable expectations for risks and returns over a 10- to 15-year time frame. Additionally, with each passing year, we aim to recalibrate our long-run approximations, incorporating new information presented by markets, policymakers and economic data.

We formulate our LTCMAs as part of a proprietary process. It draws on quantitative and qualitative inputs as well as insights from experts across J.P. Morgan Asset Management. Our own multi-asset investment approach relies heavily on our LTCMAs: The assumptions form a critical foundation of our framework for designing, building and analyzing solutions aligned with our clients' specific investment needs.

This edition of our assumptions is very different from last year's. Our return forecasts move significantly higher across many asset classes. Lower valuations, higher yields and the accompanying unwind of many policy dislocations mean that markets today offer the best long-term return potential in more than a decade. The insights presented here aim to help clients navigate changing market dynamics and identify promising investment opportunities.

We hope our analysis helps guide your long-term strategic perspective and active asset allocation. On behalf of J.P. Morgan Asset Management, we look forward to working with you to make the best use of our assumptions in setting, and achieving, your own investment goals. Thank you for your continued trust and confidence. As always, we welcome your feedback.

George Gatch
Chief Executive Officer
Asset Management

[1] Key asset classes in USD, GBP and EUR are presented at the back of this book; all others are available via our website or from your J.P. Morgan representative.

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Executive summary

Back to basics

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In brief

- Our 2023 return outlook stands in stark contrast to last year's. Across markets, the unwind of dislocations, notably negative policy rates and large central bank balance sheets, has been abrupt. Few asset classes emerged unscathed. But our LTCMAs deliver a brighter message: Lower valuations and higher yields mean that markets today offer the best potential long-term returns since 2010.
- A recession or at least several quarters of subtrend growth lie immediately ahead. Still, our forecast of global trend growth over our 10- to 15-year investment horizon is unchanged at 2.20%. Despite global inflation today running at 7.30%, we raise our long-term global inflation forecast just 20 basis points, to 2.60%, and expect today's elevated inflation to subside over the next two years.
- After policy rates normalized swiftly, bonds no longer look like serial losers. Real return forecasts for most sovereign bonds move back into positive territory, leaving bonds once again a plausible source of income as well as diversification. Higher riskless rates also translate to improved credit return forecasts.
- Projected equity returns rise sharply. Margins will likely recede from today's levels but not reverse completely to their long-term average, and valuations present an attractive entry point. Alternatives, meanwhile, still offer appealing diversification benefits. With the U.S. dollar more overvalued than at any time since the 1980s, the FX translation will be a significant component of forecast returns.
- Many secular themes affecting our outlook (demographics, globalization patterns, etc.) will demand higher capex – paradoxically coming just as the abundance of cheap capital of the last decade is reversing. As financial markets are called upon to efficiently allocate scarce capital, the result may be more idiosyncratic returns and lower correlations within indices.
- The turmoil of 2022 has brought asset return forecasts close to long-term equilibrium; the 60/40 can once again form the bedrock for portfolios, with alternatives offering alpha, inflation protection and diversification. Once today's market turbulence clears, investors will have more scope to achieve long-term portfolio return objectives.

Lower valuations and higher yields mean that asset markets today offer the best long-term returns in more than a decade. It took a painful slump in stock and bond markets to get here, the worst of which may not yet be over. Still, the turmoil of 2022 might be considered a cathartic moment, revitalizing the portfolio toolkit and creating attractive investment opportunities in the years ahead.

In the near term, investors face a challenging time, as a recession or at least several quarters of subtrend growth lie immediately ahead. Nevertheless, our assessment of long-term trend growth is only marginally below last year's. We expect today's inflationary surge to eventually subside to a rate only slightly above our previous estimates.

Our forecast annual return for a USD 60/40 stock-bond portfolio over the next 10–15 years leaps from 4.30% last year to 7.20%. Over the last 25 years, the rolling 10-year return for this portfolio has averaged 6.10%. But that statistic bears some scrutiny. The secular decline in bond yields over this period[1] provided a tailwind of about 50 basis points (bps) per year (**Exhibit 1A**). Without that tailwind – which we do not expect to recur in the coming decade – the fair historical comparison for a rolling 10-year USD 60/40 portfolio return is closer to 5.60%.

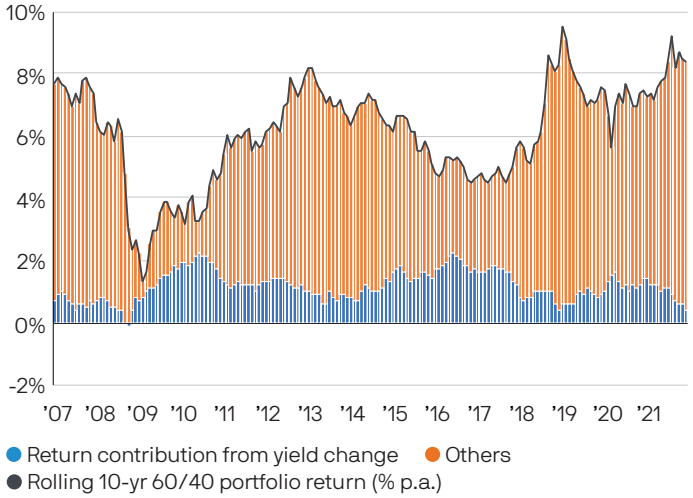
2022 saw drawdowns across asset classes, with international investors also hit hard by a soaring dollar (**Exhibit 1B**). Today, however, opportunities for long-term investors with capital to deploy are the best we've seen since 2010.[2] Meanwhile, we would remind those shouldering losses from the last year that investors able to avoid selling during drops tend to be rewarded in the longer run,[2] and that the sharpest gains are often banked early in the cycle as markets first turn.

Our title this year – Back to Basics – captures our belief that after a year of turmoil, the core principles of investing still hold firm. Once again, the 60/40 can form the bedrock of portfolios, while alternatives can offer alpha, inflation protection and diversification. Meanwhile, the end of free money, greater two-way risk in inflation and policy, and increased return dispersion across assets also give active managers more to swing for.

The past year has been undoubtedly challenging, but the amortization of the sharp moves in valuations and yields has effectively removed many of the cyclical headwinds that faced a wide range of asset classes last year. Given that our forecasts this year are in many cases close to our estimate of long-run equilibrium returns, investors could view the volatility of 2022 as bringing market pricing "back to par," enabling investors to focus on achieving long-term portfolio return objectives with renewed confidence.

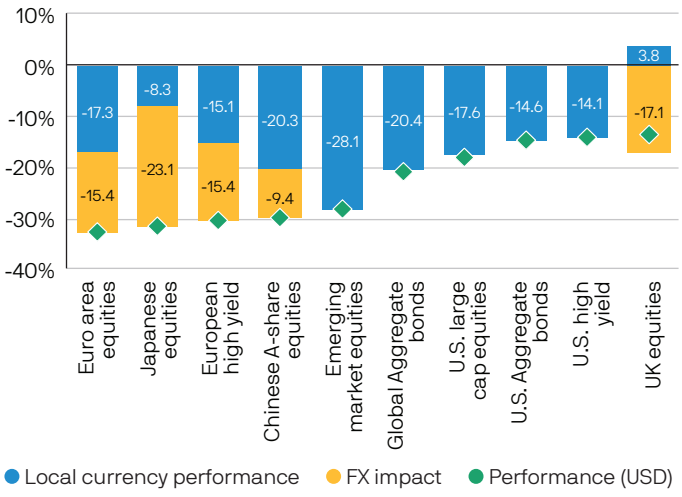
Over the last 25 years, declining bond yields provided a consistent tailwind to 60/40 returns

Exhibit 1A: Contribution of secular decline in bond yields to USD 60/40 returns



The recent sell-off in both fixed income and equity markets has depressed a balanced portfolio

Exhibit 1B: Selected asset returns from September 30, 2021, to September 30, 2022, including FX impact for USD investor



Source: Bloomberg, Haver Analytics, J.P. Morgan Asset Management; data as of September 30, 2022.

[1] U.S. 10-year yields followed a path of secular decline from 15.84% in 1981 to a low of 0.53% in 2020. Source: Bloomberg.
[2] Allowing for a 16% drawdown in a 60/40 portfolio this year, and assuming a linear 7.2% 60/40 return, a balanced portfolio recovers in approximately three years.

A bumpy road – now a better return outlook

Even as long-term return projections improve, many investors will prefer to see at least some of the near-term issues recede – notably, elevated inflation – before committing capital to asset markets. We expect inflation to cool over the next couple of years, and project only modestly higher equilibrium inflation rates over the next decade. Still, the factors that drove the surge in inflation influence our long-term outlook.

Scarcity of key goods, fragility in local supply chains, tight labor markets and a tense geopolitical backdrop (laid bare by Russia's invasion of Ukraine) all led to upside pressure on prices. Addressing these vulnerabilities – as well as achieving net-zero[3] carbon emissions and planning for ongoing global population growth – will demand investment. Paradoxically, this demand for capital investment comes just as central banks are fighting inflation vigorously and in so doing ending a decade of ultra-easy policy. Put another way, capital will become scarcer just as structural demand for investment is increasing.

To be clear, by any reasonable measure the cost of capital will remain subdued. But the world of easy policy and abundant capital, which drove broad-based asset appreciation in the 2010s, has been replaced by a world where capital is rationed via the financial markets. Investors will probably find that this creates an environment where fundamentals matter more and the dispersion of returns within an index widens. It may also lead to meaningful changes to secular winners and losers in equity markets: With capital becoming scarce, those firms that simply grew their balance sheets on cheap cash and the promise of future growth or profits will fall from favor, while those able to consistently generate cash will be rewarded.

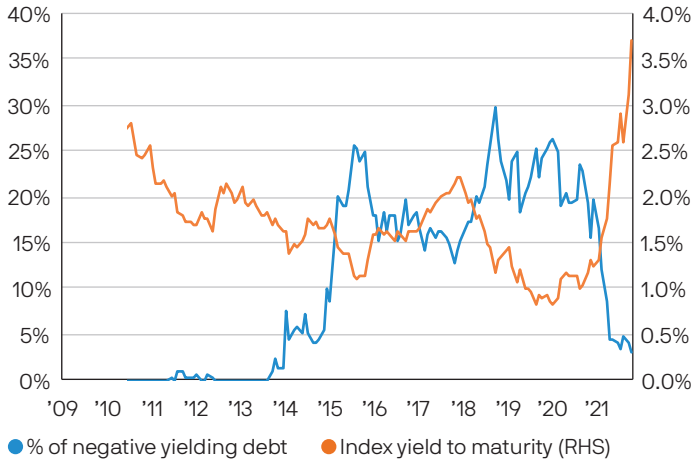
Both the memory and the initial impact of the pandemic have faded, but the effects on supply chains linger. The war in Ukraine and ongoing COVID-19-related restrictions in parts of Asia serve to highlight persistent supply-side vulnerability. The combination of fiscal stimulus in response to the pandemic, and the wave of optimism that came as societies reopened, caused a surge in demand. Fragile supply chains were unable to cope, and the result has been a widespread surge in inflation.

As a result, the drawn-out pain we expected bondholders to suffer over several years was compressed into several months (**Exhibit 2**). For equity holders, central banks' sharp policy pivot, from supporting nominal growth at all costs to depressing inflation at all costs, damaged otherwise resilient corporate revenues and earnings: At the time of writing, we are on the cusp of an earnings downgrade cycle likely to play out over the next 12 months. Policy tightening should finally kill off inflation, but the cost might well be a swift end to the current business cycle.

Across markets, the unwind of dislocations, most notably negative policy rates and large central bank balance sheets, has been abrupt. Few asset classes, with the exception of some real assets, have emerged unscathed.

We have seen a sharp repricing of global bond yields higher to levels not seen in over a decade

Exhibit 2: Global bond yield and stock of negative yielding debt, 2009-2022



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022.

Today, bonds no longer look like serial losers. Equities remain cyclically sensitive, but while margins still look high, valuations are not, and stocks are already at an attractive long-term entry point. Real assets and private markets continue to appear broadly supported and well geared to many important secular investment themes.

The most important shift from last year is that real return forecasts for assets right across the risk spectrum are positive once again. For the first time in years, investors have a complete toolkit at their disposal.

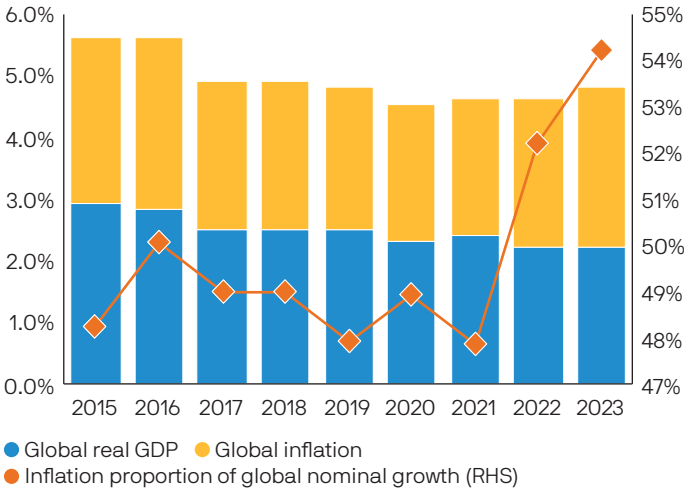
[3] To keep global warming to no more than 1.5°C – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050. Source: United Nations.

Macroeconomic outlook – secular trends little affected by cyclical pressures

We expect a period of subtrend global growth to extend through 2023, with some regions falling into recession. But despite the near-term cyclical challenges, our forecasts for long-run trend global growth over the next decade or so are unchanged at 2.20%, largely as a result of differential growth rates of emerging and developed regions gradually shifting the mix of global growth.[4] Our U.S. and eurozone forecasts dip by 10bps, to 1.60% and 1.10%, respectively, and we make cuts of 20bps, to 4.00%, for China and 30bps, to 5.70%, for India (**Exhibit 3**).

The mix of real growth and inflation slightly worsens at a global level, but today's burst of inflation is set to cool over the longer run

Exhibit 3: Evolution of global trend growth and inflation projections



Source: J.P. Morgan Asset Management; data as of October 2022.

Productivity growth once again disappointed over 2022 – it continues to be an elusive topside risk to our growth projections. If we are right that pursuing net-zero carbon emissions and addressing supply chain fragility spark a pickup in capex, then there may be scope for productivity to improve. After all, capital deepening tends to lead to a rise in total factor productivity. Still, it remains unclear how much of any lift in capex will boost productive assets or labor skills. For this reason, we remain circumspect on building further productivity gains into our Long-Term Capital Market Assumptions (LTCMAs).

Some readers may be surprised to see our inflation forecasts move only modestly higher: up 30bps, to 2.10%, across developed economies and up 10bps, to 3.40%, across emerging markets, pushing projected global inflation up 20bps, to 2.60%. With prevailing global inflation[5] of 7.30% as of September 30, 2022, our faith that inflation will cool to levels close to central bank targets, on average, may seem optimistic. Nonetheless, we see few signs that consumers expect long-term inflation will rise uncontrollably and little evidence signaling tolerance of inflation by central banks.

To be sure, risks to inflation are considerably more two-sided today, possibly pointing to more volatility in inflation in the years ahead. As we discuss in our macroeconomics section, the longer-term disinflationary forces of technology adoption and globalization may have slowed, but they have not disappeared. Meanwhile, central banks have clearly rediscovered their inflation-fighting zeal, with renewed commitment to achieving inflation targets over the next two to three years.

[4] EM economies grow at a faster rate than DM economies, so over a longer period higher growth EM regions gradually contribute a greater share of global growth.
[5] As of September 2022. Source: Bloomberg, Datastream, Haver Analytics, J.P. Morgan Asset Management.

Globalization – evolving, not unraveling

Inflation hawks often argue that "deglobalization" is pushing inflation higher over the long term. Certainly, the world today feels a more dangerous place than it has since the end of the Cold War, as geopolitical tension indices such as the Federal Reserve's (Fed's) Geopolitical Risk Index (GPR) underscore (**Exhibit 4A**). While trading blocs may become more regionally focused, we think globalization will evolve but not unravel.

For the time being, we are probably past "peak globalization," at least with regard to goods trade. Still, in the years ahead, we expect trade to run roughly in line with GDP growth (**Exhibit 4B**) but to focus more on services and labor, and less on finished goods. While the emergence of rival trading blocs increases right-tail risks to inflation – particularly as rival blocs compete for scarce commodities – globalization of services and labor may be a mitigating disinflationary force.

A more polarized world, with a renewed emphasis on trade in services and labor, will require meaningful capex. But not all capex results in better productivity. If capex is deployed simply to create contingency to an already optimal supply chain, it is unlikely to lead to higher productivity. By contrast, where capex strengthens resilience, improves efficiency for regional industry and deepens labor skills, the impact on long-term potential growth trends may be meaningful.

Fixed income and FX – bonds normalize, dollar still overvalued

As our inflation forecasts move slightly higher, our forecast of cycle-neutral cash rates rises by 20bps–30bps across developed markets. To be clear, our forecast rates represent the average cash rate we expect over the next 10–15 years, not the terminal rate from the current cycle or the economic equilibrium rate (R*).[6] This year, our USD and EUR cash return forecasts increase significantly, to 2.40% and 1.30%, respectively.

For the first time since the global financial crisis (GFC), prevailing interest rates in most currencies sit at or above the cycle-neutral rate. This implies that the normalization of rates is no longer a drag on average returns and may even be a positive contributor. The impact is minimal in cash but meaningful for longer-duration bonds. For U.S. 10-year bonds, the combination of a slightly higher cash assumption with a slightly flatter curve pushes the cycle-neutral yield up 20bps, to 3.20%. Much higher starting yields push our return forecast up by 160bps, to 4.00%.

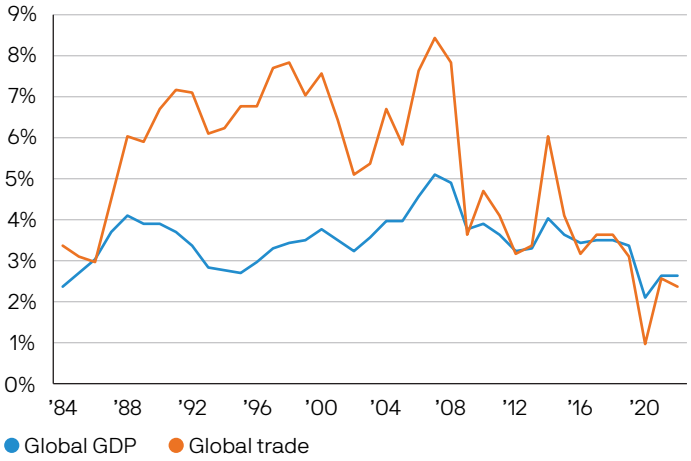
In short, over the last year rates normalized swiftly and painfully. Excepting Japan, real return forecasts across G4 sovereign bonds shift back into positive territory (**Exhibit 5**), leaving bonds once again a plausible source of income as well as diversification.

Global geopolitical risk is exhibiting more volatility after a brief lull at the turn of the decade

Exhibit 4A: The Fed's Geopolitical Risk Index (GPR) shows elevated tension

Growth in global trade is likely to continue tracking GDP growth

Exhibit 4B: Patterns of global activity and global trade growth over the last 40 years



Source: Federal Reserve, IFR, Measuring Geopolitical Risk – Dairo Caldara and Matteo Iacoviello, J.P. Morgan Asset Management; data as of June 2022.

[6] R* (R-star) is the real short-term interest rate expected to prevail when an economy is at full strength and inflation is stable. Source: New York Fed.

Normalization of rates is no longer a drag on average returns in most markets

Exhibit 5: Building-block fixed income return projections for G4 countries

	USD		GBP		EUR		JPY	
	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return
Inflation	2.6%		2.4%		1.8%		0.9%	
Cash	2.3%	2.4%	2.2%	2.2%	1.4%	1.3%	0.5%	0.4%
10-year bond	3.2%	4.0%	2.6%	3.8%	2.2%	3.0%	1.0%	0.6%
Long maturity	3.5%	4.2%	2.7%	4.4%	2.5%	3.6%	1.0%	0.7%
Investment grade credit	4.7%	5.5%	4.3%	5.7%	3.2%	3.6%	1.3%	1.1%
High yield	7.7%	6.8%			5.9%	5.7%		
Emerging market debt*	6.9%	7.1%						

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022.
Long-maturity government bond index: Citi EMU GBI 15+ yr EUR; Citi Japan GBI JPY; FTSE UK Gilts Under 15+ yr GBP and Bloomberg U.S. Treasury 20+ yr USD. High yield: Bloomberg US High Yield 2% Issuer Cap USD and Bloomberg Pan-European High Yield EUR. Emerging market debt: J.P. Morgan EMBI Global Diversified Composite. Cycle-neutral: the average yield we expect after normalization.
* Emerging market local currency debt.

While dislocations have reset quickly across large parts of the sovereign bond market, the same cannot be said for the currency market. Inevitably, rapid policy action in one asset market (interest rates) has pushed others (currencies) further from equilibrium. Today, the U.S. dollar is more overvalued in nominal terms than at any time since the 1980s, and in real terms since 2002. Any investor making a strategic allocation decision across global asset markets today must carefully scrutinize the FX translation, as it will be a meaningful component of forecast returns.

An impending period of subtrend growth may continue to support the greenback, but over our full forecast horizon we expect dollar valuations to recede – particularly as large but slow-moving blocs of international capital (including insurers and pension funds) can now find the yield in their domestic markets to match their liabilities. Over time, this could start to reduce capital flows toward U.S. assets, in turn removing some support for the dollar.

For some years, return forecasts for credit suggested it was a bright spot, not only in fixed income but across asset markets. While the drawdown in credit this year has been brutal, losses were mostly driven by the jump in riskless rates. True, spreads widened across the board, but a combination of light supply, solid corporate balance sheets and a limited need for refinancing meant credit spreads outperformed equities.

Prevailing spreads in both U.S. investment grade (IG) and high yield (HY) are near our equilibrium spread forecasts of 160bps and 480bps, respectively, leading to return forecasts up 270bps, to 5.50%, for U.S. IG and up 290bps, to 6.80%, for U.S. HY.

A feature of the last decade that we do not expect to reverse is the drift in credit index ratings: down in quality in IG and up in quality in HY. Triple Bs account for around half of the IG index today, and double Bs are more than half of the HY index (**Exhibit 6A**). The drift in rating quality might imply a secular spread compression between IG and HY. However, high demand for IG paper, portfolio de-risking and liability hedging likely keep equilibrium spreads near historical averages despite the concentration of BBBs. Meanwhile, in HY we expect default losses to be stable – with a slightly higher level of defaults than lately but with better recovery rates – which serves to keep our long-term HY spread forecast unchanged from last year.

Emerging market debt (EMD) spreads have also widened meaningfully this year, but once again, after adjusting for rating drift, we keep our equilibrium spread assumption unchanged, at 400bps for emerging market (EM) corporate debt and 380bps for EM sovereign debt. This translates to return forecasts up 200bps, to 7.00%, for EMD corporates and up 190bps, to 7.10%, for EMD sovereigns.

EMD remains on top in return terms, across extended credit – especially if adjusted for quality. But the trade-off is in liquidity, which can skew risk-adjusted returns lower in weak markets (**Exhibit 6B**).

Over the last decade, quality ratings across credit indices have changed markedly

Exhibit 6A: Trend in BBBs in IG credit and BBs in HY credit in the last 25 years

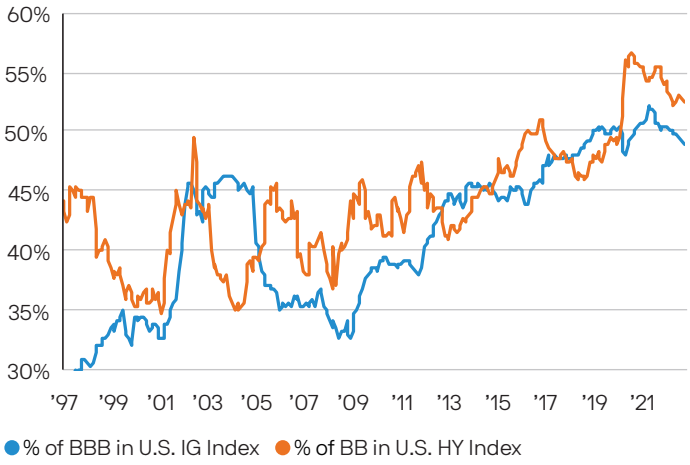
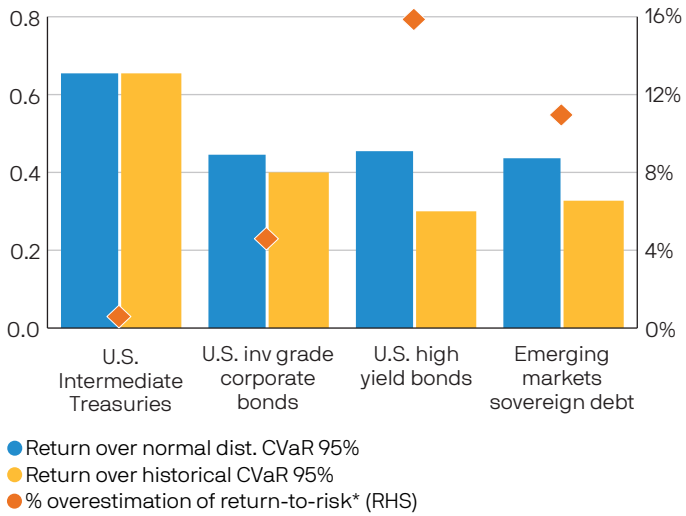


Exhibit 6B: Return-to-risk ratios focused on left-tail risk



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022.

* Percentage difference between return-to-CVaR based on normal assumption and return-to-CVaR based on historical experience. Both CVaR measures are computed at 95% confidence level. See Volatility assumptions section for details.

Toward a 10 billion person planet

Emerging market nations, and specifically many frontier market nations, are potential beneficiaries of the significant growth in global population projected over the next 25–30 years. While developed nations face the challenge of aging workforces, some of the emerging world – parts of the Middle East and South Asia, alongside much of Africa – have young, fast-growing workforces. The challenge is that much of the world's capital and productive assets are in places where the workforce is shrinking (**Exhibit 7**).

Regions with a growing labor supply do not possess the most productive capital assets

Exhibit 7: Top 10 most populous nations

	2020	2050	2100
1	China	India	India
2	India	China	China
3	United States	Nigeria	*Nigeria**
4	Indonesia	United States	*DR Congo**
5	Pakistan	Pakistan	Pakistan*
6	Brazil	Indonesia	*Ethiopia**
7	Nigeria	DR Congo	Indonesia*
8	Bangladesh	Brazil	*Tanzania**
9	Russia	Ethiopia	Brazil*
10	Mexico	Bangladesh	*Egypt**
	Share of world GDP in PPP (2020, %)		
	53	**48**	**33**

Source: Haver Analytics, IMF, U.S. Census Bureau, J.P. Morgan Asset Management; data as of September 30, 2022.

* New countries in top-10 most populous by end of 21st century

Given the higher cost of capital, it will be key for these younger nations to have the right macro and micro policies in place to attract the capital needed to convert their favorable demographics and increasing labor force into sustained economic growth. Today, the economic effect of reinforcing supply chains in developed regions through local sourcing may dominate longer-term demographic developments. But as globalization shifts from goods toward services and labor, we see potential for unlocking this potential workforce – and, in time, a new, fast-growing consumer bloc.

However, given the strain further population growth will place on global resources (energy, food and ecosystems), together with momentum toward net-zero,[7] thoughtful and substantial investment will be needed. While private capital, infrastructure and new asset classes like timberland are the most obvious beneficiaries of this trend, public market sectors such as communications, technology, renewable energy and consumer goods also stand to benefit.

Capex needs rising just as capital gets scarcer

Population growth and the need to shore up supply chain frailties point to a capex boom ahead. Financial markets, for a decade supported by abundant capital that lifted all assets' valuations, will once more have to fulfill their primary social and economic function of allocating scarce capital to where the return outlook is most promising. This will be a significant shift, its effects felt across businesses, economies and markets. In the world of investing, we think this shift will, at the margin, prove helpful for active investing styles.

The low inflation and easy policy of the 2010s have given way to a backdrop of two-sided inflation risks and greater policy uncertainty. Ahead, we anticipate an environment where asset markets are driven less by central bank support (a headwind for active alpha) and more by allocating scarce capital to long-run economic trends (a tailwind for active alpha). While the challenge of selecting the right manager persists, we believe that the potential for active alpha is improving at the margin.

Equity – valuation now a tailwind, margins still a headwind

The asset market most commonly associated with active investing decisions is equities. Last year, global equities were undeniably expensive and trading at what appeared to be unsustainable margin levels. The bear market of 2022 has swung valuations from being a headwind to a tailwind in most regions. But despite rising input and labor costs, corporate margins remain extended, as companies in some sectors (autos, semiconductors, etc.) have raised prices for the first time in several years.

[7] To keep global warming to no more than 1.5°C – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050. Source: United Nations.

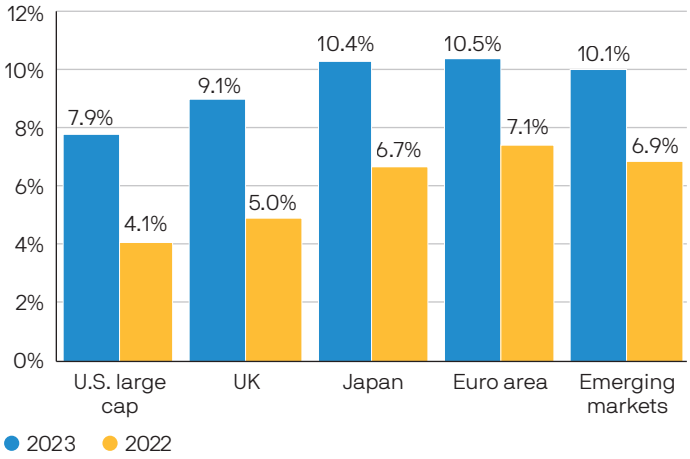
As margins likely recede, they create a headwind to equity returns. Still, we do not expect margins to reverse completely to their long-term average. It is difficult to pinpoint equilibrium margins over long periods of time due to changes in sector mix, corporate finance rules and company capital structures. Taking those changes into account, we think equilibrium margins over the LTCMA horizon will be somewhere around the pre-COVID-19 peak of 9.5% rather than the 7.5% level that would be the unadjusted 25-year average.

The prevalence of capital-light balance sheets, the pricing power of branded corporates and a management focus on profitability all suggest the potential for higher equilibrium margins. When we project that margins will revert to their pre-pandemic levels, we tacitly acknowledge that the capital share of the economy is unlikely to expand further. Equally, in choosing not to anchor our forecast on the 25-year average, we recognize that labor is unlikely to enjoy a resurgence in pricing power.

Despite the margin headwind, our equity forecasts shift meaningfully higher this year: developed market (DM) forecasts up 360bps, to 8.40% (in USD), and emerging market (EM) forecasts up 320bps, to 10.10% (in USD).[8] The slight narrowing of the wedge between DM and EM returns reflects greater margin resilience in markets such as the U.S. and Europe, where our local currency forecasts are up 380bps, to 7.90%, for U.S. stocks and up 260bps, to 8.40%, for eurozone stocks. While UK and Japan also see improvement, it is a little less pronounced given the unfavorable sector mix of the UK index, and the relative outperformance of both UK and Japanese equities in 2022 (**Exhibit 8**).

Our LTCMA equity forecasts move significantly higher this year

Exhibit 8: LTCMA forecasts, 2023 vs. 2022, USD terms



Source: J.P. Morgan Asset Management; data as of September 30, 2022. Please note that we changed our forecasting methodology for MSCI China this year, now treating the market as an asset whose local currency is CNY. The change in our emerging market equity returns reflects this change.

Alternatives – solid returns, renewed appeal

Even as return forecasts for public markets roared back this year, alternatives still offer benefits that cannot be easily found elsewhere. Over the last few years, alternative assets provided relative safety – for those willing to forgo liquidity, a welcome source of income and strong return uplift. Those attractive qualities endure.

Real assets showed their worth this year, with valuations broadly holding up even as stock markets slumped. Income from real estate and infrastructure remained roughly stable while bond yields caught up to their level. Private equity, meanwhile, continues to have a significant cushion of dry powder. This may mitigate the risk of asset markdowns, which some investors fear may dent private equity returns in the short run. Nevertheless, we have included an explicit adjustment for the impact of potential markdowns over the next year or two in our return forecast for private equity.

Higher public market return forecasts have pushed up our expectations for financial alts. Cap-weighted private equity returns increase 180bps, to 9.90%; hedge fund returns are up between 110bps and 220bps, depending on strategy; and direct lending jumps 90bps, to 7.80%. In all financial alternatives categories, we continue to see improving alpha trends that are likely to benefit further as dry powder meets the capex demand that we anticipate picking up in the 2020s.

[8] Due to a change in assumptions adopted this year, we now treat MSCI China as an asset whose local currency is CNY. As a result, MSCI China and MSCI Emerging Markets data from 2022 may not be directly comparable to 2023.

While our numbers include an adjustment for potential writedowns that may be crystalized in the next year, generally the private equity industry seems well insulated with sufficient capital to manage such issues. Given that sharp moves in public markets may act on private asset markets only with a lag, in our view a small adjustment for markdown risk in the short run is prudent.

Real estate valuations and cash flows hold steady despite the turmoil in public markets in 2022. However, the higher interest rate environment pushes our forecasts down at the margin: Core U.S. real estate declines 10bps, to 5.70%. Global core infrastructure rises 20bps, to 6.30% and global core transportation increases 10bps, to 7.50%. Those gains reflect the ongoing attractiveness of global real assets as a theme.

Our commodity return forecasts are up 50bps, to 3.10%. The commodity supercycle is not yet over, despite some weakness in metals prices this year, even as energy prices surged. Finally, we add timber to our coverage universe this year; we expect demand for these assets to grow sharply as investors value their positive ESG[9] bias, as well as the attractive forecast returns of 6.70% for global timber.

Across all alternative sectors and strategies, future performance may exhibit wider dispersion of returns

Exhibit 9: Selected alternative strategies – return assumptions (levered,* net of fees, %) in local currency

Financial alternatives	2023	2022
Private equity (USD)**		
Cap-weighted composite	9.90	8.10
Private equity - small cap	9.50	7.40
Private equity - mid cap	9.40	7.60
Private equity - large/mega cap	10.20	8.40
Private debt (USD)		
Direct lending	7.80	6.90
Venture capital (USD)		
Venture capital	8.50	n/a
Hedge funds (USD)		
Equity long bias	5.00	3.30
Event-driven	5.40	3.20
Relative value	4.90	3.80
Macro	4.10	2.70
Diversified†	5.00	3.60
Conservative††	3.70	3.30

Real assets	2023	2022
Real estate - direct (local currency)		
U.S. core	5.70	5.80
U.S. value-added	7.70	7.70
European core	4.70	4.80
European value-added	6.70	6.80
Asia-Pacific core	6.10	6.50
REITs (local currency)		
U.S. REITs	6.80	5.70
European REITs	6.10	5.10
Asia-Pacific REITs	5.10	5.00
Global REITs‡	6.40	5.40
Global infrastructure (USD)		
Core	6.30	6.10
Global transport (USD)		
Core	7.50	7.40
Global timber (USD)		
Global timber	6.70	n/a
Commodities (USD)		
Commodities	3.10	2.60
Gold	3.50	3.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2021, and September 30, 2022.

* All return assumptions incorporate leverage, except for commodities, where it does not apply.

** The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

† The Diversified assumption represents the projected return for multi-strategy hedge funds.

†† The Conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage. The 2023 Conservative assumption uses a 0.70 beta to Diversified.

‡ The global composite is built assuming the following weights: roughly 65% U.S., 15% Europe and 20% Asia-Pacific.

[9] ESG: environmental, social and governance.

Portfolio design – more choice, more opportunity

Overall, the return outlook in this year's LTCMAs stands in stark contrast to last year's. It has taken a meaningful reset in asset markets to bring us to this place, and considerable pain for bondholders over a much shorter horizon than we had expected. Still, the underlying patterns of economic growth look stable, and the assumptions that underpin asset returns – cycle-neutral real cash rates, curve shape, default and recovery rates, and margin expectations – are also little altered. But the market drawdown in 2022 is now creating an increasingly attractive entry point for long-term investors.

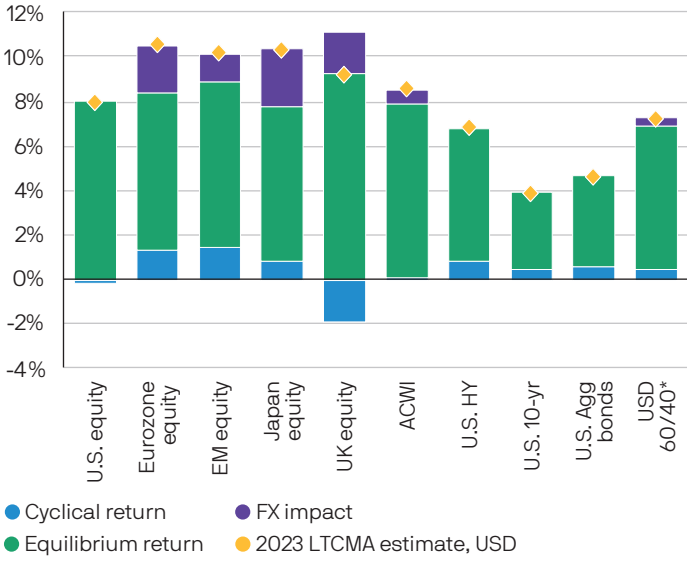
For many years, cyclical headwinds led to a large gap between secular returns[10] and our return forecasts. But these headwinds have mostly cleared (**Exhibit 10**). Many of our asset return forecasts are now at, or even a little above, fair equilibrium levels. This should in turn reassure long-term investors that the current market turmoil will be time limited.

Some of the distortions that were apparent both in return uplift (premia) across asset classes and when comparing returns and Sharpe ratios have either disappeared or greatly diminished (**Exhibits 11A** and **11B**). That is clearly a positive development.

While there are both topside and downside risks to our outlook, we acknowledge two specific caveats to any optimism. First, entry points do matter, even for long-term investors. And second, correlation patterns have been unhelpful to balanced investors in 2022.

This year, our return forecasts are now at, or even a little above, our estimates of secular returns

Exhibit 10: Secular and cyclical return drivers for key assets in USD



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Over the past year, distortions in return uplift (premia) have diminished and Sharpe ratios have improved for many assets

Exhibit 11A: Return uplift (premia)

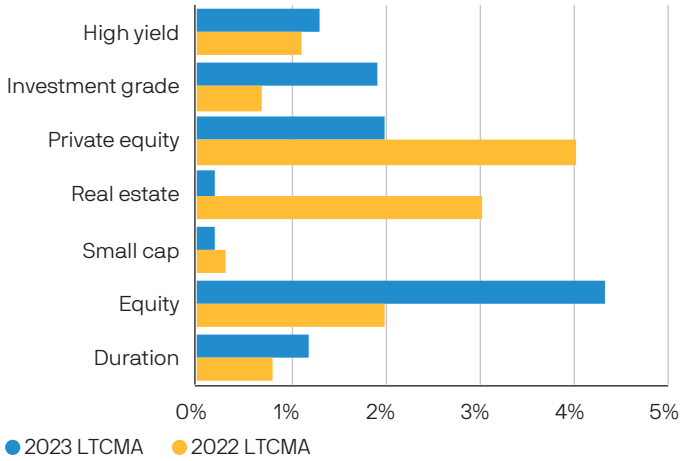
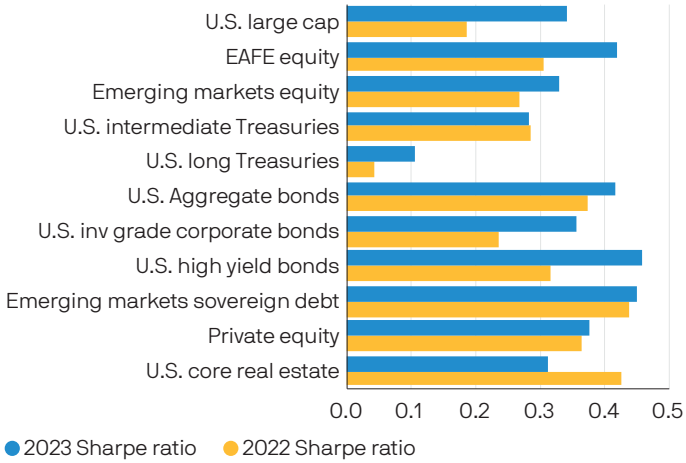


Exhibit 11B: Sharpe ratios



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

[10] Valuations, margins and prevailing yields are the more cyclical elements of our return calculations; other components (trend growth, productivity, dividend yields, equilibrium credit spreads, etc.) are more secular in nature and tend to evolve only slowly.

While entry points are much more attractive than they were a year ago, they could get even more attractive if the cyclical weakness of 2022 extends into 2023, as seems plausible. Investors thus need to consider the timing and approach of their entry point, with an eye to how much drawdown they can tolerate in the short term. With policy rates likely to rise further over the next year, investors will also be penalized less for opportunistically holding some cash in the short term in order to take advantage of any further dislocations in asset markets.

Whatever the precise timing and approach of investor entry points, it seems evident that clearing the return hurdles common in the investing industry, such as the 7% return hurdle for U.S. public plans that we discussed in our paper "How investors can reach their 7% return target," is now eminently achievable.[11]

We explore the second caveat, related to correlation patterns, in our Portfolio Implications chapter. This year, stocks and bonds moved together as inflation fears dominated, reducing the diversification benefit of bonds. Based on our assumption that the inflation genie will (eventually) return to its bottle, we believe a negative stock-bond correlation will reassert itself. Still, this year has showed that alternative assets are powerful diversifiers at times when the traditional economic model is under strain, and with it the usual relationship between stock and bond returns.

Few portfolios these days are simply stocks and bonds, and as our opportunity set grows – often to incorporate assets with "fat tails," or non-normal return distribution – our traditional allocation frameworks must also evolve. Simply put, 2022 reminds us that asset correlations can move around and diversification can't be taken for granted.

Ultimately, the main message from this year's LTCMAs is that long-term asset return forecasts for portfolios of all kinds are better today than they have been in a decade (**Exhibits 12A** and **12B**). But this has taken a rapid and forced reversal of long-standing dislocations in policy, and an accompanying bond market rout.

While the high inflation that finally stirred policymakers into action is likely to moderate, the underlying drivers of higher prices – scarcity of important goods and commodities, tightness in labor markets and heightened geopolitical tension – will remain risks for investors for the rest of the decade. Addressing these issues is likely to require substantial investment, meaning we may be about to see a capex boom just as central banks are raising rates and capital is becoming scarcer (**Exhibit 13**).

For investors, this all translates to a better environment to derive returns both from market beta and from active alpha. For investors with capital to deploy, a wide range of assets offer appealing potential returns. For those still cautious, bonds can once again provide both income and a safe haven. Meanwhile, those rotating existing portfolios are no longer confined to less liquid assets to boost returns, and balanced portfolios can compound returns at a much better pace.

Stock-bond frontiers are significantly higher than last year, with much improved returns for both bonds and equities. Alternative assets continue to offer the potential for alpha, inflation protection, and diversification

Exhibit 12A: USD stock-bond frontiers and 60/40 portfolios based on 2023 vs. 2022 LTCMAs for risk and return (%)

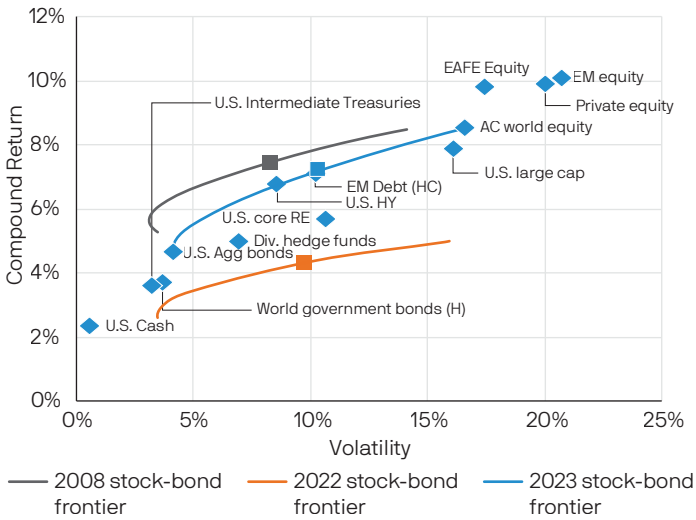
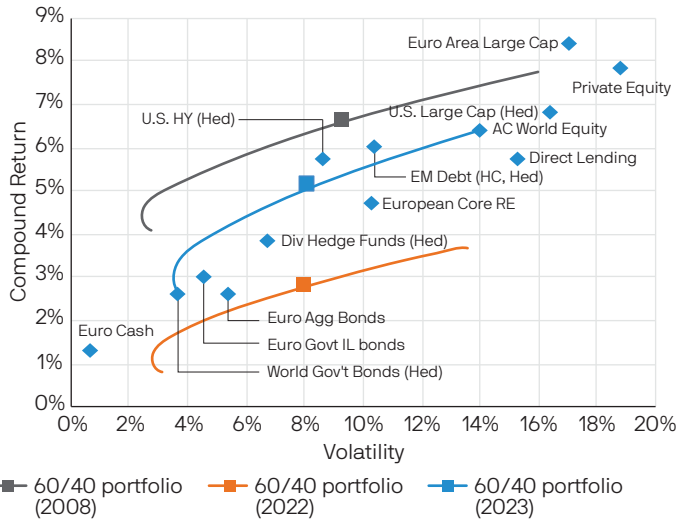


Exhibit 12B: EUR stock-bond frontiers and 60/40 portfolios based on 2023 vs. 2022 LTCMAs for risk and return (%)



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

[11] John Bilton, Jared Gross et al., "How investors can reach their 7% return target," J.P. Morgan Asset Management, July 2021.

Over our 10- to 15-year horizon, we look through some of the cyclical risks and instead home in on risks that might alter trend growth or inflation, or leave a lasting imprint on long-term asset returns

Exhibit 13: Our core case sees positive returns and stable equilibrium growth but more two-sided risks to inflation

Risk	Upside or downside?	Description	Macro or asset class implications
Worsening climate or environmental situation	Downside	More frequent or more extreme weather events leading to destruction of productive assets and disruptions to food and basic materials supply	Near-term economic downside from disruptions to supply side; forced migration may lead to international tensions in extreme cases. Positive for bonds, commodities (ex-energy), real assets, negative for stocks, credit
Russia-Ukraine war spills over into other conflicts	Downside	The current war spills over into neighboring countries, pulling in NATO, or ignites tension in other regions; may also include meaningful uplift in cyberconflict that threatens infrastructure	Elevated geopolitical tension a feature in our near-term analysis; may well have lasting trade implications; positive for USD and supportive for commodities; adds to volatility in many asset classes
Further weaponization of fuel and food	Downside	Gas supply disruption and interruption to trade in grain from Ukraine have created impetus for governments to invest heavily to reinforce supply chains; this investment may not lead to growth in productive assets	Initially inflationary and adds to volatility of inflation over longer term, as future conflicts or disputes may also cause bursts of headline inflation; may create a short-term windfall for recipients of capex dollars
Accelerated adoption of technology	Upside	Communication and automation technologies proven over the pandemic become more ubiquitous, generating an uplift in productivity	Positive for real GDP and limits inflation; supportive for stocks, credit and other risk assets; mitigates some right-tail inflation risks from bond markets
Stronger than expected investment and capex cycle	Upside	Surge in fiscal spending and upswing in capex that followed pandemic lead to building of productive capacity and upskilling in labor	Positive for real GDP and limits inflation; supportive for stocks, credit and other risk assets; mitigates some right-tail inflation risks from bond markets; may favor developed over emerging markets
Rapid abandonment of USD as key reserve currency	Downside	Challenger to USD (from either crypto or from an alternative fiat currency) emerges and pulls reserve assets away from USD; diminishes demand for U.S. assets and refocuses attention on U.S. deficit	Negative for growth, USD, bonds, credit and stocks; positive for real assets and commodities
Secondary pandemics or emergence of vaccine-resistant strains	Downside	Vaccine-resistant strain of recent pandemic or entirely new pathogen emerges, necessitating rolling lockdowns and creating disruption to supply chains globally	Negative for growth but may lead to further stimulus, leading to cyclical volatility and risking further expansion of deficits; positive for bonds in short run but risks of financial repression in longer term; increases volatility in equities and credit; generally positive at margin for real assets and commodities relative to financial assets
Inflation expectations become embedded, forcing persistently tight policy	Downside	Central banks overshoot reasonable levels of financial conditions due to embedded consumer inflation expectations; growth is stifled and investment discouraged due to high interest rates and uncertainty over prices	Bond investors suffer from jump in yields, while equity multiples contract further; growth equities under pressure and margins hit across the board. Better-performers likely to be real assets and infrastructure; consumer wealth degraded due to inflation, potentially leading to more extreme political decisions
Liquidity crisis within nonbank financial system	Downside	Contagion risks grow in some parts of the financial system without direct last resort, meaning that despite open market or liquidity stabilization, price action becomes disorderly	Fire sale of assets to meet margin calls may precipitate sharp fall in credit supply, not initially noted due to limited refinancing wall; however, over longer run, levered companies and sectors come under significant pressure
Fiscal dominance diminishes impact of monetary policy	Upside and downside	Economic stress for households or key industries prompts excessive or pro-cyclical fiscal support measures	Confidence and, in turn, growth supported in near term but may extend inflationary risks. If done prudently, may be supportive for risk assets in shorter term, but may mean tighter monetary policy for longer to counteract any lingering inflation impact – with knock on negative impact for longer term asset returns. Done recklessly or without proper funding risks increasing market volatility

Source: J.P. Morgan Asset Management; data as of October 2022.

Macroeconomic assumptions

Inching forward: Lingering inflation, moderate growth

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In brief

- The pandemic and its aftershocks have not changed our long-term growth outlook by as much as seemed possible during the past two years.
- Demographics continue to constrain growth prospects, especially in developed markets and many emerging Asian economies.
- Our growth projections have not changed significantly from last year, although we have trimmed forecasts in several economies to take account of elevated starting positions.
- We remain optimistic about long-term prospects for productivity growth, although our assumptions in this area have not changed from last year.
- The major question hanging over the outlook is whether the world has moved into a high inflation regime.
- While many economies are overheating today and inflation expectations have moved up, we think many secular forces that have depressed inflation in recent decades remain in place.
- Additionally, we think most central banks will pursue their price stability goals assiduously over the medium term.
- As a result, our inflation forecasts have moved up modestly but not dramatically.

Growth outlook

What will be the long-term macroeconomic consequences of the pandemic and its aftermath?

At this point, we can say very little for sure. Already, though, many early predictions, such as large-scale migration away from cities, seem not to be panning out. In last year's publication, we posited that expansionary fiscal policies could become a persistent feature of the macro environment. While that might prove correct in some cases, the U.S. fiscal stance has turned notably tight during 2022. The prospect of deglobalization has also loomed, but without yet finding much support in the data.

All told, we do not think the long-term outlook for real growth has changed significantly in the past couple of years (**Exhibit 1**). In our view, the main moving parts that determine long-term growth – demographics and technological change – will not feel much impact from the pandemic era. Our forecasts expect a smaller contribution to growth from the labor force (including the improvement, over time, in human capital) than occurred in the past, but a slightly greater push from technology. Total factor productivity (TFP) – the part of our growth-accounting framework that we think captures technological change – disappointed in the period following the global financial crisis, but we expect somewhat better performance from here. Indeed, the pandemic appears to have catalyzed technology adoption in many parts of the economy. Perhaps this will be one of its genuine and lasting legacies.

We see much greater uncertainty about the inflation environment. Nearly every country in our sample is currently experiencing its highest inflation rate in decades. Have we moved back into a 1970s-style high inflation atmosphere? In answering that question, we find it helpful to ask two more.

First, has the global economy become more inherently inflationary? We acknowledge that inflation expectations have moved sharply higher, a development likely to reverberate for some years. But we are skeptical about broader structural changes and attribute much of today's high inflation to economic overheating. We think many of the secular forces that pushed inflation down during the prior three decades remain in place. Still, we see competing forces that create two-way risks to inflation, and as a result we have increased our estimate of inflation volatility this year.

Second, what preferences will societies and governments display? Over the long run, inflation is partly a policy choice. Our reading of current conditions suggests that citizens and governments prefer low inflation, and we expect central banks to work toward restoring broad price stability over the next few years.

GDP growth: Mostly stable, with current overheating pressure

We are modestly trimming our GDP growth projections for several developed market (DM) economies this year, partly reflecting elevated starting points. Our views about the underlying drivers of growth – labor forces, capital stocks and TFP – have not changed significantly. Weak demographics – slower-growing and aging populations – continue, in our view, to represent the main constraint on long-term growth prospects in most DM and many emerging market (EM) economies.

Last year, we raised our expectation for total factor productivity growth, a concept that over the long run we think owes heavily to technological change. Incoming information over the past year has broadly corroborated that upgrade but does not, in our view, justify any further increment. The most striking development since last year has been the overheating pressure evident in many DM economies, with high inflation stemming in part from tight labor markets. We think unemployment rates in the U.S. and the UK, and possibly the euro area, stand below levels likely to be achieved, on average, during the next 15 years. As a result, our long-run forecasts for these economies now include a small cyclical penalty.

The early stages of the coronavirus pandemic left enormous footprints in job markets and led to widespread speculation about ongoing structural change in work relationships. There was much talk of the so-called Great Resignation in the U.S. Two years into the pandemic era, though, we see only limited signs of permanent change. Labor force participation rates have recovered across most age and gender cohorts, if not fully, and with still-notable shortfalls among the age 55–65 group, where early retirements were common in 2020. Migration has restarted in many countries. And a spell of early retirements has given way to labor force reentry.

In forecasting growth, we therefore put more stress on the long-run growth rates of the prime-age and senior populations, generally assuming broadly stable participation from the former and a gradual uptrend in employment rates among older people. We see rising senior participation as a well-established secular trend, one fueled primarily by better health outcomes.

In the U.S., we expect employment to average 0.2% growth over the coming 10–15 years, held back partly by less immigration than in recent decades. Labor forces will likely shrink in Japan and the euro area, given their slower population growth and older age distribution. Sweden, Canada and particularly Australia, with their younger populations, should enjoy more growth support from demographics.

The slightly more favorable demographic outlook in emerging market countries in aggregate conceals significant differences. Excepting India, the major EM Asian countries are experiencing slow overall population growth and outright declines among prime-age people. In the past, we applied a bonus to the China labor force projection to take account of urbanization, which shifts people from subsistence farming and similar activities into the modern economy. That process continues but now looks fairly well advanced. As a result, our labor force forecast for China edges lower this year. It remains positive, though, at 0.5%, in contrast with Korea (0.0%) and Taiwan (-0.4%). Population and labor force growth in Latin America, emerging Europe and Africa, along with India, is expected to run significantly faster.

Our 2023 assumptions anticipate mostly stable real GDP growth and higher – but not dramatically higher – inflation

Exhibit 1: 2023 Long-Term Capital Market Macroeconomic Assumptions (%, annual average)

	Real GDP			Inflation		
	2023	2022	Change	2023	2022	Change
Developed markets	**1.4**	**1.5**	**-0.1**	**2.1**	**1.8**	**0.3**
United States	1.6	1.7	-0.1	2.6	2.3	0.3
Euro area	1.1	1.2	-0.1	1.8	1.5	0.3
Japan	0.7	0.7	0.0	0.9	0.7	0.2
United Kingdom	1.3	1.4	-0.1	2.4	2.2	0.2
Australia	2.1	2.2	-0.1	2.4	2.2	0.2
Canada	1.6	1.6	0.0	2.3	1.9	0.4
Sweden	1.8	1.8	0.0	2.1	1.9	0.2
Switzerland	1.4	1.4	0.0	1.0	0.6	0.4
Emerging markets	**3.5**	**3.7**	**-0.2**	**3.4**	**3.3**	**0.1**
China	4.0	4.2	-0.2	2.2	2.5	-0.3
India	5.7	6.0	-0.3	4.5	4.5	0.0
Russia	0.4	0.8	-0.4	8.0	5.0	3.0
Brazil	2.0	2.0	0.0	4.6	4.3	0.3
Korea	2.0	2.0	0.0	2.0	2.0	0.0
Taiwan	1.7	1.7	0.0	1.3	1.1	0.2
Mexico	2.0	2.2	-0.2	3.9	3.7	0.2
South Africa	2.1	2.2	-0.1	5.5	5.3	0.2
Turkey	3.1	3.1	0.0	16.0	12.0	4.0
Global	**2.2**	**2.2**	**0.0**	**2.6**	**2.4**	**0.2**

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022. Previous year's real GDP forecasts shown include cyclical bonuses. Given depressed post-shock starting points, in last year's edition we added cyclical bonuses to our 2021 trend growth projections. This year, our 2023 forecasting returns to trend rates alone. In comparing 2022 with 2023 trend rates here, we do not use last year's rate-plus-cyclical-bonus figure but only the trend rate.

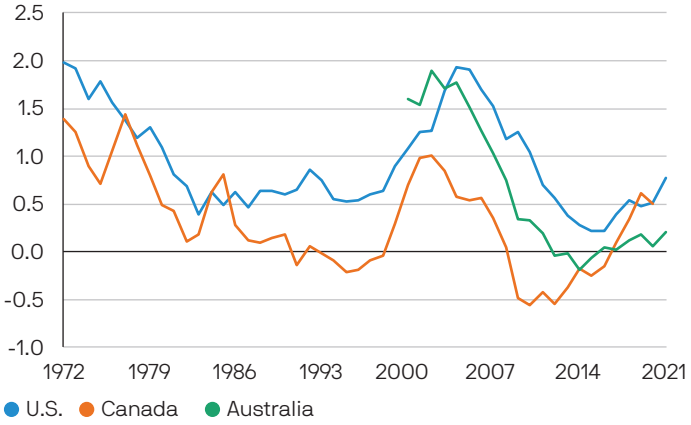
Further progress in total factor productivity

Over the long haul, annual TFP growth has averaged 0.5%–0.6% across DM economies. Like we did last year, we take a slightly more optimistic forward-looking view, forecasting 0.8% for the U.S. and 0.7% for the DM aggregate. TFP growth showed signs of shifting higher late in the previous expansion. In addition, the pandemic appears to have catalyzed widespread technology adoption and changes in business work practices that take advantage of the past few decades' innovations (**Exhibit 2**). Capex spending has moved toward generating intellectual property, historically linked with faster TFP growth. At the same time, the rapid overheating of major economies at the early stage of an expansion suggests that a 1990s-style TFP boom is not yet materializing, making additional upgrades unnecessary at this stage.

The pandemic looks to have catalyzed widespread technology adoption

Exhibit 2: Total factor productivity trends

% y/y, 10-year average



Source: Haver Analytics, J.P. Morgan Asset Management; data as of 2021.

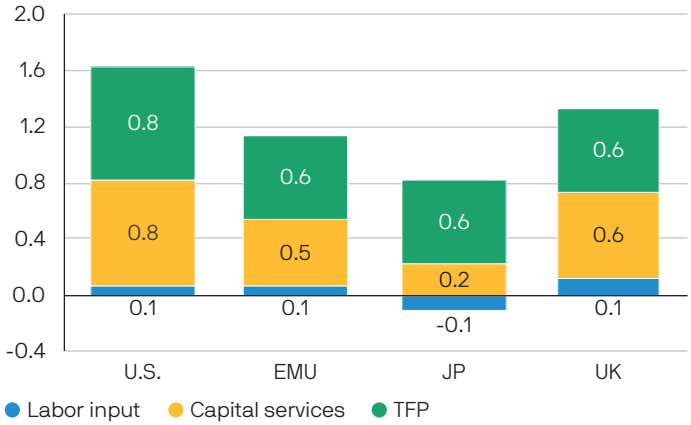
As with demographics, TFP assumptions vary widely among EM economies. India – the lowest income country in our sample – leads the way, in part reflecting the large distance between itself and the global technology frontier, and the resulting room for catch-up. We project Korea and Taiwan to run TFP growth rates similar to DM economies'. In many other EM economies, though, we forecast more sluggish TFP growth. Inbound technology transfer seems likely to prove a challenge for China in coming years, and Latin American economies have struggled with technology adoption.

Our U.S. growth forecast edges down 0.1 percentage point (ppt), to 1.6% (**Exhibit 3**). While our trend forecast has not changed, we are applying a small cyclical penalty this year to take account of the economy's present state. We cannot say with any certainty where the "neutral rate" of unemployment is, but today's 3.6% joblessness rate is very low by historical standards. We estimate that growth of 0.1% below potential, on average, would be required to bring it back to longer-term norms.

While our trend forecast has not changed, this year we apply a small cyclical penalty

Exhibit 3: Contribution to long-term GDP growth

ppt, annual average



Source: J.P. Morgan Asset Management; data and forecasts as of September 2022.

Similar logic applies to our growth forecasts for the euro area and the UK, where we also trim our projections by 0.1ppt, to 1.1% and 1.3%, respectively. Other DM economies appear to be overheating by less. We leave our other forecasts unchanged, except for Australia, where a modest reduction in the capital stock assumption brings the overall growth figure down by 0.1ppt, to 2.1%. Even with that cut, Australia is still the DM growth standout.

In EM economies, aside from India and China, most of our forecasts have not changed significantly. Our China forecast moves down 0.2ppt, to 4.0%. A revised historical growth decomposition has caused us to lower our sights on TFP growth, which, together with the urbanization story, accounts for the reduction. China has maintained solid growth performance after moving into middle income territory – in contrast to many other formerly emerging economies that rose to middle income status – so the economy's room for further catch-up has continued to narrow.

We also revise our India growth forecast down, for the second straight year. While its growth projection remains the highest among our sample, India's realized performance has deteriorated in recent years. Earlier enthusiasm for the country's prospects has dimmed somewhat as the structural reform process has slowed.

Most of our other EM growth forecasts do not change this year, although we shave 0.2ppt from Mexico's and 0.1ppt from South Africa's projection. Both face challenging policy environments that seem likely to inhibit productivity growth, and South Africa's investment rate has slowed significantly.

Inflation outlook

Higher inflation, but not the 1970s

Our inflation projections start with the recognition that the world's central banks generally regard achieving steady, low inflation as one of their most important goals. Moreover, we assume that, in theory, they should be able to influence aggregate demand enough to achieve this goal in the long run. Thus, any long-term inflation forecast begins with the central banks' inflation targets.

However, a central bank resolving to achieve an inflation target is a little like agreeing with your doctor on a personal weight goal for the year ahead. In theory, achieving this target is within your control. Yet certain forces, including your own determination, may conspire to make you overshoot or undershoot that goal. Moreover, if you begin some distance from that target, it will take time to get there. Meanwhile, your actual average weight will fluctuate and may further deviate from that long-run goal.

In our inflation projections, we first outline the central banks' targets and then consider the long-term forces that could impact the ability of central banks to achieve these targets. Finally, for each country and region, we look at how a transition path, taking inflation from current rates to a presumed long-run trend, would impact actual realized inflation over the next 10–15 years.

Central bank targets: Some DM-EM divergence

Exhibit 4 outlines the long-run inflation goals for the major DM and EM central banks.

The Federal Reserve (Fed) has a symmetrical target of 2% for long-run inflation. We note, however, this is inflation measured by the personal consumption deflator. Based on the gap between inflation as measured by CPI and by the personal consumption deflator over the past 20 years, this implies a target of roughly 2.3% inflation measured by CPI, the index our Long-Term Capital Market Assumptions use.

Among other DM central banks, the European Central Bank (ECB), the UK, Canada and Sweden have symmetrical goals of 2% inflation, while the Swiss National Bank (SNB) aims for inflation close to or below 2%. By contrast, Japan aims for inflation of at least 2% and Australia targets inflation of between 2% and 3%.

Inflation goals in emerging markets are generally higher. In particular, the central banks of India, Brazil and South Africa all currently have inflation targets of over 3%; Mexico has a symmetrical 3% target. China does not publish a long-term inflation target but is estimating 3% for 2022. Taiwan also does not publish a long-term inflation target, while the Bank of Korea (BoK) has a 2% target, more in line with DM central banks.

Any long-term inflation forecast begins with central banks' inflation targets

Exhibit 4: Central bank inflation targets

Central bank (CB)	CB inflation target	Current policy	Source
U.S. (Federal Reserve)	Headline PCE	Average inflation targeting: Will allow for inflation to overshoot 2% for a period of time to make up for periods when inflation undershoots 2%	Federal Reserve, "Statement on Longer-Run Goals and Monetary Policy Strategy," January 2022
Eurozone (European Central Bank)	Harmonised Index of Consumer Prices (HICP)	Targets inflation of 2% over the medium term	European Central Bank, "Our Monetary Policy Statement at a Glance," July 2022
UK (Bank of England)	Headline CPI	Seeks significant progress toward achieving inflation at 2% sustainably	Bank of England, "Monetary Policy Summary," May 2022
Japan (Bank of Japan)	Core CPI (ex-food)	Inflation-overshooting commitment: Continue to expand the monetary base until the year-on-year rate of increase in the observed CPI (all items less fresh food) exceeds 2% and stays above the target in a stable manner	Bank of Japan, "Price Stability Target of 2 Percent and Quantitative and Qualitative Monetary Easing with Yield Curve Control"
Canada (Bank of Canada)	Headline CPI	Aims to keep inflation at the 2% midpoint, as measured by the 12-month rate of change in CPI, of a target range of 1% to 3%	Bank of Canada, "Monetary Policy Framework Renewal," December 2021
Australia (Reserve Bank of Australia)	Headline CPI	Aims to achieve a medium-term average rate of inflation within 2%–3%	Reserve Bank of Australia, "Statement on the Conduct of Monetary Policy," August 14, 1996
Switzerland (Swiss National Bank)	Headline CPI	Aims to achieve positive rates of inflation below 2%	Swiss National Bank, "Monetary Policy Strategy"
Sweden (Riksbank)	CPIF	Aims to achieve 2% inflation, with a tolerance range of 1%–3%	Riksbank monetary policy
China (People's Bank of China)	CPI	Has set its inflation target at around 3% for 2022. The PBoC does not publish a long-term inflation target	2022 Government Work Report of the Chinese State Council
India (Reserve Bank of India)	CPI	Targets inflation of 4% for the next five years, with an upper tolerance limit of 6% and a lower tolerance limit of 2%	Reserve Bank of India monetary policy
Brazil (Central Bank of Brazil)	CPI	Targets inflation of 3.5% over the next year and 3.25% over the next three-year period, with a 1.5% tolerance margin on either side	Central bank inflation report, June 2022
Mexico (Bank of Mexico)	CPI	Targets inflation of 3%, with a 1ppt tolerance range above and below that level	Bank of Mexico quarterly report, 1Q 2022
Korea (Bank of Korea)	CPI	Targets inflation at 2% over the medium term. Prior to 2016, the BoK published inflation target ranges with either implicit or explicit inflation targets	Bank of Korea monetary policy report, June 2022
Taiwan (Central Bank of the Republic of China)	CPI	Does not target inflation	Central Bank of the Republic of China monetary policy
South Africa (South African Reserve Bank)	CPI	Targets inflation of 3%–6% but does not target an average inflation rate. Since 2017, the MPC has emphasized that it would like to see inflation close to the 4.5% midpoint of the target range	South African Reserve Bank, "Statement of the Monetary Policy Committee," March 2022

Source: J.P. Morgan Asset Management; data and forecasts as of September 2022.

Economic forces impacting the Fed's ability to hit its inflation target

The surge in inflation around the world as the pandemic has faded serves as a reminder that central banks face several challenges impacting their ability to achieve inflation targets. **Exhibit 5** summarizes some of the forces that are likely to add to or subtract from inflationary pressures over the next 10–15 years.

Strong forces and counterforces will push inflation up and down over the next decade

Exhibit 5: Long-term inflation influences

Economic forces	Last global expansion (2008–19)	Next 10–15 years
Income distribution	–	+
Globalization process	–	+
ESG	0	+
Inflation expectations	–	+
Targeting unemployment below NAIRU	0	+
Fiscal policy	–	–
Online markets & information availability	––	–
Energy costs	+	0
Union membership	–	–
Technology adoption	–	–

Source: J.P. Morgan Asset Management; data and forecasts as of September 2022.

- **Income distribution** – A more unequal income distribution has tended to suppress inflation in recent decades, as the richest households divert their income toward the purchase of assets and away from goods and services. However, tight labor markets at the start of this forecast period, combined with a rise in political populism, could leave more money in the pockets of poor and middle income households going forward. That would boost both demand and inflation.
- **Globalization process** – As we conclude in "Globalization will evolve – but not unravel," in our 2023 Long-Term Capital Market Assumptions, on balance we expect less build-out of globalization over the next 10–15 years, with some risk of partial deglobalization. In recent decades, globalization has generally been a disinflationary force due to declining tariff levels; lower costs achieved by tapping cheaper labor markets around the world; and the indirect effect of global competition, which has forced domestic firms to be more efficient. Conversely, any retreat from globalization in the years ahead could intensify inflation pressures, especially for goods.
- **ESG** – A growing global focus on sustainability could also add to inflation going forward, at least in the short run. The cheapest methods of producing, distributing and consuming food, energy and other commodities are generally not friendly to the planet. To the extent that governments try to push against these practices, inflationary pressures could be higher. However, in the very long run, sustainability should have disinflationary effects, as it counteracts practices that are contributing to drought, soil erosion, deforestation and global warming.
- **Inflation expectations** – At least in the early years of our 10- to 15-year horizon, elevated inflation expectations could add to actual inflation. As economists frequently note, expectations play a key role in setting prices. The high inflation seen around the world as the impact of the pandemic has eased is encouraging workers to demand higher wages and companies to raise their prices. This effect could fade out entirely in the aftermath of a recession. For now, it is pushing inflation higher.
- **Central banks targeting a too-low nonaccelerating inflation rate of unemployment (NAIRU)** – Most central banks assume a dual responsibility to control inflation and help facilitate full employment. However, both central bankers themselves and politicians may try to achieve or sustain a lower unemployment rate than is theoretically compatible with stable inflation. This risk has grown because of both the sheer uncertainty of economic relationships in the aftermath of the pandemic and questions concerning the ability of central bankers to make decisions independently, particularly when facing populist political leaders.
- **Fiscal drag** – After the extreme fiscal stimulus of the pandemic years, most economies face some fiscal drag going forward. In the U.S., the decline is dramatic, with the deficit falling from USD 2.4 trillion in fiscal 2021 to USD 1.4 trillion in fiscal 2022 – the biggest deficit decline as a percent of GDP since the demobilization following World War II. This is likely to continue for years as governments, saddled with heightened levels of debt and higher interest costs, cut budgets to ensure fiscal stability.

- **Online markets and information availability** – One of the most potent forces depressing inflation in recent decades has been the ability to buy an increasing variety of goods and services online. This lets buyers see different prices for the same product and switch between sellers with very little effort. We see this phenomenon as one aspect of the technology adoption story mentioned earlier, which might both boost real growth and restrain inflation.
- **Energy prices** – At the start of our forecast horizon, global energy prices were at very elevated levels. Oil was running close to USD 90 per barrel for Brent crude; natural gas prices were at very high levels, especially in Europe; and refinery margins were much wider than usual. However, while this was a large part of the inflation story in 2022, we expect these prices to elicit both demand destruction and increased supplies in the years ahead. Consequently, energy prices could, on average, drift sideways over the forecast horizon.
- **Union membership** – Trade union membership has generally declined in recent decades, and we expect this trend to continue, providing some further downward impetus to inflation.

It is nearly impossible to estimate precisely the impacts on inflation of most of these forces over the next 10 to 15 years. On balance, we believe that, for most countries, they will tend to cause inflation to slightly overshoot central bank targets.

One factor that will clearly be different across countries is the impact of changes in exchange rates. Our FX assumptions outline what changes we expect across countries (**Exhibit 6**, which also includes the observed import share of GDP).

As a very rough estimate of the inflation impact of changing exchange rates, we multiply each country's import share of GDP in 2020 by the expected annual change in its currency. By this measure, a rising euro over the forecast period will result in a drag on eurozone inflation while a falling dollar will add something to U.S. inflation.

Our forecast expects a falling dollar – all else equal – will push U.S. inflation higher

Exhibit 6: Exchange rate impacts on inflation

Economic forces	Import share of GDP (2020)	Expected annual change in trade-weighted exchange rate	Crude annual impact on inflation of change in exchange rate
U.S. dollar	13.2	-1.0	0.13
Euro	17.0	1.3	-0.22
British pound	28.0	0.9	-0.25
Japanese yen	15.5	1.7	-0.26
Canadian dollar	31.4	0.5	-0.16
Australian dollar	20.1	0.2	-0.04
Swiss franc	53.5	1.6	-0.86
Swedish krona	40.0	1.4	-0.56
Chinese yuan	16.0	1.6	-0.26
Brazilian real	15.5	-0.7	0.11
Mexican peso	38.0	-1.9	0.72

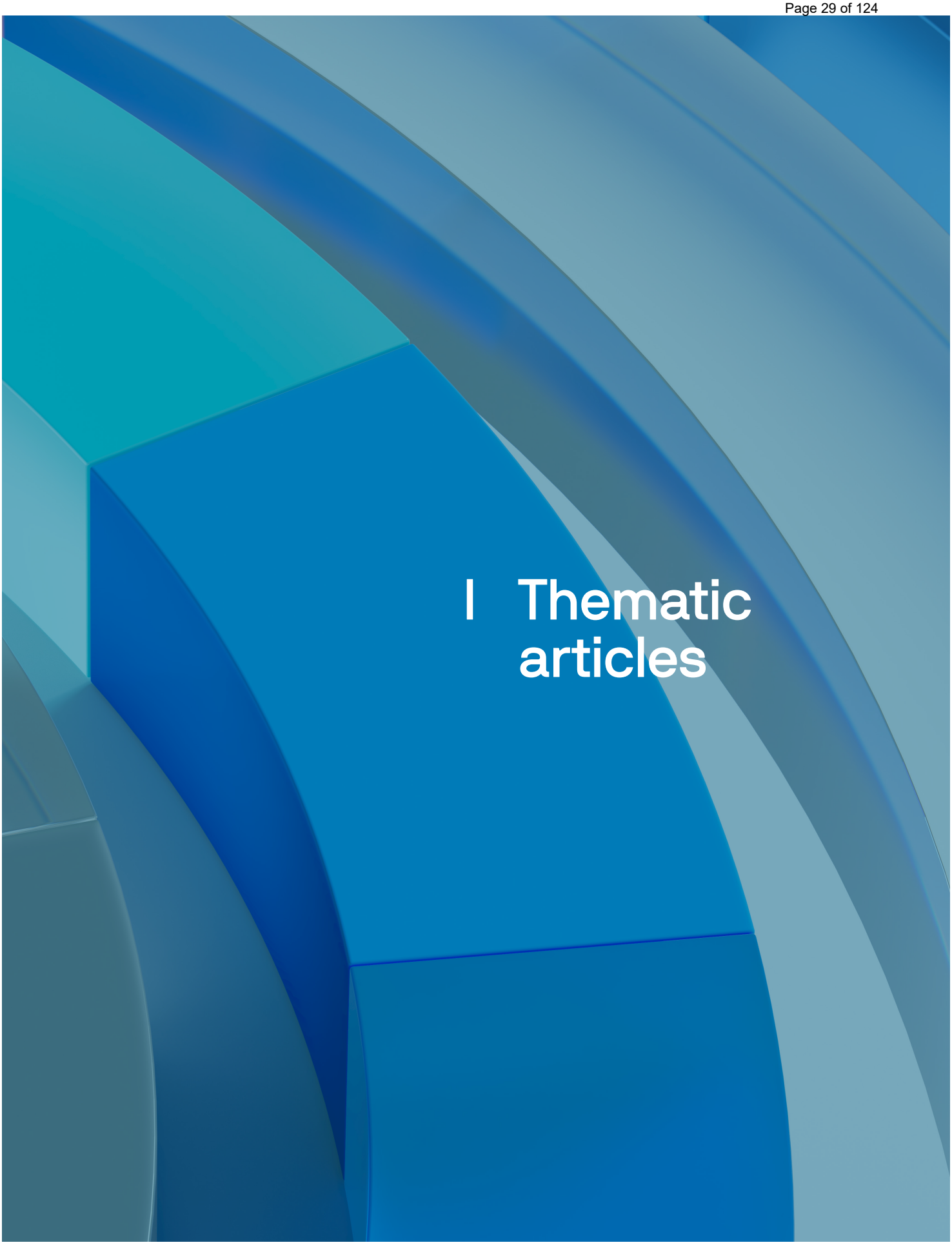
Source: J.P. Morgan Asset Management; data and forecasts as of September 2022.

Transition effects: In most countries, adding to inflation

Finally, we consider the impact of the starting point for inflation relative to its long-term trend. At publishing time, the monthly running rate for inflation had backed off from its peak earlier in 2022. However, with higher wage growth, higher inflation expectations and the lagged impact of higher home prices, inflation in most countries remains significantly above both central bank targets and our estimates of long-run trend inflation.

Despite public concern about recent inflation, we expect that inflation rates will moderate quite quickly in 2023 and 2024. Indeed, the current much more hawkish attitudes and actions of central banks suggest that inflation could fall sharply to trend rates, undershoot them and then revert to them in the early years of the forecast.

The full details of these dynamics are, of course, well beyond the scope of our Long-Term Capital Market Assumptions. However, it should be noted that, on net, this transition boosts long-term inflation by about 0.1% per year in the U.S., the eurozone and the U.K.



I Thematic articles

The future of globalization

Globalization will evolve – but not unravel

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In brief

- While an era of increasingly close economic integration may be coming to an end, deglobalization is not inevitable. Globalization will evolve but not unravel. The most likely scenario is a multi-polar world in which trading blocs become more politically aligned.
- How globalization evolves will likely depend on the role of innovation and automation, demand growth in new markets, rising (or declining) nationalism and shifts in regulation on climate, taxes and data.
- Winners and losers will emerge across regions and industries:
  - Low wage economies that have derived the greatest benefit of decades of globalization appear at greatest risk.
  - Greater regionalization as supply chains diversify and production moves closer to demand would benefit the broader Asian region and an increasingly wealthy consumer base.
  - While the intensity of goods trade may slow, services trade is likely to accelerate in an increasingly digital world.
  - The rise of "digital sovereignty" as a national security issue likely means increased spending on cybersecurity.
- As governments adopt more stringent decarbonization standards, new barriers to trade could emerge. We expect substantial investment in renewables, along with persistent demand for traditional commodities such as oil and natural gas.

The pandemic, supply chain disarray and heightened geopolitical tensions have all raised questions about whether the long trend toward deepening globalization is being thrown into reverse. But it's not easy to unwind decades of economic and capital market integration. In our view, the nature of globalization will evolve but not unravel.

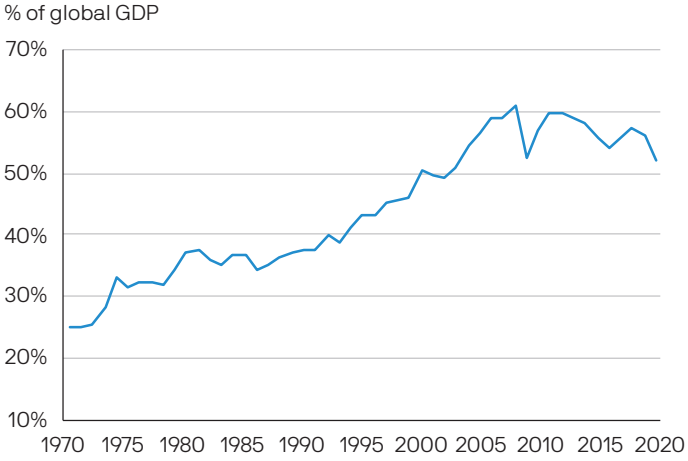
How globalization evolves in the coming decades will likely depend on the role of innovation and automation, demand growth in new markets, rising (or declining) nationalism and shifts in regulation on climate, taxes and data.

There is a wide spectrum of possible outcomes. The most likely scenario is a multi-polar world in which trading blocs become more politically aligned, sometimes driven by nationalistic (if not blinkered) economic policies. Overall, the global economy could become less efficient. Trade intensity in goods likely declines, while services could flourish amid growing digitalization.

Who wins and who loses from such a scenario? And what might it mean for investors?

Global trade as a share of GDP rose steadily for decades – until the financial crisis

Exhibit 1: Trade in goods and services



Source: World Bank, J.P. Morgan Asset Management; data as of July 2022.

The benefits of globalization

First, we'll define our terms. Globalization is the "openness" of markets and economies that allows for greater integration, particularly through the movement of goods, services, capital and labor. A broader definition also captures the exchange of knowledge, culture and politics across borders.

Globalization traces its modern history back to the global institutions and policies established following World War II. These promoted the adoption of free market systems, reduced barriers to commerce and forged international agreements to promote trade and investment. Global trade as a share of GDP rose steadily through the decades, up to the mid 2007–09 global financial crisis (GFC) (**Exhibit 1**). The world had become a much smaller and more digital place.

Globalization has dramatically reduced poverty in developing economies – one of its most important benefits – and created new consumer markets. For example, as the Chinese economy became more open, average daily consumption rose from around USD 1 per person in 1990 to USD 11 in 2020.[1] Workers from many countries increasingly emigrated to find better job prospects. In 2021, the annual value of remittances to low and middle income countries reached USD 589 billion – more than three times the flows from government foreign aid and an important spur to prosperity.[2]

Meanwhile, the geographical shift in goods production that reduced poverty in some countries boosted consumer buying power in others. Prior to the supply chain havoc caused by the COVID-19 pandemic, new vehicle prices in the U.S. increased by only 3% since 1997. During the same period, clothing prices fell 7%, toy prices declined by 76%, furniture prices dropped 14%, and TV prices were down 98%.[3] These declines underscore how trade has raised the standard of living of low income people in developed markets – consumers who devote more of their income to goods than to services.

Globalization also fostered technology transfer across markets as expertise moved from developed to developing countries, increasing the value-add in production and spurring innovation. In 1998, China's largest export products were agricultural. Today, China is a major exporter of highly complex goods in sectors such as electronics and machinery.

Even as stronger global linkages have delivered clear benefits, resistance to globalization has broadened and intensified. Opponents of the trend have marshaled several arguments to make their case.

1 World Bank national accounts data, 2019.
2 World Bank, Migration and Development Brief, November 2021.
3 U.S. Bureau of Labor Statistics, Consumer Price Index, February 2020. This data includes adjustments for quality improvements.

The costs of globalization

First, while income inequality between developed and developing nations has declined at a national level, income inequality within most nations has widened. Global trade is often blamed for creating downward pressure on wages and exposing domestic industries to global competition. However, technological advancement and innovation could take equal blame for reshaping many industries at the expense of livelihoods.

Second, in the dozen years since the GFC, as countries have become more inward-looking and both tariffs and nontariff barriers to trade have become more commonplace, supranational organizations such as the World Trade Organization (WTO) have struggled to promote open markets and free trade.

Larger economies have often found it easier to set up their own regional trade blocs. After the U.S. pulled out of the Trans-Pacific Partnership in 2017, Japan led the signing of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). In 2020, China took the lead in the creation of the 15-nation Regional Comprehensive Economic Partnership (RCEP) in Asia. While these blocs still promote free trade within regions, they don't necessarily promote global free trade, and the alliances are perhaps as much political as they are economic.

Third, key events over the last two decades have underscored some of the drawbacks to greater financial integration and complex global supply chains. Populists on both the left and the right have railed against what they deem to be the dangers of globalization, sometimes blaming other countries and people for domestic problems.

The global financial crisis inflicted financial losses and economic pain on families around the world who felt very removed from the U.S. housing market or American financial institutions. The European sovereign debt crisis of 2011–12 wreaked widespread damage throughout Europe, showing the danger of pursuing a common currency project without a strong central fiscal policy. The 2011 Japanese Tohoku earthquake and tsunami disrupted global supply chains.

More recently, the pandemic revealed the vulnerability of all economies to foreign-sourced supplies of key inputs and commodities. Russia's invasion of Ukraine has underscored the risks to countries that depend on one region or country for vital supplies.

In the coming decade, climate policy could become a particularly thorny issue in the larger debate about globalization. As governments adopt more stringent decarbonization standards, new barriers to trade could emerge. Beyond climate, social and governance issues could spark similar global battles.

The global economy will be shaped for decades to come by the extent to which globalization's costs appear to outweigh its benefits – from the perspective of policymakers, citizens, companies and market participants, among others. We see three possible scenarios for how globalization might evolve. In the following sections, we explore four key issues – related to innovation; the energy transition; growing wealth and regional demand; the USD and capital markets – that investors should consider in thinking about the future of globalization.

Three possible paths forward

The current state of globalization is a single global economy that is fraying at the edges. Resistance to a "one world" framework has steadily increased along political lines as countries seek greater protectionist measures. Going forward, collaboration in trade, economics and finance could take several different paths. For this analysis, we outline three potential outcomes:

Globalization renewed: International organizations again take the lead in global collaboration on trade and regulation, keeping globalization on track (albeit at a slower pace than in the late 20th century). Global issues, such as tackling climate change or addressing global health challenges, prompt global cooperation. Trade barriers continue to fall, and a recognition of economic mutual interests eclipses nationalistic impulses.

A multi-polar world: This is the most likely outcome, in our view. International cooperation continues, but political and cultural alignments lead to the formation of a few large core trading blocs. These new blocs draw in other countries based on what they perceive to be their national interest. One potential structure could have the U.S. and Western Europe in one bloc and China and Russia in another. Meanwhile, other countries and regions, such as emerging economies in Southeast Asia, Latin America and the Middle East, opportunistically trade with both sides. This would dictate the flow of trade, technology and investment, and create a less efficient global economy as multiple technology standards emerge. Countries won't stop trading, but what they trade may shift. We could also see that innovation and cooperation to solve global problems, such as climate change, may bind nations together in a multi-polar world.

Geopolitical alliances are just one dimension of this multi-polar world. It could also be shaped by the concentration of consumer power, with a growing number of emerging economies becoming more dominant. In this scenario, multinational companies would continue to invest directly in these growing markets and rely less on servicing them from offshore locations.

Full fragmentation: Cooperation falters with further fragmentation in production and distribution. Under this scenario, globalization unwinds as nations emphasize domestic production of goods and services and increase the use of tariffs and other barriers to trade, even among countries that are politically aligned. Immigration is generally discouraged. This would imply both higher costs and lower efficiency, and by reducing economic relationships among nations, fragmentation could lead to greater international conflict.

Which scenario unfolds, and how, could depend on the answers to a handful of key questions:

How will the next wave of innovation affect trading patterns?

Innovations in information and communication technology have allowed internet, mobile communications and software-enabled companies to decentralize goods production and supply chains, and exploit their comparative advantages on a global scale. In the future, innovation may lead to less global trade in goods but a stronger network for globalized services. It could benefit companies rich in capital at the expense of those reliant on low cost labor.

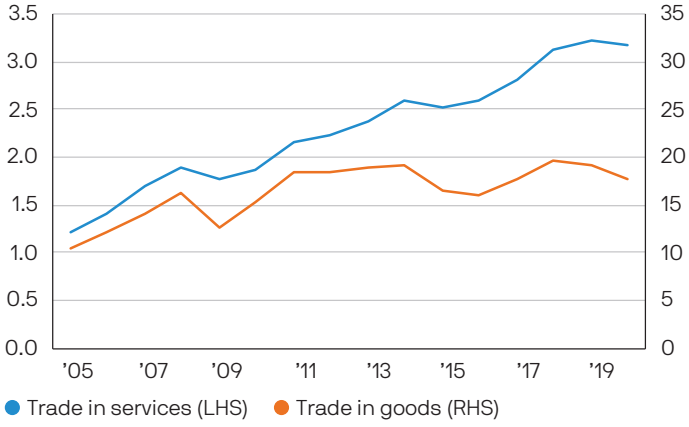
Politics and policies may restrict trade in goods, but because of new technologies, services could flourish in an increasingly digital world. Technological adaptation has already changed the way goods and services are traded. It has also contributed to the decline of goods and the rise of services as a fraction of total trade. Global trade in goods increased by 7.6% per annum between 1990 and 2005. But from 2005 to 2020, that growth rate more than halved (**Exhibit 2**). The digitization of goods and the replacement of local IT infrastructure with cloud services contributed to that decline.

Meanwhile, over the same latter 15-year period, trade in digital services grew almost twice as fast. (To be clear, digital platforms, data processing and improvement in logistics and transport have helped both types of trade by reducing friction in the value chain and easing transaction costs, with a correspondingly positive effect on trade activity overall.)

In recent years, services trade grew almost twice as fast as goods trade

Exhibit 2: International trade

Trillions of USD, annual



Source: UNCTAD, J.P. Morgan Asset Management; data as of June 2022.

While the impact of the next wave of innovation is less clear-cut, it should support the continued growth in services trade over goods. Looking at a slightly different period – 2016 to 2022 – international bandwidths, or the capacity of all internet exchanges globally, increased almost sixfold in total. Those gains illustrate how further progress in mobile communications technology and broadband expansion continue to pave the way for new markets and experiences, such as autonomous driving and the Internet of Things.

The continued growth of services supports our outlook: An evolving rather than unraveling global economy and a multi-polar world are the most likely scenario for the future of globalization.

Innovation could have yet another influence on trade in goods when it comes to labor, one that favors a fragmentation scenario: Robotics, 3D printing and virtual reality, for example, give companies more flexibility. As businesses look to diversify their supply chains, it could lead to a shift in production away from areas dependent on cheap labor. However, the economic incentive to seek out the lowest marginal cost of production could be achieved through better technology rather than low wages. Such a shift would favor those companies with more capital and advanced technology.

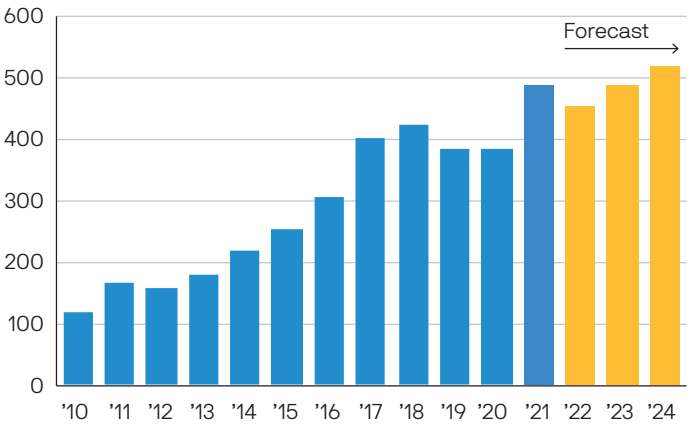
The economics of industrial robots has improved significantly, lowering the cost of automation vs. the cost of labor (**Exhibits 3** and **4**). As a result, global supply chains could fragment, becoming more regional or even national. McKinsey estimates that robotics alone could reduce global trade between USD 1.5 trillion and USD 3 trillion annually by 2030.[4]

[4] "Globalization in transition: The future of trade and value chains," McKinsey Global Institute, January 2019.

Automation costs have dramatically fallen vs. the cost of labor

Exhibit 3: Global annual installation of industrial robots

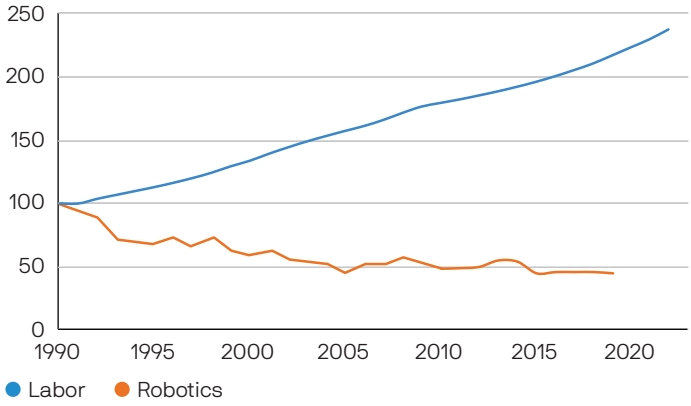
Thousands of units



Source: IFR, J.P. Morgan Asset Management; data as of June 2022.

Exhibit 4: Cost of automation

Index of average robot prices and labor compensation in manufacturing in U.S., 1990 = 100



Source: CBO, EIU, IFR, McKinsey, J.P. Morgan Asset Management; data as of June 2022.

How will the energy transition unfold?

The transition to clean energy will also have a significant impact on supply chains and trade volumes. That's because the requirements of an ecosystem based on renewable energy differ profoundly from one based on fossil fuels. Solar parks and wind farms require significantly more material and mineral inputs in construction than fossil fuel power generation. For instance, replacing a coal-fired power plant with offshore wind power requires six times the amount of mineral commodities (copper, zinc, nickel, chromium and rare earths); for a gas plant, it's 13 times more. In addition, building new gridlines to connect the world's electricity supply and demand will require significant amounts of copper and aluminum (**Exhibit 5**).

The transition to electric vehicles (EVs) presents similar challenges. While EVs are in some ways simple machines with only a sixth of the moving parts of a traditional combustion engine, their production requires six times as many minerals (lithium, nickel, cobalt, manganese and graphite).

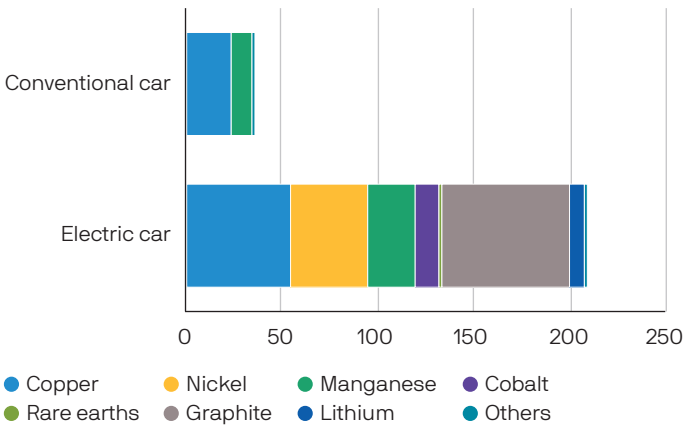
Reducing greenhouse gas emissions, either through power generation or EVs, will make the economy less fuel intensive and more materials intensive. As a result, companies will reconfigure their supply chains and new trade patterns will evolve.

This suggests the potential for a multi-polar but in many ways still globalized economy. For example, some economic integration will be required to supply manufacturers with the necessary minerals and metals for wind power, updated energy grids and EV production.

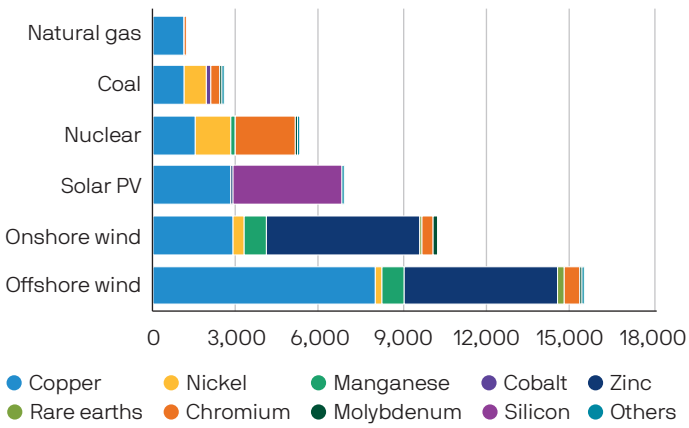
Building solar parks, wind farms and electric vehicles requires substantial mineral inputs

Exhibit 5: Minerals used in vehicle and electricity construction

Kg/vehicle



Kg/MW



Source: IFR, J.P. Morgan Asset Management; data as of June 2022.

The U.S. Inflation Reduction Act represents a meaningful commitment to climate goals but with a clear bias for sourcing or processing minerals needed for EV battery production either locally or from key trading partners. Such a stance binds some nations together and limits access for others, fostering a more multi-polar world.[5]

How will growing wealth in developing economies affect trade patterns?

The convergence in wealth levels and the cultural assimilation that has taken place among developed and emerging economies have created new markets and many new consumers. Consumers in emerging economies represent a growing source of demand for everything from cars to social media to financial services.

If local supply can meet local demand, it could reduce the need for cross-border trade, creating a more fragmented global economy. To the extent that nationalistic political agendas further restrain cross-border trade, that fragmentation could deepen. Such a shift would be gradual, though. Over the near term, multinational companies could still invest and operate in a broad range of countries to capture profits in growing consumer markets.

The relative freedom – or constraints – on cross-border trade have important implications for supply chains. For example, the distribution of motor vehicle production globally has mirrored the distribution of sales over the past 20 years.

The share of motor vehicle sales in both the U.S. and Europe has fallen during this period, matching a decline in these regions' share of production. At the same time, a sharp rise in sales in China and India has been matched by a rise in production (**Exhibit 6**).

This evolution in demand (combined with greater use of automation in production) reinforces the shift in trade activity toward becoming more regional and less global. While companies may choose manufacturing based on proximity to consumers, growth in the services sector will be determined by technological infrastructure and the changing demands of consumers with rising wealth in new markets.

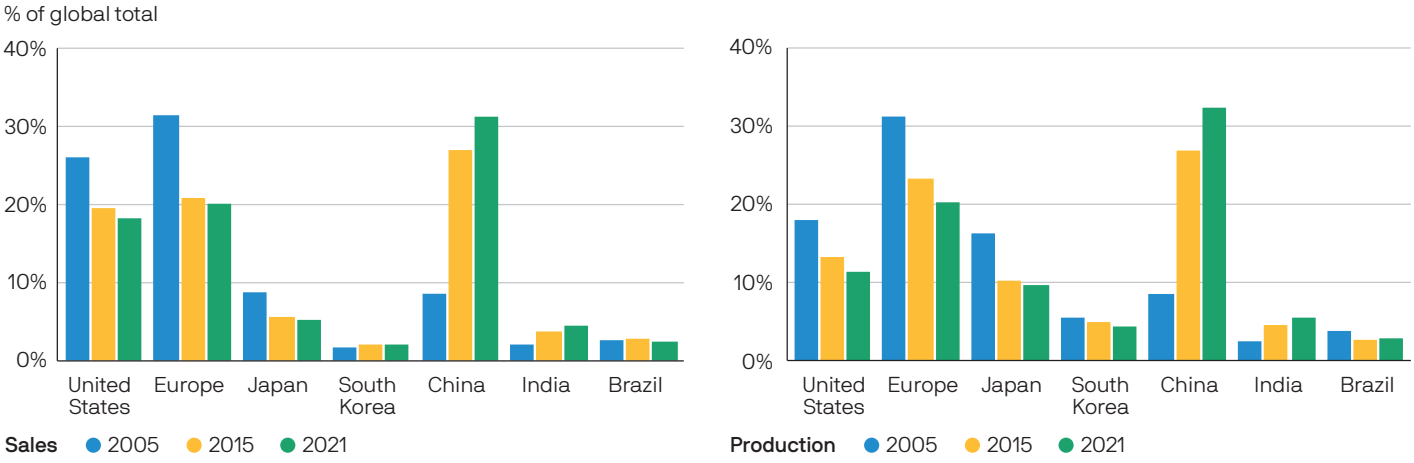
Can the dominant U.S. dollar be overthrown?

Global financial markets have become increasingly integrated as governments compete to attract international capital. This integration will not be easily unwound. The need for capital and the U.S. dollar's pivotal role in the global financial system should limit any potential fragmentation.

Despite financial market integration, we note that global capital flows have yet to recover to pre-GFC levels. Direct investment and portfolio flows were relatively stable up until 2017. However, other capital flows have dropped, perhaps because tighter regulatory policies encouraged greater domestic lending and the development of local debt markets in the emerging world. More recently, investment flows have started to recover, even if they remain some way from pre-GFC levels (**Exhibit 7**).

Motor vehicle sales have generally tracked car production over the past 20 years

Exhibit 6: Motor vehicle sales and production

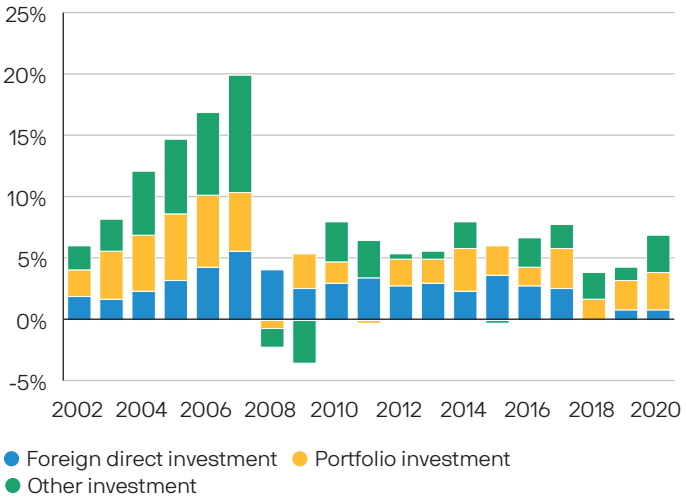


Source: International Organization of Motor Vehicle Manufacturers, J.P. Morgan Asset Management; data as of June 30, 2022.

[5] From 2024 on, EVs will not be eligible for tax credits if the battery components are made by a "foreign entity of concern," including Russia and China.

Global capital flows have yet to recover to pre-financial crisis levels

Exhibit 7: % of global GDP

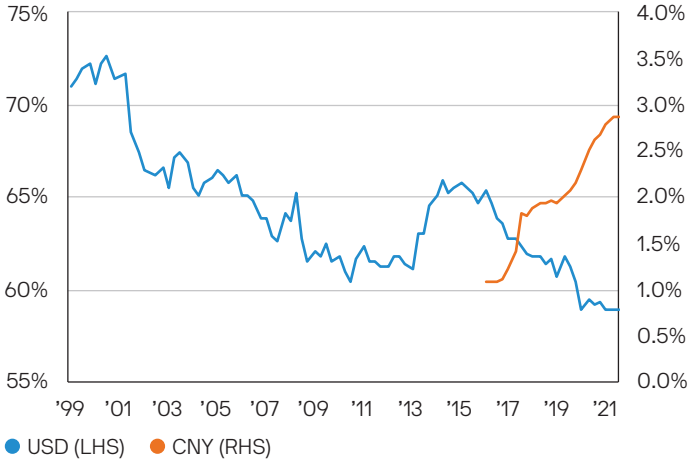


Source: IMF, J.P. Morgan Asset Management; data as of August 30, 2022.

China's share of global FX reserves has risen sharply, but the U.S. dollar faces no close rival as a global reserve currency

Exhibit 8: U.S. dollar and Chinese RMB share of foreign exchange reserves

Allocated global reserves, % of total



Source: IMF COFER, FactSet, J.P. Morgan Asset Management; data as of June 30, 2022.

At the core of financial market integration is the U.S. dollar, which plays a key role as a facilitator of globalization. No currency is more dominant in global trade, global payments or global debt, and we don't foresee this changing. The dollar is by far the leading reserve currency, with no close rivals. This is likely to be the case as long as the stability of the U.S. economy remains unmatched.

However, in the coming decades, while the dollar may not lose its dominant position, it may be eroded as market participants seek to reduce their reliance on a single currency in an increasingly multi-polar world. In an extreme (if unlikely) scenario, there might be no dominant currency and multiple payment systems.

Could the renminbi (RMB) challenge the dollar as the global reserve currency? Not within our forecast horizon. Although China's share of global foreign exchange reserves (2.9%) has increased sharply in the last four years, it remains a fraction of the U.S. dollar's (58.9%) and less than the combined holdings of the Australian and Canadian dollars in foreign exchange reserves (4.4%) (**Exhibit 8**).

For the RMB to become a reserve currency, significant changes would be needed in China's financial infrastructure. At minimum, they would require the liberalization of the current account and the removal of restrictions on cross-border capital flows, enabling market forces to determine the currency's value. Greater investor confidence in China's rule of law and legal system would also be necessary. We think the risk that the RMB overtakes the USD in the next 10 to 15 years is very low.

In an extreme situation, if a single currency such as the RMB did rise to a level that would rival the U.S. dollar, we'd expect further fracturing of the global system – and an increasingly multi-polar world as U.S. dollar hegemony came to an end.

The frequent use of financial sanctions by the U.S. might diminish the dollar's dominance (along with the political influence of the U.S. government) while promoting the use of an alternative currency like the RMB. But a similar outcome could be achieved by using multiple currencies that have a perceived lower economic risk. For example, we could see diversification in reserve holdings to other "safe" currencies, such as the Australian or Canadian dollar.

To reduce reliance on the dollar and diminish U.S. influence, market participants would need to develop alternative payment systems to process cross-border flows. This would enable transactions among countries outside of the U.S. sphere of influence. It would also increase convertibility in currency pairs that are currently less liquid. However, the share of global trade covered by such a parallel system is likely to remain very small over the next decade.

Of our three globalization scenarios, a multi-polar outcome would be more likely to emerge from a world served by diversified reserve currencies and alternative payment systems.

Could a new wave of government regulation rein in further globalization?

Trends in government regulation and taxation will also shape the course of globalization. For example, governments across both developed and emerging economies have committed to reducing carbon emissions and greenhouse gases.

Given that climate change is a profoundly global issue, there is clearly scope for greater global collaboration in tackling the challenge of the energy transition. Yet each country plans to move at its own pace, with varied degrees of implementation and enforcement. A nonstandard approach to addressing climate change could create new barriers to trade as regulatory requirements in one economy are forced upon another.

Emission trading schemes and cross-border carbon taxes, such as those developed by the European Union (EU), are two areas where friction may emerge. Both China and Europe have emission trading schemes, with very different prices for carbon. In Europe, the price of emitted carbon, or its equivalent, is USD 102 per ton, about 10 times higher than the price in China. These are unlikely to converge until global standards are adopted or until all economies' paths to net-zero are synced, allowing emission trading schemes to be calibrated to achieve carbon reduction goals.

Before that occurs, an unstable equilibrium may prevail. In such a scenario, polluters could maintain an economic edge, pushing disadvantaged industries to pressure policymakers and/or regulators for relief. This could lead to further fragmentation in the global economy.

Alternatively, environmental standards and emissions schemes may develop at a regional level, facilitating greater regional trade and bolstering the forces of globalization. Certainly, climate change policies and initiatives would benefit from a global approach. Successfully implemented, they would support a renewed globalization scenario.

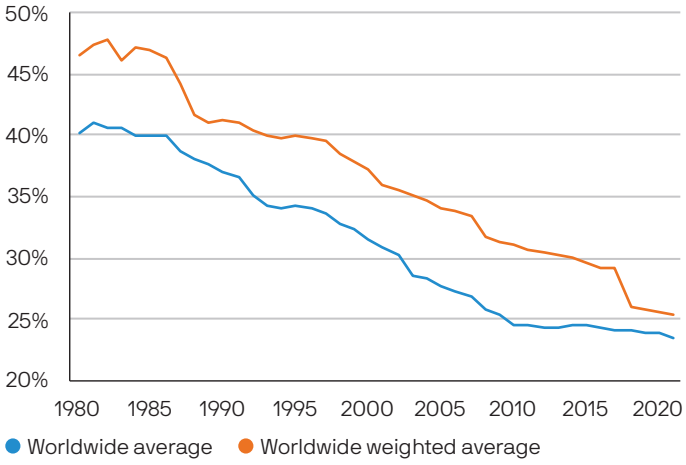
However, in recent years, adverse events impacting global food production (notably the Russia-Ukraine war) have led to growing demands for protectionism to ensure food security. Several countries have banned the export of key food items as global scarcity has increased. This issue of food security will run to a timeline of years rather than months. In the meantime, it could create headwinds to global trade.

In the area of taxation, to attract capital, countries have competed to reduce corporate taxes, especially on mobile factors of production, making up lost revenue by increasing tax rates on immobile factors of production. Globalization has both incentivized and been boosted by global tax competition. Between 1980 and 2020, the statutory corporate tax rate weighted by GDP fell from 46.5% to 25.9% (**Exhibit 9**).[6]

In recent decades, countries have competed to lower corporate taxes

Exhibit 9: Global corporate tax rates

Statutory weighted and unweighted corporate income tax rates



Tax Foundation, J.P. Morgan Asset Management; data as of December 2021. Footnote: The worldwide average represents the average statutory corporate income tax rate measured across 180 jurisdictions for which GDP data are available between 1980 and 2021, per the Tax Foundation data. The worldwide weighted average represents the average statutory corporate income tax rate weighted by GDP. For years prior to 2021, the number of countries included in calculated averages varies by year due to missing corporate tax rates (i.e., the 1980 average includes statutory corporate income tax rates of 73 jurisdictions, compared with 180 jurisdictions in 2021).

As multinational corporations have taken advantage of beneficial tax rates by transferring their taxable revenue to lower tax jurisdictions, some have called for a global minimum corporate tax. In late 2021, leaders of G20 nations agreed in principle to a 15% minimum global corporate tax rate.

Some have argued that such a minimal global corporate tax would stall globalization by limiting foreign direct investment (FDI) and force a reduction in operations and employment in regions with lower tax rates. But taxes aren't the only factor driving investment decisions. They may be outweighed by the quality of infrastructure, access to resources or nonfinancial factors such as language and culture. If the global economy moves from a state of tax competition to tax harmonization, it should not in itself limit globalization.

[6] "Corporate Tax Rates around the World," Tax Foundation, December 2020.

Another issue in an increasingly digitized globalized economy, data privacy and security, has attracted increased regulatory scrutiny of technology companies. In the U.S., antitrust legislation has already been introduced, while regulations to enhance transparency in the EU are in train. The rise of "digital sovereignty" as a national security issue suggests greater regulation may lie ahead. Case in point: Some OECD countries are considering implementation of a tax on digital services. Differing attitudes toward controlling and protecting data could create divisions across nations, in turn affecting the ability of technology companies to operate globally.

Of all the issues covered here, the regulatory backdrop has the greatest potential to create barriers related to national security or to environmental, social and governance (ESG) issues. Regulations could lead to a more fragmented economy and higher costs for consumers and companies. Over the medium term, we do expect further regulatory-driven fragmentation. But over the longer term, political dynamics could shift, spurring global collaboration to address important issues.

Investment implications

Globalization will not unravel or unwind. But as trading blocs become increasingly politically aligned and fragmented, the resulting risk is a global economy that is less efficient, with higher inflation, higher interest rates and lower equity valuations. However, over the long term, we expect a fragmented global economy will reach a new trade equilibrium, one that allows for some restored efficiencies and inflation falling back to central bank targets.

We note that companies in general have benefited from increasing globalization, and their economic incentives are unlikely to have changed. What will change are the political forces acting on those incentives, and they may shape corporate behavior.

Regional winners and losers

From an investment standpoint, it is difficult to identify any pure winners in a more fragmented world where economic growth may be lower and inflation higher. Still, the realignment of trade flows and imposition of various investment and trade restrictions will create regional winners and losers. Low wage economies that have specialized in labor-intensive manufacturing look to be some of the most vulnerable. Meanwhile, the world's poorest economies yet to partake in export-driven growth (especially those without an abundance of natural resources or sufficient infrastructure) could see their development curbed.

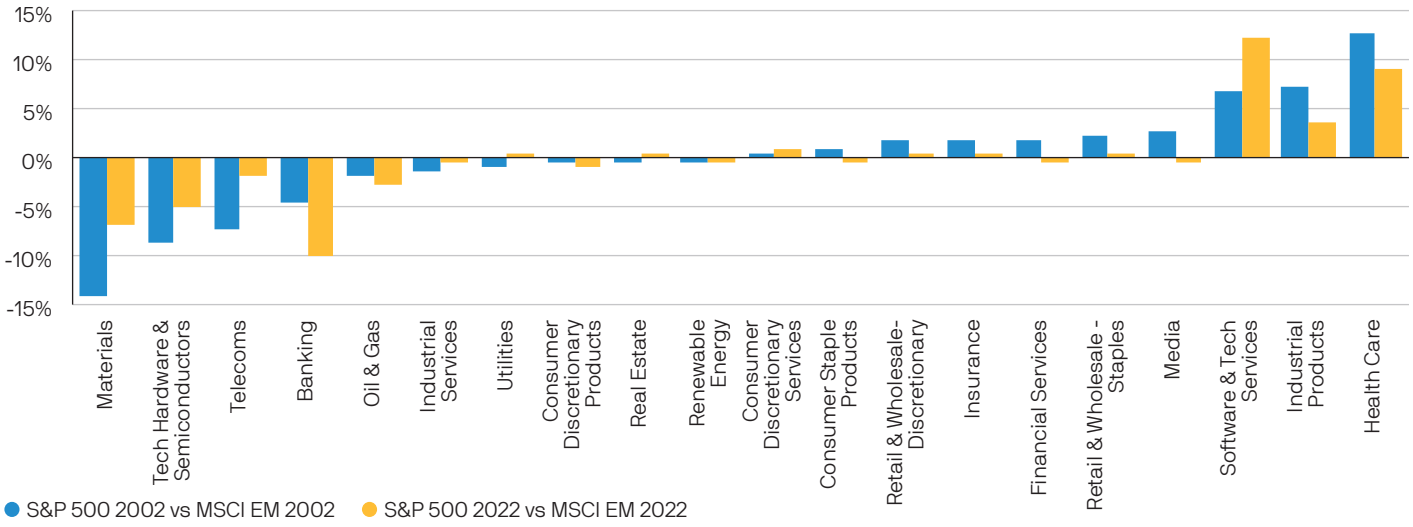
As discussed in more detail in a recent paper by our colleagues in the Strategic Investment Advisory Group, "The lifeboat economy: Implications of a fracturing world order,"[7] the increased use of both tariff and nontariff measures between China and its trading partners, particularly the U.S. and Europe, is aimed at reducing interdependence and could lead to lower levels of trade and investment flows over the longer term. In such a scenario, other economies may see benefits. The end of the low wage arbitrage in China has already benefited the wider Asian region as production has moved to relatively lower cost markets close to the source of final demand. The shift to greater supply chain diversification could accelerate this trend, especially for manufacturers of consumable products such as textiles and technology hardware. It could also support infrastructure investment, such as in ports, to bolster shifting supply chains.

However, many economies, especially viewed through the lens of emerging or developed, will continue to both rely on and compete with one another. For example, the flow of technological hardware and materials will run from emerging to developed economies, while software and health care services will likely flow in the other direction, at least in the medium term. Longer term, the narrowing of the gap between the U.S. and emerging market index weights in sectors such as health care, insurance and financial services could highlight the convergence in specializations (**Exhibit 10**).

[7] "The lifeboat economy: Implications of a fracturing world order," Strategic Investment Advisory Group, J.P. Morgan Asset Management, September 2022.

In various sectors, the gap between U.S. and emerging market index weights has narrowed

Exhibit 10: International trade



Source: Bloomberg, MSCI, S&P Global, J.P. Morgan Asset Management; data as of July 2022, leveraging Bloomberg Industry Classification Standard (BICS).

Services to take the lead

Trade in services should continue to expand in a global economy that is more virtual, despite polarization. Services industries should benefit from investment in skilled labor and labor-saving technologies. Economies such as India and the Philippines, with high rates of English speakers and established infrastructure, may gain in attracting foreign capital. While the rise of digital service taxes remains a risk, growth in services trade looks set to dominate trade growth going forward.

While the technology sector broadly may carry a heavier regulatory burden in the future, certain technology companies will benefit from new demands. Most notably, the ongoing digitization of the global economy has created a growing need for cybersecurity, further amplified by recent geopolitical tensions. Even before the Russian invasion of Ukraine, it was estimated that cybersecurity spending would surpass USD 200 billion by 2024, a 43% increase from 2021 levels.[8] As the threat and costliness of security breaches worsen, companies and governments are highly incentivized to invest in security protection. Similarly, defense sectors will benefit from a more fragmented world.

Meanwhile, robotics and automation will become increasingly important as labor replacements while the related technology becomes cheaper and access to low wage labor becomes more limited. We anticipate this trend will continue as aging demographics in developed countries continues to place a strain on the labor supply and production shifts to serve growth in new markets.

Commodities, the path to net-zero, higher inflation in the near term

The focus on building domestic energy security, though it may add to economic fragmentation, bodes well for traditional commodities and renewables. In most instances, green energy is an important source of local energy. Economies will have to invest heavily if they are to achieve their decarbonization goals and reduce dependency on unreliable energy sources. In the interim, demand for traditional commodities such as oil and natural gas will continue to drive growth in those sectors as economies seek to diversify and reduce reliance on unfriendly exporters.

Market participants now see food security, along with energy security, as major risks, as both politics and climate impact the supply and price of food. Agricultural machinery manufacturing and biotechnology that can raise crop yields may well find growing demand.

As trade relationships are redrawn, the global economy will move away from maximizing economies of scale. Higher commodity and materials prices will prevail, potentially keeping headline inflation measures elevated relative to history. Over time, we believe a multi-polar world will find new equilibriums and push elevated inflation lower as supply chains and technology adapt to this new environment.

[8] Dorsey Wright, "Investing in Cybersecurity," Nasdaq, October 21, 2021.

Conclusion

The global economy has clearly benefited from the rise in globalization in the last 70 years. However, the benefits have not been felt evenly across or within economies, and the marginal gains now (and in the future) are diminished. Protectionist headwinds from nationalism may not fade anytime soon, adding to the challenge of further economic and financial integration. But we see this as a reconfiguration rather than a reversal of the current economic system, and one that creates a multi-polar world. In any disruptive environment, there will be winners and losers – new opportunities and risks – as investors adapt and respond to change.

Demographics and destiny

The challenges and opportunities of a 10 billion person planet

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In brief

- Within our Long-Term Capital Market Assumptions time frame, a larger global population will create dramatic challenges – and opportunities. Of primary importance for investors: demographics' impact on economic growth, consumption patterns, infrastructure needs and the harvest and use of finite resources.
- Optimal policies can convert demographic challenges into demographic opportunities. Faster population growth does not guarantee faster GDP growth or better investment opportunities.Harnessing the demographic dividend will take strong national and corporate governance frameworks, good infrastructure and integration into global supply chains.
- Despite the challenge of income inequality, investment opportunities to service a fast-growing population of emerging market (EM) consumers in their home countries are abundant. Younger consumers also boost consumption. EM consumers' rise should accelerate consumption growth for clothing, educational services and transportation.
- More people mean more intensive use of energy, water, food, ecosystems and infrastructure. To alleviate the stress on our planet, adequate and timely investment is needed in sustainable energy and agriculture, reforestation and green infrastructure. Opportunities can also be found in younger economies leapfrogging over those with older infrastructure.
- We create scores based on national policies, corporate governance, migratory policies and energy transition momentum to help inform better investment decisions.
- In a world of higher interest rates, sound policy will be the key to attracting scarcer funding, creating winners and losers. Our scores and investment themes may help investors decide where they can best take advantage of this population growth.

Ten billion people: A potential dividend or a looming liability?

The world's population has tripled since 1950, from 2.6 billion to 7.8 billion people.[1] Within our Long-Term Capital Market Assumptions (LTCMA) time frame, it may reach 8.8 billion and, by 2056, 10 billion.[2] The sheer size of the population will create dramatic challenges – and opportunities. Of primary interest here: the impact of these changes on economic growth, future consumption patterns, infrastructure needs and the harvest and use of finite resources. In each area, we find investment implications.

Demographics will powerfully affect economics and investing. An economy with a rising proportion of young and working-age people (15–64) can deliver higher economic growth and higher GDP per capita – a "demographic dividend" – vs. an economy where more older adults may need social services. A young population can serve as a large labor pool and a long-term generator of tax receipts to fund older cohorts.[3]

Yet population growth poses important risks. An economy that fails to make the proper investments beforehand to incorporate productively a growing working-age population into the labor force, to build out sufficient infrastructure in time and to ensure the sustainable use of its finite natural resources could see disastrous consequences for social, political and economic stability.

These are the twin challenges and opportunities of a planet of 10 billion.

Our own work has focused on combining demographics with relevant policy indicators to generate a set of country scores that make national policies and demographics comparable. While many economies share broad demographic trends, their similarities end there. Different policy regimes can lead to diverse economic outcomes. We believe policy is a large piece of the solution of how to turn challenge into opportunity, the key to unlocking an economy's fate – and what likely separates winners from losers in the investment space.

In our view, four policy areas are most crucial: governance (public and corporate), education, immigrant integration and energy transition preparedness. Our scores aggregate relevant national, corporate, energy and population indicators to help identify the economies best positioned to benefit from their demographic profile. Investors may use this multifaceted approach to identify the places likeliest to reap the demographic dividend.

It will come as no surprise that there are major investment possibilities in fulfilling emerging market (EM) consumers' rising demand for goods and services. We thus examine likely changes ahead in key "young" economies' consumption patterns.

These economies share the need for infrastructure: water access, power generation, waste management, transportation and communications – the essentials of life and economies. These areas offer enormous investment possibilities. We consider how, in the critical areas of infrastructure and resource use, developing sustainable solutions should support a new and growing range of real assets that may offer attractive returns over the next 10 to 15 years. The sustainability theme should shape many other areas of investment as well: sustainable materials and design, food, agriculture, water systems, and better recycling and reusability of materials and resources.

"Younger" and "older" economies' policy and the demographic dividend

Our story of potential economic growth and opportunity begins with expanding populations. Three factors affect population growth. First, fertility rates, which should still leave India and China as the most populous economies in 2050, even as China's population declines. International migration is second: The movement of humans will reshape demographics, as international migrants number about 281 million and account for one-quarter of the net annual change in economies' populations.[4] Life expectancy is third: It is projected to reach 77 years at birth by 2050,[5] when 25% of the people in Europe and North America could be over 65, while the proportion of children is expected to remain stable. Europe could have the largest dependency ratio – the number of adults 65-plus and children (birth to 14) divided by the working-age population.[6]

1 Based on the U.S. Census Bureau's population estimates, as of December 2021.
2 Although population growth is projected to be slower than in previous periods. Forecasts based on U.S. Census Bureau data, which imply a slowdown to 0.8% over the next 15 years vs. an increase of 1.1% over the past 15 years and 1.5% in 1950.
3 Indeed, demographic forecasts are important to our LTCMA economic growth assumptions. Along with capital and total factor productivity, demographics affects our employment and labor input estimates. Michael Hood and David Kelly, "Macroeconomic Assumptions: Inching forward: Lingering inflation, moderate growth," 2023 Long-Term Capital Market Assumptions, J.P. Morgan Asset Management, November 2022.
4 United Nations (U.N.), 2010–20 data, authors' calculations. In high income economies, this proportion is 53%, compared with low income economies, where net migration contributes a 7% decline to the annual population growth rate, on average.
5 Up from the current average life expectancy of 73 years, Our World in Data, 2022.
6 Changes in the dependency ratio can indicate effects on social and economic development, and likely trends in the need for social support. U.N. Statistics Division, retrieved September 2022.

Sub-Saharan Africa, the Middle East and parts of Asia should see their working-age populations grow the most and should have low old-age dependency ratios; we call them "younger." We call economies with high dependency ratios "older." Those with average ratios we call "average age"[7] (**Exhibit 1**).

We bucket economies into cohorts: Older, average and younger

Exhibit 1: Economies by deviation from global average old-age dependency ratio

Older	Average	Younger
Australia	Brazil	Bahrain
Canada	Colombia	Egypt
Chile	India	Indonesia
China	Malaysia	Kenya
France	Mexico	Nigeria
Germany	Morocco	Philippines
Hong Kong	South Korea	Qatar
Italy	Turkey	Saudi Arabia
Japan	Vietnam	South Africa
Spain		UAE
Taiwan		
Thailand		
UK		
U.S.		

Source: World Bank, J.P. Morgan Asset Management; data as of December 2021. Old-age dependency ratio is the number of people aged 65-plus per 100 people of working age (16–64).

Many, but not all, emerging markets have younger populations.[8] History suggests caution, however, in translating population growth alone, or youthful emerging market demographics, into future economic growth and market returns. In 2000, 17 major EM economies were projected to have the fastest population growth over the next 20 years, but just eight ended up having faster annualized GDP growth than the global average, and just one – Saudi Arabia – delivered stronger than average equity market returns.[9] The rest have yet to put their demographic advantage to work.

For emerging markets to harness the demographic dividend, we believe they need strong institutions and governance frameworks in place beforehand. In their absence, a potential boon can turn into a liability. A body of research shows that rule of law, anti-corruption practices, economic openness and quality public education are crucial preconditions for the productive employment of the labor force and the optimal allocation of resources.[10]

These are hard to measure. There is no set, quantifiable definition of "governance," but we combine industry-leading indicators that seek to provide a narrow enough, standardized, comparable definition of key governance dimensions. Our Top-Down score identifies the younger economies that have the greatest likelihood of succeeding over the next 10 to 15 years.

Our models: Combining demographics and policy

Demographics is not the only reason to invest (or not) in a market, but it's particularly relevant to emerging markets, which tend to have younger populations. We aggregate demographics with other policy metrics into a series of scores (**Exhibit 2**). We recommend investors use this type of multifaceted approach when seeking to capitalize on the demographic dividend rather than relying on demographics alone.

[7] The ratios are based on standard deviations from the global average: Old is defined as half a standard deviation or more above the average global dependency ratio. Average is within half a standard deviation of that average, and young is half a standard deviation or less below the global average.
[8] We define as emerging markets those included in the MSCI Emerging Markets Index, the MSCI Frontier Equity Index and/or those with a minimum weight of 3% in the J.P. Morgan Emerging Market Bond Index–Diversified (EMBIG). Some are in the LTCMA universe: India, Mexico, South Africa. Outside LTCMA coverage, regions expected to see the lowest dependency ratios include sub-Saharan Africa, Central and South Asia, and North Africa and West Asia.
[9] The eight economies were China, Vietnam, Indonesia, India, Pakistan, Malaysia, Egypt and the Philippines.
[10] Academic studies have shown a strong correlation among economic development (measured as income per capita), economic growth (output per worker) and the quality of governance frameworks in place. Daniel Kaufmann and Aart Kraay, "Growth Without Governance," Policy Research Working Paper, World Bank Institute and the Development Research Group, November 2002; Robert E. Hall and Charles I. Jones, "Why Do Some Countries Produce So Much More Output per Worker than Others?" NBER Working Paper no. 6564, June 1999.

Our scores offer investors a multifaceted approach to capitalize on the demographic and migration dividends

Exhibit 2: The scores and what they measure

Score	Purpose	What it measures
Top-Down score	To aggregate key national policies and institutions correlated with economic success for a standardized, comparable picture. Higher score indicates stronger sovereign fundamentals that may make sovereign asset classes (government bonds, currencies) more appealing. Can also be useful in determining the cost of capital in modeling an asset's expected returns.	**Rule of law and corruption perception**: Extent to which economic agents and governments respect, trust and abide by national rules and norms (including quality of contract enforcement, property rights, police, courts, likelihood of crime and violence).[11] **Economic freedom**: Regulatory efficiency and openness of an economy (including trade freedom, tax burden, judicial effectiveness). **Education**: Average years of schooling and projected returns on that education.
Bottom-Up score	To capture an aggregate of bottom-up corporate governance for economies. Each is ranked by quintile based on its average score. May make investing in specific companies more appealing because of the quality of corporate governance.	**Levels of corporate governance**, using relevant components from proprietary 40-question ESG checklist that J.P. Morgan Asset Management Global Equities researchers apply to 3,000+ companies. Captures negative governance responses by companies under coverage, represented by an average per economy. Higher quintiles reflect stronger aggregate governance.
Migration-Productivity score	To capture the extent to which economies can economically capitalize on migratory trends. May make investing in an economy more appealing.	**Strength and composition of net migration** (net migration rate, ratio of migrant to domestic working-age populations, human capital of migrants, reasons for migration), quality and trend of migrant integration, brain drain and displacement rankings, and remittance flows, summing up to the strength of an economy's potential migration dividend.
Energy Transition Momentum score	To capture the potential trajectory of green energy in different economies, based on current transition readiness and performance. Higher score indicates momentum in a greener direction from a low starting point. May suggest attractive green infrastructure opportunities.	**Transition readiness**: Energy system structure, capex, regulations/political commitment, infrastructure and innovative business environment, and institutions. Boost given to countries considered "leapfrog" and "emerging," defined as having high transition readiness but relatively low current level (in energy access, environmental sustainability and economic development).

Source: J.P. Morgan Asset Management; scores as of September 30, 2022. Top-Down score: World Bank Worldwide Governance Indicator of the Rule of Law (40%); Transparency International Corruption Perception Indicator (20%); Heritage Foundation Index of Economic Freedom (20%); Penn World Table Human Capital Index (20%). Bottom-Up score: J.P. Morgan Asset Management Global Equity Research; includes some coverage bias since the Global Equities team has more engagement and interaction in markets with larger numbers of investible companies. Migration-Productivity score: Average expected net migration rate (2022–50) from U.S. Census; U.N. Department of Economic and Social Affairs Population Division ratio of working-age migrants to domestic population; Penn World Table Human Capital Index; data points are overlaid with the Migrant Integration Policy Index, and brain drain and displacement rankings taken from the Fragile States Index. Energy Momentum Transition score: World Economic Forum Energy Transition readiness index (a measure of capital and investment, energy system structure, human capital and consumer participation, infrastructure, institutions and governance) boost given to countries classified as "leapfrog" and "emerging" based on current performance.

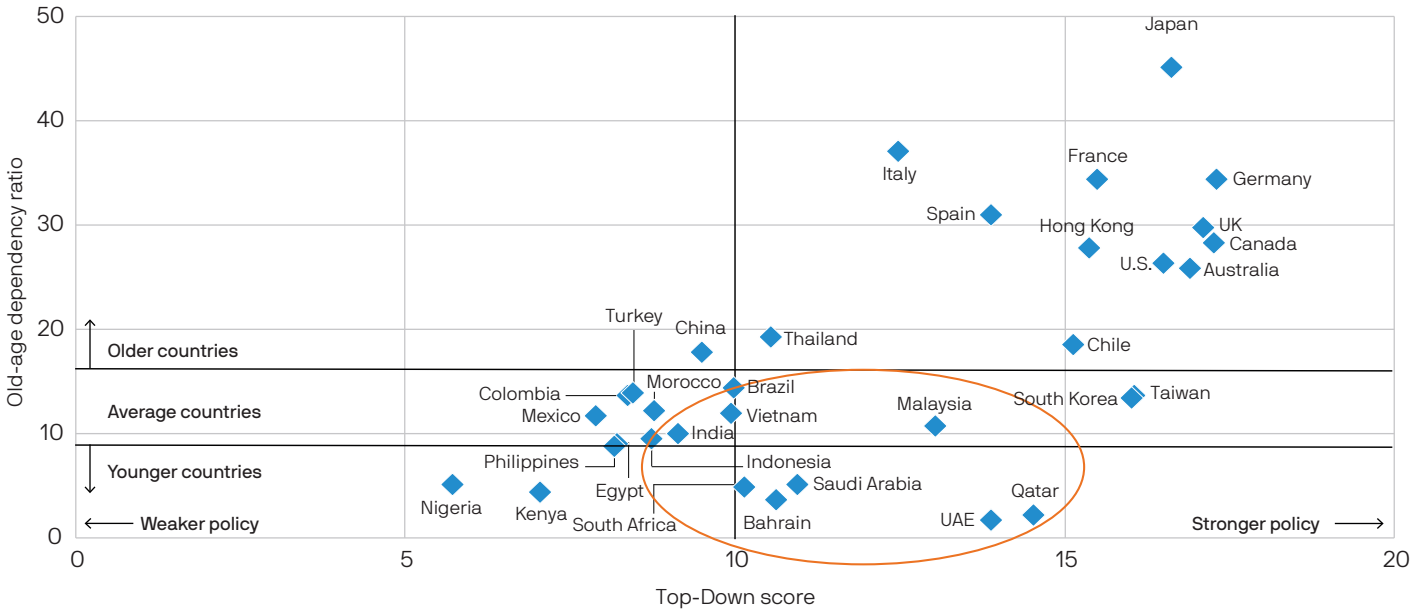
Combining demographics with Top-Down scores

Where in emerging economies might investors find both demographic promise and the policy supports to realize the promise of growth and opportunity? Here, we identify EM economies with favorable demographics (low old-age dependency ratios) and solid Top-Down scores, suggesting which economies are on a path to becoming standouts in the EM universe (**Exhibit 3**).

[11] Daniel Kauffmann, Aart Kraay and Massimo Mastruzzi, "The Worldwide Governance Indicators: Methodology and Analytical Issues," World Bank Policy Research Working Paper no. 5430, September 2010.

Economies combining younger populations with good macro governance and education look most set to harness the demographic dividend

Exhibit 3: Top-Down score vs. demographics (old-age dependency ratio, % of population)



Source: Heritage Foundation, Penn World Table (PWT), Transparency International, World Bank Governance Indicators (WGI), J.P. Morgan Asset Management. Old-age dependency ratio is the number of people aged 65+ per 100 people of working age (ages 20–64). Top-Down score is based on J.P. Morgan Asset Management country-level analysis. It is a blended governance and education score based on 40% WGI Rule of Law (measures the extent to which agents have confidence in and abide by the rules of society), 20% Index of Economic Freedom (measures jurisdictions against each other in terms of parameters such as trade freedom, tax burden, judicial effectiveness, etc.), 20% Corruption Perception Index (measures how corrupt each country's public sector is perceived to be), 20% PWT Human Capital Index (measures average years of schooling and an assumed rate of return to education). Score components as of Heritage (2021), PWT (2021), WGI (2021).

We note:

- **India, Vietnam, Malaysia, South Africa, Saudi Arabia** and the **United Arab Emirates (UAE)** show demographic promise as well as institutional strength. They are likely to gain further importance in EM benchmarks and analysis.
- **India** and **Vietnam** have better governance and education frameworks and, critically, close integration into regional and global supply chains. Their relatively large working-age populations mean that labor-intensive industries may benefit from economies of scale and find solid domestic demand. In contrast, many sub-Saharan economies have historically struggled to accumulate physical capital (tools, machines, infrastructure), skills and education on par with brisk population growth. Much of the region is still reliant on commodity exports and would need to diversify economically and better integrate into a continent-wide market to harness a demographic dividend.
- **Nigeria** and **Kenya** have demographic promise but would need to improve on the policy front to realize their economic growth potential.
- **China** was an exception – able to generate above-average growth rates for 30 years with a large, young working-age population, yet with previously low scores on traditional measures of macro governance. Despite its policy uncertainty, China's uniquely large market has drawn foreign capital from investors who saw the rewards as worth the risk. Now, China's demographic dividend is fading, but its economic growth could potentially be improved through structural reforms.

Interplay between macroeconomic policies and corporate governance

Complementing Top-Down scores with Bottom-Up scores helps paint a more complete picture for investors, given the interplay between national and corporate governance (**Exhibit 4**). A high Bottom-Up score may give an investor greater conviction about an equity or credit investment in an economy vs. basing a decision on a high Top-Down score alone. To the contrary, a high Bottom-Up score may be why an equity or credit investor would tolerate weaker macroeconomics in exchange for a strong opportunity in a specific company in a country.

Several insights jump out when comparing an economy's two scores; Malaysia scores well on both, supporting a decision to invest in the country. Saudi Arabia has a relatively good Top-Down score but does not do as well on its Bottom-Up score, highlighting that corporate governance will be key for investors selecting equity investments there. South Korea and the UAE screen extremely well on the Top-Down score but have bottom two quintile Bottom-Up scores. There, we see support for sectors linked to economic growth (in the form of a lower cost of capital, currency stability and healthy sovereign solvency), but a more discerning approach would be required to choose individual companies in which to invest.

The migration dividend: A crucial boost for older economies, a potential drag on younger ones

As noted, another important layer in forecasting an economy's potential to capitalize on its demographic dividend is international net migration. A migration dividend can help some older economies where growth is stagnating,[12] while dragging on some younger countries' economies through brain drain as lowered economic growth rates encourage further migratory outflows.[13] Brain drain disrupts human capital accumulation and can reduce productivity growth so severely that the damage may be permanent.[14] Our Migration-Productivity score draws together migrant demographics, reasons for migration, volume of remittance flows, and national and local institutional strength (**Exhibit 5**).

Bottom-Up scores indicate where corporate assets may be more appealing

Exhibit 4: Top-Down and Bottom-Up scores; shading based on quintile rank (red = lowest, green = highest)

Market	Top-Down score	Bottom-Up score
Germany		
Canada		
UK		
Australia		
Japan		
U.S.		
South Korea		
Taiwan		
France		
Hong Kong		
Chile		
Qatar		
UAE		
Spain		
Malaysia		
Italy		
Saudi Arabia		
Bahrain		
Thailand		
South Africa		
Brazil		
Vietnam		
China		
India		
Morocco		
Indonesia		
Turkey		
Colombia		
Egypt		
Philippines		
Mexico		
Kenya		
Nigeria		

Source: Heritage Foundation, Penn World Table, Transparency International, World Bank Worldwide Governance Indicators, J.P. Morgan Asset Management; data as of 2021.

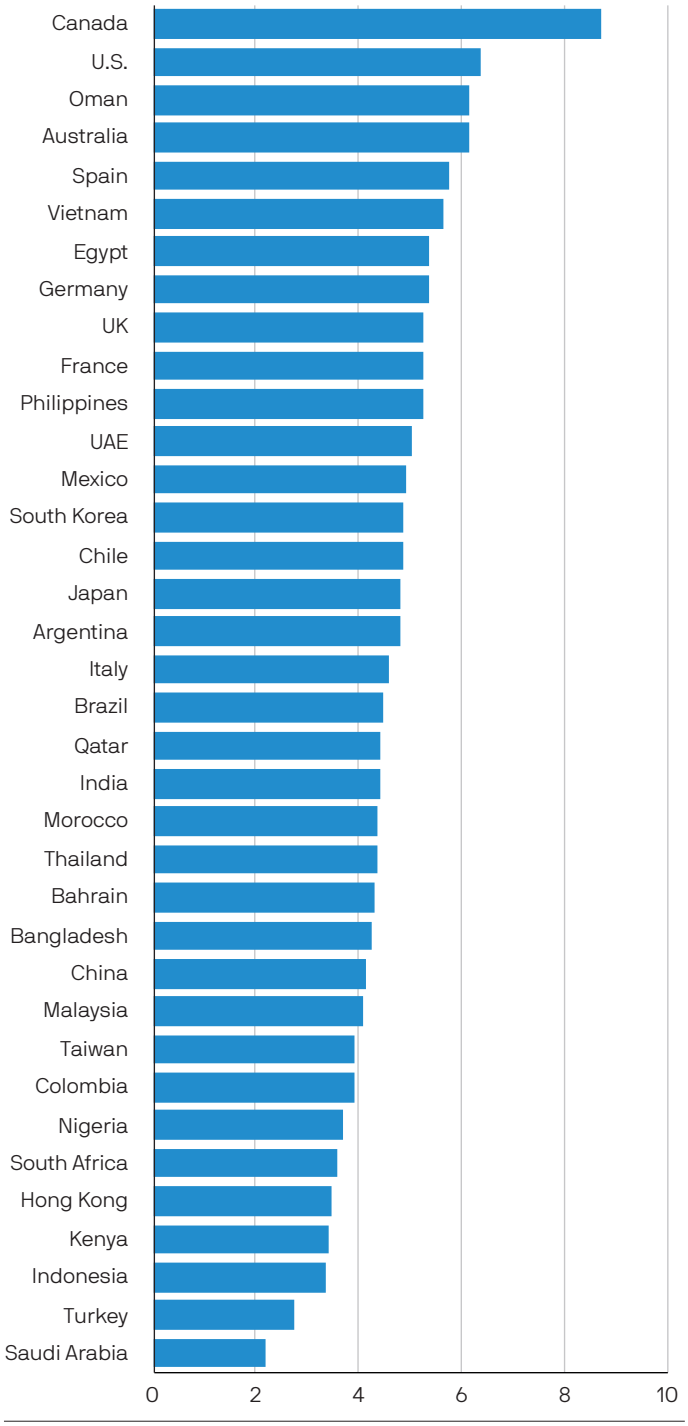
[12] An academic consensus supports the view that migration can be hugely beneficial to an economy's productivity and growth, via knowledge and skills transfer, improving labor market efficiency and migrants' disproportionately high fiscal contributions. Hillel Rapoport and Dany Bahar, "Migrants are key to productivity gains for countries," London School of Economics and Political Science, June 2018; George J. Borjas, "Does Immigration Grease the Wheels of the Labor Market?" Brookings Papers on Economic Activity 2001, no. 1 (2001); Jonathan Portes, "Immigration has made the UK more productive and prosperous – and will again in the future," UK in a Changing Europe, October 2018.

[13] Low scoring economies such as Indonesia and Mexico have negative net migration rates and are hit hard by brain drain. Likewise, despite its high net migration, Saudi Arabia's immigrant integration institutions (immigrant education, political participation, labor market mobility) rank worst.

[14] Still, net negative migration is not all bad. Remittances have increased sevenfold this century and now stand at USD 702 billion annually. The U.S. has remained the top source of remittances since 1995, primarily flowing to India and China, economies that would otherwise be losing out on their migration dividend.

Migration can help older economies with stagnation but may harm some younger economies

Exhibit 5: Migration-Productivity score



Source: J.P. Morgan Asset Management; data as of December 2021.

We can observe that **Europe**, the **U.S.** and **Canada**, older economies that attract strong net migration of working-age people, couple these inflows with institutions to integrate newcomers. This migration dividend can help offset the older age of their native populations. Migration has been a partial solution to the secular stagnation that has characterized these more developed, older economies, and it can continue to play this role.[15]

Consumption growth and the challenge of inequality

Across young EM economies, rising average income levels,[16] urbanization and favorable demographics are important drivers of strong consumption growth. Investment opportunities should be abundant for businesses that can capture the imagination and concerns of these new consumers.

But this promise is severely constrained by a major challenge: inequality.

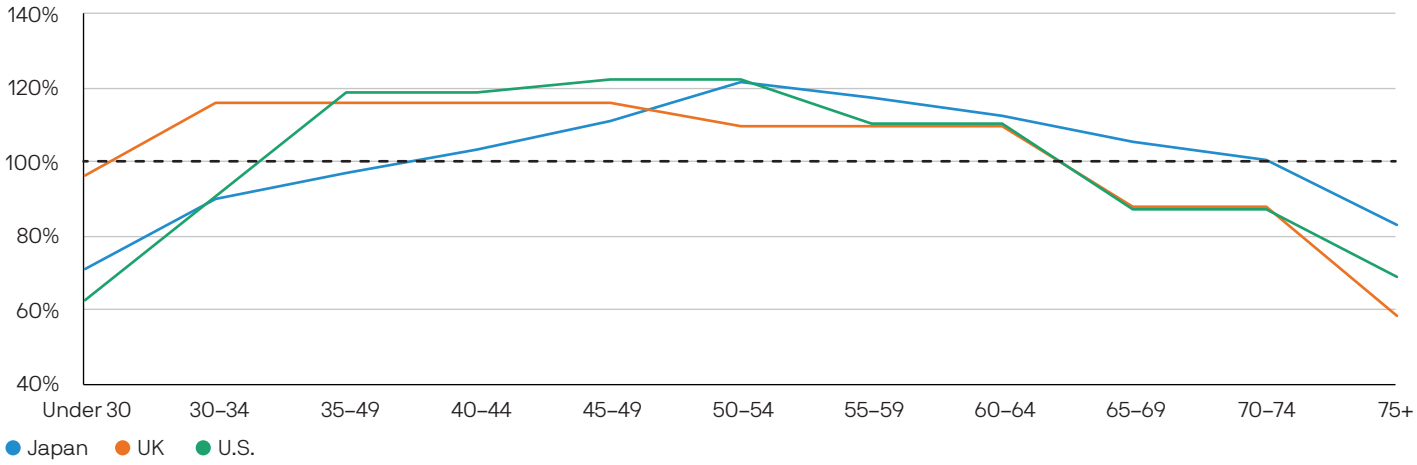
People can't spend money they don't have. The poorest half of the world's population earns only 8.5% of total income and owns 2% of total wealth.[17] Lowering fertility could help ease inequality. Economies that bring down fertility rates (for example, by promoting family planning) can achieve a fairer distribution of resources, increase income per capita more quickly[18] and offer substantial investment opportunities.

Despite the challenges of inequality, favorable demographics should nonetheless make EM consumers a key driver of global consumption growth in the next 10 to 15 years. Younger households (30 to 64 years old), which typically spend more than average (**Exhibit 6**), are expected to increase about 1 percentage point (ppt) as a share of the total in sub-Saharan Africa and Southeast Asia while declining about 4ppt in the U.S., the UK and Japan.[19]

[15] José Alves and Sandro Morgado, "Secular Stagnation: Is Immigration Part of the Solution?" CESifo Working Paper no. 9561, 2022.
[16] The association between consumption and income is stronger for low income compared with middle income economies. Paula-Elena Diacon and Liviu-George Maha, "The Relationship Between Income, Consumption and GDP: A Time Series, Cross-Country Analysis," *Procedia Economics and Finance* 23, July 2015.
[17] *World Inequality Report 2022*, World Inequality Lab, December 7, 2021.
[18] "Children per woman vs. GDP per capita, 2019," Our World in Data, 2019; Penn World Table 2.0; United Nations Population Division, 2015.
[19] The distribution of households by age is estimated using population forecasts from the U.S. Census Bureau for people age 20+.

Younger households tend to spend more – and their numbers are falling in developed economies

Exhibit 6: Household expenditures by age (% average)



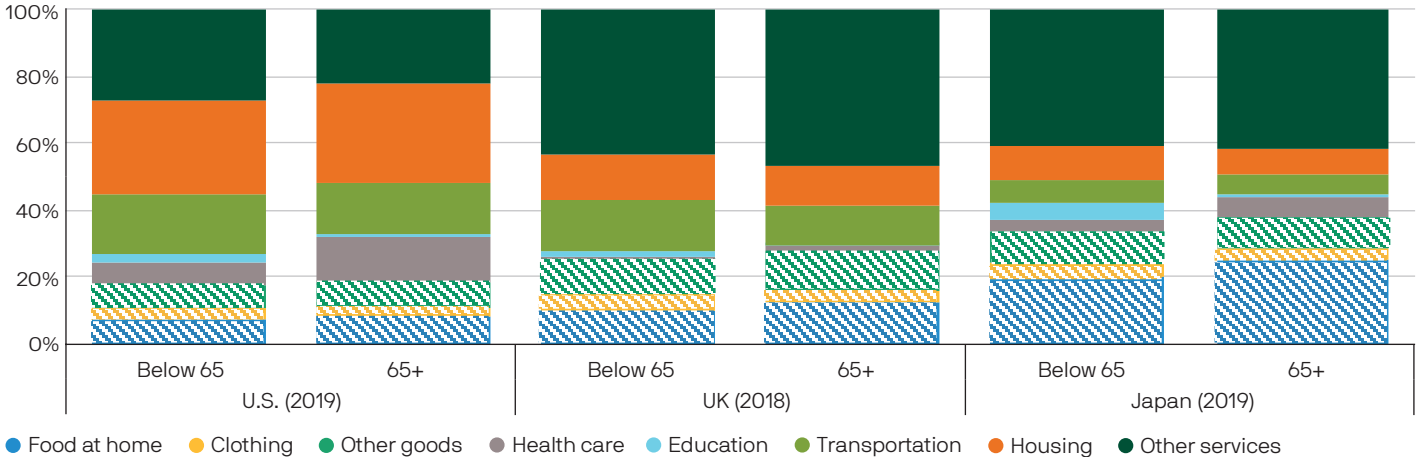
Source: Haver Analytics, MIAC Analytics, ONS, J.P. Morgan Asset Management; data as of December 2019 (U.S., Japan) and December 2018 (UK).

In which categories is EM consumer spending likely to pick up? As GDP per capita increases, we expect food's share of consumption to fall, manufactured goods' share to stay flat and services' share to rise.[20] Consumption patterns also vary with age. Looking across categories of purchases in developed countries (**Exhibit 7**), younger households spend disproportionately more on clothing, educational services and transportation, and less on food at home and medical services. A similar generational pattern, plus EM households' skew younger, would have clear implications for EM consumer markets.

The emergence of new consumers provides attractive investment opportunities. But the increase in consumption equally puts added pressure on current production systems and on the planet overall.

Younger households tend to spend more on clothing, education and transportation

Exhibit 7: Household expenditures by age (% average)



Source: Haver Analytics, Japan Ministry of Internal Affairs and Communication, ONS, J.P. Morgan Asset Management; data as of December 2019 (U.S., Japan) and December 2018 (UK).

[20] Margarida Duarte, "Manufacturing consumption, relative prices, and productivity," *Journal of Macroeconomics* 65, September 2020.

The strain of 10 billion people: Challenges as opportunities

Having considered the demographic and consumption changes ahead for a planet of 10 billion, we turn now to resource constraints and the possibility of investment opportunities.

The population-resource problem is a critical one. The rise of GDP per capita alongside population growth has and will continue to severely strain the earth's energy, water, food, ecosystems and infrastructure. Existing industries, institutions, supply chains and industrial processes need to be reimagined and revamped with adequate investment if the stress on the planet is to be mitigated. We examine those challenges and investment opportunities by theme.

Energy

Energy consumption is the primary source of human-induced greenhouse gas emissions (GGEs), and with more people comes greater energy demand.[21] It's been theorized that economic growth over time eventually brings about large gains in energy efficiency and the tapering of demand.[22] But from where the world stands today, efficiency gains would need to be dramatic – 2.8% in energy efficiency gains per year, well above the 1.8% of recent years – to keep global temperature rise by 2050 below the 2° Celsius threshold that may be catastrophic.[23] This will require significant investment to decarbonize and increase efficiency in all facets of the existing global energy system.

Rapid urbanization – city populations may be 1.5 times larger in 2045 – can offer efficiency gains by spurring structural changes such as transportation economies of scale and better, sustainable technologies.[24] But investment will be needed. Green buildings, electric vehicle charging stations, efficient street lighting and other, as yet undiscovered technologies[25] may all present investment opportunities.

Ships generate about 3% of the world's GGEs but are an essential component of global markets, carrying about 90% of all goods transported globally. Maritime trade volumes are expected to triple by 2050.[26] The industry's climate footprint could range from 90%–130% of 2008's emissions, based on a range of economic and energy scenarios.[27] Those trajectories are incompatible with the International Maritime Organization's emissions target: to halve GGEs by 2050. To achieve that, a significant share of greenhouse gas (GHG) reduction will need to come from the use of alternative fuels; about USD 1 trillion in capital will be needed in land-based and shipping infrastructure to shift from carbon- to hydrogen-based fuels. Investors can participate in this critical global transition.

Food

Without changes to consumption habits, some scientists estimate that in 2050, the planet's human population will use the equivalent of 2 planets' worth of renewable resources each year.[28] For a century, food supply has kept pace with population growth, thanks to chemical fertilizers, vast volumes of water and deforestation. The marginal gains of this model are rapidly diminishing due to GHG reduction commitments,[29] water scarcity, climate change and the need to protect forests as natural carbon sinks. The agriculture sector will need to invest massively in more efficient irrigation and GPS-guided fertilizer spreaders (and other new technologies) for crop yields to continue growing consistently yet sustainably.

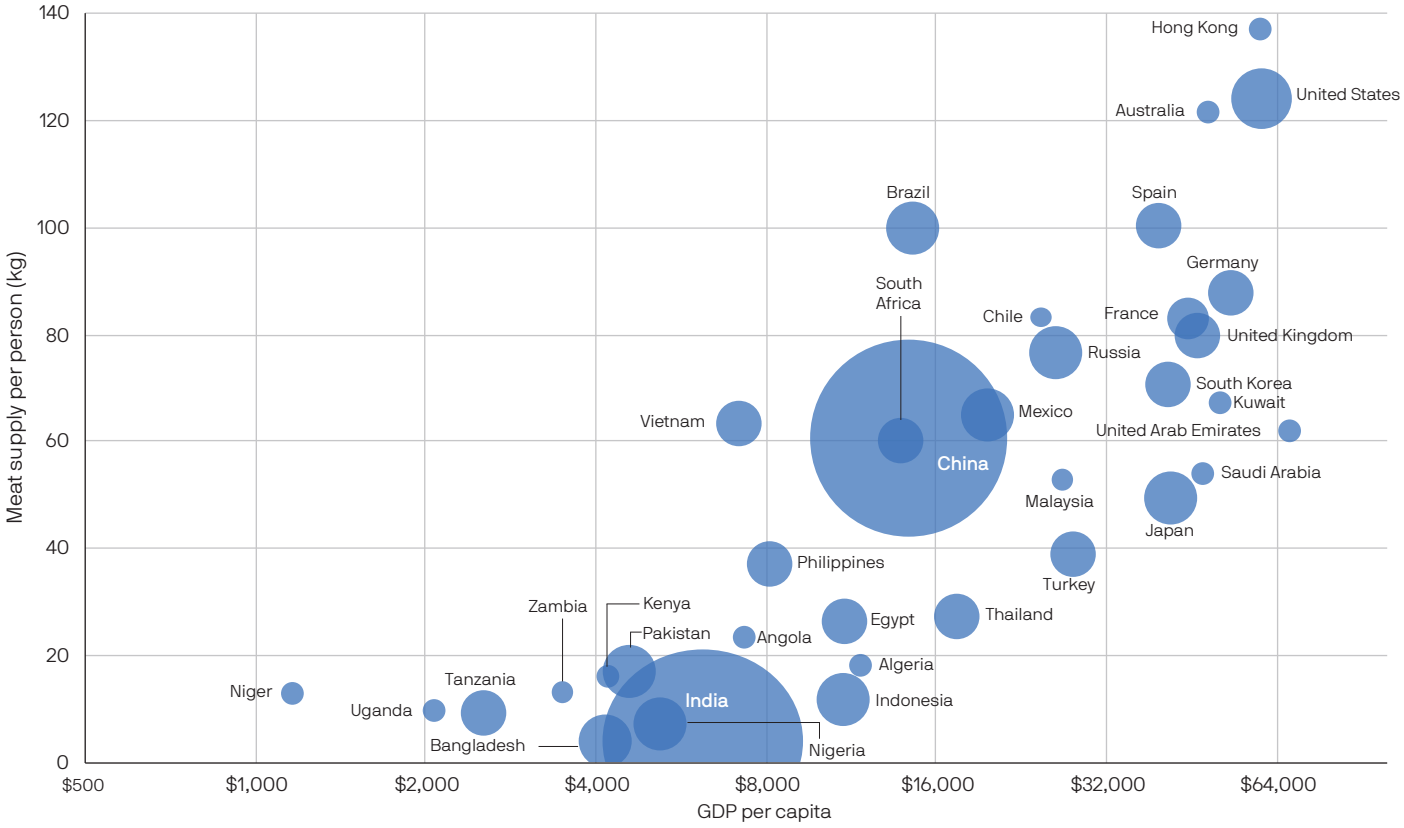
What is grown, farmed and consumed and how land is used must change, too. Meat production is most harmful in GGEs[30] and deforestation. The richest and oldest economies dominate in the consumption of animal protein, although as GDP per capita increases globally, so does the share of animal protein in human diets – growth that is not sustainable[31] (**Exhibit 8**).

Feeding 10 billion people sustainably will require fundamental dietary change – "less meat, more plants," a transition achievable through investment in alternative protein sources. Combined with new, sustainable agriculture technologies, the sector can reduce its carbon intensity and feed a surging world population.

[21] Angel Gurría, "Sustainable Energy Consumption and Climate Change," speech to Centre for International Governance Innovation, October 27, 2007.
[22] According to the Kuznets curve hypothesis, environmental degradation worsens early on as per capita income growth rises, but at a certain level of economic wealth this dynamic reverses and growth is accompanied by environmental improvement.
[23] "Global Energy Transformation: A Roadmap to 2050," International Renewable Energy Agency, 2018. A gain of 2.8% is far above recent years' annual efficiency gains of 1.8%.
[24] Yufeng Chen, Zhitao Zhu and Xi Yu, "How Urbanization Affects Energy-Environment Efficiency: Evidence from China," *Singapore Economic Review* 65, no. 6 (December 2020).
[25] "Rise of Renewables in Cities: Energy Solutions for the Urban Future," International Renewable Energy Agency, 2020.
[26] *Fourth IMO Greenhouse Gas Study*, International Maritime Organization, 2020.
[27] "World Nations Agree to at Least Halve Shipping Emissions by 2050," U.N. Climate Change News, April 14, 2018.
[28] "The Human Footprint," WWF, retrieved October 2022.
[29] The agriculture sector accounts for 18% of global GHG emissions. Countries have committed to reduce this, as they have for other top GHG-emitting industries. This will require reducing the use of chemical fertilizers.
[30] Mainly, this is due to the emission of methane, which has a higher warming potential than CO_2.
[31] Agricultural land covers only 10% of the earth's surface, but 77% of it is dedicated to the production of meat and dairy, disproportionate relative to their contribution to global calories and the protein supply (18% and 37%, respectively).

Consumption of animals is rooted in the oldest, richest nations

Exhibit 8: Share of calories from animal protein vs. GDP per capita, 2017 (dots sized by population)



Source: World Bank, U.N. Food and Agriculture Organization, Maddison Project Database 2020, J.P. Morgan Asset Management; data as of September 2022.

Ecosystems

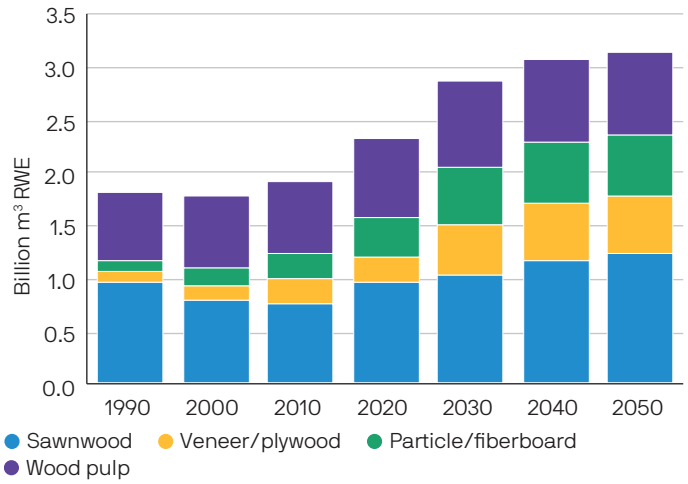
Forests are integral to sustaining life. They are home to half of the world's land-based species, and more than 1 billion people live in and around forests.[32] Population growth has intensified timber demand (the wood-based paneling trade has skyrocketed 800% in 30 years),[33] and global demand is expected to increase 37% by 2050, due in large part to urbanization and economic growth (**Exhibit 9**), driven by demand for new housing construction and new wood products.[34] This growing demand puts our planet at risk, given that forests are the second-largest storehouse of carbon (after oceans) and have a critical role to play in the fight against climate change.

Forest restoration is increasingly complex and expensive yet must move to the forefront of global priorities, given that its cost is a fraction of the risks of inaction.[35] This highlights the importance of managing forests for optimal health as a mitigant to wildfires. Investing in timber as an institutional asset goes back almost 50 years, but total institutional investment is estimated at less than USD 100 billion.[36] This figure should grow, given timber's sought-after historical investment attributes, such as consistent yield, inflation protection and public equity diversification. But this is only part of the story. Demand for forests is also growing because they offer potential carbon sequestration, which fulfills the growing demand for carbon offsets. Living trees as carbon offsets can provide investors with another income stream.[37]

[32] "Deforestation Fronts: Drivers and Responses in a Changing World," World Wildlife Fund, 2021.
[33] World Wildlife Fund – Timber Overview.
[34] Housing construction is being driven by global population growth, and new wood product consumption is driven by cross-laminated timber used in construction and wood fibers used to make sustainable clothing.
[35] As estimated by the CDP, "the cost of responding to forest-related risks remains a fraction of the potential impacts from risks" – just 14%, or USD 3.2 billion. From "The collective effort to end deforestation: A pathway for companies to raise their ambition," CDP, March 2021.
[36] Fiona Stewart and Samantha Power, "Seeing the forest for the trees: Why pension funds should take another look at forestry as an asset class," World Bank Blogs, March 1, 2021.
[37] This year, LTCMA introduces return projections for global core timberland, a maturing asset class suitable for institutional investors for which we forecast annual long-term returns of 6.4%. Anthony Werley, Pulkit Sharma et al., "Alternative asset assumptions: Sourcing uncorrelated returns in a period of rising market risk," 2023 Long-Term Capital Market Assumptions, J.P. Morgan Asset Management, November 2022.

Driven by urbanization, decarbonization and housing demand, timber consumption could rise 37% over the next 30 years

Exhibit 9: Global historical and projected consumption of wood products



Source: Food and Agriculture Organization, J.P. Morgan Asset Management; data as of 2022. M^3: cubic meters; RWE: roundwood (log) equivalent, a measure of volume used in wood product manufacturing.

Infrastructure and the leapfrogging opportunity

Younger nations have the biggest need to build infrastructure, as well as the least-established institutions. Studies point to an astounding USD 94 trillion infrastructure investment gap for just 50 economies through 2040.[38] While this is a daunting challenge, we see significant opportunities for countries to avoid the legacy infrastructure of older countries and to leapfrog directly into modern ones.

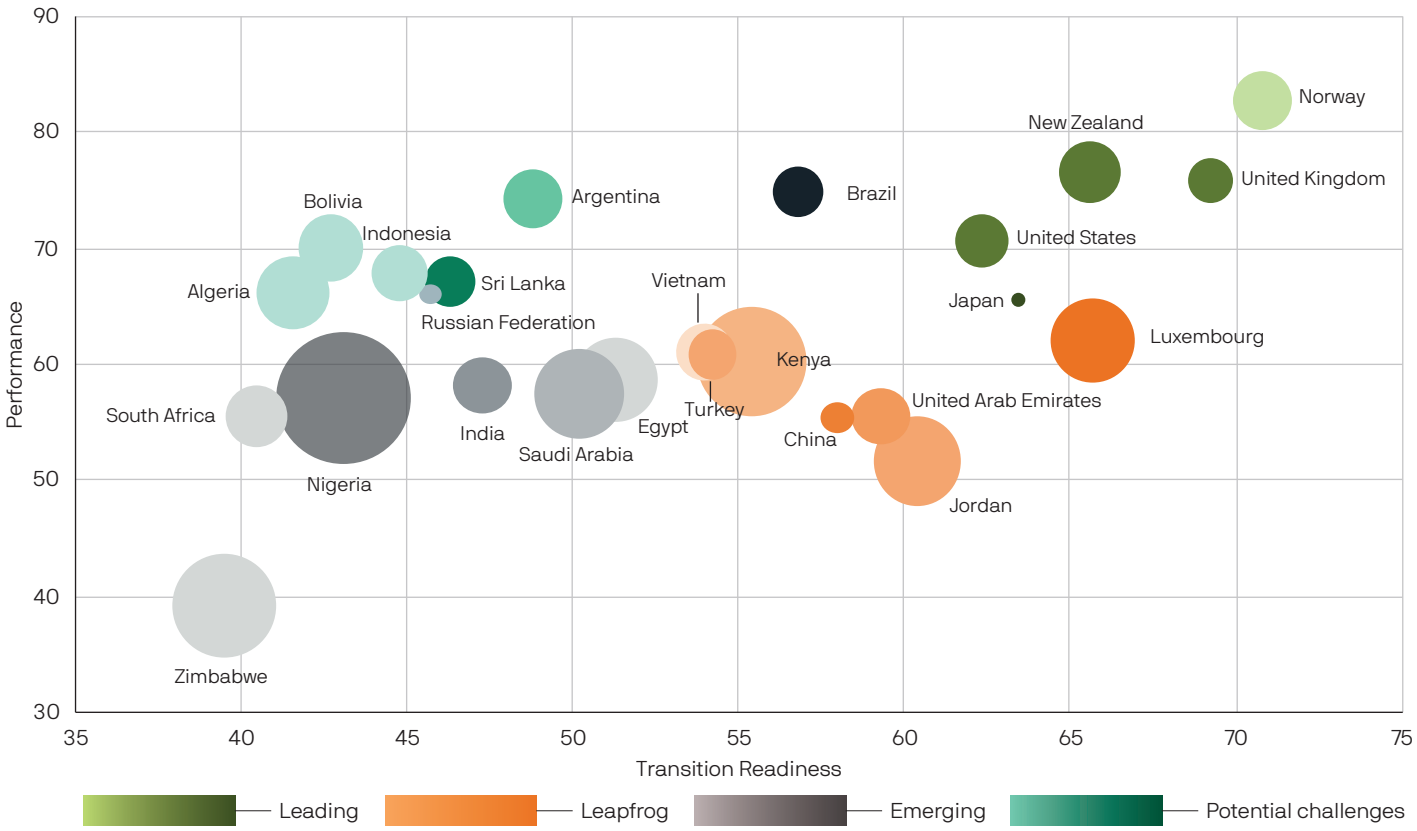
One clear leapfrogging opportunity is in energy infrastructure. There are 940 million people worldwide currently living without access to electricity, representing latent demand.[39] New energy infrastructure can center on renewables, digitalization and decentralization.[40] One example: In Zimbabwe, only 30% of households have electricity, but 85% of people have a mobile telephone. This allows for the development of a market for clean energy through the penetration of pay-as-you-go technology, a mechanism for off-grid customers to pay for decentralized, solar-powered household electricity on a rent-to-own basis.[41] This could solve the problem of solar energy's high upfront costs, lower CO_2 emissions and potentially save EM consumers money vs. other, dirtier energy sources.

The World Economic Forum has looked at the potential trajectory of green energy, based on current transition readiness and performance (Exhibit 2). It identifies "leapfrog countries" as those with high transition readiness but which are constrained by low current performance, indicating a political will to improve but the constraint of a low level of energy infrastructure and economic development. This is where opportunities for investment to have a major impact are likely to be magnified, especially when rapid population growth is added to the mix. South Africa, Malaysia, Vietnam, India, the UAE and Saudi Arabia stand out in this regard (**Exhibit 10**).

[38] Global Infrastructure Hub and Oxford Economics' Global Infrastructure Outlook, 2017.
[39] Hannah Ritchie and Max Roser, "Access to Energy," Our World in Data.
[40] Lorenzo Colantoni, Luca Franza and Giulia Sofia Sarno, "Africa's Energy Future: Energy Leapfrogging Potential in Four African Countries," Istituto Affari Internazionali, 2021.
[41] Ibid.

Economies with high transition readiness and high expected population growth, but low current performance, present the greatest leapfrog opportunities

Exhibit 10: Leapfrog economies



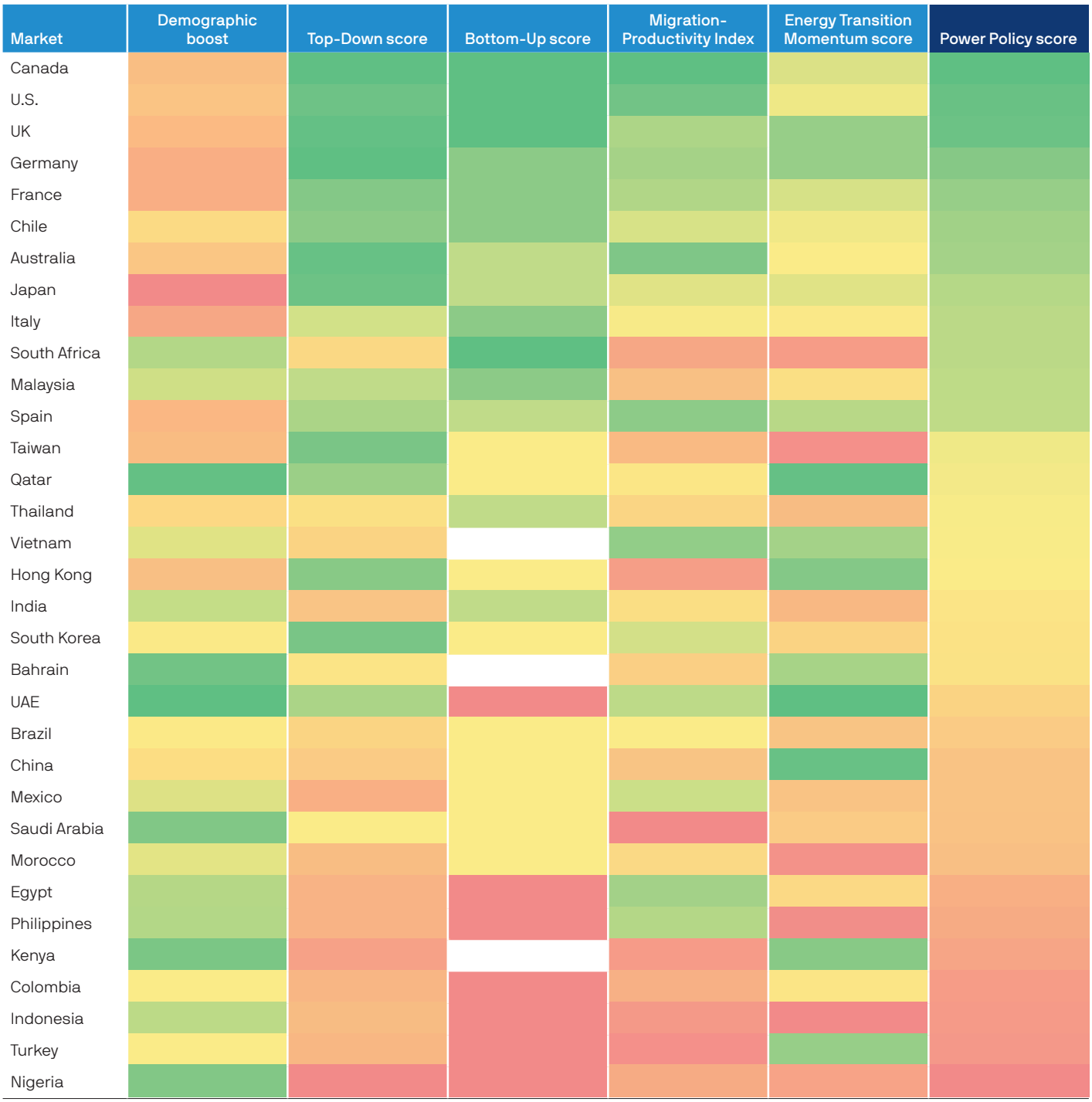
Source: World Economic Forum; data as of 2021. Bubble size based on population growth rate (2022–35). Color indicates strength of net-zero commitment (no pledge, political pledge, in policy document, in law); data from Energy & Climate Intelligence Unit. Transition readiness: Energy Transition Index (capital and investment, energy system structure, human capital and consumer participation, infrastructure, institutions and governance). Performance: World Economic Forum System Performance index (environmental sustainability, energy access, energy security, economic growth and development).

The investment implications of a planet of 10 billion people

Population growth is a precondition for economic growth, yet that outcome is far from inevitable. An economy needs sound national and corporate governance, sustainable resource management and efficient infrastructure. Together, they can turn population growth into a demographic dividend, with robust markets providing goods and services, and spurring innovation to improve living standards (**Exhibit 11**). Among younger economies, India, Vietnam, Malaysia, South Africa, Saudi Arabia and the UAE stand out as the likeliest to attract private capital and find a place in investors' portfolios. Among older countries, Canada, the UK, the U.S., Germany and France have the most potential to deliver better results than their demographics alone would suggest.

Combining demographics with policy helps highlight investment opportunities – and potential pitfalls

Exhibit 11: Power Policy scores by economy



Source: Heritage Foundation, Penn World Table (PWT), Transparency International, World Bank Worldwide Governance Indicators (WGIs), World Economic Forum, J.P. Morgan Asset Management. Demographic boost is based on the old-age dependency ratio, which is the number of people aged 65+ per 100 people of working age (20–64). Top-Down score is based on J.P. Morgan Asset Management country-level analysis. It is a blended governance and education score based on 40% WGI Rule of Law (measures the extent to which agents have confidence in and abide by the rules of society), 20% Index of Economic Freedom (measures jurisdictions against one another in terms of parameters such as trade freedom, tax burden, judicial effectiveness, etc.), 20% Corruption Perceptions Index (measures how corrupt each country's public sector is perceived to be), 20% PWT Human Capital Index (measures average years of schooling and an assumed rate of return to education). Score components as of Heritage (2021), PWT (2021), WGI (2021). Bottom-Up score and Migration-Productivity Index are based on proprietary J.P. Morgan Asset Management analysis. Energy Transition Momentum score is based on the World Economic Forum Energy Transition Index (capital and investment, energy system structure, human capital and consumer participation, infrastructure, institutions and governance). Data as of 2021.

Some of the world's youngest economies (many in sub-Saharan Africa) have access to massive natural and renewable energy resources but currently lack the institutions to convert these into an economic dividend. They need to develop stronger governance and infrastructure, and links to global supply chains in order to attract more global capital.

All of this growth requires the raw inputs of the earth. However, the alarming pace of depletion of these resources is straining the planet. Yet, exciting investment opportunities can be found in solutions to the challenges – in rethinking infrastructure, energy and food consumption habits; in more sustainable land use, agriculture and forestry. The themes include green infrastructure, sustainable agriculture technologies, alternative sources of protein and reforestation.

Ultimately, private capital should complement public initiatives to unlock the potential demographic dividend in the most sustainable way. In a world of higher rates, sound policy will be the key to attract scarcer funding, creating winners and losers along the way. Our scores and investment themes may help investors decide where they can best participate in the opportunities being generated by a still fast-growing global population.

II Assumption articles

Currency exchange rate assumptions

Rich U.S. dollar headed toward fair value

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In brief

- Our long-term fair value exchange rate assumptions change relatively little, as projected inflation differentials have remained stable despite rapidly rising inflation and aggressive monetary policy tightening over the past year.
- We maintain our conviction that the U.S. dollar – markedly richer since our last edition due to rapidly tightening monetary policy and increasing recession risks – unwinds much of its overvaluation over the Long-Term Capital Market Assumptions time horizon.
- Since currency weakness through easy monetary policy adds to inflation, we believe central bankers will prioritize, to varying degrees, their inflation targets above currency competitiveness. This should enable some currencies to fully converge to fair value over our long-term horizon.
- We expect the Australian and Canadian dollars, the Swiss franc, the Swedish krona and eventually even the euro to converge to fair value vs. the USD.
- The Chinese renminbi appreciates less vs. the USD than fair value would imply, since a competitively valued currency remains an important support for the export sector. Consequently, other Asian currencies, such as the Japanese yen, the Korean won and the Taiwanese dollar, also likely appreciate less than their fair value would imply.

Our 2023 FX return assumptions are directionally little changed, but our expectations for the dollar's decline have grown in magnitude. The forceful monetary policy response of the Federal Open Market Committee (FOMC) made the USD more attractive in the near term and widened the gap between its value at the time of writing and fundamental fair value. On a nominal trade-weighted basis, we now forecast the dollar to depreciate 1.5% per annum, compared with last year's projection of 0.8%.

As we publish, global monetary policy is nine months into a regime shift: After an uncomfortable rise in long-term inflation expectations, the FOMC has tightened monetary policy rates at the fastest pace in four decades. Global monetary policy is progressing beyond neutral territory, and developed market (DM) central banks' forward guidance has maintained its hawkish stance. With current conditions changing so swiftly, it is perhaps surprising that we are leaving our assumptions for long-term fair value in currency exchange rates largely intact.

We continue to believe that the USD is due for a sustained period of gradual decline, given the U.S. economy's higher inflation profile relative to most other developed markets. But 2022's broad USD appreciation leaves its mark as we update our expectations for the magnitude of the dollar's decline (**Exhibit 1A** and **1B**).

We have argued that the successful reflation of the global economy, and a return to trend growth, were necessary catalysts for currencies to converge toward fundamental fair value. Reflation has finally occurred: Through 2022, inflation surged globally and hawkish turnabouts by the European Central Bank (ECB), the Reserve Bank of Australia and other major central banks narrowed the lead of the Federal Reserve (Fed), which remains at the vanguard of the DM central bank hiking cycle.

Yet, a return to trend growth outside of the U.S. has remained elusive in the face of the ongoing energy crisis in Europe, a lingering drag from COVID-19 in many places and a worsening real estate market in China. As a consequence, in nominal terms the broad USD index was, at publication time, at its richest valuation the 1980s.

We expect the impact of these headwinds to fade well within our LTCMA time horizon – and with them, the USD's strength. But until then, the dollar should enjoy some more time in the spotlight.

The wider gap between today's spot rates and our estimates of fair value dominates the y/y change in our long-term assumptions for foreign exchange returns

Exhibit 1A: LTCMA FX return drivers: Major DM currencies vs. USD

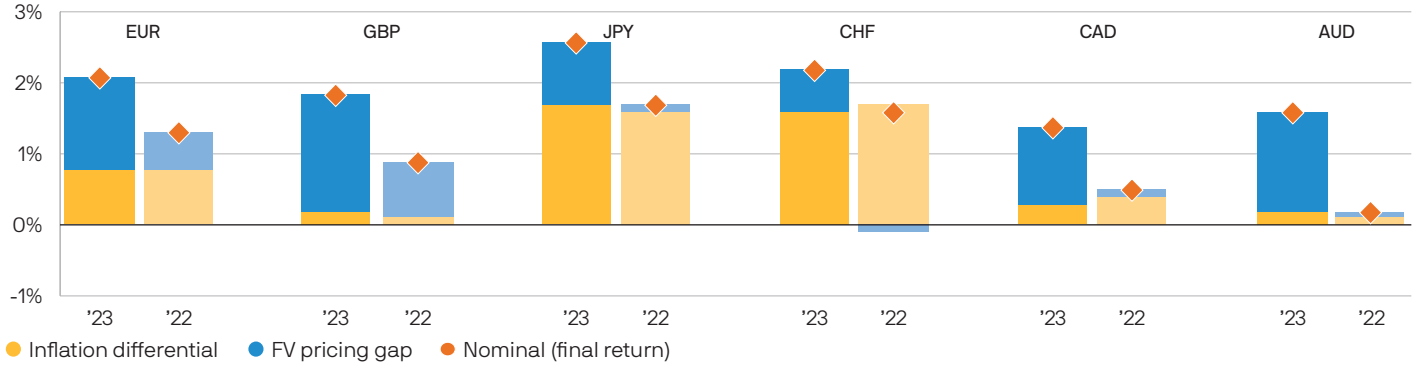
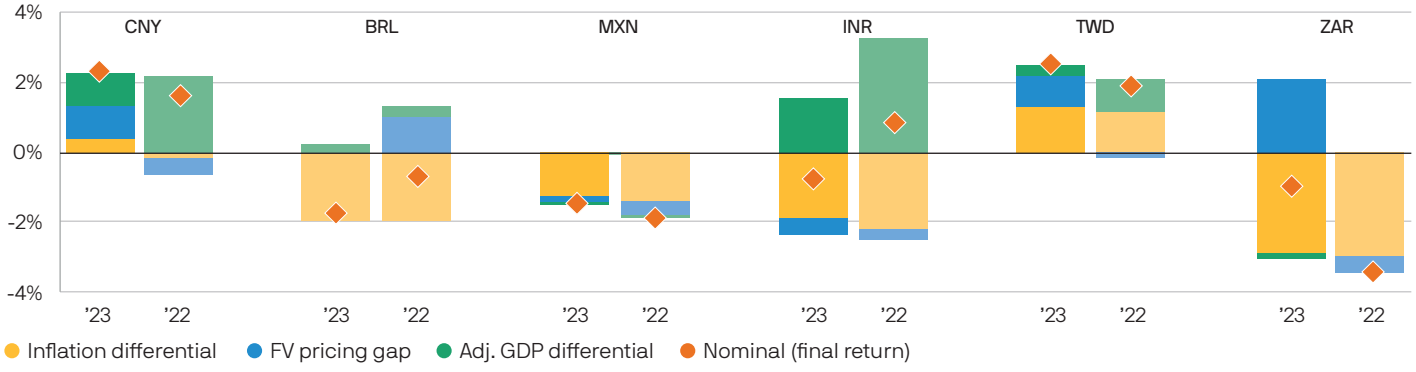


Exhibit 1B: LTCMA FX return drivers: Major EM currencies vs. USD



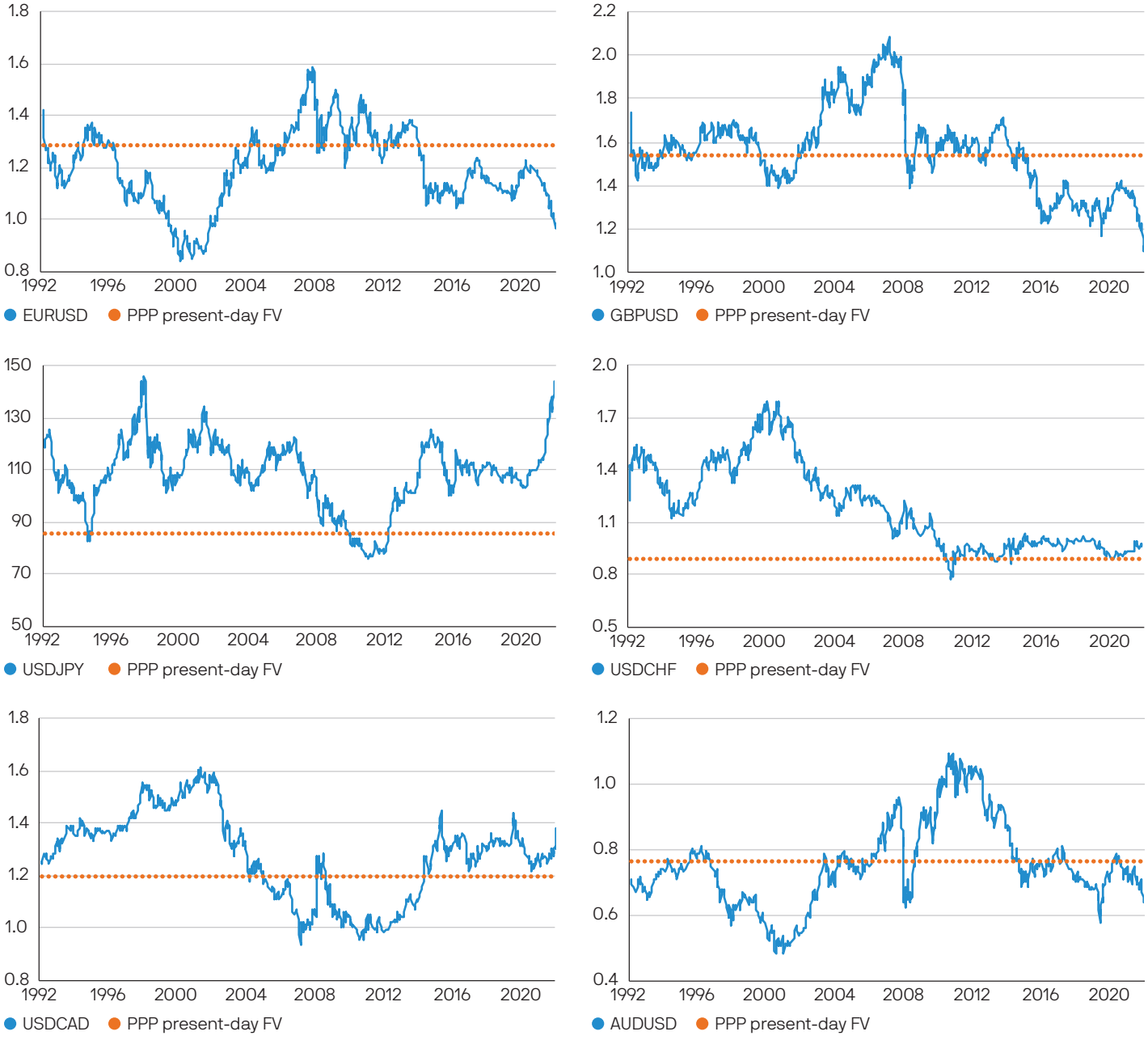
Source: J.P. Morgan Asset Management; data as of September 30, 2022. FV: fair value; EUR: euro; GBP: British pound; JPY: Japanese yen; CHF: Swiss franc; CAD: Canadian dollar; AUD: Australian dollar; CNY: Chinese renminbi; BRL: Brazilian real; MXN: Mexican peso; INR: Indian rupee; TWD: Taiwanese dollar; ZAR: South African rand.

Model and methodology

A purchasing power parity (PPP) framework continues to be the basis of our approach to determining the present-day fair value exchange rates (**Exhibit 2**). PPP itself is a simple enough concept, but national statistical agencies use different methodologies when measuring price levels, introducing complexity when we set out to use data series across countries. Leveraging the results of a recently completed research project, we now systematically strip out one of the more notable differences among national price series data – housing-related inflation – from our calculations of present-day fair value.

The deviation between spot exchange rate to USD and PPP fair valuations has widened across developed markets

Exhibit 2: PPP fair value and spot exchange rates for selected currencies



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022.

To arrive at our long-term exchange rate assumption (future fair value), we project present-day fair values forward using the Long-Term Capital Market Assumptions' (LTCMAs') underlying macroeconomic assumptions, as follows:

- **Developed market currencies**: We reflect the expected change in a country's terms of trade over 10 to 15 years by adjusting today's fair value by the differential between the two countries' projected inflation rates.
- **Emerging market (EM) currencies**: We make an additional adjustment for the expected differential in GDP growth per unit of labor. As part of this year's process, we update our calibration for the impact of the per capita growth rate differential. We now expect the exchange rate to change at roughly half the rate of the per capital growth rate differential.
- **Implications of our assumptions' reliance on PPP**: An unprecedented mix – economic normalization after the depths of COVID-19, geopolitical tensions, and monetary and fiscal stimulus – has clearly generated a global inflationary impulse. However, our assumptions' reliance on the concept of PPP implies that an individual economy's inflation outcome matters comparatively less when, as now, it is mirrored globally.
- **Safe-haven currencies**: Our computation of the present-day fair value evolves over time, but does not explicitly incorporate a temporary or cyclic safe-haven premium. Today's monetary policymakers are (almost) uniformly combating inflation and tightening financial conditions, meaningfully raising the risk of a near-term recession.

  A portion of the overvaluation that we observe in the U.S. dollar today is likely the result of its safe-haven properties amid recessionary risks. Our more aggressive projection of USD depreciation does not account for how long this premium may persist in the near term. We expect that the USD cedes some richness over the full LTCMA horizon but the catalyst for depreciation may not be imminent.

Normalization and sensitivity

The key sensitivity issues underlying our currency assumptions modeling are how much hotter an economy's rate of inflation runs above our projected rate, and how much higher a real GDP growth rate it realizes above our macro forecast.

A 1% increase in an economy's equilibrium rate of inflation (absent an increase in another economy's inflation rate) mechanically implies about 1% currency depreciation per year over our forecast horizon. This holds true in emerging markets, plus we add the following: 1% of real GDP growth per unit of labor by a single economy implies about 0.5% of additional currency appreciation per year. Thus, economies' transitions from their current inflation rates to our lower projected equilibrium rates should have a substantial impact on the U.S. dollar's trajectory.

As the macro assumptions chapter discusses, higher wage growth, higher inflation expectations and the lagged impact of higher home prices mean that most countries' inflation may for a prolonged period remain above central bank targets, and above our long-run inflation trend estimates. Should CPI inflation across the global economy fall toward the equilibrium trend rate even more slowly than expected, our currency assumptions would then likely overstate USD depreciation. This is particularly pertinent for the euro, the pound sterling and the Mexican peso, currencies of the U.S.'s major trading partners, where we estimate the transition of inflation back to equilibrium could be most challenging.[1]

The cost of a cheap currency

One can see how the rest of the world's currencies are under threat from a cycle of undervaluation: Sticky inflation implies depreciation under PPP, and a weak currency imports higher prices. In the prior economic cycle, low inflation globally meant there was little cost to policymakers encouraging relative export price competitiveness, particularly to the U.S., via direct intervention or easy monetary conditions. The Chinese renminbi and Japanese yen's cheapness to the dollar were chief examples. Looking ahead, we expect the world's central banks to varying degrees will stop making currency competitiveness a priority.

As such, while we generally have high regard for policymakers' ability and desire to achieve inflation targets (helping explain why we maintain our conviction in secular USD depreciation), not all currencies are projected to fully converge to fair value.

[1] Michael Hood and David Kelly, "Inching forward: Lingering inflation, moderate growth," 2023 Long-Term Capital Market Assumptions, J.P. Morgan Asset Management, November, 2022. See exhibit 7.

Major currency pairs

We have grouped currencies thematically into three buckets: "cyclical reversers" likely to appreciate as much as their fair value would imply and relatively more when returns are compared to the prior cycle; "competitive devaluers" likely to appreciate less than their fair value would imply as those central banks continue to favor export competitiveness; and the "structurally challenged," which we believe face idiosyncratic hurdles that they will need to overcome before a full appreciation to their fair value may occur.

Cyclical reversers: AUD, CAD, CHF, EUR and SEK

These currencies remained undervalued vs. the USD through the prior cycle, relative to their LTCMA-implied end points. The ECB's recent repeal of negative interest rate policy, the introduction of anti-fragmentation tools[2] and the Swiss National Bank's preference for unwinding its FX reserves to prevent CHF weakness suggest a departure from deliberate currency suppression and a movement toward a new regime of higher nominal yields and stronger exchange rates.

The euro area's energy dependence is its key vulnerability during the current Russia-Ukraine war. Until oil pipelines and energy supplies are more secure, euro area current account balances stand to deteriorate because of elevated commodity import bills. Nonetheless, from a capital account perspective, the high quality of euro area sovereign debt – that no longer has a negative yield – is likely to have strong, long-standing implications: attracting capital inflows into the region.

We expect the net effect of higher yielding debt on the euro area's balance of payments to be sustained appreciation toward LTCMA-implied fair values. We anticipate appreciation of 2.1% per annum over our assumptions' horizon for the euro and 2.2% for the Swiss franc (**Exhibit 3**).

We maintain our conviction in broad based USD depreciation

Exhibit 3: Assumptions for changes in selected currency exchange rates vs. USD,* nominal and real

		Nominal			Real			Forecast level (conventional)			
	Current Spot	2023	2022	Chg	2023	2022	Chg	2023	2022	Chg	Chg %
Australian dollar	0.64	1.60%	0.20%	1.40%	1.40%	0.10%	1.30%	0.78	0.74	0.04	5.41%
Brazilian real	5.41	-1.80%	-0.70%	-1.10%	0.00%	1.00%	-1.00%	6.79	5.96	0.83	13.93%
Canadian dollar	1.38	1.40%	0.50%	0.90%	1.10%	0.10%	1.00%	1.16	1.19	-0.03	-2.64%
Swiss franc	0.98	2.20%	1.60%	0.60%	0.60%	-0.10%	0.70%	0.75	0.76	-0.01	-1.38%
Chinese renminbi	7.11	2.30%	1.60%	0.70%	0.90%	-0.40%	1.30%	5.35	5.29	0.06	1.21%
Euro	0.98	2.10%	1.30%	0.80%	1.30%	0.50%	0.80%	1.27	1.36	-0.09	-6.54%
British pound	1.12	1.90%	0.90%	1.00%	1.70%	0.80%	0.90%	1.40	1.51	-0.11	-6.98%
Japanese yen	144.74	2.60%	1.70%	0.90%	0.90%	0.10%	0.80%	105.01	90.13	14.88	16.51%
Mexican peso	20.12	-1.50%	-1.90%	0.40%	0.00%	-0.40%	0.40%	24.30	26.18	-1.88	-7.16%
Swedish krona	11.11	2.60%	1.40%	1.20%	2.10%	0.90%	1.20%	8.06	7.37	0.69	9.39%

Source: J.P. Morgan Asset Management; data and forecasts as of September 2022. * All exchange rates are quoted in market conventional format.

[2] In July 2022, the ECB introduced an instrument allowing it to buy eurozone bonds, amid concerns tightening monetary policy could cause very sharp bond yield spikes at different maturities, destabilizing monetary policy transmission, known as fragmentation. "ECB's New Anti-Fragmentation Tool to Reduce Fiscal Risks as Rates Rise," *Fitch Wire*, Fitch Ratings, August 3, 2022.

Competitive devaluers: JPY, CNY, KRW and TWD

We expect that these Asian economies are likely to retain comparatively low underlying inflation, implying a low cost to maintaining an easy monetary policy bias. We expect that each economy's central bank will continue to engineer relative export price competitiveness. Our assumptions therefore reflect a smaller appreciation than a full convergence to fundamental fair value would imply.

In particular, we expect that the appreciation of the yen will be delayed owing to the Bank of Japan's efforts to reflate the economy through negative interest rate policy (despite today's historically cheap currency valuations). We also anticipate more of China's onshore commodities trade to be denominated in renminbi because of Russia's exclusion from the global SWIFT (Society for Worldwide Interbank Financial Telecommunication) banking system, further limiting the likelihood of inflation and reducing the impetus for the People's Bank of China to adjust its currency intervention policy.[3]

The structurally challenged: GBP, BRL, MXN and ZAR

We see this group of currencies facing idiosyncratic hurdles that lead us to forecast that they will not fully converge to fundamental fair value over our LTCMA time horizon. Most notably, the British pound and the Brazilian real are likely to encounter substantial political event risk during the first half of the LTCMA horizon.

The GBP's outlook is obscured by tensions surrounding the Northern Ireland Protocol, the call in some quarters for a second Scottish independence referendum and the UK's dependence on Russian energy, to name a few. The BRL confronts Brazil's deteriorating fiscal position and the possibility that a new administration, led by the Workers' Party, could directly intervene in FX markets to contain undesirable volatility.

It is too soon to have a conviction about how these challenges will be resolved. However, inflation concerns are expected to linger in these regions throughout the assumptions horizon, limiting our expectation that the British pound and the Brazilian real will recover vigorously.

Easing inflation concerns, more balanced global growth should trigger USD normalization

Our currency assumptions project that the U.S. dollar unwinds a significant portion of its broad-based overvaluation. We posit that a reversal in USD strength has not occurred so far because the usual cost of maintaining export price competitiveness – inflation – was not onerous in a world of low inflation. Going forward, however, that is no longer the case: We expect monetary policymakers globally to face greater price pressures, leading them to converge to a more hawkish stance, and a sole focus on export price competitiveness to no longer be regarded as a favorable policy outcome.

We already see the start of this policy convergence, but the USD has cyclical strength at the present time. Markets will require a catalyst for that to be discounted. Such a catalyst will take time to materialize; at the earliest, it may come when the Federal Reserve steps back from the hawkish stance that prevailed at the time of writing.

[3] The People's Bank of China's rather long-standing intervention policy, purchasing foreign exchange in currency markets, sometimes limits CNY appreciation vs. other currencies, in effect maintaining a currency peg.

Fixed income assumptions

Bonds are back – after the biggest-ever drawdown

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In brief

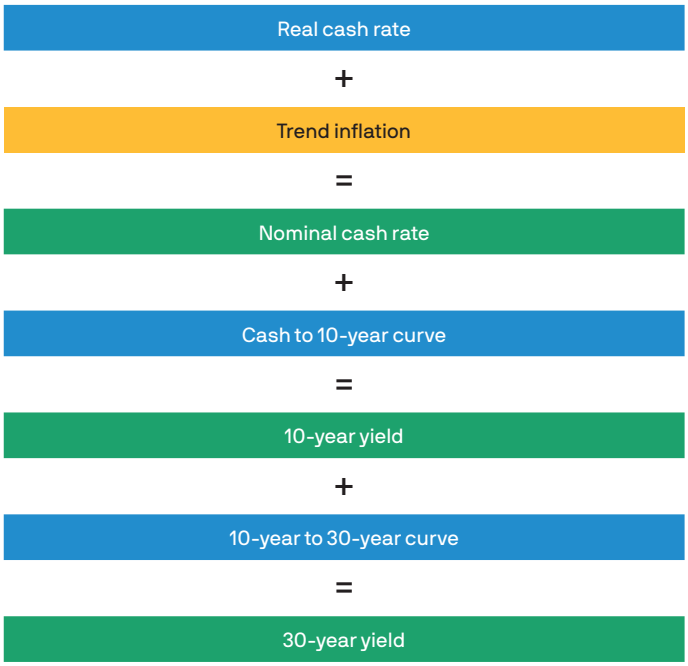
- For the first time since the global financial crisis, the expected normalization of yields raises our long-term return forecasts across most markets: With bond yields now at or above expected cycle-neutral averages, our return forecasts rise significantly and the outlook is more stable.
- High inflation and hawkish central banks sent bond yields much higher since our last edition; almost all the increase in our 2023 fixed income return forecasts derives from these higher starting points.
- Our cycle-neutral bond and cash rate return assumptions rise across developed markets. In inflation-linked bonds, higher inflation forecasts should shift the breakeven curve higher. Our long-term credit and loan spread assumptions are little changed.
- Emerging market (EM) debt assumptions are little changed, despite greater regional heterogeneity. Middle Eastern petroleum producer economies, for example, look healthier. Some Latin American economies are fighting inflation and many frontier economies face crises, helping to lift index starting yields and spreads – we view that as a reflection of near-term risk. We do not adjust our EM credit spread assumptions.
- Increasingly, we believe bonds are again becoming a good risk hedge if we are correct in our expectation that inflation will eventually retrace back toward central bank targets.
- Leverage does not seem stretched in credit markets; while defaults may drift higher over our Long-Term Capital Market Assumptions horizon, recovery rates should also increase towards historical average levels. We leave our overall loss rate forecast unchanged.

Model and methodology

Our Long-Term Capital Market Assumptions (LTCMA) cycle-neutral forecasts follow a building-block approach (**Exhibit 1**). We first combine our estimates of real cash rates with the latest LTCMA inflation projections to generate estimated nominal cash rates. Next, we forecast the slopes of government bond curves to generate 10-year and 30-year bond yields, interpolating across the curve for other maturities. This produces a sovereign yield curve in each currency. These sovereign yield curves form the base for all our fixed income assumptions. To these curves, we add spread forecasts for corporate and other nonsovereign debt sectors that we believe are fair based on the projected macroeconomic environment and the structural changes we anticipate. By combining an expected transition path from current yields to these projected yields over time with the compositional characteristics of each relevant debt market index, we ultimately arrive at forecast returns across all fixed income markets (**Exhibit 2**).

How we produce our fixed income return forecasts

Exhibit 1: LTCMA fixed income building blocks, sovereign debt



Source: J.P. Morgan Asset Management; as of September 30, 2022.

Normalization of rates is no longer a drag on average returns in most markets

Exhibit 2: Building-block fixed income return projections for G4 countries

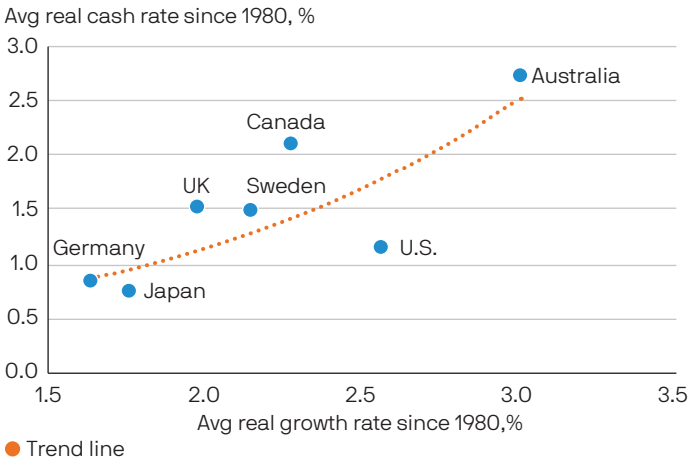
	USD		GBP		EUR		JPY	
	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return	Cycle-neutral average yields	Return
Inflation	2.6%		2.4%		1.8%		0.9%	
Cash	2.3%	2.4%	2.2%	2.2%	1.4%	1.3%	0.5%	0.4%
10-year bond	3.2%	4.0%	2.6%	3.8%	2.2%	3.0%	1.0%	0.6%
Long maturity	3.5%	4.2%	2.7%	4.4%	2.5%	3.6%	1.0%	0.7%
Investment grade credit	4.7%	5.5%	4.3%	5.7%	3.2%	3.6%	1.3%	1.1%
High yield	7.7%	6.8%			5.9%	5.7%		
Emerging market debt*	6.9%	7.1%						

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022.
Long-maturity government bond index: Citi EMU GBI 15+ yr EUR; Citi Japan GBI JPY; FTSE UK Gilts Under 15+ yr GBP and Bloomberg U.S. Treasury 20+ yr USD. High yield: Bloomberg US High Yield 2% Issuer Cap USD and Bloomberg Pan-European High Yield EUR. Emerging market debt: J.P. Morgan EMBI Global Diversified Composite. Cycle-neutral: the average yield we expect after normalization.
* Emerging market local currency debt.

Real cash rate forecasts take into account our view on each economy's economic equilibrium rate (R*) and how dovish or hawkish that central bank would need to be, on average, relative to this level to achieve its objectives. In general, while real growth rates and real cash rates across economies have differed, one consistent theme is the positive relationship between the real growth rate and the real cash rate (**Exhibit 3**).

Our forecasts reflect the positive cross-sectional relationship between growth and real cash rates

Exhibit 3: Average real cash rates vs. growth since 1980



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Our yield curve slope forecasts reflect our estimate of the term premium and average rate expectations over a cycle. Both depend heavily on expected monetary and fiscal policy, and the net supply outlook for each part of the curve.

For corporate credit and other nonsovereign debt markets, our approach also aims to forecast average neutral spreads for investment grade (IG), high yield (HY) and emerging market (EM) corporate debt. We begin with historical long-term spreads and adjust them for any structural changes we believe will impact their level over the assumptions horizon. To do this, we break the current index down into smaller, more homogeneous components, calculate average historical spreads and then adjust for duration changes that these market sectors may have experienced over time. We then re-create the overall index using the projected spreads. Finally, we qualitatively adjust the spreads to incorporate projected structural trends.

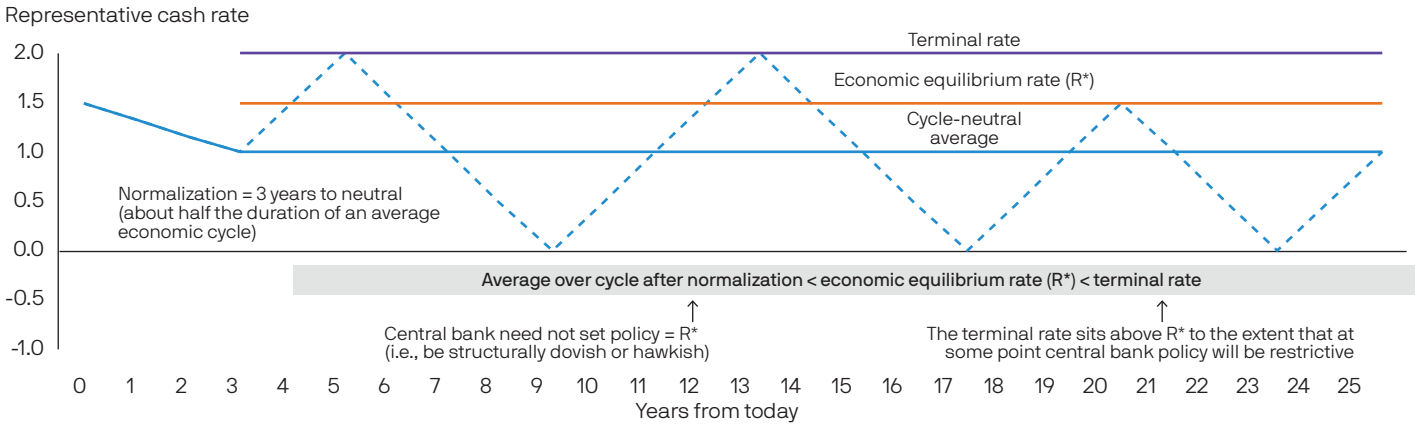
The key building blocks of our return forecasts combine these long-term spread forecasts with the path for sovereign yields, projected default rates and the associated recovery rates.

Terminology: What we are, and are not, forecasting

The LTCMA forecasts for cash and longer-term sovereign bond yields, as well as the spread at which we expect different sectors of nongovernment debt to trade, are cycle-neutral averages. They represent the average yields we expect to prevail across several cycles after an initial period of interest rate normalization (**Exhibit 4**). We forecast cycle-neutral averages to create and maintain consistency between the LTCMA's macro assumptions, the path of monetary policy and structurally informed market trends. Of course, to generate average per annum returns, we also need to forecast how long it will take to return to these cycle-neutral averages – the normalization period.

We forecast cycle-neutral average rates we expect after normalization – not R* or terminal rates

Exhibit 4: Cycle-neutral average, equilibrium and terminal rates – representative example



Source: J.P. Morgan Asset Management; data as of September 30, 2022. This year, for the first time in many years, prevailing rates for most assets are close to or above the neutral level we forecast in the LTCMA. In this case normalization will have a positive impact on the returns. This year we also revert to a 3-year normalization time horizon as default, ending the years where we showed a stylized two-stage normalization process with an initial low-for-longer period followed by a linear rise in rates to neutral. The 3-year default continues to be stylized, with linear steps and in duration based on the average length of an economic cycle. The actual pace and duration may differ and rates may continue to move further away from neutral first, before reverting over time to our forecasted neutral rate, on average.

We are not explicitly forecasting items such as an economic equilibrium rate (R*, an unobservable real cash rate that is neither expansionary nor contractionary). While our view on where R* will settle is very important, central bank policymakers set nominal cash rates and will differ from R* depending on their monetary policy stance. For example, over the last decade, central banks have spent much more time below what would be considered the economic neutral rate than above it.

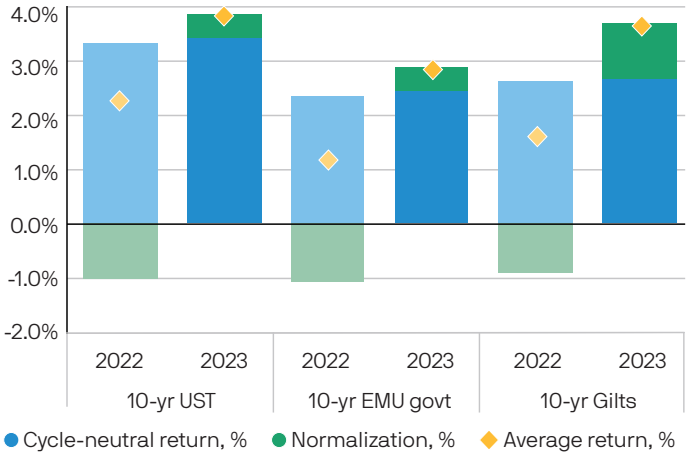
We are also not explicitly forecasting a terminal rate, the highest cash rate a central bank will achieve, although, of course, our view on terminal rates will play an important role in determining our forecasts for average yields and the slope of the curve.

Normalization and sensitivity analysis

Unlike our previous set of assumptions of the last 10 years, we no longer see normalization as a drag on long-term returns. Last year, the embedded drag reduced the annual average expected return approximately 1 percentage point (ppt) on a 10-year government bond. Since then, fixed income markets effectively have more than fully reversed this normalization drag (**Exhibit 5**).

No more drag from normalization

Exhibit 5: Major fixed income market return assumptions with normalization component, 2022 vs. 2023



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Our return forecasts are therefore much higher and more evenly distributed over time. With bond yields currently close to their cycle-neutral averages, the length of the normalization window becomes a far less important input. We therefore have reverted to our default length of three years for yields to normalize to our forecasts.

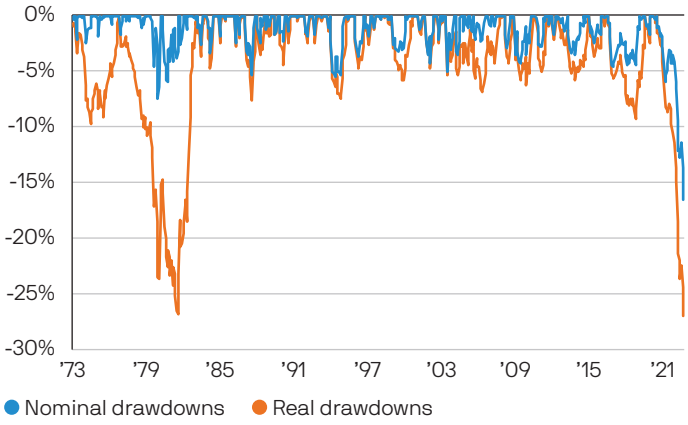
Key markets and asset classes: Back to fair value

A combination of persistently high inflation and more hawkish central banks in 2022 sent cash and bond yields markedly higher. The J.P. Morgan Government Bond Index (GBI) and 10-year U.S. Treasury yields have risen more than 225 basis points (bps) since our last edition – for the Treasury index, this resulted in the biggest nominal drawdown since the creation of the Bloomberg Treasury index, on par with the 1970s in real terms (**Exhibit 6**). At long last, bond yields are at or above our cycle-neutral averages, resulting in much higher expected returns. The improved starting valuations imply that investors can expect to earn a total return in excess of the forecasted average yield on most indices.

High inflation and more hawkish central banks prompt the biggest-ever nominal decline

Exhibit 6: U.S. Treasury index drawdowns (% from peak)

U.S. Treasury index drawdowns, % from peak



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Government bond yields

Our long-term cash rate assumptions rise across developed markets, driven by higher assumptions for inflation and real cash rates (reflecting marginally more symmetrical central bank policies). With inflation closer to targets, central bank policy should be less likely to get stuck again at the lower bound.

Our 10-year cycle-neutral U.S. Treasury yield forecast rises slightly, to 3.2%, and to 2.2% for its euro area equivalent. We expect flatter curves at the long end and leave unchanged our forecast for the 30-year yield, at 3.5% in the U.S. and 2.5% in the euro area. Our forecast for 10-year U.S. Treasury returns rises from 2.4% to 4.0%, and for euro area 10-year bonds from 1.2% to 3.0%.

Cash rates: Opposing forces are acting on yield curves this year

While greater inflation uncertainty should require a higher term premium to be priced into bond yields at the back end, this was already, to some extent, built into our past two years' forecasts. On the flip side, we expect a re-anchoring – not a de-anchoring – of inflation expectations over the assumptions horizon. This should allow for higher cash rates, on average, as central banks achieve their targets more frequently, and yield curves should be flatter, as the path of rate expectations should be shallower.[1]

Inflation-linked bonds

Over the last two years, we incorporated a lot of upside inflation risk via higher inflation risk premiums (IRPs). Consequently, we keep our IRPs constant this year. We believe central bank commitment to inflation targets will limit breakeven moves; however, we expect higher macro inflation forecasts to cause a parallel shift higher in the breakeven curve. We also expect a flattening in the real yield curve, driven by central banks achieving their targets more frequently. Hence, all the flattening in the nominal curve comes from the expected change in the real yield curve.

Credit and loans

Our fair value credit spread assumptions change little this year (**Exhibit 7**). IG and HY long-term spread assumptions are unchanged, and many themes remain intact. Much of the IG market continues to be BBB rated, leverage has fallen from the pandemic's historic highs, and we do not foresee meaningful further moves. Although default rates may rise from recent levels in some sectors, as we discuss below, we believe that the aggregate recovery rate at the index level will also be closer to historical averages because of the improvement in credit ratings. This impact leaves our overall default adjustments unchanged, despite changes in underlying factors.

Within credit, a key focus recently has been on the levels of defaults and recovery rates, after the recent energy sector default cycle saw particularly low recovery rates in U.S. high yield. We believe that default rates are likely to pick up in HY and loans from the historic lows of the past few years, but that this will largely be offset by higher recovery rates. HY in particular has become a higher rated index over the past decade, which we believe will improve recovery rates. This ultimately leaves our adjustments unchanged.

The U.S. loan market, a worthy competitor for U.S. high yield after doubling in size over the past decade, has seen its quality mix decline over 10 years (it is now 65% single B rated, up from 45% a decade ago). Private equity sponsorship and loan-only structures, along with the narrower quality differential from high yield, lead us to widen discount spreads by 30bps since the last set of LTCMAs.

Our long-term credit and loan spread assumptions are little changed

Exhibit 7: LTCMA spread assumptions, 2022 vs. 2023

Spread assumptions vs. last year

Credit spread assumptions	2022 LTCMA	2023 LTCMA
U.S. IG	160	160
U.S. HY	480	480
EUR IG	120	120
EUR HY	400	400
U.S. loans	490	520
EMD corp	400	400

Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Emerging market debt

We also see little change in our fair value assumptions for emerging market debt, although the market pricing has changed significantly over the past year. Two themes stand out: Within EM sovereign debt, the world has become increasingly heterogeneous. While some regions are looking very healthy, like the Middle Eastern petroleum producers, others are still fighting inflationary pressures with ever-higher interest rates, such as in Latin America, while many frontier economies remain very much in crisis mode, fighting rising food and energy costs and political unrest.

This has led to the second development, an optically high starting yield and spread. In particular, countries going through restructuring or viewed as approaching financial distress are raising the index level yield, but these are more reflective of near-term default risk than long-term drivers of return through spread compression.

[1] Implicitly, a flatter curve reflects little change in our view on potential growth rates and thus economic neutral rates but more our view that central banks can set policy closer to these levels, on average, going forward.

For emerging market local currencies, the strength in the U.S. dollar and the rise in local yields through tighter monetary policy have created historically attractive levels today; however, given the ongoing tightening of financial conditions, timing will be very important. Although we believe sounder underlying economic fundamentals limit the risk of a broad crisis today, continued dollar strength could still create further local, periodic market stress, despite the much improved valuation levels today.

In emerging market credit, we continue to believe that the composition of the J.P. Morgan Broad Diversified Core Index (CEMBI CORE) will remain stable, both in terms of maturity structure and ratings breakdown. We expect long-term default and recovery rates to remain close to historical levels and, as such, do not adjust our 400bps spread assumption.

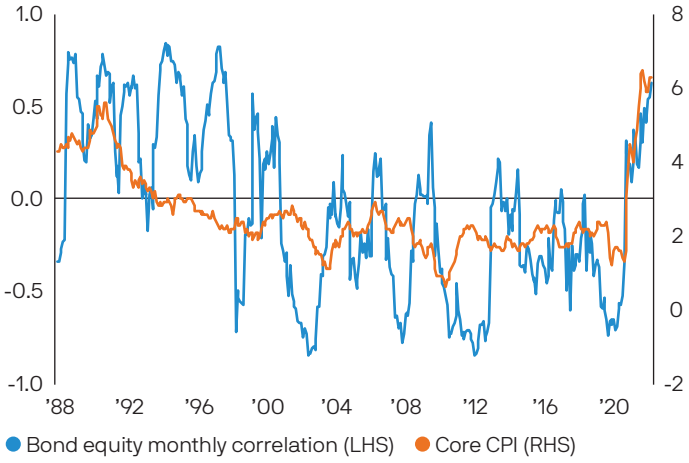
Conclusion and implications

Bonds are offering diversification once more

Higher inflation and hawkish central banks have pushed current bond yields back toward our cycle-neutral forecasts. Our return assumptions have improved dramatically, given these better starting points, while our cycle-neutral forecasts themselves have changed only slightly. Bonds are offering income again and, we believe, will again be a good hedge, regaining their safe-haven status in times of market stress. Historically, the correlation between risk assets and bonds has turned positive during periods of very high inflation (**Exhibit 8**). Our base case is for inflation to be lower and more stable, and hence for this correlation to return to more normal levels over time.

Bonds are a good risk hedge if inflation remains anchored

Exhibit 8: Bond-equity correlation (monthly) and core CPI

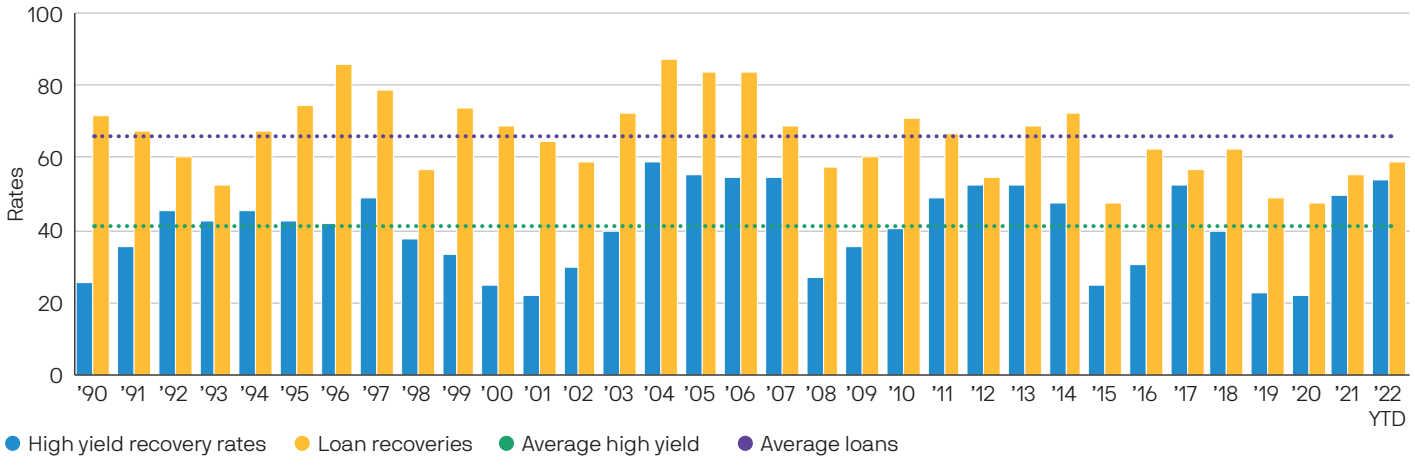


Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Credit in particular is starting to look attractive as investors benefit from both the normalization of underlying yields and spreads that fairly compensate risks. In HY, we believe that the growth of the leveraged loan and private credit markets, each now worth over USD 1 trillion, has seen the development of a higher quality index, which should better protect investors in case of default. So, while defaults mean-revert over our LTCMA horizon, recovery rates should also rise, leaving our overall loss rate forecast unchanged (**Exhibit 9**), despite the higher starting yields and spreads.

Defaults may drift higher, but so should recovery rates – we leave our loss rate unchanged

Exhibit 9: Recovery rates: High yield bonds, first-lien loans



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Equity assumptions

Better starting point, higher forecast returns

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In brief

- We raise our long-term (10 to 15 year) equity return assumptions across regions. The biggest driver of increased return expectations is better starting valuations.
- Today's corporate margins are elevated and are set to decrease. But our forecasts still leave margins at high levels vs. history, mainly reflecting a shift in sector composition.
- In the U.S., our expected return increases from 4.10% to 7.90%, primarily due to the reduction in the drag from valuation normalization. We see similar dynamics in other developed markets.
- Emerging market (EM) returns are also better this year, but to a more moderate degree than in developed markets. We downgrade our revenue growth expectations for emerging markets, reflecting both lower nominal GDP forecasts in key regions and less optimism on EM corporates' ability to earn revenues in high inflation environments.
- We expect the USD to weaken over our forecast horizon. This is a tailwind to international equity returns for U.S. dollar-based investors.

Valuations no longer a headwind

Our expected equity return assumptions move higher compared with last year's assumptions (**Exhibit 1**).

We highlight two key drivers of this step up in expected returns.

1. **Starting valuations**: Equities are more attractively valued than they were last year (**Exhibit 2**).
2. **Model enhancements**: In conjunction with our Global Equities team, we have improved our forecasting framework. Now, our top-down reading of equity markets, which reflects our forecasts for GDP, inflation, rates and other macroeconomic inputs, is cross-checked against a bottom-up aggregation of the 3,000 companies for which our Global Equities team forecasts earnings. Their insights shape our views of earnings, valuations and shareholder returns in the markets we cover.

The proportional impact of these key drivers varies by market. But in aggregate, the valuation shift explains 70% of this year's return uplift, model enhancements explain 20%, and other factors 10%. More generally, our modeling of the equity market reflects:

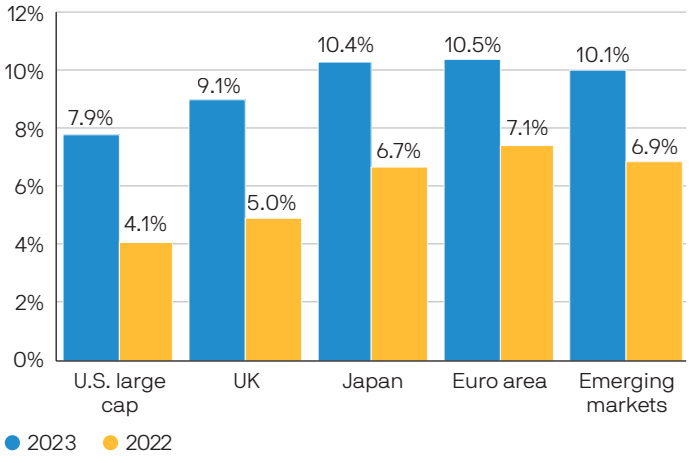
- **High single-digit returns**: We forecast high single-digit equity market returns over our 10- to 15-year investment horizon, with moderate dispersion in developed markets and more dispersion in emerging markets.
- **A much improved starting point**: In many markets, profit margins are higher than our long-term estimates of fair value. But P/E ratios are much closer to fair value than they have been in recent years - meaning valuation is now no longer a headwind.
- **The importance of shareholder returns**: Anticipating modest earnings growth and continued strong corporate balance sheets, we expect a significant portion of returns will come from buybacks in developed markets and from dividends in emerging markets.
- **Reduced international premium**: Since U.S. stocks de-rated over the past year, the international premium between other developed markets and the U.S. is much reduced.
- **The impact of foreign exchange**: At a time of mid-single digit equity returns, currency is an important consideration. We expect the USD to weaken over time relative to key developed market (DM) currencies, making markets outside the U.S. even more attractive to U.S. dollar-based investors.

Model and methodology

As in previous years, our equity assumptions methodology breaks equity returns into distinct building blocks. First, we forecast earnings per share, by considering revenue growth, margins and the share count. We then forecast P/E ratios to establish a price return forecast. Finally, we forecast dividend yields to create a total return expectation (**Exhibit 3**).

Our LTCMA equity forecasts move significantly higher this year

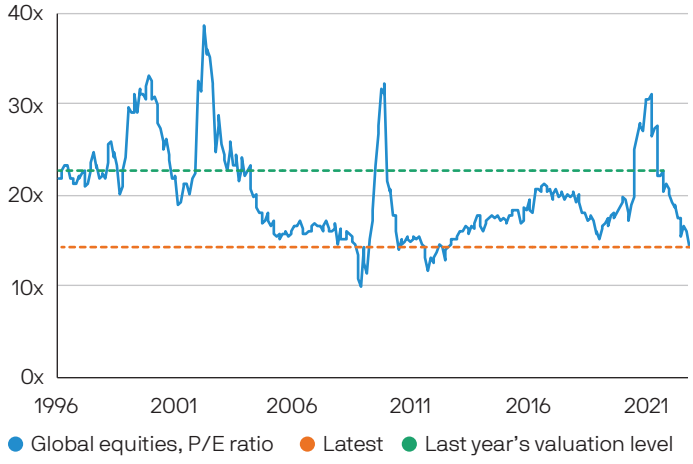
Exhibit 1: LTCMA forecasts, 2023 vs. 2022, USD terms



Source: J.P. Morgan Asset Management; data as of September 30, 2022. Please note that we changed our forecasting methodology for MSCI China this year, now treating the market as an asset whose local currency is CNY. The change in our emerging market equity returns reflects this change.

Global equities are considerably cheaper than they were last year

Exhibit 2: Global Equity P/E ratio, 1996-2022



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022.

Our forecasting methodology breaks down equity returns into different drivers

Exhibit 3: Equity forecasting building blocks

Component	Subcomponents	Component	Driver
Revenue growth	Domestic growth	Revenue growth	Earnings growth
	International contribution		
	Sales % GDP		
Margins	Change from margin today to equilibrium margin	Margins	
Net dilution	Buybacks	Net dilution	
	Gross dilution		
Valuations	Change from P/E today to equilibrium P/E	Valuations	
Dividend yield	Dividend yield forecast	Dividend yield	

Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Normalization and sensitivity

A key part of our methodology is normalization, the path that key equity market metrics take before reaching equilibrium targets. Our equilibrium targets represent where we think specific indicators, such as the P/E ratio or profit margin, lie at the end of our forecast period. For stocks covered by our Global Equities research team, we include the team's estimates over the first half of the forecast period before trending after that point toward our equilibrium targets.

Our equilibrium targets are sensitive to several inputs:

- **Revenues**: Corporate revenues are a function of the nominal GDP environment in the regions where revenues are earned. Higher real GDP and inflation expectations thus support higher revenue growth in our equity model.
- **Margins**: Although we do not make specific forecasts for the capital/labor share in various economies, our margin assumptions aim to be consistent with our understanding of trends in this metric. In most developed markets, we think that margins will be higher than historical averages, reflecting increased capitalization of particularly profitable, high return on capital "new economy" stocks.
- **Valuations**: A market with higher secular growth potential, a healthier capital structure and lower volatility of earnings will – all else equal – trade at a higher P/E ratio than other markets. As discussed in previous Long-Term Capital Market Assumptions (LTCMA) publications, our P/E forecasts are higher than long-term averages, largely due to secular shifts in index sector composition.

Exhibit 4 approximates the sensitivity of the equity return forecasts to changes in some of our forecasted inputs. Each equity market metric is unlikely to move in isolation, and our approach does not account for the introduction of nonlinearities when carrying out such a stress test. Instead, the table offers a rough estimate of the return impact created by tweaking the forecast variables.

U.S. markets

Our expected return for U.S. equities increases markedly, from 4.1% to 7.9% in U.S. dollar terms. In making last year's forecast, valuations were a significant headwind, but with current earnings multiples near our long-term expectations, U.S. large cap equities are at a much better starting point.

The durability of corporate profitability is once again reflected in our equilibrium assumptions. Between the pandemic-driven recession and, more recently, broad inflationary pressures on input costs, U.S. large cap profitability has remained resilient. This resilience validates our decision to place more emphasis on secular changes, sector composition and capital structure than on mean reversion to long-term historical averages.

Forward-looking return projections are sensitive to both the starting point and forecasted end point for various equity market metrics

Exhibit 4: Forecast sensitivity table

U.S. large cap equities, forecast sensitivities			
Starting valuations	-1x	Actual data	+1x
Impact	17.6x	18.6x	19.6x
Approximate return impact	8.4% (+0.5%)	-	7.4% (-0.5%)
Equilibrium valuations	-1x	Actual data	+1x
Impact	20.1x	21.1x	22.1x
Approximate return impact	7.5% (-0.4%)	-	8.3% (+0.4%)
Equilibrium margins	-1%	Actual data	+1%
Impact	8.4%	9.4%	10.4%
Approximate return impact	7.0% (-0.9%)	-	8.7% (+0.8%)

Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Additionally, we expect that the forces that have benefited capital at the expense of labor are unlikely to fully mean revert, further supporting our view that equilibrium corporate margins will be higher than historical averages.

The forces that benefit large caps generally present a headwind to U.S. small cap equities. Less favorable sector composition and profitability dynamics continue to weigh on the asset class. In addition, the increase in private capital formation has persuaded many companies to remain private for longer. Both factors continue to widen the quality gap between large and small cap equities, resulting in a lower premium for small caps relative to prior LTCMAs. Forecasting a P/E ratio for the U.S. small cap universe is especially difficult; history shows that the P/E ratio can move particularly sharply in the small cap space. Our assumptions are close to long-term averages; at a high level, they are consistent with the small cap market's large share of nonearners.

Ex-U.S. developed markets

Our European equity assumptions move significantly higher this year, to 8.4% in local currency terms from 5.8% last year. The increase reflects substantial de-rating of valuations in 2022, as is the case in many other markets. Margins remain a key detractor. But we continue to be optimistic about European equities over the longer term. We increasingly expect investors to recognize the improved quality of the market, which has shifted toward sectors and companies with a much better growth profile (such as luxury goods and semiconductors) and away from sectors that are inherently low growth (telecoms and banks).

We continue to emphasize the diversification potential of European equities. European stocks depend much less on the domestic economy than investors appreciate. This is made clear by the market's outperformance this year, even amid a European energy crisis. EUR breakup risk is low and will likely stay that way, as policymakers aim for more integrated and sustainable capital markets.

Return assumptions for UK equities increase from 4.1% to 7.3% in local currency terms. With a higher exposure to energy and materials companies, the UK market has been one of the best-performing stock markets recently. Still, because the earnings recovery has been so strong, the market has significantly de-rated in P/E ratio terms, and thus better valuations support our outlook. Our dilution assumptions are lower, too, reflecting balance sheet strength and strong cash flow generation. Margins are a detractor, though, especially given the market's more cyclical sector composition.

We see much better prospects for UK small and mid cap vs. large cap companies. Many of these companies are exceptionally innovative in the niche markets that they lead and have developed a global and growing footprint. This is particularly the case in industries such as retail and fintech, and in the broader industrial complex, where innovation is leading to market share gain. Our small cap return assumption improves from 7.2% to 9.4% in local currency terms.

Expected returns for Japanese equities increase from 5.0% to 7.8% in local currency terms. Stocks look attractively valued (vs. fairly valued last year). Even though margins remain slightly above our equilibrium assumption, we expect them to stay well above historical averages. With modest improvements in the domestic growth environment, coupled with increased efficiency, we expect higher EPS growth as the quality of the market improves over time.

Emerging markets

As in previous publications, we expect EM equites to outperform DM equities over our investment horizon. Emerging market stocks earn revenues in regions where nominal GDP is growing faster, supporting their earnings streams. This year, we update our methodology, taking a closer look at the nominal GDP growth pass-through to revenue growth. In some cases, we acknowledge, high inflation might support nominal GDP but hurt revenue growth in other ways.

This dynamic is particularly relevant in today's high inflation environment, especially for countries that face persistent inflation issues and steady long-term currency depreciation (India, South Africa and Brazil, for example). In such cases, we lower our revenue growth projections. Even with these adjustments, revenue expectations in emerging markets surpass those in developed markets. Additionally, compared with prior periods, we are less concerned about dilution in EM markets in the coming decades.

We raise our EM equity return assumptions 3.20% to 10.10% in USD terms. This compares to a 3.6% increase for DM equities. Regionally, EM Asian returns are 3.30% higher vs. last year at 10.20% in USD terms. We maintain the adjustments that we implemented last year to reflect the sectoral mix of China's equity market, which is leaning more toward technology and consumer sectors, with high margins. But this boost is offset by a valuation penalty, given ongoing risks of regulation in the country's corporate space. Together, these adjustments net out and we end up with a 9.40% local return for MSCI China and 9.50% for China A shares. In Korea and Taiwan, our expectations (7.9% for Korea, 7.5% for Taiwan) suggest more mature, DM-like equity markets.

Valuations are no longer a significant drag to our equity return forecasts

Exhibit 5A: Selected developed market equity long-term return assumptions and building blocks, in local currency terms

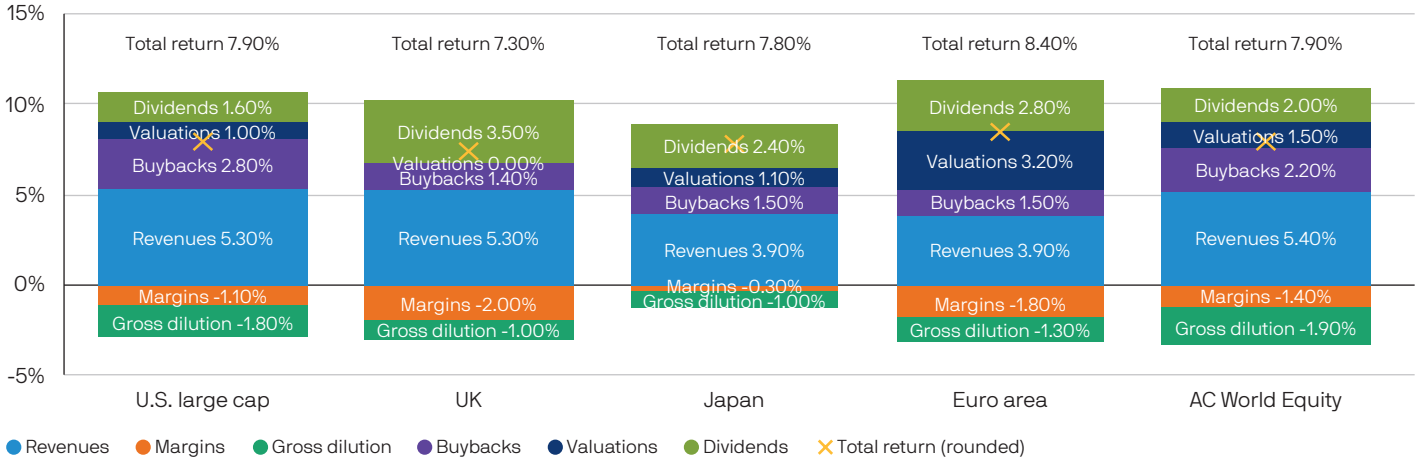
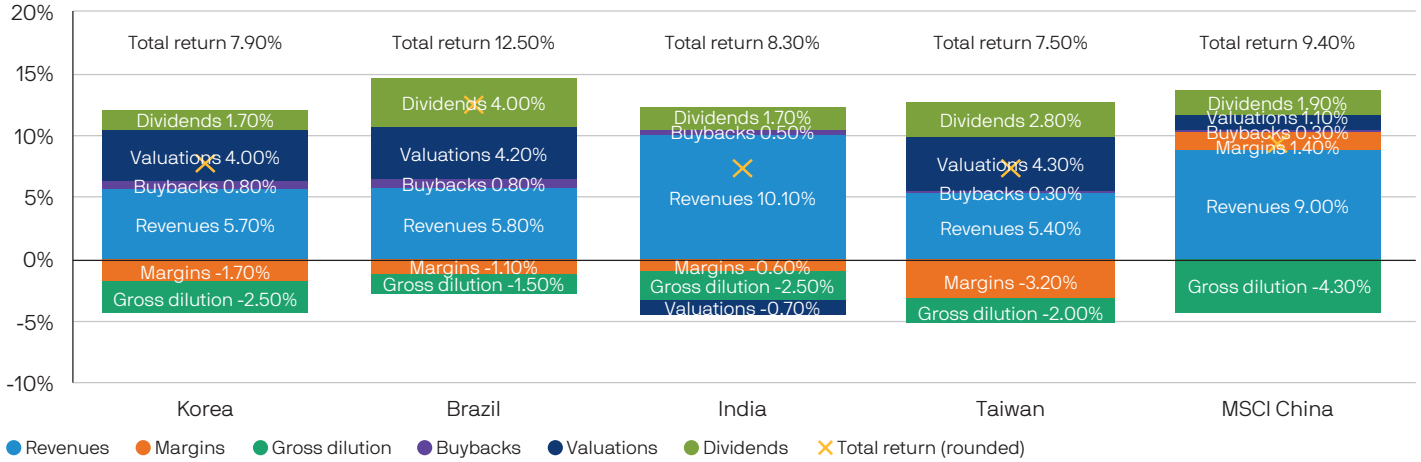


Exhibit 5B: Selected emerging market equity long-term return assumptions and building blocks, in local currency terms



Source: J.P. Morgan Asset Management; data as of September 30, 2022. Please note that figures may not sum up due to rounding. MSCI China is treated as an asset whose local currency is CNY.

We increase our Latin America return projections by 2.1% to 10.2% in USD terms. We expect more support from valuations, and a better dividend yield over the forecast horizon. Brazil ranks high in global equity returns in local terms (12.5%), but we note that currency risk and volatility are likely to be higher here. In **Exhibits 5A** and **5B** we present our long-term return assumptions and building blocks for developed market (DM) and emerging market (EM) equities.

Factors

Our long-term assumptions include return estimates for a range of long-only equity factor strategies. We cover five individual factor strategies (value, quality, momentum, minimum volatility and dividend yield) and multi-factor strategies in four geographies (U.S., global developed, international developed and emerging markets), with U.S. assumptions included in this report.

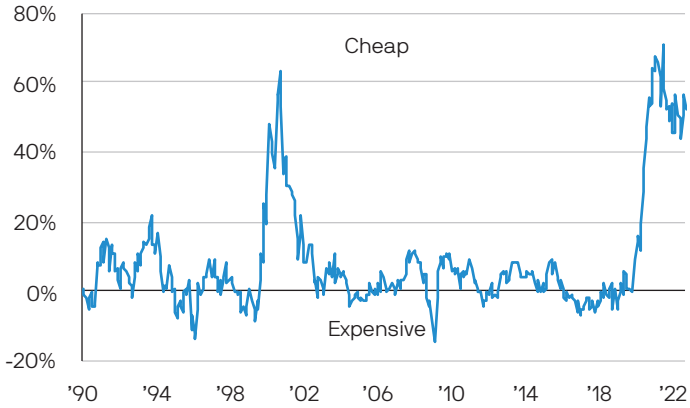
Our long-only factor strategy return assumptions reflect favorable valuations across a wide range of factors and signal the potential for significant excess returns relative to passive U.S. large cap equity exposures. Indeed, we see the most favorable valuation environment for factors in around 20 years (**Exhibits 6A** and **6B**).

Our long-only factor strategy return assumptions reflect favorable valuations across a wide range of factors

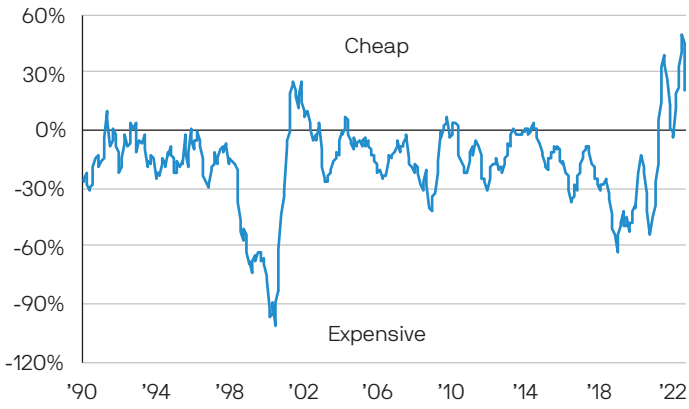
Exhibit 6A: Factor valuations, 1990–2022

U.S. Value: E/Y spread**

U.S. Quality: E/Y spread**



U.S. Momentum: E/Y spread**



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

** Valuation spread is defined as the difference in valuation (forward earnings yield) between top-ranked (Q1) and bottom-ranked (Q4) stocks, relative to a broad market universe.

Our long-term assumptions include return estimates for a range of long-only equity factor strategies

Exhibit 6B: Factor return building blocks

		U.S. diversified	U.S. value	U.S. quality	U.S. momentum	U.S. dividend	U.S. min vol
Equity market beta	(1)	0.85	1.00	0.90	1.10	0.90	0.75
Market return contribution (assuming equity market return: 7.90%)	(2)	7.09%	7.91%	7.36%	8.46%	7.36%	6.54%
Factor return contribution	(3)	2.35%	2.14%	0.48%	0.42%	1.49%	1.63%
Long-only factor strategy return assumption (2023)	**(2)+(3)=(4)**	**9.44%**	**10.05%**	**7.84%**	**8.88%**	**8.85%**	**8.18%**

Source: J.P. Morgan Asset Management; data as of September 30, 2022.

Methodology

We determine our long-term assumptions by examining properties of two index suites, designed by J.P. Morgan Asset Management and calculated by FTSE Russell. The J.P. Morgan Diversified Factor Suite describes the performance of stocks chosen for their characteristics across multiple factors; the J.P. Morgan US Single Factor Suite describes the performance of large U.S. companies chosen to target a single factor or characteristic. While there is no unambiguous, natural choice of index to represent long-only strategies in these spaces, we hope that these assumptions will help inform how investors think about asset allocation with respect to factors.

A long-only factor strategy return assumption is made up of a return contribution from equity market exposure and a contribution from its exposure to the factor itself. To reach a factor return assumption, we first make assumptions about the relative performance of the best and worst stocks according to a factor. Significantly, we measure them relative to their sector and geographical peers, isolating the pure factor performance. We rebalance the quartile portfolios monthly and incorporate conservative estimates for the cost of trading. We then apply a haircut to these returns to account for potential selection bias effects and market adaptation. These steps form a long-term baseline for our long-short factor return assumptions.

Next, we adjust for the current richness/cheapness of factors under the assumption that long-short factor returns are persistent but cyclical. Mechanically, we assume that the forward earnings yield differential between top-quartile stocks and bottom-quartile stocks will revert toward its long-term average over time, and adjust the factor return assumption accordingly. This year, the value and quality factors receive significant boosts from our valuation adjustment step, reflecting that the value factor is as cheap as it has been since the dot-com bubble, while the quality factor is nearly as cheap. In addition, momentum, which is typically biased to more expensive growth stocks, is currently favoring value stocks to the greatest extent since the dot-com bubble burst, removing what is usually a headwind to returns.

While the momentum factor is currently cheap, we do not assume a tailwind to returns based on valuations, given the potential for valuation spreads to converge because of composition shifts among top-ranked and bottom-ranked momentum stocks rather than price action.

Convertible bonds

Convertible bonds can improve the risk-adjusted returns of balanced stock-bond portfolios due to their asymmetric return profile and diversification benefits. In addition, convertible valuations can benefit from increased volatility, as they are implicitly long volatility via the optionality embedded within them. As a credit alternative, convertible bonds offer an income component and structurally lower duration than credit broadly. Consequently, convertibles will generally be more positively affected by rising stock values than negatively affected by rising interest rates due to their low duration.

For our convertible bond assumptions, we incorporate LTCMA return estimates for equity and fixed income, along with the convertibles' delta, credit quality and the underlying stock beta. While the geographic composition of the global convertible bond universe is similar to that of the MSCI World Index, it has historically been biased toward smaller companies and growth sectors. Our convertible bond assumptions estimate regional betas based on a historical regression, which is then applied to our regional weight and delta expectations.

In our view, the current trend of more issuance coming from North America and Asia ex- Japan will continue. We think the beta of the underlying equity of convertible bonds will continue to move higher as more growth and small and mid cap companies issue convertibles. For the fixed income component of convertible bonds, we make an assumption of future investment grade vs. high yield issuance and use our LTCMA regional credit return assumptions. We believe there will be more high yield issuance as a result of higher growth companies issuing convertibles as well as some cross-over activity from traditional sub-investment grade companies.

This year, our expected return for global convertible bonds and global credit sensitive convertible bonds (hedged into USD) are 9.10% and 7.20%, respectively. Credit-sensitive convertibles are securities whose underlying stock trades significantly below the conversion price, resulting in behavior more akin to debt than equity (**Exhibit 7**).

Conclusion

Following a meaningful correction in global equity markets in 2022, valuations look far more attractive than they did at the time of our last LTCMA publication. Our return assumptions increase significantly, from 5.0% to 8.5% for global equities in U.S. dollar terms, thanks in large part to greater optimism for U.S. markets.

Profit margins remain above historical averages, a potential headwind to returns. We expect some mean reversion from elevated levels, but our equilibrium margins are above historical averages. That reflects our conviction that the market's sector composition and capital structure enhancements have made corporate profitability more resilient. Additionally, compared with previous decades, we expect buybacks and dividends to play a larger role in total returns.

The sharp rotation in market leadership from secular growth to commodity and value markets has reminded us of the importance of diversification. While the expected return premia of non-U.S. markets and small cap stocks have decreased relative to the past, we still see attractive opportunities to complement U.S. large cap holdings. FX will also be an important tailwind to international markets for U.S. dollar-based investors given our view of USD weakness over time. Greater expected divergence among regions, countries and sectors should also support active management as part of an overall investment toolkit.

Expected returns move significantly higher across sectors and regions

Exhibit 7: Convertible bond long-term return assumptions, 2023 vs. 2022

	2023 return assumptions*	2022 return assumptions	Change y/y
Global convertible bonds	9.10%	5.50%	3.60%
Global credit sensitive convertible bonds	7.20%	4.60%	2.70%
Global investment grade convertible bonds	7.30%	4.10%	3.20%
U.S. convertible bonds**	9.00%	4.50%	4.50%
Europe convertible bonds	8.30%	4.90%	3.30%
Japan convertible bonds	6.20%	3.90%	2.30%

Source: J.P. Morgan Asset Management; data as of September 30, 2022. * All returns are hedged in USD. ** U.S. convertible bonds have a higher expected return compared to U.S. large cap and U.S. high yield, as the underlying equities of U.S. convertible bonds typically have higher beta (we assume beta of 1.2). Moreover, compared to the U.S. large cap and U.S. high yield markets, the U.S. convertible bond market is more biased toward growth sectors such as technology and health care. As the growth sector has de-rated significantly, the starting valuations of convertible bonds are much more attractive, resulting in higher expected returns.

Alternative asset assumptions

Sourcing uncorrelated returns in a period of rising market risk

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In brief

Changes – both positive and negative – impact our alternative asset outlook, but these strategies and sectors continue to play an important role in portfolio diversification, return and cash flow in the context of volatile markets.

Private equity: Our return assumptions rise, driven by the public market component. Cyclical factors deflate returns in the near term while dry powder raises potential future returns. We see ample potential for alpha across a broadly changing economy.

Venture capital: We expect to see venture capital continue to marginally underperform private equity, as it has historically, with much higher return volatility.

Direct lending: Return estimates increase as base rates rise and available financial capital becomes increasingly scarce. Although fundamental headwinds are strengthening, the nature of direct lending transactions supports premium returns vs. public market equivalents.

Hedge funds: Assumptions rise moderately across all strategies, with particular emphasis on macro. The overall environment for alpha improves, based on rising risk asset volatility, interest rate projections and strong positive momentum for commodities.

Real estate: Return estimates for private real estate decline across all regions due to exit capitalization expansion and the rising cost of capital, although sector dispersion may offset some challenges. The outlook for **REITs**, however, has improved, based on attractive starting valuations.

Infrastructure: Return projections remain robust. We expect infrastructure to continue to provide meaningful inflation protection and portfolio diversification in a rising rate environment.

Transport: Operating yield for global core transport continues its upward trajectory, supported by strong demand and dynamic seaborne trade flows; key return drivers include COVID-19 disruptions, inflation, geopolitical tensions and high asset utilization.

Timber: Timberland's operating yield has increased given the constrained supply of the asset globally. Driven by timberland's environmental, social and governance attributes and inflation-hedging qualities, strong growth in investor interest and limited timber supply support our return projections.

Commodities: Our return assumptions for long-term broad-basket commodities improve on the margin despite the aging of the cycle.

Across all alternative sectors and strategies, future performance may exhibit wider dispersion of returns

Exhibit 1: Selected alternative strategies – return assumptions (levered,* net of fees, %)

Financial alternatives	2023	2022
Private equity (USD)**		
Cap-weighted composite	9.90	8.10
Private equity - small cap	9.50	7.40
Private equity - mid cap	9.40	7.60
Private equity - large/mega cap	10.20	8.40
Private debt (USD)		
Direct lending	7.80	6.90
Venture capital (USD)		
Venture capital	8.50	n/a
Hedge funds (USD)		
Equity long bias	5.00	3.30
Event-driven	5.40	3.20
Relative value	4.90	3.80
Macro	4.10	2.70
Diversified†	5.00	3.60
Conservative††	3.70	3.30

Real assets	2023	2022
Real estate - direct (local currency)		
U.S. core	5.70	5.80
U.S. value-added	7.70	7.70
European core	4.70	4.80
European value-added	6.70	6.80
Asia-Pacific core	6.10	6.50
REITs (local currency)		
U.S. REITs	6.80	5.70
European REITs	6.10	5.10
Asia-Pacific REITs	5.10	5.00
Global REITs‡	6.40	5.40
Global infrastructure (USD)		
Core	6.30	6.10
Global transport (USD)		
Core	7.50	7.40
Global timber (USD)		
Global timber	6.70	n/a
Commodities (USD)		
Commodities	3.10	2.60
Gold	3.50	3.00

Source: J.P. Morgan Asset Management; estimates as of September 30, 2021, and September 30, 2022.

* All return assumptions incorporate leverage, except for commodities, where it does not apply.

** The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.

† The Diversified assumption represents the projected return for multi-strategy hedge funds.

†† The Conservative assumption represents the projected return for multi-strategy hedge funds that seek to achieve consistent returns and low overall portfolio volatility by primarily investing in lower volatility strategies such as equity market neutral and fixed income arbitrage. The 2023 Conservative assumption uses a 0.70 beta to Diversified.

‡ The global composite is built assuming the following weights: roughly 65% U.S., 15% Europe and 20% Asia-Pacific.

Overview

With resurgent risks affecting all public markets, alternatives once again demonstrate their strength as sources of less correlated returns in diversified multi-asset portfolios (**Exhibit 1**). Unlike last year, however, we expect to see future performance across sectors and strategies affected by these risk inputs and exhibiting wider dispersion in returns. In **financial alternatives**, we anticipate that challenging market crosswinds will affect potential alpha generation within both private equity (PE) and hedge funds – but with very different results. In **real assets**, the return outlook varies by category; our projections now fall broadly between public equities and fixed income on the efficient frontier, in line with their long-term average positioning. Diversification, stable returns and inflation protection are all central to their ongoing appeal.

In **private equity**, we anticipate a rising long-term market outlook for public equity to be supportive of future performance, with the uplift in private equity entirely driven by market beta. In the short term, however, the risk of valuation markdowns creates a potential drag on returns. Although alpha is lower, it remains solidly above the 15-year average – even if stubbornly below the 20-year average – and we consider it adequate for the risks taken.

Although many investors assume that **venture capital** (**VC**) has outperformed over time, looking at annualized returns since 1981 shows that private equity has actually outperformed venture capital, primarily due to the higher volatility of venture capital returns. Although a return to a lower interest rate environment would support venture capital performance – a scenario that is implicit in our macroeconomic forecast – it will not happen overnight. Furthermore, given the extreme dispersion of returns across managers, we currently expect to see VC continue to marginally underperform private equity, as it has historically, with much higher return volatility.

For **hedge funds**, increased market volatility begets price dislocations – and greater opportunity. Rising interest rates are also a direct positive for most hedge funds. From our perspective, a diversified hedge fund strategy can make a favorable portfolio contribution by delivering less correlated returns and dampening volatility.

Direct lending benefits from a confluence of market factors that we expect to persist in the medium term as interest rates rise and lenders reap the rewards of enhanced post-pandemic contracts and still-low default rates. The impact of rising rates on issuer interest coverage ratios, financing costs and net asset value (NAV) stability constitute the most significant near-term risks to our 2023 assumptions.

In an inflationary environment, many real asset sectors – such as global **real estate** and **infrastructure** – offer implicit or explicit inflation linkage characteristics and downside protection; historically, real estate performs well when there is tight supply and inflationary tailwinds. This scenario provides pricing power to reset rents, and valuations rise due to higher input costs. Our outlook for infrastructure also remains stable, thanks to the steady income and inflation protection attributes of the asset class, which provides essential services.

Unsurprisingly, today's lower starting equity valuations (and higher fixed income yields) contribute to the **REITs'** enhanced returns in our current assumptions: Supported by attractive valuations, the outlook for REITs has improved recently, creating a divergence in our views on private and public real estate.

Current market tailwinds also benefit the operating yield of several real asset categories: global core **transport** and **timberland**. Transport continues its upward trajectory, supported by strong demand and dynamic trade flows. Similarly, timberland's operating yield exhibits strong momentum, thanks to the rebound of new home construction in the U.S., which is now in line with the long-term average. For all real assets, debt has become significantly less accretive due to the increased cost of borrowing, resulting in a more modest leverage assumption.

In **commodities**, recent developments in an array of sub-asset classes support our above-inflation return outlook, including supply tightness (and modest demand growth) in energy and metals extraction, and climate change-related impacts to agricultural production. The war in Ukraine and the geopolitics of energy serve to highlight the fragility of supply across the entire commodity complex.

In an investment landscape in which traditional assets offer improved returns, active management in financial alternatives and real assets – via thoughtful allocation and the selection of top-tier managers – becomes more critical in realizing alternatives' potential for alpha, inflation sensitivity and diversification.

Financial alternatives

Headwinds strengthen, but opportunities for alpha generation remain

Private equity

Our 2023 private equity return assumptions rise noticeably from last year's projections. The public market component drives all of the increase, while cyclical valuation factors and ongoing trends deflate returns on the margin (**Exhibit 2**). Although alpha has declined modestly year over year, it still surpasses the 15-year average for a median manager, which reflects our economic change thesis (below). In the near term, cyclical valuation write-downs affect our outlook, and secular factors – including the rising cost of debt and strong competition for deal flow amid a wall of dry powder – weigh on returns. Exit multiple compression may also burden the return outlook, although most of that impact is embedded in the valuation write-down noted above.

We believe the PE return premium will provide adequate compensation for the illiquidity and leverage risk taken vs. public markets, particularly in an environment of increased asset volatility.

Private equity assumptions rise, primarily driven by higher public market return expectations

Exhibit 2: Private equity and venture capital return assumptions (USD, %)

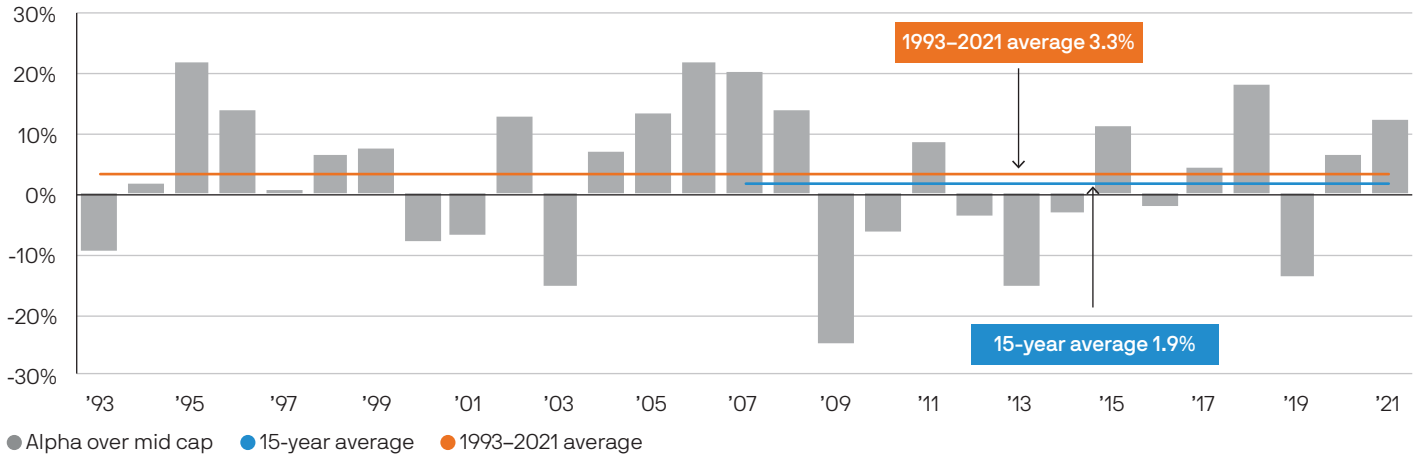
Private equity fund size	2023	2022
Cap-weighted composite	9.90	8.10
PE – small cap (<USD 1bn)	9.50	7.40
PE – mid cap (USD 1bn–USD 5bn)	9.40	7.60
PE – large/mega cap (>USD 5bn)	10.20	8.40
Venture capital	8.50	n/a

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022.

We model financial sponsors as change agents, enhancing growth and operational efficiency, especially those ranking average or above average in their peer group. As such, we see ample investment potential across a broadly changing economy (**Exhibit 3**). Managers will uncover opportunities in digitalization; housing; health care; environmental, social and governance (ESG); and cybersecurity, and will also face the challenges of geopolitical risk and globalization that is past its peak. We expect PE investing will increasingly involve growth capital, direct investing, subscription lines of credit and commitment drawdown fee economics.

We see ample investment potential across a broadly changing economy, which should allow managers to generate adequate – if moderately lower – alpha

Exhibit 3: Historical premium of PE to U.S. mid cap equity (1993–2021)*,**



Source: Bloomberg, Burgiss Private iQ, J.P. Morgan Asset Management; data as of March 31, 2022.
* Includes buyout and expansion capital funds
** The historical premium to U.S. mid cap returns (shown here) is not directly comparable to the forward-looking PE cap-weighted composite alpha trend assumption. Our alpha trend assumption reflects a range of public market exposures (across regions and size categories) in addition to U.S. mid cap, the dominant market exposure.

Building blocks: Public market beta, alpha

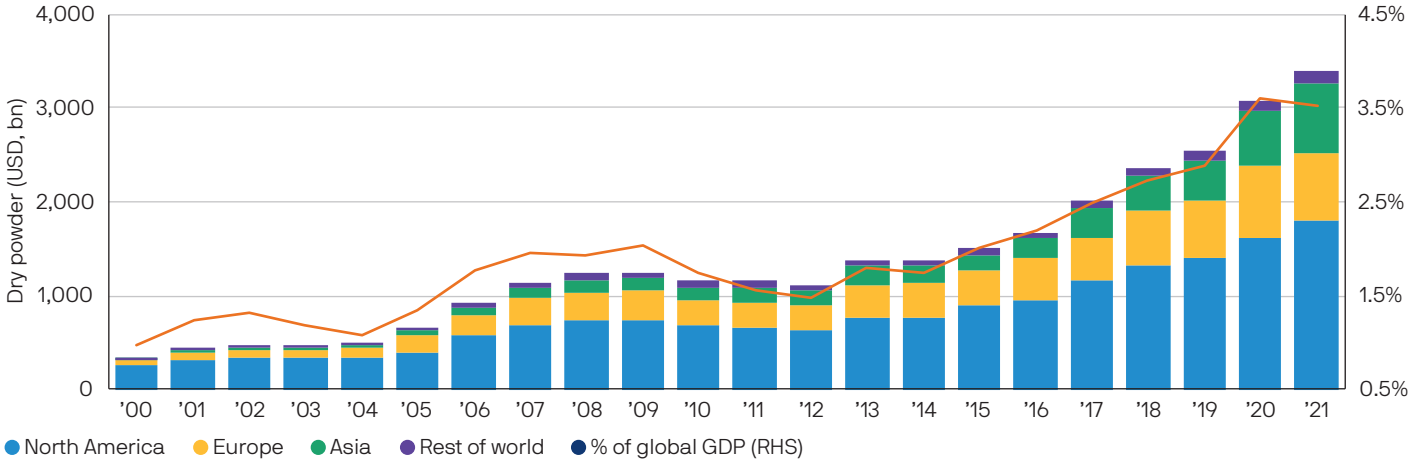
We base our core buyout/growth capital return projections on public market beta, derived from our Long-Term Capital Market Assumptions (LTCMA) public market return expectations. The PE return premium we add is slightly higher than it has been in previous periods, reflecting the role that growth sectors and the growth capital style of investing now play in PE investing, as well as the widespread use of operational tools, such as subscription lines of credit. The geographic investment breakdown follows from industry sources' intentions for dry powder, with the U.S. market's percentage modeled by mid and small cap markets (**Exhibit 4**).

We base our alpha expectations primarily on average alpha trends, with an eye toward periods that seem closest to the investment environment facing the industry over the next 10–15 years. In previous LTCMAs, we referenced the more robust alpha environment of the 1993–2000 period. In this year's projection, we focus on the alpha potential encompassed by the opportunity of a changing global economy that, in part, harkens back to the strong industry alpha regime of the 1990s. Our return projections remain bounded, however, by dry powder, near-term markdowns (which we have explicitly identified as a separate line item this year, given their potential impact on future performance) and the rising cost of debt (**Exhibit 5**). Our outlook now aligns more closely with the less robust alpha environment of the past 15 years.

We make adjustments in our forecasting model to reflect the broader PE environment, including levels of dry powder and the use of investment options such as direct investment, lines of credit and fees.

Growth sectors and the growth capital style of investing are playing a rising role in PE, and managers now have access to record amounts of dry powder

Exhibit 4: Volume of dry powder by geographic region and as a % of global GDP



Source: International Monetary Fund, Preqin; data as of December 31, 2021.

Our methodology reflects our assessment of the alpha potential of the current period, adjusted for excess capital to invest (reserves), the rising cost of debt and the use of various investment options

Exhibit 5: Components of return

	Small PE (<USD 1bn)	Mid PE (USD 1bn–USD 5bn)	Large/mega PE (>USD 5bn)*	Cap-weighted**
Public market exposures				
U.S. small cap	100%	40%		
U.S. mid cap		50%	55%	
Europe		10%	20%	
Japan†			5%	
Asia ex-Japan			20%	
Assumptions (USD, %)				
Public market exposure	8.10	8.30	9.00	8.70
Alpha trend	2.30	2.20	2.40	2.30
NAV public market adjustment††	-0.90	-1.10	-1.20	-1.10
2023 LTCMA‡	**9.50**	**9.40**	**10.20**	**9.90**
2022 LTCMA‡	7.40	7.60	8.40	8.10

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022.
* The regional weights for Large/mega PE composite are: U.S. 55%, Europe 20%, Japan 5% and Asia ex-Japan 20%. These capitalization weights were calculated using data from Preqin.
** The private equity composite is AUM-weighted: 65% large cap and mega cap, 25% mid cap and 10% small cap. Capitalization size categories refer to the size of the asset pool, which has a direct correlation to the size of companies acquired, except in the case of mega cap.
† The Japan weight is an extrapolated number.
†† The NAV public market adjustment accounts for the drawdown in public equity market returns.
‡ Includes impact of translation into USD.

Dispersion in managers' performance

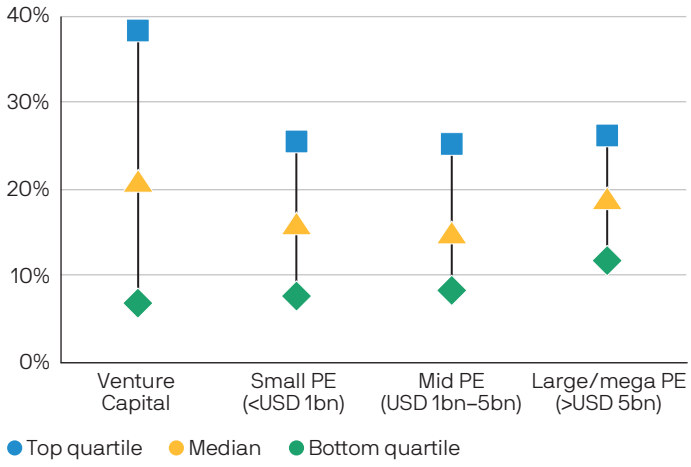
Our PE return projections are founded on managers' average or median returns. Dispersion in PE manager performance has been historically wide relative to public market manager dispersion (**Exhibit 6**). We think this trend will continue. Manager selection thus remains a key element in achieving an above-adequate PE return premium.

Conclusion

Since last year, the environment for PE investing has become more problematic. Discount rates have risen, valuations have plummeted, and dry powder remains high. With those shifts, PE-owned companies' NAVs – which remain wide vs. those of listed companies – are likely to narrow, further challenging our beta and alpha projections. The economy is now in transition, but direct investing and modest fee accommodations should help offset the industry's wall of dry powder and NAV markdowns.

Historically, manager dispersion in PE has been wide – and it will continue to be, underscoring the importance of manager selection

Exhibit 6: Historical returns by manager percentile ranking (IRR, USD)*



Source: Burgiss Private iQ, J.P. Morgan Asset Management; data as of March 31, 2022.
* Includes buyout and expansion capital funds for vintages 2006 to 2022.

Venture capital

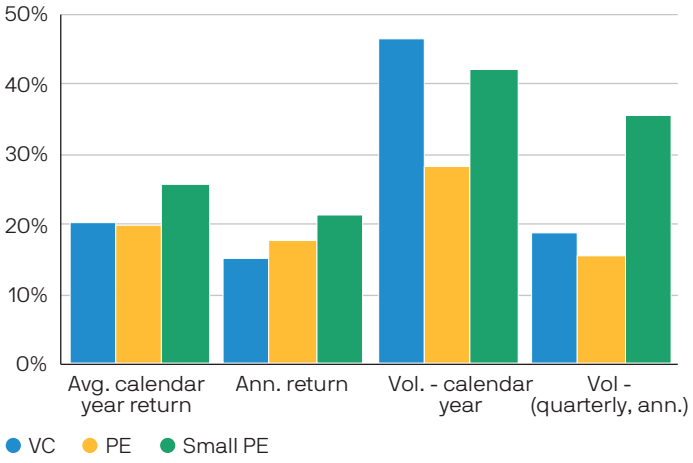
This year, we introduce return projections for venture capital alongside our private equity assumptions. Our 2023 return forecast calls for venture capital to deliver annual returns of 8.50% over our 10–15 year investment horizon.

Building blocks and methodology

In forming a return estimate for venture capital, it is important to review the characteristics of the historical data set. Although many investors assume that venture capital has outperformed over time, annualized returns since 1981 show that private equity has outperformed venture capital, primarily due to the higher volatility of venture capital returns (**Exhibit 7**). In the aftermath of the tech bubble collapse in the early 2000s, for example, venture capital saw outsize losses.

Over a 40-year period, venture capital has underperformed private equity and proven more volatile

Exhibit 7: Venture capital vs. private equity returns and volatility (1981–2021)



Source: Burgiss, J.P. Morgan Asset Management; data as of August 31, 2022.

In an effort to capture the true trend in what is a very idiosyncratic asset class, we have chosen a statistical approach to generate our long-term assumption. In calculating an expected return for venture capital, we took both a fundamental, bottom-up approach and a top-down view.

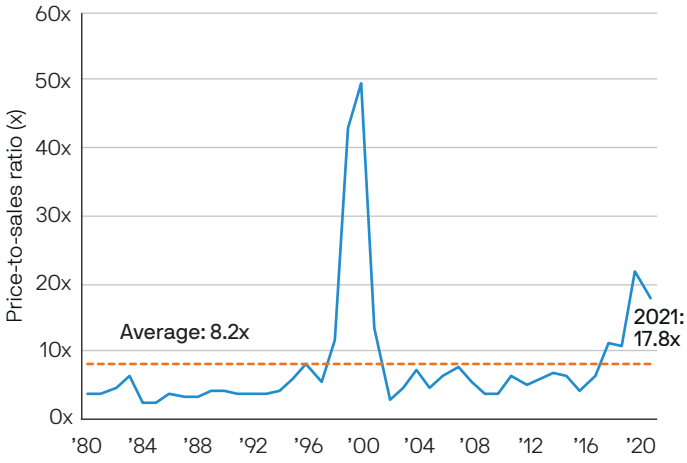
We ran two bottom-up analyses using different combinations of independent variables,[1] whereas our top-down approach looked at the relationship between private equity and venture capital returns over time. For the first iteration, we added the average historical spread between year-over-year quarterly venture capital and private equity returns on both an arithmetic and a geometric basis. The second iteration of our top-down approach used the historical statistical relationship between quarterly venture capital and private equity returns on a year-over-year basis.

Conclusion

Looking ahead, we recognize the outsize returns experienced during the pandemic and the revaluation of assets that has occurred alongside the rerating in public markets this year. Valuations may continue to fall, and our forecast implies that valuations will be in line with the average across the forecast horizon (**Exhibit 8**).

Venture capital valuations ended 2021 well above long-run averages

Exhibit 8: Venture capital IPO price-to-sales ratio (1980-2021)



Source: Burgiss, J.P. Morgan Asset Management; data as of August 31, 2022.

A return to a low interest rate environment, as seen in the expansion following the financial crisis, would support venture capital returns – a scenario that is implicit in our macroeconomic forecast. However, this will not happen overnight. Furthermore, given the extreme dispersion of returns across managers, we expect to see venture capital continue to marginally underperform private equity, as it has historically, with much higher return volatility. Investors need to be aware that venture capital remains a challenging asset class to navigate – and may not deliver returns commensurate with greater risk.

[1] Independent variables include: small private equity buyout returns (zero to USD 500 million), 10-year U.S. Treasury yield, U.S. real GDP growth, S&P 500 total returns, relative performance of the the Russell 2000 Index vs. the Russell 2000 Growth Index (total return), price-to-sales (P/S) ratios of VC-backed IPOs and the number of VC-backed IPOs.

Direct lending

Our 2023 projections for private debt climb to 7.8% from 6.9% last year, reflecting starting spreads of more than 6.0% as well as our view that the base cash/secured overnight financing rate (SOFR) will rise from current levels. This increase is partially offset by higher financing costs. The current sweet spot we have observed recently in direct lending investing (with the strategy offering premium spreads and fees vs. poorer public market options and negligible underwriting losses) is likely to shrink over time, however, as assets under management surge and underwriting standards fall.

Return estimation methodology and building blocks

Our 2023 assumptions reflect two enhancements we made to our methodology this year that impact the all-in cost of financing: We replaced "illiquidity" with "fees" as a category to represent typical fees obtained on middle market loans. We also included a new category called "administration fees" to incorporate fees managers typically charge back to funds (**Exhibit 9**).

Direct lending as market risks rise

Our 2023 outlook starts from a position of strength. Previous portfolio performance has been – and, we expect, will continue to be – driven by select industry exposures, seniority within the capital structure (evidenced by managers choosing to originate a larger percentage of transactions as senior secured first-lien debt) and a focus on assets with resilient business models.

As recently as late 2021, financing competitors were retreating from the space, which had experienced a post-pandemic uptick in underwriting standards. Barriers to entry remain high: Direct lending providers need to have strong origination networks and the capacity to provide customized, one-stop services and swift execution in the midst of uncertain syndicated loan market conditions. The apparent "free lunch" of 550 basis points (bps) and 650bps, which are representative of spreads (plus fees) for large and midsize deals, respectively, ignores the reality on the ground. In the capital markets, there is a material cost for customization, illiquidity and shrinking financing options. Those variables appear – at least for now – to be fully priced in current spread and fee terms.

Financing costs and fee adjustments filter through our enhanced methodology for direct lending

Exhibit 9: Building blocks for direct lending return assumptions

USD, %	Rate/spread	
Base rate (cash)	2.40	LTCMA assumption for cash
Weighted-average spread	6.10	Based on anticipated leveraged loan spreads, weighted for issuance quality and seniority
Fees	1.00	Represents additional return relative to liquid loan alternatives in the form of upfront fees and pre-payment premiums (amortized over a three-year period).
Starting yield	**9.50**	**Cash + spread + fees**
Leverage	9.50	Reflects 1x turn of leverage added
Credit cost	-1.90	Assumed defaults, net of assumed recoveries in restructuring scenarios
Cost of financing	-5.00	Estimated total cost of funding for an asset-based facility (spread, LTCMA cash rate and fees)
Administration fees	-0.80	Based on manager discussions of fund administration fees.
Fees	-3.50	Based on manager discussions of management and performance fees on levered assets
2023 Net levered return	**7.80**	**Sum of starting yield + leverage + credit cost + cost of financing + fees**
2022 Net levered return	**6.90**	

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022, and September 30, 2021.

Deal flow diminishes

Fundamental headwinds for lenders are rising as private equity volumes shrink and the slowing economic outlook puts pressure on corporate fundamentals. The impact of rising rates on issuer interest coverage ratios, financing costs and NAV stability – and the prospect of experiencing an actual credit default cycle – constitute both near and longer-term considerations.

The current credit cycle is not yet over, however, and commentaries from the larger publicly traded direct lending vehicles (business development companies, which primarily power direct lending) indicate healthy credit performance to date. We model our direct lending outlook in the context of such active management, which will (we assume) work to offset fees and moderate exposure to potential losses when more normal credit cycle patterns reemerge.

Conclusion

Our latest return assumptions reflect our concerns with the maturing of the credit cycle – and its probable impact on direct lending industry underwriting performance, by reducing the all-in return premium for private debt vs. leveraged loans and high yield bonds, which now drops below historical return spreads.

Hedge funds

Our 2023 hedge fund return projections rise moderately across all strategies (**Exhibit 10**). Although the drivers of the increase are mixed, the overall environment for industry alpha has improved over the past two years, since the post-pandemic economic recovery began; therefore, we are projecting it to be slightly above average vs. the past 15 years. By strategy type, some clear distinctions emerge: We anticipate a better outlook for macro strategies, for example, and more subdued performance for the equity long-biased style.

Hedge fund returns remain attractive as a portfolio diversifier. Expectations of increased market volatility, coupled with potential return contributions from niche private market strategies (particularly within the private debt and structured debt space), add to the hedge fund sector's appeal. The relatively wide dispersion of manager returns also contributes to the allure of the strategy class, although strong due diligence is required – as is access to top-tier managers.

In line with last year's LTCMA return assumptions, we again note an uptick in the performance outlook for macro strategies, which is entirely due to continued improvement in expected alpha. We attribute this trend to rising risk asset volatility generally and in particular to the projected interest rate outlook and positive price momentum for commodities over the next few years. Cross-asset factor and intra-asset returns – especially within foreign exchange – also contribute materially to this improved outlook.

Hedge fund assumptions rise, driven by higher public market return and alpha expectations for most strategies

Exhibit 10: Hedge fund return assumptions (USD, %)

Strategy	2023 LTCMA	2022 LTCMA
Equity long bias	5.00	3.30
Event-driven	5.40	3.20
Relative value	4.90	3.80
Macro	4.10	2.70
Diversified*	5.00	3.60
Conservative**	3.70	3.30

Source: J.P. Morgan Asset Management; as of September 2022.
* The Diversified assumption represents the projected return for multi-strategy hedge funds.
** The Conservative assumption uses a 0.70 beta to Diversified for the 2023 assumption. The 2022 Conservative assumption used a 0.65 beta to Diversified.

Return estimation methodology and building blocks

Our return projections are primarily based on a multi-factor modeling framework that captures the most important systematic risks and performance generators for each fund strategy class. Essentially, this approach uses regression analysis based on historical industry performance data to extract the beta, or public market drivers of return, from the alpha, or idiosyncratic skills-based return contributors. What our statistical analysis cannot identify as a market factor we attribute as alpha, and every strategy's return projection is the sum of its beta and alpha components. Ultimately, we arrive at a return projection by overlaying the factor model's output with our own judgment, which is informed by various historical beta and alpha regimes (**Exhibit 11**).

Differentiating between beta and alpha drivers of hedge fund strategies

Exhibit 11: Components of hedge fund strategy returns

2023 forecast	Equity long bias	Event-driven	Relative value	Macro	Diversified*	Conservative**
Beta return	3.57	3.31	1.54	1.38	2.66	1.86
Alpha trend line	1.44	2.04	3.36	2.76	2.33	1.85
Return expectation	5.01	5.35	4.90	4.14	4.99	3.71
Rounded	**5.00**	**5.40**	**4.90**	**4.10**	**5.00**	**3.70**
2022 LTCMA	3.30	3.20	3.80	2.70	3.60	3.30
Change	1.70	2.20	1.10	1.40	1.40	0.40

Source: J.P. Morgan Asset Management; as of September 2022.
* The Diversified assumption represents the projected return for multi-strategy hedge funds.
** The Conservative assumption uses a 0.70 beta to Diversified for the 2023 assumption. The 2022 Conservative assumption used a 0.65 beta to Diversified.

More recently, we have enhanced our approach by migrating from a long-only based regression model to a spread methodology that utilizes long-only and long-short data factors to better capture the industry's investment dynamics over time. The enhanced predictive power of this new approach can be seen in the R-squared value, which ranges between 0.86 and 0.93 for all strategies (save macro), indicating the improved "fit" of the data to our analysis (**Exhibit 12**). Although macro's constantly changing investment profile and multiple asset class positions are harder to capture with our analytical model, the results are still meaningful.

Conclusion

If, as we anticipate in our latest LTCMA assumptions, fixed income delivers modest returns and equity performance strengthens in an environment of rising market volatility, a diversified hedge fund strategy can make a favorable portfolio contribution by delivering less correlated returns and dampening volatility. More importantly, our return, volatility and correlation assumptions, when deployed within an optimization framework, suggest that hedge funds can actually play a larger role than that indicated by the 5.0% return assumption, especially if manager performance exceeds the mean returns modeled in our 2023 projections (**Exhibit 13**).

Hedge fund monthly alpha assumptions mostly rise driven by higher expected r^2 expectations for most strategies

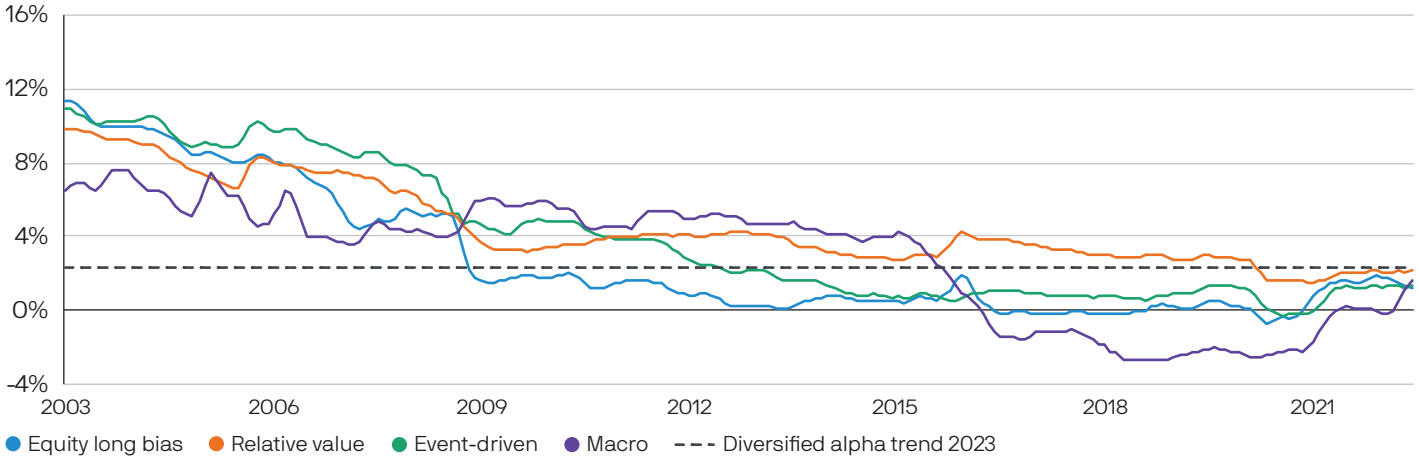
Exhibit 12: Hedge fund model assumptions

2023 forecast	Monthly intercept	SPTR	SC_LC	EAFE_ SPTR	EM_ EAFE	HY_IG	EMD_IG	CNVT_ SPTR	US10Y	COMDTY	DXY	r-sq
HFRI Equity Hedge Index	0.12%	0.44	0.21	0.04	0.01	–	–	–	–	–	–	0.87
HFRI Event Driven Index	0.17%	0.14	–	0.08	(0.00)	0.43	0.15	0.25	–	–	–	0.88
HFRI Relative Value Index	0.28%	–	–	–	–	0.32	0.29	0.13	0.00	–	–	0.86
HFRI Macro Total Index	0.23%	0.10	–	0.02	0.00	–	(0.13)	–	0.11	0.14	0.06	0.24
HFRI Fund Weighted Composite Index	0.12%	0.29	0.08	0.13	0.04	(0.00)	0.13	0.18	(0.00)	0.07	0.07	0.93

Source: J.P. Morgan Asset Management; estimates as of September 2022.

Hedge fund alpha trend line assumptions mostly rise; diversified alpha's 2023 trend line rises to 2.3%

Exhibit 13: Hedge fund alpha trend line assumptions



Source: J.P. Morgan Asset Management; as of September 2022.

Real assets

Stable, inflation-sensitive and differentiated return

Our long-term assumptions for real assets have remained stable or declined slightly from last year's assumptions. As public markets experienced severe drawdowns recently, real assets demonstrated strong return resiliency – with real estate in particular generating record returns. Given the improved return outlook for many traditional public market asset classes, the relative attractiveness of real assets has declined. However, real assets are projected to continue to deliver low volatility returns driven by income, which – coupled with attractive downside risk resiliency – have the potential to provide diversification benefits as part of an overall portfolio.

Model and methodology

Real assets

We apply a building-block approach to constructing our leveraged return assumptions for global real assets, on a net of fees basis. For private core real assets, we start with net operating income (NOI) and adjust for maintenance capital expenditure, net cash flow growth and exit yield; we incorporate leverage and then deduct industry fees. To capture the unique nature and distinct return drivers of each real asset category more specifically, we incorporate slight deviations in the building blocks, but our approach is broadly consistent (**Exhibit 14**).

In real estate, for example, the value-added return uses the core real estate return as a starting point and adjusts for the valuation spreads between core and non-core assets. For REITs, we start from an unleveraged property return, given that REITs are ultimately subject to the same underlying fundamentals as private real estate. We also take into account differences in sector composition, leverage and amortization-to-net asset value discounts (or premiums) in deriving our performance projections.

Our approach to constructing leveraged return assumptions is broadly consistent across real asset categories

Exhibit 14: Real assets illustrative building blocks

	Core real assets returns
=	Starting NOI yield
-	Maintenance capex
+	Net cash flow growth
+	Exit yield adjustment
-	Standard industry fees
+	Leverage impact

Source: J.P. Morgan Asset Management.

Commodities

For commodities, however, we take a slightly different approach in constructing our return projections: Our model begins with a cash return assumption and then adds a premium or discount based on current commodity cycle positioning and expected price trajectories. We make further adjustments related to per capita consumption patterns in emerging markets and the anticipated decline in trade-weighted USD. Finally, we layer in a gold premium based on rising global demand and discount fees to create a total return expectation (**Exhibit 15**).

In looking at price gains for the average cycle going forward, we have modified our thesis as supply issues increasingly take center stage in driving our outlook. We maintain our view that "capital starvation" supply constraints will continue to affect supplies in energy and metals as investors remain unwilling to provide sufficient capital to these sectors. We harbor additional concerns about the impact of geopolitics and environmental regulations on supply availability.

Two approaches to commodities forecasting arrive at the same return assumption

Exhibit 15: Building blocks for commodities return assumptions

Cycle-based methodology	2023	Details	Index-component methodology†		2023
			Index component:	Return assumptions	Composite weights††
Collateral return*	2.40	LTCMA for cash			
Commodity cycle positioning (+premium/-discount)	0.10	Where we are in the current commodity cycle and projections of the next, as indicated by the Commodity Event Index and length/return study of past cycles	- Energy	2.80	36.00
EM per capita consumption adjustment	0.10	Increased growth of EM demand, catalyzed by lockdown reopenings and strong economic growth expectations	- Agriculture+‡	3.10	34.00
Trade-weighted USD decline impact (projected incremental annual decline vs. historical base period)	1.00	The inverse relationship between commodity returns and the U.S. dollar; we use the LTCMA assumption for trade-weighted USD	- Metals‡	3.50	29.00
Total return, gross of fees	**3.60**				
Fees	-0.50	Fees, based on U.S. commodity ETFs and mutual fund average fees			
Total return, net of fees**	**3.10**	Assumption based on the Bloomberg Commodity Total Return Index (a collateralized index composed of futures contracts)	**Weighted total return**		**3.10**
Gold premium	0.40	We assume gold demand benefits relative to overall commodities given greater demand from central banks as well as consumers in China and India	Gold premium		0.40
Gold return, net of fees	**3.50**		**Gold return**		**3.50**

Source: Bloomberg, J.P. Morgan Asset Management, estimates as of September 30, 2022.
* The Long-Term Capital Market Assumption for U.S. cash in the specified year.
** Assumes the impact of roll yield will net to zero over the life of the assumptions.
† Execution dynamics are embedded in the sector-based fundamental methodology.
†† Return assumptions are weighted using Bloomberg Commodity Index weights as of September 30, 2022. Weights may not add up to 100% due to rounding.
‡ "Agriculture+" includes the combination of grains, softs and livestock constituents, while "Metals" combines both precious and industrial metals constituents of the Bloomberg Commodity Index as of September 30, 2022.

Key markets and asset classes

Global real estate

Our 2023 assumptions for core and value-added real estate remain stable or decline slightly across all regions, reflecting its resilient performance during the recent public market downturn, exit capitalization expansion and the rising cost of capital (**Exhibit 16**). In a rising rate environment, however – as rents reset at higher rates and valuations rise due to input costs – we expect real estate to offer attractive implicit or explicit inflation linkage characteristics that will help support performance over the long term.

Our 2023 assumptions for core and value-added real estate are lowered slightly across regions

Exhibit 16: Real estate return assumptions (local currency, %)

Strategy	2023 LTCMA	2022 LTCMA
U.S. core	5.70	5.80
U.S. value-added	7.70	7.70
European core	4.70	4.80
European value-added	6.70	6.80
Asia-Pacific core	6.10	6.50

Source: J.P. Morgan Asset Management; estimates as of September 30, 2021, and September 30, 2022.

U.S. real estate

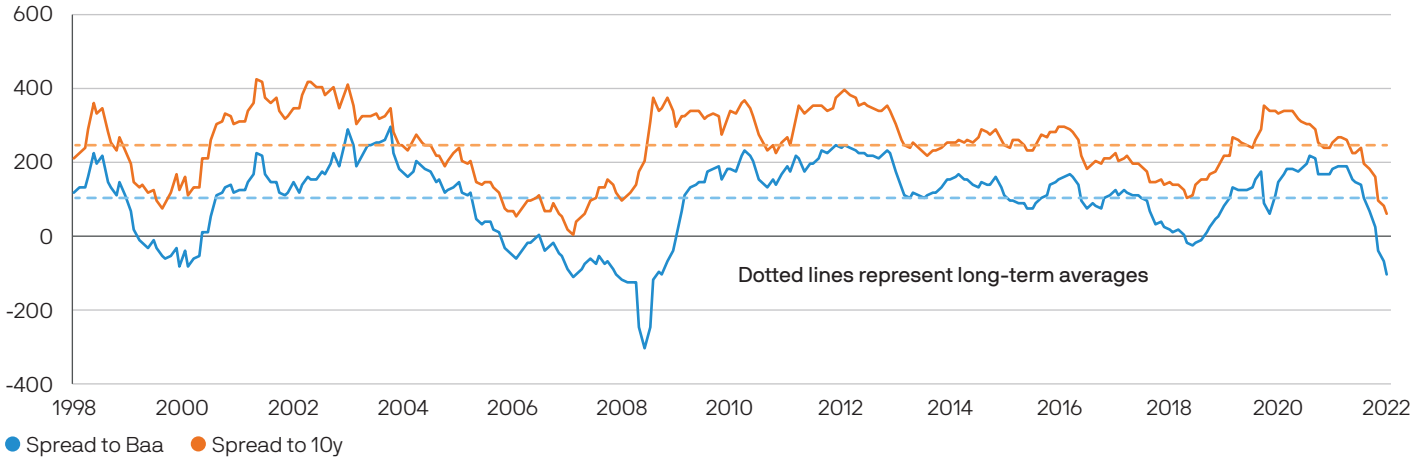
Our return assumption for U.S. core real estate declines to 5.7% from 5.8% last year as real estate reprices in a higher cost-of-capital environment. Our initial capitalization rate assumption incorporates an upward adjustment to reflect the repricing currently taking place in property transaction markets, as investors are underwriting deals to reflect the higher cost of debt amid growing economic uncertainty.

Despite this near-term economic uncertainty, we expect to see NOI growth remain strong. Some sectors, such as residential and industrial real estate, have experienced sharp increases in market rents during the past year; as a result, existing leases are likely to reset higher when rents roll over. In the immediate term, the embedded growth in established portfolios should help insulate NOI growth if economic conditions worsen (and cause market rents to flatten or decline). After assessing these factors – and incorporating higher long-term inflation expectations – we have raised our NOI growth assumption this year.

However, we do not expect higher growth to be strong enough to offset a widening spread over fixed income over time. The current spread to fixed income indices – intermediate Baa bonds and 10-year Treasuries – is lower than the historical average (**Exhibit 17**). Our assumption for value-added real estate is unchanged from last year, given the offsetting factors of higher starting unlevered core real estate returns, stronger cash flow growth and higher exit yield adjustment.

The spread between U.S. core real estate and key fixed income indices has narrowed recently relative to its historical average

Exhibit 17: Core capitalization rate spreads to fixed income indices



Source: J.P. Morgan Asset Management, NCREIF, Moody's Analytics; data as of June 30, 2022.

European real estate

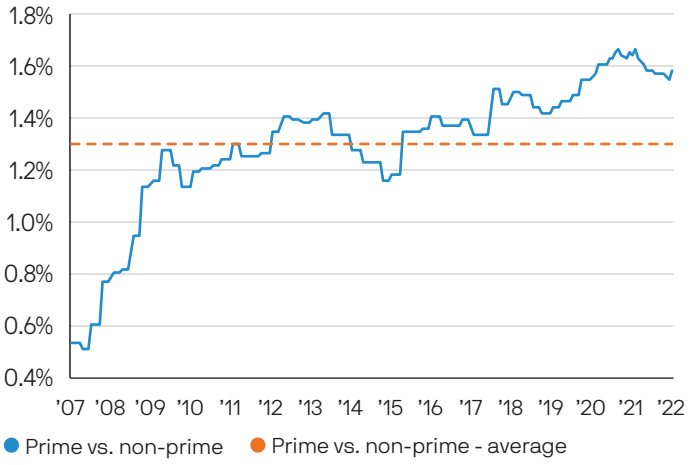
Our 2023 European core real estate return assumption declines slightly to 4.7% from 4.8% last year.[2] We attribute the change to higher exit yields and interest rates. However, relatively robust rental growth forecasts – supported by low vacancy rates and inflation-enhanced cash flows – partially offset the impact of higher rates.

Our starting assumption for core NOI yield[3] increases slightly compared to last year, but viewing the year-over-year comparison doesn't capture the period of yield compression (and subsequent expansion) that characterizes the past 12 months. Although we expect yields to rise further over the short term, our longer-term expectations suggest that they will settle only slightly ahead of current levels as robust long-term rental growth offsets the impact of a higher long-term risk-free rate.

We reduce our European value-added projections, with the lower core return offset by the impact of an accretive yield spread between core and non-core pricing (**Exhibit 18**). With market participants becoming increasingly cautious about the economic outlook for Europe – and the knock-on implications for real estate cash flows and capital values – we expect to see further changes to both core entry yields and core/non-core spreads.

The spread between core and non-core pricing appears poised to increase in the medium term

Exhibit 18: European core and non-core real estate yield spread vs. historical average



Source: CBRE ERIX, J.P. Morgan Asset Management; data as of July 2022.

More broadly, real estate returns in Europe continue to be characterized by dispersion both within and across sectors. The shift to online retail, for example, is likely to continue to support logistics returns and undermine traditional retail performance. It is our view that neither trend is adequately reflected in current market pricing, suggesting opportunities for alpha. In the office sector, hybrid working patterns are strengthening demand for high quality offices while undermining demand for lower quality spaces, creating both investment opportunities and risks. Finally, the residential sector is also benefiting from the shift to hybrid working as demand increases for viable alternatives to traditional office and retail spaces.

Asia-Pacific real estate

Our Asia-Pacific core real estate return assumption drops to 6.1% from 6.5% last year. Macroeconomic conditions and monetary policies vary widely across the region. Overall, we anticipate that long-term growth in Asia-Pacific will be stronger than in other regions – and that investors' allocations to real estate in Asia-Pacific will increase over time.

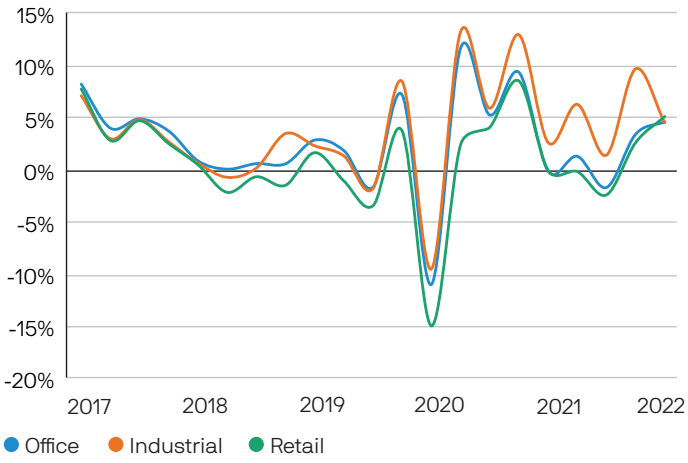
Looking ahead, our NOI growth assumptions for Asia-Pacific remain largely stable, although we have observed a slowdown in the industrial sector following a period of high growth in 2021–22. On the other hand, rising rents in the office and retail sectors continue to drive improvements (**Exhibit 19**).

Entry yields held steady in 2022, as only a few office and retail markets benefited from higher rents even as the leasing market improved, whereas the industrial sector experienced continued tailwinds that drove down entry yield.

[2] For Europe and U.K. real estate, in 2023 we have updated the raw data source from CBRE to MSCI for the volatility and correlation calculation.
[3] Net operating income yield refers to estimated net operating income/asset value at the start of our 10- to 15-year projection period.

Signs of recovery emerge in Asia-Pacific's office and retail sectors

Exhibit 19: Total real estate return by industry sectors in Asia Pacific



Source: MSCI – IPD; data as of June 30, 2022.

Real estate investment trusts (REITs)

Our global REITs return projection rises, with increases across all regions (**Exhibit 20**). We expect that REITs will be well positioned, particularly in periods of inflation, thanks to their diversified access to funding and attractive starting valuations.

Assumptions reflect greater upside potential vs. prior year (estimates for all regions)

Exhibit 20: REITs return assumptions (local currency, %)

REITs	2023	2022
U.S.	6.80	5.70
European	6.10	5.10
Asia-Pacific	5.10	5.00
Global	6.40	5.40

Source: J.P. Morgan Asset Management; estimates as of September 30, 2022.

As we have in previous years, we adjust our assumptions in the U.S. for greater public market exposure to alternative sectors, such as technology-related assets (transmission towers, data centers) as well as health care facilities and manufactured housing. In the past, these adjustments have added meaningfully to U.S. REIT returns. This year, however, the return adjustment is lower for two reasons: The NOI trajectory is slightly lower than in previous years for health care and data centers, and higher for industrial and residential assets; plus, these industrial and residential projects can also be accessed in private markets – and their relative weight has increased as a result of strong performance. In short, the growth gap between different sectors, which investors have been able to access more readily via public markets historically, is narrower than it has been in previous years.

Although leverage has become less accretive, given the higher interest rate environment (and access to funding is key), some of this impact ought to be offset by higher top-line cash flow, particularly for residential and industrial sectors, where strong pricing power exists.

Looking ahead, the amortization-to-NAV discount implies significant upside for REITs across all regions. Markets are pricing in substantial declines in net asset value – an outcome that could potentially materialize in a deep recession scenario. In a mild recession scenario, however, the valuation discount to NAV across all regions looks compelling already, particularly in Europe and the U.S.

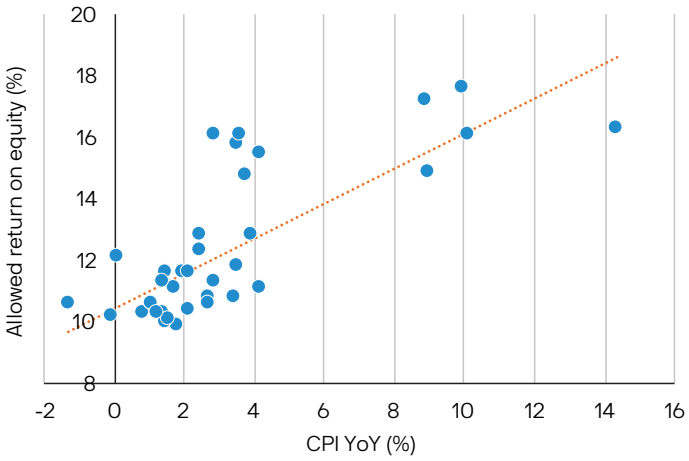
Global core infrastructure

Our 2023 global core infrastructure return assumption increases to 6.3%, up from 6.1% last year. We expect core infrastructure returns to hold up well in the coming 10–15 years, thanks to the fundamentals of the asset class – particularly embedded inflation protection – and the essential nature of the services that core infrastructure provides.

Private core infrastructure offers both explicit (e.g., contractual inflation indexation) and implicit (e.g., allowed return on equity [ROE] and commodity cost pass-through) protection, making the fundamentals of the asset class attractive and particularly well positioned during periods of rising inflation. Over time, we have observed a positive correlation between U.S. utilities' allowed ROE and inflation (**Exhibit 21**), with a two-year lag to account for timings of rate cases (the formal process by which utility regulators assess whether a provider's proposed base rates are fair and reasonable).

Strong correlation is apparent between U.S. utilities' allowed ROE and inflation

Exhibit 21: Inflation vs. U.S. utilities' allowed ROE



Source: Bloomberg, SNL.com, J.P. Morgan Asset Management. Inflation is U.S. Consumer Price Index year-over-year as of 2Q 2022.

Ample investment opportunities exist in this space. The uptick in demand for the asset class is reflected in the rising number of core fund launches and the increasing total of assets under management. However, the widespread need for greater core investment dwarfs the size of funds available, as evidenced by the fact that transaction activity remains high. Additionally, the ongoing energy transition away from fossil fuels has created a pressing need for investments to drive renewable energy adoption – underscored by the current energy crisis in Europe and the UK. The ability of infrastructure assets to directly contribute to these efforts, as well as a sustained industry-wide push to adopt better ESG standards, also inform our positive outlook.

Global core transport

Our 2023 long-term projection for global transport edges slightly higher, from 7.4% last year to 7.5% this year. Operating yields, which have risen over the course of the past year, boost our outlook as increased demand and disrupted supply chains lead to higher asset utilization – and higher lease rates.

Market headwinds are also strengthening: Increasing regulations, rising borrowing costs, labor shortages, and higher maintenance and operating costs present challenges to the asset class, which has outperformed in the past two years as increased demand, congestion and commodity stockpiling led to trade flow readjustments. Although we expect to see demand fall to more historical levels in the medium term for some subcategories, such as maritime leasing (specifically container ships), we anticipate that demand for transport assets over the long term will remain resilient.

Maritime and energy logistics: The maritime sector has witnessed the biggest increase in utilization and operating yields since the post-pandemic economic recovery (**Exhibit 22A**). Russia's invasion of Ukraine – and the ensuing geopolitical turmoil – have sparked a sense of urgency in the energy security conversation globally while also disrupting global supply chains and shipping lanes. These disruptions typically benefit seaborne trade, given the flexibility of travel in delivering cargo to meet sources of demand. Although the initial near-term shifts have led to an increase in European seaborne liquefied natural gas, we expect this trend to be sustained in the longer term as countries look to diversify their sources of energy.

Aircraft: The aircraft industry is also showing signs of recovery, but the prevalence of new COVID-19 variants has limited growth in passenger traffic to intraregional traffic. Although we expect to see longer-term recovery and growth in traffic volumes, rising interest rates, aviation-related labor shortages and looming signs of a recession are potential headwinds that threaten the pace of recovery (**Exhibit 22B**). Similar headwinds also prevail for transportation sectors linked to retail consumption, such as container ships and container leasing, in the near to medium term.

Global core timberland

This year, we introduce return projections for global core timberland, which is maturing as an asset class suitable for institutional investors. Our forecast calls for it to generate annual returns of 6.7% over our 10- to 15-year investment horizon. As inflation rises, investors are seeking to access timberland's income-oriented returns, capital appreciation potential, diversification benefits, low return volatility and strong ESG characteristics.

The increase in investor interest has coincided with a period of timberland shortage: Overall, global timber supply is limited by forest establishment that occurred 25 to 45 years ago. Land conversions and stronger environmental protections are impacting the total forest area available for commercial harvest, even as global demand for sustainable building products continues to rise (**Exhibit 23**). The expected growth in demand for timber is further underpinned by global population growth, China and Europe's ongoing wood requirements, and a 15-year history of residential underbuilding in the U.S.

Constrained supply of softwood timber, which is the predominant material for home construction, also informs our view. Even if the U.S. housing market cooled under pressure from rising rates, we would expect to see ongoing investor interest in forests as a premium-priced source of tradable carbon credits, especially for corporates seeking to meet compliance-based commitments to reduce their carbon footprints. Taken together, these factors create an opportunity for new capital to serve as a resource for timberland development.

The U.S. continues to be the largest investible region for timberland, and local housing demand remains strong, boosting timberland's appeal as an inflation-linked asset class. Although affordability headwinds have recently dampened new home construction forecasts, we expect to see housing starts stay well above the levels recorded in the wake of the global financial crisis (GFC).

Elsewhere, expanding household formation and global population growth continue to propel housing demand. In some international timber markets, such as Australia, demand exceeds domestic timber supply, providing investors with an opportunity to achieve higher returns and greater diversification. We also expect export-driven markets, such as Chile and New Zealand, to continue to benefit from exporting logs to China.

Demand for food, fuel and travel continues to climb despite ongoing trade flow readjustments

Exhibit 22A: Total seaborne maritime and energy logistics trade

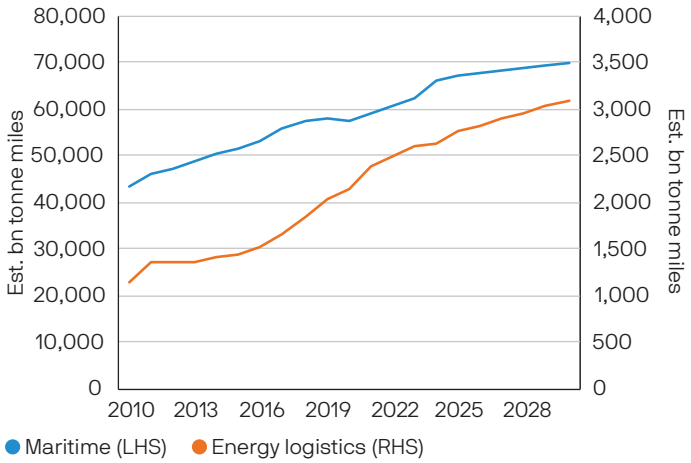
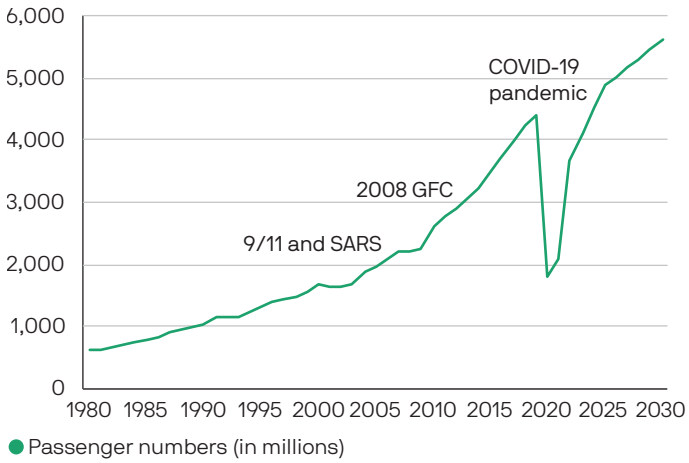


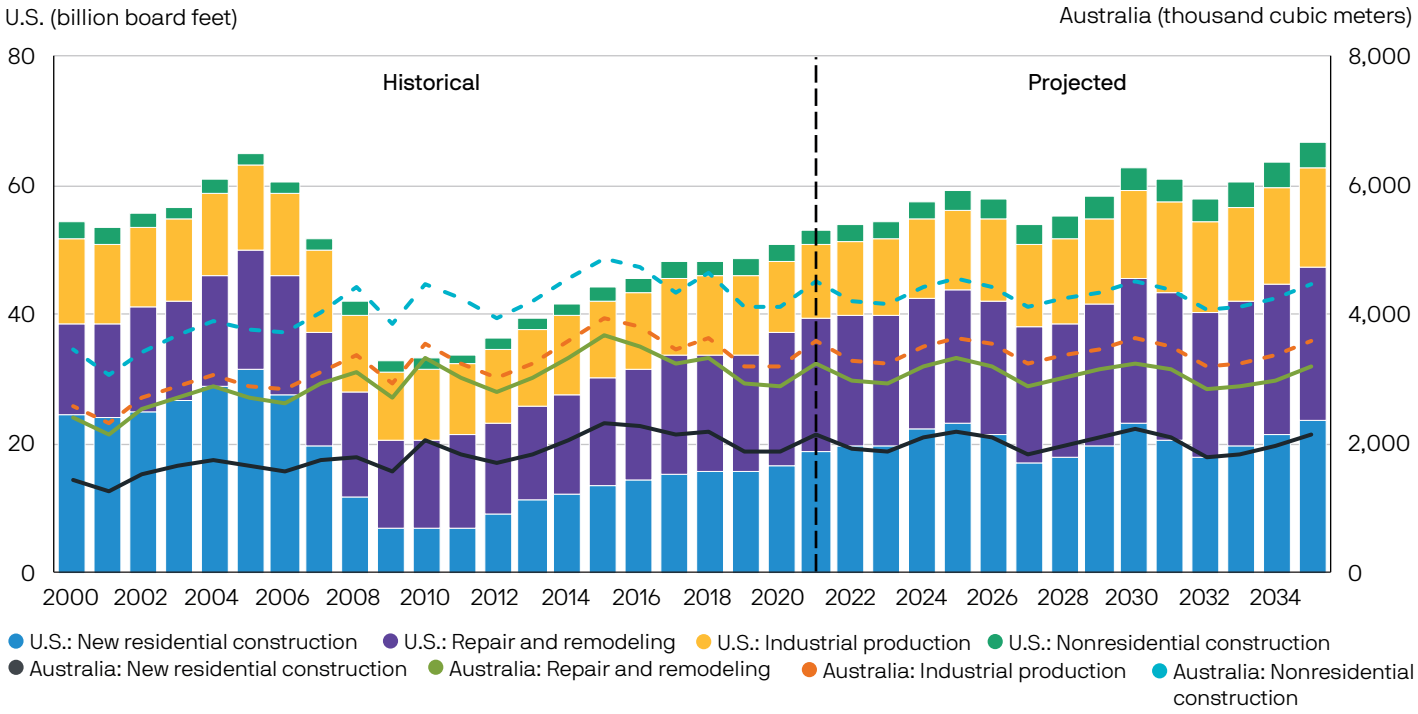
Exhibit 22B: Total air traffic growth outlook



Source: Clarksons Research, MSI, Morten Beyer & Agnew, J.P. Morgan Asset Management Global Alternatives Research; data as of September 30, 2022.

We anticipate a stable demand outlook for softwood lumber across regions

Exhibit 23: Softwood lumber consumption by major end-users in Australia and the U.S.



Source: Forest Economic Advisors, U.S. data as of 2Q 2022; Australia data as of 4Q 2021.

Commodities

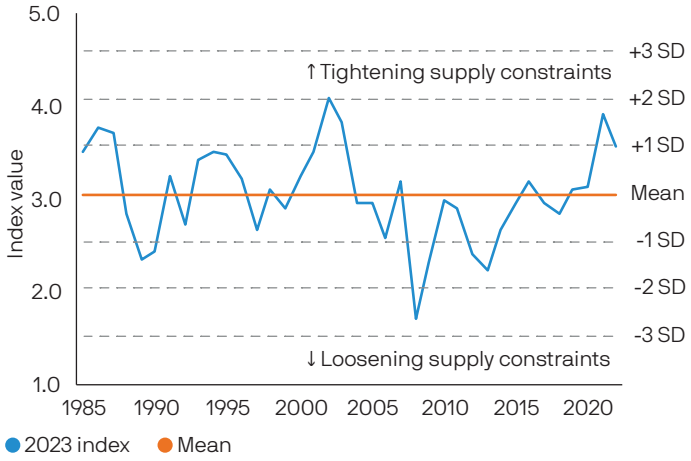
Our 2023 return assumption for long-term broad-basket commodities improves, rising from 2.60% last year to 3.10% as we look out over the coming 12 years – the average length of a commodity cycle, according to our model. Normal cycle dynamics, melded with capex shortfalls in energy and extraction – and combined with a challenging environmental forecast for agriculture – produce a better-than-average return outlook across the entire cycle. This view, which includes the downside of the current cycle and two years of the beginning of a new cycle, draws upon historical dynamics weighted heavily toward our modeling of the average cycle since 1975 (excluding the great commodities supercycle of 1999–2011).

Our cycle clock indicates a modified downturn ahead

Our Commodity Event Index model, which attempts to capture producers' supply constraints and sentiment, indicates above-trend constraint levels consistent with positive but decelerating returns for the current cycle. The war in Ukraine may have accelerated the "up" phase of the cycle – with high prices instigating demand destruction – which has subsequently catalyzed the "down" side of the cycle. We believe, however, that this cycle's unique capital expenditure inadequacy, which is being driven by government policy and ESG pressures (as well as shareholder-driven corporate discipline), will keep cycle prices elevated vs. previous cycles (**Exhibit 24**).

The J.P. Morgan Commodity Event Index attempts to capture producers' supply constraints

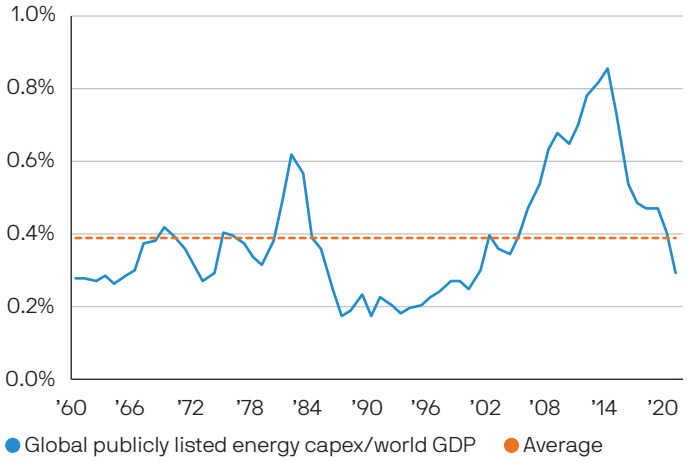
Exhibit 24: The Commodity Event Index



Source: Baker Hughes, Bloomberg Finance L.P., Empirical Research Partners, FactSet, U.S. Bureau of Economic Analysis, J.P. Morgan Asset Management; data as of June 30, 2022.

Capital starvation: Capital investment for energy producers is at 20-year lows

Exhibit 25: Publicly listed energy company capex relative to global GDP



Source: Empirical Research Partners, World Bank, J.P. Morgan Asset Management; data as of December 31, 2021.

Above-average cycle return across sectors

Energy: We believe that the equilibrium energy price over our investment horizon will be closer to USD 90–USD 95 in West Texas Intermediate (WTI) terms. That reflects both growing demand for energy through the late 2020s (as modeled by the International Energy Agency[4]) and a cumulative capex shortfall of some USD 1.3 trillion over the next 10 years[5] (as modeled by J.P. Morgan Research's energy research team) (**Exhibit 25**). Additionally, most energy markets are in deep backwardation (that is, spot pricing is higher than futures market pricing), providing a lower starting point for projected returns.

Industrial metals: The industrial metals extraction industry, which currently has fewer constraints on its output than energy, is subject to normal down-cycle dynamics. However, copper – the largest weighting in the industrial metals subindex at approximately 4% – is a core material of the new economy and, as such, may provide a better return profile than normal cyclical conditions would suggest.

Gold: We have modeled a modest return premium of 40bps relative to the Bloomberg Commodity Total Return Index (BCOM) assumption to reflect gold's elevated demand profile from central banks as well as elevated per capita gold consumption from large, fast-growing populations in India and China.

Agricultural/soft commodities: Although limited hard data exists on the impact of supply constraints, we expect an above-inflation return outlook of 3.10% for agricultural and soft commodities. Against a backdrop of demand growth and geopolitical stressors, numerous studies suggest that climate change will impact agricultural/soft commodity prices more than in the past: The OECD-FAO Agricultural Outlook projects that food production will increase by 1.1% while global food consumption will grow by 1.4% over the next eight to 10 years.[6] Similarly, a NASA study projects that corn crop yields will decline 24% by 2030, primarily due to climate change.[7] In this context, our outlook – that food/soft commodities will rise above the rate of U.S. dollar inflation – still appears moderately conservative.

[4] "Oil demand in the Stated Policies Scenario in the World Energy Outlooks 2021, 2020 and 2016," World Energy Outlook 2021, International Energy Agency, October 8, 2021.
[5] Global Energy Strategy, J.P. Morgan Research.
[6] OECD-FAO Agricultural Outlook 2022–2031, Organization for Economic Cooperation and Development and the Food and Agriculture Organization, July 5, 2021.
[7] "Climate impacts on global agriculture emerge earlier in a new generation of climate and crop models," *Nature Food*, November 1, 2021.

Real assets: Conclusions and implications

Our 2023 long-term assumptions for real assets remain stable – or decline slightly – since last year, leading to a modest reduction in their relative attractiveness when compared to traditional public market asset classes. Public markets, which fell sharply in 2022, are now benefiting from better starting valuations and an improved long-term return outlook, but real assets have not lost their appeal: We expect these assets to continue to deliver stable returns, inflation protection, downside risk resiliency and diversification benefits as part of an overall portfolio.

Within real estate, continued sector dispersion may offset some of the challenges presented by lower return expectations. Elevated spreads between core and value-added pricing also suggest clear and potentially growing opportunities for investment. Notwithstanding our cautious short-term outlook, REITs are well positioned through the cycle, thanks to their diversified access to funding and attractive starting valuations.

Strong investor interest in global core infrastructure has led to increased capital flows and greater competition for assets. Against this backdrop, investment managers will need to maintain their underwriting discipline and avoid style drift from truly "core" infrastructure investments – all while maintaining active portfolio oversight – if they are to achieve expected performance.

Although transport has been subject to ongoing COVID-19 pressures, it continues to demonstrate robust risk-adjusted returns. Ongoing demand (relative to available asset supply) is driving both income and price appreciation, particularly as rising inflation pushes up input costs.

ESG considerations are increasingly important to investors, and real assets, such as timberland, should be well positioned to benefit from this theme. The asset class's appeal, which includes steady income and capital appreciation, may be further enhanced by its ability to offset carbon emissions in response to climate change.

Our above-inflation return outlook for commodities is supported by developments across most sub-asset classes: supply tightness and modest demand growth in energy and metals extraction, and climate change-driven headwinds to agricultural production. Additionally, the ongoing conflict in Ukraine and the geopolitics of energy generally highlight the fragility of supply across the entire commodity complex.

Even as the outlook for public market returns improves, real asset mandates will still play an essential role as a diversified source of returns. Importantly, investors need to consider allocating to actively managed core/core-plus real assets, capturing intracategory dispersion at different points in the cycle and layering in diversified exposures to non-core categories by manager, asset type and vintage year selection. By following this approach, investors can position allocations across market cycles and capitalize on the benefits that accrue to different real asset categories.

Volatility and correlation assumptions

Fixed income volatility rises; its diversification benefits weaken

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In brief

- We forecast higher volatility for most asset classes, most meaningfully in fixed income as rates revert to higher yield levels and returns likely rise back to levels last seen before the global financial crisis.
- Over our long-term forecast horizon, U.S. stock-bond correlations remain negative, although slightly less negative because of the effect of positive short-term correlation.
- Correlation between U.S. equities and Treasuries should remain volatile, lessening the efficacy of core fixed income in smoothing equity volatility, but while the benefits of diversification may have weakened at the margin, they endure.
- Risk dynamics proved challenging in 2022 as short-term volatility deviated significantly from our long-term assumptions. Despite this dislocation, our analysis reaffirms that even as long-term volatility forecasts trend upward, short-term risks don't become long-term forecasts unless today's macro and market environment becomes a multi-year phenomenon.
- Our Sharpe ratio forecast for equities improves, reverting to historical averages, and rises for government bonds and corporate credit. Real assets' Sharpe ratios are stable to declining, yet despite this relative downgrade, alternatives retain their stable and highly diversifying return and risk profiles.

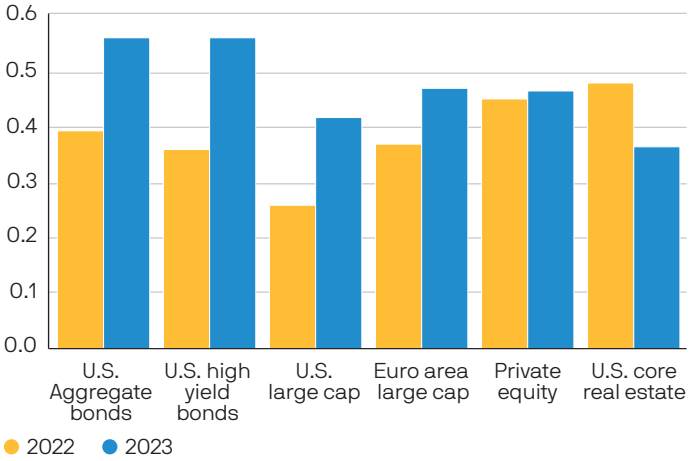
Short-term volatility has been trending upward for many asset classes across global markets, amid extreme economic and market developments: surging inflation, hawkish pivots by monetary policymakers and record asset price movements, especially in fixed income. Some aspects of this new economic, market and interest rate regime could linger as policy makers tackle high inflation and subtrend growth in the next year or so. But even as the economic environment trends toward our long-run equilibrium assumptions, we note that some of these changes may be more structural.

Against this backdrop, the simple addition of asset movements since our last set of assumptions raises our volatility forecast marginally. We also incorporate a risk scenario from last year's forecast as a component in this year's forecast, with a low probability of occurrence. This raises our volatility forecast further, especially for fixed income. We also project weaker stock-bond correlations than in the past 15 years.

Sharpe ratios[1] for equities, fixed income and other publicly traded assets have reshuffled rapidly since our last edition as our Long-Term Capital Market Assumptions (LTCMA) return expectations rise (**Exhibit 1**). We forecast improved Sharpe ratios for equities, government bonds and corporate credit. In contrast, Sharpe ratios for alternative asset classes are stable to declining. Although alternatives' relative risk-adjusted returns weaken, we highlight their stable, highly diversifying return and risk profiles.

Public assets' Sharpe ratio forecasts improve significantly since our last edition

Exhibit 1: Projected Sharpe ratios for key asset classes based on 2023 LTCMAs vs. 2022 LTCMAs



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

In the last edition, we flagged two risks: increasingly frequent extreme events – rising volatility at the tails with a corresponding rise in the volatility of volatility, and a sharp, short-term shift toward positive stock-bond correlation. We were not surprised to see these two risks realized over the past year, a time of transformation in the economic landscape. What did surprise us was the speed at which our forecasts played out, and the magnitude of the shifts.

Why did the risks unfold so rapidly? Because inflation has been much higher, and stickier, than most market participants anticipated, and because of the response of the Federal Reserve (Fed) in an ongoing set of rate hikes. Both the stickier inflation and the Fed's response were influenced, as has been widely observed, by skyrocketing energy costs, inflation's broadening from goods to wages and fears that inflation expectations could become unanchored. Taken together, these factors have created a monetary policy regime not seen in more than 20 years, and fundamentally change the volatility and correlation landscape.

Model and methodology

Long-term asset volatility and correlations are the common starting point for all our assumptions. To calculate our assumptions, our data window starts in 2H 2006 and ends 1H 2022. We use monthly data for liquid assets and quarterly data for private assets, removing outliers that could bias our volatility estimates.[2] To align our forecasts with our forward-looking long-term view, we leverage historical return series but weight each data point by relevance, based on what we expect will be the frequency of various economic regimes.

Over the past few years, we have applied a long-run average probability of 15% to global periods of stress, reflecting our expectations of the likelihood that recession-like conditions will prevail during the next 10–15 years. Applying this probability also mitigates the impact of a rolling data window on the forecasts. Last, we incorporate key themes and structural changes that we expect over the forecast horizon, such as changes in the composition of credit ratings and the maturities of benchmark corporate bond indices.[3]

[1] The Sharpe ratio is approximated by the ratio of compound return less the cash rate to volatility.
[2] For extreme data points above the 99.5% (or below the 0.5%) significance level of normal distribution, we adjust data by capping (or flooring) it at the 99.5% (or 0.5%) level.
[3] For a covariance matrix to be used in optimization, it needs to be symmetric and positive semi-definite (PSD). The final matrix is adjusted to ensure this stable numerical property, PSD, is satisfied.

Sensitivity analysis: Incorporating short-term changes into long-term forecasts

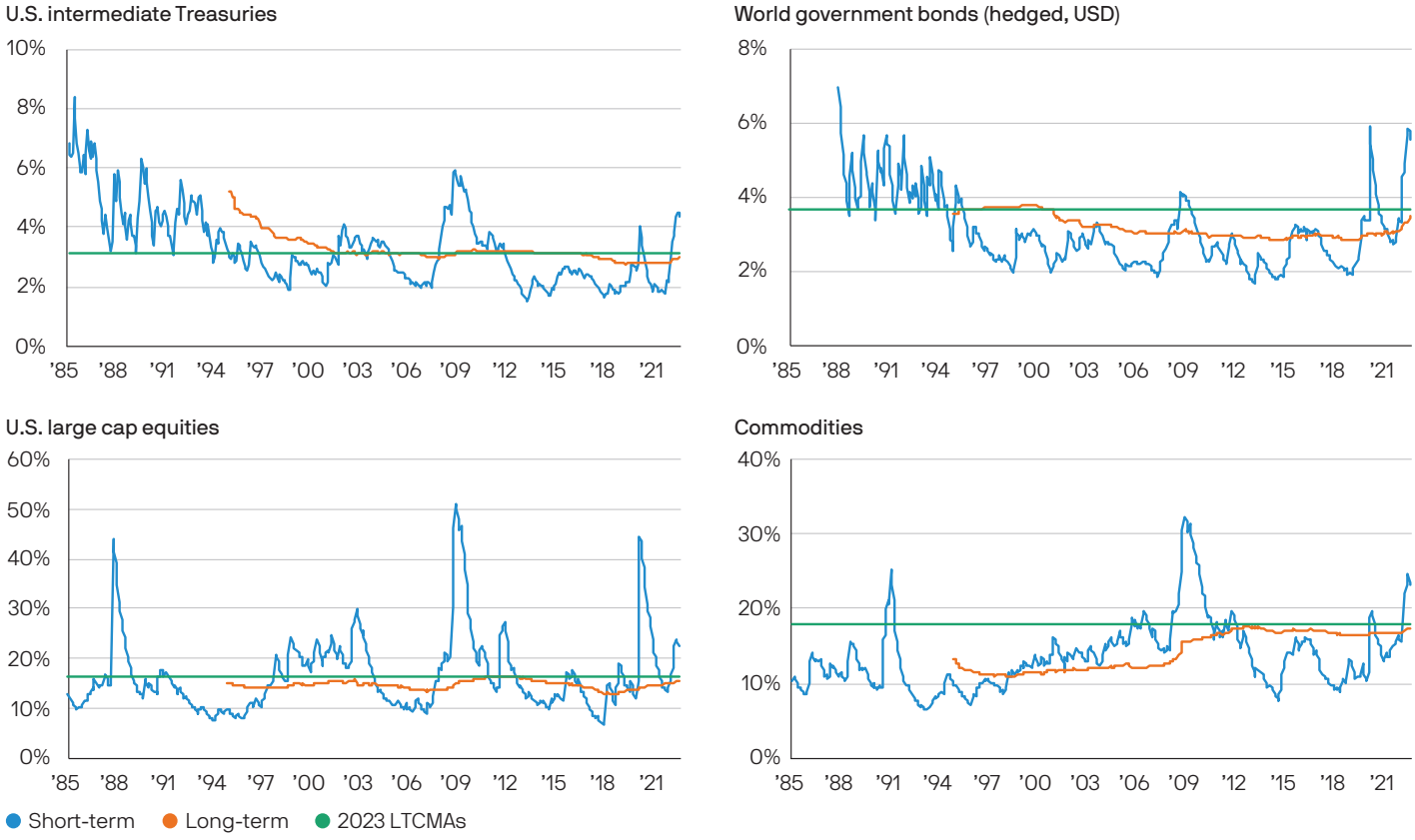
Recent economic and market developments have had different impacts on short-term and long-term volatility and correlations. Since, as noted, we believe that some of these developments are not transient but likely to become structural, how do we address this within the LTCMA forecast framework?

Our LTCMA forecast period has a 10- to 15-year horizon, aiming to capture at least one business cycle. On a year-over-year basis, our long-term volatility and correlation forecasts are typically stable. However, in the short term, to the contrary, forecasts can change quickly, and to be successful over time, investors will have to navigate the short waves and deviations from long-term levels.

Many asset classes have recently experienced a rapid rise in short-term volatility, especially fixed income. This upward trend puts risk well above historical long-term levels and above our past LTCMA volatility projections (**Exhibit 2**). Nonetheless, long-term volatility,[4] including our forecasts, continues to change only gradually.

While short-term volatility is trending higher across global markets, projected long-term levels remain stable

Exhibit 2: Short- vs. long-term volatility (%), selected assets (USD)

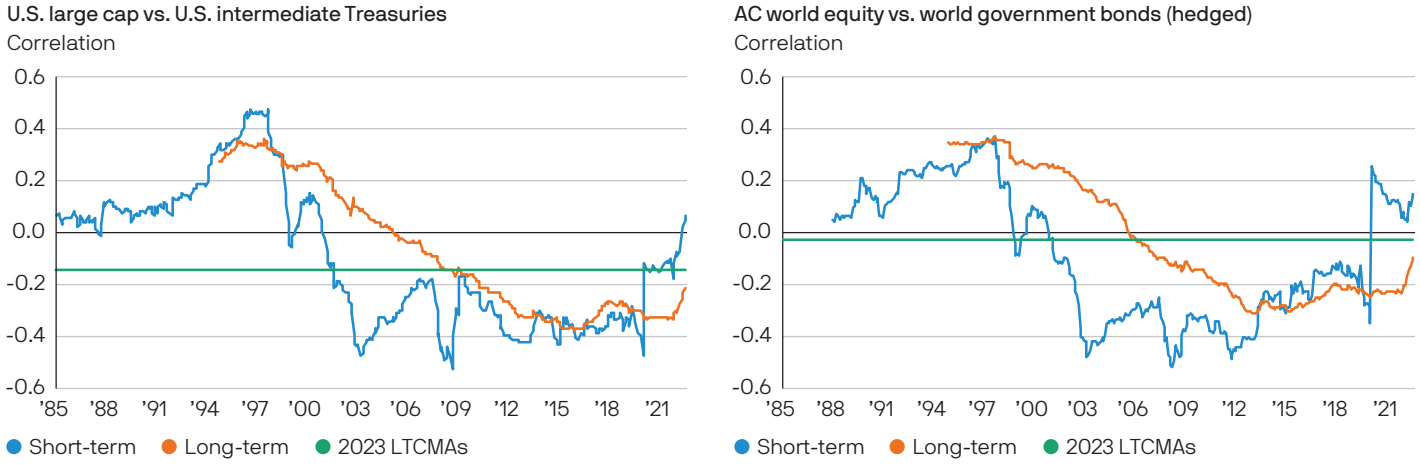


Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022.

[4] Long-term volatility is annualized equal 15-year volatility using monthly return data. Short-term volatility is annualized exponentially weighted moving average (EWMA) volatility with a three-month half-life and a three-year lookback window, using daily return data.

U.S. and global stock-bond correlations are positive in the short term, which has lifted long-term correlation

Exhibit 3: Short- vs. long-term stock-bond correlations, U.S. and global (USD)



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022.

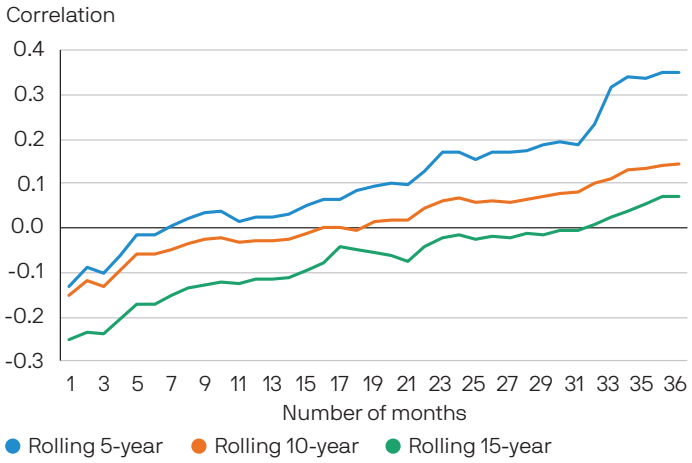
With the pickup in short-term volatilities, we have noted that short-term stock-bond correlations[5] in both U.S. and global markets have been moving rapidly higher, as well (**Exhibit 3**). As of the time of writing, as yield levels have normalized, core fixed income's forward-looking return potential has improved, creating room for yield compression when market distress occurs. So have bonds once again returned to being indispensable hedging assets?

While long-term correlations[6] remain negative between U.S. large cap equities and Treasuries, in line with the past decade, they are trending upward. Long-term U.S. stock-bond correlations could become neutral – or even positive – if the environment at the time of writing were to persist for significantly longer. In our view, core bonds' long-run diversification benefits remain intact. But that rests on the assumption that today's short-term dynamics abate.

How much longer would current conditions need to persist for stock-bond correlation to turn positive over the long term? We studied this by creating example scenarios, adding data from a hypothetical positive stock-bond correlation regime to existing time series, and examined the impact of positive correlation on a rolling 15-year correlation forecast.

Positive stock-bond correlation picks up significantly faster by shorter-term measures than by longer-term measures

Exhibit 4: Impact of regime changes on short- vs. long-term measures of U.S. stock-bond correlation



Source: Bloomberg, J.P. Morgan Asset Management.

As **Exhibit 4** shows, in our hypothetical analysis positive stock-bond correlation picks up significantly faster by shorter-term measures than by longer-term measures such as rolling 10- and 15-year correlations. This sensitivity analysis suggests that at least 24 months of positive stock-bond correlation would likely be needed for this dynamic to turn positive by long-term measurements. Shy of two years, long-term stock-bond correlations likely remain negative.

[5] Short-term correlation is exponentially weighted moving average (EWMA) volatility with a three-month half-life and a three-year lookback window, using weekly return data.
[6] Long-term correlation is equal-weighted 15-year correlation using monthly return data.

Our analysis highlights where the LTCMA 2023 volatility and correlation risk forecasts stand vs. long- and short-run history. We use this information to help calibrate an additional regime in this year's forecasts. The new regime is defined at the start of 2022, with a weight that is both intuitive (i.e., likely frequency of occurrence) and has an appropriate level of impact on the forecasts. Our fixed income forecasts bring our assumptions back to risk levels similar to the pre-global financial crisis period of non-zero cash rates. The long-term efficacy of diversification – using core fixed income to smooth equity volatility – may be weakened, at the margin, but in our view it is not gone.

Key markets: Volatility and correlation forecasts

We introduce an additional regime into our data-weighting methodology this year, with the aim of capturing the current environment of central bank rate hiking, weaker stock-bond correlation, quantitative tightening, inflation and potentially fatter left tails.[7]

The calibrations are:

- Recessionary/stress scenarios, to which we give a 15% weight, applied to periods the NBER classifies as recessions
- New inflationary scenarios, to which we give a 10% weight, applied to data from January 2022–June 2022

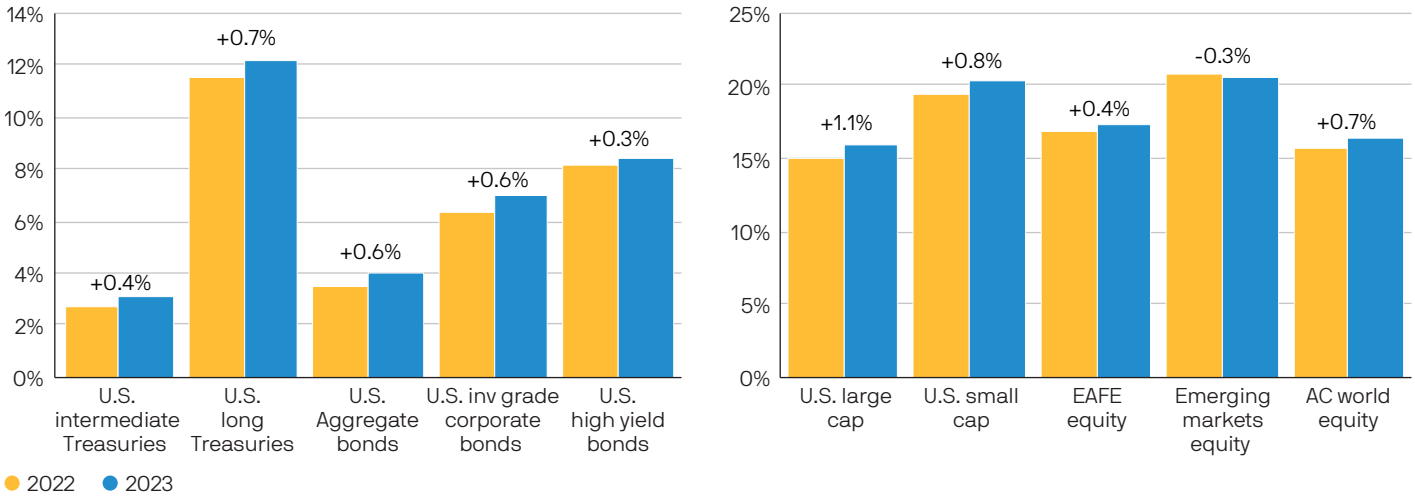
As a result, we forecast higher volatility and weaker U.S. stock-bond correlation. Correlation remains negative but less negative than in the past.

Equities

Our volatility forecast for equities generally moves up, especially for U.S. equities, across both large and small caps (**Exhibit 5**). Our emerging market (EM) equity volatility forecast is more stable year over year, in local currency terms. When we incorporate the effects of foreign exchange, volatility is slightly reduced, because EM FX movements marginally diversify moves in local equity prices.

Higher risk in fixed income and selected equities

Exhibit 5: Volatility forecasts for key asset classes, 2023 LTCMA vs. 2022 LTCMA



Source: J.P. Morgan Asset Management; data as of September 30, 2022.

[7] A tail is the tapering at the far ends of a distribution curve, representing least likely outcomes; in a left- (right-) tail occurrence, an asset or portfolio value moves more than 2 standard deviations below (above) its mean, or average.

Fixed income

Fixed income volatility rises in this edition, driven by the heightened rate risk environment that we incorporate into our forecasts. For the past 15 years, short-end government bond risk was suppressed by quantitative easing, a supportive Fed and low inflation. Now, we are seeing the opposite: quantitative tightening, Fed hiking at the fastest pace since the 1990s, high inflation and higher yield levels (which tend to be accompanied by higher volatility). Our new regime has the most impact on long-duration bonds.

Credit assets' risk profile has declined since late 2000 as the composition of corporate credit indices has shifted toward lower quality.[8] The percentage of lowest rated investment grade bonds, BBB, grew from 38% of the U.S. investment grade index in 2007 to 50% in 2022.[9] At the same time, maturities extended: The index is now composed of notably more 10-year and longer bonds (**Exhibit 6**). For these reasons, we adjust our volatility forecasts to reflect the higher risk of investment grade corporate bonds. We apply a similar rationale and approach to the other asset classes we cover, using their forecasted composite weights.

Alternatives

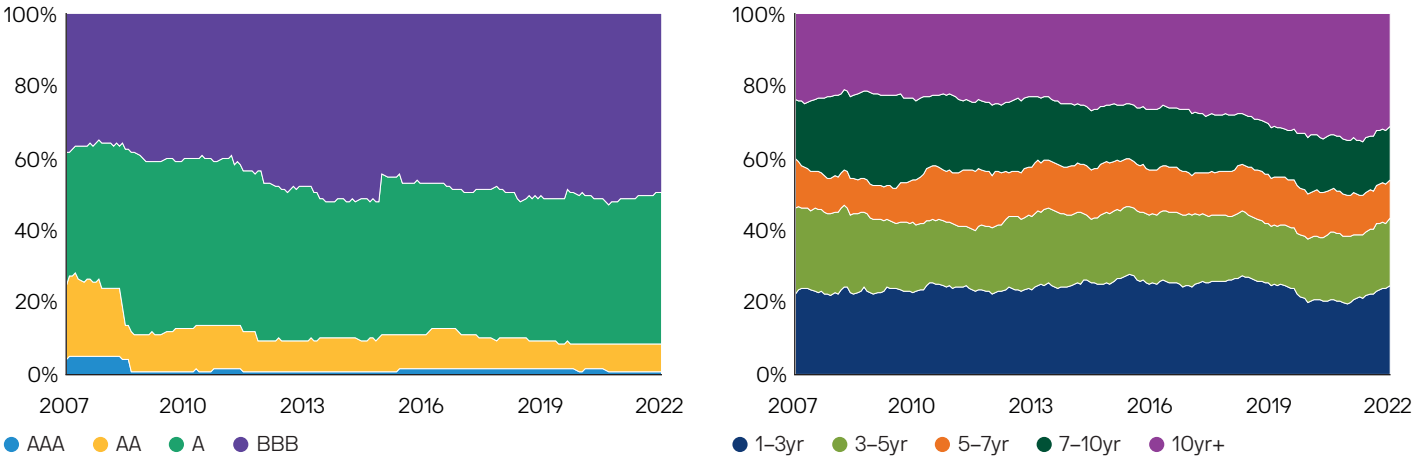
Our volatility forecast rises for financial alternatives. The magnitude of this volatility increase is in line with that of underlying public market beta. Within private equity, our small cap private equity forecast is for higher volatility relative to mid and large cap. Venture capital, a new asset class this year, has historically demonstrated higher volatility than private equity, and our forecast is for its volatility to be the highest within the universe of alternative investments.[10]

In this edition, we introduce global core timberland, an institutionalized asset class that demonstrates structurally low leverage, attractive risk-adjusted returns and a volatility profile similar to core real estate's.[11]

Our real assets forecast is stable. In this year's edition, we see a downward inflection in the relative attractiveness of real assets' returns vs. other alternatives. Despite that relative lessening, our projection shows real assets continuing to offer stable returns and volatility with low correlation to public markets.

Risk rises in investment grade corporate bonds due to lower quality and longer maturities

Exhibit 6: U.S. investment grade corporate bond market composition by rating and maturity (%)



Source: J.P. Morgan Securities, J.P. Morgan Asset Management; data as of September 30, 2022. J.P. Morgan JULI index composition by market value.

[8] For more details on the underlying asset class composition forecasts by maturity and rating, see Michael Feser, Sean Daly et al., "Fixed income assumptions: Bonds are back – after the biggest-ever drawdown," 2023 Long-Term Capital Market Assumptions, J.P. Morgan Asset Management, November 2022.
[9] Composite weight computed using J.P. Morgan JULI indices, as of September 30, 2022.
[10] All of the volatility assumptions are reflective of the risk profile of median managers. Within alternatives, manager selection is critical for more opportunistic asset classes that display wide manager dispersion, such as venture capital and private equity.
[11] The impact of data smoothing plays an important role in measuring the volatility of appraisal-based asset categories. We continue to utilize a return de-smoothing approach, adjusting the volatility by taking into consideration embedded operational volatility. Since timberland is subject to a significant seasonal appraisal bias, we also draw upon the Fisher-Geltner-Webb and Cho-Kawaguchi-Shilling methodologies. However, each methodology comes with benefits and challenges. Fully incorporating factors including liquidity, scale, quality and appraisal in the volatility estimate process would better reflect the true economic volatility and risk-adjusted return characteristics of private market asset classes.

Conclusion: Government bonds remain a portfolio diversifier, but with higher risk

Risk dynamics proved challenging in markets in 2022, as short-term risk deviated significantly from our long-term forecasts. Our latest volatility and correlation projections nod to this structural change. However, our analysis reaffirms that unless today's short-term environment becomes long term – persists well beyond the next 12 months to become a multi-year phenomenon – short-term risks will not become long-term forecasts.

Stepping back for a broad view, much of the change to asset returns and risks is consistent with historical experience. Equity returns of 8%–9%, our 2023 LTCMA forecast, generate Sharpe ratios around 0.35, in line with long-run historical averages. Credit continues to have a higher Sharpe ratio than government bonds, driven by the credit risk premium. And while our fixed income volatility forecast rises, fixed income's Sharpe ratio still improves, along with better forward return potential. These changes simply bring us back to the world of Sharpe ratios prior to the global financial crisis.

Our forecast sees the classic 60/40 stock-bond portfolio once again generating respectable returns – though the picture is not all rosy. Stock-bond correlation should remain volatile, and less negative than before.

We expect core real assets to deliver economic volatility of around 10% over time.[12] Real assets fall in their relative Sharpe ratio ranking yet have other dimensions we believe investors should continue to consider that are not captured in simple mean return and volatility. These opportunities include real assets' high inflation sensitivity and strong potential for cash flow growth. Real assets' stability is especially important during times when short-term risk and correlation are volatile, as they are today.

[12] For a discussion of economic volatility as a middle way between accounting and de-smoothed volatility, see our chapter in the last edition. Grace Koo, Paul Kennedy et al., "Volatility and correlation assumptions: Stable forecast in a dislocated world: Risk outlook little changed, uncertainty rising," 2022 Long-Term Capital Market Assumptions, J.P. Morgan Asset Management, November 2021.

Portfolio implications

Striking a balance: Strategic patience, tactical flexibility

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In brief

- Fundamental changes to the investment environment require a clear-eyed assessment of the longer-term assumptions that anchor the strategic allocation process. The new environment also suggests a more flexible approach to short-term strategy, as recent market shifts offer opportunities to manage risk and capture returns in the near term. Investors need to strike a balance between strategic patience and tactical flexibility.
- The year 2022 marks a regime shift – from a world of low inflation and easy financial conditions to one of high inflation, tightening policy and higher interest rates. The emergence of this new regime presents an opportunity for investors to stress-test their allocation process and implement changes that will support risk-adjusted returns over multiple horizons.
- Among our key conclusions: A baseline portfolio may deliver higher forward returns than at any time in more than a decade. However, the potential shift to a more positively correlated environment limits an investor's capacity to diversify equity risk and may increase volatility as a result. Lower volatility credit sectors may become more compelling as part of a return strategy. Diversified alternatives may offer value as much for their ability to reduce risk as for their ability to deliver returns.

In our Long-Term Capital Market Assumptions (LTCMAs), we seek to strike a balance between capturing short-term changes in valuations and remaining anchored to long-term equilibrium return assumptions. Over time, changes in valuations and returns tend to move in opposite directions: Near-term declines in value generally hold the prospect of higher future returns as valuations normalize across time. The long-term equilibrium is not immutable, however. It will respond slowly to secular changes in fundamental drivers of asset returns – rather than to short-term changes in asset prices.

Investors can therefore benefit from guidance as to where and when higher and lower returns are likely to occur. They can also take comfort in a consistent framework that guides asset allocation over extended time horizons. While specific markets may offer more, or less, attractive returns at various moments, the long-term nature of the assumptions means that the optimal portfolio remains well anchored. Rebalancing to this strategic benchmark during periods of volatility will generally add value insofar as deviations are generally mean-reverting.

Current valuations have shifted dramatically lower since our 2022 LTCMAs, leading to significantly higher forward return assumptions across public markets. However, we are also witnessing elements of a regime shift that may change some of the underlying fundamentals.

Consider:

- The investing environment has undergone a significant transformation over the past 12 months, from a world of low inflation and easy financial conditions to one of high inflation, tightening policy and higher interest rates. Such regime changes can drive fundamental shifts in the relative returns, risks and correlations across asset classes.
- The time frame required for high confidence in forward return assumptions, which in the case of this exercise is 10–15 years, makes it challenging to incorporate market conditions that may not persist over the full cycle. The long-term assumptions themselves may not fully capture the risks and opportunities in the current environment.
- We cannot yet know how long this new equilibrium may last. But it is quite possible that the effects will linger long enough to influence investment decision-making over the next several years. Investors can, and should, respond to the new equilibrium even if its long-term fate remains uncertain.

This new environment requires a clear-eyed assessment of longer-term assumptions around asset allocation, and suggests a more flexible approach to short-term strategy as well. Investors will need to look across multiple time frames, striking a balance between strategic patience and tactical flexibility. As we describe below, there is value in stress-testing a new equilibrium.

2022: Investing through a regime shift

This time last year, we observed that a traditional 60/40 portfolio would deliver subpar long-term returns given elevated valuations across public markets, and we emphasized the risk that stock-bond diversification might prove to be less effective in a period of low rates and rising inflation. Investing in alternative asset classes (especially in sectors with moderate returns and lower absolute volatility) could help shift risk from public markets while preserving overall returns.

This proved to be reasonable advice – particularly the emphasis on core real assets as a means of building in some resiliency to inflation. Investors who followed these suggestions would likely have avoided some of the sharp losses they would otherwise have experienced in 2022. In hindsight, we could have offered a stronger note of caution but, of course, few anticipated the war in Ukraine and the resulting economic fallout.

Beyond geopolitical turmoil, the past year may also signal a significant shift in the internal dynamics of asset allocations: Diversification within public markets disappeared in 2022 as stocks and bonds declined in lockstep, the relative outperformance of private assets led to allocation imbalances, and the forceful policy response to rising inflation upended traditional yield curve and currency dynamics.

If these trends persist, strategies will need to adjust; even if they are temporary, these trends may offer a compelling tactical opportunity. We may sense that it is unwise to do nothing in response to these shifts, but still need guidance about how to respond. We use an allocation model, adjusted for higher correlations and the latest return assumptions, to illustrate the directional tilts that could make sense.

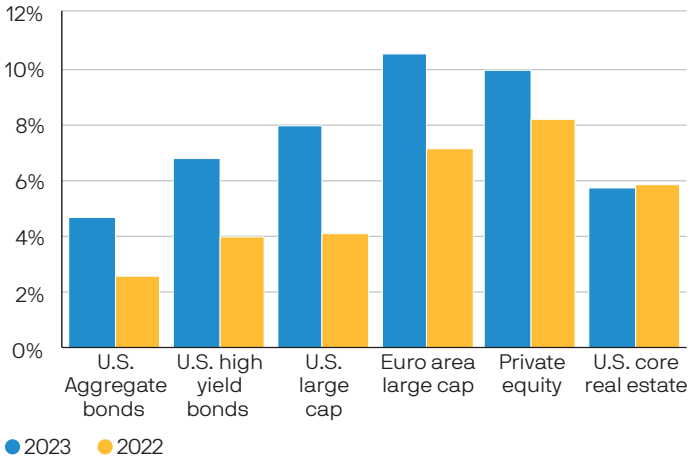
Uncertainty is a given in any asset allocation model

Strategic asset allocation models rely on key inputs derived from capital market forecasts – returns, volatilities and correlations – that are always subject to some uncertainty. But the process works effectively when we have confidence in these underlying inputs, as we explain below:

- Variability of asset class returns is a widely accepted fact of life in the financial markets, but over long horizons we can have greater confidence in our forecasts. Initial conditions, which are directly observable, drive much of the change, along with shifting components of the equilibrium model. The significant repricing of many markets over the past 12 months has led to dramatic improvements in long-term return assumptions. **Exhibit 1** illustrates the striking moves in long-term assumptions.
- Despite significant movement in asset class volatility over short horizons, these movements tend to be mean-reverting over relatively brief periods, which means that longer-term volatilities remain well anchored. As seen in **Exhibit 2**, the currently elevated level of short-term volatility should have a limited impact on the longer-term volatilities that underlie our assumptions for stocks and bonds.

After the 2022 market downturn, return projections rise across key asset classes

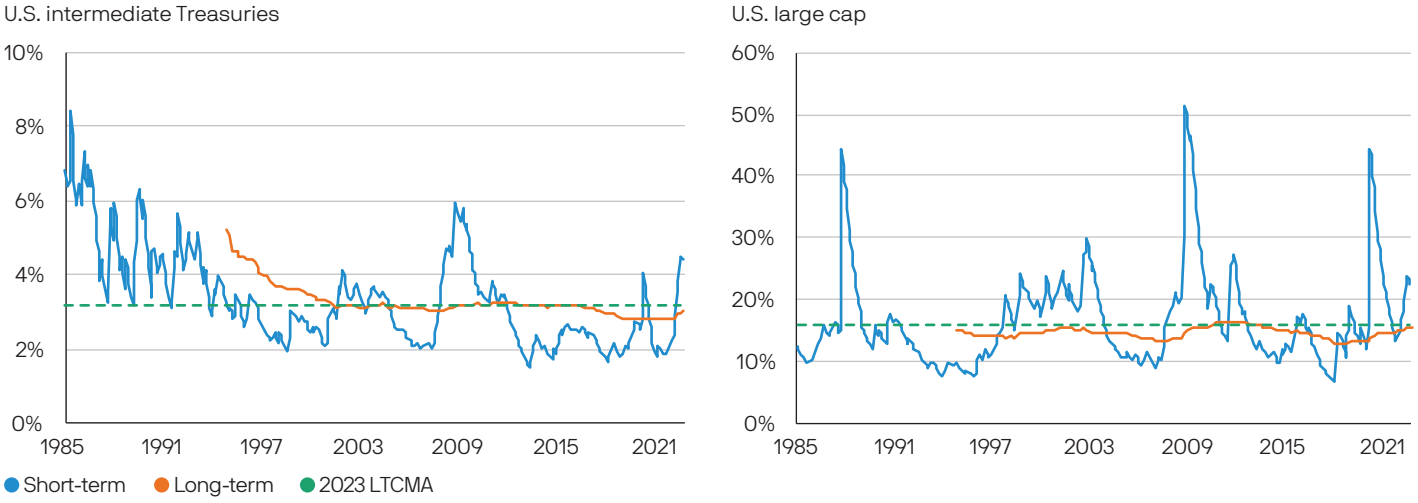
Exhibit 1: Return projections, 2023 vs. 2022



Source: Bloomberg, J.P. Morgan Asset Management.

Short-term volatility has a limited impact on longer-term volatility

Exhibit 2: Short- vs. long-term volatility (%) for U.S. Treasuries and U.S. large cap

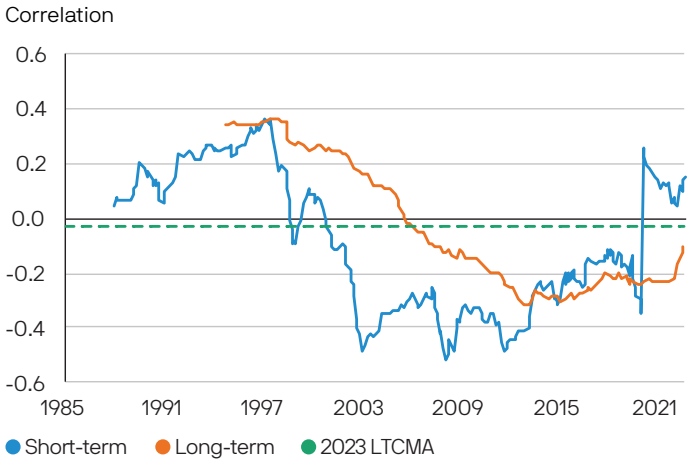


Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022. Short-term volatility is exponentially weighted moving average (EWMA) volatility with a three-month half-life and a three-year lookback window, using daily return data. Long-term volatility is equal-weighted 15-year volatility using monthly return data.

- At the portfolio level, risk is driven by both asset class volatility and cross-asset class correlations. Correlation relationships across asset classes are fixed within asset allocation modeling exercises and are generally derived from recent historical data. Changes to correlation relationships are infrequent, making it difficult to anticipate potential regime changes. **Exhibit 3** makes this challenge plain: The long-term "average" correlation between stocks and bonds is assumed to be negative, while the historical record shows two broad regimes, one of which was consistently positive and the other consistently negative – until the recent move back into positive territory. The argument for retaining a negative correlation over the long term rests on the assumption that the spike in correlation is largely inflation driven, and will decline from currently elevated levels as inflation subsides. Should this process take longer than anticipated, the duration of the positive correlation may extend as well.

There are two broad historical regimes in correlations between stocks and bonds – one consistently positive and the other consistently negative

Exhibit 3: Short- vs. long-term stock-bond correlations between world equities and world government bonds (hedged, USD)



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022. Short-term correlation is exponentially weighted moving average (EWMA) volatility with a three-month half-life and a three-year lookback window, using weekly return data.

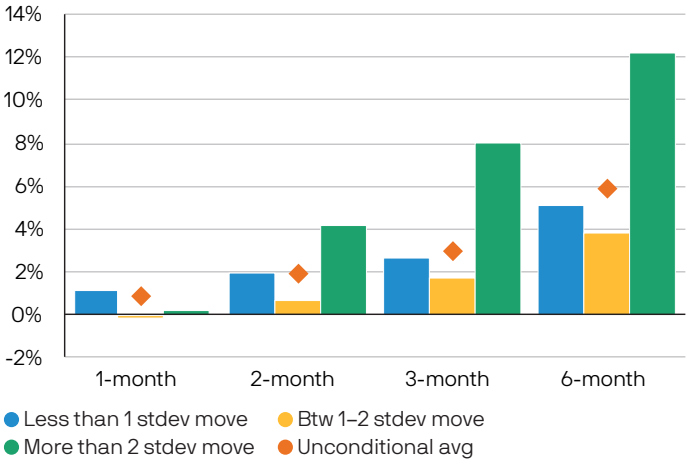
The LTCMA process does not rely on naive mean reversion to a fixed equilibrium but instead tries to capture the future environment implied by our macroeconomic assumptions. Nonetheless, the inherent stability of these critical assumptions helps to anchor asset allocations over time. But it is useful to stress-test these underlying assumptions, particularly during periods of volatility, to provide a better perspective on current conditions.

Shorter horizons and strategic flexibility

How should an investor think about navigating between a stable long-term asset allocation and implementing portfolio tilts that reflect short-term conditions? We noted earlier that changes in short-term valuations often signal directionally opposite movements in future return assumptions. The more that short-term returns deviate from the long-term assumption, the more confident we are in our forecast of short-term outcomes. **Exhibit 4** illustrates the consistently positive performance that often follows a significant market drawdown.

Stronger mean reversion often follows large market moves

Exhibit 4: Short-term rebound in U.S. large cap equity following different levels of drawdown



Source: Bloomberg, J.P. Morgan Asset Management; data as of September 30, 2022. Analysis using S&P 500 return since January 1926–September 2022.

Our confidence in the long-term numbers makes them a useful guide for anchoring a portfolio's strategic allocation. However, they are less useful in answering an important question – whether the correct response to volatility is simply to rebalance back to the long-term strategy, or to go further and tilt the portfolio in different directions. In the next section, we explore this topic in more detail.

Stress-testing strategic allocations under different regimes

Allocating a portfolio so that it responds effectively to short-term signals requires conviction, and an allocation modeling exercise can be structured to offer useful guidance. Adjusting the model in two ways can help illuminate potential solutions: first, by revealing the degree to which "traditional" asset class constraints are preventing the most efficient allocation of capital; and second, by making thoughtful adjustments to the long-term assumptions to better capture current market conditions.

Exhibit 5 illustrates the process. The baseline portfolio is a typical 60/40 allocation using this year's LTCMAs. We show the strategy with and without a 20% weighting to diversified alternatives, which have a positive impact on both return and volatility characteristics.

Relative to last year's analysis, the most significant difference here is simply the much higher return assumptions from public markets. The baseline 60/40 portfolio can now achieve a target return well in excess of 7% even before incorporating alternative asset classes.

The role of diversified alternatives has been even more fully demonstrated over the past year. While alternatives are no longer as critical to reaching forward return targets as they were at the end of 2021, they are now even more important from a diversification standpoint. The rise in stock-bond correlation makes a 60/40 portfolio much riskier, even if its returns are more compelling. As a result, alternative allocations are essential as a means of managing volatility as well as providing a reliable source of high returns.

We evaluate baseline and adjusted portfolios under different guideline and correlation assumptions

Exhibit 5: Portfolios using LTCMA forecasts along with stress-testing scenarios

	Baseline portfolio		Optimized portfolio with LTCMA		Optimized portfolio with new regime correlation		New regime portfolio	
Stock-bond correlation	-0.15				0.12			
	Public only	Public + private	Public only	Public + private	Public only	Public + private	Public only	Public + private
Arithmetic return	8.1%	8.2%	8.0%	8.1%	8.0%	8.1%	8.0%	8.1%
Annualized volatility	10.7%	10.2%	9.8%	9.3%	9.8%	9.6%	10.2%	9.7%
Sharpe ratio	0.53	0.57	0.57	0.61	0.57	0.59	0.55	0.59
CVaR 95	-19.7%	-18.6%	-17.9%	-16.9%	-17.9%	-17.5%	-18.7%	-17.8%
CVaR 99	-26.1%	-24.7%	-23.8%	-22.5%	-23.8%	-23.3%	-24.8%	-23.6%
Asset	**Weight**							
U.S. intermediate Treasuries	12.5%	10.0%	0.0%	0.0%	0.0%	0.0%	6.3%	5.0%
U.S. long Treasuries	10.0%	8.0%	27.2%	21.7%	0.0%	0.0%	12.5%	10.0%
U.S. inv grade corporate bonds	10.0%	8.0%	0.0%	0.0%	30.8%	24.7%	12.5%	10.0%
U.S. high yield bonds	5.0%	4.0%	25.0%	20.0%	22.7%	18.1%	12.5%	10.0%
Emerging markets sovereign debt	2.5%	2.0%	2.2%	1.8%	8.2%	6.5%	6.3%	5.0%
U.S. large cap	35.0%	28.0%	22.8%	18.3%	19.2%	15.3%	25.0%	20.0%
EAFE equity	17.5%	14.0%	10.5%	8.4%	4.4%	3.5%	16.9%	13.5%
Emerging markets equity	7.5%	6.0%	12.3%	9.9%	14.8%	11.8%	8.1%	6.5%
Alternatives	0.0%	20.0%	0.0%	20.0%	0.0%	20.0%	0.0%	20.0%

Source: J.P. Morgan Asset Management; as of September 30, 2022. "Alternatives" represents a diversified basket of alternative assets, including 30% private equity, 25% real estate, 20% infrastructure, 10% hedged funds and 15% direct lending. "New regime" analysis is a hypothetical scenario. The scenario risk matrix is generated using an exponentially weighted three-month half-life approach with data in September 2022.

In **Exhibit 6**, we explain the varying components and investment implications of the three optimized portfolios in our allocation model.

Our optimized portfolios have different constraints and correlations, but all target returns similar to the 60/40 baseline

Exhibit 6: Investment implications of optimized portfolios

	Description	Implications
Optimized portfolio with LTCMAs	Relaxes constraints on individual asset classes, allowing the directional flow of capital into and out of certain market sectors based on their assumed long-term risk and return characteristics	• Prioritizes long-duration fixed income as a means of diversifying risk. • The overall size of the equity portfolio declines somewhat, and this capital is reallocated to the most equity-like credit sectors of fixed income, including high yield and emerging market bonds. • Instead of a structural bias to the U.S. over global, the portfolio invests the maximum allowable weight to global equities, given lower current multiples and a strong U.S. dollar.
Optimized portfolio with new regime correlation	Keeps the relaxed constraints but goes further by also "hardwiring" a higher stock-bond correlation assumption (and therefore a lower level of structural diversification)	• The diversifying role of Treasuries effectively disappears. • Exposure to credit sectors is maximized across investment grade, high yield and emerging markets to reflect their higher forward returns and relatively modest volatility. • The size of the equity allocation declines, but the optimization retains the preference for global equity over U.S. equity.
New regime portfolio	Retains the higher stock-bond correlation from the second optimization model but places reasonable constraints on the underlying distribution of assets	• Modest overweights to credit sectors and international equities based on attractive risk-adjusted return expectations. • A minimum exposure to Treasuries, consistent with liquidity and risk diversification benefits. • A roughly balanced distribution of equities and fixed income, with or without the use of diversified alternatives.

Source: J.P. Morgan Asset Management.

Optimization models, correlation and portfolio construction

What useful takeaways can we extract from this admittedly simple modeling exercise? We see several:

First, the baseline allocation delivers one bit of very good news: At the current market juncture, a traditional portfolio is far more likely to reach its long-term return targets, given the significant repricing of markets that has taken place in 2022. Forward-looking returns on stocks and bonds are expected to be materially higher over the coming 10–15 years. Of course, the repricing has come at the cost of sharply negative returns over the past year.

Second, diversified alternatives continue to supply attractive returns and moderate risk to a portfolio, suggesting that investors should allocate as much to these assets as their liquidity budgets prudently allow. Our model allocates broadly across private equity, global core real estate, infrastructure, diversified hedge funds and direct lending. Depending on an investor's specific return needs and risk appetite, the mix of alternative strategies may change, but the overall value of diversified alternatives is clear.

Third, credit sectors appear to be particularly compelling, given the attractive entry point and relatively low volatility (at least, relative to equities). We recommend a diversified active multi-sector approach that can allocate across various sleeves of the credit markets (including investment grade, high yield and emerging markets). That approach might be found in a single strategy with tactical flexibility or through multiple managers operating in individual sectors.

Fourth, the size of equity exposure and the corresponding need for an uncorrelated hedge asset constitute a critical pivot point in the asset allocation process. Just as a negative stock-bond correlation allows for a large equity allocation to be maintained safely alongside risk-diversifying fixed income, the shift to a more positively correlated environment reduces an investor's capacity to safely hold equity risk. In such a scenario, equity investors looking to maximize the value of their capital allocation in this space may wish to employ active strategies that manage exposures dynamically.

Fifth, the strength of the dollar and the level of current valuations in global public markets make non-U.S. investments more compelling to a U.S. investor (and, conversely, make U.S. investments less compelling to a non-U.S. investor). While some of the currency benefits will accrue to any strategy that moves across borders, global equity and credit may be the biggest beneficiaries: Active management can maximize exposure to countries and firms that are positioned well relative to dollar strength, and avoid those that may suffer.

A diversified portfolio of public and private strategies offers the best path to achieving long-term objectives. The compelling return assumptions for stocks and bonds provide a stronger foundation for asset performance than we have seen in many years. Higher correlations may persist, however, making a strategy built entirely from public assets potentially too risky. Alternative asset classes continue to offer a valuable source of return and risk management, along with a broad range of liquidity options.

Conclusion

Today's investing environment is a reminder of the benefits of the strategic allocation process. On one hand, we derive tremendous value from thoughtfully assessing future expectations, allocating with conviction and rebalancing back to a stable strategic portfolio. This year's LTCMA analysis indicates that a portfolio with a bias to public markets may deliver higher forward returns than at any time in more than a decade. Investors with capital available to deploy – either in the form of cash or from external contributions – have before them an outstanding entry point.

On the other hand, the rapid adjustment of markets offers additional opportunities to manage risk and capture returns in the near term, while forcing us to reconsider some of our long-term assumptions. Near- term tilts to credit sectors and international equity may offer attractive risk-adjusted returns, while lower volatility alternatives and short-duration fixed income help to manage risk and preserve liquidity. The potential for a more positively correlated market environment requires vigilance around the distribution of risk across portfolios.

The emergence of a new macroeconomic regime presents an opportunity for investors to stress-test their allocation process and implement changes that will support risk-adjusted returns over multiple horizons. The long term, after all, is simply a series of shorter periods in which thoughtful strategic adjustments can make a real difference.

III Assumption matrices

U.S. dollar assumptions

		Compound Return 2022 (%)	Annualized Volatility (%)	Arithmetic Return 2023 (%)	Compound Return 2023 (%)	U.S. Inflation	U.S. Cash	U.S. Intermediate Treasuries	U.S. Long Treasuries	TIPS	U.S. Aggregate Bonds	U.S. Securitized	U.S. Short Duration Government/Credit	U.S. Long Duration Government/Credit	U.S. Inv Grade Corporate Bonds	U.S. Long Corporate Bonds	U.S. High Yield Bonds	U.S. Leveraged Loans	World Government Bonds hedged	World Government Bonds	World ex-U.S. Government Bonds hedged	World ex-U.S. Government Bonds	Emerging Markets Sovereign Debt	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds	U.S. Muni 1-15 Yr Blend	U.S. Muni High Yield
Fixed income	U.S. Inflation	2.60	2.62	1.77	2.30	1.00																					
	U.S. Cash	2.40	2.40	0.50	1.30	-0.03	1.00																				
	U.S. Intermediate Treasuries	3.60	3.65	3.18	2.10	-0.39	0.26	1.00																			
	U.S. Long Treasuries	4.20	4.91	12.27	1.80	-0.29	0.12	0.83	1.00																		
	TIPS	4.30	4.45	5.57	2.10	-0.10	0.09	0.58	0.58	1.00																	
	U.S. Aggregate Bonds	4.60	4.68	4.09	2.60	-0.39	0.16	0.83	0.82	0.72	1.00																
	U.S. Securitized	4.80	4.84	3.06	3.10	-0.39	0.19	0.79	0.70	0.63	0.92	1.00															
	U.S. Short Duration Government/Credit	3.60	3.61	1.63	2.10	-0.46	0.33	0.81	0.54	0.56	0.82	0.81	1.00														
	U.S. Long Duration Government/Credit	5.20	5.72	10.47	2.30	-0.32	0.08	0.72	0.89	0.67	0.93	0.77	0.63	1.00													
	U.S. Inv Grade Corporate Bonds	5.50	5.73	7.02	2.80	-0.25	0.06	0.45	0.54	0.69	0.81	0.66	0.59	0.81	1.00												
	U.S. Long Corporate Bonds	5.80	6.40	11.37	2.40	-0.27	0.04	0.45	0.62	0.64	0.82	0.66	0.54	0.89	0.96	1.00											
	U.S. High Yield Bonds	6.80	7.14	8.53	3.90	-0.09	-0.07	-0.05	-0.04	0.46	0.36	0.34	0.29	0.31	0.66	0.60	1.00										
	U.S. Leveraged Loans	6.20	6.50	7.98	4.70	0.09	-0.13	-0.41	-0.31	0.19	0.02	-0.01	-0.06	0.01	0.36	0.30	0.77	1.00									
	World Government Bonds hedged	3.70	3.77	3.68	2.00	-0.47	0.17	0.85	0.86	0.55	0.86	0.76	0.71	0.84	0.58	0.62	0.07	-0.22	1.00								
	World Government Bonds	4.40	4.62	6.83	2.30	-0.30	0.15	0.72	0.62	0.65	0.78	0.71	0.71	0.71	0.63	0.63	0.31	-0.06	0.70	1.00							
	World ex-U.S. Government Bonds hedged	3.60	3.67	3.71	2.00	-0.49	0.14	0.71	0.74	0.50	0.78	0.68	0.63	0.77	0.57	0.62	0.14	-0.11	0.96	0.64	1.00						
	World ex-U.S. Government Bonds	4.60	4.94	8.51	2.40	-0.28	0.13	0.61	0.50	0.63	0.71	0.64	0.65	0.64	0.63	0.62	0.39	0.04	0.61	0.98	0.59	1.00					
	Emerging Markets Sovereign Debt	7.10	7.58	10.23	5.20	-0.18	0.04	0.24	0.27	0.59	0.58	0.52	0.42	0.55	0.81	0.75	0.75	0.45	0.37	0.54	0.41	0.58	1.00				
	Emerging Markets Local Currency Debt	7.10	7.80	12.38	5.90	-0.09	0.11	0.18	0.12	0.44	0.44	0.40	0.38	0.39	0.60	0.56	0.64	0.35	0.23	0.59	0.27	0.66	0.79	1.00			
	Emerging Markets Corporate Bonds	7.00	7.40	9.34	4.80	-0.11	0.01	0.14	0.16	0.54	0.50	0.43	0.37	0.46	0.80	0.71	0.74	0.56	0.26	0.42	0.30	0.46	0.90	0.71	1.00		
	U.S. Muni 1-15 Yr Blend	3.70	3.77	3.79	2.10	-0.24	0.10	0.51	0.47	0.54	0.69	0.64	0.53	0.61	0.67	0.62	0.39	0.13	0.56	0.52	0.53	0.50	0.57	0.35	0.46	1.00	
	U.S. Muni High Yield	5.20	5.53	8.32	2.90	0.16	-0.03	0.07	0.16	0.45	0.31	0.27	0.11	0.30	0.51	0.43	0.50	0.48	0.16	0.16	0.17	0.18	0.54	0.28	0.54	0.58	1.00
Equities	U.S. Large Cap	7.90	9.07	16.13	4.10	-0.07	-0.05	-0.15	-0.11	0.26	0.19	0.16	0.09	0.20	0.46	0.44	0.74	0.57	-0.02	0.25	0.06	0.33	0.62	0.61	0.58	0.17	0.29
	U.S. Mid Cap	8.00	9.46	18.04	4.30	-0.07	-0.06	-0.17	-0.13	0.27	0.19	0.17	0.10	0.19	0.48	0.45	0.79	0.62	-0.04	0.23	0.04	0.31	0.61	0.61	0.58	0.20	0.30
	U.S. Small Cap	8.10	9.94	20.37	4.40	-0.10	-0.07	-0.17	-0.16	0.19	0.14	0.12	0.06	0.13	0.40	0.37	0.71	0.54	-0.07	0.18	0.01	0.26	0.52	0.55	0.49	0.16	0.22
	Euro Area Large Cap	10.50	12.56	21.86	7.10	-0.09	0.00	-0.09	-0.13	0.26	0.23	0.22	0.20	0.19	0.48	0.44	0.73	0.53	-0.01	0.37	0.05	0.46	0.66	0.73	0.62	0.21	0.27
	Japanese Equity	10.40	11.46	15.46	6.70	-0.13	-0.07	-0.08	-0.06	0.24	0.23	0.21	0.18	0.23	0.48	0.46	0.68	0.48	0.00	0.28	0.05	0.35	0.55	0.61	0.54	0.18	0.24
	Hong Kong Equity	7.50	9.18	19.40	6.90	-0.02	0.00	-0.15	-0.15	0.20	0.17	0.14	0.13	0.14	0.43	0.39	0.61	0.50	-0.09	0.23	-0.05	0.29	0.54	0.66	0.58	0.16	0.26
	UK Large Cap	9.10	10.42	17.23	5.00	0.01	-0.06	-0.24	-0.25	0.20	0.10	0.09	0.05	0.08	0.39	0.36	0.71	0.61	-0.16	0.24	-0.09	0.34	0.55	0.66	0.56	0.11	0.28
	EAFE Equity	9.80	11.14	17.40	6.50	-0.08	-0.03	-0.12	-0.13	0.28	0.22	0.20	0.17	0.21	0.50	0.47	0.78	0.58	-0.03	0.36	0.04	0.45	0.66	0.74	0.64	0.19	0.28
	Chinese Domestic Equity	11.80	15.37	29.38	8.20	-0.05	0.15	-0.07	-0.06	0.10	0.12	0.10	0.07	0.10	0.27	0.24	0.33	0.27	-0.01	0.11	0.02	0.14	0.29	0.32	0.35	0.09	0.16
	Emerging Markets Equity	10.10	11.96	20.65	6.90	-0.05	0.03	-0.12	-0.12	0.31	0.22	0.19	0.18	0.20	0.49	0.45	0.74	0.57	-0.03	0.36	0.02	0.44	0.65	0.80	0.66	0.17	0.30
	AC Asia ex-Japan Equity	10.00	11.77	20.11	7.00	-0.09	0.02	-0.09	-0.08	0.30	0.24	0.20	0.19	0.22	0.50	0.46	0.72	0.54	-0.01	0.33	0.04	0.41	0.62	0.74	0.64	0.18	0.29
	AC World Equity	8.50	9.74	16.63	5.00	-0.07	-0.03	-0.14	-0.12	0.29	0.22	0.19	0.14	0.21	0.51	0.48	0.79	0.61	-0.03	0.32	0.05	0.41	0.67	0.72	0.64	0.19	0.30
	U.S. Equity Value Factor	10.10	11.38	17.05	5.60	-0.10	-0.09	-0.18	-0.18	0.20	0.15	0.15	0.09	0.13	0.40	0.38	0.74	0.57	-0.06	0.20	0.03	0.29	0.55	0.61	0.54	0.13	0.22
	U.S. Equity Momentum Factor	8.90	10.18	16.94	4.70	-0.05	-0.04	-0.12	-0.05	0.32	0.23	0.19	0.11	0.24	0.51	0.49	0.76	0.60	0.01	0.25	0.08	0.32	0.63	0.58	0.59	0.24	0.36
	U.S. Equity Quality Factor	7.80	8.79	14.76	4.70	-0.07	-0.05	-0.13	-0.09	0.26	0.21	0.17	0.10	0.21	0.47	0.45	0.73	0.55	0.00	0.25	0.08	0.33	0.62	0.62	0.58	0.19	0.28
	U.S. Equity Minimum Volatility Factor	8.20	8.93	12.70	4.60	-0.04	-0.07	-0.13	-0.08	0.25	0.20	0.17	0.07	0.21	0.44	0.44	0.71	0.53	0.01	0.23	0.09	0.31	0.59	0.61	0.53	0.19	0.27
	U.S. Equity Dividend Yield Factor	8.90	10.00	15.69	5.20	-0.05	-0.10	-0.18	-0.16	0.22	0.16	0.15	0.08	0.15	0.41	0.40	0.73	0.57	-0.07	0.21	0.02	0.30	0.56	0.62	0.53	0.16	0.23
	U.S. Convertible Bonds hedged	9.00	9.77	13.07	4.50	-0.13	-0.05	-0.10	-0.04	0.37	0.28	0.21	0.15	0.27	0.58	0.53	0.80	0.66	0.04	0.28	0.12	0.36	0.67	0.58	0.66	0.30	0.38
	Global Convertible Bonds hedged	9.10	9.73	11.78	5.50	-0.17	-0.03	-0.11	-0.05	0.35	0.29	0.23	0.19	0.28	0.61	0.56	0.82	0.67	0.05	0.28	0.13	0.36	0.70	0.61	0.71	0.30	0.38
Alternatives	Private Equity	9.90	11.64	19.96	8.10	0.13	-0.01	-0.46	-0.51	0.10	-0.15	-0.16	-0.11	-0.19	0.29	0.18	0.70	0.67	-0.40	0.00	-0.29	0.12	0.54	0.57	0.57	0.02	0.33
	Venture Capital	8.50	10.73	22.54	-	0.02	-0.06	-0.43	-0.44	0.02	-0.21	-0.20	-0.20	-0.23	0.13	0.05	0.49	0.51	-0.37	-0.13	-0.28	-0.02	0.36	0.36	0.38	-0.04	0.26
	U.S. Core Real Estate	5.70	6.22	10.56	5.80	0.33	-0.12	-0.37	-0.28	0.03	-0.22	-0.16	-0.29	-0.20	0.00	-0.04	0.42	0.50	-0.34	-0.21	-0.31	-0.16	0.17	0.18	0.26	-0.22	0.39
	U.S. Value-Added Real Estate	7.70	9.09	17.58	7.70	0.33	-0.12	-0.37	-0.28	0.03	-0.22	-0.16	-0.29	-0.20	0.00	-0.04	0.42	0.50	-0.34	-0.21	-0.31	-0.16	0.17	0.18	0.26	-0.22	0.39
	European Core Real Estate	6.80	7.52	12.51	6.10	0.25	-0.05	-0.39	-0.39	0.10	-0.15	-0.17	-0.17	-0.15	0.19	0.12	0.50	0.50	-0.38	0.12	-0.33	0.24	0.40	0.48	0.42	0.02	0.26
	Asia Pacific Core Real Estate	8.10	9.08	14.75	7.50	0.23	-0.06	-0.33	-0.30	0.21	-0.01	0.01	-0.09	-0.04	0.31	0.24	0.67	0.65	-0.26	0.10	-0.20	0.19	0.48	0.51	0.54	0.09	0.48
	U.S. REITs	6.80	7.94	15.84	5.70	-0.05	-0.04	-0.01	0.09	0.31	0.28	0.25	0.10	0.32	0.46	0.47	0.64	0.42	0.14	0.28	0.20	0.32	0.56	0.56	0.48	0.22	0.28
	Global Core Infrastructure	6.30	6.84	10.82	6.10	0.22	-0.03	-0.30	-0.32	0.23	-0.05	-0.02	-0.03	-0.11	0.22	0.14	0.57	0.61	-0.25	0.12	-0.19	0.22	0.45	0.49	0.48	0.05	0.32
	Global Core Transport	7.50	8.37	13.84	7.40	0.21	0.12	0.03	0.02	-0.04	-0.10	-0.03	-0.11	-0.11	-0.30	-0.25	-0.16	-0.07	-0.02	-0.07	-0.07	-0.09	-0.19	-0.05	-0.19	-0.20	0.01
	Global Timberland	6.70	7.19	10.26	-	-0.13	0.12	-0.07	-0.19	0.05	0.03	0.01	0.10	-0.01	0.20	0.17	0.25	0.16	-0.06	0.20	0.00	0.26	0.32	0.46	0.27	0.06	-0.01
	Diversified Hedge Funds	5.00	5.22	6.89	3.60	0.04	0.02	-0.31	-0.22	0.23	0.04	-0.03	-0.04	0.07	0.38	0.33	0.63	0.68	-0.18	0.05	-0.09	0.13	0.48	0.42	0.52	0.10	0.41
	Event Driven Hedge Funds	5.40	5.76	8.73	3.20	-0.02	-0.06	-0.26	-0.27	0.24	0.10	0.08	0.08	0.08	0.42	0.37	0.79	0.76	-0.15	0.15	-0.05	0.25	0.55	0.55	0.58	0.13	0.39
	Long Bias Hedge Funds	5.00	5.58	11.08	3.30	-0.07	-0.04	-0.20	-0.20	0.27	0.17	0.13	0.13	0.15	0.47	0.42	0.78	0.67	-0.10	0.23	-0.02	0.33	0.59	0.62	0.61	0.16	0.32
	Relative Value Hedge Funds	4.90	5.09	6.29	3.80	0.05	-0.06	-0.30	-0.26	0.28	0.11	0.09	0.07	0.09	0.44	0.38	0.83	0.86	-0.16	0.09	-0.06	0.19	0.58	0.55	0.62	0.16	0.45
	Macro Hedge Funds	4.10	4.41	8.13	2.70	0.01	0.05	-0.12	-0.11	0.12	-0.07	-0.14	-0.01	-0.02	0.07	0.07	0.10	0.08	-0.11	0.09	-0.08	0.13	0.10	0.18	0.05	-0.09	-0.03
	Direct Lending	7.80	8.65	13.65	6.90	0.23	-0.13	-0.46	-0.47	0.14	-0.15	-0.10	-0.17	-0.19	0.19	0.11	0.69	0.73	-0.36	-0.18	-0.24	-0.07	0.45	0.38	0.50	0.04	0.36
	Commodities	3.10	4.60	17.88	2.60	0.31	-0.03	-0.31	-0.34	0.20	-0.16	-0.17	-0.11	-0.15	0.09	0.05	0.39	0.39	-0.37	0.10	-0.33	0.19	0.27	0.40	0.27	-0.17	0.14
	Gold	3.50	4.82	16.77	3.00	-0.02	0.08	0.30	0.27	0.48	0.33	0.28	0.28	0.30	0.31	0.28	0.13	-0.03	0.23	0.47	0.19	0.47	0.27	0.34	0.24	0.18	0.09

U.S. dollar assumptions

Note: All estimates on this page are in U.S. dollar terms. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all of these asset classes and strategies. Exclusive reliance on this information is not advised. This information is not intended as a recommendation to invest in an particular asset class or strategy or as a promise of future performance. These asset class and strategy assumptions are passive only for liquid assets and industry averages (median managers) for alternatives. The assumptions do not consider the impact of active management. Reference to future returns are not promises or even estimates of actual returns portfolio's may achieve. Assumptions, opinions and estimates are provided for illustrative purposes only. Forecasts of financial market trends that are based on current market conditions constitute our judgement and are subject to change without notice. We believe the information provided herein is reliable, but to not warrant its accuracy or completeness. This materials is not intended to provide and should not be relied upon for accounting, legal or tax advice.

Source: J.P. Morgan Asset Management; as of September 30, 2022. Alternative asset classes (including hedge funds, private equity, real estate, direct lending, transportation, infrastructure and timberland) are unlike other asset categories shown above in that there is no underlying investible index. The return estimates for these alternative asset classes and strategies are estimates of the industry average – median manager, net of manager fees. The dispersion of return among managers of these asset classes and strategies is typically significantly wider than that of traditional asset classes. Correlations of value-added and core real estate in their local currencies are identical since value-added local returns are scaled versions of their corresponding core real estate local returns. This year, we have updated the raw data source for Europe and U.K. Real Estate and this may result in a change in correlation forecasts. For equity and fixed income assumptions we assume current index regional weight in composite indices with multiple countries/regions. All returns are nominal. The return forecasts of composite and hedged assets are computed using unrounded return and rounded to the nearest 10bp at the final stage. In some cases this may lead to apparent differences in hedging impact across assets, but this is purely due to rounding. For the full opportunity set, please contact your J.P. Morgan representative.

	U.S. Large Cap	U.S. Mid Cap	U.S. Small Cap	Euro Area Large Cap	Japanese Equity	Hong Kong Equity	UK Large Cap	EAFE Equity	Chinese Domestic Equity	Emerging Markets Equity	AC Asia ex-Japan Equity	AC World Equity	U.S. Equity Value Factor	U.S. Equity Momentum Factor	U.S. Equity Quality Factor	U.S. Equity Minimum Volatility Factor	U.S. Equity Dividend Yield Factor	U.S. Convertible Bonds hedged	Global Convertible Bonds hedged	Private Equity	Venture Capital	U.S. Core Real Estate	U.S. Value-Added Real Estate	European Core Real Estate	Asia Pacific Core Real Estate	U.S. REITs	Global Core Infrastructure	Global Core Transport	Global Timberland	Diversified Hedge Funds	Event Driven Hedge Funds	Long Bias Hedge Funds	Relative Value Hedge Funds	Macro Hedge Funds	Direct Lending	Commodities	Gold
U.S. Large Cap	1.00																																			
U.S. Mid Cap	0.96	1.00																																		
U.S. Small Cap	0.91	0.95	1.00																																	
Euro Area Large Cap	0.85	0.84	0.77	1.00																																
Japanese Equity	0.74	0.74	0.69	0.76	1.00																															
Hong Kong Equity	0.64	0.64	0.59	0.71	0.61	1.00																														
UK Large Cap	0.82	0.81	0.73	0.90	0.74	0.75	1.00																													
EAFE Equity	0.89	0.88	0.81	0.97	0.85	0.76	0.94	1.00																												
Chinese Domestic Equity	0.36	0.35	0.34	0.36	0.33	0.55	0.36	0.39	1.00																											
Emerging Markets Equity	0.76	0.77	0.71	0.83	0.70	0.85	0.82	0.87	0.53	1.00																										
AC Asia ex-Japan Equity	0.73	0.75	0.70	0.80	0.68	0.89	0.78	0.84	0.58	0.98	1.00																									
AC World Equity	0.97	0.95	0.88	0.93	0.81	0.75	0.90	0.97	0.41	0.88	0.85	1.00																								
U.S. Equity Value Factor	0.96	0.96	0.92	0.84	0.73	0.63	0.83	0.88	0.33	0.75	0.72	0.94	1.00																							
U.S. Equity Momentum Factor	0.96	0.96	0.90	0.81	0.72	0.63	0.76	0.86	0.38	0.75	0.73	0.94	0.89	1.00																						
U.S. Equity Quality Factor	0.99	0.96	0.90	0.84	0.72	0.62	0.80	0.87	0.35	0.74	0.71	0.95	0.95	0.96	1.00																					
U.S. Equity Minimum Volatility Factor	0.94	0.92	0.86	0.79	0.66	0.58	0.77	0.83	0.28	0.69	0.66	0.90	0.93	0.90	0.95	1.00																				
U.S. Equity Dividend Yield Factor	0.93	0.94	0.88	0.81	0.69	0.63	0.83	0.86	0.28	0.74	0.70	0.91	0.97	0.86	0.93	0.95	1.00																			
U.S. Convertible Bonds hedged	0.86	0.89	0.85	0.76	0.71	0.65	0.72	0.82	0.44	0.76	0.76	0.87	0.81	0.90	0.84	0.76	0.77	1.00																		
Global Convertible Bonds hedged	0.86	0.89	0.83	0.81	0.74	0.69	0.76	0.86	0.47	0.80	0.80	0.90	0.81	0.90	0.85	0.77	0.77	0.98	1.00																	
Private Equity	0.77	0.79	0.74	0.77	0.60	0.69	0.80	0.80	0.48	0.80	0.76	0.82	0.76	0.77	0.76	0.70	0.74	0.77	0.79	1.00																
Venture Capital	0.64	0.66	0.70	0.57	0.53	0.56	0.60	0.60	0.47	0.61	0.61	0.65	0.62	0.65	0.62	0.55	0.58	0.69	0.69	0.78	1.00														
U.S. Core Real Estate	0.41	0.40	0.35	0.31	0.33	0.28	0.42	0.37	0.11	0.33	0.31	0.40	0.41	0.38	0.39	0.44	0.40	0.27	0.27	0.42	0.26	1.00														
U.S. Value-Added Real Estate	0.41	0.40	0.35	0.31	0.33	0.28	0.42	0.37	0.11	0.33	0.31	0.40	0.41	0.38	0.39	0.44	0.40	0.27	0.27	0.42	0.26	1.00	1.00												
European Core Real Estate	0.56	0.56	0.48	0.65	0.51	0.53	0.68	0.66	0.38	0.64	0.59	0.65	0.53	0.58	0.54	0.47	0.50	0.58	0.59	0.72	0.58	0.36	0.36	1.00												
Asia Pacific Core Real Estate	0.63	0.65	0.55	0.64	0.55	0.63	0.71	0.69	0.35	0.70	0.68	0.69	0.62	0.62	0.60	0.61	0.64	0.60	0.61	0.71	0.47	0.69	0.69	0.63	1.00											
U.S. REITs	0.76	0.77	0.73	0.66	0.54	0.46	0.60	0.69	0.14	0.57	0.55	0.73	0.76	0.73	0.77	0.83	0.79	0.64	0.64	0.51	0.32	0.53	0.53	0.26	0.61	1.00										
Global Core Infrastructure	0.45	0.45	0.39	0.51	0.39	0.52	0.55	0.52	0.17	0.57	0.52	0.52	0.43	0.45	0.43	0.41	0.44	0.44	0.44	0.62	0.47	0.46	0.46	0.55	0.55	0.34	1.00									
Global Core Transport	0.01	-0.04	-0.03	0.00	-0.18	-0.01	-0.04	-0.06	-0.09	-0.07	-0.05	-0.04	0.00	-0.01	0.04	0.07	0.00	-0.24	-0.23	-0.11	-0.11	0.31	0.31	-0.16	0.10	0.18	0.12	1.00								
Global Timberland	0.37	0.37	0.39	0.47	0.27	0.44	0.40	0.44	0.31	0.43	0.41	0.42	0.38	0.36	0.37	0.39	0.37	0.26	0.31	0.47	0.44	-0.04	-0.04	0.34	0.22	0.26	0.28	0.04	1.00							
Diversified Hedge Funds	0.71	0.74	0.66	0.66	0.61	0.59	0.70	0.72	0.44	0.69	0.67	0.75	0.65	0.77	0.69	0.63	0.62	0.79	0.82	0.78	0.71	0.37	0.37	0.63	0.61	0.45	0.43	-0.14	0.34	1.00						
Event Driven Hedge Funds	0.82	0.86	0.81	0.78	0.71	0.66	0.81	0.84	0.41	0.78	0.74	0.87	0.82	0.83	0.80	0.73	0.79	0.85	0.87	0.83	0.68	0.42	0.42	0.61	0.68	0.57	0.48	-0.11	0.36	0.87	1.00					
Long Bias Hedge Funds	0.87	0.91	0.86	0.83	0.76	0.74	0.83	0.89	0.47	0.86	0.83	0.93	0.85	0.90	0.86	0.79	0.82	0.90	0.92	0.84	0.74	0.34	0.34	0.65	0.65	0.60	0.50	-0.13	0.40	0.87	0.94	1.00				
Relative Value Hedge Funds	0.71	0.76	0.68	0.71	0.65	0.67	0.77	0.77	0.40	0.77	0.73	0.78	0.72	0.73	0.68	0.65	0.71	0.78	0.82	0.80	0.60	0.45	0.45	0.61	0.71	0.51	0.54	-0.13	0.31	0.83	0.92	0.86	1.00			
Macro Hedge Funds	0.20	0.21	0.12	0.24	0.15	0.21	0.30	0.27	0.07	0.28	0.26	0.26	0.17	0.21	0.21	0.24	0.23	0.22	0.24	0.33	0.26	-0.03	-0.03	0.19	0.14	0.15	0.03	-0.18	0.33	0.47	0.28	0.32	0.28	1.00		
Direct Lending	0.60	0.67	0.60	0.53	0.42	0.48	0.61	0.58	0.26	0.59	0.53	0.62	0.63	0.62	0.60	0.59	0.64	0.62	0.63	0.76	0.57	0.46	0.46	0.53	0.66	0.42	0.49	-0.04	0.15	0.64	0.74	0.68	0.78	0.11	1.00	
Commodities	0.39	0.41	0.33	0.43	0.32	0.39	0.58	0.48	0.10	0.52	0.43	0.47	0.39	0.38	0.36	0.36	0.44	0.37	0.36	0.60	0.41	0.37	0.37	0.57	0.56	0.26	0.46	-0.10	0.24	0.48	0.51	0.49	0.54	0.49	0.53	1.00
Gold	0.03	0.05	0.00	0.07	0.02	0.16	0.10	0.10	0.16	0.21	0.18	0.10	-0.01	0.08	0.05	0.07	0.04	0.14	0.14	0.08	-0.02	-0.08	-0.08	0.07	0.21	0.09	0.13	0.05	0.14	0.13	0.08	0.15	0.10	0.37	0.03	0.35

Euro assumptions

		Compound Return 2022 (%)																									
		Annualized Volatility (%)																									
		Arithmetic Return 2023 (%)																									
		Compound Return 2023 (%)				Euro Inflation	Euro Cash	U.S. Aggregate Bonds hedged	Euro Aggregate Bonds	U.S. Inv Grade Corporate Bonds hedged	Euro Inv Grade Corp Bonds	U.S. High Yield Bonds hedged	Euro High Yield Bonds	U.S. Leveraged Loans hedged	Euro Government Bonds	Euro Govt Inflation-Linked Bonds	World Government Bonds hedged	World Government Bonds	World ex-Euro Government Bonds hedged	World ex-Euro Government Bonds	Global Multiverse Bonds hedged	Emerging Markets Sovereign Debt hedged	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds hedged	European Large Cap
Fixed Income	Euro Inflation	1.80	1.81	1.06	1.50	1.00																					
	Euro Cash	1.30	1.30	0.61	0.10	-0.17	1.00																				
	U.S. Aggregate Bonds hedged	3.50	3.58	4.12	1.40	-0.41	0.31	1.00																			
	Euro Aggregate Bonds	3.00	3.10	4.48	1.20	-0.46	0.30	0.75	1.00																		
	U.S. Inv Grade Corporate Bonds hedged	4.30	4.55	7.19	1.50	-0.35	0.15	0.83	0.67	1.00																	
	Euro Inv Grade Corp Bonds	3.60	3.73	5.10	1.50	-0.38	0.12	0.62	0.78	0.83	1.00																
	U.S. High Yield Bonds hedged	5.70	6.05	8.65	2.70	-0.11	0.02	0.35	0.27	0.63	0.64	1.00															
	Euro High Yield Bonds	5.70	6.14	9.70	2.90	-0.14	-0.01	0.25	0.32	0.54	0.69	0.87	1.00														
	U.S. Leveraged Loans hedged	5.10	5.40	7.99	3.50	-0.02	-0.07	0.05	0.10	0.35	0.48	0.78	0.86	1.00													
	Euro Government Bonds	2.80	2.92	4.88	1.10	-0.42	0.30	0.70	0.98	0.57	0.66	0.14	0.19	-0.03	1.00												
	Euro Govt Inflation-Linked Bonds	2.60	2.74	5.32	0.80	-0.18	0.14	0.43	0.67	0.50	0.64	0.39	0.40	0.25	0.65	1.00											
	World Government Bonds hedged	2.60	2.67	3.70	0.80	-0.45	0.33	0.86	0.86	0.60	0.53	0.07	0.02	-0.18	0.89	0.48	1.00										
	World Government Bonds	2.30	2.53	6.85	1.00	-0.23	0.20	0.39	0.52	0.23	0.23	-0.19	-0.14	-0.18	0.55	0.19	0.60	1.00									
	World ex-Euro Government Bonds hedged	2.50	2.57	3.72	0.70	-0.38	0.24	0.86	0.67	0.57	0.38	0.01	-0.12	-0.28	0.70	0.31	0.94	0.55	1.00								
	World ex-Euro Government Bonds	2.10	2.52	9.26	1.00	-0.18	0.15	0.26	0.33	0.08	0.07	-0.29	-0.23	-0.23	0.36	0.03	0.45	0.96	0.44	1.00							
	Global Multiverse Bonds hedged	3.10	3.16	3.55	1.20	-0.47	0.32	0.95	0.89	0.83	0.75	0.40	0.34	0.13	0.84	0.58	0.90	0.45	0.82	0.28	1.00						
	Emerging Markets Sovereign Debt hedged	6.00	6.50	10.31	4.00	-0.24	0.07	0.59	0.52	0.78	0.73	0.75	0.61	0.44	0.41	0.50	0.38	-0.05	0.33	-0.20	0.64	1.00					
	Emerging Markets Local Currency Debt	5.00	5.39	9.14	4.60	-0.10	0.14	0.32	0.40	0.43	0.52	0.45	0.46	0.38	0.34	0.39	0.25	0.27	0.13	0.17	0.42	0.56	1.00				
	Emerging Markets Corporate Bonds hedged	5.80	6.20	9.22	3.60	-0.23	0.04	0.53	0.46	0.77	0.75	0.76	0.68	0.57	0.33	0.43	0.28	-0.05	0.22	-0.19	0.57	0.90	0.56	1.00			
	European Large Cap	7.70	8.69	14.76	5.10	-0.08	-0.15	0.10	0.16	0.37	0.50	0.70	0.76	0.65	0.06	0.35	-0.10	-0.22	-0.20	-0.29	0.18	0.52	0.48	0.55	1.00		
Equities	European Small Cap	9.20	10.62	17.88	6.50	-0.14	-0.13	0.14	0.19	0.43	0.55	0.74	0.80	0.69	0.06	0.33	-0.07	-0.21	-0.16	-0.29	0.22	0.54	0.41	0.59	0.92		
	U.S. Large Cap	5.80	6.80	14.73	2.80	-0.03	-0.17	0.04	0.17	0.27	0.44	0.56	0.61	0.57	0.09	0.28	-0.06	0.06	-0.17	-0.01	0.14	0.38	0.49	0.39	0.81		
	U.S. Large Cap hedged	6.80	8.00	16.26	2.80	-0.03	-0.15	0.18	0.17	0.44	0.52	0.73	0.66	0.56	0.08	0.33	-0.02	-0.33	-0.09	-0.44	0.23	0.62	0.37	0.59	0.83		
	Euro Area Large Cap	8.40	9.69	16.98	5.80	-0.11	-0.12	0.14	0.19	0.39	0.50	0.70	0.73	0.60	0.09	0.35	-0.06	-0.29	-0.16	-0.37	0.22	0.56	0.45	0.58	0.97		
	Euro Area Small Cap	9.30	10.77	18.23	6.20	-0.13	-0.11	0.15	0.19	0.41	0.51	0.73	0.78	0.65	0.08	0.36	-0.06	-0.28	-0.16	-0.36	0.23	0.54	0.40	0.57	0.92		
	UK Large Cap	7.00	7.98	14.66	3.70	0.05	-0.20	-0.06	0.03	0.24	0.39	0.60	0.70	0.66	-0.07	0.23	-0.25	-0.16	-0.34	-0.20	0.02	0.36	0.47	0.44	0.91		
	UK Large Cap hedged	6.40	7.22	13.31	2.60	-0.05	-0.10	0.08	0.09	0.32	0.38	0.59	0.59	0.52	0.01	0.32	-0.11	-0.33	-0.19	-0.40	0.15	0.47	0.41	0.48	0.86		
	Japanese Equity	8.30	9.20	14.14	5.40	-0.12	-0.12	0.07	0.17	0.31	0.41	0.49	0.53	0.48	0.09	0.24	-0.05	0.11	-0.15	0.07	0.14	0.31	0.49	0.36	0.67		
	Japanese Equity hedged	8.70	10.06	17.46	5.00	0.01	-0.17	-0.10	-0.03	0.17	0.28	0.51	0.53	0.49	-0.10	0.20	-0.27	-0.46	-0.35	-0.52	-0.04	0.33	0.29	0.38	0.73		
	Chinese Domestic Equity	9.70	13.10	28.37	6.90	-0.07	0.00	0.03	0.07	0.16	0.18	0.22	0.26	0.24	0.05	0.01	-0.05	-0.02	-0.11	-0.05	0.05	0.15	0.22	0.24	0.27		
	Emerging Markets Equity	8.00	9.24	16.58	5.60	-0.07	-0.06	0.12	0.15	0.40	0.49	0.68	0.70	0.64	0.05	0.31	-0.09	-0.18	-0.18	-0.26	0.19	0.53	0.63	0.60	0.77		
	AC Asia ex-Japan Equity	7.90	9.14	16.60	5.70	-0.11	-0.07	0.14	0.17	0.40	0.49	0.63	0.66	0.59	0.07	0.29	-0.05	-0.12	-0.15	-0.19	0.20	0.48	0.59	0.57	0.73		
	AC World Equity	6.40	7.29	13.93	3.70	-0.06	-0.15	0.09	0.18	0.37	0.52	0.67	0.73	0.66	0.08	0.34	-0.08	-0.05	-0.19	-0.13	0.18	0.48	0.55	0.51	0.92		
	AC World ex-EMU Equity	6.30	7.19	13.87	3.50	-0.06	-0.15	0.08	0.18	0.36	0.51	0.66	0.71	0.66	0.08	0.33	-0.08	-0.02	-0.19	-0.09	0.17	0.46	0.56	0.49	0.89		
	Developed World Equity	6.30	7.22	14.13	3.50	-0.06	-0.16	0.08	0.18	0.35	0.50	0.65	0.71	0.64	0.08	0.33	-0.08	-0.04	-0.18	-0.11	0.17	0.46	0.52	0.48	0.91		
	Global Convertible Bonds hedged	8.00	8.64	11.88	4.30	-0.24	-0.03	0.30	0.30	0.61	0.65	0.80	0.76	0.67	0.19	0.42	0.06	-0.26	-0.03	-0.39	0.36	0.69	0.38	0.71	0.78		
	Global Credit Sensitive Convertible hedged	6.10	6.40	8.04	3.40	-0.17	-0.10	0.24	0.36	0.42	0.54	0.45	0.51	0.42	0.27	0.27	0.18	-0.01	0.10	-0.13	0.33	0.42	0.22	0.44	0.49		
Alternatives	Private Equity	7.80	9.36	18.69	6.80	0.11	-0.17	-0.21	-0.12	0.18	0.31	0.58	0.58	0.64	-0.23	0.16	-0.39	-0.19	-0.46	-0.21	-0.12	0.38	0.45	0.46	0.72		
	Venture Capital	6.40	8.60	22.18	-	0.03	-0.22	-0.25	-0.16	0.01	0.13	0.36	0.33	0.44	-0.22	0.03	-0.34	-0.11	-0.38	-0.11	-0.18	0.22	0.31	0.27	0.50		
	U.S. Core Real Estate	3.60	4.34	12.48	4.50	0.31	-0.38	-0.19	-0.20	-0.03	0.07	0.34	0.35	0.44	-0.25	0.00	-0.28	0.00	-0.26	0.05	-0.19	0.10	0.29	0.22	0.38		
	European Core Real Estate	4.70	5.19	10.15	4.80	0.16	-0.31	-0.31	-0.28	-0.02	0.05	0.34	0.33	0.45	-0.33	-0.04	-0.43	-0.13	-0.42	-0.11	-0.28	0.18	0.23	0.24	0.47		
	European Value-Added Real Estate	6.70	7.98	16.75	6.80	0.18	-0.30	-0.36	-0.35	-0.05	0.02	0.35	0.33	0.46	-0.40	-0.09	-0.50	-0.19	-0.49	-0.17	-0.34	0.15	0.20	0.23	0.48		
	Asia Pacific Core Real Estate	6.00	6.87	13.70	6.20	0.16	-0.32	-0.05	-0.07	0.24	0.31	0.55	0.56	0.62	-0.17	0.12	-0.26	-0.03	-0.27	-0.03	-0.02	0.35	0.43	0.45	0.61		
	Global REITs	4.90	5.74	13.43	4.60	-0.08	-0.15	0.20	0.26	0.41	0.51	0.62	0.64	0.57	0.19	0.46	0.08	0.06	-0.02	-0.02	0.29	0.47	0.57	0.46	0.78		
	Global Core Infrastructure	4.20	4.98	12.91	4.80	0.22	-0.20	-0.12	-0.08	0.06	0.13	0.38	0.39	0.53	-0.12	0.13	-0.21	0.07	-0.25	0.06	-0.08	0.25	0.37	0.31	0.31		
	Global Core Transport	5.40	6.32	14.09	6.10	0.20	-0.11	-0.11	-0.11	-0.36	-0.33	-0.29	-0.26	-0.16	-0.03	-0.15	0.05	0.42	0.08	0.49	-0.13	-0.33	0.12	-0.31	-0.10		
	Global Timberland	4.60	5.35	12.66	-	0.08	0.05	-0.06	0.03	-0.10	-0.04	-0.11	-0.09	-0.06	0.04	0.03	0.04	0.45	0.01	0.48	0.00	-0.09	0.36	-0.10	0.12		
	Diversified Hedge Funds hedged	3.80	4.02	6.77	2.40	-0.06	-0.12	0.06	0.08	0.37	0.44	0.65	0.68	0.68	-0.03	0.27	-0.16	-0.31	-0.22	-0.39	0.11	0.48	0.28	0.52	0.73		
	Event Driven Hedge Funds hedged	4.20	4.56	8.75	2.00	-0.03	-0.09	0.11	0.11	0.39	0.50	0.80	0.79	0.76	-0.01	0.30	-0.14	-0.36	-0.22	-0.46	0.17	0.56	0.36	0.60	0.80		
	Long Bias Hedge Funds hedged	3.80	4.38	11.07	2.10	-0.10	-0.08	0.16	0.12	0.46	0.51	0.78	0.74	0.67	0.01	0.30	-0.10	-0.40	-0.17	-0.50	0.20	0.60	0.35	0.63	0.80		
	Relative Value Hedge Funds hedged	3.70	3.89	6.33	2.60	0.01	-0.01	0.13	0.14	0.42	0.53	0.84	0.85	0.87	0.01	0.34	-0.14	-0.30	-0.23	-0.38	0.19	0.57	0.44	0.64	0.75		
	Macro Hedge Funds hedged	2.90	3.22	8.16	1.50	-0.01	0.09	-0.04	0.00	0.08	0.09	0.08	0.12	0.09	-0.04	0.30	-0.08	-0.13	-0.10	-0.15	0.00	0.06	0.05	0.02	0.23		
	Direct Lending	5.70	6.77	15.21	5.60	0.10	-0.10	-0.13	-0.02	-0.08	0.02	0.12	0.13	0.25	-0.04	0.01	-0.11	0.43	-0.16	0.47	-0.07	-0.02	0.41	0.04	0.22		
	Commodities	1.00	2.28	16.36	1.30	0.31	-0.21	-0.32	-0.30	-0.11	-0.04	0.23	0.23	0.35	-0.36	0.12	-0.45	-0.18	-0.45	-0.14	-0.30	0.04	0.18	0.09	0.29		
	Gold	1.40	2.65	16.15	1.70	0.03	0.08	0.18	0.10	0.11	0.05	-0.07	-0.10	-0.07	0.10	0.14	0.18	0.36	0.21	0.36	0.16	0.02	0.21	0.04	-0.17		

Euro assumptions

Note: All estimates on this page are in euro terms. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all of these asset classes and strategies. Exclusive reliance on this information is not advised. This information is not intended as a recommendation to invest in an particular asset class or strategy or as a promise of future performance. These asset class and strategy assumptions are passive only for liquid assets and industry averages (median managers) for alternatives. The assumptions do not consider the impact of active management. Reference to future returns are not promises or even estimates of actual returns portfolio's may achieve. Assumptions, opinions and estimates are provided for illustrative purposes only. Forecasts of financial market trends that are based on current market conditions constitute our judgement and are subject to change without notice. We believe the information provided herein is reliable, but to not warrant its accuracy or completeness. This materials is not intended to provide and should not be relied upon for accounting, legal or tax advice.

Source: J.P. Morgan Asset Management; as of September 30, 2022. Alternative asset classes (including hedge funds, private equity, real estate, direct lending, transportation, infrastructure and timberland) are unlike other asset categories shown above in that there is no underlying investible index. The return estimates for these alternative asset classes and strategies are estimates of the industry average – median manager, net of manager fees. The dispersion of return among managers of these asset classes and strategies is typically significantly wider than that of traditional asset classes. Correlations of value-added and core real estate in their local currencies are identical since value-added local returns are scaled versions of their corresponding core real estate local returns. This year, we have updated the raw data source for Europe and U.K. Real Estate and this may result in a change in correlation forecasts. For equity and fixed income assumptions we assume current index regional weight in composite indices with multiple countries/regions. All returns are nominal. The return forecasts of composite and hedged assets are computed using unrounded return and rounded to the nearest 10bp at the final stage. In some cases this may lead to apparent differences in hedging impact across assets, but this is purely due to rounding. For the full opportunity set, please contact your J.P. Morgan representative.

	European Small Cap	U.S. Large Cap	U.S. Large Cap hedged	Euro Area Large Cap	Euro Area Small Cap	UK Large Cap	UK Large Cap hedged	Japanese Equity	Japanese Equity hedged	Chinese Domestic Equity	Emerging Markets Equity	AC Asia ex-Japan Equity	AC World Equity	AC World ex-EMU Equity	Developed World Equity	Global Convertible Bonds hedged	Global Credit Sensitive Convertible hedged	Private Equity	Venture Capital	U.S. Core Real Estate	European Core Real Estate	European Value-Added Real Estate	Asia Pacific Core Real Estate	Global REITs	Global Core Infrastructure	Global Core Transport	Global Timberland	Diversified Hedge Funds hedged	Event Driven Hedge Funds hedged	Long Bias Hedge Funds hedged	Relative Value Hedge Funds hedged	Macro Hedge Funds hedged	Direct Lending	Commodities	Gold
European Small Cap	1.00																																		
U.S. Large Cap	0.77	1.00																																	
U.S. Large Cap hedged	0.81	0.82	1.00																																
Euro Area Large Cap	0.90	0.75	0.84	1.00																															
Euro Area Small Cap	0.97	0.70	0.80	0.93	1.00																														
UK Large Cap	0.83	0.77	0.69	0.82	0.79	1.00																													
UK Large Cap hedged	0.76	0.63	0.74	0.84	0.81	0.83	1.00																												
Japanese Equity	0.64	0.70	0.53	0.61	0.60	0.66	0.50	1.00																											
Japanese Equity hedged	0.68	0.61	0.68	0.72	0.68	0.66	0.62	0.77	1.00																										
Chinese Domestic Equity	0.27	0.29	0.22	0.24	0.23	0.28	0.16	0.26	0.27	1.00																									
Emerging Markets Equity	0.75	0.64	0.68	0.73	0.74	0.73	0.68	0.57	0.59	0.47	1.00																								
AC Asia ex-Japan Equity	0.70	0.63	0.63	0.69	0.69	0.69	0.62	0.57	0.57	0.54	0.96	1.00																							
AC World Equity	0.88	0.96	0.86	0.86	0.83	0.86	0.75	0.76	0.71	0.34	0.80	0.78	1.00																						
AC World ex-EMU Equity	0.85	0.96	0.84	0.82	0.80	0.85	0.72	0.77	0.70	0.35	0.79	0.77	1.00	1.00																					
Developed World Equity	0.87	0.97	0.86	0.85	0.82	0.86	0.74	0.76	0.71	0.31	0.75	0.72	1.00	0.99	1.00																				
Global Convertible Bonds hedged	0.83	0.67	0.85	0.78	0.81	0.63	0.67	0.55	0.65	0.34	0.74	0.71	0.79	0.77	0.77	1.00																			
Global Credit Sensitive Convertible hedged	0.52	0.42	0.52	0.48	0.50	0.39	0.36	0.34	0.33	0.14	0.38	0.35	0.48	0.46	0.47	0.59	1.00																		
Private Equity	0.71	0.75	0.64	0.66	0.65	0.74	0.59	0.54	0.57	0.44	0.72	0.69	0.79	0.79	0.78	0.63	0.32	1.00																	
Venture Capital	0.51	0.64	0.48	0.46	0.43	0.55	0.38	0.51	0.50	0.46	0.53	0.55	0.62	0.64	0.62	0.51	0.20	0.77	1.00																
U.S. Core Real Estate	0.36	0.48	0.31	0.29	0.28	0.45	0.20	0.40	0.33	0.11	0.33	0.32	0.45	0.46	0.45	0.16	0.16	0.46	0.32	1.00															
European Core Real Estate	0.46	0.54	0.38	0.38	0.38	0.55	0.34	0.46	0.45	0.36	0.44	0.42	0.54	0.55	0.54	0.37	0.19	0.64	0.58	0.49	1.00														
European Value-Added Real Estate	0.47	0.54	0.39	0.39	0.39	0.57	0.35	0.47	0.49	0.37	0.46	0.43	0.55	0.56	0.55	0.38	0.18	0.67	0.60	0.49	0.98	1.00													
Asia Pacific Core Real Estate	0.59	0.60	0.50	0.52	0.55	0.65	0.48	0.52	0.42	0.30	0.62	0.61	0.65	0.66	0.64	0.47	0.36	0.66	0.44	0.75	0.57	0.57	1.00												
Global REITs	0.73	0.80	0.71	0.71	0.69	0.72	0.66	0.62	0.54	0.19	0.66	0.65	0.84	0.84	0.84	0.64	0.36	0.62	0.41	0.56	0.36	0.34	0.68	1.00											
Global Core Infrastructure	0.29	0.43	0.23	0.24	0.19	0.40	0.11	0.36	0.29	0.11	0.36	0.34	0.41	0.43	0.41	0.18	-0.15	0.53	0.47	0.57	0.44	0.44	0.47	0.41	1.00										
Global Core Transport	-0.23	0.18	-0.18	-0.15	-0.25	-0.05	-0.24	0.06	-0.13	-0.03	-0.17	-0.10	0.02	0.05	0.05	-0.40	-0.19	-0.02	0.08	0.42	0.02	-0.01	0.14	0.13	0.34	1.00									
Global Timberland	0.02	0.36	-0.02	0.07	-0.03	0.17	0.05	0.29	0.03	0.23	0.09	0.14	0.26	0.28	0.28	-0.13	-0.12	0.33	0.42	0.18	0.28	0.25	0.14	0.25	0.32	0.53	1.00								
Diversified Hedge Funds hedged	0.80	0.61	0.71	0.70	0.76	0.67	0.60	0.51	0.64	0.36	0.71	0.66	0.73	0.72	0.71	0.82	0.54	0.69	0.59	0.28	0.52	0.54	0.53	0.54	0.25	-0.30	-0.02	1.00							
Event Driven Hedge Funds hedged	0.86	0.66	0.82	0.78	0.84	0.72	0.70	0.54	0.67	0.30	0.75	0.68	0.78	0.77	0.77	0.86	0.60	0.71	0.53	0.31	0.44	0.47	0.55	0.62	0.25	-0.29	-0.06	0.87	1.00						
Long Bias Hedge Funds hedged	0.86	0.67	0.87	0.80	0.84	0.69	0.70	0.54	0.70	0.33	0.79	0.74	0.80	0.78	0.77	0.92	0.56	0.67	0.55	0.22	0.42	0.45	0.49	0.61	0.20	-0.35	-0.09	0.89	0.94	1.00					
Relative Value Hedge Funds hedged	0.80	0.59	0.69	0.72	0.78	0.72	0.66	0.53	0.62	0.31	0.76	0.70	0.73	0.72	0.70	0.80	0.52	0.70	0.48	0.36	0.49	0.51	0.62	0.60	0.37	-0.27	-0.05	0.83	0.92	0.85	1.00				
Macro Hedge Funds hedged	0.22	0.09	0.17	0.19	0.26	0.24	0.32	0.06	0.12	0.01	0.25	0.21	0.19	0.18	0.17	0.23	0.09	0.25	0.16	-0.11	0.02	0.03	0.05	0.18	-0.15	-0.26	0.06	0.46	0.25	0.31	0.26	1.00			
Direct Lending	0.16	0.52	0.04	0.12	0.07	0.33	0.07	0.43	0.15	0.20	0.22	0.25	0.41	0.45	0.43	0.02	-0.04	0.51	0.48	0.48	0.51	0.49	0.45	0.37	0.55	0.57	0.66	0.11	0.11	0.01	0.18	-0.08	1.00		
Commodities	0.26	0.26	0.19	0.19	0.24	0.47	0.34	0.19	0.18	0.01	0.36	0.29	0.32	0.33	0.30	0.16	0.08	0.52	0.36	0.42	0.47	0.49	0.51	0.27	0.36	-0.05	0.10	0.37	0.35	0.29	0.42	0.42	0.35	1.00	
Gold	-0.14	-0.08	-0.20	-0.24	-0.19	-0.08	-0.15	-0.11	-0.33	0.11	0.00	-0.01	-0.09	-0.06	-0.09	-0.10	-0.08	0.01	0.01	0.06	-0.01	-0.05	0.18	-0.01	0.14	0.28	0.27	-0.01	-0.11	-0.10	-0.04	0.26	0.31	0.28	1.00

Sterling assumptions

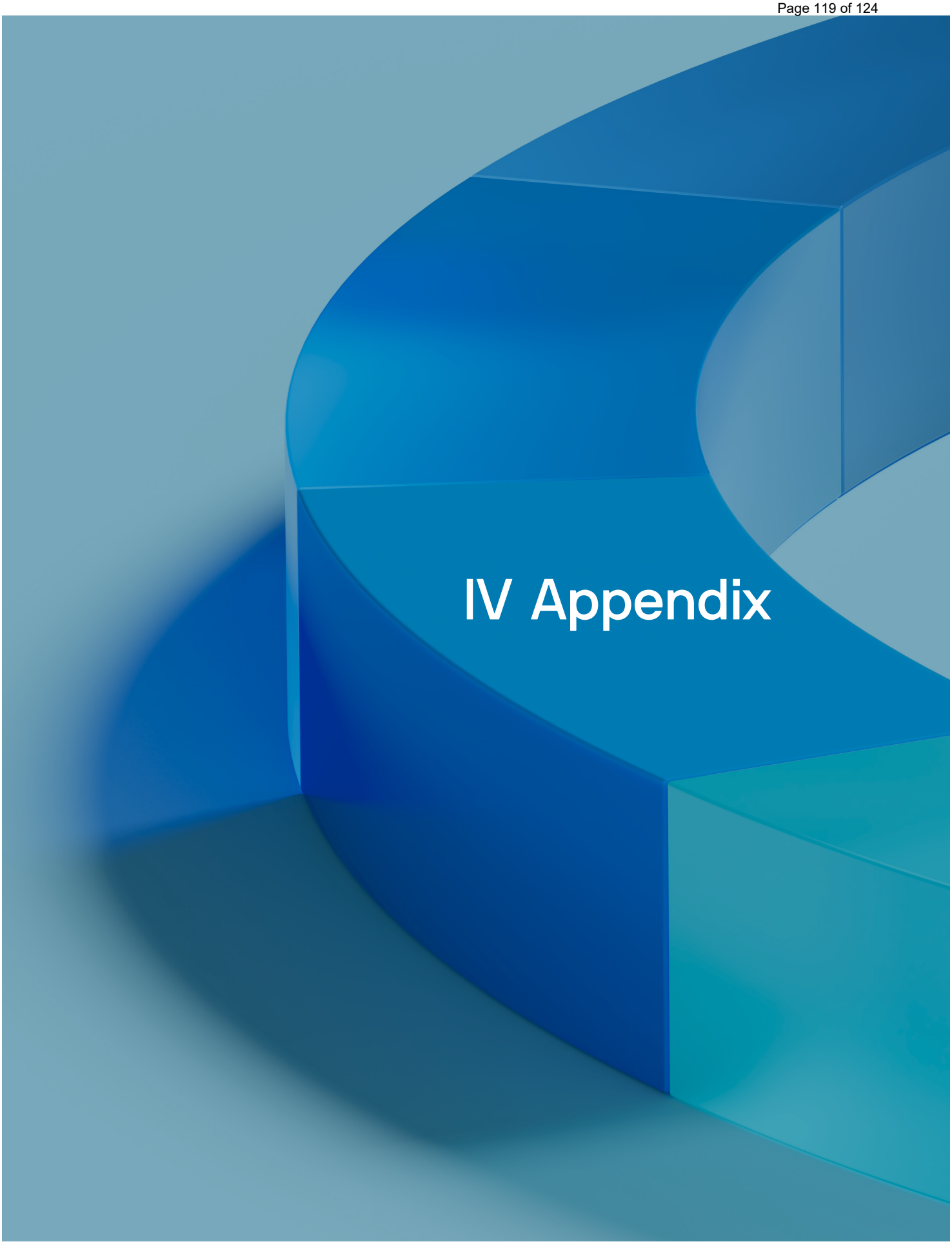
		Compound Return 2022 (%)		Annualized Volatility (%)		UK Inflation	UK Cash	U.S. Aggregate Bonds hedged	Euro Aggregate Bonds hedged	U.S. Inv Grade Corporate Bonds hedged	Euro Inv Grade Corp Bonds hedged	UK Inv Grade Corporate Bonds	U.S. High Yield Bonds hedged	Euro High Yield Bonds hedged	Global Credit hedged	U.S. Leveraged Loans hedged	Euro Government Bonds hedged	UK Gilts	UK Inflation-Linked Bonds	World Government Bonds hedged	World Government Bonds	World ex-UK Government Bonds hedged	World ex-UK Government Bonds	Emerging Markets Sovereign Debt hedged	Emerging Markets Local Currency Debt	Emerging Markets Corporate Bonds hedged	UK All Cap	UK Large Cap
		Arithmetic Return 2023 (%)																										
		Compound Return 2023 (%)																										
Fixed Income	UK Inflation	2.40	2.42	1.96	2.20	1.00																						
	UK Cash	2.20	2.20	0.69	1.50	-0.26	1.00																					
	U.S. Aggregate Bonds hedged	4.40	4.48	4.11	2.80	-0.29	0.30	1.00																				
	Euro Aggregate Bonds hedged	4.00	4.09	4.43	2.60	-0.39	0.25	0.73	1.00																			
	U.S. Inv Grade Corporate Bonds hedged	5.30	5.54	7.07	3.00	-0.26	0.14	0.83	0.66	1.00																		
	Euro Inv Grade Corp Bonds hedged	4.60	4.72	4.99	2.90	-0.27	0.10	0.60	0.77	0.83	1.00																	
	UK Inv Grade Corporate Bonds	5.70	5.99	7.83	2.30	-0.07	-0.01	0.61	0.62	0.80	0.83	1.00																
	U.S. High Yield Bonds hedged	6.60	6.95	8.66	4.10	-0.09	-0.01	0.35	0.27	0.64	0.64	0.56	1.00															
	Euro High Yield Bonds hedged	6.70	7.11	9.35	4.30	-0.09	-0.04	0.26	0.31	0.56	0.70	0.58	0.89	1.00														
	Global Credit hedged	5.10	5.24	5.44	2.90	-0.27	0.14	0.83	0.75	0.98	0.89	0.85	0.64	0.57	1.00													
	U.S. Leveraged Loans hedged	6.00	6.30	8.02	4.90	0.04	-0.11	0.02	0.06	0.34	0.47	0.42	0.76	0.85	0.34	1.00												
	Euro Government Bonds hedged	3.80	3.91	4.88	2.50	-0.39	0.26	0.69	0.97	0.55	0.63	0.51	0.13	0.16	0.63	-0.07	1.00											
	UK Gilts	4.20	4.48	7.65	0.90	-0.22	0.24	0.72	0.67	0.51	0.40	0.60	0.03	-0.02	0.56	-0.17	0.69	1.00										
	UK Inflation-Linked Bonds	3.80	4.35	10.73	-0.50	-0.18	0.09	0.58	0.54	0.53	0.48	0.62	0.33	0.25	0.58	0.18	0.51	0.74	1.00									
	World Government Bonds hedged	3.50	3.57	3.69	2.20	-0.33	0.32	0.86	0.86	0.60	0.50	0.50	0.07	0.01	0.65	-0.22	0.88	0.85	0.61	1.00								
	World Government Bonds	2.50	2.87	8.75	1.40	-0.18	0.27	0.48	0.43	0.21	0.07	0.15	-0.25	-0.33	0.24	-0.46	0.49	0.62	0.39	0.66	1.00							
	World ex-UK Government Bonds hedged	3.50	3.56	3.52	2.40	-0.32	0.32	0.86	0.86	0.60	0.51	0.49	0.08	0.02	0.66	-0.22	0.89	0.82	0.59	1.00	0.64	1.00						
	World ex-UK Government Bonds	2.40	2.80	9.13	1.40	-0.20	0.27	0.45	0.41	0.19	0.05	0.12	-0.28	-0.34	0.21	-0.47	0.47	0.59	0.37	0.63	0.99	0.61	1.00					
	Emerging Markets Sovereign Debt hedged	6.90	7.39	10.30	5.50	-0.20	0.09	0.59	0.52	0.79	0.76	0.67	0.76	0.65	0.82	0.43	0.41	0.30	0.45	0.38	0.06	0.39	0.03	1.00				
	Emerging Markets Local Currency Debt	5.30	5.87	11.06	5.00	-0.23	0.28	0.45	0.42	0.42	0.38	0.36	0.30	0.27	0.44	0.10	0.40	0.32	0.33	0.39	0.44	0.39	0.43	0.53	1.00			
	Emerging Markets Corporate Bonds hedged	6.80	7.20	9.32	5.00	-0.12	0.03	0.51	0.45	0.77	0.76	0.67	0.76	0.70	0.79	0.55	0.32	0.20	0.37	0.28	-0.05	0.29	-0.07	0.90	0.43	1.00		
Equities	UK All Cap	7.60	8.40	13.22	4.60	0.04	-0.11	0.11	0.11	0.37	0.44	0.44	0.66	0.67	0.38	0.55	0.01	-0.04	0.17	-0.11	-0.19	-0.10	-0.19	0.54	0.44	0.54	1.00	
	UK Large Cap	7.30	8.11	13.29	4.10	0.06	-0.12	0.06	0.07	0.31	0.38	0.40	0.61	0.62	0.32	0.51	-0.02	-0.08	0.15	-0.14	-0.18	-0.13	-0.18	0.49	0.45	0.49	0.99	1.00
	UK Small Cap	9.40	10.68	16.96	7.20	-0.01	-0.09	0.17	0.18	0.45	0.54	0.49	0.71	0.71	0.47	0.59	0.06	0.02	0.20	-0.04	-0.25	-0.04	-0.27	0.59	0.29	0.60	0.85	0.78
	U.S. Large Cap	6.10	7.07	14.49	3.20	-0.01	-0.08	0.18	0.21	0.35	0.42	0.43	0.55	0.50	0.38	0.39	0.15	0.16	0.32	0.07	0.09	0.07	0.07	0.48	0.50	0.43	0.76	0.74
	U.S. Large Cap hedged	7.70	8.88	16.18	4.30	-0.03	-0.11	0.18	0.18	0.45	0.53	0.48	0.73	0.69	0.46	0.56	0.08	0.00	0.22	-0.03	-0.29	-0.02	-0.31	0.62	0.31	0.58	0.80	0.75
	Euro Area Large Cap	8.70	10.21	18.42	6.20	-0.08	0.00	0.24	0.21	0.43	0.45	0.45	0.64	0.63	0.45	0.43	0.13	0.05	0.24	0.04	-0.04	0.05	-0.04	0.60	0.55	0.55	0.88	0.86
	Euro Area Large Cap hedged	9.40	10.68	16.98	7.20	-0.05	-0.09	0.13	0.18	0.39	0.50	0.46	0.70	0.74	0.42	0.60	0.08	-0.06	0.14	-0.07	-0.34	-0.07	-0.34	0.56	0.32	0.57	0.88	0.84
	Euro Area Small Cap	9.50	11.21	19.70	6.60	-0.05	-0.03	0.23	0.18	0.44	0.46	0.46	0.68	0.67	0.45	0.49	0.09	0.03	0.22	0.02	-0.05	0.02	-0.06	0.60	0.49	0.58	0.87	0.82
	Euro Area Small Cap hedged	10.20	11.67	18.29	7.60	-0.03	-0.11	0.13	0.16	0.41	0.51	0.47	0.73	0.78	0.42	0.65	0.05	-0.07	0.14	-0.09	-0.33	-0.08	-0.35	0.54	0.28	0.57	0.85	0.80
	Japanese Equity	8.50	9.31	13.36	5.80	-0.16	-0.02	0.21	0.22	0.36	0.38	0.36	0.45	0.40	0.37	0.28	0.16	0.09	0.23	0.09	0.10	0.09	0.10	0.39	0.47	0.37	0.62	0.60
	Japanese Equity hedged	9.60	10.95	17.50	6.50	0.03	-0.16	-0.10	-0.04	0.18	0.28	0.25	0.51	0.53	0.18	0.49	-0.10	-0.24	-0.03	-0.28	-0.51	-0.27	-0.52	0.32	0.14	0.37	0.65	0.62
	AC Asia ex-Japan Equity	8.20	9.51	17.13	6.10	-0.05	0.01	0.24	0.18	0.44	0.44	0.40	0.59	0.55	0.45	0.42	0.10	0.06	0.19	0.05	-0.01	0.05	-0.01	0.55	0.58	0.57	0.70	0.68
	Chinese Domestic Equity	10.00	13.31	28.01	7.30	-0.05	0.06	0.10	0.09	0.20	0.17	0.11	0.20	0.18	0.19	0.15	0.08	0.00	0.02	0.03	-0.06	0.03	-0.06	0.19	0.17	0.26	0.22	0.21
	Emerging Markets Equity	8.30	9.68	17.56	6.00	-0.01	0.00	0.21	0.16	0.44	0.44	0.41	0.64	0.59	0.44	0.47	0.08	0.03	0.22	0.01	-0.03	0.01	-0.03	0.61	0.62	0.62	0.75	0.73
	AC World Equity	6.70	7.59	13.91	4.10	-0.03	-0.06	0.22	0.22	0.44	0.48	0.48	0.65	0.61	0.45	0.46	0.13	0.12	0.31	0.05	0.03	0.05	0.02	0.59	0.57	0.55	0.87	0.85
	AC World ex-UK Equity	6.70	7.61	14.11	4.10	-0.03	-0.05	0.22	0.22	0.44	0.48	0.48	0.65	0.60	0.45	0.45	0.14	0.13	0.32	0.06	0.04	0.06	0.03	0.59	0.58	0.54	0.86	0.83
	Developed World Equity	6.50	7.40	13.99	3.90	-0.03	-0.06	0.21	0.22	0.42	0.47	0.48	0.63	0.59	0.44	0.45	0.14	0.13	0.32	0.05	0.04	0.05	0.02	0.57	0.55	0.52	0.86	0.84
	Global Convertible Bonds hedged	8.90	9.53	11.84	5.70	-0.17	-0.02	0.28	0.28	0.60	0.64	0.55	0.81	0.77	0.60	0.66	0.16	0.06	0.26	0.04	-0.26	0.04	-0.28	0.70	0.29	0.70	0.74	0.67
	Global Credit Sensitive Convertible hedged	7.00	7.33	8.42	4.80	-0.08	-0.09	0.20	0.35	0.38	0.53	0.50	0.39	0.46	0.43	0.38	0.26	0.09	0.21	0.15	-0.14	0.15	-0.15	0.38	0.12	0.39	0.38	0.34
Alternatives	Private Equity	8.10	9.47	17.48	7.20	0.11	-0.12	-0.11	-0.03	0.24	0.35	0.32	0.49	0.46	0.26	0.48	-0.13	-0.18	0.18	-0.26	-0.18	-0.27	-0.19	0.42	0.32	0.43	0.69	0.68
	Venture Capital	6.70	8.62	20.70	-	0.01	-0.14	-0.17	-0.08	0.03	0.13	0.17	0.25	0.19	0.07	0.28	-0.12	-0.09	0.17	-0.21	-0.17	-0.23	-0.18	0.20	0.12	0.19	0.44	0.41
	U.S. Core Real Estate	3.90	4.40	10.22	4.90	0.45	-0.40	-0.22	-0.19	-0.09	0.05	0.13	0.30	0.29	-0.05	0.41	-0.24	-0.22	0.08	-0.28	-0.42	-0.26	-0.43	0.07	-0.16	0.18	0.22	0.21
	European Core Real Estate	5.00	5.60	11.27	5.20	0.14	-0.16	-0.09	-0.09	0.04	0.02	0.11	0.03	0.00	0.04	0.01	-0.10	-0.04	0.04	-0.10	0.15	-0.12	0.15	0.10	0.17	0.07	0.31	0.32
	European Core Real Estate hedged	5.60	6.08	10.13	6.20	0.24	-0.33	-0.33	-0.30	-0.03	0.05	0.08	0.34	0.30	-0.04	0.46	-0.35	-0.32	-0.11	-0.45	-0.54	-0.45	-0.55	0.17	-0.22	0.23	0.36	0.35
	UK Core Real Estate	5.50	6.28	12.97	6.10	0.21	-0.35	-0.29	-0.22	0.03	0.14	0.04	0.49	0.49	0.01	0.55	-0.30	-0.39	-0.10	-0.43	-0.56	-0.42	-0.56	0.18	-0.29	0.29	0.34	0.33
	European Value-Added Real Estate	6.90	8.31	17.64	7.20	0.23	-0.28	-0.32	-0.31	-0.05	0.00	0.05	0.23	0.18	-0.06	0.30	-0.36	-0.30	-0.09	-0.42	-0.30	-0.43	-0.31	0.13	-0.06	0.17	0.41	0.41
	European Value-Added Real Estate hedged	7.60	8.87	16.76	8.20	0.24	-0.32	-0.39	-0.36	-0.07	0.02	0.03	0.35	0.30	-0.09	0.47	-0.42	-0.39	-0.15	-0.52	-0.60	-0.53	-0.60	0.14	-0.25	0.22	0.37	0.35
	Global REITs	5.10	6.02	14.04	5.00	0.03	-0.09	0.28	0.27	0.45	0.47	0.55	0.61	0.56	0.47	0.42	0.21	0.25	0.40	0.16	0.10	0.16	0.09	0.55	0.54	0.49	0.74	0.72
	Global Core Infrastructure	4.50	5.05	10.76	5.20	0.17	-0.09	0.07	0.09	0.09	0.11	0.18	0.16	0.13	0.13	0.25	0.08	0.12	0.41	0.06	0.04	0.05	0.02	0.22	0.16	0.19	0.06	0.06
	Global Core Transport	5.60	6.53	14.13	6.50	0.11	0.05	0.05	0.03	-0.34	-0.36	-0.17	-0.49	-0.48	-0.28	-0.43	0.13	0.33	0.22	0.27	0.46	0.26	0.45	-0.40	0.09	-0.43	-0.32	-0.28
	Global Timberland	4.90	5.47	11.04	-	-0.07	0.19	0.15	0.18	-0.02	-0.06	0.03	-0.34	-0.34	0.01	-0.41	0.23	0.37	0.27	0.32	0.65	0.29	0.64	-0.13	0.40	-0.22	-0.05	-0.01
	Diversified Hedge Funds hedged	4.80	5.02	6.78	3.80	0.08	-0.12	0.04	0.05	0.35	0.43	0.42	0.63	0.67	0.35	0.68	-0.05	-0.12	0.15	-0.18	-0.43	-0.18	-0.44	0.46	0.11	0.51	0.66	0.61
	Event Driven Hedge Funds hedged	5.20	5.56	8.72	3.40	0.00	-0.09	0.09	0.11	0.40	0.51	0.44	0.78	0.79	0.41	0.74	-0.01	-0.13	0.16	-0.16	-0.44	-0.15	-0.46	0.54	0.23	0.58	0.75	0.70
	Long Bias Hedge Funds hedged	4.80	5.37	11.03	3.50	-0.06	-0.06	0.16	0.12	0.46	0.51	0.44	0.77	0.75	0.45	0.66	0.00	-0.09	0.14	-0.11	-0.41	-0.10	-0.42	0.59	0.26	0.61	0.77	0.71
	Relative Value Hedge Funds hedged	4.70	4.89	6.27	4.00	0.00	-0.06	0.11	0.12	0.42	0.53	0.46	0.82	0.85	0.43	0.85	-0.01	-0.16	0.18	-0.16	-0.47	-0.15	-0.48	0.57	0.24	0.63	0.70	0.67
	Macro Hedge Funds hedged	3.90	4.21	8.08	2.90	0.08	0.07	-0.07	-0.04	0.05	0.06	0.09	0.08	0.11	0.02	0.07	-0.07	-0.04	0.00	-0.10	-0.06	-0.10	-0.05	0.07	0.09	0.03	0.29	0.31
	Direct Lending	6.00	7.14	15.78	6.00	-0.03	0.02	0.06	0.14	-0.05	-0.04	0.02	-0.17	-0.20	-0.02	-0.14	0.17	0.28	0.29	0.18	0.50	0.16	0.49	-0.11	0.29	-0.13	-0.01	0.02
	Commodities	1.20	2.47	16.27	1.70	0.28	-0.15	-0.21	-0.27	-0.06	-0.06	-0.04	0.20	0.13	-0.09	0.22	-0.31	-0.29	-0.03	-0.34	-0.07	-0.33	-0.06	0.11	0.20	0.12	0.38	0.43
	Gold	1.70	3.12	17.30	2.10	-0.06	0.15	0.30	0.15	0.15	0.01	0.09	-0.10	-0.17	0.14	-0.23	0.16	0.35	0.27	0.30	0.46	0.30	0.45	0.07	0.33	0.01	-0.09	-0.07

Sterling assumptions

Note: All estimates on this page are in sterling terms. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all of these asset classes and strategies. Exclusive reliance on this information is not advised. This information is not intended as a recommendation to invest in an particular asset class or strategy or as a promise of future performance. These asset class and strategy assumptions are passive only for liquid assets and industry averages (median managers) for alternatives. The assumptions do not consider the impact of active management. Reference to future returns are not promises or even estimates of actual returns portfolio's may achieve. Assumptions, opinions and estimates are provided for illustrative purposes only. Forecasts of financial market trends that are based on current market conditions constitute our judgement and are subject to change without notice. We believe the information provided herein is reliable, but to not warrant its accuracy or completeness. This materials is not intended to provide and should not be relied upon for accounting, legal or tax advice.

Source: J.P. Morgan Asset Management; as of September 30, 2022. Alternative asset classes (including hedge funds, private equity, real estate, direct lending, transportation, infrastructure and timberland) are unlike other asset categories shown above in that there is no underlying investible index. The return estimates for these alternative asset classes and strategies are estimates of the industry average – median manager, net of manager fees. The dispersion of return among managers of these asset classes and strategies is typically significantly wider than that of traditional asset classes. Correlations of value-added and core real estate in their local currencies are identical since value-added local returns are scaled versions of their corresponding core real estate local returns. This year, we have updated the raw data source for Europe and U.K. Real Estate and this may result in a change in correlation forecasts. For equity and fixed income assumptions we assume current index regional weight in composite indices with multiple countries/regions. All returns are nominal. The return forecasts of composite and hedged assets are computed using unrounded return and rounded to the nearest 10bp at the final stage. In some cases this may lead to apparent differences in hedging impact across assets, but this is purely due to rounding. For the full opportunity set, please contact your J.P. Morgan representative.

	UK Small Cap	U.S. Large Cap	U.S. Large Cap hedged	Euro Area Large Cap	Euro Area Large Cap hedged	Euro Area Small Cap	Euro Area Small Cap hedged	Japanese Equity	Japanese Equity hedged	AC Asia ex-Japan Equity	Chinese Domestic Equity	Emerging Markets Equity	AC World Equity	AC World ex-UK Equity	Developed World Equity	Global Convertible Bonds hedged	Global Credit Sensitive Convertible hedged	Private Equity	Venture Capital	U.S. Core Real Estate	European Core Real Estate	European Core Real Estate hedged	UK Core Real Estate	European Value-Added Real Estate	European Value-Added Real Estate hedged	Global REITs	Global Core Infrastructure	Global Core Transport	Global Timberland	Diversified Hedge Funds hedged	Event Driven Hedge Funds hedged	Long Bias Hedge Funds hedged	Relative Value Hedge Funds hedged	Macro Hedge Funds hedged	Direct Lending	Commodities	Gold
UK Small Cap	1.00																																			
U.S. Large Cap	0.68	1.00																																		
U.S. Large Cap hedged	0.79	0.84	1.00																																	
Euro Area Large Cap	0.78	0.77	0.78	1.00																																
Euro Area Large Cap hedged	0.82	0.71	0.84	0.89	1.00																															
Euro Area Small Cap	0.85	0.73	0.76	0.94	0.84	1.00																														
Euro Area Small Cap hedged	0.90	0.66	0.81	0.84	0.93	0.91	1.00																													
Japanese Equity	0.54	0.66	0.54	0.63	0.57	0.61	0.56	1.00																												
Japanese Equity hedged	0.63	0.53	0.67	0.60	0.72	0.58	0.68	0.72	1.00																											
AC Asia ex-Japan Equity	0.62	0.63	0.62	0.72	0.63	0.71	0.62	0.54	0.48	1.00																										
Chinese Domestic Equity	0.22	0.23	0.22	0.23	0.21	0.22	0.20	0.20	0.23	0.51	1.00																									
Emerging Markets Equity	0.65	0.65	0.66	0.76	0.66	0.77	0.67	0.55	0.50	0.96	0.44	1.00																								
AC World Equity	0.77	0.95	0.87	0.89	0.80	0.86	0.77	0.73	0.62	0.78	0.29	0.81	1.00																							
AC World ex-UK Equity	0.76	0.96	0.86	0.88	0.79	0.85	0.76	0.73	0.61	0.78	0.29	0.81	1.00	1.00																						
Developed World Equity	0.77	0.97	0.87	0.88	0.80	0.84	0.77	0.74	0.62	0.73	0.26	0.76	1.00	1.00	1.00																					
Global Convertible Bonds hedged	0.82	0.67	0.85	0.74	0.79	0.77	0.81	0.54	0.65	0.69	0.34	0.71	0.78	0.77	0.76	1.00																				
Global Credit Sensitive Convertible hedged	0.43	0.36	0.49	0.38	0.45	0.37	0.45	0.28	0.29	0.25	0.10	0.26	0.39	0.38	0.39	0.53	1.00																			
Private Equity	0.63	0.71	0.65	0.65	0.62	0.62	0.59	0.42	0.46	0.61	0.33	0.65	0.74	0.74	0.74	0.62	0.45	1.00																		
Venture Capital	0.45	0.53	0.45	0.37	0.39	0.34	0.35	0.37	0.41	0.43	0.35	0.41	0.51	0.51	0.51	0.48	0.28	0.69	1.00																	
U.S. Core Real Estate	0.22	0.23	0.31	0.08	0.26	0.11	0.25	0.08	0.29	0.06	-0.07	0.10	0.19	0.18	0.19	0.14	0.23	0.20	0.07	1.00																
European Core Real Estate	0.22	0.34	0.18	0.28	0.12	0.27	0.11	0.29	0.13	0.17	0.13	0.22	0.35	0.35	0.36	0.18	0.32	0.40	0.32	-0.05	1.00															
European Core Real Estate hedged	0.40	0.29	0.40	0.17	0.40	0.19	0.39	0.18	0.47	0.20	0.23	0.24	0.29	0.28	0.29	0.37	0.20	0.40	0.37	0.44	0.46	1.00														
UK Core Real Estate	0.38	0.21	0.42	0.19	0.35	0.26	0.39	-0.03	0.36	0.14	0.07	0.21	0.23	0.21	0.22	0.40	0.13	0.29	0.13	0.50	0.02	0.48	1.00													
European Value-Added Real Estate	0.38	0.37	0.36	0.27	0.32	0.28	0.31	0.29	0.40	0.22	0.22	0.29	0.38	0.37	0.38	0.35	0.30	0.51	0.44	0.24	0.82	0.85	0.34	1.00												
European Value-Added Real Estate hedged	0.41	0.28	0.41	0.17	0.41	0.20	0.40	0.19	0.50	0.20	0.24	0.25	0.29	0.28	0.29	0.39	0.20	0.43	0.39	0.44	0.42	0.99	0.52	0.85	1.00											
Global REITs	0.64	0.80	0.71	0.73	0.65	0.72	0.64	0.59	0.46	0.66	0.15	0.68	0.84	0.84	0.83	0.62	0.26	0.53	0.26	0.39	0.11	0.16	0.27	0.13	0.14	1.00										
Global Core Infrastructure	0.02	0.16	0.07	0.05	0.00	-0.02	-0.06	0.04	0.03	0.00	-0.24	0.08	0.12	0.12	0.12	0.01	-0.06	0.24	0.19	0.21	0.04	0.00	-0.02	0.02	0.00	0.14	1.00									
Global Core Transport	-0.45	0.02	-0.34	-0.24	-0.34	-0.34	-0.43	-0.09	-0.36	-0.29	-0.19	-0.34	-0.15	-0.13	-0.11	-0.54	-0.15	-0.25	-0.12	0.09	-0.06	-0.36	-0.41	-0.30	-0.40	-0.03	0.21	1.00								
Global Timberland	-0.19	0.21	-0.22	0.04	-0.18	-0.06	-0.25	0.21	-0.25	0.00	0.05	-0.04	0.13	0.14	0.15	-0.27	-0.06	0.14	0.21	-0.32	0.38	-0.26	-0.54	0.02	-0.30	0.07	0.17	0.55	1.00							
Diversified Hedge Funds hedged	0.74	0.52	0.71	0.58	0.70	0.64	0.76	0.41	0.64	0.55	0.32	0.59	0.62	0.61	0.61	0.81	0.51	0.65	0.53	0.26	0.27	0.52	0.42	0.50	0.55	0.44	0.03	-0.49	-0.26	1.00						
Event Driven Hedge Funds hedged	0.80	0.61	0.82	0.68	0.78	0.74	0.84	0.48	0.66	0.60	0.26	0.65	0.71	0.70	0.70	0.85	0.59	0.68	0.47	0.30	0.18	0.45	0.47	0.41	0.48	0.54	0.03	-0.48	-0.29	0.87	1.00					
Long Bias Hedge Funds hedged	0.82	0.65	0.87	0.73	0.80	0.77	0.84	0.51	0.70	0.69	0.32	0.73	0.76	0.76	0.74	0.92	0.53	0.65	0.51	0.20	0.19	0.44	0.40	0.41	0.46	0.57	0.00	-0.53	-0.29	0.88	0.94	1.00				
Relative Value Hedge Funds hedged	0.73	0.50	0.70	0.61	0.73	0.66	0.78	0.43	0.62	0.59	0.26	0.65	0.62	0.61	0.60	0.80	0.50	0.63	0.38	0.34	0.17	0.50	0.49	0.42	0.52	0.51	0.12	-0.50	-0.33	0.84	0.92	0.86	1.00			
Macro Hedge Funds hedged	0.18	0.14	0.18	0.22	0.19	0.26	0.24	0.10	0.12	0.23	0.03	0.26	0.23	0.22	0.21	0.21	0.10	0.34	0.23	-0.11	0.15	0.01	0.01	0.10	0.01	0.19	-0.10	-0.19	0.14	0.45	0.26	0.30	0.27	1.00		
Direct Lending	-0.11	0.32	-0.17	-0.04	-0.15	-0.10	-0.20	0.24	-0.16	-0.05	-0.05	-0.06	0.18	0.19	0.21	-0.18	0.01	0.21	0.21	-0.06	0.33	-0.02	-0.26	0.15	-0.05	0.14	0.20	0.56	0.69	-0.17	-0.18	-0.25	-0.15	-0.02	1.00	
Commodities	0.18	0.24	0.19	0.23	0.14	0.28	0.20	0.13	0.11	0.27	-0.04	0.37	0.30	0.30	0.29	0.15	0.02	0.44	0.20	0.20	0.31	0.23	0.24	0.35	0.25	0.27	0.14	-0.19	0.02	0.29	0.29	0.26	0.34	0.46	0.16	1.00
Gold	-0.16	-0.02	-0.20	-0.09	-0.27	-0.05	-0.22	-0.06	-0.38	0.06	0.09	0.08	0.00	0.00	-0.02	-0.11	-0.13	-0.05	-0.10	-0.25	0.05	-0.34	-0.36	-0.21	-0.37	0.04	0.09	0.31	0.39	-0.11	-0.17	-0.13	-0.14	0.30	0.34	0.29	1.00



IV Appendix

Appendix

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Appendix

Glossary

Alternatives Nontraditional assets, including private equity, private credit, real assets (real estate, infrastructure, transport, timberland) and hedge funds.

Backwardation In commodities markets, when spot pricing is higher than futures market pricing.

Demographic dividend A younger, faster-growing population can boost GDP growth more than an older, slower-growing population. Countries with a younger demographic profile have the opportunity to boost development; see their working-age population benefit from health, education and employment; and have fewer children per household – generally leading to larger investments per child, more freedom for women to join the workforce and more household savings, according to the United Nations (U.N.) Population Fund.

Dependency ratio The number of adults in a society age 65-plus and children (birth to 14) divided by the working-age population, according to the U.N.

Exit multiple A measure of a company's valuation, generally calculated as enterprise value over Ebitda, or earnings before interest, taxes, depreciation and amortization, at the time of sale – for example, by a private equity general partner monetizing an investment.

Fat tail A non-normal return distribution in which there is a higher than normal probability of an extreme negative or positive outcome (e.g., high or low return). A tail is the tapering at the far ends of a distribution curve, representing least likely outcomes; a fat tail in our forecasting refers to wider distribution of risks around a central projection.

Implied volatility A metric that measures market expectations of changes in a security's price.

Multiples on invested capital (MOIC) An investment return metric that states an investment's current value as a multiple of the amount of the initial investment, regardless of the length of the investment period.

Net operating income (NOI) A calculation used in valuing real assets, consisting of pre-tax revenues minus normal operating expenses.

Net-zero The target of negating the amount of greenhouse gases (GHGs) produced by human activity, to be achieved by reducing emissions and absorbing carbon dioxide from the atmosphere. The state in which the GHGs going into the atmosphere are balanced by their removal. For carbon dioxide, the state at which global warming stops. The Paris Agreement holds that to prevent the worst climate damages, global net human-caused carbon dioxide (CO_2) emissions must reach net-zero around 2050.

Rate case A formal proceeding at which a public utility's changing costs for the operation and maintenance of its system are considered, as well as how the costs are to be allocated among customers.

Sharpe ratio A measure of an investment's return relative to the price risks involved. It is calculated by subtracting a risk-free rate of return (generally on cash) from the investment's expected or realized return and dividing the result by the investment's expected or realized price fluctuation.

Total factor productivity (TFP) Productivity growth that is not explained by capital stock accumulation or the labor force (increased hours worked) but rather captures the efficiency or intensity with which inputs are utilized. A residual that likely reflects technological change.

Portfolio Insights

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Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2022 Edition

The equity risk premium is the price of risk in equity markets, and it is not just a key input in estimating costs of equity and capital in both corporate finance and valuation, but it is also a key metric in assessing the overall market. Given its importance, it is surprising how haphazard the estimation of equity risk premiums remains in practice. We begin this paper by looking at the economic determinants of equity risk premiums, including investor risk aversion, information uncertainty and perceptions of macroeconomic risk. In the standard approach to estimating the equity risk premium, historical returns are used, with the difference in annual returns on stocks versus bonds, over a long period, comprising the expected risk premium. We note the limitations of this approach, even in markets like the United States, which have long periods of historical data available, and its complete failure in emerging markets, where the historical data tends to be limited and volatile. We look at two other approaches to estimating equity risk premiums – the survey approach, where investors and managers are asked to assess the risk premium and the implied approach, where a forward-looking estimate of the premium is estimated using either current equity prices or risk premiums in non-equity markets. In the next section, we look at the relationship between the equity risk premium and risk premiums in the bond market (default spreads) and in real estate (cap rates) and how that relationship can be mined to generate expected equity risk premiums. We close the paper by examining why different approaches yield different values for the equity risk premium, and how to choose the "right" number to use in analysis.

(This is the thirteenth update of this paper. The first update was in the midst of the financial crisis in 2008 and there have been annual updates at the start of each year from 2009 through 2022)

models for wealth. However, that may tell us more about the dangers of using historical data and the failures of classic utility models than they do about equity risk premiums. In short, since the only people puzzled by the magnitude of equity risk premiums seem to be economist and researchers, perhaps the word "puzzle" should be removed from the phenomenon.

Estimation Approaches

There are three broad approaches used to estimate equity risk premiums. One is to survey subsets of investors and managers to get a sense of their expectations about equity returns in the future. The second is to assess the returns earned in the past on equities relative to riskless investments and use this historical premium as the expectation. The third is to attempt to estimate a forward-looking premium based on the market rates or prices on traded assets today; we will categorize these as implied premiums.

Survey Premiums

If the equity risk premium is what investors demand for investing in risky assets today, the most logical way to estimate it is to ask these investors what they require as expected returns. Since investors in equity markets number in the millions, the challenge is often finding a subset of investors that best reflects the aggregate market. In practice, se see surveys of investors, managers and even academics, with the intent of estimating an equity risk premium.

Investors

When surveying investors, we can take one of two tacks. The first is to focus on individual investors and get a sense of what they expect returns on equity markets to be in the future. The second is to direct the question of what equities will deliver as a premium at portfolio managers and investment professionals, with the rationale that their expectations should matter more in the aggregate, since they have the most money to invest.

a. Individual Investors: The oldest continuous index of investor sentiment about equities was developed by Robert Shiller in the aftermath of the crash of 1987 and has been

updated since.[45] UBS/Gallup has also polled individual investors since 1996 about their optimism about future stock prices and reported a measure of investor sentiment.[46] While neither survey provides a direct measure of the equity risk premium, they both yield broad measure of where investors expect stock prices to go in the near future. The Securities Industry Association (SIA) surveyed investors from 1999 to 2004 on the expected return on stocks and yields numbers that can be used to extract equity risk premiums. In the 2004 survey, for instance, they found that the median expected return across the 1500 U.S. investors they questioned was 12.8%, yielding a risk premium of roughly 8.3% over the treasury bond rate at that time.[47] While there are services that continue to survey individual investors, they seem to be designed more to capture shifts in sentiments rather than to estimate equity risk premiums.[48] Natixis is a new entrant into the survey game, and their surveys provide measures of both short term and long term expected returns on the part of investors. In a survey in mid-2021, they reported that individual investors globally were expecting to earn annual returns that would exceed inflation by 135, and wide variations in these expectations, not only across geographies, but also between individual and "professional" investors. Individual investors in the United States, for instance, were expecting long term annual returns of 17.5% on stocks, well above the 6.7% expected by investment professionals.[49]

b. Institutional Investors/ Investment Professionals: Investors Intelligence, an investment service, tracks more than a hundred newsletters and categorizes them as bullish, bearish or neutral, resulting in a consolidated advisor sentiment index about the future direction of equities. Like the Shiller and UBS surveys, it is a directional survey that does not yield an equity risk premium. Merrill Lynch (now BofA), in its monthly survey of institutional investors globally, explicitly poses the question about equity risk

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[45] The data is available on Robert Shiller's site at Yale University. The current link to the survey data is here: https://bit.ly/3J76GXs.

[46] The data is available at https://bit.ly/3i5xEmn. Note that if the link no longer works, typing in investor survey in the search box will bring it up.

[47] See http://www.sifma.org/research/surveys.aspx. The 2004 survey seems to be the last survey done by SIA. The survey yielded expected stock returns of 10% in 2003, 13% in 2002, 19% in 2001, 33% in 2000 and 30% in 1999.

[48] The American Association of Individual Investors (AAII) surveys investors every week and reports sentiments shifts, http://www.aaii.com/files/surveys/sentiment.xls.

[49] The Natixis surveys can be found on their website at https://www.im.natixis.com/us/research/2021-natixis-global-survey-of-individual-investors.

premiums to these investors. In its February 2007 report, for instance, Merrill reported an average equity risk premium of 3.5% from the survey, but that number jumped to 4.1% by March, after a market downturn.[50] As markets settled down in 2009, the survey premium has also settled back to 3.76% in January 2010. Through much of 2010, the survey premium stayed in a tight range (3.85% - 3.90%) but the premium climbed to 4.08% in the January 2012 update. In February 2014, the survey yielded a risk premium of 4.6%, though it may not be directly comparable to the earlier numbers because of changes in the survey.[51] In an indication of the volatility in these survey numbers, the Merrill Lynch survey in June 2020 found that managers were expecting to earn a return of only 3.4% on equities, an equity risk premium of about 2.5%, but that number had rebounded by the end of the year, as markets recovered.[52]

While survey premiums have become more accessible, very few practitioners seem to be inclined to use the numbers from these surveys in computations and there are several reasons for this reluctance:

1. Survey risk premiums are responsive to recent stock prices movements, with survey numbers generally increasing after bullish periods and decreasing after market decline. Thus, the peaks in the SIA survey premium of individual investors occurred in the bull market of 1999, and the more moderate premiums of 2003 and 2004 occurred after the market collapse in 2000 and 2001.
2. Survey premiums are sensitive not only to whom the question is directed at but how the question is asked. For instance, individual investors seem to have higher (and more volatile) expected returns on equity than institutional investors and the survey numbers vary depending upon the framing of the question.[53]
3. In keeping with other surveys that show differences across sub-groups, the premium seems to vary depending on who gets surveyed. Kaustia, Lehtoranta and Puttonen (2011) surveyed 1,465 Finnish investment advisors and note that not only are male advisors more likely to provide an estimate but that their estimated

[50] See http://www.ml.com/index.asp?id=7695_8137_47928.
[51] Global Fund Manager Survey, Bank of America Merrill Lynch, February 2014.
[52] Global Fund Manager Survey, Bank of America Merrill Lynch, January 2022
[53] Asking the question "What do you think stocks will do next year?" generates different numbers than asking "What should the risk premium be for investing in stocks?"

premiums are roughly 2% lower than those obtained from female advisors, after controlling for experience, education and other factors.[54]

4. Studies that have looked at the efficacy of survey premiums indicate that if they have any predictive power, it is in the wrong direction. Fisher and Statman (2000) document the negative relationship between investor sentiment (individual and institutional) and stock returns.[55] In other words, investors becoming more optimistic (and demanding a larger premium) is more likely to be a precursor to poor (rather than good) market returns.

As technology aids the process, the number and sophistication of surveys of both individual and institutional investors will also increase. However, it is also likely that these survey premiums will be more reflections of the recent past rather than good forecasts of the future.

Managers

As noted in the first section, equity risk premiums are a key input not only in investing but also in corporate finance. The hurdle rates used by companies – costs of equity and capital – are affected by the equity risk premiums that they use and have significant consequences for investment, financing and dividend decisions. Graham and Harvey have been conducting annual surveys of Chief Financial Officers (CFOs) or companies for roughly the last decade with the intent of estimating what these CFOs think is a reasonable equity risk premium (for the next 10 years over the ten-year bond rate). In their December 2018 survey, they report an average equity risk premium of 4.42% across survey respondents, up from the average premium of 3.37% a year earlier. The median premium in the December 2017 survey was 3.63%, close to the prior year's value of 3.55%.[56]

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[54] Kaustia, M., A. Lehtoranta and V. Puttonen, 2011, *Sophistication and Gender Effects in Financial Advisers Expectations*, Working Paper, Aalto University.

[55] Fisher, K.L., and M. Statman, 2000, *Investor Sentiment and Stock Returns*, Financial Analysts Journal, v56, 16-23.

[56] Graham, J.R. and C.R. Harvey, 2018, *The Equity Risk Premium in 2018*, Working paper, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3151162 . See also Graham, J.R. and C.R. Harvey, 2009, *The Equity Risk Premium amid a Global Financial Crisis*, Working paper, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1405459.

A Study of Financial Analysts: Practice and Theory

Stanley B. Block

The study reported here focused on determining what analytical techniques financial analysts who are members of AIMR actually use. The study achieved a response rate of 33.75 percent. Questions covered 16 areas, including the use of present value analysis, the importance of quarterly earnings' announcements in decision making, belief in efficient markets, acceptance or rejection of market anomalies, and belief in the importance of international diversification for risk reduction.

The exams, curriculum materials, and seminars designed for the CFA® (Chartered Financial Analyst) Program are based on knowing what is important to practicing financial analysts. Yet, little documentation exists about what financial analysts actually believe in and do. The intent of this research was not necessarily to identify the normative approaches but, rather, to identify the most widely used approaches. Moreover, the results are not intended to suggest that future analysts be directed to the most commonly used approaches. The intention of this article is to share knowledge about what goes on in the day-to-day practice of financial analysts.

For example, use of present value analysis is heavily stressed in the CFA curriculum and is a major focus of textbooks on investments, but how widely is present value analysis actually used and by whom? Also, new techniques for analysis, such as economic value added, have received relatively less attention than traditional measures of analysis, but little is known about how widely accepted EVA is by practitioners. This survey addressed such issues.

The Study

The participants in this study came from the membership of AIMR (the Association for Investment Management and Research). Questionnaires were mailed to a random sample of 900 AIMR members in the United States in October 1998.[1] Because of address changes and other factors, 880 mailings successfully arrived at their intended destinations. Of that number, 297 usable responses were received, for a return ratio of 33.75 percent. A follow-up telephone survey of randomly selected nonrespondents indicated no statistically significant differences between those who initially answered the questionnaire and those who did not.

The final questionnaire, which is reproduced in Appendix A, had been previously tested in three pilot group surveys.

The questionnaire materials made clear to participants that the survey was sponsored by the author and not by any business organization or AIMR itself.[2]

The Respondent Group

The first three tables in this article reveal key characteristics of those who responded to the questionnaire. In **Table 1**, the 297 respondents are delineated by the type of firm for which they worked. The largest number of responding financial analysts were employed by brokerage firms and private money management groups. Investment management counseling firms, mutual funds, and bank trust departments are also represented substantially. Although no attempt was made in this study to stratify the sample by industry classification in advance, the composition of respondents does reasonably represent the membership profile by industry classification as reported by the more than 32,000 AIMR members in the *1998 Membership Directory.*[3]

As indicated in **Table 2**, 67.7 percent of the respondents were CFA charterholders and 53.9 percent held M.B.A. degrees. The charterholder number in this sample is slightly smaller than for the total organization (70 percent), whereas the M.B.A. degree number is slightly larger than for the

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Table 1. Respondent Breakdown by Industry Classification

Industry	Number	Percent
Brokerage	77	25.9
Private money management group	75	25.2
Investment management counseling	39	13.1
Mutual fund	39	13.1
Bank trust department	32	10.8
Investment banking	18	6.1
Other	12	4.1
Pension fund	5	1.7
Total	297	100.0

total membership (47 percent). Note that the average experience of the respondents is 15.3 years.

Table 3 reports the undergraduate majors of the respondents. A large percentage of the respondents (and perhaps, inferentially, a large percentage of AIMR members, although no industry data

Table 2. Respondent Breakdown by Certification, Education, and Experience

Characteristic	Number	Percent
A. Certification		
Charterholder	201	67.7
Noncharterholder	96	32.3
Total	297	100.0
B. Highest degree		
M.B.A.	160	53.9
Master	4	1.3
Doctor of Jurisprudence (J.D.)	2	0.7
Bachelor	131	44.1
Total	297	100.0
C. Experience (years)		
0–5	30	
6–10	81	
11–15	78	
16–20	36	
21–25	18	
26–30	15	
More than 30	39	
Total	297	
Average	15.3 years	

are available with which to compare these data) had undergraduate degrees in business and economics. The notion that the typical route to becoming a financial analyst is for an individual to get a liberal arts degree and then use that broad-based background to concentrate later on financial analysis is not supported by these data.

The Results

This section contains discussion of the survey findings regarding the variables (or inputs to valuation)

Table 3. Respondent Breakdown by Type of Undergraduate Degree

Discipline	Number	Percent
Finance	96	32.3
Economics	76	25.6
General business	38	12.8
Accounting	29	9.8
Liberal arts	28	9.4
Math, science, engineering	17	5.7
Other (psychology, public affairs, etc.)	13	4.4
Total	297	100.0

and tools financial analysts use in equity valuation, their attitudes toward issues important in portfolio management, and their attitudes toward market efficiency versus market anomalies.

Valuation Inputs. Respondents were asked about their use of several variables and tools in analyzing securities. Among the most important was present value (PV) analysis; others included corporate earnings and cash flow.

Present value. The use of PV analysis is a central theme in valuation theory. There is probably not a CFA exam preparation course being taught around the world or an investments course being offered at a university that does not include PV analysis techniques. But as Panel A of **Table 4** indicates, only 15.2 percent of respondents always use PV analysis and for 45.7 percent, it is not part of their normal procedures. Apparently, practitioners split about 50/50 in their use of PV techniques.

Should this finding be taken as an indictment of the profession? Hardly. When faced with the reality of valuation in the marketplace, the task of projecting earnings, dividends, and a stock price into the future and determining an appropriate discount rate may be too fraught with uncertainty for analysts to rely on discounted cash flow (DCF) analysis in the determination of value. As noted financial economist Stewart Myers (1984) of the Massachusetts Institute of Technology has suggested, "DCF is sensible, and widely used, for valuing relatively safe stocks paying regular dividends, but DCF is not as helpful in valuing companies with significant growth opportunities" (pp. 126–137).

Nevertheless, because PV analysis is part of the foundation of finance, I decided to analyze its use by various categories of participants. Shown in Panels B and C of Table 4 are the use and nonuse of PV analysis by CFA charterholders (hereafter, simply "charterholders") versus noncharterholders and M.B.A.s versus non-M.B.A.s. Although the charterholder group indicated a slightly larger tendency to use PV analysis than the noncharterholder group, the difference is not statistically significant at any

Table 4. Use of PV Techniques

Answer	Numbers	Percent
A. Overall sample		
Always	45	15.2
Sometimes	116	39.1
Never	136	45.7
Total	297	100.0
B. Charterholders versus noncharterholders		
Charterholders		
Always	38	18.9
Sometimes	70	34.8
Never	93	46.3
Total	201	100.0
Noncharterholders		
Always	7	7.3
Sometimes	46	47.9
Never	43	44.8
Total	96	100.0
C. M.B.A.s versus non-M.B.A.s		
M.B.A.s		
Always	17	10.6
Sometimes	71	44.4
Never	72	45.0
Total	160	100.0
Non-M.B.A.s		
Always	28	20.4
Sometimes	44	32.1
Never	65	47.4
Total	137[a]	100.0

[a]Included 131 bachelor, 4 master, and 2 J.D. degrees for a total of 137.

reasonable level of significance on the basis of a chi-square independence of classification test (reported in Appendix B). The same conclusion applies in regard to the use of PV analysis by M.B.A.s versus non-M.B.A.s. If anything, non-M.B.A.s appear to be slightly higher users of PV analysis.

Table 5 shows the breakdown of the use of PV analysis by respondents' industry classifications. In this case, the chi-square test (see Appendix B) indicated a statistically significant difference between the categories. A null hypothesis of no relationship between industry classification and the use of PV analysis could be rejected at the 5 percent level of significance. In this sample, individuals employed by mutual funds and bank trust departments appear to be relatively high users of PV analysis whereas those working for brokerage firms, private money management groups, and investment banking firms do not.[4]

Other inputs. The respondents were also asked to determine the relative importance of other inputs in analyzing securities. **Table 6** shows how the survey participants ranked the importance of earnings, cash flow, book value, and dividends. The average ranking for the input is shown in the far right column. Earnings and cash flow are considered far more important than book value and dividends.

The lack of importance these respondents assigned to dividends is interesting. As reported in Table 6, only 3 of the 297 respondents considered dividends to be the most important variable in valuing a security. One hypothesis is that such conclusions by analysts are linked to the irrelevance of dividends theory initially postulated by Modigliani and Miller (1961)—and debated ever since. But a far more likely cause of the low dividends ranking is that in the momentum-driven environment of 20–30 percent annual returns of the mid-to-late 1990s, dividends do not count for much in the minds of analysts. Furthermore, the sharply lower capital gains rates specified in the Taxpayer Relief Act of 1997 all but wiped out the equalization of taxing investment dividends and capital gains that was an essential element of the Reagan Tax Reform Act of 1986. Finally, the desire by corporations to buy back shares rather than increase cash dividends appears to be a distinctive feature of the 1990s.

Table 5. Industry Classification and Use of PV Techniques

	Always		Sometimes		Never	
Industry[a]	Number	Percent	Number	Percent	Number	Percent
Brokerage (77)	5	6.5	32	41.6	40	51.9
Private money management (75)	11	14.7	25	33.3	39	52.0
Investment management counseling (39)	3	7.7	19	48.7	17	43.6
Mutual fund (39)	12	30.8	16	41.0	11	28.2
Bank trust department (32)	10	31.2	8	25.0	14	43.8
Investment banking (18)	0	0.0	3	16.7	15	83.3
Other (12)	4	33.0	8	66.7	0	0.0
Pension fund (5)	0	0.0	5	100.0	0	0.0
Total	45		116		136	

[a]Total number in category in parentheses.

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Table 6. Rank of Inputs in Importance

Variable	First	Second	Third	Fourth	Average Ranking
Earnings	156	118	23	0	1.55
Cash flow	133	140	19	5	1.65
Book value	5	32	133	127	3.29
Dividends	3	7	122	165	3.51

Not all would agree with the lack of importance of dividends. Bernstein (1998) made a strong case that management creates additional reinvestment and earnings risk for shareholders when the company retains a progressively larger percentage of earnings. The unimportance of dividends to this sample of analysts is further reflected, however, in **Table 7**, in which the respondents ranked the most significant inputs in determining a stock's P/E. Only 3 of the 297 respondents ranked dividend policy first among the five inputs listed; 276 ranked it last. Although analysts might change the rankings shown in Table 7 when valuing a real estate investment trust or a company in the later stages of its life cycle, the classification of dividends as unimportant is clear in Tables 6 and 7.

Also in Table 7, the growth potential for the company has a strong #1 ranking as a determinant of a stock's multiplier. The #2 ranking of quality of earnings (above quality of management, risks, and dividend policy) appears to reaffirm the strong concern that practicing analysts have for the legitimacy of reported earnings.

In another question related to valuation, I asked the respondents to rank the importance of the three inputs shown in **Table 8** as part of the determination of whether a stock should be bought, sold, or held. The long-term outlook for the company and the current value of the stock versus its historical trading range received top rankings; next quarter's EPS number was last by a large margin. This response is somewhat surprising; a click on the Internet will bring a deluge of under- and overperformance of quarterly earnings against expected earnings. Perhaps the 15.3 years average experience of the respondents allows them to overcome the hype of the moment.

Valuation Models. In addition to questions about the inputs to stock evaluation, the questionnaire asked respondents about their use of three valuation models. Panels A and B of **Table 9** provide the results for two traditional models—the dividend valuation (dividend discount) model and the capital asset pricing model (CAPM). Neither model fared well in the survey. The dividend model was viewed as very important or moderately important by 42 percent of the respondents, and the same two opinions totaled 31.1 percent for the CAPM.

The model that received the highest number of very or moderately important opinions, as indicated in Panel C of Table 9, is the economic value added (EVA) model developed by Stern Stewart and Company. Strictly speaking, EVA is not a valuation model, but it does have implications for describing stock price behavior. Based on these survey results, EVA may take on increasing importance for analysts. Whether the respondents understood that EVA is primarily a method for splitting earnings between required returns and excess returns is not evident from the questionnaire. Further inquiry about how analysts use EVA would thus be useful.

Portfolio Management

The issues discussed so far have dealt with valuing individual securities. The three items tabulated in **Table 10**—beliefs about market timing, the appeal

Table 7. Rank of Variables in Determining P/E

Variable	First	Second	Third	Fourth	Fifth	Average Ranking
Growth potential	205	62	18	12	0	1.45
Quality of earnings	43	104	115	35	0	2.48
Quality of management	31	74	112	71	9	2.84
Risks	15	56	44	170	12	3.36
Dividend policy	3	2	8	9	276	4.87

Table 8. Rank of Variables in Determining Buy, Hold, and Sell Decisions

Variable	First	Second	Third	Average Ranking
Current versus historical trading range	216	67	14	1.32
Long-term outlook for the company	76	171	50	1.91
Next quarter's EPS	5	59	233	2.77

Table 9. Importance of Models of Stock Price Behavior

Model	Number	Percent
A. Dividend valuation model		
Very important	34	11.8
Moderately important	87	30.2
Not very important	112	38.9
Unimportant	55	19.1
Total	288[a]	100.0
B. Capital asset pricing model		
Very important	5	1.8
Moderately important	83	29.3
Not very important	135	47.7
Unimportant	60	21.2
Total	283[b]	100.0
C. Economic value added		
Very important	41	14.4
Moderately important	151	53.2
Not very important	62	21.9
Unimportant	30	10.5
Total	284[c]	100.0

[a]Nine participants chose not to answer.
[b]Fourteen participants chose not to answer.
[c]Thirteen participants chose not to answer.

of global investing, and near-term reversion to the mean—relate more to portfolio management.

Panel A of Table 10 indicates that only 28.6 percent of the respondents believed that attempts at market timing are likely to enhance portfolio returns (the value is 32.7 percent if only those *with* opinions are included). The consistency of this response with the results shown in Panel C will be discussed shortly.

Table 10. Beliefs about Portfolio Management

Belief	Number	Percent	Among Those with Opinions
A. Does market timing enhance portfolio return?			
Yes	85	28.6	32.7%
No	175	58.9	67.3
No opinion	37	12.5	—
Total	297	100.0	100.0%
B. Has global investing lost appeal in more closely linked markets?			
No	37	12.5	
Some loss	202	68.2	
Substantial loss	57	19.3	
Total	296[a]	100.0	
C. Will there be a reversion to the mean in the next decade for yields and P/Es?			
Yes	171	57.6	71.6%
No	68	22.9	28.4
No opinion	58	19.5	—
Total	297	100.0	100.0%

[a]One participant chose not to answer.

Panel B of Table 10 deals with global investing. A major phenomenon portfolio managers have witnessed in the mid-to-late 1990s is the speed at which international financial markets react to each other. Market performance in the United States on a given day appears to start a chain reaction in London, Tokyo, and other major markets. The sequence may also move in the other direction. The internationalization of the world economy through reduced trading barriers and the increased merger activity between financial institutions in various countries appears to add to this chain reaction. The responses to Question 14 reported in Panel B give strong support to the notion that global investing may have lost some of its appeal in the closely linked markets as a means to achieve better risk–return outcomes through diversification. Slightly more that 87 percent of respondents believed there has been some loss or substantial loss of appeal.

Finally, Panel C of Table 10 addresses a question that all portfolio managers and analysts appear to be asking in the financial press—whether there will be a reversion to the mean for P/Es and dividend yields within the next decade. With the P/E for the S&P 500 Index in the 24–28 range and dividend yields in the 1.6–1.8 percent range in late 1998, this question is timely and of great interest to the profession and investors. Among the respondents, as indicated in Panel C, 57.6 percent expected a reversion to the mean. This statistic suggests that many believe equity values will be lower in the future, but responses to Question 7 (not reported here) indicate that respondents believe high values may be sustainable as long as interest rates and inflation remain low. The reversion is perhaps most likely to come when these mitigating variables are no longer in place.

The totality of information in Table 10 may reveal an inconsistency on the part of respondents. The majority did not believe in market timing but did believe in a coming reversion to the mean. Presumably, a reversion to the mean has implications for the timing of decisions.

Market Efficiency

The respondents were asked to indicate their acceptance or rejection of the efficient market hypothesis (EMH), which in its broadest (semistrong) form suggests that public information is impounded in the current price of the stock and that any additional analysis by an individual analyst is likely to produce little or nothing in the way of added value.[5] The EMH was initially postulated in the 1960s, and it has been under severe attack ever since as researchers claimed to identify anomalies in

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almost every area of investments. As shown in **Table 11**, close to 100 percent of practicing analysts in this survey were neutral or strongly disagreed with the EMH.

Table 11. Opinion of the Efficient Market Hypothesis

Opinion	Number	Percent
Strongly agree	8	2.7
Neutral	101	34.2
Strongly Disagree	186	63.1
Total	295[a]	100.0

[a]Two participants chose not to answer this question.

The responses to an allied topic are presented in **Table 12**. In answering a question about the most important variable in determining portfolio returns, more than 60 percent of the respondents chose the skill and training of the portfolio manager as most important. Despite the emphasis on the risk component often found in the academic literature, risk in the portfolio came in at about half the percentage of skill and training. And the amount of trading in the portfolio came in a poor third. These responses are generally in line with the rejection of the EMH reported in Table 11 but at variance with the responses to the usefulness of the CAPM shown in Table 9.

Table 12. Most Important Variable in Determining Portfolio Return

Variable	Number	Percent
The skill and training of the portfolio manager	179	60.3
The amount of risk in the portfolio	116	39.1
The amount of trading in the portfolio	2	0.6
Total	297	100.0

A number of respondents who indicated that skill and training was the most important variable in determining portfolio return suggested that ego might have played a role in their opinion. Such a suggestion would be consistent with the empirical research in this area in the past decades (Fama 1991; Kandel and Stambaugh 1996). Perhaps hope triumphed over reality for the majority of respondents.

To inquire into analysts' attitudes toward anomalies that tend to disprove the EMH, the respondents were given four market strategies from which to choose (Question 12). These four were by no means inclusive of all the possible strategies, and in spite of research in this area, no one answer can be assumed to be correct. The answers are presented in **Table 13**.

Table 13 shows that the low-P/E effect and the small-firm effect received the greatest allegiance. This response to the small-firm effect is of particular interest because the small-firm effect has been called too time-period specific and overly dependent on the month of January for high returns. As an example of the time-period specificity, research has found that between 1975 and 1983, small-capitalization stocks averaged a 35.3 percent annual return, more than twice the 15.7 percent return of large-cap stocks. During the same time period, compounded total returns on small-cap stocks exceeded 1,400 percent.[6] However, from 1984 to 1997, small-cap stocks (as defined by Ibbotson and Associates 1998) increased by 526.9 percent while large-cap stocks (S&P 500) were up 902.8 percent. When one strips the 1975–83 period out of the Ibbotson and Associates data, small-cap stocks *fell* one-third below large-cap stocks from 1926 through 1997.

Table 13. Statements about Market Anomalies with Which Respondents Agreed

Statement	Number Agreeing
Low-P/E stocks tend to outperform the market	184
Small-cap stocks tend to outperform the market	165
High-P/E growth stocks tend to outperform the market	39
Large-cap stocks tend to outperform the market	30
	418[a]

[a]Respondents could select more than one answer.

The intent here is not to castigate small-cap stocks; clearly, such stocks as Microsoft, Intel, and Home Depot had to start as small-cap stocks. Furthermore, for the particularly astute analyst, smaller companies may represent especially good areas for study, in that even the strongest advocates of the EMH would admit that small companies provide opportunities. The important point is that the strong support for the small-firm (and low-P/E) anomaly in this study may indicate that many practicing financial analysts maintain a belief in these concepts and a belief that a different market environment may bring the opportunity for strong small-cap performance to reappear. Also, the loyalty that some investors have shown to large-cap high-P/E stocks (such as Coca Cola and General Electric) is not necessarily felt by respondents in this study, who appear to be more value-stock than growth-stock oriented.

Conclusions

The most important conclusion from this survey is that PV techniques are not as widely used in practice as they are in theory. Only 54.3 percent of the respondents said they use PV analysis as part of their normal analytical process. The cause may be that the difficulties of projecting future cash flows and selecting an appropriate discount rate simply make use of PV analysis appear to be too difficult for real-life decisions. Although the length of forecasting periods was not specifically covered in the questionnaire, my observation is that few analysts project earnings or dividends more than two (or at most three) years into the future because of uncertainty. Also, they rarely project future P/Es. The industry practice is to divide the current price by future earnings to create a multiple of future earnings. This approach is, of course, very different from projecting a future P/E that can be used to discount a future stock price back to the present.

Answers to a number of questions indicate that the dividend-paying policy of a company is relatively unimportant in the analytical process. This attitude may be related to the current environment. In addition, although quarterly earnings announcements have received much attention in the financial press, 292 of the 297 analysts said quarterly earnings carry less weight than the long-term outlook for the company or its current versus historical trading range. The respondents gave high marks for importance to the EVA approach to valuation and low marks to the dividend valuation model and CAPM.

The respondents adhere to the notion that the most important variable in determining return on a portfolio is the skill and training of the portfolio manager and that this consideration overweights theories about stock market efficiency. Finally, respondents believe that global investing has lost some appeal as a risk–return optimizer in a world that appears to be increasingly integrated.

Notes

1. The original database from which names were drawn was the *1998 Membership Directory* of AIMR.
2. Although I am a CFA charterholder, I did not communicate that information to participants because of the concern that it could cause bias in answers.
3. The latest profile of AIMR membership can be found on AIMR's World Wide Web site: www.aimr.org.
4. Readers should not conclude anything beyond preliminary observations from these data because some of the industry classifications had relatively low numbers of respondents.
5. The semistrong form of the EMH asserts that only public information is impounded in the price. Some may suggest that the EMH is merely an unbiased estimator of current value, but the major thrust of the semistrong definition and the definition in Question 5 is the same.
6. For more discussion of the small-firm effect, see Chapter 6 in Siegel (1998).

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Appendix A. Questionnaire on Investment Analysis for Members of AIMR

1. Background of respondent.
   a. Please indicate the type of money management firm in which you work:
      _____ Bank trust department
      _____ Pension fund
      _____ Brokerage
      _____ Other (please specify)
      _____ Mutual fund
      _____ Private money management group
      _____ Investment banking
      _____ Investment management counseling
   b. Please indicate the following:
      _____ Age
      _____ Highest degree
      _____ Experience in investments (years)
      _____ Undergraduate major
2. Rank the relative importance from one to three of the following factors in influencing your determination of a buy, sell, or hold of a company's stock.
   a. _____ Next quarter's earnings per share
   b. _____ Long-term outlook for the firm
   c. _____ Current value of the stock vs. the historical trading range
3. What do you consider the most important variable in determining the amount of return that a portfolio is likely to achieve over a period of time? (Select only one)
   a. The amount of risk in the portfolio
   b. The skill and training of the portfolio manager(s)
   c. The amount of trading in the portfolio
4. To what extent do you *formally* use net present analysis in analyzing a stock?
   a. Always
   b. Sometimes
   c. Not part of the normal procedure
5. To what extent do you think the efficient market hypothesis is correct? It implies that stocks are correctly priced at any point in time and any individual analyst's attempt to determine valuation is worthless.
   a. Strongly agree
   b. Neutral
   c. Strongly disagree
6. In relating price to other variables, please rank the relative importance of the following variables from one through four.
   a. Earnings
   b. Cash flow
   c. Book value
   d. Dividends
7. Throughout most of 1998, the S&P 500 Index was trading at a multiple of 23–25 (the historical normal is 13–15) and a dividend yield of 1.6–1.8 percent (the historical norm is 3.5–5 percent). Rank the importance of the following four variables in explaining this phenomenon.
   a. The market is overvalued
   b. Low interest rates and low inflation are the primary causes
   c. The business cycle is no longer operative
   d. 401(k)s and the emergence of Baby Boomers have permanently changed the demand for equities
8. In evaluating individual stocks, how important is the P/E ratio in helping to determine value?
   a. Very important
   b. Moderately important
   c. Not very important
   d. Unimportant

9. Indicate the relative importance of price to book value as a general indication of value for nonfinancial stocks.
   a. Very important
   b. Moderately important
   c. Not very important
   d. Unimportant

10. In evaluating individual stocks, how important is the dividend valuation model, as shown below, in helping to determine value? (The model stresses that the value of a stock is equal to the present value of future dividends.)

$$P_0 = D_1/(k_e - g)$$

   a. Very important
   b. Moderately important
   c. Not very important
   d. Unimportant

11. In evaluating individual stocks, how important is the CAPM in helping to determine value? The CAPM is based on using the stock's beta to determine its required rate of return and valuation.
   a. Very important
   b. Moderately important
   c. Not very important
   d. Unimportant

12. Please indicate which of the following statements you generally consider to be true *over the long run* (with a checkmark).
   a. Large-cap stocks tend to outperform the market
   b. Small-cap stocks tend to outperform the market
   c. High P/E growth stocks tend to outperform the market
   d. Low P/E stocks tend to outperform the market

13. In determining an appropriate multiplier for a stock, rank the following variables from one to five.
   a. Growth potential
   b. Overall riskiness of the issue
   c. Quality of management
   d. Quality of earnings
   e. Dividend policy

14. Global investing as a means to achieve better risk–return trade-off has lost ____ appeal in a world more closely linked in terms of financial markets.
   a. No
   b. Some
   c. Substantial

15. Economic value added (EVA) has received attention in the financial press. How important do you consider EVA to be in analyzing stocks?
   a. Very important
   b. Moderately important
   c. Not very important
   d. Unimportant

16. Do you think that market timing can enhance the return on a portfolio?
   Yes _____ No _____ No opinion _____

17. Do you believe there will be a reversion to the mean (back to normality) for dividend yield ratios and P/Es over the next decade?
   Yes _____ No _____ No opinion _____

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Appendix B. Chi-Square Tests

Null Hypothesis	*t*-Statistic	Degrees of Freedom	Level of Significance for Rejection of the Null Hypothesis
There is no significant difference between charterholders and noncharterholders in the use of PV analysis.	2.353	1	Accept
There is no significant difference between M.B.A.s and non-M.B.A.s in the use of PV analysis.	1.971	1	Accept
There is no significant difference between industry classification (brokerage, private money management, etc.) and the use of present value analysis.	15.215	7	5%

Forecasting US Equity Returns in the 21st Century

John Y. Campbell, Harvard University
July 2001

What returns should investors expect the US stock market to deliver on average during the next century? Does the experience of the last century provide a reliable guide to the future? In this short note I first discuss alternative methodologies for forecasting average future equity returns, then discuss current market conditions, and finally draw conclusions for long-term return forecasts. Throughout I work in real, that is inflation-adjusted, terms.

I. Methods for forecasting returns

1. Average past returns

Perhaps the simplest way to forecast future returns is to use some average of past returns. Very naturally, this method has been favored by many investors and analysts. However there are several difficulties with it.

a) *Geometric average or arithmetic average?* The geometric average return is the cumulative past return on US equities, annualized. Siegel (1998) studies long-term historical data on value-weighted US share indexes. He reports a geometric average of 7.0% over two different sample periods, 1802–1997 and 1871–1997. The arithmetic average return is the average of one-year past returns on US equities. It is considerably higher than the geometric average return, 8.5% over 1802–1997 and 8.7% over 1871–1997.[1]

When returns are serially uncorrelated, the arithmetic average represents the best forecast of future return in any randomly selected future year. For long holding periods, the best forecast is the arithmetic average compounded up appropriately. If one is making a 75-year forecast, for example, one should forecast a cumulative return of 1.085^{75} based on 1802–1997 data.

When returns are negatively serially correlated, however, the arithmetic average is not necessarily superior as a forecast of long-term future returns. To understand this, consider an extreme example in which prices alternate deterministically between 100 and 150. The return is 50% when prices rise, and -33% when prices fall. Over any even number of periods, the geometric average return is zero, but the arithmetic average return is 8.5%. In this case the arithmetic average return is misleading because it fails to take account of the fact that high returns always multiply a low initial price of 100, while low returns always multiply a high initial price of 150. The geometric average is a better indication of long-term future

[1] When returns are lognormally distributed, the difference between the two averages is approximately one-half the variance of returns. Since stock returns have an annual standard deviation of about 18% over these long periods, the predicted difference is $0.18^2/2 = 0.016$ or 1.6%. This closely matches the difference in the data.

prospects in this example.[2]

This point is not just a theoretical curiosity, because in the historical data summarized by Siegel, there is strong evidence that the stock market is mean-reverting. That is, periods of high returns tend to be followed by periods of lower returns. This suggests that the arithmetic average return probably overstates expected future returns over long periods.

b) *Returns are very noisy.* The randomness in stock returns is extreme. With an annual standard deviation of real return of 18%, and 100 years of past data, a single year's stock return that is only one standard deviation above average increases the average return by 18 basis points. A lucky year that is two standard deviations above average increases the average return by 36 basis points. Even when a century or more of past data is used, forecasts based on historical average returns are likely to change substantially from one year to the next.

c) *Realized returns rise when expected returns fall.* To the extent that expected future equity returns are not constant, but change over time, they can have perverse effects on realized returns. Suppose for example that investors become more risk-tolerant and reduce the future return that they demand from equities. If expected future cash flows are unchanged, this drives up prices and realized returns. Thus an estimate of future returns based on average past realized returns will tend to increase just as expected future returns are declining.

Something like this probably occurred in the late 1990's. A single good year can have a major effect on historical average returns, and several successive good years have an even larger effect. But it would be a mistake to react to the spectacular returns of 1995–99 by increasing estimates of 21st Century returns.

d) *Unpalatable implications.* Fama and French (2000) point out that average past US stock returns are so high that they exceed estimates of the return to equity (ROE) calculated for US corporations from accounting data. Thus if one uses average past stock returns to estimate the cost of capital, the implication is that US corporate investments have destroyed value; corporations should instead have been paying all their earnings out to stockholders. This conclusion is so hard to believe that it further undermines confidence in the average-return methodology.

One variation of the average-past-returns approach is worth discussing. One might take the view that average past equity returns in other countries provide relevant evidence about US equity returns. Standard international data from Morgan Stanley Capital International, available since the early 1970's, show that equity returns in most other industrialized countries have been about as high as those in the US. The exceptions are the heavily commodity-dependent markets of Australia and Canada, and the very small Italian market (Campbell 1999). Jorion and Goetzmann (1999) argue that other countries' returns were

[2]One crude way to handle this problem is to measure the annualized variance of returns over a period such as 20 years that is long enough for returns to be approximately serially uncorrelated, and then to adjust the geometric average up by one-half the annualized 20-year variance as would be appropriate if returns are lognormally distributed. Campbell and Viceira (2001, Figure 4.2) report an annualized 20-year standard deviation of about 14% in long-term annual US data, which would imply an adjustment of $0.14^2/2 = 0.010$ or 1.0%.

lower than US returns in the early 20th Century, but this conclusion appears to be sensitive to their omission of the dividend component of return (Dimson, Marsh, and Staunton 2000). Thus the use of international data does not change the basic message that the equity market has delivered high average returns in the past.

2. Valuation ratios

An alternative approach is to use valuation ratios—ratios of stock prices to accounting measures of value such as dividends or earnings—to forecast future returns. In a model with constant valuation ratios and growth rates, the famous Gordon growth model says that the dividend-price ratio

$$\frac{D}{P} = R - G, \tag{1}$$

where R is the discount rate or expected equity return, and G is the growth rate of dividends (equal to the growth rate of prices when the valuation ratio is constant). This formula can be applied either to price per share and conventional dividends per share, or to the total value of the firm and total cash paid out by the firm (including share repurchases). A less well-known but just as useful formula says that in steady state, where earnings growth comes from reinvestment of retained earnings which earn an accounting ROE equal to the discount rate R,

$$\frac{E}{P} = R. \tag{2}$$

Over long periods of time summarized by Siegel (1998), these formulas give results consistent with average realized returns. Over the period 1802–1997, for example, the average dividend-price ratio was 5.4% while the geometric average growth rate of prices was 1.6%. These numbers add to the geometric average return of 7.0%. Over the period 1871–1997 the average dividend-price ratio was 4.9% while the geometric average growth rate of prices was 2.1%, again adding to 7.0%. Similarly, Campbell and Shiller (2001) report that the average P/E ratio for S&P500 shares over the period 1872-2000 was 14.5. The reciprocal of this is 6.9%, consistent with average realized returns.

When valuation ratios and growth rates change over time, these formulas are no longer exactly correct. Campbell and Shiller (1988) and Vuolteenaho (2000) derive dynamic versions of the formulas that can be used in this context. Campbell and Shiller show, for example, that the log dividend-price ratio is a discounted sum of expected future discount rates, less a discounted sum of expected future dividend growth rates. In this note I will work with the simpler deterministic formulas.

II. Current market conditions

Current valuation ratios are wildly different from historical averages, reflecting the unprecedented bull market of the last 20 years, and particularly the late 1990's. The attached figure, taken from Campbell and Shiller (2001), illustrates this point. The bottom left panel shows the dividend-price ratio D/P in January of each year from 1872–2000. The long-term historical average is 4.7%, but D/P has fallen dramatically since 1982 to about 1.2% in January 2000 (and 1.4% today).

The dividend-price ratio may have fallen in part because of shifts in corporate financial policy. An increased tendency for firms to repurchase shares rather than pay dividends increases the growth rate of dividends per share, by shrinking the number of shares. Thus it increases G in the Gordon growth formula and reduces conventionally measured D/P. One way to correct for this is to add repurchases to conventional dividends. Recent estimates of this effect by Liang and Sharpe (1999) suggest that it may be an upward adjustment of 75 to 100 basis points, and more in some years. Of course, this is not nearly sufficient to explain the recent decline in D/P.

Alternatively, one can look at the price-earnings ratio. The top left panel of the figure shows P/E over the same period. This has been high in recent years, but there are a number of earlier peaks that are comparable. Close inspection of these peaks shows that they often occur in years such as 1992, 1934, and 1922 when recessions caused temporary drops in (previous-year) earnings. To smooth out this effect, Campbell and Shiller (2001), following Graham and Dodd (1934), advocate averaging earnings over 10 years. The price-averaged earnings ratio is illustrated in the top right panel of the figure. This peaked at 45 in January 2000; the previous peak was 28 in 1929. The decline in the S&P500 since January 2000 has only brought the ratio down to the mid-30's, still higher than any level seen before the late 1990's.

The final panel in the figure, on the bottom right, shows the ratio of current to 10-year average earnings. This ratio has been high in recent years, reflecting robust earnings growth during the 1990's, but it is not unprecedentedly high. The really unusual feature of the recent stock market is the level of prices, not the growth of earnings.

III. Implications for future returns

The implications of current valuations for future returns depend on whether the market has reached a new steady state, in which current valuations will persist, or whether these valuations are the result of some transitory phenomenon.

If current valuations represent a new steady state, then they imply a substantial decline in the equity returns that can be expected in the future. Using Campbell and Shiller's (2001) data, the unadjusted dividend-price ratio has declined by 3.3 percentage points from the historical average. Even adjusting for share repurchases, the decline is at least 2.3 percentage points. Assuming constant long-term growth of the economy, this would imply that the geometric average return on equity is no longer 7%, but 3.7% or at most 4.7%. Looking at the price-averaged earnings ratio, adjusting for the typical ratio of current to averaged earnings, gives an even lower estimate. Current earnings are normally 1.12 times averaged earnings; $1.12/35 = 0.032$, implying a 3.2% return forecast. These forecasts allow for only a very modest equity premium relative to the yield on long-term inflation-indexed bonds, currently about 3.5%, or the 3% safe real return assumed recently by the Trustees.

If current valuations are transitory, then it matters critically what happens to restore traditional valuation ratios. One possibility is that earnings and dividends are below their long-run trend levels; rapid earnings and dividend growth will restore traditional valuations without any declines in equity returns below historical levels. While this is always a possi-

bility, Campbell and Shiller (2001) show that it would be historically unprecedented. The US stock market has an extremely poor record of predicting future earnings and dividend growth. Historically stock prices have increased relative to earnings during decades of rapid earnings growth, such as the 1920's, 1960's, or 1990's, as if the stock market anticipates that rapid earnings growth will continue in the next decade. However there is no systematic tendency for a profitable decade to be followed by a second profitable decade; the 1920's, for example, were followed by the 1930's and the 1960's by the 1970's. Thus stock market optimism often fails to be justified by subsequent earnings growth.[3]

A second possibility is that stock prices will decline or stagnate until traditional valuations are restored. This has occurred at various times in the past after periods of unusually high stock prices, notably the 1900's and 1910's, the 1930's, and the 1970's. This would imply extremely low and perhaps even negative returns during the adjustment period, and then higher returns afterwards.

The unprecedented nature of recent stock market behavior makes it impossible to base forecasts on historical patterns alone. One must also form a view about what happened to drive stock prices up during the 1980's and particularly the 1990's. One view is that there has been a structural decline in the equity premium, driven either by the correction of mistaken perceptions of risk (aided perhaps by the work of economists on the equity premium puzzle), or by the reduction of barriers to participation and diversification by small investors.[4] Economists such as McGrattan and Prescott (2001) and Jagannathan, McGrattan, and Scherbina (2001) argue that the structural equity premium is now close to zero, consistent with theoretical models in which investors effectively share risks and have modest risk aversion, and consistent with the view that the US market has reached a new steady state.

An alternative view is that the equity premium has declined only temporarily, either because investors irrationally overreacted to positive fundamental news in the 1990's (Shiller 2000), or because the strong economy made investors more tolerant of risk.[5] On this view the equity premium will return to historical levels, implying extremely poor near-term returns and higher returns in the more distant future after traditional valuations have been restored.

It is too soon to tell which of these views is correct, and I believe it is sensible to put some weight on each of them. That is, I expect valuation ratios to return part way but not

[3]Vuolteenaho (2000) notes, however, that US corporations were unusually profitable in the late 1990's and that profitability has some predictive power for future earnings growth.

[4]Heaton and Lucas (1999) model barriers of this sort. It is hard to get large effects of increased participation on stock prices unless initial participation levels are extremely low. Furthermore, one must keep in mind that what matters for pricing is the wealth-weighted participation rate, that is, the probability that a randomly selected dollar of wealth is held by an individual who can participate in the market. This is higher than the equal-weighted participation rate, the probability that a randomly selected individual can participate.

[5]Campbell and Cochrane (1999) present a model in which investors judge their well-being by their consumption relative to a recent average of past aggregate consumption. In this model investors are more risk-tolerant when consumption grows rapidly and they have a "cushion of comfort" relative to their minimum expectations. The Campbell-Cochrane model fits past cyclical variations in the stock market, which will likely continue in the future, but it is hard to explain the extreme recent movements using this model.

fully to traditional levels.[6] A rough guess for the long term, after the adjustment process is complete, might be a geometric average equity return of 5% to 5.5% or an arithmetic average return of 6.5% to 7%.

If equity returns are indeed lower on average in the future, it is likely that short-term and long-term real interest rates will be somewhat higher. That is, the total return to the corporate capital stock is determined primarily by the production side of the economy and by national saving and international capital flows; the division of total return between riskier and safer assets is determined primarily by investor attitudes towards risk. Reduced risk aversion then reduces the equity premium both by driving down the equity return and by driving up the riskless interest rate. The yield on long-term inflation-indexed Treasury securities (TIPS) is about 3.5%, while short-term real interest rates have recently averaged about 3%. Thus 3% to 3.5% would be a reasonable guess for safe real interest rates in the future, implying a long-run average equity premium of 1.5% to 2.5% in geometric terms or about 3% to 4% in arithmetic terms.

Finally, I note that it is tricky to use these numbers appropriately in policy evaluation. Average equity returns should never be used in base-case calculations without showing alternative calculations to reflect the possibilities that realized returns will be higher or lower than average. These calculations should include an alternative in which equities underperform Treasury bills. Even if the probability of underperformance is small over a long holding period, it cannot be zero or the stock market would be offering an arbitrage opportunity or "free lunch". Equally important, the bad states of the world in which underperformance occurs are heavily weighted by risk-averse investors. Thus policy evaluation should use a broad range of returns to reflect the uncertainty about long-run stock market performance.

[6]This compromise view also implies that negative serial correlation, or mean-reversion, is likely to remain a characteristic of stock returns in the 21st Century.

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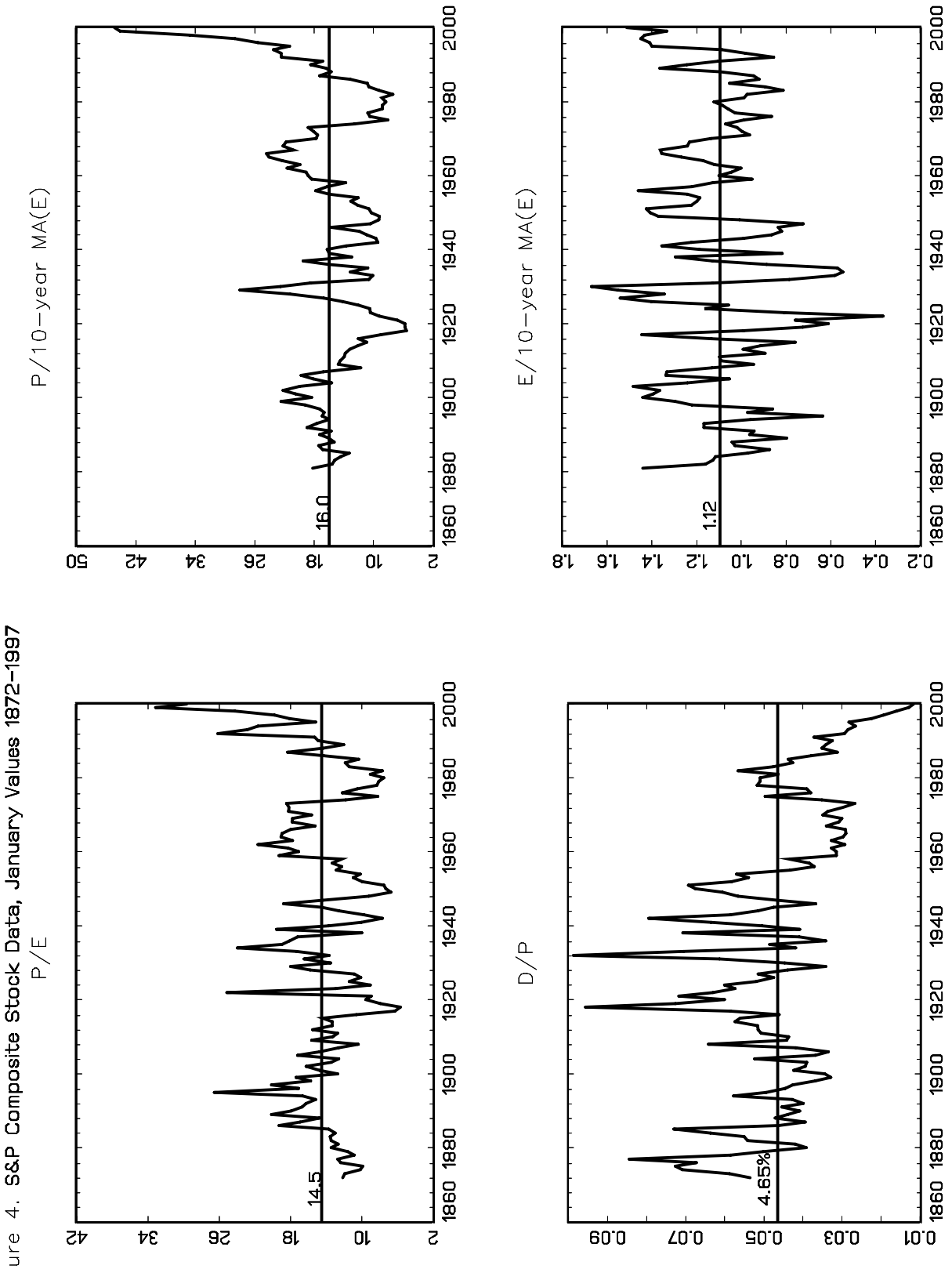

Figure 4. S&P Composite Stock Data, January Values 1872-1997

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Option-Implied Measures of Equity Risk*

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Abstract. Equity risk measured by beta is of great interest to both academics and practitioners. Existing estimates of beta use historical returns. Many studies have found option-implied volatility to be a strong predictor of future realized volatility. We find that option-implied volatility and skewness are also good predictors of future realized beta. Motivated by this finding, we establish a set of assumptions needed to construct a beta estimate from option-implied return moments using equity and index options. This beta can be computed using only option data on a single day. It is therefore potentially able to reflect sudden changes in the structure of the underlying company.

JEL Classification: G12

1. Introduction

Many studies have demonstrated that option-implied volatility is a strong predictor of future volatility in equity markets. Classic contributions include Day and Lewis (1992), Canina and Figlewski (1993), Lamoureux and Lastrapes (1993), Christensen and Prabhala (1998), Fleming (1998), and Blair, Poon, and Taylor (2001). The predictive power of option-implied equity volatility has been confirmed recently

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by Busch, Christensen, and Nielsen (2008), who compare option-implied forecasts with state-of-the-art realized volatility forecasts.[1]

Volatility is clearly not the only risk measure of interest. The central equity risk concept is arguably market beta, which captures the covariation of the return on an individual security with the return on the market portfolio, as approximated by a broad market index. Accurate measurement of market betas is critical for important issues such as cost of capital estimation, performance measurement, and the detection of abnormal returns.

The importance of companies' market beta in corporate finance as well as in asset pricing raises the question whether option-implied information can be used to compute and predict these betas. Interestingly, we find that option-implied volatility and skewness are good predictors of future beta, just as previous authors have found option-implied volatility to be a strong predictor of future volatility. Motivated by this finding, we establish a set of assumptions under which a company beta can be estimated from option-implied volatility and skewness measures from equity and index options.

Existing techniques for beta estimation use historical returns data. These methods thus assume that the future will be sufficiently similar to the past to justify simple extrapolation of current or lagged betas. There is widespread agreement that betas are time varying, and historical methods can easily allow for this. One popular approach uses a rolling window of historical returns to capture time variation, while other approaches model the time variation in historical betas more explicitly and in a more sophisticated fashion. However, no matter how sophisticated the modeling of the time variation in the betas, a historical method may not perform well if historical patterns in the data are unstable. The appeal of our procedure is that option prices are inherently forward looking and therefore contain information on future betas as opposed to lagged betas.

A key strength of our approach is that betas can be computed using closing prices of options observed only on a single day. This may be an important advantage when a company experiences major changes in its operating environment or capital structure, in which case historical return data do not constitute a reliable source for estimating betas. Examples include firms involved in mergers or acquisitions, reorganized firms emerging from Chapter 11, firms undertaking initial public offerings or seasoned equity offerings, as well as firms undertaking large-scale expansions and/or major changes in the composition of debt and equity.

We are not the first to propose extracting market beta from options. French, Groth, and Kolari (1983) and Buss and Vilkov (2009) combine option-implied

[1] Papers focusing on other markets include Blair, Poon, and Taylor (2001), Ederington and Guan (2002), Figlewski (1997), Jorion (1995), and Pong *et al.* (2004). See Poon and Granger (2003) and Granger and Poon (2005) for surveys.

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volatility with historical correlation to improve the measurement of betas. However, these approaches rely on conventional correlation estimates from historical returns. McNulty *et al.* (2002) emphasize the problems with historical beta when computing the cost of capital and propose as an alternative the forward-looking market-derived capital pricing model, which uses option data to assess equity risk. Siegel (1995) notes the advantage of a beta based on option data and proceeds to propose the creation of a new derivative, called an exchange option, which would allow for the computation of what he refers to as "implicit" betas. Unfortunately, the exchange options discussed by Siegel (1995) are not yet traded, and therefore, his method cannot be used in practice to compute betas. While others have thus suggested various forms of option-implied betas, we suggest a new measure that exclusively uses available options data, and furthermore, we are the first to conduct a large-scale empirical study of the properties of betas based on option information.

We show that market betas can be computed without using historical correlation estimates and without the creation of a new derivative, by using prices on existing equity options and index options. Our proposed beta is computed using option-implied estimates of variance and skewness, which can be computed using the methods proposed by Bakshi and Madan (2000), Bakshi, Kapadia, and Madan (2003) (henceforth BKM), Britten-Jones and Neuberger (2000), and Carr and Madan (2001) and developed further in Jiang and Tian (2005).[2] These methods allow us to retrieve the moments of the underlying distributions for index options and stock options from the cross section of option prices. We then use a traditional one-factor model and express the option-implied beta as a function of the variance and the skewness of the underlying distributions.

We implement this model using option contracts for the one hundred components of the S&P100 index as well as data on S&P500 options. Daily option data are obtained from the OptionMetrics database over the period 1996–2004. We compare the performance of the option-implied beta with that of historical betas. Although the option-implied betas are computed using only one day of data, we find that they perform well compared to traditional historical beta estimates. The option-implied betas outperform the historical betas in cross-sectional regressions. For the purpose of predicting future betas, we find that the option-implied betas contain information that is not contained in historical betas. Interestingly, we find that the option-implied betas have significant predictive power for future betas that extend beyond the options' maturities.

The empirical findings in this paper are related to some of the results in the growing literature on the pricing of equity options and, more specifically, to results on the differential pricing of equity and index options. Dennis and Mayhew (2002) and Duan and Wei (2009) find that firms with high historical market betas have higher

[2] See also Jackwerth and Rubinstein (1996).

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negatively skewed risk-neutral distributions. This paper demonstrates that their result is to be expected because option-implied betas are higher if the underlying risk-neutral distribution is more negatively skewed. We also demonstrate that a stock's option-implied beta is partly determined by the difference between the skew of the stock's risk-neutral distribution and the skew of the index's risk-neutral distribution. BKM document differences between the skew of stock and index options. Driessen, Maenhout, and Vilkov (2009) use equity options to obtain correlations between stocks in a parametric setup.

The remainder of this paper is organized as follows: Section 2 discusses the derivation of option-implied return moments and illustrates their ability to anticipate changes in future betas using the components of the S&P100. Section 3 establishes a set of sufficient conditions for deriving an option-implied beta using equity and index options data only. Section 4 presents empirical results comparing the option-implied beta with more traditional estimates computed using daily returns. Section 5 concludes. The appendix contains a brief description of the derivations of the option-based moments, as well as a Monte Carlo study of the moment estimators.

2. Option-Implied Return Moments and Equity Risk

In this section, we show how current option-implied variance and skewness estimates from individual stock and index options are informative about the future riskiness of a stock. Accurate measurement of equity risk is critically important, and practitioners as well as academics usually approach this issue by specifying factor models and estimating the required betas. Factor models and betas are used by practitioners for a number of reasons. First, they provide a benchmark for performance measurement because they indicate the return a portfolio manager ought to have made given the risk present in his portfolio. Second, factor models provide a benchmark for the detection of abnormal returns as is, for instance, done in event studies. Third, factor models can be used to determine the required cost of capital.

We first discuss how to compute return moments from option prices. Subsequently, we discuss the data and the choices we make with respect to the implementation of these return moments. Then we document the informativeness of the moments for future equity risk.

2.1 THE LINK BETWEEN OPTION PRICES AND RETURN MOMENTS

In this subsection, we explain how to compute return moments using option prices. We employ the methods of Carr and Madan (2001) as used in BKM.[3] The key result

[3] See also Bakshi and Madan (2000), Britten-Jones and Neuberger (2000), Derman and Kani (1998), Jiang and Tian (2009), and Rubinstein (1994).

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is that any twice differentiable payoff function can be spanned by a position in bonds, stocks, and out-of-the-money options. A brief overview of this general result is presented in Appendix A.

Let q denote the probability distribution function under the risk-neutral measure. The variance and skewness under the risk-neutral measure are defined as

$$\begin{aligned} \text{SKEW} &\equiv \frac{E^q[(R-E^q[R])^3]}{\text{VAR}^{3/2}}, \\ \text{VAR} &\equiv E^q[(R-E^q[R])^2]. \end{aligned} \tag{1}$$

Using the noncentral moments, we can rewrite them as

$$\begin{aligned} \text{SKEW} &= \frac{E^q[R^3]-3E^q[R]E^q[R^2]+2E^q[R]^3}{\text{VAR}^{3/2}}, \\ \text{VAR} &= E^q[R^2]-E^q[R]^2. \end{aligned} \tag{2}$$

Following BKM, we define the "Quad" and "Cubic" contracts as having a payoff function equal to the squared return and cubed return, respectively, for a given horizon τ. The fair values of these contracts are

$$\begin{aligned} \text{Quad} &= \mathrm{e}^{-r\tau}E^q[R^2], \\ \text{Cubic} &= \mathrm{e}^{-r\tau}E^q[R^3]. \end{aligned}$$

Substituting these expressions into the variance and skewness formulas in Equation (2), we get the option-implied moments

$$\text{SKEW}^{\text{OI}} = \frac{\mathrm{e}^{r\tau}\text{Cubic}-3E^q[R]\mathrm{e}^{r\tau}\text{Quad}+2E^q[R]^3}{\text{VAR}^{3/2}}, \tag{3}$$

$$\text{VAR}^{\text{OI}} = \mathrm{e}^{r\tau}\text{Quad}-E^q[R]^2. \tag{4}$$

BKM show that under any martingale pricing measure, the Quad and Cubic contract prices can be recovered from the market prices on portfolios of out-of-the-money European calls $C(\tau, K)$ and puts $P(\tau, K)$, where K denotes the strike price and τ denotes the time to maturity.

The price of the Quad contract is

$$\text{Quad} = \int_S^\infty \frac{2(1-\ln[\frac{K}{S}])}{K^2}C(\tau,K)\mathrm{d}K + \int_0^S \frac{2(1+\ln[\frac{S}{K}])}{K^2}P(\tau,K)\mathrm{d}K, \tag{5}$$

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where S is the price of the underlying stock. The price of the Quad contract can be interpreted as the forward price of volatility.[4]
The price of the Cubic contract is

$$\text{Cubic} = \int_S^\infty \frac{6\ln\left(\frac{K}{S}\right) - 3\ln\left(\frac{K}{S}\right)^2}{K^2} C(\tau, K)\mathrm{d}K - \int_0^S \frac{6\ln\left(\frac{S}{K}\right) + 3\ln\left(\frac{S}{K}\right)^2}{K^2} P(\tau, K)\mathrm{d}K. \tag{6}$$

BKM further show that using a third-order approximation the risk-neutral log-return mean can be approximated by

$$E^q[R] = \mathrm{e}^{r\tau} - 1 - \frac{\mathrm{e}^{r\tau}}{2}\text{Quad} - \frac{\mathrm{e}^{r\tau}}{6}\text{Cubic}. \tag{7}$$

This relationship provides the last element required to compute variance and skewness from Quad and Cubic contracts.

2.2. DATA AND MOMENT ESTIMATION

We obtain option data from OptionMetrics that is a comprehensive source of high-quality historical data for the US equity and index options markets. We extract the security ID, date, expiration date, call or put identifier, strike price, best bid, best offer, and implied volatility from the option price file. For European options, implied volatilities are calculated using mid-quotes and the Black–Scholes formula. For American options, a binomial tree approach that takes into account the early exercise premium is employed. In our empirical analysis, we focus on the quotes of the one hundred stocks in the S&P100 as of December 31 2004 and the S&P500 index, for the period January 1 1996 to December 31 2004.

Interest rates are taken from the CRSP Zero Curve file, and underlying security prices are obtained through CRSP. As in Bakshi, Cao, and Chen (1997), BKM, and Jiang and Tian (2005), we use the average of the bid and ask quotes for each option contract and we filter out average quotes that are less than \$3/8. We also filter out quotes that do not satisfy standard no-arbitrage conditions. Finally, we eliminate in-the-money options because they are less liquid than out-of-the-money and at-the-money options. We eliminate put options with strike prices of more than 103% of the underlying asset price ($K/S > 1.03$), as well as call options with strike prices of less than 97% of the underlying asset price ($K/S < 0.97$).

[4] Volatilities derived in this fashion have been studied among others by Britten-Jones and Neuberger (2000), Carr and Madan (2001), Carr and Wu (2009), and Jiang and Tian (2005). Alternatively, one could use at-the-money implied Black–Scholes volatility as an estimate of volatility.

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Moments are computed by integrating over moneyness. In practice, we do not have a continuum of option prices across moneyness, and we therefore have to make a number of choices regarding implementation. We follow Carr and Wu (2009) and Jiang and Tian (2005) in imposing structure on implied volatilities. Our implementation is specifically designed to improve the quality of the integration procedure. First, as mentioned above, we limit our attention to options on the firms in the S&P100 in order to maximize the availability of strike prices and the size of the integration domain. Second, we only estimate the moments for days that have at least two out-of-the-money call prices and two out-of-the-money put prices available. Third, as in Carr and Wu (2009) and Jiang and Tian (2005), for each maturity, we interpolate implied volatilities using a cubic spline across moneyness levels (K/S) to obtain a continuum of implied volatilities. The cubic spline is only effective for interpolating between the maximum and minimum available strike price. For moneyness levels below (above) the available moneyness level in the market, we simply extrapolate the implied volatility of the lowest (highest) available strike price.

After implementing this interpolation–extrapolation technique, we are able to extract a fine grid of 1,000 implied volatilities for moneyness levels between 1% and 300%. We then convert these implied volatilities into call and put prices using the following rule: moneyness levels less than 100% ($K/S < 1$) are used to generate put prices and moneyness levels more than 100% ($K/S > 1$) are used to generate call prices. This fine grid of option prices is then used to compute the option-implied moments by approximating the Quad and Cubic contracts using trapezoidal numerical integration. It is important to note that this procedure does not assume that the Black–Scholes model correctly prices options. It merely provides a translation between option prices and implied volatilities. Also note that our implementation follows Jiang and Tian (2005) and is slightly different from the one in BKM and Dennis and Mayhew (2002). We document and discuss the benefits of our approach in more detail with the help of a Monte Carlo experiment in Appendix B.

We can in principle compute several option-implied moments for every underlying asset, one for each available option maturity. For each day, we linearly interpolate using the two contracts nearest to the 180-day maturity to get the 180-day VAR and SKEW contracts, always using one contract with maturity more than 180 days and one contract with maturity less than 180 days. The choice of a 180-day horizon is to some extent based on a trade-off between option liquidity that is largest for options with 30–90 days to maturity and the relevant horizon for firm risk, which is arguably considerably longer.

Panel A in Table I presents descriptive statistics of the option data. We report the average firm size (market capitalization in billion dollars) and the number of firms in each industry from our list of one hundred stocks. We also show the average

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Table I. Descriptive statistics on option data and moment estimates

Panel A reports the average firm size and the number of firms in each industry from our list of one hundred stocks observed from 1996 through 2004. It also shows the average daily option volume, the average number of quotes each day, and the minimum number of quotes per day for call and put options separately. Panel B reports standard deviations (SD, annualized) and skewness implied from 180-day options averaged by industry. The average *ex post* realized betas are also reported for reference. Panel C reports the option-implied standard deviation and skewness as well as *ex post* realized beta by firm-size decile.

Panel A: Market capitalization and option data by industry

			Call options			Put options		
Industry	Number of firms	Average firm size	Average daily volume	Average daily # quotes	Minimum daily # quotes	Average daily volume	Average daily # quotes	Minimum daily # quotes
Energy	6	48.33	549.73	6.44	5.09	250.17	6.43	4.97
Materials	6	21.67	231.26	5.95	4.43	135.78	6.24	4.73
Industrials	13	44.15	445.22	6.62	4.84	265.62	7.32	4.50
Consumer discretionary	17	22.18	304.50	6.26	4.82	195.54	6.39	4.98
Consumer staples	12	61.75	403.13	6.20	4.93	234.82	6.81	4.55
Health care	10	66.20	638.83	6.97	5.09	336.18	8.27	5.63
Financials	13	58.46	681.83	8.00	5.19	470.97	9.21	5.77
Information technology	14	81.21	1,849.48	9.54	6.49	903.35	10.50	5.72
Telecommunications services	4	68.25	894.44	6.60	5.75	544.98	6.72	5.78
Utilities	5	11.40	117.14	4.88	4.00	66.63	5.24	4.35
S&P500 index			4,652.29	27.08	10.00	8,731.36	35.92	9.00

Panel B: Moments sorted by industry

Industry	SD 180-day	SKEW 180-day	Average *ex post* beta
Energy	0.4022	−0.4782	0.7997
Materials	0.3455	−0.4368	0.9380
Industrials	0.3343	−0.4711	0.9011
Consumer discretionary	0.3724	−0.4440	0.9505
Consumer staples	0.2887	−0.4932	0.5914
Health care	0.3534	−0.5142	0.8358
Financials	0.3590	−0.6116	1.2329
Information technology	0.4860	−0.5112	1.4601
Telecommunications services	0.4266	−0.5034	1.0839
Utilities	0.3010	−0.4964	0.5228
S&P500 index	0.2357	−1.4622	

Panel C: Moments sorted by firm size

Firm size	SD 180-day	SKEW 180-day	Average *ex-post* beta
1 (low)	0.4499	−0.3588	1.0976
2	0.3925	−0.4370	0.8827
3	0.3398	−0.4641	0.7781
4	0.3787	−0.4402	0.9303
5	0.3196	−0.4595	0.7693
6	0.3447	−0.5082	0.9252
7	0.3961	−0.5870	1.2341
8	0.3966	−0.5289	1.2009
9	0.3136	−0.5870	0.7665
10 (high)	0.3576	−0.6245	1.1880

daily option volume, the average number of quotes each day, and the minimum number of quotes per day for call and put options separately. The option trading volumes are much higher for index options than for individual equity options. It is also clear that there is substantial industry variation in option trading volumes, with volumes for IT and telecom much higher than those for materials and utilities.

Descriptive statistics of the option-implied moments are reported in Panels B and C of Table I. Panel B reports the average standard deviation (annualized) and skewness implied from 6-month options averaged by industry. The average *ex post* betas from returns are reported for reference. Panel C reports the option-implied standard deviation and skewness as well as *ex post* beta averaged by firm-size decile.

Figure 1 displays some properties of the moments over time. In Panel A, we plot the value of the volatility index (VIX) index during 1996–2004. Panel B plots

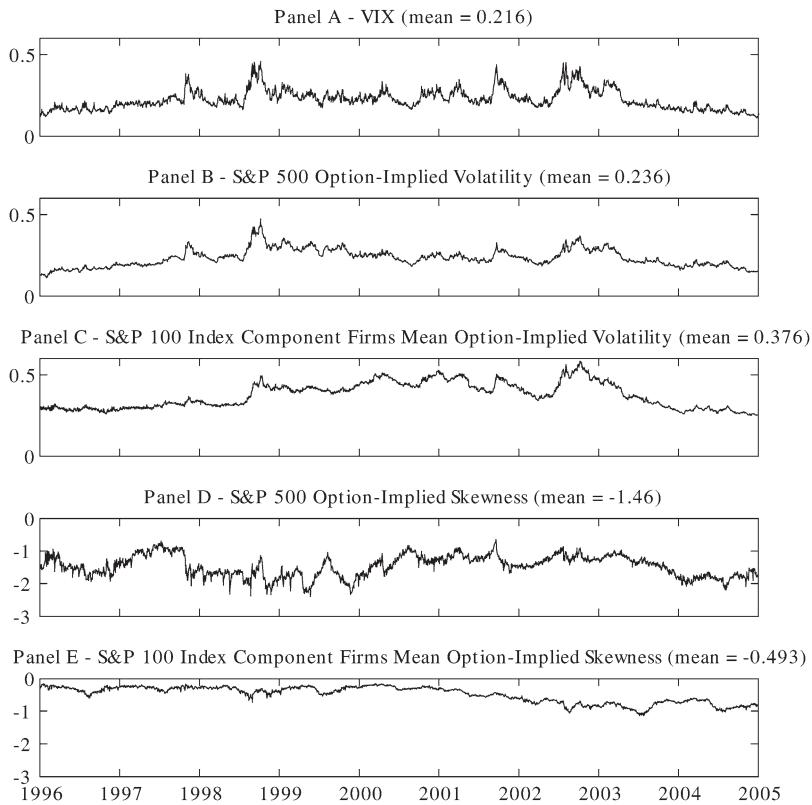

Figure 1. Option-implied volatility and skewness. (A) The value of the VIX index during 1996–2004. (B) The S&P500 option-implied volatility for the same period. (C) The average of the option-implied volatility for the S&P100 components. (D) S&P500 option-implied skewness and (E) the average of the option-implied skewness for the S&P100 components.

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the S&P500 option-implied volatility for the same period. Panel C plots the average of the option-implied volatility across the one hundred firms in the S&P100. Panel D plots S&P500 option-implied skewness, and Panel E plots the average of the option-implied skewness for the S&P100 components.

It is reassuring that our measure of S&P500 option-implied volatility in Panel B is very highly correlated with the VIX in Panel A. The average of the option-implied volatilities for the S&P100 stocks in Panel C is also highly correlated with the VIX. From Panels D and E, we can draw some conclusions regarding skewness. First, the S&P500 option-implied skewness exceeds the average option-implied skewness of the S&P100 firms. This finding is consistent with the results in BKM. Note that here and in the rest of the paper, we refer to more negative skewness as higher skewness. Second, the correlation between option-implied skewness and option-implied volatility for the S&P500 is −0.06, and the correlation between the average option-implied skewness and average option-implied volatility for the S&P100 components is 0.05. Finally, while the option-implied volatility for the S&P500 is strongly correlated with the average option-implied volatility for the S&P100 components (0.70), the correlation between the two skewness time series is virtually zero.

2.3 OPTION-IMPLIED MOMENTS PREDICT FUTURE (*EX POST*) BETA

We are now ready to assess the informational content of the option-implied moments for future equity risk. There is an ongoing discussion on the appropriate choice of factor model and the empirical performance of alternative factor models and the appropriate measure of equity risk. We derive our results in the context of a particular factor model, the capital asset pricing model (CAPM). There is evidence in the literature that some multifactor models can improve on the performance of the CAPM, but this issue remains hotly debated.[5] We merely note that the academic literature remains divided about the performance of the CAPM and that the CAPM is still the factor model most often used in financial practice. In our empirical application, the CAPM performs relatively well.

We measure the *ex post* market beta using the realized betas proposed by Andersen *et al.* (2006). While Andersen *et al.* use high-frequency data, we use daily data to compute the covariance between the market and the equity as well as the variance of the market. This implementation is inspired by Schwert's (1989) construction of a measure of realized volatility. In our main results, we

[5] See Campbell, Lo, and MacKinlay (1997), Cochrane (2001), Jagannathan and McGrattan (1995), Fama (1991), Ferson (1995, 2004), and the references therein for an overview of this extensive debate. See also Ferson and Korajczyk (1995) and MacKinlay (1995).

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use 6 months of daily returns on the S&P500 and on the individual equities to compute *ex post* beta for the 6-month or 180-day period. This construction is consistent with the choice of 180-day maturity options discussed above because presumably 180-day options are most informative for the distribution of returns over the next 180 days. We also conduct robustness exercises using 1-year and 2-year *ex post* betas.

In Table II, we report on forecasting regressions that use various permutations of the option-implied moments. In all cases, coefficients of multiple correlation are reported.[6] Because of space constraints, we do not report results for individual companies, but instead we focus on industry results and firm-size deciles. Results for individual companies are available from the authors on request. In Panel A, we regress the industry-averaged *ex post* beta estimated from the subsequent 6 months on today's option-implied variance (VAR) and skewness (SKEW) averaged across industry.[7]

Table II. Multiple correlation from regressing *ex-post* betas on option-implied moments

We first create *ex-post* realized beta estimates using rolling 6-month regressions on daily data. We then regress the *ex-post* beta estimated on the subsequent 6 months on today's option-implied variance (VAR) and skewness (SKEW). Subscript ''m'' denotes moments implied from S&P500 options, and subscript ''i'' denotes option-implied moments from individual equity options.

Regressors	VAR_m	$SKEW_m$	VAR_i	$SKEW_i$	VAR_m, $SKEW_m$	VAR_i, $SKEW_i$	VAR_m, $SKEW_m$, VAR, $SKEW_i$
Panel A: By industry							
Energy	0.232	0.009	0.113	0.324	0.232	0.383	0.410
Materials	0.259	0.113	0.057	0.546	0.276	0.548	0.607
Industrials	0.324	0.263	0.177	0.505	0.404	0.522	0.643
Consumer discretionary	0.045	0.207	0.215	0.516	0.209	0.540	0.573
Consumer staples	0.175	0.164	0.559	0.108	0.249	0.672	0.754
Health care	0.057	0.319	0.474	0.071	0.329	0.482	0.578
Financials	0.404	0.115	0.315	0.542	0.413	0.597	0.644
Information technology	0.013	0.326	0.598	0.087	0.328	0.601	0.687
Telecommunications	0.194	0.104	0.623	0.098	0.227	0.643	0.679
Utilities	0.124	0.207	0.219	0.287	0.241	0.363	0.489
Panel B: By firm size							
1 (small)	0.065	0.229	0.317	0.464	0.234	0.557	0.631
2	0.175	0.051	0.086	0.422	0.179	0.427	0.475
3	0.193	0.298	0.438	0.287	0.367	0.494	0.551
4	0.278	0.157	0.200	0.264	0.310	0.340	0.516
5	0.115	0.075	0.469	0.427	0.142	0.612	0.685
6	0.109	0.026	0.317	0.266	0.110	0.427	0.522
7	0.069	0.207	0.552	0.015	0.223	0.553	0.630
8	0.029	0.362	0.439	0.267	0.366	0.467	0.583
9	0.070	0.199	0.493	0.063	0.216	0.494	0.603
10 (big)	0.104	0.207	0.187	0.120	0.239	0.227	0.277

[6] The conclusions do not change when using the square roots of the adjusted R^2.

[7] Correlations are overall somewhat higher when we first regress on a firm-by-firm basis and subsequently average the correlation coefficients.

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Subscript "m" denotes moments implied from S&P500 options, and subscript "i" denotes option-implied moments from individual equity options.

The results in Panel A are of substantial interest and allow for several conclusions. When using all four option-implied moments in forecasting beta (in the last column), the resulting coefficient of multiple correlation is quite high in all sectors and particularly in the consumer staples, IT, and telecom sectors. Second, when considering the four individual moments as predictors, the individual skewness, $SKEW_i$, typically has the highest correlation with *ex post* beta. Third, when comparing the correlation from the two market-based moments with the correlation from the two firm-specific moments, the latter are always larger.

Consider now Panel B where we regress the average *ex post* beta in each firm-size decile on the option-implied moments averaged across firms in the relevant decile as well. The rightmost column shows that the correlation when using all four moments is smallest for the biggest firms and quite large in all the other size categories. Only $SKEW_i$ seems to show a clear pattern across firm size: correlations tend to be larger for smaller firms and smaller for larger firms.

The findings in Table II are obtained using 6-month (180-day) *ex post* betas. A natural question is if the options with 180-day maturities have explanatory power for *ex post* betas computed over longer time horizons. We repeated the results in Table II using 1-year and 2-year *ex post* betas. We did not investigate *ex post* betas computed over horizons more than 2 years because this excessively reduces the sample period in view of the fact that the option data are available only for 1996–2004. Results for 1-year and 2-year *ex post* betas are not reported but available on request. The results are very surprising. Not only do the moments constructed from options with 180-day maturities have substantial predictive power for 1- and 2-year *ex post* betas but also the multiple correlation coefficients are almost uniformly higher than the ones for 180-day *ex post* betas in Table II. We discuss the implications of this finding in more detail below.

The main conclusion from Table II is that option-implied moments seem to contain a lot of information about future equity risk as captured by the *ex post* realized beta. This finding begs the question of how to sensibly combine the information in the moments. We suggest ways to do so in the next section.

3. Option-Implied Betas

In this section, we show how the univariate variance and skewness from individual equity and market index options can be aggregated into a single stock-specific risk measure. We show that under certain assumptions, the risk measure can be interpreted as a beta. We also analyze the potential biases in the option-implied risk measure.

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3.1 FACTOR MODELS AND BETA ESTIMATION

The computation of betas for the CAPM is an issue that is hotly debated. In several classic applications of the CAPM, betas were computed by running a regression of stock returns on market returns, using returns for the past 60 months.[8] This technique is still used in many academic and practitioner approaches to beta estimation. The choice of sixty lagged returns reflects the tension implicit in using historical returns to compute betas: on the one hand, one would like to use as long a history as possible to obtain more precise estimates, but, on the other hand, one does not want to use older returns data because it is likely that the beta changes over time.

Over the last two decades, the modeling of the time variation in the market beta has taken center stage in the CAPM literature. There is by now widespread consensus that beta is time varying, although it is less clear how much this time variation helps the model's empirical performance out of sample. A number of different econometric techniques are available to model the time variation in the beta.[9] While modeling the time variation in the beta is helpful, it does not address the criticism that this type of measurement is backward looking, much like the simple regressions that use 60 months of lagged returns. But many applications of factor models, such as computing the cost of capital, are inherently forward looking. We now show that it is possible to compute forward-looking betas using the information embedded in option prices.

3.2. ESTIMATING MARKET BETAS USING OPTION DATA: EXISTING APPROACHES

The standard estimates of beta derived from historical market returns and individual equity returns can be written as

$$\beta_i = \frac{\mathrm{COV_{i,m}}}{\mathrm{VAR_m}} = \mathrm{CORR_{i,m}}\left(\frac{\mathrm{VAR_i}}{\mathrm{VAR_m}}\right)^{1/2},$$

where the moments are computed from times series of historical returns. This is also the method used when computing *ex post* beta in Section 2.3 above.

[8] See, for instance, Black, Jensen, and Scholes (1972), Fama and MacBeth (1973), and Fama and French (1992, 1993, 1996).

[9] On modeling time variation in betas, see Bollerslev, Engle, and Wooldridge (1988), Blume (1971, 1975), Bos and Newbold (1984), Cochrane (2001), Ferson (1995, 2004), Ferson and Harvey (1999), Ferson, Kandel, and Stambaugh (1987), Ghysels (1998), Harvey (1989), and Jagannathan and Wang (1996). See Bauer *et al.* (2008) for a Bayesian approach. Lewellen and Nagel (2006) advocate estimating conditional betas using daily or weekly returns and short data windows. Companies such as BARRA provide investors and risk managers with time-varying estimates of market betas.

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French, Groth, and Kolari (1983) suggest introducing option information in a hybrid estimation method, where the correlation between equity and market return, $\mathrm{CORR}_{i,m}$, is estimated from historical returns but where the variances are implied from options. We can write

$$\beta_i^{\mathrm{HYBR}} = \mathrm{CORR}_{i,m}\left(\frac{\mathrm{VAR}_i^{\mathrm{OI}}}{\mathrm{VAR}_m^{\mathrm{OI}}}\right)^{1/2},$$

where $\mathrm{VAR}_i^{\mathrm{OI}}$ and $\mathrm{VAR}_m^{\mathrm{OI}}$ are the option-implied variances implied from option prices on individual equity options and on index options. We will refer to this as the hybrid beta estimate below. French, Groth, and Kolari (1983) empirically investigate the performance of the hybrid beta using a single day of data, and index option data were not available for their sample. Below we provide a more extensive empirical investigation of their approach that has also been investigated and extended by Buss and Vilkov (2009).

Note that the hybrid estimator still requires historical data and so cannot be used for firms where little or no history is available. It is also problematic to use it when the nature of the firm has changed dramatically, for example, following a merger or a major reorganization or expansion when the correlation between firm and market is likely to change. McNulty *et al.* (2002) cite the sensitivity of the correlation estimates from historical data as a key detractor for corporate practitioners when using the CAPM for cost of capital computations.

Siegel (1995) circumvents the computation of historical correlations by assuming the existence of an option to exchange shares in firm i for units of the market index. From the accounting identity dollars per share = (dollars per index unit) × (index units per share), one can derive the beta of firm i as follows:

$$\beta_i = \frac{\mathrm{VAR}_i^{\mathrm{OI}} + \mathrm{VAR}_m^{\mathrm{OI}} - \mathrm{VAR}_X^{\mathrm{OI}}}{2\mathrm{VAR}_m^{\mathrm{OI}}},$$

where $\mathrm{VAR}_X^{\mathrm{OI}}$ is the option-implied variance implied from the option to exchange index units for equity shares. Note that this is the method used to imply covariance estimates from range-based volatility estimates in currency markets in Brandt and Diebold (2006). Unfortunately, since exchange options are not yet traded, the implicit beta cannot be computed in practice.

Below we argue that betas similar in spirit to Siegel's (1995) "implicit" betas can be computed without the creation of a new derivative by using prices on existing equity and index options. We will refer to these betas as "option-implied" betas. First, we derive an estimator of beta that relies on univariate moments only. Second, we implement the moment-based beta with the option moments derived above.

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3.3 COMPUTING BETAS FROM THE MOMENTS OF STOCK AND INDEX RETURNS

Following BKM, we assume that the log return on stock i follows a single-factor model of the form

$$R_i = \alpha_i + \beta_i R_{\mathrm{m}} + \epsilon_i, \tag{8}$$

where the market return R_{m} has mean μ_{m}. The idiosyncratic shock ϵ_i has zero mean and is assumed to be independent of the market return R_{m}.

Consider now the moments of the return distribution. To simplify notation, we do not provide time subscripts for the moments, but empirically there will be a different estimate for the moments at each point in time. We use the conventional definition of skewness as the third central moment divided by the standard deviation to the third power. Using the single-factor return structure with an independent idiosyncratic term, we can write the skewness of R_i as

$$\begin{aligned}\mathrm{SKEW_i} &= \frac{E[\alpha_i + \beta_i R_{\mathrm{m}} + \epsilon_i - E[\alpha_i + \beta_i R_{\mathrm{m}} + \epsilon_i]]^3}{\mathrm{VAR_i}^{3/2}} \\ &= \frac{\beta_i^3 E[R_{\mathrm{m}} - \mu_{\mathrm{m}}]^3 + E[\epsilon_i]^3}{\mathrm{VAR_i}^{3/2}} \\ &= \frac{\beta_i^3 \mathrm{SKEW_m VAR_m}^{3/2} + \mathrm{SKEW}_{\epsilon,i}\mathrm{VAR}_{\epsilon,i}^{3/2}}{\mathrm{VAR_i}^{3/2}}.\end{aligned} \tag{9}$$

From this, we can write beta as

$$\beta_i = \left[\left(\frac{\mathrm{SKEW_i}}{\mathrm{SKEW_m}}\right)\left(\frac{\mathrm{VAR_i}}{\mathrm{VAR_m}}\right)^{3/2} - \left(\frac{\mathrm{SKEW}_{\epsilon,i}}{\mathrm{SKEW_m}}\right)\left(\frac{\mathrm{VAR}_{\epsilon,i}}{\mathrm{VAR_m}}\right)^{3/2}\right]^{1/3}. \tag{10}$$

In order to be able to implement an estimator using only moments of R_i and R_{m}, we now make the identifying assumption that the skewness of the idiosyncratic shock is zero, $\mathrm{SKEW}_{\epsilon,i} = 0$. Note that Duan and Wei (2009) make a similar assumption. We can then solve for the market beta of stock i to be simply

$$\beta_i^{\mathrm{MM}} = \left(\frac{\mathrm{SKEW_i}}{\mathrm{SKEW_m}}\right)^{1/3}\left(\frac{\mathrm{VAR_i}}{\mathrm{VAR_m}}\right)^{1/2}, \tag{11}$$

where the "MM" superscript indicates that the market beta is computed using the moments of the return distribution.[10]

[10] Fouque and Kollman (2009) suggest an implied volatility regression approach to implementing Equation (11).

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Note that expression (11) indicates that the skewness of the market return has to be nonzero for the market beta to be well defined in this setup. Recall from Figure 1 that the market skewness is always negative and large in magnitude empirically. However, this requirement implies that multivariate normality cannot be used as a sufficient condition for the existence of the CAPM. Instead, we have to resort to quadratic utility, see, for instance, the discussion in Huang and Litzenberger (1988) and Cochrane (2001). Alternatively, Kraus and Litzenberger (1976, 1983) demonstrate that we obtain the CAPM if all risk assets have linear characteristic lines, even if the market return is characterized by an asymmetric distribution.

Note also that setting $\text{SKEW}_{\epsilon,i} = 0$ is a sufficient but not necessary condition for using option information in beta estimation. Thus, even if the $\text{SKEW}_{\epsilon,i} = 0$ assumption is violated, return moments may be useful for forecasting, as we saw in Table II. Moreover, if prior information is available about the value of $\text{SKEW}_{\epsilon,i}$, then this can be used to estimate beta from Equation (10) rather than Equation (11).

Figure 2 quantifies the bias $\beta_i^{\text{MM}} - \beta_i$ as a function of $\text{SKEW}_{\epsilon,i}$. On the horizontal axis, we let $\text{SKEW}_{\epsilon,i}$ take values on a grid from -0.5 to $+0.5$. Motivated by the average of the empirical values in Table I above, we set $\beta_i = 1$, $\text{VAR}_\text{m} = 0.24^2$, and $\text{SKEW}_\text{m} = -1.44$. $\text{VAR}_{\epsilon,i}$ is set equal to the difference between the average firm variance and the market variance which is roughly 0.24^2. VAR_i and SKEW_i can

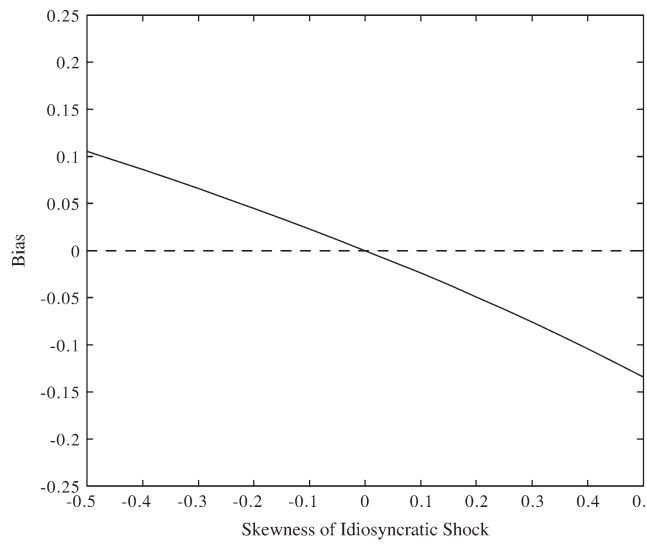

Figure 2. Bias from idiosyncratic skewness
We plot the bias $\beta_i^{\text{MM}} - \beta_i$ as a function of $\text{SKEW}_{\epsilon,i}$. We set $\beta_i = 1$, $\text{VAR}_\text{m} = 0.24^2$, and $\text{SKEW}_\text{m} = -1.44$, based on sample averages. $\text{VAR}_{\epsilon,i}$ is set equal to the difference between the average firm variance and the market variance which is roughly 0.24^2. VAR_i and SKEW_i can then be computed from $\text{VAR}_\text{i} = \beta_i^2 \text{VAR}_\text{m} + \text{VAR}_{\epsilon,i}$ and Equation (9), which gives the inputs needed for computing β_i^{MM} in Equation (11).

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then be computed from $\mathrm{VAR_i} = \beta_i^2 \mathrm{VAR_m} + \mathrm{VAR}_{\epsilon,i}$ and Equation (9) that gives the inputs needed for computing β_i^{MM} in Equation (11). Figure 2 shows that the bias amounts to 10% of the true beta when the idiosyncratic skewness is close to -0.5 or $+0.5$. The figure also shows that the bias is roughly linear in the idiosyncratic skewness. Assuming that $\mathrm{SKEW_m}$ is negative, which is the case empirically, then β_i^{MM} will be biased downward if $\mathrm{SKEW}_{\epsilon,i}$ is positive and vice versa.

It is not straightforward to further verify the appropriateness of the $\mathrm{SKEW}_{\epsilon,i} = 0$ assumption. We note that if there is a systematic asymmetry pattern across the idiosyncratic distribution of firms, we would expect the moment-based betas to be systematically higher or lower than the historical betas. This is not the case as we will see in Figure 4 below. However, we do observe that moment-based betas are slightly more centered around one than historical betas. This finding may be due to the assumption of a symmetric idiosyncratic return component, if the idiosyncratic skewness is negative for low beta stocks and positive for high beta stocks.

At this point, Equation (11) is simply a method to compute a market beta using moments. The moments can be computed using either historical data or option-implied information. We next analyze the use of option-implied information to compute Equation (11).

3.4 COMPUTING BETAS FROM OPTION-IMPLIED MOMENTS

Using the option-implied moments from Equations (3) and (4) as well as the moment-based beta estimate in Equation (11), we can compute the option-implied beta of stock i with data on individual stocks and the index. We get

$$\beta_i^{\mathrm{OI}} = \left(\frac{\mathrm{SKEW_i^{OI}}}{\mathrm{SKEW_m^{OI}}}\right)^{1/3} \left(\frac{\mathrm{VAR_i^{OI}}}{\mathrm{VAR_m^{OI}}}\right)^{1/2}. \tag{12}$$

Recall from the conventional beta computations above that

$$\beta_i^{\mathrm{HYBR}} = \mathrm{CORR_{i,m}} \left(\frac{\mathrm{VAR_i}}{\mathrm{VAR_m}}\right)^{1/2}.$$

Therefore, in Equation (12), the term $(\frac{\mathrm{SKEW_i^{OI}}}{\mathrm{SKEW_m^{OI}}})^{1/3}$ captures the option-implied correlation. As discussed above, French, Groth, and Kolari (1983) construct betas that combine option-implied volatilities with historical correlations in an effort to improve beta measurement. They have

$$\beta_i = \mathrm{CORR_{i,m}} \left(\frac{\mathrm{VAR_i^{OI}}}{\mathrm{VAR_m^{OI}}}\right)^{1/2}.$$

Our option-implied beta can be thought of as a logical extension of their idea.

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The moments computed from options data are risk-neutral moments. The question arises as to how a beta computed from these moments is related to that computed from physical moments? Fortunately, BKM provide us with useful guidance on the potential bias arising from our use of option-implied moments as proxies for physical moments. Consider first the relationship between physical and risk-neutral variance. BKM show that for the market index,

$$\mathrm{VAR}_{\mathrm{m}}^{q} \approx \mathrm{VAR}_{\mathrm{m}}^{p}\left(1-\gamma \mathrm{SKEW}_{\mathrm{m}}^{p}\sqrt{\mathrm{VAR}_{\mathrm{m}}^{p}}\right),$$

where γ is the coefficient of relative risk aversion and the superscripts p and q denote the physical and risk-neutral measure, respectively. If we assume a similar relationship for the individual equity, we can form the ratio used in our beta computation

$$\mathrm{VAR}_{\mathrm{i}}^{q}/\mathrm{VAR}_{\mathrm{m}}^{q} \approx \frac{\mathrm{VAR}_{\mathrm{i}}^{p}/\mathrm{VAR}_{\mathrm{m}}^{p}\left(1-\gamma \mathrm{SKEW}_{\mathrm{i}}^{p}\sqrt{\mathrm{VAR}_{\mathrm{i}}^{p}}\right)}{\left(1-\gamma \mathrm{SKEW}_{\mathrm{m}}^{p}\sqrt{\mathrm{VAR}_{\mathrm{m}}^{p}}\right)}.$$

Figure 3 quantifies the bias $\beta_i^{\mathrm{OI}} - \beta_i$ as a function of γ for three different values of the idiosyncratic skewness $\mathrm{SKEW}_{\epsilon,i}$. On the horizontal axis, we let γ take values on a grid from 1 to 4. We again set $\beta_i = 1$, $\mathrm{VAR}_{\mathrm{m}}^{p} = 0.24^2$, and $\mathrm{SKEW}_{\mathrm{m}}^{p} = -1.44$. $\mathrm{VAR}_{\epsilon,i}$ is set equal to the difference between the average firm variance and the market variance which is roughly 0.24^2, and $\mathrm{SKEW}_{\mathrm{i}}$ can then be computed from $\mathrm{VAR}_{\mathrm{i}} = \beta_i^2\mathrm{VAR}_{\mathrm{m}} + \mathrm{VAR}_{\epsilon,i}$ and Equation (11) that gives the inputs needed for computing β_i^{OI}. Figure 3 provides a number of insights. First, the bias is of course zero when the idiosyncratic skewness is zero (dot-dashed line) and the coefficient of relative risk aversion is zero. Second, the bias is decreasing with the coefficient of relative risk aversion. Third, recall from Figure 2 that a negative idiosyncratic skewness creates a positive bias in beta. Thus, when the idiosyncratic skewness is negative, the two biases to some extent cancel each other out (solid line). Fourth, when the idiosyncratic skewness is positive the bias is the largest. Fortunately, a negative idiosyncratic skewness due to bankruptcy risk may be the most empirically relevant.

Consider next the relationship between physical and risk-neutral skewness. BKM show that for the market index,

$$\mathrm{SKEW}_{\mathrm{m}}^{q} \approx \mathrm{SKEW}_{\mathrm{m}}^{p} - \gamma\left(\mathrm{KURT}_{\mathrm{m}}^{p}-3\right)\sqrt{\mathrm{VAR}_{\mathrm{m}}^{p}}.$$

Assuming again a similar relationship for the individual equity, we get

$$\mathrm{SKEW}_{\mathrm{i}}^{q}/\mathrm{SKEW}_{\mathrm{m}}^{q} \approx \frac{\left[\mathrm{SKEW}_{\mathrm{i}}^{p} - \gamma\left(\mathrm{KURT}_{\mathrm{i}}^{p}-3\right)\sqrt{\mathrm{VAR}_{\mathrm{i}}^{p}}\right]}{\left[\mathrm{SKEW}_{\mathrm{m}}^{p} - \gamma\left(\mathrm{KURT}_{\mathrm{m}}^{p}-3\right)\sqrt{\mathrm{VAR}_{\mathrm{m}}^{p}}\right]}.$$

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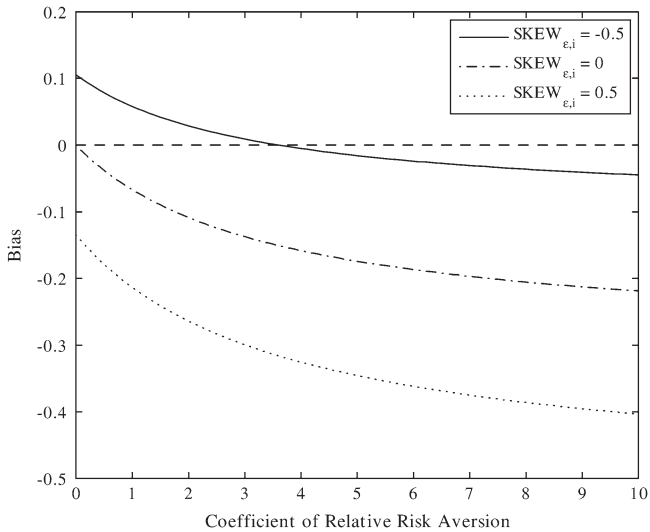

Figure 3. Bias from risk-neutral variance
We plot the bias $\beta_i^{\mathrm{OI}} - \beta_i$ as a function of the coefficient of relative risk aversion for three different levels of idiosyncratic skewness, $\mathrm{SKEW}_{\epsilon,i}$. We set $\beta_i = 1$, $\mathrm{VAR_m} = 0.24^2$, and $\mathrm{SKEW_m} = -1.44$, based on sample averages. $\mathrm{VAR}_{\epsilon,i}$ is set equal to the difference between the average firm variance and the market variance which is roughly 0.24^2. $\mathrm{VAR_i}$ and $\mathrm{SKEW_i}$ can then be computed from $\mathrm{VAR_i} = \beta_i^2 \mathrm{VAR_m} + \mathrm{VAR}_{\epsilon,i}$ and Equation (9), which gives the inputs needed for computing β_i^{OI}.

If the excess kurtosis is close to zero in individual stocks and in the market returns, this is approximately equal to $\mathrm{SKEW}_{\mathrm{i}}^{p}/\mathrm{SKEW}_{\mathrm{m}}^{p}$. Kurtosis is difficult to estimate reliably from returns as well as options, and we therefore do not attempt to assess the bias arising from nonzero excess kurtosis here.

Even if the moments are different under the two measures, the option-implied beta estimates may be useful for making assessments about beta. This issue also arises in the literature on volatility forecasting. Even though the implied volatility from options is a risk-neutral volatility measure, empirical researchers continue to use implied volatility for volatility estimation because its forecasting performance is very good. We refer the reader to Britten-Jones and Neuberger (2000) for further theoretical discussion. As an excellent recent example of this approach, Busch, Christensen, and Nielsen (2008) find that the implied volatility from options works better for forecasting future volatility than the state-of-the-art model based on lagged realized volatility (from intraday data) only. This is true in foreign exchange, equity, and bond markets. This strong empirical finding obtains in spite of the fact that the presence of a stochastic volatility risk premium theoretically ought to reduce the forecasting power of implied volatility.

We thus argue that the usefulness of the option-implied beta is largely an empirical issue. The (unobserved) differences between the risk-neutral and the

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physical moments will translate into empirically measurable estimation and forecasting errors, and the size of these forecasting errors will determine the method's usefulness.

3.5 OPTION-IMPLIED BETAS AND OPTION-IMPLIED STATE PRICE DENSITIES

Several papers have used index option prices to construct option-implied state price densities. See, for example, Jackwerth and Rubinstein (1996), Ait-Sahalia and Lo (2000), Jackwerth (2000), and Bliss and Panigirtzoglou (2004).

The absence of arbitrage guarantees the existence of a stochastic discount factor, M, with the property that

$$E[M(1 + R_i)] = 1.$$

Assuming the existence of a risk-free rate, R_f, we can write the expected excess return on asset i as

$$E[R_i - R_f] = -(1 + R_f)\mathrm{Cov}(M, R_i).$$

So note that even if we have the stochastic discount factor implied from index options, we still need to construct an estimate of the covariance between the stochastic discount factor and the return on each individual stock in order to get the desired estimate of the expected return on the stock. The stochastic discount factor alone does not provide all the information required to compute the expected returns on individual stocks.

It is not obvious how to obtain alternative estimates of the required covariance using only index and individual equity option prices. Using only this information is crucial because our goal is to construct estimates of expected returns using only one day of index and individual equity option prices. Our approach essentially assumes that the stochastic discount factor is linear in the market return so that the single-factor CAPM model obtains. In that case, the estimation of the expected return on the individual stock requires an estimate of its β with the market return that we obtain using options on the index and on individual stocks as outlined above.

4. Empirical Results on Option-Implied Betas

In this section, we first discuss, for all firms in the S&P100 index, the estimates of option-implied betas averaged over time. We then give a detailed discussion of the conditional performance of the option-implied betas using three firms, namely Walt Disney Corporation, Exxon Mobil Corporation, and Verizon Communications. Next we investigate the cross section of asset returns using option-implied and

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traditional beta estimates. Finally, we compare the ability of option-implied and traditional historical beta estimates to anticipate changes in future beta. Throughout we also analyze the empirical performance of the hybrid beta proposed by French, Groth, and Kolari (1983).

4.1 OPTION-IMPLIED AND *EX POST* BETA: UNCONDITIONAL EVIDENCE

As mentioned above, we can in principle compute several option-implied betas for every underlying asset, one for each available option maturity. However, we choose to focus on a fixed maturity of 180 days. This choice reflects a trade-off between option liquidity, which is largest for options with 30–90 days to maturity, and the relevant horizon for firm risk, which is arguably considerably longer.

For each day, we linearly interpolate using the two contracts nearest to the 180-day maturity to get the 180-day VAR and SKEW contracts, always using one contract with maturity more than 180 days and one contract with maturity less than 180 days. Using these contracts, we obtain estimates of the 180-day option-implied beta β^{OI} using Equation (12) for each day t.

As a first assessment of the option-implied betas, Figure 4 graphically compares the time-averaged option-implied beta with the time-averaged *ex post* beta for each firm. Each "$\times$" marks the average option-implied beta and average *ex post* beta for one of the S&P100 components. The dashed line is the 45-degree line, and the solid line represents the regression line of *ex post* beta on option-implied beta. Note that the regression fit is remarkably good at 67.5%. The solid line has a slope of 1.14 and an intercept of -0.212. On average, option-implied betas are slightly more centered around one than the *ex post* betas. However, recall that raw beta estimates are adjusted toward one in many applications of historical beta. See, for instance, Damodaran (1999, chapter 4), Bodie, Kane, and Marcus (2007, p. 284), and the references therein for more on the motivation for these types of adjustments. If we apply this sort of adjustment to the realized *ex post* betas in Figure 4, the resulting regression line is very close to the 45-degree line.

We conclude that the correspondence across firms between option-implied betas and *ex post* betas is high. This is quite remarkable as the option-implied beta uses only one day of option data, and the *ex post* beta is computed using daily returns over a 6-month period. Encouraged by this finding, we proceed by analyzing the cross-sectional and forecasting performance of the option-implied betas. We start by providing a detailed discussion of the option-implied beta dynamics for three of the firms in our S&P100 sample. These results are very different from the unconditional evidence discussed here and emphasize the conditional performance of the beta estimates.

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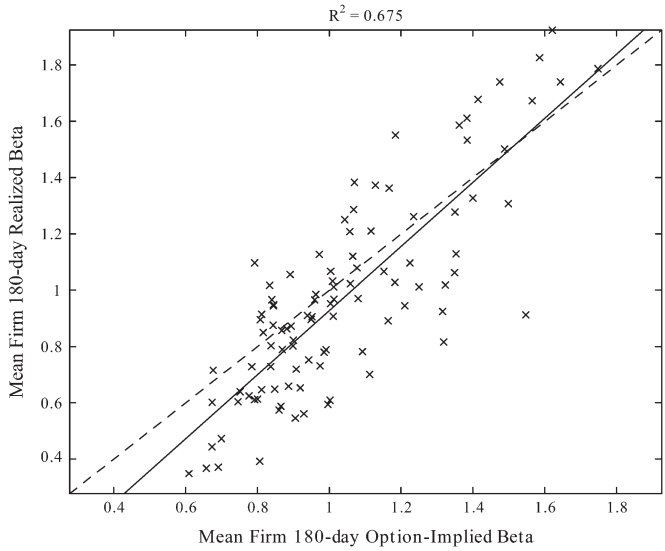

Figure 4. Mean *ex post* beta versus option-implied beta
We plot time averages of *ex post* beta for each of the S&P100 components versus the time averages of option-implied beta. The averages are computed for the period January 1 1996 to December 31 2004. The solid line is the regression line of mean *ex post* beta on mean option-implied beta. The slope of the regression is 1.14, and the intercept is −0.212.

4.2 OTHER BENCHMARK BETAS

When studying the conditional performance of the option-implied betas, we have to formulate historical benchmark betas. In implementing historical benchmark betas, a number of choices have to be made. For an overview, see, for instance, Damodaran (1999). For our purpose, two important choices are the length of the estimation period and the frequency of the return data. With respect to the choice of data frequency, we are constrained by the fact that we do not have an extensive time series of option data available. We thus estimate historical betas using daily returns to construct the most powerful test possible of the option-implied beta.[11]

With respect to the length of the estimation period, we implement historical beta in a number of different ways. Because we use 180-day option-implied beta β^{OI}, the use of 180 daily returns to compute historical beta is an obvious alternative. On the other hand, many academic studies of the CAPM have followed the approach of

[11] The use of daily betas has some disadvantages, see, for instance, Scholes and Williams (1977). However, in the event study literature, daily data and short estimation windows have been used extensively. See MacKinlay (1997) for a review. Several recent cross-sectional studies have also started using daily betas, typically constructed using estimation windows less than 5 years. See, for example, Ang, Chen, and Xing (2006), Barberis, Shleifer, and Wurgler (2005), and Lewellen and Nagel (2006).

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Black, Jensen, and Scholes (1972) and Fama and MacBeth (1973) and computed historical betas using returns for the past 60 months. Industry providers of betas typically use estimation periods between 2 and 5 years (see Damodaran, 1999, p. 88; Bodie, Kane, and Marcus, 2007). When investigating the robustness of our results with respect to the estimation window, we find that using historical returns estimated using 1–5 years yields much worse results than using 6 months (180 days) of daily returns. If we interpret the 180-day historical betas as estimates of the conditional beta, as in Lewellen and Nagel (2006), this indicates that the conditional historical betas perform better than the unconditional ones obtained using longer historical windows. Please note that we do not always report historical beta results for all estimation windows because of space constraints.

4.3 THREE CASE STUDIES

We cannot discuss the results for all hundred S&P100 components in detail because of space constraints, but we provide a detailed discussion of the forecasting performance for three of the components of the index: Disney, Exxon, and Verizon. In Section 4.5, we discuss results for all hundred stocks and provide more details about the analysis.

Figure 5 plots the option-implied skewness and volatility for these three companies. Comparing with Figure 1, it is clear that the volatility for all three companies is positively correlated with S&P500 volatility. In fact, the correlations are 0.71, 0.78, and 0.48, respectively. Skewness patterns are more complex and harder to relate to S&P500 skewness. Verizon skewness substantially increases in the second half of 1998, at a time when S&P500 skewness is also large, but in fact the overall correlation between the two series is -0.01. Disney skewness increases at the end of 1997 when S&P500 skewness increases, but the overall correlation is 0.01. It is difficult to visually identify covariation patterns between Exxon and S&P500 skewness; the overall correlation is 0.10.

The left column of panels in Figure 6 presents the time path of betas for Disney. We compare the option-implied beta with our proxy for the *ex post* "realized" beta, which is computed as the covariance divided by variance for *ex post* daily returns over the 180-day period, depicted in the top row of Figure 6. There is substantial variation in the *ex post* betas, and both the option-implied beta and the 180-day historical beta do an excellent job at capturing this variation. The 180-day historical beta does slightly better overall. The 5-year historical beta is much too smooth to capture the variation in the 180-day *ex post* beta.

The middle column of Figure 6 presents a similar analysis for Exxon. Once again the 5-year historical beta does not perform well. The 180-day historical beta substantially outperforms the option-implied beta. However, closer inspection of the

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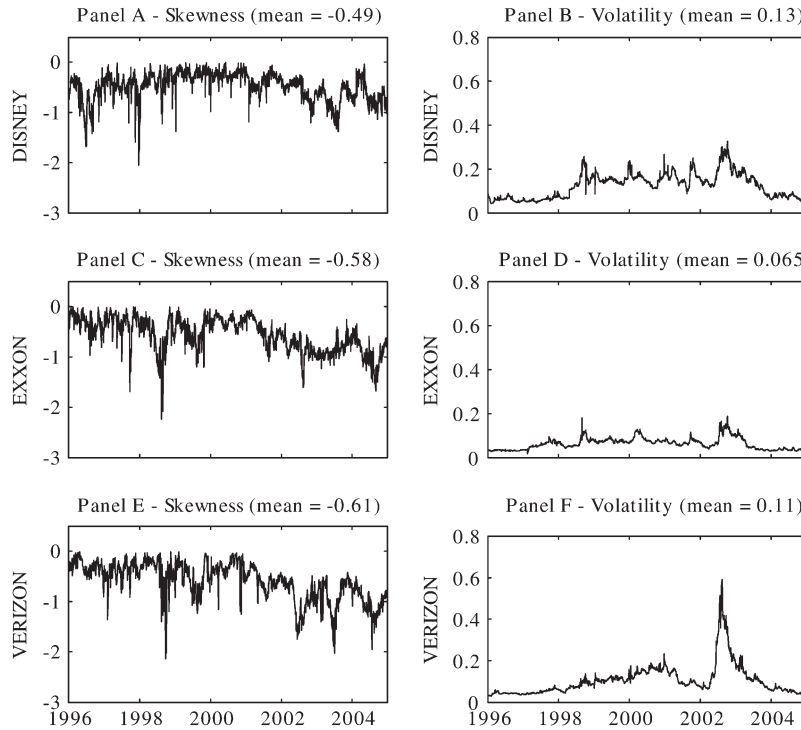

Figure 5. Option-implied moments for Disney, Exxon, and Verizon
We plot the time series of the option-implied moments needed for computing the option-implied beta for Walt Disney Corporation (DIS), Exxon Mobil Corporation (XOM), and Verizon Communications (VZ). The other moments needed are the option-implied volatility and skewness for the S&P500 in Figure 1. We use moments for 180-day returns in all cases. The moments are calculated at a daily frequency for the period January 1 1996 to December 31 2004.

figures indicates that this result is largely due to the patterns in *ex post* beta during 2000 and 2001, when the *ex post* beta becomes very small and even negative. A negative beta is widely regarded as unrealistic and therefore indicative of a problem with our proxy for the *ex post* beta. In our opinion, this suggests that it is important to look beyond the simple correlation between the *ex post* beta and the forecasts. In the case of Exxon, the 180-day historical beta substantially outperforms the option-implied beta when judged by correlation but that is only because the 180-day historical beta is equivalent to the lagged *ex post* beta and therefore ends up being unrealistically small or negative in the period 2000–01. The time path for the option-implied betas is much more plausible. See also Lewellen and Nagel (2006) for negative estimates of historical betas obtained using short data windows.

The right column of Figure 6 presents our findings for Verizon. In this case, the option-implied beta substantially outperforms both historical betas, as well

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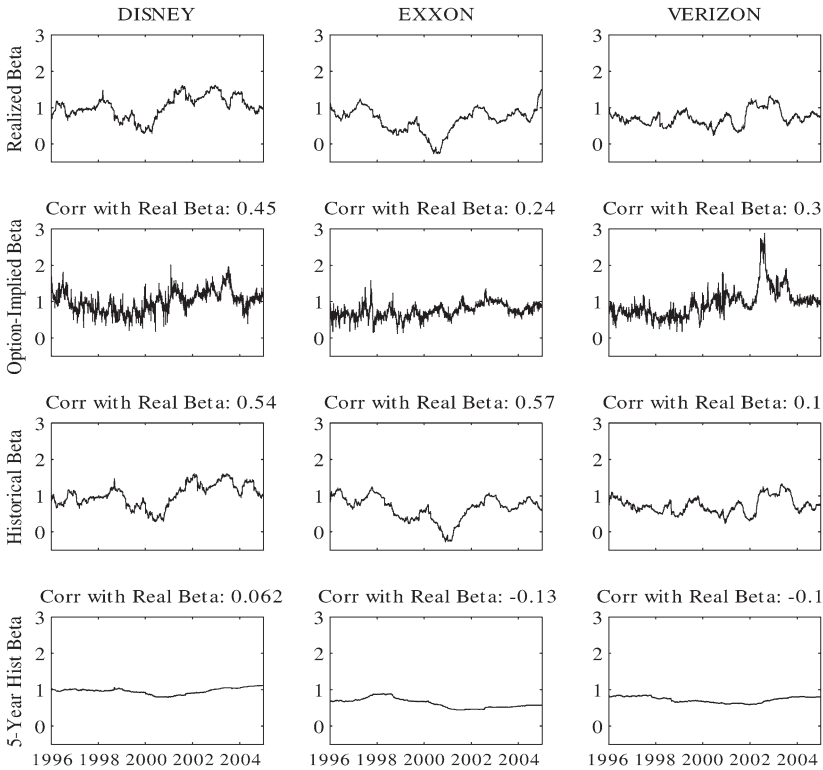

Figure 6. Realized, option-implied, and historical betas: Disney, Exxon, and Verizon
We plot the time series of different types of betas for Disney, Exxon, and Verizon for the period January 1 1996 to December 31 2004. The top row plots the time series of *ex post* 180-day realized betas (β^{REAL}). On each day, a 180-day *ex post* beta is computed using the returns for the following 180 days. The second row plots the time series of option-implied betas. On each day, a 180-day option-implied beta (β^{OI}) is computed. The third row plots the time series of 180-day historical betas, computed using the previous 180 days of returns. The bottom row plots the time series of 5-year historical betas, computed using the previous 1,825 days of returns.

as the 1-year and 2-year historical beta forecasts that are not included because of space constraints. Note how the option-implied beta nicely captures the increase in the *ex post* beta toward the end of the sample, even though it overshoots in 2002.

The results from the three case studies encourage a full-scale investigation using the one hundred S&P100 components. However, they also illustrate that the *ex post* realized beta computed over a relatively short period such as 180 days can produce questionable estimates of the true but unknown beta. This caveat is important when interpreting the results below. The three case studies also illustrate that the option-implied betas contain a certain amount of high-frequency noise when estimated from only one day of options data. We could reduce this noise by estimating

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the option-implied betas using several days of options. However, in order to be as transparent as possible, all the option-implied betas below are estimated using just one day of options data.

4.4 THE CROSS-SECTION OF RETURNS

Perhaps, the most important implications of factor models are cross-sectional. We therefore investigate the cross-sectional performance of the option-implied betas, even though our sample of one hundred firms observed over 9 years is far from ideal to study the cross section. We first regress average 180-day and then average 365-day excess returns on average beta in the spirit of Black, Jensen, and Scholes (1972).

Panel A of Table III presents the first set of results, with year-by-year cross-sectional regressions and 180-day excess returns. We show results for three different beta estimates: option-implied beta, historical beta using 180 days of returns, and hybrid beta using option-implied volatilities but correlations from 180 days of returns.

Consider first the regressions using historical betas. Note that the slope coefficient is positive for the 1996–99 years, negative for the 2000–02 years, and then again positive for the 2003–04 years. The market movements surrounding the bursting of the dot-com bubble in 2000–02 are clearly difficult to reconcile with the single-factor model. This pattern is also observed when using option-implied beta. We boldface the R^2 for option-implied beta and hybrid beta when it is larger than the R^2 from historical beta. Notice that the option-implied beta almost always has a larger R^2 than the historical beta. This is not the case for the hybrid beta.[12]

Panel B of Table III reports results for the overall 1996–2004 period. Given the negative slopes on beta during 2000–02, we also report results for three subperiods. For the overall sample, the slope is positive but small and the fit is better when using historical beta. Figure 7(A) shows the mean excess 180-day return scattered against beta when using option-implied and historical betas, respectively. The two beta estimates perform very similarly on the first subsample, whereas the option-implied beta performs best on the most recent subsample, perhaps because the options markets are getting more liquid over time. The 2000–02 period appears as an anomaly with a negative relationship between returns and beta for both beta estimates.

In Panels C and D of Table III, we repeat the analysis using excess returns over 365 days instead of 180 days. The results are very similar. Option-implied beta again has an R^2 that is higher than that from historical beta in most years. The magnitudes of the R^2 from the option-implied betas are similar as well.

[12] We recognize that having a high R^2 when the slope estimate is negative is not necessarily desirable.

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Table III. Cross-sectional regression of average realized excess return on average predicted beta

For the one hundred firms in the S&P100, we cross-sectionally regress average excess return on the average predicted beta. The excess return is defined as the actual equity return less the 3-month *T*-bill rate. In Panel A, cross-sectional regressions are run for each year of data. In Panel B, we report the full-sample result as well as three subperiods corresponding to before, during, and after the 3 years with negative slope coefficients on historical beta in Panel A. Boldface font indicates that the R^2 is larger than that of the corresponding regression with historical beta.

	Option-implied beta			Historical beta			Hybrid beta		
	Slope	*t*-statistics	R^2	Slope	*t*-statistics	R^2	Slope	*t*-statistics	R^2
Panel A: 180-Day excess return, year-by-year regressions									
1996	0.07	1.25	0.02	0.13	2.72	0.07	0.14	1.86	0.04
1997	0.26	4.05	**0.14**	0.11	2.17	0.05	0.18	2.32	**0.05**
1998	0.35	4.24	**0.16**	0.17	3.36	0.10	0.27	3.60	**0.12**
1999	0.71	7.14	**0.34**	0.29	5.76	0.26	0.43	5.41	0.23
2000	−0.21	−3.64	0.12	−0.17	−4.88	0.20	−0.20	−4.73	0.19
2001	−0.16	−5.06	**0.21**	−0.08	−4.40	0.17	−0.10	−4.27	0.16
2002	−0.11	−2.87	**0.08**	−0.05	−1.21	0.02	−0.05	−0.99	0.01
2003	0.12	4.32	**0.17**	0.12	3.70	0.13	0.12	3.20	0.10
2004	0.03	0.72	**0.01**	0.01	0.45	0.00	−0.01	−0.29	0.00
Panel B: 180-Day excess return, subperiod regressions									
1996–99	0.41	9.75	0.49	0.27	9.88	0.50	0.42	9.67	0.49
2000–02	−0.16	−5.93	**0.27**	−0.09	−4.75	0.19	−0.10	−4.42	0.17
2003–04	0.13	4.66	**0.19**	0.08	2.99	0.09	0.10	2.85	0.08
1996–2004	0.05	2.36	0.05	0.05	3.95	0.14	0.07	3.86	0.13
Panel C: 365-Day excess return, year-by-year regressions									
1996	0.39	3.11	0.09	0.48	4.28	0.16	0.57	3.08	0.09
1997	0.67	4.39	**0.17**	0.22	1.80	0.03	0.39	2.05	**0.04**
1998	1.08	6.22	**0.29**	0.51	4.73	0.19	0.80	4.88	**0.20**
1999	1.08	5.23	0.22	0.53	5.43	0.23	0.75	4.90	0.20
2000	−0.44	−5.10	0.21	−0.31	−5.77	0.26	−0.37	−5.73	0.26
2001	−0.26	−5.02	**0.21**	−0.13	−4.08	0.15	−0.16	−3.98	0.14
2002	0.04	0.69	0.01	0.13	2.33	0.05	0.14	2.15	0.05
2003	0.13	3.04	**0.09**	0.08	1.50	0.02	0.06	1.07	0.01
2004	0.14	1.77	**0.03**	0.07	1.28	0.02	0.05	0.62	0.00
Panel D: 365-Day excess return, subperiod regressions									
1996–99	0.91	8.94	0.45	0.61	8.96	0.45	0.92	8.78	0.44
2000–02	−0.25	−5.53	**0.24**	−0.12	−3.62	0.12	−0.13	−3.39	0.11
2003–04	0.18	3.55	**0.12**	0.11	2.33	0.05	0.12	1.81	0.03
1996–2004	0.15	3.35	0.10	0.14	4.69	0.18	0.18	4.58	0.18

Figure 7(B) reports the mean excess 365-day return scattered against the average option-implied beta (left column) and against the average historical beta (right column). Figure 7(B) clearly looks very similar to Figure 7(A) where 180-day returns were used. Option-implied and historical beta estimates perform very similarly on the first subsample, they both perform poorly on the second subsample, and the option-implied beta performs best on the third subsample.

It is not straightforward to relate our results to the available literature for a number of reasons. First, we use a short sample because of the limited availability of option

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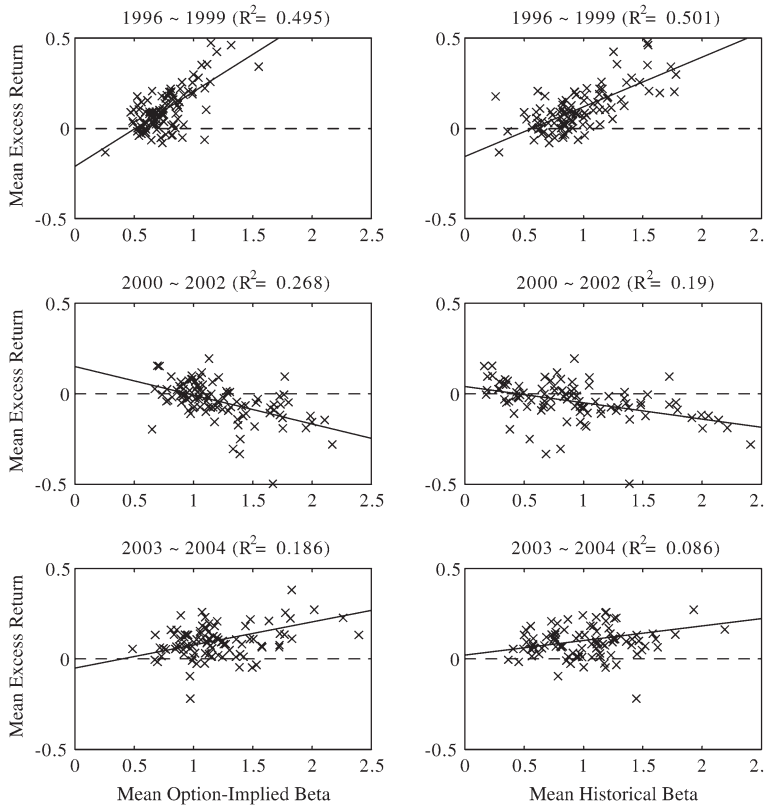

Figure 7. (A) Mean excess return versus mean beta, 180-day returns. We plot the average excess 180-day return for each of the S&P100 components against the average option-implied beta (left column) and the average historical 180-day beta (right column). The averages are computed for three subperiods: 1996–99 (top row), 2000–02 (middle row), and 2003–04 (bottom row). The solid lines represent the regression of excess return on beta.

data. Second, we use individual stock returns rather than portfolios.[13] Third, we use 180- and 365-day returns, while most of the literature uses monthly returns. Fourth, we investigate a relatively small cross-sectional sample. Fifth, our sample is limited to large cap stocks, and therefore the cross-sectional application has limited power to test a given model. For the purpose of this study, we merely conclude that the option-implied beta has significant explanatory power in the cross section. This is

[13] It is well known that assessing the performance of the CAPM using individual stocks is subject to testing problems related to measurement error in the betas. See Black, Jensen, and Scholes (1972) for an early discussion of this problem. We limit ourselves to one hundred stocks because we want to use liquid option contracts.

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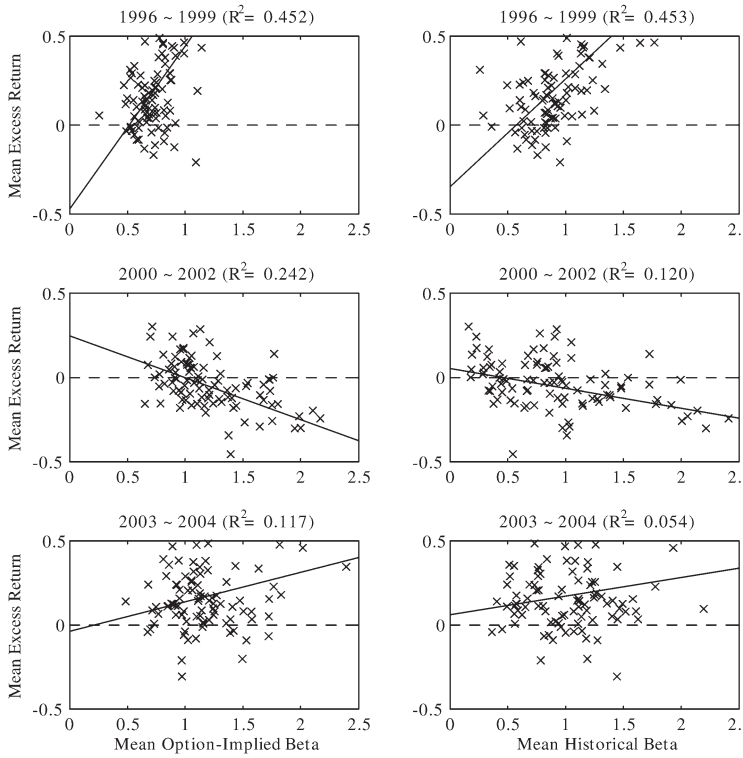

Figure 7. (B) Mean excess return versus mean beta, 365-day returns. We plot the average excess 365-day return for each of the S&P100 components against the average option-implied beta (left column) and the average historical 180-day beta (right column). The averages are computed for three subperiods: 1996–99 (top row), 2000–02 (middle row), and 2003–04 (bottom row). The solid lines represent the regression of excess return on beta.

quite remarkable given that the option-implied betas are estimated using only one day of option data.

4.5 ANTICIPATING *EX POST* REALIZED BETA

We started the empirical investigation in Section 2.3 by assessing the ability of option-implied moments to track changes in future beta. We then derived a new beta estimator using the option-implied moments. In this section, we close the loop and assess the ability of option-implied beta to anticipate changes in future beta.

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Consider Table IV. We run multivariate regressions of *ex post* beta on historical beta and either option-implied or hybrid beta, for each firm in the S&P100.[14] We report for each industry the proportion of stocks where the estimated coefficient for OI or HYBR, respectively, is statistically significantly estimated. OI refers to option-implied beta, and HYBR refers to using option-implied volatilities but historical return correlations. Panel A reports results when the 180-day historical beta is used as the benchmark. Panels B and C repeat the exercise using the 1- and 5-year historical betas, respectively, as a benchmark. In each panel, we report on three different forecasting horizons: 180 days, 1 year, and 2 years. This is inspired by the somewhat surprising empirical results discussed in the context of Table II. While the performance of the option-implied moments for 180-day *ex post* betas in Table II is impressive, the performance improves even more when using 1- and 2-year *ex post* betas.

First consider Panel A. Of the one hundred stocks we investigate, 32% have statistically significant loadings on the option-implied beta at the 180-day forecast horizon, even though the historical beta is included in the regression. When the horizon of interest increases from 180 to 365 and 730 days, this percentage improves to 38% and 56%, respectively. Panel A also reports results for hybrid beta, where the correlation used for computing the hybrid beta is computed using either 180 days, 1 year, or 5 years of daily returns. Clearly the hybrid beta performs well. When forecasting 180-day *ex post* betas, the percentage of significant estimates is 32% when computing correlation using 180 days of data. The percentages are 26% and 39% when correlations are computed using 1- and 5-year windows, respectively.

The performance of the option-implied as well as hybrid betas improves when forecasting 1- and 2-year *ex post* betas. These results are consistent with the results for forecasting using return moments reported in Table II, and they are somewhat surprising. One potential explanation is the potential problems with *ex post* betas evident from Figure 6. As discussed before, *ex post* betas often take on implausible values when constructed using a short horizon. This is less often the case when using longer horizons, and this may explain the improved forecasting performance of the option-implied betas.

Panels B and C use 1- and 5-year historical betas, respectively, as a benchmark, instead of 180-day historical betas as in Panel A. The historical betas computed using longer windows have less forecasting power, as is evident from Figure 6, and as a result the option-implied and hybrid betas perform relatively better overall.

[14] When implementing forecasting regressions, one potential problem is overlapping data (see Christensen and Prabhala, 1998). Two potential solutions are to use instrumental variable techniques and to use nonoverlapping data. Instrumental variable regressions were noninformative because of the poor quality of the instruments. Regression results were very similar when using a sample of nonoverlapping data based on 30-day betas.

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Table IV. Proportion of stocks for which option-implied or hybrid betas predict realized beta

We run a time series regression of realized beta (180-, 365-, and 730-day horizons) on the historical beta and OI beta for each firm in the S&P100. We then report for each industry the proportion of stocks for which the coefficient for OI is significant at 95% confidence level based on Newey–West *t*-statistics with lag 180. We repeat the procedure by replacing the OI beta with HYBR betas computed over horizons of 180, 365, and 1,825 days. OI refers to option-implied beta and HYBR refers to using option-implied volatilities but historical return correlations. We report the results when the historical betas are computed over 180-, 365-, and 1825-day horizons in Panels A, B, and C, respectively.

	180-Day realized beta				365-Day realized beta				730-Day realized beta			
Industry	OI	HYBR180	HYBR365	HYBR1825	OI	HYBR180	HYBR365	HYBR1825	OI	HYBR180	HYBR365	HYBR1825
Panel A: 180-Day historical beta as benchmark												
Energy	0.33	0.17	0.17	0.80	0.33	0.33	0.17	0.80	0.50	0.17	0.17	0.80
Materials	0.67	0.67	0.67	0.50	0.83	0.67	0.83	0.33	1.00	1.00	1.00	0.50
Industrials	0.38	0.31	0.38	0.31	0.46	0.54	0.31	0.54	0.77	0.62	0.46	0.77
Consumer discretionary	0.41	0.59	0.41	0.38	0.41	0.53	0.53	0.38	0.65	0.65	0.53	0.63
Consumer staples	0.17	0.08	0.00	0.33	0.17	0.08	0.00	0.50	0.50	0.33	0.08	0.58
Health care	0.20	0.30	0.00	0.56	0.20	0.30	0.30	0.44	0.30	0.20	0.20	0.56
Financials	0.31	0.23	0.15	0.11	0.38	0.23	0.15	0.11	0.62	0.46	0.38	0.22
Information technology	0.29	0.43	0.36	0.31	0.43	0.36	0.50	0.31	0.36	0.36	0.21	0.23
Telecommunications	0.25	0.00	0.50	0.00	0.25	0.25	0.25	0.00	0.75	0.50	0.25	0.33
Utilities	0.20	0.00	0.00	1.00	0.40	0.00	0.20	1.00	0.20	0.00	0.00	1.00
All hundred stocks	0.32	0.32	0.26	0.39	0.38	0.35	0.33	0.42	0.56	0.45	0.34	0.54
Panel B: 365-Day historical beta as benchmark												
Energy	0.33	0.50	0.17	0.80	0.33	0.67	0.17	0.80	0.50	0.67	0.17	0.80
Materials	0.67	0.50	0.67	0.17	0.67	0.83	0.67	0.00	1.00	0.83	0.67	0.33
Industrials	0.38	0.23	0.23	0.31	0.62	0.38	0.23	0.46	0.85	0.69	0.46	0.85
Consumer discretionary	0.41	0.65	0.59	0.44	0.53	0.65	0.76	0.44	0.65	0.65	0.71	0.69
Consumer staples	0.17	0.17	0.08	0.58	0.25	0.33	0.08	0.67	0.42	0.42	0.17	0.58
Health care	0.40	0.20	0.30	0.56	0.30	0.30	0.40	0.56	0.40	0.20	0.30	0.56
Financials	0.31	0.08	0.38	0.22	0.38	0.38	0.38	0.33	0.62	0.38	0.46	0.44
Information technology	0.29	0.43	0.36	0.31	0.36	0.64	0.57	0.23	0.50	0.29	0.43	0.23
Telecommunications	0.25	0.25	0.50	0.00	0.25	0.50	0.50	0.00	0.75	0.50	0.50	0.33
Utilities	0.60	0.60	0.00	0.75	0.60	0.60	0.00	0.75	0.20	0.20	0.20	0.75
All hundred stocks	0.36	0.35	0.34	0.41	0.43	0.51	0.41	0.43	0.59	0.48	0.43	0.57

(*Continued*)

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Table IV. (Continued)

	180-Day realized beta				365-Day realized beta				730-Day realized beta			
Industry	OI	HYBR180	HYBR365	HYBR1825	OI	HYBR180	HYBR365	HYBR1825	OI	HYBR180	HYBR365	HYBR1825
Panel C: 1825-Day historical beta as benchmark												
Energy	0.80	0.60	0.40	0.60	0.40	0.40	0.40	0.60	0.80	0.40	0.40	0.80
Materials	0.83	1.00	1.00	0.83	1.00	1.00	1.00	0.67	1.00	1.00	1.00	0.83
Industrials	0.54	0.54	0.46	0.23	0.54	0.54	0.54	0.54	0.69	0.69	0.77	0.77
Consumer discretionary	0.63	0.69	0.50	0.56	0.63	0.63	0.69	0.75	0.75	0.69	0.75	0.75
Consumer staples	0.25	0.75	0.67	0.75	0.25	0.67	0.58	0.75	0.50	0.75	0.58	0.75
Health care	0.44	0.67	0.44	0.78	0.44	0.56	0.00	0.78	0.11	0.00	0.00	0.78
Financials	0.44	0.33	0.44	0.33	0.44	0.56	0.56	0.56	0.56	0.67	0.56	0.56
Information technology	0.62	0.62	0.54	0.62	0.62	0.69	0.62	0.62	0.77	0.77	0.77	0.69
Telecommunications	0.33	0.33	0.67	0.33	0.67	0.67	0.67	0.33	0.67	0.67	0.67	0.67
Utilities	0.75	1.00	1.00	0.25	0.75	1.00	1.00	0.25	0.25	1.00	0.75	0.25
All hundred stocks	0.54	0.64	0.57	0.54	0.54	0.64	0.58	0.63	0.62	0.66	0.63	0.71

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The improvements provided by option-implied and hybrid betas differ across sectors. For the industrials, consumer discretionary, materials, and IT sectors, they perform well. Their performance is generally weaker for the consumer staples and health care industries.

In Table V, we cross-sectionally regress the improvement in correlation offered by option-implied and hybrid betas on various firm characteristics. We only report results obtained using the 180-day historical return as the benchmark as this is the best performing historical beta. Each regressor is normalized by dividing by its standard deviation. Note that for all horizons and for both option-implied and hybrid betas, the distance of average *ex post* beta from one is negative and significant. Thus, option-implied betas have relative difficulty when the *ex post* beta is far from unity. This effect is particularly strong for option-implied beta and was evident already in Figure 4 where on average the option-implied beta tended to be closer to one than *ex post* beta. Note again that the approach commonly used for historical betas that shrinks the betas toward unity may lessen this effect.

The mean *ex post* beta variable is significant in two of three option-implied beta cases, suggesting that option-implied beta performs better for higher beta stocks. Firm size is significantly negative in two of three option-implied columns, indicating that option-implied beta performs better for the smaller firms in the sample. Recall, however, that all the firms we consider are large caps. The option volume is positive in two of the three option-implied columns. This may suggest that estimates of the option-implied moments will improve as option markets become more liquid. We therefore expect that as option market liquidity continues to improve, the added value of using option-implied information to compute beta will increase.

Table V. Improvement in correlation regressed on firm characteristics

We cross-sectionally regress the improvement in correlation on various firm characteristics. HYBR refers to the 180-day hybrid beta. Each regressor is normalized by dividing by the standard deviation. Bold face font indicates a t-statistic significant at the 5% level.

	180-Day realized beta		365-Day realized beta		730-Day realized beta	
Regressor	OI	HYBR	OI	HYBR	OI	HYBR
Constant	**−0.336**	0.002	−0.249	0.020	0.102	0.142
Firm size	**−0.197**	**−0.067**	**−0.159**	−0.050	−0.116	−0.043
Option volume	**0.169**	**0.075**	**0.128**	0.044	0.087	0.026
Mean (REALB)	**0.127**	−0.006	0.112	0.011	0.011	−0.017
|Mean (REALB) − 1|	**−0.163**	**−0.043**	**−0.156**	**−0.045**	**−0.153**	**−0.060**
SD (REALB)	0.002	0.024	−0.005	0.012	0.027	0.017
R^2	0.35	0.13	0.26	0.09	0.15	0.10

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4.6 COMBINING THE INFORMATION IN HISTORICAL AND OPTION-IMPLIED BETAS

So far we have focused on comparing betas computed from option prices with those computed from returns. In this section, we instead ask if there is scope for combining the two types of beta. They are computed using very different information sets, and so it is likely that the option-based betas complement the information in traditional return-based betas.

In order to assess the potential benefits of combining betas, we investigate multivariate regressions of *ex post* realized beta on the two kinds of betas. The multivariate forecasting regression is

$$\beta_{t,t+H}^{\text{REAL}} = \theta_1 + \theta_2 \beta_t^{\text{OI}} + \theta_3 \beta_t^{\text{HIST}} + u_{t,t+H}, \tag{13}$$

where β_t^{REAL} is *ex post* realized beta, β_t^{HIST} is the (best performing) 180-day historical beta, and β_t^{OI} is the option-implied beta computed using option prices on day t only.

The results using a horizon H of 180, 365, and 730 days are reported in Table VI. We run pooled panel regressions of the *ex post* beta on the forecasted betas, either by industry or by size decile. For the industry-based results in Panel A, the coefficient on historical beta is positive and significant virtually everywhere. When using a horizon of 180 days for *ex post* beta, the option-implied beta coefficient is positive and significant in five cases. Point estimates are large but usually smaller than the loadings on the historical betas, indicating that the information in the historical beta is more important. Looking next at the 365-day horizon, the option-implied beta is positive and significant in six cases. The results for the 730-day horizon are similar: seven significant option-implied betas. The results across industries largely confirm the findings from Table IV: the option-implied betas perform best for the materials, industrials, and consumer discretionary sectors.

These results suggest that the option-implied beta is complementary to the information in historical beta for predicting future beta. Once again, we obtain the interesting result that options contain important information for forecasting *ex post* betas computed over horizons that exceed the options' maturities.

In Panel B, both the historical beta and the option-implied betas are positive and significant in virtually every case. Unlike the case of the industry results, few patterns emerge as a function of firm size.

In summary, option-implied betas complement historical betas. Option-implied betas are computed using a very different information set than the one used for historical betas. This makes them useful in combination with the historical beta. We emphasize again that the option-implied beta is computed using only one day of data, and its performance is therefore quite remarkable.

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Table VI. Multivariate beta prediction panel regressions

We run multivariate regressions of *ex post* beta on forecasted beta. We consider three horizons for the *ex post* beta: 180, 365, and 730 days. We include two betas in each regression: option-implied beta (OI) and historical beta estimated on the past 180 daily returns (HIST). Newey–West *t*-statistics with lag 180 are in parentheses. We compute *t*-statistics by running pooled panel regressions. In Panel A, we pool by industry and in Panel B by firm-size decile. Statistical significance at the 5% level is indicated in bold.

	REALB (180)				REALB (365)				REALB (730)			
	Constant	OI	HIST	R^2	Constant	OI	HIST	R^2	Constant	OI	HIST	R^2
Panel A: Industry												
Energy	0.179	**0.219**	**0.475**	0.28	**0.294**	**0.242**	**0.347**	0.23	**0.468**	**0.305**	0.114	0.19
Materials	**0.195**	**0.286**	**0.491**	0.54	**0.230**	**0.330**	**0.430**	0.63	**0.263**	**0.401**	**0.341**	0.65
Industrials	**0.319**	0.230	0.424	0.30	0.331	0.258	0.393	0.39	0.371	0.266	0.350	0.40
Consumer discretionary	**0.438**	**0.188**	**0.344**	0.25	**0.488**	**0.190**	**0.297**	0.28	**0.591**	**0.176**	**0.222**	0.26
Consumer staples	**0.217**	−0.004	**0.634**	0.43	**0.229**	0.040	**0.560**	0.42	**0.218**	**0.138**	**0.422**	0.34
Health care	**0.378**	−0.019	**0.563**	0.33	**0.398**	0.026	**0.479**	0.33	**0.430**	**0.129**	**0.294**	0.23
Financials	**0.293**	0.033	**0.724**	0.56	**0.372**	0.022	**0.663**	0.52	**0.466**	0.006	**0.596**	0.49
Information technology	**0.546**	**0.184**	**0.447**	0.33	**0.650**	**0.143**	**0.404**	0.31	**0.859**	0.055	**0.334**	0.22
Telecommunications	0.112	0.046	**0.859**	0.58	0.192	0.026	**0.791**	0.60	**0.381**	0.009	**0.628**	0.43
Utilities	0.117	0.176	**0.573**	0.43	**0.194**	**0.233**	**0.411**	0.36	**0.292**	**0.308**	**0.202**	0.32
Panel B: Firm size												
1 (small)	**0.324**	**0.277**	**0.426**	0.43	**0.369**	**0.269**	**0.399**	0.50	**0.448**	**0.252**	**0.360**	0.48
2	**0.293**	**0.197**	**0.453**	0.30	**0.394**	**0.195**	**0.376**	0.28	**0.538**	**0.224**	**0.221**	0.23
3	**0.153**	**0.117**	**0.683**	0.55	**0.195**	**0.137**	**0.623**	0.56	**0.258**	**0.163**	**0.545**	0.51
4	0.098	**0.162**	**0.726**	0.60	**0.166**	**0.153**	**0.654**	0.60	**0.263**	**0.175**	**0.528**	0.51
5	**0.228**	**0.104**	**0.605**	0.43	**0.273**	**0.119**	**0.549**	0.45	**0.306**	**0.178**	**0.444**	0.42
6	**0.116**	**0.140**	**0.714**	0.62	**0.155**	**0.153**	**0.663**	0.64	**0.220**	**0.182**	**0.572**	0.61
7	**0.310**	**0.112**	**0.645**	0.50	**0.358**	**0.112**	**0.601**	0.52	**0.468**	**0.048**	**0.567**	0.48
8	**0.293**	**0.189**	**0.566**	0.47	**0.362**	**0.172**	**0.515**	0.46	**0.484**	**0.128**	**0.445**	0.40
9	**0.331**	**−0.042**	**0.614**	0.38	**0.347**	**0.015**	**0.519**	0.36	**0.380**	**0.105**	**0.344**	0.25
10 (big)	**0.239**	**0.167**	**0.630**	0.56	**0.319**	**0.158**	**0.565**	0.53	**0.439**	**0.151**	**0.463**	0.44

5. Concluding Remarks

Market betas are one of the most important concepts in the practice and theory of finance, and for many interesting applications of market betas, such as computing the cost of capital, out-of-sample performance is key. Currently, market betas are obtained by using regression techniques on historical data. Many historical implementations use a simple rolling regression approach, while other approaches allow more explicitly for time-varying betas. However, no matter how sophisticated the approach, historical betas implicitly assume that the past offers a good guide to the future.

This paper presents a radically different approach that extracts betas from option data. Because option data contain information about the future, this approach is inherently forward looking. The approach is inspired by the literature on volatility forecasting, where a number of authors have compared the forecasting performance of implied volatility with that of more traditional historical methods. The strength of our approach is that betas can be computed using a single cross section of option data, which may be an important advantage when a company experiences (potential) changes in its operating environment or capital structure.

We test our method using a very conservative approach by investigating how it compares with historical methods on average, including stable periods. We find that the option-implied estimates perform relatively well. Option-implied betas that were extracted for equities with liquid options often outperform the historical market beta in predicting the future beta in the following period. In some cases, combining historical betas with option-implied betas further improves results. We also provide a detailed study of the hybrid beta method proposed by French, Groth, and Kolari (1983). Hybrid betas that combine option-implied volatilities with historical correlations perform very well. Option-implied and hybrid betas also explain a sizeable amount of the cross-sectional variation in expected returns.

Much remains to be done. The computation of the option-implied beta uses moments extracted from options data. While we have made full use of recent innovations in the implementation of these procedures, and added some innovations ourselves, it may be that the out-of-sample performance of the option-implied betas can be improved through more efficient estimation of moments. Alternatively, it may be possible to better estimate option-implied correlation using the methods of Carr and Madan (2000). Also, we have not provided an explanation for the relatively poor performance of option-implied betas for stocks with very small *ex post* betas, and the differences in performance across industries also merit further investigation. Another remaining question is if option-implied beta performs even better in situations and time periods that can *a priori* be labeled as inherently

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unstable. It may also prove interesting to investigate the optimal combination of option-implied and historical betas, which is of course related to the previous question. Finally, we note that it may be possible to compute option-implied betas that are estimated for a particular purpose using the relevant statistical loss function, for instance, in a portfolio model (Granger, 1969).

Our technique can be used for a variety of applications, such as the detection of abnormal returns in event studies, and the uncovering of abnormal returns for portfolio management. The very definition of the word "event" indicates that some aspects of the firm or the firm's environment change, and therefore it will prove interesting to contrast the results obtained using option-implied betas with those obtained using historical betas. One particularly promising application is the computation of the cost of capital for newly merged companies.

The main focus in this paper has been on forecasting 180-day *ex post* betas, which are relevant for certain applications such as abnormal returns. For other applications, such as cost of capital calculations, longer horizon betas may be needed. We plan to investigate the performance of option-implied betas in this context by using long-term equity anticipation securities as well as option contracts with longer maturities traded on non-US markets. Indeed, our option-implied beta approach allows for the computation of a complete term structure of beta for each company so long as the options data are available.

We compute option-implied moments and betas using option prices on a given day. While this is the most obvious and transparent initial approach to investigating the method's merits, the performance of the option-implied betas may be improved by adjusting these betas using a pre-determined rule or by smoothing betas and/or moments using information extracted from option prices on other days. The optimal use and optimal smoothing of information contained in option prices is certainly worthy of further study.

Finally, we have compared and combined the option-implied betas with simple historical betas from daily data. Option-implied betas could alternatively be compared and combined with other methods. Many alternatives exist, including realized betas from intraday data as in Andersen *et al.* (2006), the GARCH betas in Bollerslev, Engle, and Wooldridge (1988), the stochastic Bayesian beta in Jostova and Philipov (2005), simple Bayesian adjustments to ordinary least squares such as Vasicek (1973), or commercial beta estimates such as those from BARRA, Bloomberg, and Ibbotson.

Appendix A: Replicating Payoff Functions

Carr and Madan (2001) show that any twice continuously differentiable payoff function $f(S)$ can be replicated with bonds, the underlying stock, and the cross section of out-of-the-money options. For convenience, we replicate their argument here. The fundamental theorem of calculus implies that for any fixed F,

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$$f(S) = f(F) + 1_{S>F}\int_F^S f'(u)\mathrm{d}u - 1_{S<F}\int_S^F f'(u)\mathrm{d}u$$

$$= f(F) + 1_{S>F}\int_F^S [f'(F) + \int_F^u f''(v)\mathrm{d}v]\mathrm{d}u$$

$$-1_{S<F}\int_S^F [f'(F) + \int_u^F f''(v)\mathrm{d}v]\mathrm{d}u.$$

Because $f'(F)$ is not a function of u, we are able to apply Fubini's theorem

$$f(S) = f(F) + f'(F)(S-F) + 1_{S>F}\int_F^S\int_v^S f''(v)\mathrm{d}u\mathrm{d}v + 1_{S<F}\int_S^F\int_S^v f''(v)\mathrm{d}u\mathrm{d}v.$$

Now integrate over u

$$f(S) = f(F) + f'(F)(S-F) + 1_{S>F}\int_F^S f''(v)(S-v)\mathrm{d}v + 1_{S<F}\int_S^F f''(v)(v-S)\mathrm{d}v$$

$$= f(F) + f'(F)(S-F) + \int_F^\infty f''(v)(S-v)^+\mathrm{d}v + \int_0^F f''(v)(v-S)^+\mathrm{d}v.$$

If we set F equal to the initial stock price, $F = S_0$, and integrate over K instead of v, where K is interpreted as the strike, we are left with the spanning equation

$$f(S) = [f(S_0) - f'(S_0)S_0] + f'(S_0)S + \int_{S_0}^\infty f''(K)(S-K)^+\mathrm{d}K$$

$$+ \int_0^{S_0} f''(K)(K-S)^+\mathrm{d}K.$$

From this equation, we see that the payoff $f(S)$ is spanned by a $[f(S_0) - f'(S_0)S_0]$ position in bonds, $f'(S_0)$ position in shares of the stock, and a $f''(K)\mathrm{d}K$ position in out-of-the-money options.

Appendix B: The Accuracy of the Moment Computations

As we do not have a continuum of option prices available to compute the moments, it is inevitable that certain biases will be induced in the estimation. We conducted a number of Monte Carlo experiments to determine the importance of these biases

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on the estimation of volatility and skewness, and we used the results of these Monte Carlo experiments to guide our empirical implementation. There are three types of biases that are of particular concern in the estimation of volatility and skewness: discretization of strike prices, truncation of the integration domain, and asymmetry of the integration domain. Jiang and Tian (2005) examine the effects of discretization and truncation on the computation of option-implied volatility. We closely follow their setup and extend their analysis to the computation of option-implied skewness.

To examine the size of the approximation errors induced by these biases, we generate option prices using Heston's (1993) stochastic volatility (HSV) model with standard parameterization based on the empirical results of Bakshi, Cao, and Chen (1997): $\theta = 0.04$, $\kappa = 2$, $\sigma_v = 0.225$, and $\rho = -0.5$. We set the initial instantaneous variance (V) to be equal to the long-run variance $V = \theta = 0.04$, the initial stock price equal to $S_0 = 100$, and the risk-free rate equal to $r = 0.05$. Because we are interested in a 180-day beta, we set the time to maturity equal to 180 days, $T = 180/365$. To measure the variance and the skewness of the distribution implied by the HSV parameterization, we use the following approach. To ensure that we do not encounter negative stock prices or negative variances, we use Ito's lemma to convert the risk-neutral stochastic volatility dynamics in HSV to $\mathrm{dln}S$ and $\mathrm{dln}V$. Once we discretize the equations, we get the following risk-neutral dynamics:

$$\ln(S_{t+\Delta t}) = \ln(S_t) + \left(r - \frac{1}{2}V_t\right)\Delta t + \sqrt{V_t}\sqrt{\Delta t}\epsilon^S_{t+\Delta t}, \tag{14}$$

$$\ln(V_{t+\Delta t}) = \ln(V_t) + \frac{1}{V_t}\left(\left(\kappa + \lambda\right)\left(\frac{\kappa\theta}{\kappa + \lambda} - V\right) - \frac{1}{2}\sigma_V^2\right)\Delta t + \frac{1}{\sqrt{V_t}}\sigma\sqrt{\Delta t}\epsilon^V_{t+\Delta t},$$

$$\epsilon^V_{t+\Delta t} = \rho\epsilon^S_{t+\Delta t} + \sqrt{1-\rho^2}\epsilon_{t+\Delta t},$$

where $\Delta t = 1/252$, assuming that there are 124 trading days in 180 calendar days. By iterating through these equations 124 times, we can generate a 180-day stock price path. We repeat this exercise 250,000 times, calculate the log returns $\ln(\frac{S_T}{S_0})$ of each path, and compute volatility, which is equal to 0.2037, and skewness, which is equal to -0.4610. To verify the accuracy of this simulation-based approach, we compare the call price with strike $K = 100$ obtained using simulation, C_{SIM}, with the closed-form solution C_{HEST}. We find $C_{\mathrm{HEST}} = 6.5905$ and $C_{\mathrm{SIM}} = 6.5780$.

We now have benchmarks to evaluate the accuracy of our estimation procedure. The first bias we investigate results from the discreteness of the strike prices. To compute the moments arbitrarily precisely, we need a continuum of option prices

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from 0 to plus infinity, while in reality we only have prices at fixed strike price levels. In the first part of this experiment, we generate HSV call and put prices with different discrete strike price intervals d ranging from $d = 0.1$ to $d = 5$ using the integration domain $[Su^{-1}, Su]$ with $u = 2$. The percentage approximation errors for the volatility and skewness estimates are plotted in the top row of panels in Figure 8 for both simple trapezoidal integration using only observed prices (dotted line) and the interpolation–extrapolation technique of Jiang and Tian (2005) described in Section 2 (solid line). We conclude that when using the interpolation–extrapolation technique of Jiang and Tian, the bias is negligible for realistic discreteness.

We next investigate the bias resulting from the truncation of the integration domain. We keep the strike price interval constant at $d = 0.1$, and we vary the width of the integration domain $[Su^{-1}, Su]$ by changing u between 1.1 and 2. The middle

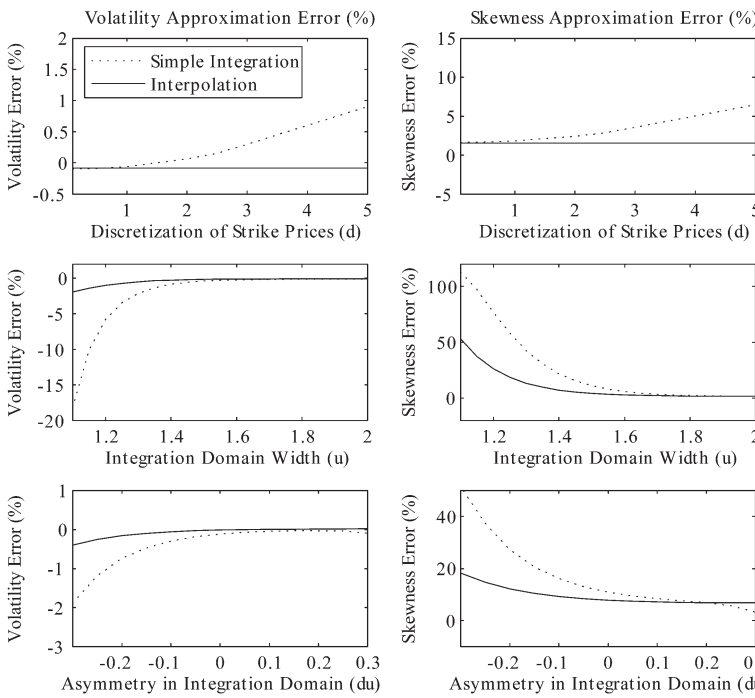

Figure 8. Volatility and skewness approximation error
We plot the percentage approximation errors for the simple integration approach (dotted line) and the interpolation–extrapolation technique (solid line) of Jiang and Tian (2005). HSV call and put prices are generated with parameters $\theta = 0.04$, $\kappa = 2$, $\sigma_v = 0.225$, $\rho = -0.5$, and $V = 0.04$. The approximation error is calculated as the percent difference between the estimated moments and the actual moments. The actual moments are obtained by generating 250,000 HSV 180-day log returns and computing the sample standard deviation (0.2037) and skewness (-0.4610).

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row of panels in Figure 8 plots the percentage approximation errors in the volatility and skewness estimation for simple trapezoidal integration using only observed prices (dotted line) and for the interpolation–extrapolation technique (solid line). We see that it is difficult to estimate skewness accurately when the width of the integration domain is small. Therefore, as mentioned above, we choose a sample of stocks with liquid option data.

Finally, we investigate the bias induced by the asymmetry of the integration domain, which has not been investigated in the previous studies. This asymmetry presumably has little effect on the measurement of volatility, but it may be important for the measurement of skewness because skewness in effect compares the two sides of the distribution. If the integration domain is asymmetric, there is more information about one side of the log return distribution than about the other. To illustrate the resulting bias, we generate HSV call and put prices with a constant strike price interval $d = 0.1$ and we vary the integration domain from $[Su_L^{-1}, Su_H]$, where $u = 1.6$, $u_L = u - \mathrm{d}u$, $u_H = u + \mathrm{d}u$ and we vary du between -0.3 and 0.3. The bottom row of Figure 8 plots the percentage approximation errors in the volatility and skewness estimation for simple trapezoidal integration using only observed prices (dotted line) and for the interpolation–extrapolation technique (solid line). For the interpolation–extrapolation technique used, the errors are very small for the relevant strike prices.

We conclude from these three experiments that the integration technique introduced by Jiang and Tian (2005) does a good job of mitigating potential biases. We therefore use this approach in our empirical implementation.

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Efficient Capital Markets: A Review of Theory and Empirical Work

Eugene F. Fama

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SESSION TOPIC: STOCK MARKET PRICE BEHAVIOR

SESSION CHAIRMAN: BURTON G. MALKIEL

EFFICIENT CAPITAL MARKETS: A REVIEW OF THEORY AND EMPIRICAL WORK*

EUGENE F. FAMA**

I. INTRODUCTION

THE PRIMARY ROLE of the capital market is allocation of ownership of the economy's capital stock. In general terms, the ideal is a market in which prices provide accurate signals for resource allocation: that is, a market in which firms can make production-investment decisions, and investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time "fully reflect" all available information. A market in which prices always "fully reflect" available information is called "efficient."

This paper reviews the theoretical and empirical literature on the efficient markets model. After a discussion of the theory, empirical work concerned with the adjustment of security prices to three relevant information subsets is considered. First, *weak form* tests, in which the information set is just historical prices, are discussed. Then *semi-strong form* tests, in which the concern is whether prices efficiently adjust to other information that is obviously publicly available (e.g., announcements of annual earnings, stock splits, etc.) are considered. Finally, *strong form* tests concerned with whether given investors or groups have monopolistic access to any information relevant for price formation are reviewed.[1] We shall conclude that, with but a few exceptions, the efficient markets model stands up well.

Though we proceed from theory to empirical work, to keep the proper historical perspective we should note to a large extent the empirical work in this area preceded the development of the theory. The theory is presented first here in order to more easily judge which of the empirical results are most relevant from the viewpoint of the theory. The empirical work itself, however, will then be reviewed in more or less historical sequence.

Finally, the perceptive reader will surely recognize instances in this paper where relevant studies are not specifically discussed. In such cases my apologies should be taken for granted. The area is so bountiful that some such injustices are unavoidable. But the primary goal here will have been accomplished if a coherent picture of the main lines of the work on efficient markets is presented, along with an accurate picture of the current state of the arts.

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1. The distinction between weak and strong form tests was first suggested by Harry Roberts.

II. The Theory of Efficient Markets

A. *Expected Return or "Fair Game" Models*

The definitional statement that in an efficient market prices "fully reflect" available information is so general that it has no empirically testable implications. To make the model testable, the process of price formation must be specified in more detail. In essence we must define somewhat more exactly what is meant by the term "fully reflect."

One possibility would be to posit that equilibrium prices (or expected returns) on securities are generated as in the "two parameter" Sharpe [40]-Lintner [24, 25] world. In general, however, the theoretical models and especially the empirical tests of capital market efficiency have not been this specific. Most of the available work is based only on the assumption that the conditions of market equilibrium can (somehow) be stated in terms of expected returns. In general terms, like the two parameter model such theories would posit that conditional on some relevant information set, the equilibrium expected return on a security is a function of its "risk." And different theories would differ primarily in how "risk" is defined.

All members of the class of such "expected return theories" can, however, be described notationally as follows:

$$E(\tilde{p}_{j,t+1}|\Phi_t) = [1 + E(\tilde{r}_{j,t+1}|\Phi_t)]p_{jt}, \tag{1}$$

where E is the expected value operator; p_{jt} is the price of security j at time t; $p_{j,t+1}$ is its price at $t + 1$ (with reinvestment of any intermediate cash income from the security); $r_{j,t+1}$ is the one-period percentage return $(p_{j,t+1} - p_{jt})/p_{jt}$; Φ_t is a general symbol for whatever set of information is assumed to be "fully reflected" in the price at t; and the tildes indicate that $p_{j,t+1}$ and $r_{j,t+1}$ are random variables at t.

The value of the equilibrium expected return $E(\tilde{r}_{j,t+1}|\Phi_t)$ projected on the basis of the information Φ_t would be determined from the particular expected return theory at hand. The conditional expectation notation of (1) is meant to imply, however, that whatever expected return model is assumed to apply, the information in Φ_t is fully utilized in determining equilibrium expected returns. And this is the sense in which Φ_t is "fully reflected" in the formation of the price p_{jt}.

But we should note right off that, simple as it is, the assumption that the conditions of market equilibrium can be stated in terms of expected returns elevates the purely mathematical concept of expected value to a status not necessarily implied by the general notion of market efficiency. The expected value is just one of many possible summary measures of a distribution of returns, and market efficiency per se (i.e., the general notion that prices "fully reflect" available information) does not imbue it with any special importance. Thus, the results of tests based on this assumption depend to some extent on its validity as well as on the efficiency of the market. But some such assumption is the unavoidable price one must pay to give the theory of efficient markets empirical content.

The assumptions that the conditions of market equilibrium can be stated

in terms of expected returns and that equilibrium expected returns are formed on the basis of (and thus "fully reflect") the information set Φ_t have a major empirical implication—they rule out the possibility of trading systems based only on information in Φ_t that have expected profits or returns in excess of equilibrium expected profits or returns. Thus let

$$x_{j,t+1} = p_{j,t+1} - E(p_{j,t+1}|\Phi_t). \tag{2}$$

Then

$$E(\tilde{x}_{j,t+1}|\Phi_t) = 0 \tag{3}$$

which, *by definition,* says that the sequence $\{x_{jt}\}$ is a "fair game" with respect to the information sequence $\{\phi_t\}$. Or, equivalently, let

$$z_{j,t+1} = r_{j,t+1} - E(\tilde{r}_{j,t+1}|\Phi_t), \tag{4}$$

then

$$E(\tilde{z}_{j,t+1}|\Phi_t) = 0, \tag{5}$$

so that the sequence $\{z_{jt}\}$ is also a "fair game" with respect to the information sequence $\{\Phi\}$.

In economic terms, $x_{j,t+1}$ is the excess market value of security j at time $t+1$: it is the difference between the observed price and the expected value of the price that was projected at t on the basis of the information Φ_t. And similarly, $z_{j,t+1}$ is the return at $t+1$ in excess of the equilibrium expected return projected at t. Let

$$\alpha(\Phi_t) = [\alpha_1(\Phi_t), \alpha_2(\Phi_t), \ldots, \alpha_n(\Phi_t)]$$

be any trading system based on Φ_t which tells the investor the amounts $\alpha_j(\Phi_t)$ of funds available at t that are to be invested in each of the n available securities. The total excess market value at $t+1$ that will be generated by such a system is

$$V_{t+1} = \sum_{j=1}^{n} \alpha_j(\Phi_t)[r_{j,t+1} - E(\tilde{r}_{j,t+1}|\Phi_t)],$$

which, from the "fair game" property of (5) has expectation,

$$E(\tilde{V}_{t+1}|\Phi_t) = \sum_{j=1}^{n} \alpha_j(\Phi_t)E(\tilde{z}_{j,t+1}|\Phi_t) = 0.$$

The expected return or "fair game" efficient markets model[2] has other important testable implications, but these are better saved for the later discussion of the empirical work. Now we turn to two special cases of the model, the submartingale and the random walk, that (as we shall see later) play an important role in the empirical literature.

2. Though we shall sometimes refer to the model summarized by (1) as the "fair game" model, keep in mind that the "fair game" properties of the model are *implications* of the assumptions that (i) the conditions of market equilibrium can be stated in terms of expected returns, and (ii) the information Φ_t is fully utilized by the market in forming equilibrium expected returns and thus current prices.

The role of "fair game" models in the theory of efficient markets was first recognized and studied rigorously by Mandelbrot [27] and Samuelson [38]. Their work will be discussed in more detail later.

B. *The Submartingale Model*

Suppose we assume in (1) that for all t and Φ_t

$$E(\tilde{p}_{j,t+1}|\Phi_t) \geqslant p_{jt}, \quad \text{or equivalently,} \quad E(\tilde{r}_{j,t+1}|\Phi_t) \geqslant 0. \tag{6}$$

This is a statement that the price sequence $\{p_{jt}\}$ for security j follows a submartingale with respect to the information sequence $\{\Phi_t\}$, which is to say nothing more than that the expected value of next period's price, as projected on the basis of the information Φ_t, is equal to or greater than the current price. If (6) holds as an equality (so that expected returns and price changes are zero), then the price sequence follows a martingale.

A submartingale in prices has one important empirical implication. Consider the set of "one security and cash" mechanical trading rules by which we mean systems that concentrate on individual securities and that define the conditions under which the investor would hold a given security, sell it short, or simply hold cash at any time t. Then the assumption of (6) that expected returns conditional on Φ_t are non-negative directly implies that such trading rules based only on the information in Φ_t cannot have greater expected profits than a policy of always buying-and-holding the security during the future period in question. Tests of such rules will be an important part of the empirical evidence on the efficient markets model.[3]

C. *The Random Walk Model*

In the early treatments of the efficient markets model, the statement that the current price of a security "fully reflects" available information was assumed to imply that successive price changes (or more usually, successive one-period returns) are independent. In addition, it was usually assumed that successive changes (or returns) are identically distributed. Together the two hypotheses constitute the random walk model. Formally, the model says

$$f(r_{j,t+1}|\Phi_t) = f(r_{j,t+1}), \tag{7}$$

which is the usual statement that the conditional and marginal probability distributions of an independent random variable are identical. In addition, the density function f must be the same for all t.[4]

3. Note that the expected profitability of "one security and cash" trading systems vis-à-vis buy-and-hold is not ruled out by the general expected return or "fair game" efficient markets model. The latter rules out systems with expected profits in excess of equilibrium expected returns, but since in principle it allows equilibrium expected returns to be negative, holding cash (which always has zero actual and thus expected return) may have higher expected return than holding some security.

And negative equilibrium expected returns for some securities are quite possible. For example, in the Sharpe [40]-Lintner [24, 25] model (which is in turn a natural extension of the portfolio models of Markowitz [30] and Tobin [43]) the equilibrium expected return on a security depends on the extent to which the dispersion in the security's return distribution is related to dispersion in the returns on all other securities. A security whose returns on average move opposite to the general market is particularly valuable in reducing dispersion of portfolio returns, and so its equilibrium expected return may well be negative.

4. The terminology is loose. Prices will only follow a random walk if price changes are independent, identically distributed; and even then we should say "random walk with drift" since expected price changes can be non-zero. If one-period returns are independent, identically distributed, prices will not follow a random walk since the distribution of price changes will depend

Expression (7) of course says much more than the general expected return model summarized by (1). For example, if we restrict (1) by assuming that the expected return on security j is constant over time, then we have

$$E(\tilde{r}_{j,t+1}|\Phi_t) = E(\tilde{r}_{j,t+1}). \tag{8}$$

This says that the mean of the distribution of $r_{j,t+1}$ is independent of the information available at t, Φ_t, whereas the random walk model of (7) in addition says that the entire distribution is independent of Φ_t.[5]

We argue later that it is best to regard the random walk model as an extension of the general expected return or "fair game" efficient markets model in the sense of making a more detailed statement about the economic environment. The "fair game" model just says that the conditions of market equilibrium can be stated in terms of expected returns, and thus it says little about the details of the stochastic process generating returns. A random walk arises within the context of such a model when the environment is (fortuitously) such that the evolution of investor tastes and the process generating new information combine to produce equilibria in which return distributions repeat themselves through time.

Thus it is not surprising that empirical tests of the "random walk" model that are in fact tests of "fair game" properties are more strongly in support of the model than tests of the additional (and, from the viewpoint of expected return market efficiency, superfluous) pure independence assumption. (But it is perhaps equally surprising that, as we shall soon see, the evidence against the independence of returns over time is as weak as it is.)

D. *Market Conditions Consistent with Efficiency*

Before turning to the empirical work, however, a few words about the market conditions that might help or hinder efficient adjustment of prices to information are in order. First, it is easy to determine *sufficient* conditions for capital market efficiency. For example, consider a market in which (i) there are no transactions costs in trading securities, (ii) all available information is costlessly available to all market participants, and (iii) all agree on the implications of current information for the current price and distributions of future prices of each security. In such a market, the current price of a security obviously "fully reflects" all available information.

But a frictionless market in which all information is freely available and investors agree on its implications is, of course, not descriptive of markets met in practice. Fortunately, these conditions are sufficient for market efficiency, but not necessary. For example, as long as transactors take account of all

---

on the price level. But though rigorous terminology is usually desirable, our loose use of terms should not cause confusion; and our usage follows that of the efficient markets literature.

Note also that in the random walk literature, the information set Φ_t in (7) is usually assumed to include only the past return history, $r_{j,t}$, $r_{j,t-1}$, . . .

5. The random walk model does not say, however, that past information is of no value in *assessing* distributions of future returns. Indeed since return distributions are assumed to be stationary through time, past returns are the best source of such information. The random walk model does say, however, that the *sequence* (or the order) of the past returns is of no consequence in assessing distributions of future returns.

available information, even large transactions costs that inhibit the flow of transactions do not in themselves imply that when transactions do take place, prices will not "fully reflect" available information. Similarly (and speaking, as above, somewhat loosely), the market may be efficient if "sufficient numbers" of investors have ready access to available information. And disagreement among investors about the implications of given information does not in itself imply market inefficiency unless there are investors who can consistently make better evaluations of available information than are implicit in market prices.

But though transactions costs, information that is not freely available to all investors, and disagreement among investors about the implications of given information are not necessarily sources of market inefficiency, they are potential sources. And all three exist to some extent in real world markets. Measuring their effects on the process of price formation is, of course, the major goal of empirical work in this area.

III. The Evidence

All the empirical research on the theory of efficient markets has been concerned with whether prices "fully reflect" particular subsets of available information. Historically, the empirical work evolved more or less as follows. The initial studies were concerned with what we call *weak form* tests in which the information subset of interest is just past price (or return) histories. Most of the results here come from the random walk literature. When extensive tests seemed to support the efficiency hypothesis at this level, attention was turned to *semi-strong form* tests in which the concern is the speed of price adjustment to other obviously publicly available information (e.g., announcements of stock splits, annual reports, new security issues, etc.). Finally, *strong form* tests in which the concern is whether any investor or groups (e.g., managements of mutual funds) have monopolistic access to any information relevant for the formation of prices have recently appeared. We review the empirical research in more or less this historical sequence.

First, however, we should note that what we have called *the* efficient markets model in the discussions of earlier sections is the hypothesis that security prices at any point in time "fully reflect" *all* available information. Though we shall argue that the model stands up rather well to the data, it is obviously an extreme null hypothesis. And, like any other extreme null hyposthesis, we do not expect it to be literally true. The categorization of the tests into weak, semi-strong, and strong form will serve the useful purpose of allowing us to pinpoint the level of information at which the hypothesis breaks down. And we shall contend that there is no important evidence against the hypothesis in the weak and semi-strong form tests (i.e., prices seem to efficiently adjust to obviously publicly available information), and only limited evidence against the hypothesis in the strong form tests (i.e., monopolistic access to information about prices does not seem to be a prevalent phenomenon in the investment community).

A. *Weak Form Tests of the Efficient Markets Model*

1. Random Walks and Fair Games: A Little Historical Background

As noted earlier, all of the empirical work on efficient markets can be considered within the context of the general expected return or "fair game" model, and much of the evidence bears directly on the special submartingale expected return model of (6). Indeed, in the early literature, discussions of the efficient markets model were phrased in terms of the even more special random walk model, though we shall argue that most of the early authors were in fact concerned with more general versions of the "fair game" model.

Some of the confusion in the early random walk writings is understandable. Research on security prices did not begin with the development of a theory of price formation which was then subjected to empirical tests. Rather, the impetus for the development of a theory came from the accumulation of evidence in the middle 1950's and early 1960's that the behavior of common stock and other speculative prices could be well approximated by a random walk. Faced with the evidence, economists felt compelled to offer some rationalization. What resulted was a theory of efficient markets stated in terms of random walks, but usually implying some more general "fair game" model.

It was not until the work of Samuelson [38] and Mandelbrot [27] in 1965 and 1966 that the role of "fair game" expected return models in the theory of efficient markets and the relationships between these models and the theory of random walks were rigorously studied.[6] And these papers came somewhat after the major empirical work on random walks. In the earlier work, "theoretical" discussions, though usually intuitively appealing, were always lacking in rigor and often either vague or *ad hoc*. In short, until the Mandelbrot-Samuelson models appeared, there existed a large body of empirical results in search of a rigorous theory.

Thus, though his contributions were ignored for sixty years, the first statement and test of the random walk model was that of Bachelier [3] in 1900. But his "fundamental principle" for the behavior of prices was that speculation should be a "fair game"; in particular, the expected profits to the speculator should be zero. With the benefit of the modern theory of stochastic processes, we know now that the process implied by this fundamental principle is a martingale.

After Bachelier, research on the behavior of security prices lagged until the

6. Basing their analyses on futures contracts in commodity markets, Mandelbrot and Samuelson show that if the price of such a contract at time t is the expected value at t (given information Φ_t) of the spot price at the termination of the contract, then the futures price will follow a martingale with respect to the information sequence $\{\Phi_t\}$; that is, the expected price change from period to period will be zero, and the price changes will be a "fair game." If the equilibrium expected return is not assumed to be zero, our more general "fair game" model, summarized by (1), is obtained.

But though the Mandelbrot-Samuelson approach certainly illuminates the process of price formation in commodity markets, we have seen that "fair game" expected return models can be derived in much simpler fashion. In particular, (1) is just a formalization of the assumptions that the conditions of market equilibrium can be stated in terms of expected returns and that the information Φ_t is used in forming market prices at t.

coming of the computer. In 1953 Kendall [21] examined the behavior of weekly changes in nineteen indices of British industrial share prices and in spot prices for cotton (New York) and wheat (Chicago). After extensive analysis of serial correlations, he suggests, in quite graphic terms:

> The series looks like a wandering one, almost as if once a week the Demon of Chance drew a random number from a symetrical population of fixed dispersion and added it to the current price to determine the next week's price [21, p. 13].

Kendall's conclusion had in fact been suggested earlier by Working [47], though his suggestion lacked the force provided by Kendall's empirical results. And the implications of the conclusion for stock market research and financial analysis were later underlined by Roberts [36].

But the suggestion by Kendall, Working, and Roberts that series of speculative prices may be well described by random walks was based on observation. None of these authors attempted to provide much economic rationale for the hypothesis, and, indeed, Kendall felt that economists would generally reject it. Osborne [33] suggested market conditions, similar to those assumed by Bachelier, that would lead to a random walk. But in his model, independence of successive price changes derives from the assumption that the decisions of investors in an individual security are independent from transaction to transaction—which is little in the way of an economic model.

Whenever economists (prior to Mandelbrot and Samuelson) tried to provide economic justification for the random walk, their arguments usually implied a "fair game." For example, Alexander [8, p. 200] states:

> If one were to start out with the assumption that a stock or commodity speculation is a "fair game" with equal expectation of gain or loss or, more accurately, with an expectation of zero gain, one would be well on the way to picturing the behavior of speculative prices as a random walk.

There is an awareness here that the "fair game" assumption is not sufficient to lead to a random walk, but Alexander never expands on the comment. Similarly, Cootner [8, p. 232] states:

> If any substantial group of buyers thought prices were too low, their buying would force up the prices. The reverse would be true for sellers. Except for appreciation due to earnings retention, the conditional expectation of tomorrow's price, given today's price, is today's price.
>
> In such a world, the only price changes that would occur are those that result from new information. Since there is no reason to expect that information to be non-random in appearance, the period-to-period price changes of a stock should be random movements, statistically independent of one another.

Though somewhat imprecise, the last sentence of the first paragraph seems to point to a "fair game" model rather than a random walk.[7] In this light, the second paragraph can be viewed as an attempt to describe environmental conditions that would reduce a "fair game" to a random walk. But the specification imposed on the information generating process is insufficient for this purpose; one would, for example, also have to say something about investor

7. The appropriate conditioning statement would be "Given the sequence of historical prices."

tastes. Finally, lest I be accused of criticizing others too severely for ambiguity, lack of rigor and incorrect conclusions,

> By contrast, the stock market trader has a much more practical criterion for judging what constitutes important dependence in successive price changes. For his purposes the random walk model is valid as long as knowledge of the past behavior of the series of price changes cannot be used to increase expected gains. More specifically, the independence assumption is an adequate description of reality as long as the actual degree of dependence in the series of price changes is not sufficient to allow the past history of the series to be used to predict the future in a way which makes expected profits greater than they would be under a naive buy-and hold model [10, p 35].

We know now, of course, that this last condition hardly requires a random walk. It will in fact be met by the submartingale model of (6).

But one should not be too hard on the theoretical efforts of the early empirical random walk literature. The arguments were usually appealing; where they fell short was in awareness of developments in the theory of stochastic processes. Moreover, we shall now see that most of the empirical evidence in the random walk literature can easily be interpreted as tests of more general expected return or "fair game" models.[8]

2. Tests of Market Efficiency in the Random Walk Literature

As discussed earlier, "fair game" models imply the "impossibility" of various sorts of trading systems. Some of the random walk literature has been concerned with testing the profitability of such systems. More of the literature has, however, been concerned with tests of serial covariances of returns. We shall now show that, like a random walk, the serial covariances of a "fair game" are zero, so that these tests are also relevant for the expected return models.

If x_t is a "fair game," its unconditional expectation is zero and its serial covariance can be written in general form as:

$$E(\tilde{x}_{t+\tau}\,\tilde{x}_t) = \int_{x_t} x_t E(\tilde{x}_{t+\tau}|x_t) f(x_t) dx_t,$$

where f indicates a density function. But if x_t is a "fair game,"

$$E(\tilde{x}_{t+\tau}|x_t) = 0.^9$$

8. Our brief historical review is meant only to provide perspective, and it is, of course, somewhat incomplete. For example, we have ignored the important contributions to the early random walk literature in studies of warrants and other options by Sprenkle, Kruizenga, Boness, and others. Much of this early work on options is summarized in [8].

9. More generally, if the sequence $\{x_t\}$ is a fair game with respect to the information sequence $\{\Phi_t\}$, (i.e., $E(\tilde{x}_{t+1}|\Phi_t) = 0$ for all Φ_t); then x_t is a fair game with respect to any Φ'_t that is a subset of Φ_t (i.e., $E(\tilde{x}_{t+1}|\Phi'_t) = 0$ for all Φ'_t). To show this, let $\Phi_t = (\Phi'_t,\ \Phi''_t)$. Then, using Stieltjes integrals and the symbol F to denote cumulative distinction functions, the conditional expectation

$$E(\tilde{x}_{t+1}|\Phi'_t) = \int_{\Phi''_t}\int_{x_{t+1}} x_{t+1} dF(x_{t+1}, \Phi''_t|\Phi'_t) \quad = \int_{\Phi''_t}\left[\int_{x_{t+1}} x_{t+1} dF(x_{t+1}|\Phi'_t,\Phi''_t)\right] dF(\Phi''_t|\Phi'_t).$$

From this it follows that for all lags, the serial covariances between lagged values of a "fair game" variable are zero. Thus, observations of a "fair game" variable are linearly independent.[10]

But the "fair game" model does not necessarily imply that the serial covariances of *one-period returns* are zero. In the weak form tests of this model the "fair game" variable is

$$z_{j,t} = r_{j,t} - E(\tilde{r}_{j,t}|r_{j,t-1}, r_{j,t-2}, \ldots). \quad \text{(Cf. fn. 9)} \tag{9}$$

But the covariance between, for example, r_{jt} and $r_{j,t+1}$ is

$$E([\tilde{r}_{j,t+1} - E(\tilde{r}_{j,t+1})]\,[\tilde{r}_{jt} - E(\tilde{r}_{jt})]) = \int_{r_{jt}} [r_{jt} - E(\tilde{r}_{jt})]\,[E(\tilde{r}_{j,t+1}|r_{jt}) - E(\tilde{r}_{j,t+1})]f(r_{jt})dr_{jt},$$

and (9) does not imply that $E(\tilde{r}_{j,t+1}|r_{jt}) = E(\tilde{r}_{j,t+1})$: In the "fair game" efficient markets model, the deviation of the return for t + 1 from its conditional expectation is a "fair game" variable, but the conditional expectation itself can depend on the return observed for t.[11]

In the random walk literature, this problem is not recognized, since it is assumed that the expected return (and indeed the entire distribution of returns) is stationary through time. In practice, this implies estimating serial covariances by taking cross products of deviations of observed returns from the overall sample mean return. It is somewhat fortuitous, then, that this procedure, which represents a rather gross approximation from the viewpoint of the general expected return efficient markets model, does not seem to greatly affect the results of the covariance tests, at least for common stocks.[12]

But the integral in brackets is just $E(\tilde{x}_{t+1}|\Phi_t)$ which by the "fair game" assumption is 0, so that

$$E(x_{t+1}|\Phi'_t) = 0 \text{ for all } \Phi'_t \subset \Phi_t.$$

10. But though zero serial covariances are consistent with a "fair game," they do not imply such a process. A "fair game" also rules out many types of non linear dependence. Thus using arguments similar to those above, it can be shown that if x is a "fair game," $E(\tilde{x}_t\tilde{x}_{t+1} \cdots \tilde{x}_{t+\tau}) = 0$ for all τ, which is not implied by $E(\tilde{x}_t\tilde{x}_{t+\tau}) = 0$ for all τ. For example, consider a three-period case where x must be either ± 1. Suppose the process is $x_{t+2} = \text{sign}\,(x_t x_{t+1})$, i.e.,

x_t	x_{t+1}	$\rightarrow$	x_{t+2}
+	+	$\rightarrow$	+
+	−	$\rightarrow$	−
−	+	$\rightarrow$	−
−	−	$\rightarrow$	+.

If probabilities are uniformly distributed across events,

$$E(\tilde{x}_{t+2}|x_{t+1}) = E(\tilde{x}_{t+2}|x_t) = E(\tilde{x}_{t+1}|x_t) = E(\tilde{x}_{t+2}) = E(\tilde{x}_{t+1}) = E(\tilde{x}_t) = 0,$$

so that all pairwise serial covariances are zero. But the process is not a "fair game," since $E(\tilde{x}_{t+2}|x_{t+1}, x_t) \neq 0$, and knowledge of (x_{t+1}, x_t) can be used as the basis of a simple "system" with positive expected profit.

11. For example, suppose the level of one-period returns follows a martingale so that

$$E(\tilde{r}_{j,t+1}|r_{jt}, r_{j,t-1} \ldots) = r_{jt}.$$

Then covariances between successive returns will be nonzero (though in this special case first differences of returns will be uncorrelated).

12. The reason is probably that for stocks, changes in equilibrium expected returns for the

TABLE 1 (from [10])
First-order Serial Correlation Coefficients for One-, Four-, Nine-, and Sixteen-Day Changes in Log_e Price

Stock	Differencing Interval (Days)			
	One	Four	Nine	Sixteen
Allied Chemical	.017	.029	−.091	−.118
Alcoa	.118*	.095	−.112	−.044
American Can	−.087*	−.124*	−.060	.031
A. T. & T.	−.039	−.010	−.009	−.003
American Tobacco	.111*	−.175*	.033	.007
Anaconda	.067*	−.068	−.125	.202
Bethlehem Steel	.013	−.122	−.148	.112
Chrysler	.012	.060	−.026	.040
Du Pont	.013	.069	−.043	−.055
Eastman Kodak	.025	−.006	−.053	−.023
General Electric	.011	.020	−.004	.000
General Foods	.061*	−.005	−.140	−.098
General Motors	−.004	−.128*	.009	−.028
Goodyear	−.123*	.001	−.037	.033
International Harvester	−.017	−.068	−.244*	.116
International Nickel	.096*	.038	.124	.041
International Paper	.046	.060	−.004	−.010
Johns Manville	.006	−.068	−.002	.002
Owens Illinois	−.021	−.006	.003	−.022
Procter & Gamble	.099*	−.006	.098	.076
Sears	.097*	−.070	−.113	.041
Standard Oil (Calif.)	.025	−.143*	−.046	.040
Standard Oil (N.J.)	.008	−.109	−.082	−.121
Swift & Co.	−.004	−.072	.118	−.197
Texaco	.094*	−.053	−.047	−.178
Union Carbide	.107*	.049	−.101	.124
United Aircraft	.014	−.190*	−.192*	−.040
U.S. Steel	.040	−.006	−.056	.236*
Westinghouse	−.027	−.097	−.137	.067
Woolworth	.028	−.033	−.112	.040

* Coefficient is twice its computed standard error.

For example, Table 1 (taken from [10]) shows the serial correlations between successive changes in the natural log of price for each of the thirty stocks of the Dow Jones Industrial Average, for time periods that vary slightly from stock to stock, but usually run from about the end of 1957 to September 26, 1962. The serial correlations of successive changes in $\log_e$ price are shown for differencing intervals of one, four, nine, and sixteen days.[13]

common differencing intervals of a day, a week, or a month, are trivial relative to other sources of variation in returns. Later, when we consider Roll's work [37], we shall see that this is not true for one week returns on U.S. Government Treasury Bills.

13. The use of changes in $\log_e$ price as the measure of return is common in the random walk literature. It can be justified in several ways. But for current purposes, it is sufficient to note that for price changes less than fifteen per cent, the change in $\log_e$ price is approximately the percentage price change or one-period return. And for differencing intervals shorter than one month, returns in excess of fifteen per cent are unusual. Thus [10] reports that for the data of Table 1, tests carried out on percentage or one-period returns yielded results essentially identical to the tests based on changes in $\log_e$ price.

The results in Table 1 are typical of those reported by others for tests based on serial covariances. (Cf. Kendall [21], Moore [31], Alexander [1], and the results of Granger and Morgenstern [17] and Godfrey, Granger and Morgenstern [16] obtained by means of spectral analysis.) Specifically, there is no evidence of substantial linear dependence between lagged price changes or returns. In absolute terms the measured serial correlations are always close to zero.

Looking hard, though, one can probably find evidence of statistically "significant" linear dependence in Table 1 (and again this is true of results reported by others). For the daily returns eleven of the serial correlations are more than twice their computed standard errors, and twenty-two out of thirty are positive. On the other hand, twenty-one and twenty-four of the coefficients for the four and nine day differences are negative. But with samples of the size underlying Table 1 (N = 1200-1700 observations per stock on a daily basis) statistically "significant" deviations from zero covariance are not necessarily a basis for rejecting the efficient markets model. For the results in Table 1, the standard errors of the serial correlations were approximated as $(1/(N-1))^{\frac{1}{2}}$, which for the daily data implies that a correlation as small as .06 is more than twice its standard error. But a coefficient this size implies that a linear relationship with the lagged price change can be used to explain about .36% of the variation in the current price change, which is probably insignificant from an economic viewpoint. In particular, it is unlikely that the small absolute levels of serial correlation that are always observed can be used as the basis of substantially profitable trading systems.[14]

It is, of course, difficult to judge what degree of serial correlation would imply the existence of trading rules with substantial expected profits. (And indeed we shall soon have to be a little more precise about what is implied by "substantial" profits.) Moreover, zero serial covariances are consistent with a "fair game" model, but as noted earlier (fn. 10), there are types of nonlinear dependence that imply the existence of profitable trading systems, and yet do not imply nonzero serial covariances. Thus, for many reasons it is desirable to directly test the profitability of various trading rules.

The first major evidence on trading rules was Alexander's [1, 2]. He tests a variety of systems, but the most thoroughly examined can be decribed as follows: If the price of a security moves up at least y%, buy and hold the security until its price moves down at least y% from a subsequent high, at which time simultaneously sell and go short. The short position is maintained until the price rises at least y% above a subsequent low, at which time one covers the short position and buys. Moves less than y% in either direction are

14. Given the evidence of Kendall [21], Mandelbrot [28], Fama [10] and others that large price changes occur much more frequently than would be expected if the generating process were Gaussian, the expression $(1/(N-1))^{\frac{1}{2}}$ understates the sampling dispersion of the serial correlation coefficient, and thus leads to an overstatement of significance levels. In addition, the fact that sample serial correlations are predominantly of one sign or the other is not in itself evidence of linear dependence. If, as the work of King [23] and Blume [7] indicates, there is a market factor whose behavior affects the returns on all securities, the sample behavior of this market factor may lead to a predominance of signs of one type in the serial correlations for individual securities, even though the population serial correlations for both the market factor and the returns on individual securities are zero. For a more extensive analysis of these issues see [10].

ignored. Such a system is called a y% filter. It is obviously a "one security and cash" trading rule, so that the results it produces are relevant for the submartingale expected return model of (6).

After extensive tests using daily data on price indices from 1897 to 1959 and filters from one to fifty per cent, and after correcting some incorrect presumptions in the initial results of [1] (see fn. 25), in his final paper on the subject, Alexander concludes:

> In fact, at this point I should advise any reader who is interested only in practical results, and who is not a floor trader and so must pay commissions, to turn to other sources on how to beat buy and hold. The rest of this article is devoted principally to a theoretical consideration of whether the observed results are consistent with a random walk hypothesis [8], p. 351).

Later in the paper Alexander concludes that there is some evidence in his results against the independence assumption of the random walk model. But market efficiency does not require a random walk, and from the viewpoint of the submartingale model of (6), the conclusion that the filters cannot beat buy-and-hold is support for the efficient markets hypothesis. Further support is provided by Fama and Blume [13] who compare the profitability of various filters to buy-and-hold for the individual stocks of the Dow-Jones Industrial Average. (The data are those underlying Table 1.)

But again, looking hard one can find evidence in the filter tests of both Alexander and Fama-Blume that is inconsistent with the submartingale efficient markets model, if that model is interpreted in a strict sense. In particular, the results for very small filters (1 per cent in Alexander's tests and .5, 1.0, and 1.5 per cent in the tests of Fama-Blume) indicate that it is possible to devise trading schemes based on very short-term (preferably intra-day but at most daily) price swings that will on average outperform buy-and-hold. The average profits on individual transactions from such schemes are miniscule, but they generate transactions so frequently that over longer periods and ignoring commissions they outperform buy-and-hold by a substantial margin. These results are evidence of persistence or positive dependence in very short-term price movements. And, interestingly, this is consistent with the evidence for slight positive linear dependence in successive daily price changes produced by the serial correlations.[15]

15. Though strictly speaking, such tests of pure independence are not directly relevant for expected return models, it is interesting that the conclusion that very short-term swings in prices persist slightly longer than would be expected under the martingale hypothesis is also supported by the results of non-parametric runs tests applied to the daily data of Table 1. (See [10], Tables 12-15.) For the daily price changes, the actual number of runs of price changes of the same sign is less than the expected number for 26 out of 30 stocks. Moreover, of the eight stocks for which the actual number of runs is more than two standard errors less than the expected number, five of the same stocks have positive daily, first order serial correlations in Table 1 that are more than twice their standard errors. But in both cases the statistical "significance" of the results is largely a reflection of the large sample sizes. Just as the serial correlations are small in absolute terms (the average is .026), the differences between the expected and actual number of runs on average are only three per cent of the total expected number.

On the other hand, it is also interesting that the runs tests do not support the suggestion of slight negative dependence in four and nine day changes that appeared in the serial correlations. In the runs tests such negative dependence would appear as a tendency for the actual number of runs to exceed the expected number. In fact, for the four and nine day price changes, for 17 and

But when one takes account of even the minimum trading costs that would be generated by small filters, their advantage over buy-and-hold disappears. For example, even a floor trader (i.e., a person who owns a seat) on the New York Stock Exchange must pay clearinghouse fees on his trades that amount to about .1 per cent per turnaround transaction (i.e., sales plus purchase). Fama-Blume show that because small filters produce such frequent trades, these minimum trading costs are sufficient to wipe out their advantage over buy-and-hold.

Thus the filter tests, like the serial correlations, produce empirically noticeable departures from the strict implications of the efficient markets model. But, in spite of any statistical significance they might have, from an economic viewpoint the departures are so small that it seems hardly justified to use them to declare the market inefficient.

3. Other Tests of Independence in the Random Walk Literature

It is probably best to regard the random walk model as a special case of the more general expected return model in the sense of making a more detailed specification of the economic environment. That is, the basic model of market equilibrium is the "fair game" expected return model, with a random walk arising when additional environmental conditions are such that distributions of one-period returns repeat themselves through time. From this viewpoint violations of the pure independence assumption of the random walk model are to be expected. But when judged relative to the benchmark provided by the random walk model, these violations can provide insights into the nature of the market environment.

For example, one departure from the pure independence assumption of the random walk model has been noted by Osborne [34], Fama ([10], Table 17 and Figure 8), and others. In particular, large daily price changes tend to be followed by large daily changes. The signs of the successor changes are apparently random, however, which indicates that the phenomenon represents a denial of the random walk model but not of the market efficiency hypothesis. Nevertheless, it is interesting to speculate why the phenomenon might arise. It may be that when important new information comes into the market it cannot always be immediately evaluated precisely. Thus, sometimes the initial price will overadjust to the information, and other times it will underadjust. But since the evidence indicates that the price changes on days following the initial large change are random in sign, the initial large change at least represents an unbiased adjustment to the ultimate price effects of the information, and this is sufficient for the expected return efficient markets model.

Niederhoffer and Osborne [32] document two departures from complete randomness in common stock price changes from transaction to transaction. First, their data indicate that reversals (pairs of consecutive price changes of opposite sign) are from two to three times as likely as continuations (pairs of consecutive price changes of the same sign). Second, a continuation is

18 of the 30 stocks in Table 1 the actual number of runs is less than the expected number. Indeed, runs tests in general show no consistent evidence of dependence for any differencing interval longer than a day, which seems especially pertinent in light of the comments in footnote 14.

slightly more frequent after a preceding continuation than after a reversal. That is, let (+|++) indicate the occurrence of a positive price change, given two preceding positive changes. Then the events (+|++) and (−|−−) are slightly more frequent than (+|+−) or (−|−+).[16]

Niederhoffer and Osborne offer explanations for these phenomena based on the market structure of the New York Stock Exchange (N.Y.S.E.). In particular, there are three major types of orders that an investor might place in a given stock: (a) buy limit (buy at a specified price or lower), (b) sell limit (sell at a specified price or higher), and (c) buy or sell at market (at the lowest selling or highest buying price of another investor). A book of unexecuted limit orders in a given stock is kept by the specialist in that stock on the floor of the exchange. Unexecuted sell limit orders are, of course, at higher prices than unexecuted buy limit orders. On both exchanges, the smallest non-zero price change allowed is ⅛ point.

Suppose now that there is more than one unexecuted sell limit order at the lowest price of any such order. A transaction at this price (initiated by an order to buy at market[17]) can only be followed either by a transaction at the same price (if the next market order is to buy) or by a transaction at a lower price (if the next market order is to sell). Consecutive price increases can usually only occur when consecutive market orders to buy exhaust the sell limit orders at a given price.[18] In short, the excessive tendency toward reversal for consecutive non-zero price changes could result from bunching of unexecuted buy and sell limit orders.

The tendency for the events (+|++) and (−|−−) to occur slightly more frequently than (+|+−) and (−|−+) requires a more involved explanation which we shall not attempt to reproduce in full here. In brief, Niederhoffer and Osborne contend that the higher frequency of (+|++) relative to (+|+−) arises from a tendency for limit orders "to be concentrated at integers (26, 43), halves (26½, 43½), quarters and odd eighths in descending order of preference."[19] The frequency of the event (+|++), which usually requires that sell limit orders be exhausted at at least two consecutively higher prices (the last of which is relatively more frequently at an odd eighth), more heavily reflects the absence of sell limit orders at odd eighths than the event (+|+−), which usually implies that sell limit orders at only one price have been exhausted and so more or less reflects the average bunching of limit orders at all eighths.

But though Niederhoffer and Osborne present convincing evidence of sta-

16. On a transaction to transaction basis, positive and negative price changes are about equally likely. Thus, under the assumption that price changes are random, any pair of non-zero changes should be as likely as any other, and likewise for triplets of consecutive non-zero changes.

17. A buy limit order for a price equal to or greater than the lowest available sell limit price is effectively an order to buy at market, and is treated as such by the broker.

18. The exception is when there is a gap of more than ⅛ between the highest unexecuted buy limit and the lowest unexecuted sell limit order, so that market orders (and new limit orders) can be crossed at intermediate prices.

19. Their empirical documentation for this claim is a few samples of specialists' books for selected days, plus the observation [34] that actual trading prices, at least for volatile high priced stocks, seem to be concentrated at integers, halves, quarters and odd eighths in descending order.

tistically significant departures from independence in price changes from transaction to transaction, and though their analysis of their findings presents interesting insights into the process of market making on the major exchanges, the types of dependence uncovered do not imply market inefficiency. The best documented source of dependence, the tendency toward excessive reversals in pairs of non-zero price changes, seems to be a direct result of the ability of investors to place limit orders as well as orders at market, and this negative dependence in itself does not imply the existence of profitable trading rules. Similarly, the apparent tendency for observed transactions (and, by implication, limit orders) to be concentrated at integers, halves, even eighths and odd eighths in descending order is an interesting fact about investor behavior, but in itself is not a basis on which to conclude that the market is inefficient.[20]

The Niederhoffer-Osborne analysis of market making does, however, point clearly to the existence of market inefficiency, but with respect to strong form tests of the efficient markets model. In particular, the list of unexecuted buy and sell limit orders in the specialist's book is important information about the likely future behavior of prices, and this information is only available to the specialist. When the specialist is asked for a quote, he gives the prices and can give the quantities of the highest buy limit and lowest sell limit orders on his book, but he is prevented by law from divulging the book's full contents. The interested reader can easily imagine situations where the structure of limit orders in the book could be used as the basis of a profitable trading rule.[21] But the record seems to speak for itself:

> It should not be assumed that these transactions undertaken by the specialist, and in which he is involved as buyer or seller in 24 per cent of all market volume, are necessarily a burden to him. Typically, the specialist sells above his last purchase on 83 per cent of all his sales, and buys below his last sale on 81 per cent of all his purchases ([32], p. 908).

Thus it seems that the specialist has monopoly power over an important block of information, and, not unexpectedly, uses his monopoly to turn a profit. And this, of course, is evidence of market inefficiency in the strong form sense. The important economic question, of course, is whether the market making

20. Niederhoffer and Osborne offer little to refute this conclusion. For example ([32], p. 914):

> Although the specific properties reported in this study have a significance from a statistical point of view, the reader may well ask whether or not they are helpful in a practical sense. Certain trading rules emerge as a result of our analysis. One is that limit and stop orders should be placed at odd eights, preferably at 7/8 for sell orders and at 1/8 for buy orders. Another is to buy when a stock advances through a barrier and to sell when it sinks through a barrier.

> The first "trading rule" tells the investor to resist his innate inclination to place orders at integers, but rather to place sell orders 1/8 below an integer and buy orders 1/8 above. Successful execution of the orders is then more likely, since the congestion of orders that occur at integers is avoided. But the cost of this success is apparent. The second "trading rule" seems no more promising, if indeed it can even be translated into a concrete prescription for action.

21. See, for example, ([32], p. 908). But it is unlikely that anyone but the specialist could earn substantial profits from knowledge of the structure of unexecuted limit orders on the book. The specialist makes trading profits by engaging in many transactions, each of which has a small average profit; but for any other trader, including those with seats on the exchange, these profits would be eaten up by commissions to the specialist.

function of the specialist could be fulfilled more economically by some non-monopolistic mechanism.[22]

4. Distributional Evidence

At this date the weight of the empirical evidence is such that economists would generally agree that whatever dependence exists in series of historical returns cannot be used to make profitable predictions of the future. Indeed, for returns that cover periods of a day or longer, there is little in the evidence that would cause rejection of the stronger random walk model, at least as a good first approximation.

Rather, the last burning issue of the random walk literature has centered on the nature of the distribution of price changes (which, we should note immediately, is an important issue for the efficient markets hypothesis since the nature of the distribution affects both the types of statistical tools relevant for testing the hypothesis and the interpretation of any results obtained). A model implying normally distributed price changes was first proposed by Bachelier [3], who assumed that price changes from transaction to transaction are independent, identically distributed random variables with finite variances. If transactions are fairly uniformly spread across time, and if the number of transactions per day, week, or month is very large, then the Central Limit Theorem leads us to expect that these price changes will have normal or Gaussian distributions.

Osborne [33], Moore [31], and Kendall [21] all thought their empirical evidence supported the normality hypothesis, but all observed high tails (i.e., higher proportions of large observations) in their data distributions vis-à-vis what would be expected if the distributions were normal. Drawing on these findings and some empirical work of his own, Mandelbrot [28] then suggested that these departures from normality could be explained by a more general form of the Bachelier model. In particular, if one does not assume that distributions of price changes from transaction to transaction necessarily have finite variances, then the limiting distributions for price changes over longer differencing intervals could be any member of the stable class, which includes the normal as a special case. Non-normal stable distributions have higher tails than the normal, and so can account for this empirically observed feature of distributions of price changes. After extensive testing (involving the data from the stocks in Table 1), Fama [10] concludes that non-normal stable distributions are a better description of distributions of daily returns on common stocks than the normal. This conclusion is also supported by the empirical work of Blume [7] on common stocks, and it has been extended to U.S. Government Treasury Bills by Roll [37].

Economists have, however, been reluctant to accept these results,[23] primar-

22. With modern computers, it is hard to believe that a more competitive and economical system would not be feasible. It does not seem technologically impossible to replace the entire floor of the N.Y.S.E. with a computer, fed by many remote consoles, that kept all the books now kept by the specialists, that could easily make the entire book on any stock available to anybody (so that interested individuals could then compete to "make a market" in a stock) and that carried out transactions automatically.

23. Some have suggested that the long-tailed empirical distributions might result from processes

ily because of the wealth of statistical techniques available for dealing with normal variables and the relative paucity of such techniques for non-normal stable variables. But perhaps the biggest contribution of Mandelbrot's work has been to stimulate research on stable distributions and estimation procedures to be applied to stable variables. (See, for example, Wise [46], Fama and Roll [15], and Blattberg and Sargent [6], among others.) The advance of statistical sophistication (and the importance of examining distributional assumptions in testing the efficient markets model) is well illustrated in Roll [37], as compared, for example, with the early empirical work of Mandelbrot [28] and Fama [10].

5. "Fair Game" Models in the Treasury Bill Market

Roll's work is novel in other respects as well. Coming after the efficient markets models of Mandelbrot [27] and Samuelson [38], it is the first weak form empirical work that is consciously in the "fair game" rather than the random walk tradition.

More important, as we saw earlier, the "fair game" properties of the general expected return models apply to

$$z_{jt} = r_{jt} - E(\tilde{r}_{jt}|\Phi_{t-1}). \tag{10}$$

For data on common stocks, tests of "fair game" (and random walk) properties seem to go well when the conditional expected return is estimated as the average return for the sample of data at hand. Apparently the variation in common stock returns about their expected values is so large relative to any changes in the expected values that the latter can safely be ignored. But, as Roll demonstrates, this result does not hold for Treasury Bills. Thus, to test the "fair game" model on Treasury Bills requires explicit economic theory for the evolution of expected returns through time.

Roll uses three existing theories of the term structure (the pure expectations hypothesis of Lutz [26] and two market segmentation hypotheses, one of which is the familiar "liquidity preference" hypothesis of Hicks [18] and Kessel [22]) for this purpose.[24] In his models r_{jt} is the rate observed from the term structure at period t for one week loans to commence at $t + j - 1$, and can be thought of as a "futures" rate. Thus $r_{j+1,\,t-1}$ is likewise the rate on

that are mixtures of normal distributions with different variances. Press [35], for example, suggests a Poisson mixture of normals in which the resulting distributions of price changes have long tails but finite variances. On the other hand, Mandelbrot and Taylor [29] show that other mixtures of normals can still lead to non-normal stable distributions of price changes for finite differencing intervals.

If, as Press' model would imply, distributions of price changes are long-tailed but have finite variances, then distributions of price changes over longer and longer differencing intervals should be progressively closer to the normal. No such convergence to normality was observed in [10] (though admittedly the techniques used were somewhat rough). Rather, except for origin and scale, the distributions for longer differencing intervals seem to have the same "high-tailed" characteristics as distributins for shorter differencing intervals, which is as would be expected if the distributions are non-normal stable.

24. As noted early in our discussions, all available tests of market efficiency are implicitly also tests of expected return models of market equilibrium. But Roll formulates explicitly the economic models underlying his estimates of expected returns, and emphasizes that he is simultaneously testing economic models of the term structure as well as market efficiency.

one week loans to commence at $t + j - 1$, but observed in this case at $t - 1$. Similarly, L_{jt} is the so-called "liquidity premium" in r_{jt}; that is

$$r_{jt} = E(\tilde{r}_{0,t+j-1}|\Phi_t) + L_{jt}.$$

In words, the one-week "futures" rate for period $t + j - 1$ observed from the term structure at t is the expectation at t of the "spot" rate for $t + j - 1$ plus a "liquidity premium" (which could, however, be positive or negative).

In all three theories of the term structure considered by Roll, the conditional expectation required in (10) is of the form

$$E(\tilde{r}_{j,t}|\Phi_{t-1}) = r_{j+1,t-1} + E(\tilde{L}_{jt}|\Phi_{t-1}) - L_{j+1,t-1}.$$

The three theories differ only in the values assigned to the "liquidity premiums." For example, in the "liquidity preference" hypothesis, investors must always be paid a positive premium for bearing interest rate uncertainty, so that the L_{jt} are always positive. By contrast, in the "pure expectations" hypothesis, all liquidity premiums are assumed to be zero, so that

$$E(\tilde{r}_{jt}|\Phi_{t-1}) = r_{j+1,t-1}.$$

After extensive testing, Roll concludes (i) that the two market segmentation hypotheses fit the data better than the pure expectations hypothesis, with perhaps a slight advantage for the "liquidity preference" hypothesis, and (ii) that as far as his tests are concerned, the market for Treasury Bills is effcient. Indeed, it is interesting that when the best fitting term structure model is used to estimate the conditional expected "futures" rate in (10), the resulting variable z_{jt} seems to be serially independent! It is also interesting that if he simply assumed that his data distributions were normal, Roll's results would not be so strongly in support of the efficient markets model. In this case taking account of the observed high tails of the data distributions substantially affected the interpretation of the results.[25]

6. Tests of a Multiple Security Expected Return Model

Though the weak form tests support the "fair game" efficient markets model, all of the evidence examined so far consists of what we might call "single security tests." That is, the price or return histories of individual securities are examined for evidence of dependence that might be used as the basis of a trading system for *that* security. We have not discussed tests of whether securities are "appropriately priced" vis-à-vis one another.

But to judge whether differences between average returns are "appropriate" an economic theory of equilibrium expected returns is required. At the moment, the only fully developed theory is that of Sharpe [40] and Lintner [24,

25. The importance of distributional assumptions is also illustrated in Alexander's work on trading rules. In his initial tests of filter systems [1], Alexander assumed that purchases could always be executed exactly (rather than at least) y% above lows and sales exactly y% below highs. Mandelbrot [28] pointed out, however, that though this assumption would do little harm with normally distributed price changes (since price series are then essentially continuous), with non-normal stable distributions it would introduce substantial positive bias into the filter profits (since with such distributions price series will show many discontinuities). In his later tests [2], Alexander does indeed find that taking account of the discontinuities (i.e., the presence of large price changes) in his data substantially lowers the profitability of the filters.

25] referred to earlier. In this model (which is a direct outgrowth of the mean-standard deviation portfolio models of investor equilibrium of Markowitz [30] and Tobin [43]), the expected return on security j from time t to t + 1 is

$$E(\tilde{r}_{j,t+1}|\Phi_t) = r_{f,t+1} + \left[\frac{E(\tilde{r}_{m,t+1}|\Phi_t) - r_{f,t+1}}{\sigma(\tilde{r}_{m,t+1}|\Phi_t)}\right]\frac{\text{cov}\,(\tilde{r}_{j,t+1}, \tilde{r}_{m,t+1}|\Phi_t)}{\sigma(\tilde{r}_{m,t+1}|\Phi_t)}, \tag{11}$$

where $r_{f,t+1}$ is the return from t to t + 1 on an asset that is riskless in money terms; $r_{m,t+1}$ is the return on the "market portfolio" m (a portfolio of all investment assets with each weighted in proportion to the total market value of all its outstanding units); $\sigma^2(\tilde{r}_{m,t+1}|\Phi_t)$ is the variance of the return on m; cov $(\tilde{r}_{j,t+1}, \tilde{r}_{m,t+1}|\Phi_t)$ is the covariance between the returns on j and m; and the appearance of Φ_t indicates that the various expected returns, variance and covariance, could in principle depend on Φ_t. Though Sharpe and Lintner derive (11) as a one-period model, the result is given a multiperiod justification and interpretation in [11]. The model has also been extended in (12) to the case where the one-period returns could have stable distributions with infinite variances.

In words, (11) says that the expected one-period return on a security is the one-period riskless rate of interest $r_{f,t+1}$ plus a "risk premium" that is proportional to $\text{cov}(\tilde{r}_{j,t+1}, \tilde{r}_{m,t+1}|\Phi_t)/\sigma(\tilde{r}_{m,t+1}|\Phi_t)$. In the Sharpe-Lintner model each investor holds some combination of the riskless asset and the market portfolio, so that, given a mean-standard deviation framework, the risk of an individual asset can be measured by its contribution to the standard deviation of the return on the market portfolio. This contribution is in fact cov $(\tilde{r}_{j,t+1}, \tilde{r}_{m,t+1}|\Phi_t)/\sigma(\tilde{r}_{m,t+1}|\Phi_t)$.[26] The factor

$$[E(\tilde{r}_{m,t+1}|\Phi_t) - r_{f,t+1}]/\sigma(\tilde{r}_{m,t+1}|\Phi_t),$$

which is the same for all securities, is then regarded as the market price of risk.

Published empirical tests of the Sharpe-Lintner model are not yet available, though much work is in progress. There is some published work, however, which, though not directed at the Sharpe-Lintner model, is at least consistent with some of its implications. The stated goal of this work has been to determine the extent to which the returns on a given security are related to the returns on other securities. It started (again) with Kendall's [21] finding that though common stock price changes do not seem to be serially correlated, there is a high degree of cross-correlation between the *simultaneous* returns of different securities. This line of attack was continued by King [23] who (using factor analysis of a sample of monthly returns on sixty N.Y.S.E. stocks for the period 1926-60) found that on average about 50% of the variance of an individual stock's returns could be accounted for by a "market factor" which affects the returns on all stocks, with "industry factors" accounting for at most an additional 10% of the variance.

26. That is,

$$\sum_j \text{cov}\,(\tilde{r}_{j,t+1}, \tilde{r}_{m,t+1}|\Phi_t)/\sigma(\tilde{r}_{m,t+1}|\Phi_t) = \sigma(\tilde{r}_{m,t+1}|\Phi_t).$$

For our purposes, however, the work of Fama, Fisher, Jensen, and Roll [14] (henceforth FFJR) and the more extensive work of Blume [7] on monthly return data is more relevant. They test the following "market model," originally suggested by Markowitz [30]:

$$\tilde{r}_{j,t+1} = \alpha_j + \beta_j \tilde{r}_{M,t+1} + \tilde{u}_{j,t+1} \tag{12}$$

where $r_{j,t+1}$ is the rate of return on security j for month t, $r_{M,t+1}$ is the corresponding return on a market index M, α_j and β_j are parameters that can vary from security to security, and $u_{j,t+1}$ is a random disturbance. The tests of FFJR and subsequently those of Blume indicate that (12) is well specified as a linear regression model in that (i) the estimated parameters $\hat{\alpha}_j$ and $\hat{\beta}_j$ remain fairly constant over long periods of time (e.g., the entire post-World War II period in the case of Blume), (ii) $r_{M,t+1}$ and the estimated $\hat{u}_{j,t+1}$, are close to serially independent, and (iii) the $\hat{u}_{j,t+1}$ seem to be independent of $r_{M,t+1}$.

Thus the observed properties of the "market model" are consistent with the expected return efficient markets model, and, in addition, the "market model" tells us something about the process generating expected returns from security to security. In particular,

$$E(\tilde{r}_{j,t+1}) = \alpha_j + \beta_j E(\tilde{r}_{M,t+1}). \tag{13}$$

The question now is to what extent (13) is consistent with the Sharpe-Lintner expected return model summarized by (11). Rearranging (11) we obtain

$$E(\tilde{r}_{j,t+1}|\Phi_t) = \alpha_j(\Phi_t) + \beta_j(\Phi_t) E(\tilde{r}_{m,t+1}|\Phi_t), \tag{14}$$

where, noting that the riskless rate $r_{f,t+1}$ is itself part of the information set Φ_t, we have

$$\alpha_j(\Phi_t) = r_{f,t+1}[1 - \beta_j(\Phi_t)], \tag{15}$$

and

$$\beta_j(\Phi_t) = \frac{\operatorname{cov}(\tilde{r}_{j,t+1}, \tilde{r}_{m,t+1}|\Phi_t)}{\sigma^2(\tilde{r}_{m,t+1}|\Phi_t)}. \tag{16}$$

With some simplifying assumptions, (14) can be reduced to (13). In particular, if the covariance and variance that determine $\beta_j(\Phi_t)$ in (16) are the same for all t and Φ_t, then $\beta_j(\Phi_t)$ in (16) corresponds to β_j in (12) and (13), and the least squares *estimate* of β_j in (12) is in fact just the ratio of the sample values of the covariance and variance in (16). If we also assume that $r_{f,t+1}$ is the same for all t, and that the behavior of the returns on the market portfolio m are closely approximated by the returns on some representative index M, we will have come a long way toward equating (13) and (11). Indeed, the only missing link is whether in the estimated parameters of (12)

$$\hat{\alpha}_j \cong r_f(1 - \hat{\beta}_j). \tag{17}$$

Neither FFJR nor Blume attack this question directly, though some of Blume's evidence is at least promising. In particular, the magnitudes of the

estimated $\hat{\bar{\alpha}}_j$ are roughly consistent with (17) in the sense that the estimates are always close to zero (as they should be with monthly return data).[27]

In a sense, though, in establishing the apparent empirical validity of the "market model" of (12), both too much and too little have been shown *vis-à-vis* the Sharpe-Lintner expected return model of (11). We know that during the post-World War II period one-month interest rates on riskless assets (e.g., government bills with one month to maturity) have not been constant. Thus, if expected security returns were generated by a version of the "market model" that is fully consistent with the Sharpe-Lintner model, we would, according to (15), expect to observe some non-stationarity in the estimates of α_j. On a monthly basis, however, variation through time in one-period riskless interest rates is probably trivial relative to variation in other factors affecting monthly common stock returns, so that more powerful statistical methods would be necessary to study the effects of changes in the riskless rate.

In any case, since the work of FFJR and Blume on the "market model" was not concerned with relating this model to the Sharpe-Lintner model, we can only say that the results for the former are somewhat consistent with the implications of the latter. But the results for the "market model" are, after all, just a statistical description of the return generating process, and they are probably somewhat consistent with other models of equilibrium expected returns. Thus the only way to generate strong empirical conclusions about the Sharpe-Lintner model is to test it directly. On the other hand, any alternative model of equilibrium expected returns must be somewhat consistent with the "market model," given the evidence in its support.

B. *Tests of Martingale Models of the Semi-strong Form*

In general, semi-strong form tests of efficient markets models are concerned with whether current prices "fully reflect" all obviously publicly available information. Each individual test, however, is concerned with the adjustment of security prices to one kind of information generating event (e.g., stock splits, announcements of financial reports by firms, new security issues, etc.). Thus each test only brings supporting evidence for the model, with the idea that by accumulating such evidence the validity of the model will be "established."

In fact, however, though the available evidence is in support of the efficient markets model, it is limited to a few major types of information generating events. The initial major work is apparently the study of stock splits by Fama,

27. With least squares applied to monthly return data, the estimate of α_j in (12) is

$$\hat{\alpha}_j = \bar{r}_{j,t} - \hat{\beta}_j \bar{r}_{M,t},$$

where the bars indicate sample mean returns. But, in fact, Blume applies the market model to the wealth relatives $R_{jt} = 1 + r_{jt}$ and $R_{Mt} = 1 + r_{Mt}$. This yields precisely the same estimate of β_j as least squares applied to (12), but the intercept is now

$$\hat{\alpha}'_j = \bar{R}_{jt} - \hat{\beta}_j \bar{R}_{Mt} = 1 + \bar{r}_{jt} - \hat{\beta}_j(1 + \bar{r}_{Mt}) = 1 - \hat{\beta}_j + \hat{\alpha}_j.$$

Thus what Blume in fact finds is that for almost all securities, $\hat{\alpha}'_j + \hat{\beta}_j \cong 1$, which implies that $\hat{\alpha}_j$ is close to 0.

Fisher, Jensen, and Roll (FFJR) [14], and all the subsequent studies summarized here are adaptations and extensions of the techniques developed in FFJR. Thus, this paper will first be reviewed in some detail, and then the other studies will be considered.

1. Splits and the Adjustment of Stock Prices to New Information

Since the only apparent result of a stock split is to multiply the number of shares per shareholder without increasing claims to real assets, splits in themselves are not necessarily sources of new information. The presumption of FFJR is that splits may often be associated with the appearance of more fundamentally important information. The idea is to examine security returns around split dates to see first if there is any "unusual" behavior, and, if so, to what extent it can be accounted for by relationships between splits and other more fundamental variables.

The approach of FFJR to the problem relies heavily on the "market model" of (12). In this model if a stock split is associated with abnormal behavior, this would be reflected in the estimated regression residuals for the months surrounding the split. For a given split, define month O as the month in which the effective date of a split occurs, month 1 as the month immediately following the split month, month -1 as the month preceding, etc. Now define the average residual over all split securities for month m (where for each security m is measured relative to the split month) as

$$u_m = \sum_{j=1}^{N} \frac{\hat{u}_{jm}}{N},$$

where $\hat{u}_{jm}$ is the sample regression residual for security j in month m and N is the number of splits. Next, define the cumulative average residual U_m as

$$U_m = \sum_{k=-29}^{m} u_k.$$

The average residual u_m can be interpreted as the average deviation (in month m relative to split months) of the returns of split stocks from their normal relationships with the market. Similarly, U_m can be interpreted as the cumulative deviation (from month -29 to month m). Finally, define u_m^+, u_m^-, U_m^+, and U_m^- as the average and cumulative average residuals for splits followed by "increased" (+) and "decreased" (−) dividends. An "increase" is a case where the percentage change in dividends on the split share in the year after the split is greater than the percentage change for the N.Y.S.E. as a whole, while a "decrease" is a case of relative dividend decline.

The essence of the results of FFJR are then summarized in Figure 1, which shows the cumulative average residuals U_m U_m^+, and U_m^- for $-29 \leq m \leq 30$. The sample includes all 940 stock splits on the N.Y.S.E. from 1927-59, where the exchange was at least five new shares for four old, and where the security was listed for at least twelve months before and after the split.

For all three dividend categories the cumulative average residuals rise in

the 29 months prior to the split, and in fact the average residuals (not shown here) are uniformly positive. This cannot be attributed to the splitting process, since in only about ten per cent of the cases is the time between the announcement and effective dates of a split greater than four months. Rather, it seems that firms tend to split their shares during "abnormally" good times—that is, during periods when the prices of their shares have increased more than would

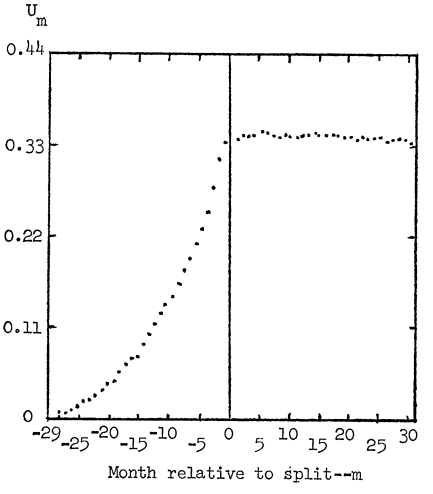

FIGURE 1a
Cumulative average residuals—all splits.

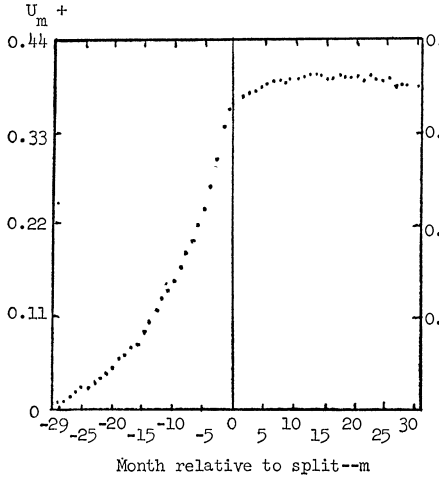

FIGURE 1b
Cumulative average residuals for dividend "increases."

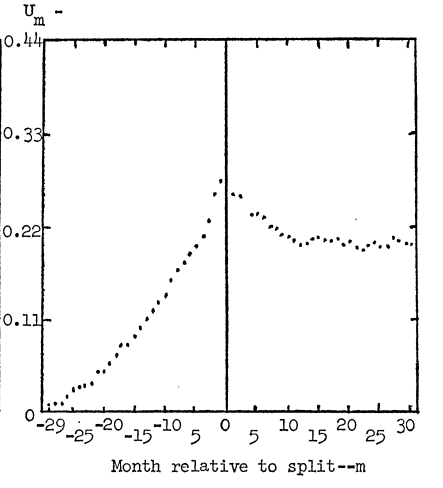

FIGURE 1c
Cumulative average residuals for dividend "decreases."

be implied by their normal relationships with general market prices, which itself probably reflects a sharp improvement, relative to the market, in the earnings prospects of these firms sometime during the years immediately preceding a split.[28]

After the split month there is almost no further movement in U_m, the cumulative average residual for all splits. This is striking, since 71.5 per cent (672 out of 940) of all splits experienced greater percentage dividend increases in the year after the split than the average for all securities on the N.Y.S.E. In light of this, FFJR suggest that when a split is announced the market interprets this (and correctly so) as a signal that the company's directors are probably confident that future earnings will be sufficient to maintain dividend payments at a higher level. Thus the large price increases in the months immediately preceding a split may be due to an alteration in expectations concerning the future earning potential of the firm, rather than to any intrinsic effects of the split itself.

If this hypothesis is correct, return behavior subsequent to splits should be substantially different for the cases where the dividend increase materializes than for the cases where it does not. FFJR argue that in fact the differences are in the directions that would be predicted. The fact that the cumulative average residuals for the "increased" dividends (Figure 1b) drift upward but only slightly in the year *after* the split is consistent with the hypothesis that when the split is *declared*, there is a price adjustment in anticipation of future dividend increases. But the behavior of the residuals for stock splits associated with "decreased" dividends offers even stronger evidence for the split hypothesis. The cumulative average residuals for these stocks (Figure 1c) rise in the few months before the split, but then fall dramatically in the few months after the split when the anticipated dividend increase is not forthcoming. When a year has passed after the split, the cumulative average residual has fallen to about where it was five months prior to the split, which is about the earliest time reliable information about a split is likely to reach the market. Thus by the time it becomes clear that the anticipated dividend increase is not forthcoming, the apparent effects of the split seem to have been wiped away, and the stock's returns have reverted to their normal relationship with market returns.

Finally, and most important, although the behavior of post-split returns will be very different depending on whether or not dividend "increases" occur, and in spite of the fact that a large majority of split securities do experience dividend "increases," when all splits are examined together (Figure 1a), subsequent to the split there is no net movement up or down in the cumulative

28. It is important to note, however, that as FFJR indicate, the persistent upward drift of the cumulative average residuals in the months preceding the split is not a phenomenon that could be used to increase expected trading profits. The reason is that the behavior of the average residuals is not representative of the behavior of the residuals for individual securities. In months prior to the split, successive sample residuals for individual securities seem to be independent. But in most cases, there are a few months in which the residuals are abnormally large and positive. The months of large residuals differ from security to security, however, and these differences in timing explain why the signs of the average residuals are uniformly positive for many months preceding the split.

average residuals. Thus, apparently the market makes unbiased forecasts of the implications of a split for future dividends, and these forecasts are fully reflected in the prices of the security by the end of the split month. After considerably more data analysis than can be summarized here, FFJR conclude that their results lend considerable support to the conclusion that the stock market is efficient, at least with respect to its abiliy to adjust to the information implicit in a split.

2. Other Studies of Public Announcements

Variants of the method of residual analysis developed in [14] have been used by others to study the effects of different kinds of public announcements, and all of these also support the efficient markets hypothesis.

Thus using data on 261 major firms for the period 1946-66, Ball and Brown [4] apply the method to study the effects of annual earnings announcements. They use the residuals from a time series regression of the annual earnings of a firm on the average earnings of all their firms to classify the firm's earnings for a given year as having "increased" or "decreased" relative to the market. Residuals from regressions of monthly common stock returns on an index of returns (i.e., the market model of (12)) are then used to compute cumulative average return residuals separately for the earnings that "increased," and those that "decreased." The cumulative average return residuals rise throughout the year in advance of the announcement for the earnings "increased" category, and fall for the earnings "decreased" category.[29] Ball and Brown [4, p. 175] conclude that in fact no more than about ten to fifteen percent of the information in the annual earnings announcement has not been anticipated by the month of the announcement.

On the macro level, Waud [45] has used the method of residual analysis to examine the effects of announcements of discount rate changes by Federal Reserve Banks. In this case the residuals are essentially just the deviations of the daily returns on the Standard and Poor's 500 Index from the average daily return. He finds evidence of a statistically significant "announcement effect" on stock returns for the first trading day following an announcement, but the magnitude of the adjustment is small, never exceeding .5%. More interesting from the viewpoint of the efficient markets hypothesis is his conclusion that, if anything, the market anticipates the announcements (or information is somehow leaked in advance). This conclusion is based on the non-random patterns of the signs of average return residuals on the days immediately preceding the announcement.

Further evidence in support of the efficient markets hypothesis is provided in the work of Scholes [39] on large secondary offerings of common stock (ie., large underwritten sales of existing common stocks by individuals and institutions) and on new issues of stock. He finds that on average secondary issues are associated with a decline of between one and two per cent in the cumulative average residual returns for the corresponding common stocks. Since the magnitude of the price adjustment is unrelated to the size of the

29. But the comment of footnote 28 is again relevant here.

issue, Scholes concludes that the adjustment is not due to "selling pressure" (as is commonly believed), but rather results from negative information implicit in the fact that somebody is trying to sell a large block of a firm's stock. Moreover, he presents evidence that the value of the information in a secondary depends to some extent on the vendor; somewhat as would be expected, by far the largest negative cumulative average residuals occur where the vendor is the corporation itself or one of its officers, with investment companies a distant second. But the identity of the vendor is not generally known at the time of the secondary, and corporate insiders need only report their transactions in their own company's stock to the S.E.C. within six days after a sale. By this time the market on average has fully adjusted to the information in the secondary, as indicated by the fact that the average residuals behave randomly thereafter.

Note, however, that though this is evidence that prices adjust efficiently to public information, it is also evidence that corporate insiders at least sometimes have important information about their firm that is not yet publicly known. Thus Scholes' evidence for secondary distributions provides support for the efficient markets model in the semi-strong form sense, but also some strong-form evidence against the model.

Though his results here are only preliminary, Scholes also reports on an application of the method of residual analysis to a sample of 696 new issues of common stock during the period 1926-66. As in the FFJR study of splits, the cumulative average residuals rise in the months preceding the new security offering (suggesting that new issues tend to come after favorable recent events)[30] but behave randomly in the months following the offering (indicating that whatever information is contained in the new issue is on average fully reflected in the price of the month of the offering).

In short, the available semi-strong form evidence on the effect of various sorts of public announcements on common stock returns is all consistent with the efficient markets model. The strong point of the evidence, however, is its consistency rather than its quantity; in fact, few different types of public information have been examined, though those treated are among the obviously most important. Moreover, as we shall now see, the amount of semi-strong form evidence is voluminous compared to the strong form tests that are available.

C. *Strong Form Tests of the Efficient Markets Models*

The strong form tests of the efficient markets model are concerned with whether all available information is fully reflected in prices in the sense that no individual has higher expected trading profits than others because he has monopolistic access to some information. We would not, of course, expect this model to be an exact description of reality, and indeed, the preceding discussions have already indicated the existence of contradictory evidence. In particular, Niederhoffer and Osborne [32] have pointed out that specialists on the N.Y.S.E. apparently use their monopolistic access to information concern-

30. Footnote 28 is again relevant here.

ing unfilled limit orders to generate monopoly profits, and Scholes' evidence [39] indicates that officers of corporations sometimes have monopolistic access to information about their firms.

Since we already have enough evidence to determine that the model is not strictly valid, we can now turn to other interesting questions. Specifically, how far down through the investment community do deviations from the model permeate? Does it pay for the average investor (or the average economist) to expend resources searching out little known information? Are such activities even generally profitable for various groups of market "professionals"? More generally, who are the people in the investment community that have access to "special information"?

Though this is a fascinating problem, only one group has been studied in any depth—the managements of open end mutual funds. Several studies are available (e.g., Sharpe [41, 42] and Treynor [44]), but the most thorough are Jensen's [19, 20], and our comments will be limited to his work. We shall first present the theoretical model underlying his tests, and then go on to his empirical results.

1. Theoretical Framework

In studying the performance of mutual funds the major goals are to determine (a) whether in general fund managers seem to have access to special information which allows them to generate "abnormal" expected returns, and (b) whether some funds are better at uncovering such special information than others. Since the criterion will simply be the ability of funds to produce higher returns than some norm with no attempt to determine what is responsible for the high returns, the "special information" that leads to high performance could be either keener insight into the implications of publicly available information than is implicit in market prices or monopolistic access to specific information. Thus the tests of the performance of the mutual fund industry are not strictly strong form tests of the efficient markets model.

The major theoretical (and practical) problem in using the mutual fund industry to test the efficient markets model is developing a "norm" against which performance can be judged. The norm must represent the results of an investment policy based on the assumption that prices fully reflect all available information. And if one believes that investors are generally risk averse and so on average must be compensated for any risks undertaken, then one has the problem of finding appropriate definitions of risk and evaluating each fund relative to a norm with its chosen level of risk.

Jensen uses the Sharpe [40]-Lintner [24, 25] model of equilibrium expected returns discussed above to derive a norm consistent with these goals. From (14)-(16), in this model the expected return on an asset or portfolio j from t to t + 1 is

$$E(\tilde{r}_{j,t+1}|\Phi_t) = r_{f,t+1}\,[1 - \beta_j(\Phi_t)] + E(\tilde{r}_{m,t+1}|\Phi_t)\beta_j(\Phi_t), \qquad (18)$$

where the various symbols are as defined in Section III. A. 6. But (18) is an *ex ante* relationship, and to evaluate performance an *ex post* norm is needed.

One way the latter can be obtained is to substitute the realized return on the market portfolio for the expected return in (18) with the result[31]

$$E(\tilde{r}_{j,t+1}|\Phi_t, r_{m,t+1}) = r_{f,t+1}\,[1 - \beta_j(\Phi_t)] + r_{m,t+1}\beta_j(\Phi_t). \tag{19}$$

Geometrically, (19) says that within the context of the Sharpe-Lintner model, the expected return on j (given information Φ_t and the return $r_{m,t+1}$ on the market portfolio) is a linear function of its risk

$$\beta_j(\Phi_t) = \text{cov}\,(\tilde{r}_{j,t+1}, \tilde{r}_{m,t+1}|\Phi_t)/\sigma^2(\tilde{r}_{m,t+1}|\Phi_t),$$

as indicated in Figure 2. Assuming that the value of $\beta_j(\Phi_t)$ is somehow known, or can be reliably estimated, if j is a mutual fund, its *ex post* performance from t to t + 1 might now be evaluated by plotting its combination of realized return $r_{j,t+1}$ and risk in Figure 2. If (as for the point a) the combination falls above the expected return line (or, as it is more commonly called, the "market line"), it has done better than would be expected given its level of risk, while if (as for the point b) it falls below the line it has done worse.

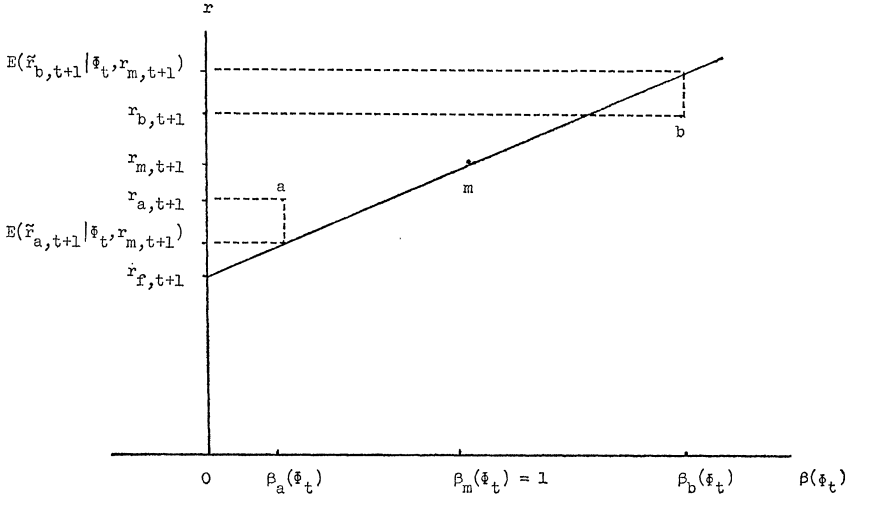

FIGURE 2
Performance Evaluation Graph

Alternatively, the market line shows the combinations of return and risk provided by portfolios that are simple mixtures of the riskless asset and the market portfolio m. The returns and risks for such portfolios (call them c) are

$$r_{c,t+1} = \alpha r_{f,t+1} + (1 - \alpha) r_{m,t+1}$$

$$\beta_c(\Phi_t) = \frac{\text{cov}\,(\tilde{r}_{c,t+1}, \tilde{r}_{m,t+1}|\Phi_t)}{\sigma^2(\tilde{r}_{m,t+1}|\Phi_t)} = \frac{\text{cov}\,((1 - \alpha)\tilde{r}_{m,t+1}, \tilde{r}_{m,t+1}|\Phi_t)}{\sigma^2(\tilde{r}_{m,t+1}|\Phi_t)} = 1 - \alpha,$$

31. The assumption here is that the return $\tilde{r}_{j,t+1}$ is generated according to

$$\tilde{r}_{j,t+1} = r_{f,t+1}[1 - \beta_j(\Phi_t)] + r_{m,t+1}\beta_j(\Phi_t) + \tilde{u}_{j,t+1},$$

and

$$E(\tilde{u}_{j,t+1}|r_{m,t+1}) = 0 \text{ for all } r_{m,t+1}.$$

where α is the proportion of portfolio funds invested in the riskless asset. Thus, when $1 \geqslant \alpha \geqslant 0$ we obtain the combinations of return and risk along the market line from $r_{f,t+1}$ to m in Figure 2, while when $\alpha < 0$ (and under the assumption that investors can borrow at the same rate that they lend) we obtain the combinations of return and risk along the extension of the line through m. In this interpretation, the market line represents the results of a naive investment strategy, which the investor who thinks prices reflect all available information might follow. The performance of a mutual fund is then measured relative to this naive strategy.

2. Empirical Results

Jensen uses this risk-return framework to evaluate the performance of 115 mutual funds over the ten year period 1955-64. He argues at length for measuring return as the nominal ten year rate with continuous compounding (i.e., the natural log of the ratio of terminal wealth after ten years to initial wealth) and for using historical data on nominal one-year rates with continuous compounding to estimate risk. The Standard and Poor Index of 500 major common stocks is used as the proxy for the market portfolio.

The general question to be answered is whether mutual fund managements have any special insights or information which allows them to earn returns above the norm. But Jensen attacks the question on several levels. First, can the funds in general do well enough to compensate investors for loading charges, management fees, and other costs that might be avoided by simply choosing the combination of the riskless asset f and the market portfolio m with risk level comparable to that of the fund's actual portfolio? The answer seems to be an emphatic no. As far as net returns to investors are concerned, in 89 out of 115 cases, the fund's risk-return combination for the ten year period is below the market line for the period, and the average over all funds of the deviations of ten year returns from the market time is -14.6%. That is, on average the consumer's wealth after ten years of holding mutual funds is about fifteen per cent less than if he held the corresponding portfolios along the market line.

But the loading charge that an investor pays in buying into a fund is usually a pure salesman's commission that the fund itself never gets to invest. Thus one might ask whether, ignoring loading charges (i.e., assuming no such charges were paid by the investor), in general fund managements can earn returns sufficiently above the norm to cover all other expenses that are presumably more directly related to the management of the fund portfolios. Again, the answer seems to be no. Even when loading charges are ignored in computing returns, the risk-return combinations for 72 out of 115 funds are below the market line, and the average deviation of ten year returns from the market line is -8.9%.

Finally, as a somewhat stronger test of the efficient markets model, one would like to know if, ignoring all expenses, fund managements in general showed any ability to pick securities that outperformed the norm. Unfortunately, this question cannot be answered with precision for individual funds since, curiously, data on brokerage commissions are not published regularly.

But Jensen suggests the available evidence indicates that the answer to the question is again probably negative. Specifically, adding back all other published expenses of funds to their returns, the risk-return combinations for 58 out of 115 funds were below the market line, and the average deviation of ten year return from the line was −2.5%. But part of this result is due to the absence of a correction for brokerage commissions. Estimating these commissions from average portfolio turnover rates for all funds for the period 1953-58, and adding them back to returns for all funds increases the average deviation from the market line from −2.5% to .09%, which still is not indicative of the existence of special information among mutual fund managers.

But though mutual fund managers in general do not seem to have access to information not already fully reflected in prices, perhaps there are individual funds that consistently do better than the norm, and so provide at least some strong form evidence against the efficient markets model. If there are such funds, however, they escape Jensen's search. For example, for individual funds, returns above the norm in one subperiod do not seem to be associated with performance above the norm in other subperiods. And regardless of how returns are measured (i.e., net or gross of loading charges and other expenses), the number of funds with large positive deviations of returns from the market line of Figure 2 is less than the number that would be expected by chance with 115 funds under the assumption that fund managements have no special talents in predicting returns.[32]

Jensen argues that though his results apply to only one segment of the investment community, they are nevertheless striking evidence in favor of the efficient markets model:

> Although these results certainly do not imply that the strong form of the martingale hypothesis holds for all investors and for all time, they provide strong evidence in support of that hypothesis. One must realize that these analysts are extremely well endowed. Moreover, they operate in the securities markets every day and have wide-ranging contacts and associations in both the business and financial communities. Thus, the fact that they are apparently unable to forecast returns accurately enough to recover their research and transactions costs is a striking piece of evidence in favor of the strong form of the martingale hypothesis—at least as far as the extensive subset of information available to these analysts is concerned [20, p. 170].

IV. Summary and Conclusions

The preceding (rather lengthy) analysis can be summarized as follows. In general terms, the theory of efficient markets is concerned with whether prices at any point in time "fully reflect" available information. The theory only has empirical content, however, within the context of a more specific model of

32. On the other hand, there is some suggestion in Scholes' [39] work on secondary issues that mutual funds may occassionally have access to "special information." After corporate insiders, the next largest negative price changes occur when the secondary seller is an investment company (including mutual funds), though on average the price changes are much smaller (i.e., closer to 0) than when the seller is a corporate insider.

Moreover, Jensen's evidence itself, though not indicative of the existence of special information among mutual fund managers, is not sufficiently precise to conclude that such information never exists. This stronger conclusion would require exact data on unavoidable expenses (including brokerage commissions) of portfolio management incurred by funds.

market equilibrium, that is, a model that specifies the nature of market equilibrium when prices "fully reflect" available information. We have seen that all of the available empirical literature is implicitly or explicitly based on the assumption that the conditions of market equilibrium can be stated in terms of expected returns. This assumption is the basis of the expected return or "fair game" efficient markets models.

The empirical work itself can be divided into three categories depending on the nature of the information subset of interest. *Strong-form* tests are concerned with whether individual investors or groups have monopolistic access to any information relevant for price formation. One would not expect such an extreme model to be an exact description of the world, and it is probably best viewed as a benchmark against which the importance of deviations from market efficiency can be judged. In the less restrictive *semi-strong-form* tests the information subset of interest includes all obviously publicly available information, while in the *weak form* tests the information subset is just historical price or return sequences.

Weak form tests of the efficient market model are the most voluminous, and it seems fair to say that the results are strongly in support. Though statistically significant evidence for dependence in successive price changes or returns has been found, some of this is consistent with the "fair game" model and the rest does not appear to be sufficient to declare the market inefficient. Indeed, at least for price changes or returns covering a day or longer, there isn't much evidence against the "fair game" model's more ambitious offspring, the random walk.

Thus, there is consistent evidence of positive dependence in day-to-day price changes and returns on common stocks, and the dependence is of a form that can be used as the basis of marginally profitable trading rules. In Fama's data [10] the dependence shows up as serial correlations that are consistently positive but also consistently close to zero, and as a slight tendency for observed numbers of runs of positive and negative price changes to be less than the numbers that would be expected from a purely random process. More important, the dependence also shows up in the filter tests of Alexander [1, 2] and those of Fama and Blume [13] as a tendency for very small filters to produce profits in excess of buy-and-hold. But any systems (like the filters) that attempt to turn short-term dependence into trading profits of necessity generate so many transactions that their expected profits would be absorbed by even the minimum commissions (security handling fees) that floor traders on major exchanges must pay. Thus, using a less than completely strict interpretation of market efficiency, this positive dependence does not seem of sufficient importance to warrant rejection of the efficient markets model.

Evidence in contradiction of the "fair game" efficient markets model for price changes or returns covering periods longer than a single day is more difficult to find. Cootner [9], and Moore [31] report preponderantly negative (but again small) serial correlations in weekly common stock returns, and this result appears also in the four day returns analyzed by Fama [10]. But it does not appear in runs tests of [10], where, if anything, there is some slight indication of positive dependence, but actually not much evidence of any

dependence at all. In any case, there is no indication that whatever dependence exists in weekly returns can be used as the basis of profitable trading rules.

Other existing evidence of dependence in returns provides interesting insights into the process of price formation in the stock market, but it is not relevant for testing the efficient markets model. For example, Fama [10] shows that large daily price changes tend to be folowed by large changes, but of unpredictable sign. This suggests that important information cannot be completely evaluated immediately, but that the initial first day's adjustment of prices to the information is unbiased, which is sufficient for the martingale model. More interesting and important, however, is the Niederhoffer-Osborne [32] finding of a tendency toward excessive reversals in common stock price changes from transaction to transaction. They explain this as a logical result of the mechanism whereby orders to buy and sell at market are matched against existing limit orders on the books of the specialist. Given the way this tendency toward excessive reversals arises, however, there seems to be no way it can be used as the basis of a profitable trading rule. As they rightly claim, their results are a strong refutation of the theory of random walks, at least as applied to price changes from transaction to transaction, but they do not constitute refutation of the economically more relevant "fair game" efficient markets model.

Semi-strong form tests, in which prices are assumed to fully reflect all obviously publicly available information, have also supported the efficient markets hypothesis. Thus Fama, Fisher, Jensen, and Roll [14] find that the information in stock splits concerning the firm's future dividend payments is on average fully reflected in the price of a split share at the time of the split. Ball and Brown [4] and Scholes [39] come to similar conclusions with respect to the information contained in (i) annual earning announcements by firms and (ii) new issues and large block secondary issues of common stock. Though only a few different types of information generating events are represented here, they are among the more important, and the results are probably indicative of what can be expected in future studies.

As noted earlier, the strong-form efficient markets model, in which prices are assumed to fully reflect all available information, is probably best viewed as a benchmark against which deviations from market efficiency (interpreted in its strictest sense) can be judged. Two such deviations have in fact been observed. First, Niederhoffer and Osborne [32] point out that specialists on major security exchanges have monopolistic access to information on unexecuted limit orders and they use this information to generate trading profits. This raises the question of whether the "market making" function of the specialist (if indeed this is a meaningful economic function) could not as effectively be carried out by some other mechanism that did not imply monopolistic access to information. Second, Scholes [39] finds that, not unexpectedly, corporate insiders often have monopolistic access to information about their firms.

At the moment, however, corporate insiders and specialists are the only two groups whose monopolistic access to information has been documented. There is no evidence that deviations from the strong form of the efficient markets

model permeate down any further through the investment community. For the purposes of most investors the efficient markets model seems a good first (and second) approximation to reality.

In short, the evidence in support of the efficient markets model is extensive, and (somewhat uniquely in economics) contradictory evidence is sparse. Nevertheless, we certainly do not want to leave the impression that all issues are closed. The old saw, "much remains to be done," is relevant here as elsewhere. Indeed, as is often the case in successful scientific research, now that we know we've been in the past, we are able to pose and (hopefully) to answer an even more interesting set of questions for the future. In this case the most pressing field of future endeavor is the development and testing of models of market equilibrium under uncertainty. When the process generating equilibrium expected returns is better understood (and assuming that some expected return model turns out to be relevant), we will have a more substantial framework for more sophisticated intersecurity tests of market efficiency.

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MODERN REGULATORY FINANCE

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ficulties. From the start, the model itself is a prospective, forward-looking model. To stress this point, the following equation restates the CAPM formula with expectational operators ("E") attached to each input variable:

$$E(K) = E(R_F) + E(\beta) \times [E(R_M) - E(R_F)] \quad (6\text{-}2)$$

where: $E(K)$ = expected return, or cost of capital
$E(R_F)$ = expected risk-free rate
$E(\beta)$ = expected beta
$E(R_M)$ = expected market return

The measurement difficulty is that the CAPM model is a prospective model while the available capital market data required to match the three theoretical input variables (expected risk-free return, expected beta, and expected market risk premium) are frequently historical. None of the input variables exist as a separate identifiable entity. It is thus necessary in practice to employ different proxies, with different results obtained with each set of proxy variables. Each of the three required inputs to the CAPM is examined below.

6.4 CAPM Application: Risk-free Rate

To implement the CAPM methodology, an estimate of the risk-free return is required. Several decisions must be made as to the proper proxies for the risk-free rate.

Risk-Free Rate Maturity

As a proxy for the risk-free rate, long-term rates are the relevant benchmarks when determining the cost of common equity rather than short-term or intermediate-term interest rates. There are several reasons for this, both conceptual and practical.

At the conceptual level, because common stock is a long-term investment and because the cash flows to investors in the form of dividends last indefinitely, the yield on very long-term government bonds, namely, the yield on 30-year Treasury bonds, is the best measure of the risk-free rate for use in the CAPM and Risk Premium methods.[4] The expected common stock return is based on long-term cash flows, regardless of an individual's holding time period. Utility asset investments generally have long-term useful lives and should be correspondingly matched with long-term maturity financing instruments. Moreover, short-term Treasury

4. By definition, the beta of risk-free securities is zero. Financial theory, for example Modigliani-Miller's capital structure paradigm, generally assumes that debt, particularly government debt, is risk free, that is, that it has no default risk or that default risk is completely diversifiable (Beta = 0). Most financial scholars and finance textbooks make the commonplace assumption that the beta of Treasury debt is zero. Although it is difficult to measure the beta risk of a bond because a bond's maturity and coupon have a significant effect on the volatility of its prices, the beta of debt is very close to zero in practice.

12.4 Growth Estimates: Analysts' Forecasts

Since investor growth expectations are the quantities desired in the DCF model, the use of growth forecasts published by investment services merits serious consideration. The growth rates assumed by investors can be determined by a study of the analyses of future earnings and projected long-run growth rates made by the investment community. The anticipated long-run growth rates actually used by institutional investors to determine the desirability of investing in different securities influence investors' growth anticipations.

Typically, growth forecasts are in the form of earnings per share over periods ranging from one to 5 years, and are supported by extensive financial analysis.[7] The average growth rate estimate from all the analysts that follow the company measures the consensus expectation of the investment community for that company. In most cases, it is necessary to use earnings forecasts rather than dividend forecasts due to the extreme scarcity of dividend forecasts compared to the widespread availability of earnings forecasts. Given the paucity of dividend forecasts, using the latter would produce unreliable DCF results. In any event, the use of the DCF model prospectively assumes constant growth in both earnings and dividends. Moreover, as discussed below, there is an abundance of empirical research that shows the validity and superiority of earnings forecasts relative to historical estimates when estimating the cost of capital.

The uniformity of growth projections is a test of whether they are typical of the market as a whole. If, for example, 10 out of 15 analysts forecast growth in the 5% - 7% range, the probability is high that their analysis reflects a degree of consensus in the market as a whole. As a side note, the lack of uniformity in growth projections is a reasonable indicator of higher risk. Chapter 3 alluded to divergence of opinion amongst analysts as a valid risk indicator.

Because of the dominance of institutional investors and their influence on individual investors, analysts' forecasts of long-run growth rates provide a sound basis for estimating required returns. Financial analysts exert a strong influence on the expectations of many investors who do not possess the resources to make their own forecasts, that is, they are a cause of g. The accuracy of these forecasts in the sense of whether they turn out to be correct is not at issue here, as long as they reflect widely held expectations. As long as the forecasts are typical and/or influential in that they are consistent with current stock price levels, they are relevant. The use of analysts' forecasts in the DCF model is sometimes denounced on the grounds that it is dif-

7. Analysts do not generally disseminate their methods of forecasting and do not generally recommend the purchase or sale of a security based on any single growth variable or growth estimating technique. A professional financial analyst is reluctant to reveal the premises and methods of his professional judgment and recommendations. Moreover, analysts' buy/sell recommendations result from complex judgments that cannot be reduced to a single variable or to simple mechanistic equations or models. Several methods and algorithms, involving both quantitative and qualitative factors, are likely to be used in arriving at a final growth forecast, including historical indicators.

ficult to forecast earnings and dividends for only one year, let alone for longer time periods. This objection is unfounded, however, because it is present investor expectations that are being priced; it is the consensus forecast that is embedded in price and therefore in required return, and not the future as it will turn out to be.

Data Sources

Ideally, one could decide which analysts make the most reliable forecasts and then confine the analysis to those forecasts. This would be impractical since reliable data on past forecasts are generally not available. Moreover, analysts with poor track records are replaced by more competent analysts, so that a poor forecasting record by a particular firm is not necessarily indicative of poor future forecasts. In any event, analysts working for large brokerage firms typically have a following, and investors who heed a particular analyst's recommendations do exert an influence on the market. So, an average of all the available forecasts from large reputable investment houses is likely to produce the best DCF growth rate.

Growth rate forecasts are available online from several sources. For example, Value Line Investment Analyzer, IBES (Institutional Brokers' Estimate System), Zacks Investment Research, S&P Global Market Intelligence, Reuters, Yahoo Finance, and Thompson Financial web sites provide analysts' earnings forecasts on a regular basis by reporting on the results of periodic (usually monthly) surveys of the earnings growth forecasts of a large number of investment advisors, brokerage houses, and other firms that engage in fundamental research on U.S. corporations. These firms include most large institutional investors, such as pension funds, banks, and insurance companies. Representative of industry practices, the Zacks Investment Research Web site is a central location whereby investors are able to research the different analyst estimates for any given stock without necessarily searching for each individual analyst. Zacks gathers and compiles the different estimates made by stock analysts on the future earnings for the majority of U.S. publicly traded companies. Estimates of earnings per share for the upcoming 2 fiscal years, and a projected 5-year growth rate in such earnings per share are available at monthly intervals. The forecast 5-year growth rates are normalized in order to remove short-term distortions. Forecasts are updated when analysts formally change their stated predictions.

Exclusive reliance on a single analyst's growth forecast runs the risk of being unrepresentative of investors' consensus forecast. One would expect that averages of analysts' growth forecasts, such as those contained in IBES or Zacks, are more reliable estimates of investors' consensus expectations likely to be impounded in stock prices.[8] Averages of analysts' growth forecasts rather than a single analyst's growth forecasts are more reliable estimates of investors' consensus expectations.

8. The earnings growth rates published by Zacks, Value Line, S&P Global Market Intelligence, Thomson Financial, Reuters, and IBES contain significant overlap since all rely on virtually the same population of institutional analysts who provide such forecasts.

One problem with the use of published analysts' forecasts is that some forecasts cover only the next one or two years. If these are abnormal years, they may not be indicative of longer-run average growth expectations. Another problem is that forecasts may not be available in sufficient quantities or may not be available at all for certain utilities, small water utilities for example, in which case alternate methods of growth estimation must be employed.

Empirical Literature on Earnings Forecasts

Published studies in the academic literature demonstrate that growth forecasts made by security analysts represent an appropriate source of DCF growth rates, are reasonable indicators of investor expectations and are more accurate than forecasts based on historical growth. These studies show that investors rely on analysts' forecasts to a greater extent than on historic data. Let's examine the highlights of this extensive literature.

Academic research confirms the superiority of analysts' earnings forecasts over univariate time-series forecasts that rely on history. This latter category includes many *ad hoc* forecasts from statistical models, ranging from the naive methods of simple averages, moving averages, etc. to the sophisticated time-series techniques such as the Box-Jenkins modeling techniques. The literature suggests that analysts' earnings forecasts incorporate all the public information available to the analysts and the public at the time the forecasts are released. This finding implies that analysts have already factored historical growth trends into their forecast growth rates, making reliance on historical growth rates somewhat redundant and, at worst, potentially double counting growth rates which are irrelevant to future expectations. Furthermore, these forecasts are statistically more accurate than forecasts based solely on historical earnings, dividends, hook value equity, and the like. Let's take a look at the supportive academic evidence.

Summary of Empirical Research

Brown and Rozeff

The study by Brown and Rozeff (1978) shows that analysts, as proxied by Value Line analysts, make better forecasts than could be obtained using only historical data, because analysts have available not only past data but also a knowledge of such crucial factors as rate case decisions, construction programs, new products, cost data, and so on. Brown and Rozeff test the accuracy of analysts' forecasts versus forecasts based on past data only, and conclude that their evidence of superior analyses means that analysts' forecasts should be used in studies of cost of capital. Their evidence supports the hypothesis that Value Line analysts consistently make better predictions than historical time-series models.

where b and r are defined as previously, s is the expected percent growth in number of shares to finance investment, and v is the profitability of the equity investment. The variable s measures the long-run expected stock financing that the utility will undertake, and can be measured as the expected growth in the number of shares based on the last ten years. If the utility's investments are growing at a stable rate and if the earnings retention rate is also stable, then s will grow at a stable rate. The variable s can be estimated by taking a weighted average of past percentage increases in the number of shares. This measurement is difficult, however, owing to the sporadic and episodic nature of stock financing, and smoothing techniques must be employed. The variable v is the profitability of the equity investment and can be measured as ($v = 1 - B/P$), where P is the stock price and B the book value B per share, as discussed in Chapter 9.

There are three problems in the practical application of the sustainable growth method:

(1) It may be even more difficult to estimate what b, r, s, and v investors have in mind than it is to estimate what g they envisage. It would appear far more economical and expeditious to use available growth forecasts and obtain g directly instead of relying on four individual forecasts of the determinants of such growth. It seems only logical that the measurement and forecasting errors inherent in using four different variables to predict growth far exceed the forecasting error inherent in a direct forecast of growth itself.

(2) There is an element of circularity in estimating g by a forecast of b and ROE for the utility being regulated, since ROE is determined in large part by regulation. To estimate what ROE resides in the minds of investors is equivalent to estimating the market's assessment of the outcome of regulatory hearings. Expected ROE is exactly what regulatory commissions set in determining an allowed rate of return. In other words, the method requires an estimate of ROE before it can even be implemented. Common sense would dictate the inconsistency of a return on equity recommendation that is different than the expected ROE that the method assumes the utility will earn forever.

For example, using an expected return on equity of 11% to determine the growth rate and using that same growth rate to recommend a return on equity of 9% is inconsistent. It is not reasonable to assume that this regulated utility company is expected to earn 11% forever, but estimate a 9% return on equity. The only way this utility can earn 11% is that rates be set by the regulator so that the utility will in fact earn 11%. One is assuming, in effect, that the company will earn a return rate exceeding the recommended cost of equity forever, but then one is recommending that a different rate be granted by the regulator. In essence, using an ROE in the sustainable growth formula that differs from the final estimated cost of equity is asking the regulator to adopt two different returns.

The problem is that the 11% ROE used in the retention growth computation exceeds the cost of equity of 9% for Utility X. The analysis thus assumes that the expected earned returns (i.e., ROE) of Utility X exceeds its cost of equity forever. That is, the method assumes that Utility X will earn a ROE higher than its cost of equity to be granted by its regulators and reflected in its rates. While this scenario implicit in the retention growth method may be imaginable and realistic for an unregulated company, it is implausible to assume for a regulated company whose rates are continually re-set by its regulator at a level designed to permit the company to earn a return equal to its cost of capital (ROE = K). This logical flaw compromises the integrity of the results produced by this method.

The circularity problem is somewhat dampened by the self-correcting nature of the DCF model. If a high equity return is granted, the stock price will increase in response to the unanticipated favorable return allowance, lowering the dividend yield component of market return in compensation for the high g induced by the high allowed return. At the next regulatory hearing, more conservative forecasts of r would prevail. The impact on the dual components of the DCF formula, yield and growth, are at least partially offsetting.

(3) The empirical finance literature discussed earlier demonstrates that the sustainable growth method of determining growth is not as significantly correlated to measures of value, such as stock price and price/earnings ratios, as other historical growth measures or analysts' growth forecasts. Other proxies for growth, such as historical growth rates and analysts' growth forecasts, outperform retention growth estimates.

In summary, there are three proxies for the expected growth component of the DCF model: historical growth rates, analysts' forecasts, and the sustainable growth method. Criteria in choosing among the three proxies should include ease of use, ease of understanding, theoretical and mathematical correctness, and empirical validation. The latter two are crucial. The method should be logically valid and consistent, and should possess an adequate track record in predicting and explaining security value. The retention growth method is the weakest of the three proxies on both conceptual and empirical grounds. The research in this area has shown that the first two growth proxies do a better job of explaining variations in market valuation (M/B and P/E ratios) and are more highly correlated to measures of value than is the retention growth proxy.

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Dividend Payout and Future Earnings Growth

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Because dividends reduce the funds available for investment, many market observers and investors associate high dividend payout with weak future earnings growth. Tests using aggregate market data, however, provided evidence that contradicts that view. Because aggregate results may not apply at the company level, we conducted a company-by-company analysis of the relationship between payout and future earnings growth. Our tests also show that high-dividend-payout companies tend to experience strong, not weak, future earnings growth. These results are robust to alternative measures of payout and earnings, sample composition, mean reversion in earnings, the effects of particular industries, time periods, and share repurchases.

Market observers often view low dividend payout as a signal for high future earnings growth. The rationale is that companies pay fewer dividends or retain more earnings when growth opportunities are ample, so low payout indicates strong future earnings growth. For example, the Gordon (1962) constant dividend growth model shows that with constant expected return, high dividend payout should be offset by either a high P/E or low expected earnings growth. The intertemporal extension of the Miller and Modigliani (1961) dividend irrelevance theorem predicts that with unaltered investments and constant expected return, higher dividend payout will be followed by lower growth (Ibbotson and Chen 2003).[1] Moreover, from the perspective of capital structure, "pecking order theory" (Myers 1984) hypothesizes that companies with great growth opportunities will prefer internally generated cash flows to external sources of funds. This hypothesis suggests that companies with plentiful growth opportunities will have low dividend payouts (or high earnings-retention rates). Empirical studies on the determinants of dividend payout generally support the idea that dividend payout is inversely correlated with investment opportunities (Fama and French 2002; Rozeff 1982).

In an intriguing approach, Arnott and Asness (2003) investigated the relationship between payout and future earnings growth by focusing on the market portfolio, proxied by the S&P 500 Index. The results of that study, which incorporated 130 years of data and a variety of tests, are in sharp contrast with conventional wisdom. Arnott and Asness found that future earnings growth is associated with high rather than low dividend payout. This finding proved robust to various subperiods, to extensive controls for the mean reversion of earnings growth, and to a host of micro and macro variables. The authors noted that their findings "offer a challenge to market observers who see the low dividend payouts . . . as a sign of strong future earnings to come" (p. 70).

The Arnott–Asness analysis has direct and important implications for the valuation of the overall equity market. Does the high dividend–high growth relationship also exist at the company level? Although this question is of utmost importance for valuing individual stocks, the answer is not obvious because aggregate results may not apply at the company level.

One reason for differences between aggregate and company-level results is that the S&P 500 composite is capitalization weighted, so the dividend policies and performance of a few large companies in the index may dominate the aggregate results. Company-level analyses, however, treat all companies equally, thereby reducing the possibility that a handful of giant companies dominate results. Two recent studies illustrate this idea clearly. Fama and French (2001) reported that the percentage of U.S. public companies that pay dividends has decreased sharply since 1978. Thus, on the company level, companies are paying fewer dividends than before. In a more recent study, however, DeAngelo, DeAngelo, and Skinner (2004) showed that aggregate dividends have increased since 1978 because dividends are now more concentrated in a few very large corporations.

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A second reason for caution in extending the Arnott–Asness aggregate result to individual companies is that companies in the S&P 500 tend to be large, well-established businesses. Whether the findings apply to a more diverse sample of companies is an empirical question. This issue has become particularly important in recent years because newly listed companies tend to be smaller, less profitable, and more growth oriented than before (Fama and French 2001). As a result, the differences in characteristics between S&P 500 companies and other public companies have become more important in recent years.

Study Design

Following Arnott and Asness, we measured earnings growth as the compounded annual growth rate. We tested for the relationship between payout and future earnings growth by using the following multivariate regression:

$$EG_{0,t} = \alpha_0 + \beta_1 Payout + \beta_2 Size + \beta_3 ROA + \beta_4 E/P + \beta_5 LEV + \beta_6 PEG_{-t,0} + \beta_7 AG_{0,t} + e, \quad (1)$$

where

$EG_{0,t}$ = earnings growth, measured as compounded annual earnings for common shareholders (Compustat #237) growth from Year 0 to year t; growth was calculated over one-, three-, and five-year periods—that is, $t = 1, 3,$ or 5

Payout = dividend payout, measured as Year 0 dividends (Compustat #21) divided by Year 0 earnings (Compustat #237)

Size = natural logarithm of market value of equity (Compustat #25 × Compustat #199) at the end of Year 0

ROA = return on assets, measured as earnings (Compustat #237) for Year 0 divided by total assets (Compustat #6) at the end of Year 0

LEV = leverage, measured as the book value of debt (Compustat #6 – Compustat #60) to total assets (Compustat #6),[2] with all measurements at the end of Year 0

E/P = earnings yield, measured as earnings (Compustat #237) for Year 0 divided by the end-of-year market value of equity (Compustat #25 × Compustat #199)

$PEG_{-t,0}$ = past earnings growth, measured as compounded annual earnings (Compustat #237) growth from year $-t$ to Year 0, with t = 1, 3, or 5 (the basic procedure was the same as for the *EG* variable)

$AG_{0,t}$ = compounded annual growth in total assets (Compustat #6) from Year 0 to year t with t = 1, 3, or 5 with period t designations as for *EG*

A notable difference between our study and that of Arnott and Asness relates to the time horizon. Whereas Arnott and Asness focused on 5-year-ahead and 10-year-ahead long-term earnings growth, we studied earnings growth over short (1-year-ahead), intermediate (3-year-ahead), and long (5-year-ahead) horizons. We examined relatively short horizons for two reasons. One is that, although investors and analysts are clearly interested in long-term earnings growth, they are also interested in short- and intermediate-horizon growth. Second, long-term growth measures require a large number of observations, a requirement that increases survivor bias as the observation period increases.

Our key independent variable is *Payout*. A negative coefficient on *Payout* would support the conventional wisdom that low earnings growth follows high payout. A positive coefficient on *Payout* would be consistent with the results presented in Arnott and Asness.

We controlled for size because large companies are more established and mature than small companies and thus less likely to exhibit stronger growth. Consequently, we expected to observe an inverse relationship between company size and future earnings growth. We controlled for return on assets because when profitability is already high (other factors being equal), companies should find it difficult to demonstrate strong earnings growth. Thus, we expected *ROA* also to be negatively associated with earnings growth.

The leverage control was based on the expectation that companies with high leverage will tend to have large investments, as suggested by Fama and French (2002), and thus higher earnings growth. Hence, we predicted a positive relationship between leverage and earnings growth.

Following Arnott and Asness, we also controlled for earnings yield and past earnings growth. Under the assumption that the market is reasonably efficient, we expected investors to pay more for a dollar of current earnings if future earnings growth is high (i.e., higher P/E). Thus, we predicted that *E/P* (the inverse of P/E) would be negatively related to future earnings growth.[3]

We considered the possibility of mean reversion in earnings growth by including past earnings growth in our regression. Our tests used the same observation period for past and future earnings growth. For example, we controlled for five-year past growth when examining five-year future growth rates. We expected a negative relationship

between past earnings growth and future earnings growth. However, because these controls may not have adequately addressed the possibility of mean reversion, we report later on additional controls for the mean reversion effect.

Finally, we controlled for future asset growth. Other factors being equal, we expected large companies to report higher earnings than small companies. Also, we expected that when companies grew, we would observe growth in earnings. We expected to observe a positive coefficient for the asset growth variable.

Data

We obtained our data from the 2004 Compustat annual files. The sample includes both "active" and "inactive" companies. The sample period is 1950 through 2003. Because our tests required data for past and future earnings growth, the sample size was a decreasing function of the growth horizon.[4] We began with all domestic companies listed on the NYSE, Amex, and NASDAQ that paid dividends on common shares for Year 0. In addition, we required companies with

- positive earnings for Year 0,[5]
- book value of equity greater than $250,000 or total assets greater than $500,000, and
- membership in industries other than financial services (SIC codes 6000–6999) and utilities (SIC codes 4000–4949).

To control for the effects of outliers, for all variables except *Size* and *Payout* (as defined in the previous section), we removed the top and bottom 1 percent of observations. Following the literature, we removed small companies on the basis of the study's requirement for minimum book value of equity or total assets (as in Fama and French 2002). With respect to *Payout*, we removed only the top 1 percent of the observations rather than truncate observations at both the top and bottom ends of the distribution.[6] We used this procedure because the minimum payout would be 0 and about 44 percent of Compustat companies do not pay dividends.

The sample necessarily includes only companies that paid dividends and reported positive earnings in the year under examination. In the interest of maximizing the sample size and generality of results, we did include companies that missed dividends or reported losses in particular years when the dividend and earnings criteria were met in Year 0. Therefore, the study covers the population of Compustat companies insofar as possible. The sample used to test Equation 1 is quite large—40,968 company-years for Year 0 in the case of the one-year growth. Although the number of company-years used in tests of the five-year growth measure decreases to 27,925, our sample continues to be large and comprehensive.

Table 1 reports descriptive statistics for the sample. Note that the medians of earnings growth observations, *EG*, range from 12.6 percent (one-year growth measure) to 9.7 percent (five-year growth measure). Table 1 also shows that the median dividend payout of 33.2 percent is subject to considerable variation among companies. *Payout* at the 75th percentile is more than twice *Payout* for the 25th percentile. With respect to the other variables, the characteristics of the sample companies are similar to those of dividend-paying companies as reported by Fama and French (2001).

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
A. Dependent variables					
EG(0,1)	0.215	0.732	–0.074	0.126	0.324
EG(0,3)	0.113	0.256	–0.022	0.102	0.224
EG(0,5)	0.099	0.170	0.006	0.097	0.187
B. Independent variables					
Payout	0.398	0.314	0.197	0.332	0.506
Size	5.058	2.026	3.558	4.906	6.413
ROA	0.074	0.042	0.044	0.067	0.096
Leverage	0.465	0.174	0.340	0.468	0.588
E/P	0.105	0.068	0.059	0.087	0.132
PEG(–1,0)	0.260	0.851	–0.059	0.134	0.341
PEG(–3,0)	0.142	0.276	–0.006	0.115	0.244
PEG(–5,0)	0.123	0.179	0.021	0.110	0.206

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Results

We first examine the univariate association between current payout and past and future earnings growth. Then, we analyze the relationship between payout and future earnings growth by using multivariate regressions.

Univariate Analysis. For the univariate association between current payout and past and future earnings growth, the cross-correlation matrix in **Table 2** shows Pearson product-moment correlation coefficients between current payout and past and future earnings growth over one-, three-, and five-year observation periods.

Table 2 shows a negative correlation between past and future earnings growth, indicating mean reversion in the growth of earnings. Note also the strong, positive association between current payout and one-, three-, and five-year-ahead earnings growth. The data reveal an even stronger negative correlation, however, between payout and past earnings growth.

Overall, the data suggest that companies with high current dividend payouts tend to have high future earnings growth but relatively low past earnings growth. Because earnings growth tends to revert to the mean, the positive relationship between payout and future earnings growth may be explained by the low past earnings growth of high-payout companies. We controlled for this possibility in our multivariate analysis.

Multivariate Analysis. Regression results for the multivariate analysis for each of the three earnings-growth observation periods are in **Table 3**. Using the Fama and MacBeth (1973) procedure, we estimated regression coefficients for each year to control for cross-sectional dependence. Thus, all reported coefficients are averages of yearly regressions. Note that the coefficients on *Payout* are all positive and highly significant for all three measurement periods.

In Table 3, the control variables are generally highly significant and exhibit the expected relationships with future earnings growth. On the one

Table 2. Correlations between Dividend Payout, Past Earnings Growth, and Future Earnings Growth

	Payout	*PEG*(–5,0)	*PEG*(–3,0)	*PEG*(–1,0)	*EG*(0,1)	*EG*(0,3)	*EG*(0,5)
Payout	1.000	–0.495	–0.457	–0.209	0.248	0.214	0.162
PEG(–5,0)		1.000	0.554	0.144	–0.218	–0.190	–0.164
PEG(–3,0)			1.000	0.228	–0.199	–0.190	–0.155
PEG(–1,0)				1.000	–0.052	–0.072	–0.061
EG(0,1)					1.000	0.509	0.383
EG(0,3)						1.000	0.646
EG(0,5)							1.000

Note: All correlation coefficients are significant at the 1 percent level.

Table 3. Future Earnings Growth as a Function of Dividend Payout

	One-Year *EG*		Three-Year *EG*		Five-Year *EG*	
Variable	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic
Intercept	0.283	6.79***	0.103	6.63***	0.061	7.15***
Payout	0.537	12.45***	0.167	12.96***	0.083	10.31***
Size	–0.029	–7.48***	–0.012	–9.92***	–0.007	–7.90***
ROA	–2.388	–10.54***	–0.974	–11.71***	–0.646	–11.30***
E/P	–1.537	–9.41***	–0.695	–11.97***	–0.468	–11.16***
Leverage	0.077	2.22**	0.065	5.35***	0.058	9.12***
PEG	0.012	0.089	–0.083	–5.90***	–0.118	–10.12***
AG	0.873	14.13***	0.996	29.67***	1.011	39.61***
Adjusted R^2		19.96%		31.59%		36.41%

Note: The reported *t*-statistics and adjusted R^2s are based on the Fama–MacBeth procedure.

*Significant at the 10 percent level in a two-tailed test.
**Significant at the 5 percent level in a two-tailed test.
***Significant at the 1 percent level in a two-tailed test.

hand, large companies, companies with higher current profitability, and companies with higher earnings yields tend to have lower future earnings growth. On the other hand, leverage and asset growth are positively associated with future earnings growth. The past earnings growth variable is negative and highly significant for the three- and five-year growth measures. To the extent that our control variables capture the determinants of earnings growth, Table 3 shows that, after consideration of possible mean reversion and other factors, companies with high current payouts tend to realize high future earnings growth.

Earlier, we noted that because the results of time-series studies that use long observation periods can be influenced by the effects of survivorship, these results may not apply to Compustat companies in general. Although our examination of five-year growth with provision for past earnings growth required 11 annual observations, the data show that the tenor of results is essentially the same as for the one-year growth measure. Therefore, the results do not appear to be materially influenced by survivorship considerations.

We provided for the effects of mean reversion by including a past earnings growth variable, as Arnott and Asness did. Our basic procedure used the same observation period for past and future earnings growth. For example, in the examination of five-year future growth rates, the variable for past earnings growth also represented five years. But growth cycles need not be symmetrical. For example, earnings may decrease for one year or three years, then increase for five years. To examine the effects of nonuniform earnings cycles, we repeated the tests and controlled for all three *PEG* measures. For example, for the three-year-ahead growth regression, in addition to the three-year *PEG* measure, we included *PEG* measures for one and five years. The results of our tests (not reported) were essentially the same as those reported here.

The Fama–MacBeth approach we used entails estimating the regression separately for each year and reporting the average of the annual coefficients. The statistical significance of the average coefficient is based on the assumption that the annual coefficients are normally distributed. If the normality assumption is violated, the validity of the statistical significance reported is subject to question. Therefore, we used the Shapiro–Wilk test to determine whether the annual coefficients on *Payout*, the key independent variable, were normally distributed. We found that we could not reject the null hypothesis that the annual coefficients on *Payout* were normally distributed in any of the three (one-year, three-year, and five-year) regressions.[7]

We tested for potential nonlinearity in the relationship between dividend payout and future earnings growth by conducting a rank regression (nonparametric) test of Equation 1. For each year, we first sorted all dependent and independent variables into deciles. Then, we fitted the annual regressions by using decile ranks rather than numerical values of the continuous variables.

We found the coefficients (not reported) on *Payout* in our three rank regressions to be positive and statistically significant at the 1 percent level.[8] Thus, our rank regressions support our basic finding that payout is positively associated with future earnings growth.

The positive association between current dividend payout and future earnings growth is consistent with the aggregate results reported by Arnott and Asness. The data clearly show that on an individual-company level and after controlling for other influences, future earnings growth increases with payout.

Sensitivity Tests

Given the importance of these findings, we conducted a variety of sensitivity tests of the results. We considered alternative measures of earnings, small companies, regulated industries, an additional control for mean reversion in earnings, specific time periods, industry membership, and share repurchases.

Alternative Measures of Earnings. Because our payout measure included only common dividends, we also measured earnings as net income before extraordinary items and available to common shareholders (Compustat #237). Other common earnings measures that we considered are operating income before depreciation (Compustat #13) and income excluding extraordinary items (Compustat #18). We tested whether our results were sensitive to these alternative measures of earnings and found the results (not reported) to be essentially the same with all three measures.

Small Companies and Regulated Industries. Following Fama and French (2002), we originally omitted company-years from the sample in which the book value of equity was less than $250,000 or total assets were less than $500,000. We also omitted financial firms and utilities, which may have payout-to-earnings relationships different from those of other companies. When we relaxed these filters, we found almost no difference in results (not reported).

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Additional Control for Mean Reversion in Earnings. Previously, we discussed the possibility that mean reversion in earnings growth could be contributing to our results. Although we controlled for mean reversion in earnings growth in Equation 1, we carried out additional tests for the role of mean reversion.

The first test focused on the subsample of companies for which mean reversion in earnings growth was not likely to explain our results. We sorted companies into four groups on the basis of past earnings growth and payout. With respect to earnings growth, we sorted observations according to low and high past earnings growth based on median values in Year 0. For *Payout*, we sorted observations into low and high current payout groups based on the Year 0 median payout. All sorts were done annually. The four groups are shown in **Exhibit 1**.

Exhibit 1. The Four Groups

1. Low Payout. Low Past Earnings Growth.	2. High Payout. Low Past Earnings Growth.
3. Low Payout. High Past Earnings Growth.	4. High Payout. High Past Earnings Growth.

If mean reversion is responsible for the results reported in Table 3, the association between payout and future earnings growth should be *negative* rather than positive for observations in Groups 1 and 4. For example, for Group 1, mean reversion in earnings growth would suggest that low-payout companies have high future earnings growth because past earnings growth is low. By the same reasoning, mean reversion in earnings growth would suggest that high-payout companies (Group 4) would have low future earnings growth. We fitted Equation 1 for companies in Groups 1 and 4 and found that the regression results (not reported) remained qualitatively unchanged.

We then conducted a second test that addressed the joint effects of past earnings growth/current payout on the payout–future growth relationship. For this test, we created two dummy variables to capture the effects of high or low past earnings growth and high or low current payout. The variable D^{PEG} was set to 1 if the company's past earnings growth (one-year, three-year, five-year) in year t was above the median past earnings growth of the same horizon in year t. Otherwise, the value was 0. Similarly, we set a variable D^{Payout} to 1 if the company's payout in year t was above the median payout in year t and set it to 0 otherwise. We then had the two dummy variables interact with all the independent variables in our main model. The expanded model is

$$EG_{0,t} = \alpha_0 + \sum \beta_i \mathbf{X} + \phi_0 D^{PEG} + \sum \phi_i D^{PEG} \mathbf{X} + \gamma_0 D^{Payout} + \sum \gamma_i D^{Payout} \mathbf{X} + e, \quad (2)$$

where **X** is the vector of the independent variables in Equation 1 (that is, *Payout*, *Size*, *ROA*, *LEV*, *E/P*, *PEG*, and *AG*) and β_1, ϕ_1, and γ_1 are the coefficients for, respectively, *Payout*, $D^{PEG} \times$ *Payout*, and $D^{Payout} \times$ *Payout*.

The relationship between payout and future earnings growth is captured by $\beta_1 + \phi_1 D^{PEG} + \gamma_1 D^{Payout}$. This expression permitted us to examine the joint relationship between payout and future earnings growth for each of the four classifications of companies. For example, for companies with low past earnings growth and low payout, Group 1 in Exhibit 1, the relationship is captured by β_1 because both D^{PEG} and D^{Payout} equal 0. Similarly, for companies with high past earnings growth and low payout, Group 3 in Exhibit 1, the relationship is captured by $\beta_1 + \phi_1$ because $D^{PEG} = 1$ and $D^{Payout} = 0$.

Table 4 shows a positive relationship between payout and future earnings growth for nearly all groups and for all of the three growth measures. With the exception of observations in the low past earnings growth and low payout group (Group 1), these relationships tend to be highly significant.

Table 4. Extended Analysis of the Impact of Mean Reversion in Earnings Growth on the Relationship between Future Earnings Growth and Dividend Payout

	One-Year *EG*		Three-Year *EG*		Five-Year *EG*	
Classification	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic
Group 1: Low payout and low *PEG* (β_1)	0.056	0.82	0.037	1.12	0.036	1.43
Group 2: High payout and low *PEG* ($\beta_1 + \gamma_1$)	0.551	8.78***	0.140	8.08***	0.071	6.33***
Group 3: Low payout and high *PEG* ($\beta_1 + \phi_1$)	–0.058	–1.01	0.072	2.61**	0.050	2.38**
Group 4: High payout and high *PEG* ($\beta_1 + \phi_1 + \gamma_1$)	0.437	7.79***	0.175	8.30***	0.086	6.78***

Notes: The regression is Equation 2. The coefficients and *t*-statistics reported are based on the Fama and MacBeth procedure.

*Significant at the 10 percent level in a two-tailed test.
**Significant at the 5 percent level in a two-tailed test.
***Significant at the 1 percent level in a two-tailed test.

Note also that, given past earnings growth (low or high), the relationship between payout and future earnings growth is generally more positive for high-payout companies. In addition, these results suggest that mean reversion in earnings growth is not the driving force behind our finding. Mean reversion in earnings growth would suggest that the coefficients for Group 3 would be generally smaller than those for Group 1. Similarly, the coefficients for Group 2 should be higher than those for Group 4, but Table 4 shows that, with the exception of one regression, the relationships are the opposite.

Specific Time Periods. We considered to what extent a single time period might be responsible for the results and whether the relationship between payout and future growth has changed over time. To address these issues, we used two approaches. First, we fitted Equation 1 for each of the five 10-year time periods in our sample beginning with the 1950s. Year 0 determined the classification by decade. The requirement of data for past earnings growth reduced the number of years included for the 1950s, and with respect to more recent years, we included data from 2000 to 2003 in the 1990s category.

Panel A of **Table 5** shows coefficients and *t*-statistics for *Payout* for each 10-year subperiod. Note that the relationships between earnings growth and payout are positive and generally significant. Thus, we have no reason to suspect that the results are attributable to any particular time period.

A second way to examine the temporal change in the relationship between payout and future earnings growth is to incorporate dummy variables for decades in Equation 1. Specifically, we created four

Table 5. Future Earnings Growth as a Function of Dividend Payout: Analysis by Decade

	One-Year *EG*		Three-Year *EG*		Five-Year *EG*	
Variable	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic
A. Regressions for each decade						
Before 1960	0.287	1.87*	0.082	4.90***	0.058	1.85
1960–69	0.444	7.93***	0.109	3.68***	0.047	3.46***
1970–79	0.639	9.30***	0.231	10.10***	0.095	10.86***
1980–89	0.706	9.42***	0.219	9.27***	0.122	5.77***
After 1990	0.576	7.30***	0.166	9.63***	0.081	8.18***
B. Pooled regressions with time dummy variables						
Intercept	0.253	10.59***	0.111	12.78***	0.063	0.79***
Payout	0.727	28.87***	0.214	23.15***	0.116	18.62***
Size	–0.026	–12.99***	–0.013	–17.07***	–0.007	–14.29***
ROA	–2.370	–21.98***	–1.090	–26.69***	–0.761	–27.23***
E/P	–0.626	–9.91***	–0.358	–15.70***	–0.302	–19.98***
Leverage	–0.029	–1.09	0.025	2.55**	0.033	5.01***
PEG	0.023	4.40***	–0.089	–13.98***	–0.096	–14.85***
AG	0.798	41.78***	1.011	84.57***	0.984	98.82***
D50	–0.095	–2.14**	–0.042	–2.62***	–0.012	–1.11
D60	–0.054	–2.46**	–0.039	–4.95***	–0.021	–3.95***
D70	0.073	4.22***	0.015	2.45**	0.036	8.61***
D80	–0.025	–1.41	–0.008	–1.22	–0.004	–0.94
D50 × Payout	–0.280	–3.52***	–0.087	–3.02***	–0.035	–1.84*
D60 × Payout	–0.353	–8.36***	–0.079	–5.20***	–0.013	–1.28
D70 × Payout	–0.217	–6.14***	0.027	2.12**	–0.021	–2.43**
D80 × Payout	–0.006	–0.18	–0.016	–1.27	–0.005	–0.62
Adjusted R^2		17.05%		32.00%		35.62%

Notes: The regression for Panel A is Equation 1. All coefficients, *t*-statistics, and adjusted R^2s reported in Panel A are based on the Fama–MacBeth procedure. The regression for Panel B is Equation 3. All coefficients, *t*-statistics, and adjusted R^2s reported in Panel B are based on pooled ordinary least-squares estimations.

*Significant at the 10 percent level in a two-tailed test.
**Significant at the 5 percent level in a two-tailed test.
***Significant at the 1 percent level in a two-tailed test.

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decade dummy variables: *D50*, *D60*, *D70*, and *D80*. The decade variable was coded 1 if the observation was in that decade and was coded 0 otherwise. We then had the four decade dummies interact with *Payout*. The expanded regression was

$$EG_{0,t} = \alpha_0 + \beta_1 Payout + \beta_2 Size + \beta_3 ROA + \beta_4\, E/P + \beta_5 LEV + \beta_6 PEG_{-t,0} + \beta_7 AG_{0,t} + \beta_8 D50 + \beta_9 D60 + \beta_{10} D70 + \beta_{11} D80 + \beta_{12} D50 \times Payout + \beta_{13} D60 \times Payout + \beta_{14} D70 \times Payout + \beta_{15} D80 \times Payout + e. \quad (3)$$

Panel B of Table 5 summarizes the results, two of which are particularly interesting. First, we found that earnings growth, on average, was weaker in the 1950s and 1960s than in the 1990s (including 2000–2003) but was stronger in the 1970s, as evidenced by the significantly negative coefficients on *D50* and *D60* and positive coefficient on *D70*. Second, and more importantly, we found generally negative interaction terms between decade dummies and *Payout* (except for the 1980s). Consistent with the results reported in Panel A of Table 5, these data reveal that the positive relationship between payout and future earnings growth has strengthened in recent years.

Industry Effects. Our results may be merely reflecting industry effects. If so, then after controlling for industry membership, if companies with high dividend payouts tend to concentrate in industries that experience higher earnings growth, we should not find a positive relationship between payout and high earnings growth. To examine this possibility, we applied two tests.

For the first test, we substituted industry-adjusted dividend payout for dividend payout in Equation 1. We calculated industry-adjusted payout as Adjusted payout = Payout – Median industry payout, where median industry payout is the median payout of dividend-paying companies with the same two-digit SIC code in a particular year.

Panel A in **Table 6** shows results of this analysis that are similar to those in Table 3. In fact,

Table 6. Future Earnings Growth as a Function of Dividend Payout with Control for Industry Effects

	One-Year *EG*		Three-Year *EG*		Five-Year *EG*	
Variable	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic
A. Industry-adjusted payout						
Intercept	0.488	11.00***	0.165	11.16***	0.093	11.21***
Adjusted *Payout*	0.544	13.10***	0.158	13.44***	0.077	10.82***
Size	–0.026	–6.95***	–0.011	–9.22***	–0.006	–7.29***
ROA	–2.531	–11.11***	–1.018	–11.78***	–0.664	–11.35***
E/P	–1.592	–9.65***	–0.706	–12.43***	–0.473	–11.04***
Leverage	0.050	1.40	0.057	4.75***	0.054	8.49***
PEG	0.011	0.89	–0.092	–6.51***	–0.127	–11.12***
AG	0.859	13.95***	0.987	29.47***	1.006	38.90***
Adjusted R^2		19.91%		31.31%		36.24%
B. Industry dummy variables						
Intercept	0.248	4.92***	0.087	4.78***	0.045	3.51***
Payout	0.543	12.05***	0.165	13.25***	0.084	10.29***
Size	–0.030	–8.91***	–0.012	–10.45***	–0.007	–8.95***
ROA	–2.312	–10.90***	–0.925	–11.92***	–0.611	–11.05***
E/P	–1.711	–11.14***	–0.750	–13.83***	–0.500	–12.26***
Leverage	0.104	3.14***	0.076	6.42***	0.064	11.24***
PEG	0.010	0.79	–0.079	–5.71***	–0.114	–9.64***
AG	0.817	14.24***	0.960	30.07***	0.983	42.81***
Adjusted R^2		24.39%		36.30%		41.10%

Notes: The regression for Panel A is Equation 1, where *Payout* is "adjusted payout" (that is, Payout – Median industry payout). The regression for Panel B is Equation 4. Industry indicators have been omitted because with one for each industry, they are too numerous to show here and the specific industry relationships are not central to our analysis. All coefficients, *t*-statistics, and adjusted R^2s reported are based on the Fama–MacBeth procedure.

*Significant at the 10 percent level in a two-tailed test.
**Significant at the 5 percent level in a two-tailed test.
***Significant at the 1 percent level in a two-tailed test.

the Panel A significance levels for *Payout* are somewhat higher with the industry-adjusted payout variable included.

The second test of industry effects was to include dummy variables for industry membership in the regression. To avoid singularity, we created dummy variables for all but one industry. The expanded regression was

$$EG_{0,t} = \alpha_0 + \beta_1 Payout + \beta_2 Size + \beta_3 ROA + \beta_4\, E/P + \beta_5 LEV + \beta_6 PEG_{-t,0} + \beta_7 AG_{0,t} + \sum \phi_i IND_i + e, \quad (4)$$

where IND_i is a dummy variable that equaled 1 if the company belonged to industry i (defined by a two-digit SIC code) and equaled 0 otherwise.

The results, given in Panel B of Table 6, are similar to those reported in Panel A. Specifically, the coefficients on *Payout* remain strong and significant for all three growth measures. Therefore, our primary results do not seem to be driven by industry effects.

Share Repurchases. Share repurchases have become a popular and important way to distribute cash since the 1980s. For example, Allen and Michaely (2003) reported that in 1979, the aggregate payout through share repurchases was only about 4 percent of earnings but the percentage increased to more than 48 percent in 1998. Because of the dramatic increases in both the magnitude and frequency of share repurchases in recent years, Allen and Michaely, among others, emphasized the desirability of considering repurchases in tests that relate to corporate dividend payouts. We considered the sensitivity of our results to repurchases by examining the relationships between earnings growth and three measures of payout—dividend payout (as previously defined), repurchase payout, and total payout.

Repurchase payout is defined as the ratio of common stock repurchases to earnings. Total payout is the sum of dividend payout and repurchase payout. Following Grullon and Michaely (2002), we measured the dollar amount of a company's common stock repurchases as the dollar amount of its total stock repurchases (Compustat #115) minus the change in redemption value of the preferred shares outstanding (Compustat #56). Because share repurchases were not common until the 1980s, our tests incorporated observations beginning in 1980. To separate the effects of dividend payouts and share repurchases, the sample of dividend-paying companies in this test included only companies that paid dividends and did *not* repurchase shares in Year 0. Similarly, only companies that repurchased shares and did *not* pay regular dividends in Year 0 were included in the repurchase sample.

The results of this analysis are presented in **Table 7**. We found that the payout–future growth relationship continues to be strong after explicit consideration of share repurchases. Specifically, total payout is positively related to future earnings growth in all three regressions. For the companies that paid dividends and did not repurchase shares, dividend payout is strongly and positively associated with future earnings growth for all three growth measurement periods. Repurchase payout is also positively related to future earnings growth, but the significance levels, although high, are somewhat lower than for the other payout measures. Collectively, Table 7 indicates that (1) total current payout is positively related to future earnings growth and (2) the relationship is stronger for dividends than for share repurchases.

Table 7. Future Earnings Growth as a Function of Dividend Payout: Alternative Measures of Payout

	One-Year *EG*		Three-Year *EG*		Five-Year *EG*	
Variable	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic
Total payout	0.246	9.35***	0.060	8.96***	0.035	6.06***
Dividend payout	0.600	8.75***	0.183	10.43***	0.090	5.60***
Repurchase payout	0.149	6.22***	0.030	4.58***	0.009	1.96*

Notes: The regression is Equation 1 with *Payout* measured as total payout, dividend payout, and repurchase payment. Only the coefficients for the alternative measures of *Payout* are shown. All coefficients, *t*-statistics, and adjusted R^2s reported are based on the Fama–MacBeth procedure.

*Significant at the 10 percent level in a two-tailed test.
**Significant at the 5 percent level in a two-tailed test.
***Significant at the 1 percent level in a two-tailed test.

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Potential Explanation: Free Cash Flow Theory

What explains the positive relationship between current payout and future earnings growth? Arnott and Asness suggested that the positive current payout–future growth relationship is consistent with free cash flow theory. As described by Jensen (1986) and others, free cash flow theory suggests that the managers of companies with abundant free cash flows have incentives to overinvest. Thus, the low dividend–low growth relationship may be a result of overinvestment on the part of low-payout companies.

In one test of the free cash flow theory, Lang and Litzenberger (1989) examined stock returns associated with announcements of dividend changes. They found, after they held the magnitudes of dividend increases constant, that companies with limited growth opportunities experience larger share price increases. Lang and Litzenberger interpreted these results as consistent with free cash flow theory; that is, the stronger market reactions for the low-growth companies indicate that the reduction in agency costs through dividend increases is larger for companies with limited growth opportunities.

To test for the operation of free cash flow theory in this context, we followed Fama and French (2002) and adopted as a proxy for growth opportunities the ratio of the company's market value of equity and book value of debt to the book value of its assets, *V/A*. The variable *V/A* is a rough proxy for Tobin's *q* that has been used in numerous studies, including Lang and Litzenberger. Higher *V/A* indicates greater growth opportunities and hence fewer free cash flow problems. If the positive relationship between dividend payout and future earnings growth is a result, at least in part, of the reduction of agency costs through dividend payout, this relationship should be stronger for companies with limited growth opportunities because those companies have higher agency costs associated with abundant free cash flows.

Our main interest was with the interaction between *V/A* and *Payout*—that is, *V/A* × *Payout*. If free cash flow theory is operative, we would expect the coefficient on *V/A* × *Payout* to be negative. A negative coefficient on the interaction term would suggest that when growth opportunities are limited, the positive relationship between payout and future earnings growth is more prominent than when growth opportunities are plentiful. The revised model is

$$EG_{0,t} = \alpha_0 + \beta_1 Payout + \beta_2 Size + \beta_3 ROA + \beta_4 E/P + \beta_5 LEV + \beta_6 PEG_{-t,0} + \beta_7 AG + \beta_8 V/A \times Payout + e, \quad (5)$$

where *V* is the market value of equity (Compustat #25 × Compustat #199) plus the book value of debt (Compustat #181 – Compustat #35) plus preferred stock (Compustat #10) and *A* represents book value of total assets (Compustat #6).

Table 8 reports the results of this analysis. The relationship between payout and future earnings growth continues to be strong despite the introduction of the *V/A* and *V/A* × *Payout* variables. As expected, *V/A*, the proxy for growth opportunities, is positively associated with future earnings growth. More importantly, *V/A* × *Payout* has the predicted negative coefficient for the one- and three-year growth measures. These results indicate that when growth potential is low, the association between payout and earnings growth is strong, a relationship that is consistent with free cash flow theory.

Conclusion

We reported on the relationship between current dividend payout and future growth in earnings at the individual-company level. Our study was motivated by the Arnott–Asness analysis of the market-wide relationship between current dividend payout and future growth in earnings. Arnott and Asness found that high aggregate current payout is associated with high, rather than low, aggregate future earnings growth.[9]

We examined a large sample of companies over a 50-year time period. Our tests included controls for mean reversion in earnings and other variables that have been posited to explain earnings growth. We found a strong, positive association between current dividend payout and future earnings growth. These results are robust to (1) alternative measures of earnings, (2) additional controls for mean reversion in earnings, (3) various subperiods, (4) consideration of industry effects, and (5) the influence of share repurchases. We also found that, consistent with free cash flow theory, the positive relationship between dividend payout and future earnings growth is more prominent for companies with limited growth opportunities or a tendency toward overinvestment.

Our company-level analysis complements the aggregate-level analysis of Arnott and Asness. Both studies found that high payout is related to high future earnings growth and thereby challenge conventional wisdom. The Arnott–Asness results bear on the valuation of the overall market, and our results shed light on the valuation of individual stocks.

Table 8. Future Earnings Growth as a Function of Dividend Payout with Control for the Influence of Growth Opportunities

	One-Year *EG*		Three-Year *EG*		Five-Year *EG*	
Variable	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic	Coefficient	*t*-Statistic
Intercept	0.117	2.33**	0.068	4.06***	0.050	5.14***
Payout	0.791	10.28***	0.220	10.72***	0.089	6.84***
Size	–0.034	–9.46***	–0.014	–11.79***	–0.008	–9.23***
ROA	–4.474	–13.83***	–1.650	–14.80***	–1.121	–14.76***
E/P	–0.368	–2.79***	–0.328	–5.03***	–0.219	–4.67***
Leverage	–0.035	–1.07	0.028	2.22**	0.033	4.52***
PEG	–0.002	–0.15	–0.093	–6.53***	–0.126	–9.99***
AG	0.802	12.93***	0.949	28.74***	0.972	39.83***
V/A	0.211	11.30***	0.059	11.45***	0.0.29	7.37***
V/A × *Payout*	–0.188	–5.39***	–0.042	–4.92***	–0.005	–0.88
Adjusted R^2		22.10%		32.90%		37.49%

Notes: The regression is Equation 5. All coefficients, *t*-statistics, and adjusted R^2s reported are based on the Fama–MacBeth procedure.

*Significant at the 10 percent level in a two-tailed test.
**Significant at the 5 percent level in a two-tailed test.
***Significant at the 1 percent level in a two-tailed test.

We thank John Shon and Murugappa Krishnan for helpful comments.

This article qualifies for 1 PD credit.

Notes

1. Arnott and Asness (2003) provided a numerical example for this argument (pp. 70–71). They also pointed out that the intertemporal argument is, in fact, an extrapolation of Miller and Modigliani's theorem.
2. Compustat does not provide book value of equity (Compustat #60) for most companies before 1960. For those companies, we measured leverage as total liability (Compustat #181) divided by total assets (Compustat #6).
3. Interestingly, Arnott and Asness showed that after controling for dividend payout, aggregate earnings yield was at best weakly negatively related to aggregate future earnings growth. Nevertheless, we included *E/P* in our regression because the negative association between *E/P* and future earnings growth is strongly motivated by theory.
4. For example, when we examined five-year-ahead earnings growth, the first year we examined was 1955 and the last year we examined was 1998 because we needed data to calculate earnings growth for the past and future five years surrounding the event year. In contrast, when we examined one-year-ahead earnings growth, the first year we examined was 1951 and the last year was 2002 because we needed data only for the years immediately before and after the event year.
5. Negative dividend payout has no clear economic meaning. This requirement only slightly reduced the number of sample companies because only about 1 percent of companies that pay dividends in a particular year also report losses.
6. Removing companies in the top 2 percent or top 0.5 percent of the dividend-payout distribution did not qualitatively alter our results. Also, our results held when we removed companies with the lowest 1 percent of positive dividend payout.
7. The Shapiro–Wilk *W* statistic equaled 0.992, 0.980, and 0.988, respectively, for the one-year, three-year, and five-year regressions, with respective *p*-values of 0.97, 0.57, and 0.91.
8. The coefficients on *Payout*, which are all significant at the 1 percent level, are 0.073, 0.064, and 0.041 for, respectively, the one-, three-, and five-year growth periods.
9. We also considered whether high payout is associated with high future growth in sales. Rozeff found that companies with strong *expected* sales growth tend to have lower dividend payouts. We are not aware of any empirical evidence on the relationship between dividend payout and *actual* sales growth. To examine this issue, we substituted sales growth (both past and future) for earnings growth in Equation 1 and found no significant association between payout and future sales growth. Thus, the results suggest that companies pay lower dividends in expectation of higher sales growth but do not necessarily enjoy higher actual sales growth.

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International Evidence on the Payout Ratio, Earnings, Dividends, and Returns

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Recent evidence for the U.S. market has shown that, contrary to popular wisdom, the greater the proportion of earnings paid out as dividends, the greater the subsequent real earnings growth. This study extends previous work by examining whether a similar relationship exists in 11 international markets and by considering the role the payout ratio plays in explaining future real dividend growth and returns. Higher payout ratios do indeed lead to higher real earnings growth—but not to higher real dividend growth. This information has limited use, however, for predicting future returns.

Arnott and Asness (2003; hereafter A&A) established the somewhat surprising finding that higher aggregate dividend-payout ratios in the United States are associated with higher future earnings growth. This finding supports theories that view dividends as signals for earnings expectations. We have extended the work of A&A and others in two main ways:

- We investigated whether similar findings are evident in 11 major international markets.
- We extended the analysis to the relationship between the payout ratio and returns, which we believe to be important because returns are the ultimate focus of portfolio managers and investment strategists.

Although the payout ratio has long been of importance to corporate finance researchers (e.g., Lintner 1956), it has been relatively neglected in the asset-pricing and prediction literature (see McManus, ap Gwilym, and Thomas 2004; ap Gwilym, Seaton, and Thomas, forthcoming 2005)—despite market fascination with investment strategies based on dividends and earnings (e.g., the "Dow 10" strategy).[1] A&A redressed this omission in the literature by examining the aggregate payout ratio for U.S. stocks since 1871 and its relationship to subsequent 10-year real earnings growth. They found a positive coefficient on the payout ratio in a simple linear regression for a variety of subperiods and suggested that the low payout ratio of 2001 would lead to low earnings growth in the following decade. In their analysis of 5-year earnings growth and a rolling 30-year period, they found that these results are robust.

Because dividends are "stickier" (more stable over time) than earnings, A&A also examined whether the phenomenon is actually reflecting mean reversion in earnings; a transient drop in earnings would raise the payout ratio and signal a future rebound in earnings, implying that dividend policy is not really useful as a predictor. They tested this question empirically by including past real earnings growth in the regression, but the hypothesis that the payout ratio is reflecting mean reversion in earnings was comprehensively rejected. Other possible predictor market variables (such as the yield-curve slope and earnings yield) were included, but the inference remained the same: A high payout ratio is associated with high subsequent earnings growth.

Market strategists are also paying more attention to dividends and payout ratios as the markets enter an era that many believe may be unexciting for equities (see Perkins and Gavrina 2004). With the global dividend yield declining from more than 5 percent in the 1980s to less than 2 percent by the late 1990s and with the payout ratio peaking in the early 1990s but currently low, investors are being reminded of the importance of dividends to long-run total returns. Low payout ratios at least

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allow the possibility, other things being equal, of payment hikes.

A primary focus of this article is whether the U.S. findings extend to other countries. A&A suggested that their findings

> conform to a world in which managers possess private information that causes them to pay out a large share of earnings when they are optimistic . . . and to pay out a small share when they are pessimistic. . . . Alternatively, the facts also fit a world in which low payout ratios lead to . . . inefficient empire building. (p. 84)

Given the different managerial cultures, financial market histories, and corporate and individual tax regimes of countries, we believed, before our study, that to discover the U.S. findings repeated in other countries would be quite remarkable.[2]

In assessing the historical evidence that expected future earnings growth is fastest when the current payout ratio is high and slowest when the payout ratio is low, A&A applied the Miller and Modigliani (1961) "dividend irrelevance" theorem, which states that the value of a firm is completely independent of the proportion of earnings retained by that firm. Miller and Modigliani's work established that in a frictionless world, when the investment policy of a firm is held constant, its dividend-payout policy has no consequences for shareholder wealth. Nevertheless, Lintner found that companies follow deliberate dividend-payout strategies.

Several explanations of this dividend puzzle have been suggested. One popular theory is that companies can signal future profitability by paying dividends (Bhattacharya 1979). Recent evidence on this proposition is mixed; DeAngelo, DeAngelo, and Skinner (1996) and Bernartzi, Michaely, and Thaler (1997) showed that current dividend changes do not help predict companies' future earnings growth. Another viewpoint is that dividend policies address agency problems between corporate insiders and outside shareholders. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) analyzed two models designed to address this issue. In the "outcome" model, the hypothesis was that dividends are paid because minority shareholders pressure corporate insiders to pay out cash; hence, strong minority rights should be associated with higher payouts. In the "substitute" model, insiders interested in issuing equity in the future pay dividends to establish a reputation for decent treatment of minority shareholders; hence, strong shareholder protection may mean high payouts are not required to establish credibility. In other words, the quality of shareholder protection is seen as a proxy for agency costs. La Porta et al. found that dividend policies vary across countries in a way consistent with the outcome agency model. They devised a shareholder rights table (see La Porta et al. 1998) in which the "common law" countries of the United States and the United Kingdom scored high on shareholder protection. Among the "civil law" countries, Italy and Germany scored at the bottom; Greece, Switzerland, and the Netherlands scored somewhat better, followed by Portugal and France, and then, Spain and Japan.

Data and Methodology

We studied 11 countries: France, Germany, Greece, Italy, Japan, the Netherlands, Portugal, Spain, Switzerland, the United Kingdom, and the United States. They were chosen on the basis of availability of data from the 30 countries in the Organization for Economic Cooperation and Development to represent the industrialized world.

The data required for each country were monthly values of dividend yield, earnings yield, a retail price index or consumer price index (as appropriate), and the stock market index level. The source was Datastream.

For each country, we chose an index to represent the country's aggregate equity market. To facilitate comparisons with the A&A findings, we used the S&P 500 Index for the United States. For Germany, we used the DAX 30 because the total market index lacked some earnings yield data. We encountered the same problem for Spain, so we used the MADRIDZ. For the rest of the countries, we used a total market index. For the United Kingdom and the United States, we had observations from January 1965 through December 2004, whereas for France, Germany, Japan, the Netherlands, and Switzerland, observations begin with January 1973. Italy's first month of data is January 1986, and Spain's is January 1987. Observations for both Greece and Portugal start in 1990. All observations end in December 2004.

Following the procedure of A&A, we used the earnings yield series to estimate a history of 12-month trailing earnings in index points for each country. First, the earnings yield series was multiplied by the price series. To obtain a real earnings series, the earnings series was divided through by the retail price index. The same process was applied to the dividend yield to create a real dividend series. The payout ratio was defined as the ratio of one-year trailing dividends to one-year trailing earnings. An important issue with these indices is that their composition will vary over time. A&A pointed out that the aggregate EPS

series is not the same as the earnings growth on a static portfolio. Higher-performing stocks will replace lower-performing stocks in the index, and each time rebalancing occurs to account for new listings, the divisor of the index will increase. This process causes the total earnings of the index as well as EPS to decrease; the end result is that EPS cannot keep pace with the growth experienced by the economy as a whole (GDP growth).

We also constructed, in accord with the method used by Fama and French (1998), a return series for each country's index. We assumed that dividends were reinvested at the end of 12-month periods for all return periods in excess of one year. The formula for calculating the return on the index was

$$R_n = \left[\frac{P_2\left(1+d_2\right)}{P_1}\right] - 1,$$

where R_n is the nominal 12-month return, P_1 and P_2 are the price levels at, respectively, the beginning and end of the 12-month period, and d_2 is the dividend yield at the end of the period expressed as a decimal. We then calculated the real return series by subtracting the change in inflation over the period from the nominal return. Return horizons of 1, 5, and 10 years were used.

Because of the differing periods for which data were available by country, the study focused on three periods of matched data. The United Kingdom and the United States, which had the most observations available, are in three time periods: 1965–2004 (Period 1), 1973–2004 (Period 2), and 1990–2004 (Period 3). France, Germany, Japan, the Netherlands, and Switzerland are in the last two time periods. The remaining countries—Greece, Italy, Portugal, and Spain—are only in the last period. For the longest time period, we estimated rolling 10- and 5-year regressions. Thus, for example, those regressions on the U.K. Total Market Index are of the 10-year and 5-year real earnings growth (REG) or real dividend growth (RDG) regressed on the payout ratio (PR) for the period 1965–2004. For the second time period, 1973–2004, 5-year REG, RDG, or real returns were used. For example, for France, we regressed 5-year real returns on the payout ratio to investigate the relationship between those two variables over the 1973–2004 period. (Both the 10-year and 5-year periods are consistent with the approach of A&A.) For the last time period, 1990–2004, we used 1-year real returns, REG, or RDG as the dependent variable.

We investigated the explanatory power of the following variables: the payout ratio, the dividend yield, the earnings yield, lagged dividend growth, and lagged earnings growth. For the lagged variables, in the first time period, we lagged real earnings or dividend growth by 10 years and 5 years, whereas for the second time period, we used 5-year lags.

We ran these regression models for all the countries. As additional tests, for 1973–2004 and 1990–2004, we also created "World" indices—both equally weighted and value weighted—that included all of the countries in our sample for a particular period. The value-weighted series were created by assigning a set of weights based on each country's market value expressed in U.S. dollars.[3] All returns for these indices were calculated from the perspective of a U.S. dollar investor.

The summary statistics computed for the payout ratio for all countries for the three time periods are displayed in **Table 1**. Panel A reveals that for the longest period, the United Kingdom had higher maximum, minimum, mean, and median payout ratios than the United States. Although the differences are not substantial, this finding confirms that a culture of paying dividends is more evident in the United Kingdom than in the United States. The compound annual real growth in earnings and dividends in the United States and the United Kingdom is similar.

Panel B presents the same statistics and growth rates for the 1973–2004 period and includes the equal-weighted World index (EW) and value-weighted World index (VW) for the seven countries. The mean payout ratio ranges from 0.27 for Switzerland to 0.53 for the United Kingdom. The highest maximum payout ratio is, again, for the United Kingdom, and the lowest minimum value for the ratio is for Switzerland. The median payout ratios range from 0.27 to 0.54, with Switzerland's noticeably lower than the others. Japan has the lowest compound annual real growth in dividends and earnings. France has the highest annual real growth rate in earnings and dividends in this sample. The equal-weighted World index has higher growth rates than the value-weighted index, reflecting outperformance of the smaller markets.

Panel C details the findings for the 1990–2004 period—with four new countries added to those of Panel B. As in Panels A and B, the United Kingdom has the highest mean and maximum payout ratios. Portugal has the lowest minimum payout ratio. The mean and median payout ratios have similar ranges. The data indicate that all the countries except Japan had positive earnings growth over the 1990–2004 period. The positive growth rates range from 1.00 percent (Portugal) to 8.95 percent (Greece). Dividend growth was also positive—except for the United Kingdom. Dividend growth rates for the remaining markets varied from 0.21

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Table 1. Summary Statistics

	Payout Ratio				Compound Annual Real Growth	
Country	Max.	Min.	Mean	Median	Earnings	Dividend
A. 1965–2004						
United Kingdom	0.83	0.33	0.56	0.58	2.26%	1.17%
United States	0.77	0.29	0.50	0.49	2.22	1.14
B. 1973–2004						
France	0.69	0.29	0.45	0.45	5.75%	4.85%
Germany	0.69	0.21	0.38	0.37	4.40	0.90
Japan	0.52	0.26	0.38	0.38	0.43	–0.68
Netherlands	0.61	0.29	0.48	0.48	4.01	2.94
Switzerland	0.44	0.20	0.27	0.27	2.80	3.18
United Kingdom	0.83	0.33	0.53	0.54	2.25	1.46
United States	0.77	0.29	0.49	0.46	2.69	1.53
EW7	0.52	0.35	0.43	0.42	3.94	2.28
VW7	0.60	0.34	0.45	0.44	2.72	1.30
C. 1990–2004						
France	0.57	0.32	0.44	0.44	3.66%	7.03%
Germany	0.48	0.21	0.32	0.31	2.87	1.29
Greece	0.61	0.12	0.39	0.43	8.95	12.78
Italy	0.69	0.25	0.46	0.49	1.87	4.11
Japan	0.52	0.26	0.39	0.38	–0.35	0.21
Netherlands	0.61	0.40	0.50	0.50	4.48	3.99
Portugal	0.68	0.02	0.45	0.47	1.00	3.72
Spain	0.55	0.31	0.42	0.42	2.23	2.91
Switzerland	0.44	0.21	0.28	0.27	5.45	6.83
United Kingdom	0.83	0.45	0.61	0.60	1.02	–0.02
United States	0.77	0.29	0.49	0.44	4.00	1.92
EW11	0.50	0.35	0.43	0.43	5.28	4.45
VW11	0.59	0.34	0.46	0.44	2.87	2.06

percent (Japan) to 12.78 percent (Greece). Consistent with the findings in Panel B, the EW11 had higher growth rates than the VW11.

Although the average payout ratios do not rank the country markets precisely according to the rankings by agency problems reported by La Porta et al. (2000), and indeed agency issues were not the main focus of the present study, the general consistency between payout ratios and lack of agency problems cannot be ignored. The United Kingdom and the United States have high payouts, whereas Greece, Switzerland, and Germany have low shareholder protection and low payouts. The patterns for the remaining countries are less clear.[4]

Regression Results

In this section, we report our findings on the relationships between the dividend-payout ratio and earnings growth, dividend growth, and equity market returns.

Payout Ratio and Earnings Growth. Table 2 demonstrates the extent to which PR can explain subsequent REG, in each of the three data periods, for 10-year, 5-year, or 1-year subsequent earnings growth. In Panel A, coefficients on the PR variable are positive with some statistical significance. This result is consistent with A&A but inconsistent with the "traditional" view that higher retention of earnings leads to higher subsequent growth. The explanatory power of the U.S. regressions, with adjusted R^2 values of 28.3 percent and 40.4 percent, is reasonable; the R^2 values for the United Kingdom are markedly lower.

In Panel B, as in Panel A, all the PR coefficients are positive; all but the coefficient for Germany are significant. The explanatory power of the regressions, however, differs considerably. France, Japan, the United States, and the value-weighted World index have reasonably high adjusted R^2 values, but the remaining countries (particularly Germany, the Netherlands, and Switzerland) do not.

Table 2. Subsequent Real Earnings Growth as a Function of Payout Ratio
(*t*-statistics in parentheses)

Country	Constant	PR	Adjusted R^2
A. 1965–2004			
10-year subsequent real earnings growth			
United Kingdom	0.00	0.03	7.8%
	(0.33)	(2.31)	
United States	–0.08	0.19	28.3
	(–3.61)	(4.07)	
5-year subsequent real earnings growth			
United Kingdom	–0.05	0.13	17.4%
	(–2.59)	(3.70)	
United States	–0.21	0.45	40.4
	(–5.70)	(6.22)	
B. 1973–2004: 5-year subsequent real earnings growth			
France	–0.13	0.42	25.9%
	(–4.02)	(5.95)	
Germany	0.02	0.06	0.3
	(0.68)	(0.88)	
Japan	–0.20	0.52	31.7
	(–4.80)	(5.18)	
Netherlands	–0.03	0.16	5.4
	(–0.93)	(2.01)	
Switzerland	–0.12	0.57	8.6
	(–2.95)	(3.80)	
United Kingdom	–0.06	0.15	17.8
	(–2.68)	(3.49)	
United States	–0.23	0.51	49.3
	(–7.30)	(8.25)	
EW7	–0.18	0.49	18.6
	(–3.17)	(3.76)	
VW7	–0.29	0.67	55.9
	(–9.66)	(10.28)	
C. 1990–2004: 1-year subsequent real earnings growth			
France	–0.89	2.15	42.0%
	(–7.61)	(7.96)	
Germany	–0.07	0.36	0.6
	(–0.33)	(0.57)	
Greece	0.05	0.08	–0.5
	(0.33)	(0.23)	
Italy	0.08	–0.09	–0.3
	(0.80)	(–0.38)	
Japan	–0.40	1.01	14.6
	(–3.85)	(4.02)	
Netherlands	–0.63	1.34	15.6
	(–2.71)	(2.81)	
Portugal	–0.63	1.46	25.1
	(–4.75)	(4.63)	
Spain	–0.18	0.48	4.6
	(–1.29)	(1.36)	
Switzerland	–0.36	1.49	9.4
	(–1.46)	(1.65)	
United Kingdom	–0.26	0.45	8.2%
	(–2.44)	(2.59)	
United States	–0.36	0.88	13.3
	(–2.40)	(2.84)	
EW11	–0.35	0.90	6.7
	(–1.76)	(1.96)	
VW11	–0.55	1.28	17.3
	(–2.72)	(2.77)	

The results shown in Panel C of Table 2 are consistent with those of the previous panels: All of the markets except Italy display positive PR coefficients. Again, the explanatory power varies from country to country, with Germany, Greece, Italy, and Spain having particularly low values. Overall, across various earnings growth horizons and for a number of countries, the evidence clearly points to the existence of a positive relationship between payout ratios and real earnings growth.

As an additional test of the relationship between the two, we considered whether countries with higher payout ratios deliver higher subsequent real earnings growth. **Table 3** shows the REG experienced by an investor who at the beginning of each year ranked the seven individual markets available between 1973 and 2004 according to PR and invested in the same ranking each year. For example, rank #1 captures the REG of an investment in the lowest-PR country at the beginning of each annual period and rank #7 represents an investment in the highest-PR country each year. The results show that investing in a country with a high PR leads to higher REG than does investing in low-PR markets, but the relationship is not monotonic. The final column of Table 3 shows that the average annual difference between investing in the highest-PR and the lowest-PR markets was 5.3 percentage points (pps), although this difference was significant only at the 90 percent level. If an investor had taken a 50 percent long position in each of #6 and #7 and a 50 percent short position in each of #1 and #2, however, the REG difference would have been 5.6 pps, which, with a *t*-statistic of 2.28, would be significant at the 95 percent level.

The ability to explain future earnings growth may be improved by introducing the overall valuation of the aggregate stock market into the model. For example, at the individual stock level, Barth, Elliott, and Finn (1999) found that companies with track records of consistent earnings growth achieve higher P/E multiples than companies with patchy earnings records. The presumption is that

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Table 3. Average Arithmetic Annual Real Earnings Growth for Markets Ranked Annually by Payout Ratio, 1973–2004

#1 (low PR)	#2	#3	#4	#5	#6	#7 (high PR)	#7 – #1
1.4%	0.7%	3.4%	5.9%	6.9%	6.7%	6.7%	5.3 pps (t-statistic = 1.84)

the market anticipates that the consistent performers will continue to deliver stellar earnings growth. Given that the aggregate market discounts future prospects, one would expect earnings yield to be negatively related to subsequent real earnings growth.

Table 4 presents results of regressions containing earnings yield (EY) and payout ratio at the beginning of each period as the explanatory variables for real earnings growth. Panel A indicates that the inclusion of EY generally produced a modest improvement over Table 2 in the explanatory power of the regressions for the United Kingdom and the United States. The predominance of negative coefficients for EY is consistent with the hypothesis. Despite the inclusion of EY, PR retains its positive coefficient, albeit with reduced statistical significance.

For the countries and period reflected in Panel B, the use of EY also raised adjusted R^2 values. The coefficients on EY are negative in five of the markets and are significant for France, Germany, and Switzerland. Again, PR retains a positive relationship with REG in all cases, with generally high levels of significance.

The impact of EY is most noticeable in the regressions reported in Panel C for all 11 markets. Compared with Table 2, a significant improvement in the explanatory power is notable. EY demonstrates strongly negative coefficients for most countries. PR has a positive coefficient for all markets except Greece and Italy and is statistically significant in seven country markets plus both World indices, although generally the results appear less conclusive than they are for the five-year regressions.

The implication of Table 4 is that the inclusion of EY does not detract in any meaningful way from the positive relationship previously observed between dividend-payout ratio and real earnings growth. This finding is consistent with the findings of A&A for the U.S. market. Regressions that contained earnings yield improved in explanatory power over those using PR alone, but the effect is most noticeable in the short (one-year) regressions.

A final possibility we considered is that the payout ratio may merely be proxying for depressed or inflated earnings (see A&A, p. 76). Dividends are generally considered to be a much smoother time series than earnings. Therefore, in recessionary periods, earnings may be low relative to dividends, resulting in a high PR, whereas in a period of high growth, the converse may be true. If mean reversion in earnings occurs, it would be consistent with our previous observation that a high payout ratio (i.e., low earnings) results in high subsequent earnings growth whereas a low payout ratio (i.e., high earnings) leads to low subsequent earnings growth. To attempt to test the idea that the payout ratio serves as a proxy for high/low earnings, we ran regressions in which the independent variable was PR and the dependent variable was lagged earnings growth (LEG).[5]

Table 5 presents the results of these regressions. The coefficients on both 10-year lagged earnings growth (LEG_{10} in Panel A for 1975–2004) and 5-year lagged earnings growth (LEG_5 in Panel B for 1970–2004) are negative, which is consistent with the hypothesis of depressed earnings reverting to a mean, although only the U.K. LEG_5 coefficient is significant. The introduction of the lagged growth variables improves the explanatory power somewhat compared with Table 2, but the PR coefficients remain positive and significant. In Panel C for 1978–2004, the coefficients on LEG_5 are statistically significant except those for the United States and Switzerland and all are negative except the coefficient for Japan. Despite this result, the PR coefficients retain positive signs in all but two markets, and many are still significant. Lagged earnings growth seems to have some role to play in explaining subsequent earnings growth, particularly for the five-year horizon. The 10-year results appear to be more consistent with the findings of A&A, who noted that although lagged earnings growth had the anticipated negative sign in their results, the predictive ability of the variable was poor and it failed to materially diminish the role of the payout ratio, particularly in 1946–2001.

Payout Ratio and Dividend Growth. The positive relationship we reported in the previous section between the dividend-payout ratio and real earnings growth failed to conform to conventional wisdom but was consistent with the U.S. evidence presented by A&A. In this section, we report an extension of our analysis that considered whether a similarly unexpected relationship exists

Table 4. Subsequent Real Earnings Growth as a Function of Payout Ratio and Earnings Yield
(*t*-statistics in parentheses)

Country	Constant	PR	EY	Adjusted R^2
A. 1965–2004				
10-year subsequent real earnings growth				
United Kingdom	0.01	0.02	–0.05	8.3%
	(0.77)	(0.98)	(–0.66)	
United States	–0.01	0.10	–0.30	41.2
	(–0.30)	(1.42)	(–1.76)	
5-year subsequent real earnings growth				
United Kingdom	–0.08	0.16	0.09	17.7%
	(–1.57)	(2.75)	(0.43)	
United States	–0.18	0.42	–0.21	31.7
	(–2.97)	(4.49)	(–1.76)	
B. 1973–2004: 5-year subsequent real earnings growth				
France	–0.04	0.38	–0.82	36.0%
	(–1.21)	(4.64)	(–3.47)	
Germany	0.09	0.10	–1.21	8.5
	(2.31)	(1.48)	(–2.50)	
Japan	–0.21	0.52	0.27	31.9
	(–5.02)	(5.23)	(0.62)	
Netherlands	0.06	0.02	–0.33	10.4
	(0.95)	(0.21)	(–1.80)	
Switzerland	0.01	0.48	–1.15	27.4
	(0.11)	(3.11)	(–3.35)	
United Kingdom	–0.12	0.22	0.23	20.3
	(–1.97)	(3.01)	(0.86)	
United States	–0.19	0.46	–0.32	51.4
	(–3.33)	(5.69)	(–1.45)	
EW7	–0.15	0.46	–0.23	19.8
	(–2.31)	(3.31)	(–1.31)	
VW7	–0.30	0.67	0.37	56.6
	(–9.48)	(11.26)	(1.14)	
C. 1990–2004: 1-year subsequent real earnings growth				
France	–0.42	1.54	–2.96	50.1%
	(–1.93)	(4.11)	(–2.53)	
Germany	0.04	0.29	–1.39	1.2
	(0.16)	(0.47)	(–0.60)	
Greece	0.58	–0.03	–6.74	38.8
	(3.54)	(–0.14)	(–6.46)	
Italy	0.40	–0.10	–5.77	14.6
	(2.43)	(–0.40)	(–3.09)	
Japan	–0.35	0.95	–1.35	14.2
	(–1.35)	(2.99)	(–0.17)	
Netherlands	–0.40	1.33	–3.47	29.0
	(–1.99)	(3.55)	(–3.32)	
Portugal	–0.51	1.25	–0.29	26.0
	(–2.79)	(3.11)	(–1.13)	
Spain	–0.05	0.66	–2.88	36.5
	(–0.36)	(2.15)	(–5.64)	
Switzerland	0.25	0.46	–5.54	22.8
	(0.89)	(0.51)	(–4.58)	

(continued)

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Table 4. Subsequent Real Earnings Growth as a Function of Payout Ratio and Earnings Yield (continued)
(*t*-statistics in parentheses)

Country	Constant	PR	EY	Adjusted R^2
United Kingdom	–0.13	0.49	–2.59	16.2%
	(–0.96)	(2.90)	(–2.21)	
United States	–0.04	0.89	–7.49	22.3
	(–0.20)	(2.79)	(–2.27)	
EW11	–0.12	0.91	–4.65	21.5
	(–0.56)	(2.25)	(–3.60)	
VW11	–0.49	1.78	–14.52	22.3
	(–2.41)	(3.82)	(–2.55)	

between the payout ratio and subsequent real dividend growth. A commonly accepted implication of Miller and Modigliani is that a high payout ratio leads to low subsequent real dividend growth unless the company's funds are replenished by stock issuance, and vice versa. For example, a 100 percent PR would almost certainly result in underinvestment in the company's ongoing business

Table 5. Subsequent Real Earnings Growth as a Function of Payout Ratio and Lagged Earnings Growth
(*t*-statistics in parentheses)

Country	Constant	PR	Lagged Earnings Growth (LEG)	Adjusted R^2
A. 1975–2004: 10-year subsequent real earnings growth				
United Kingdom	0.01	0.03	–0.09	11.0%
	(1.00)	(3.01)	(–0.72)	
United States	–0.07	0.17	–0.18	29.1
	(–2.03)	(2.51)	(–0.59)	
B. 1970–2004: 5-year subsequent real earnings growth				
United Kingdom	–0.02	0.09	–0.64	56.8%
	(–0.89)	(3.03)	(–8.67)	
United States	–0.18	0.41	–0.18	48.4
	(–4.58)	(5.19)	(–1.36)	
C. 1978–2004: 5-year subsequent real earnings growth				
France	0.16	–0.15	–0.98	76.0%
	(4.37)	(–1.89)	(–12.38)	
Germany	0.16	–0.22	–0.87	63.2
	(4.01)	(–1.95)	(–10.35)	
Japan	–0.47	1.28	0.86	50.5
	(–6.32)	(6.42)	(4.82)	
Netherlands	–0.02	0.17	–0.37	27.1
	(–0.55)	(2.54)	(–3.93)	
Switzerland	0.01	0.18	–0.25	10.1
	(0.21)	(0.76)	(–1.41)	
United Kingdom	–0.02	0.10	–0.64	57.1
	(–0.98)	(2.89)	(–9.11)	
United States	–0.22	0.48	–0.15	53.2
	(–5.96)	(6.93)	(–1.25)	
EW7	–0.09	0.33	–0.58	55.5
	(–1.71)	(2.94)	(–5.17)	
VW7	–0.18	0.44	–0.44	65.6
	(–5.51)	(6.26)	(–3.49)	

and produce no RDG in the long run, whereas a low PR might allow the company to undertake many projects with positive net present values and thus raise subsequent RDG.

Table 6 reports the results of regressions akin to those reported in Table 2 but with RDG as the dependent variable. Panel A reveals a negative and statistically significant relationship between PR and 10-year subsequent RDG; the adjusted R^2 value is particularly high for the United Kingdom. Results for the five-year RDG in Panel A and the results shown in Panel B are similar. All the country markets except the United States have negative PR coefficients; the World indices also have positive coefficients. In Panel B, PR has some explanatory power related to RDG for the United States, France, and Germany but not for the other markets. Panel C indicates that, as found for the longer growth horizons, a high proportion of these markets show a negative relationship between PR and RDG. The explanatory power varies considerably from country to country. Overall, the evidence presented in Table 6 points to PR and subsequent RDG being negatively related. Unlike our findings for PR as related to REG, the relationship we found between PR and RDG concurs with conventional wisdom.

Table 6. Subsequent Real Dividend Growth as a Function of Payout Ratio
(*t*-statistics in parentheses)

Country	Constant	PR	Adjusted R^2
A. 1965–2004			
10-year subsequent real dividend growth			
United Kingdom	0.14	–0.21	58.4%
	(8.23)	(–7.33)	
United States	0.03	–0.04	4.5
	(3.38)	(–2.50)	
5-year subsequent real dividend growth			
United Kingdom	0.10	–0.15	0.1%
	(3.93)	(–3.38)	
United States	–0.01	0.03	0.8
	(–0.72)	(1.05)	
B. 1973–2004: 5-year subsequent real dividend growth			
France	0.12	–0.15	7.6%
	(4.25)	(–2.76)	
Germany	0.10	–0.22	11.3
	(3.57)	(–3.28)	
Japan	0.02	–0.06	2.5
	(0.98)	(–1.49)	
Netherlands	0.13	–0.18	5.7
	(2.55)	(–1.84)	
Switzerland	0.10	–0.22	1.3
	(2.74)	(–1.56)	
United Kingdom	0.07	–0.07	4.1%
	(2.97)	(–1.85)	
United States	–0.03	0.09	14.2
	(–2.52)	(3.56)	
EW7	0.01	0.03	–0.2
	(0.32)	(0.28)	
VW7	–0.03	0.10	7.2
	(–2.20)	(2.90)	
C. 1990–2004: 1-year subsequent real dividend growth			
France	–0.21	0.64	6.9%
	(–1.32)	(1.66)	
Germany	0.48	–1.41	34.5
	(4.13)	(–4.09)	
Greece	0.70	–1.42	50.4
	(8.78)	(–7.52)	
Italy	0.51	–0.98	16.6
	(3.43)	(–3.15)	
Japan	0.04	–0.10	0.7
	(1.10)	(–1.49)	
Netherlands	0.35	–0.61	12.9
	(3.60)	(–3.19)	
Portugal	0.54	–1.08	21.2
	(6.35)	(–6.24)	
Spain	0.35	–0.78	10.4
	(2.13)	(–2.16)	
Switzerland	0.52	–1.59	13.9
	(2.56)	(–2.17)	
United Kingdom	0.11	–0.18	5.3
	(2.51)	(–2.63)	
United States	–0.04	0.11	2.3
	(–1.01)	(1.37)	
EW11	0.26	–0.48	4.9
	(2.22)	(–1.88)	
VW11	–0.02	0.08	0.2
	(–0.32)	(0.57)	

The possibility remains, however, that a market's overall valuation plays a part in explaining the relationship between PR and RDG in that market, in the same way market valuation plays a role in the relationship of PR and REG. To explore this possibility, we ran regressions for the three periods in which we used dividend yield (DY) at the beginning of the period as an additional variable to proxy for overall market valuation. **Table 7** reports the results. Panel A offers mixed evidence: PR has negative coefficients for the U.K. market but positive coefficients for the U.S. market. The U.S. market also exhibits a positive coefficient in the five-year regression results shown in Panel B. Five of the markets, however, show a negative relationship between

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Table 7. Subsequent Real Dividend Growth as a Function of Payout Ratio and Dividend Yield
(*t*-statistics in parentheses)

Country	Constant	PR	DY	Adjusted R^2
A. 1965–2004				
10-year subsequent real dividend growth				
United Kingdom	0.14	–0.21	0.00	58.4%
	(5.52)	(–7.66)	(–0.29)	
United States	–0.03	0.01	0.01	16.8
	(–1.65)	(0.70)	(3.69)	
5-year subsequent real dividend growth				
United Kingdom	0.04	–0.11	0.01	19.8%
	(1.09)	(–2.73)	(1.65)	
United States	–0.01	0.03	0.00	0.7
	(–0.77)	(1.07)	(0.42)	
B. 1973–2004: 5-year subsequent real dividend growth				
France	0.14	–0.04	–0.02	32.0%
	(4.87)	(–0.50)	(–4.78)	
Germany	0.10	–0.05	–0.02	15.9
	(3.45)	(–0.67)	(–2.37)	
Japan	0.02	–0.04	–0.01	5.0
	(0.96)	(–0.86)	(–1.20)	
Netherlands	0.25	–0.20	–0.02	24.0
	(5.15)	(–3.67)	(–3.34)	
Switzerland	0.13	0.11	–0.05	34.9
	(3.67)	(0.62)	(–4.40)	
United Kingdom	–0.01	–0.02	0.01	10.0
	(–0.16)	(–0.44)	(1.50)	
United States	–0.03	0.09	0.00	14.0
	(–1.83)	(3.44)	(–0.13)	
EW7	0.06	0.00	–0.98	11.0
	(1.26)	(0.05)	(–2.90)	
VW7	–0.04	0.10	0.04	7.0
	(–2.12)	(2.92)	(0.26)	
C. 1990–2004: 1-year subsequent real dividend growth				
France	–0.14	0.63	–0.02	7.7%
	(–0.69)	(1.53)	(–0.88)	
Germany	0.55	–0.96	–0.11	47.6
	(5.44)	(–3.16)	(–4.03)	
Greece	0.70	–1.23	–0.03	51.3
	(8.73)	(–4.70)	(–1.08)	
Italy	0.50	–0.48	–0.09	20.2
	(3.44)	(–1.23)	(–1.33)	
Japan	–0.04	–0.11	0.10	6.0
	(–0.89)	(–1.56)	(1.28)	
Netherlands	0.36	–0.45	–0.03	21.2
	(4.72)	(–3.03)	(–3.91)	
Portugal	0.68	–0.72	–0.11	46.8
	(7.10)	(–5.52)	(–5.15)	
Spain	0.34	–0.62	–0.02	11.6
	(2.04)	(–1.69)	(–1.40)	
Switzerland	0.92	–1.37	–0.29	44.7
	(3.98)	(–2.08)	(–4.68)	

(continued)

Table 7. Subsequent Real Dividend Growth as a Function of Payout Ratio and Dividend Yield (continued)
(*t*-statistics in parentheses)

Country	Constant	PR	DY	Adjusted R^2
United Kingdom	0.12	–0.34	0.02	15.9%
	(2.57)	(–3.43)	(2.82)	
United States	–0.03	0.02	–0.03	8.0
	(–0.82)	(1.76)	(–1.58)	
EW11	0.25	–0.34	–2.15	6.8
	(2.24)	(–1.55)	(–1.34)	
VW11	–0.14	0.11	3.01	5.1
	(–1.09)	(0.68)	(1.55)	

RDG and PR, although both World indices have positive coefficients. The DY coefficients are generally negative throughout Table 7. The addition of DY improves the explanatory power of the regressions compared with those in which PR was the only independent variable (Table 6). Panel C confirms the positive relationship between PR and RDG for the United States, but PR has negative coefficients for the remaining countries except France. DY is negative for all the markets (for some, strongly negative) except Japan and the United Kingdom, which confirms the hypothesis that higher market valuations are consistent with greater future growth of both earnings and dividends.

As a further comparison of the payout ratio's relationships to real earnings growth and real dividend growth, **Table 8** reports the results of regressions of subsequent RDG on PR and *lagged* real dividend growth (LDG) as the explanatory variables. In Panel A, the PR coefficients are negative for both the United Kingdom and, surprisingly, the United States. Ten-year lagged dividend growth (LDG_{10}) also has a negative coefficient in both cases, which is consistent with the evidence for LEG_{10} in Panel A of Table 5 and suggests some tendency for mean reversion. Panel C shows similar findings in the five-year regression results for the seven countries and the Word indices. The PR variable is negative in all cases except the United States and the World indices; LDG_5 is negative in all cases except the United Kingdom and Switzerland. The inclusion of the lagged variable adds considerably to the explanatory power of the model compared with the regressions reported in Table 6.

The observations of a positive relationship between PR and REG and a negative relationship between PR and RDG are consistent with traditional theory only in the case of the PR–RDG relationship. Therefore, either the findings in this study are peculiar to the time periods used or there is a flaw in conventional thinking about payout policy. Because A&A demonstrated that PR and REG have been positively linked throughout the 20th century in the United States, we conclude that the observations we made for the 1965–2004 period are not atypical. Some of the negative relationship between PR and REG can no doubt be explained by the mean reversion of earnings, as revealed in Table 5, but this finding alone does not describe the entire relationship. Therefore, an additional explanation is probably warranted.

Consider an environment that managers, in aggregate, deem to be offering high returns on capital investments. To fund these investments, companies retain more and more of their earnings, and the payout ratio falls. But because many companies are chasing the perceived opportunities in the marketplace (in accordance with the initial optimism among corporate decision makers), future returns fail to match the optimistic estimates made when earnings were retained. This scenario is consistent with a low payout ratio leading to lower subsequent real earnings growth. The reverse situation would occur if managers saw only limited possibilities and underestimated the profitability of potential projects. They would be prepared to return large portions of earnings to shareholders (unless they were building personal empires) and make few investments. These few investments would not suffer from the competition that exists during periods of high optimism and thus would earn higher rates of return than were initially estimated. In this scenario, a high payout ratio is consistent with higher subsequent earnings growth.

Another potential explanation for the findings reported in this study is that mean reversion exists in the payout ratio itself. If so, when the payout ratio is high, the predictions are that future real earnings growth will rise but also that dividends will not be increased at an equally high rate. Because managers seek to avoid dividend cuts wherever possible, a period of high earnings growth gives managers the opportunity to raise dividends but to do so at a slower pace than that at which earnings are increasing, thus bringing PR

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Table 8. Subsequent Real Dividend Growth as a Function of Payout Ratio and Lagged Dividend Growth
(*t*-statistics in parentheses)

Country	Constant	PR	LDG	Adjusted R^2
A. 1975–2004: 10-year subsequent real dividend growth				
United Kingdom	0.09	–0.08	–0.26	70.6%
	(8.60)	(–4.23)	(–4.17)	
United States	0.03	–0.03	–0.01	4.9
	(2.71)	(–1.26)	(–0.09)	
B. 1970–2004: 5-year subsequent real dividend growth				
United Kingdom	0.11	–0.15	–0.16	16.6%
	(4.31)	(–2.98)	(1.95)	
United States	–0.02	0.05	–0.24	9.3
	(–1.32)	(1.91)	(–2.65)	
C. 1978–2004: 5-year subsequent real dividend growth				
France	0.15	–0.17	–0.50	25.1%
	(5.23)	(–2.79)	(–4.91)	
Germany	0.18	–0.40	–0.86	46.4
	(4.50)	(–3.42)	(–6.99)	
Japan	0.01	–0.04	–0.16	2.4
	(0.76)	(–0.86)	(–1.29)	
Netherlands	0.12	–0.13	–0.19	12.3
	(2.40)	(–1.17)	(–1.41)	
Switzerland	0.14	–0.36	0.26	9.7
	(3.32)	(–2.40)	(1.35)	
United Kingdom	0.12	–0.16	0.13	18.7
	(4.81)	(–3.32)	(1.24)	
United States	–0.03	0.10	–0.56	40.0
	(–2.54)	(4.49)	(–6.29)	
EW7	–0.04	0.18	–0.21	11.3
	(–1.10)	(2.43)	(–1.45)	
VW7	–0.02	0.08	–0.28	16.8
	(–1.18)	(2.43)	(–2.28)	

down to a lower level.[6] In this way, should earnings stall or decline in future periods, the managers might feel less pressure to cut dividends because earnings would still adequately cover the distribution. When the payout ratio is very high, earnings presumably have less room to decrease before a dividend reduction is called for.

To investigate whether mean reversion in the payout ratio is causing the difference in sign between the PR–REG relationship and the PR–RDG relationship, we carried out a regression of both PR and the change in PR (PRC) *over the same period* against RDG. (Although PRC cannot be observed before an event, it can serve as a useful explanatory variable for our purposes here.) When the payout ratio is high, subsequent real earnings growth is also high; the logical extension would be that this effect is correlated with rising dividends. Therefore, the negative relationship between PR and RDG is surprising. By controlling for mean reversion in PR through the use of PRC, we hoped to achieve a more direct observation than was possible in previous regressions of the effect of PR on RDG.

Panel A of **Table 9** shows that the addition of the change in payout ratio for this long period leads to positive coefficients for both PR and PRC for the United Kingdom; for the United States, one coefficient on PR has become less negative than it was in Table 6; the coefficients on PRC are positive. These findings support the notion that real dividend growth is positively related to PR when mean reversion in PR is accounted for. In Panel B, however, many of the markets have retained the negative, statistically significant coefficients on PR. Only the coefficients for the United Kingdom and the Netherlands have flipped to positive. The introduction of PRC has had little impact on the one-year results reported in Panel C. Therefore, mean reversion in PR may explain some of the negative relationship observed between RDG and PR, but it fails to give a full explanation of this conundrum.

Table 9. Subsequent Real Dividend Growth as a Function of Payout Ratio and Subsequent Change in Payout Ratio
(*t*-statistics in parentheses)

Country	Constant	PR	PRC	Adjusted R^2
A. 1965–2004				
10-year subsequent real dividend growth				
United Kingdom	0.00	0.03	0.19	83.5%
	(0.21)	(0.92)	(8.54)	
United States	0.01	–0.01	0.03	7.5
	(1.17)	(–0.41)	(1.81)	
5-year subsequent real dividend growth				
United Kingdom	0.00	0.03	0.23	43.8%
	(0.14)	(0.64)	(6.55)	
United States	–0.01	0.03	0.01	0.6
	(–0.63)	(0.85)	(0.21)	
B. 1973–2004: 5-year subsequent real dividend growth				
France	0.16	–0.26	–0.09	9.2%
	(3.95)	(–2.97)	(–1.65)	
Germany	0.13	–0.29	–0.12	12.3
	(3.42)	(–2.95)	(–0.96)	
Japan	0.11	–0.32	–0.23	35.4
	(5.16)	(–5.28)	(–6.00)	
Netherlands	0.00	0.07	0.07	24.3
	(0.11)	(0.81)	(5.39)	
Switzerland	0.08	–0.15	0.06	1.1
	(1.43)	(–0.69)	(0.36)	
United Kingdom	0.01	0.03	0.17	18.7
	(0.30)	(0.60)	(3.68)	
United States	–0.03	0.09	0.00	13.8
	(–2.07)	(2.89)	(0.00)	
EW7	0.05	–0.07	–0.09	0.7
	(0.75)	(–0.40)	(–0.89)	
VW7	0.03	–0.04	–0.09	15.6
	(0.77)	(–0.49)	(–1.99)	
C. 1990–2004: 1-year subsequent real dividend growth				
France	–0.39	1.04	0.65	12.2%
	(–1.85)	(2.12)	(1.57)	
Germany	0.44	–1.28	0.23	35.1
	(3.87)	(–3.83)	(0.92)	
Greece	0.65	–1.31	0.25	51.0
	(7.42)	(–6.20)	(1.11)	
Italy	0.29	–0.53	1.36	37.0
	(2.48)	(–1.93)	(3.66)	
Japan	0.14	–0.35	–0.59	26.2
	(2.75)	(–3.14)	(–3.46)	
Netherlands	0.57	–1.05	–0.48	20.6
	(5.72)	(–5.38)	(–3.16)	
Portugal	–0.14	0.40	1.60	55.8
	(–1.18)	(1.44)	(4.97)	
Spain	0.12	–0.23	1.17	27.8
	(0.85)	(–0.70)	(2.96)	
Switzerland	0.37	–1.06	0.60	15.0
	(1.50)	(–1.18)	(0.76)	

(continued)

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Table 9. Subsequent Real Dividend Growth as a Function of Payout Ratio and Subsequent Change in Payout Ratio (continued)
(*t*-statistics in parentheses)

Country	Constant	PR	PRC	Adjusted R^2
United Kingdom	0.06	–0.09	0.22	12.9%
	(1.11)	(–1.14)	(2.55)	
United States	0.02	0.00	–0.27	13.6
	(0.34)	(0.02)	(–2.11)	
EW11	0.37	–0.73	–0.39	6.7
	(2.97)	(–2.66)	(–1.39)	
VW11	0.11	–0.20	–0.44	20.2
	(1.62)	(–1.39)	(–2.61)	

The Payout Ratio and Returns. We have been considering the ability of the payout ratio to explain growth in earnings and growth in dividends. The information that practitioners want, however, is whether this evidence can be used to generate returns. Do higher earnings and/or dividend growth lead to higher returns? To find an answer, we ranked five-year periods of REG and RDG on an annual basis for the markets where data were available for the 1973–2004 period. We formed quartiles in which Quartile 1 contains the lowest six five-year periods of REG (or RDG) and so on up to Quartile 4, which contains the highest six five-year periods of REG (RDG). The concurrent average annually compounded percentage real return of each quartile is reported in **Table 10**.

Panel A demonstrates that periods of high REG (Quartile 4) were clearly accompanied by higher returns than periods of low REG (Quartile 1), but the results provide no evidence of a linear increase in returns across quartiles. Panel B reveals that periods of high RDG were also accompanied by higher returns than were low-RDG periods. As for REG, however, no linear relationship is shown.

The conclusion of this simple analysis is that high REG and RDG *tend* to exist in parallel with relatively higher returns. The implication of this conclusion for practitioners is that a high payout

Table 10. Average Five-Year Real Returns for Quartiles Ranked by Concurrent Real Earnings Growth and Quartiles Ranked by Real Dividend Growth, 1973–2004

Country	Quartile 1 (low REG or RDG)	Quartile 2	Quartile 3	Quartile 4 (high REG or RDG)
A. Ranking by concurrent five-year real earnings growth				
France	6.17%	8.70%	9.66%	20.11%
Germany	3.45	–0.60	9.34	17.07
Japan	–6.48	3.14	7.43	12.27
Netherlands	3.76	9.03	15.25	21.31
Switzerland	0.66	2.17	14.47	17.01
United Kingdom	5.76	11.38	8.64	12.97
United States	7.66	6.11	3.30	16.80
EW7	5.21	4.46	13.87	15.96
VW7	6.57	6.15	10.04	13.06
B. Ranking by concurrent five-year real dividend growth				
France	2.88%	18.12%	8.86%	14.79%
Germany	–0.83	6.67	6.09	18.19
Japan	–2.33	–2.61	9.21	12.09
Netherlands	2.53	19.23	14.44	8.90
Switzerland	–0.67	8.24	7.39	19.35
United Kingdom	–1.36	13.63	11.90	14.57
United States	6.63	4.97	10.87	11.40
EW7	5.36	9.37	6.75	18.03
VW7	6.87	2.23	9.46	17.27

ratio may lead to subsequent high real earnings growth but also to low real dividend growth. Thus, PR emits a somewhat contradictory signal in terms of returns. **Table 11** formalizes this idea by presenting results for regressions akin to those of Tables 2 and 6 but with subsequent real returns as the dependent variable and PR as the independent variable. In Panel A, for the 10-year subsequent real return regressions, both PR coefficients are negative but only the U.K. coefficient is significant. The adjusted R^2 value is very low for the United States but fairly substantial for the United Kingdom. For the 5-year subsequent real return regressions, however, the U.S. coefficient is positive whereas the U.K. coefficient remains negative. Panel B, with a fairly even mix of positive and negative coefficients, shows no general relationship between PR and returns. The explanatory power of most of these regressions is negligible. In Panel C, 9 of the 11 countries have positive PR coefficients, as do both World indices. The adjusted R^2 values are typically low, although generally higher than those in the 5-year regressions in Panel B. These results provide little evidence that PR has any ability to predict subsequent aggregate market returns.

Table 11. Subsequent Real Returns as a Function of Payout Ratio
(*t*-statistics in parentheses)

Country	Constant	PR	Adjusted R^2
A. 1965–2004			
10-year subsequent real returns			
United Kingdom	0.30	–0.39	51.5%
	(10.79)	(–7.28)	
United States	0.14	–0.14	2.5
	(3.37)	(–1.67)	
5-year subsequent real returns			
United Kingdom	0.19	–0.21	5.3%
	(3.70)	(–2.09)	
United States	–0.03	0.19	2.9
	(–0.54)	(1.63)	
B. 1973–2004: 5-year subsequent real returns			
France	0.07	0.09	0.3%
	(0.82)	(0.45)	
Germany	0.07	0.02	0.0
	(1.25)	(0.18)	
Japan	0.00	0.11	0.1
	(0.05)	(0.63)	
Netherlands	0.22	–0.22	1.8
	(2.83)	(–1.26)	
Switzerland	0.05	0.14	0.0
	(0.72)	(0.56)	
United Kingdom	0.14	–0.08	0.7
	(3.21)	(–0.92)	
United States	–0.11	0.40	18.1%
	(–2.48)	(4.93)	
EW7	0.20	–0.24	8.5
	(5.13)	(–2.69)	
VW7	0.24	–0.50	25.2
	(6.81)	(–4.05)	
C. 1990–2004: 1-year subsequent real returns			
France	–0.77	1.81	11.5%
	(–3.11)	(3.51)	
Germany	0.37	–0.88	3.2
	(1.58)	(–1.24)	
Greece	–0.26	1.01	7.7
	(–1.61)	(2.61)	
Italy	0.43	–0.77	6.6
	(1.86)	(–1.59)	
Japan	–0.43	1.06	9.5
	(–2.44)	(2.34)	
Netherlands	–0.31	0.84	2.6
	(–1.02)	(1.46)	
Portugal	–0.09	0.38	0.9
	(–0.57)	(1.08)	
Spain	–0.01	0.29	–0.2
	(–0.01)	(0.41)	
Switzerland	0.08	0.15	–0.5
	(0.26)	(0.14)	
United Kingdom	–0.38	0.75	10.7
	(–2.41)	(3.14)	
United States	0.04	0.13	0.3
	(0.33)	(0.60)	
EW11	–0.25	0.69	13.3
	(–1.91)	(2.73)	
VW11	–0.11	7.65	1.5
	(–0.64)	(0.88)	

PR may in some way, however, be correlated with the valuation of the aggregate market. If so, then the specification in Table 11 fails to remove this effect. To test for this possibility, we included earnings yield as an additional explanatory variable to proxy for overall market valuation (as in Table 4). **Table 12** provides the results. In Panel A, with the inclusion of EY, both PR coefficients for the United States become positive and significant, the 5-year U.K. coefficient is also positive, but the 10-year U.K. coefficient remains significantly negative. In Panel B, six of the seven individual markets have positive PR coefficients (compared with five in Table 11) but only the U.K. and U.S. coefficients are significant. Both of the World indices have negative coefficients in Panel B, but the reason may be that returns were calculated in U.S. dollars. The inclusion of EY appears to have had little effect (when compared with Table 11) on the PR coefficients reported in Panel C.

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Table 12. Subsequent Real Returns as a Function of Payout Ratio and Earnings Yield
(*t*-statistics in parentheses)

Country	Constant	PR	EY	Adjusted R^2
A. 1965–2004				
10-year subsequent real returns				
United Kingdom	0.20	–0.28	0.42	54.0%
	(3.03)	(–3.43)	(1.67)	
United States	–0.28	0.39	1.83	25.4
	(–2.83)	(2.98)	(5.09)	
5-year subsequent real returns				
United Kingdom	–0.22	0.25	1.74	25.0%
	(–1.79)	(1.82)	(2.88)	
United States	–0.19	0.36	1.10	13.2
	(–2.47)	(2.79)	(3.42)	
B. 1973–2004: 5-year subsequent real returns				
France	–0.07	0.14	1.27	12.6%
	(–0.94)	(0.92)	(2.72)	
Germany	–0.04	–0.05	1.91	9.5
	(–0.57)	(–0.41)	(2.59)	
Japan	–0.10	0.04	3.88	28.0
	(–1.73)	(0.34)	(4.62)	
Netherlands	0.02	0.06	0.66	5.7
	(0.14)	(0.23)	(1.53)	
Switzerland	0.07	0.13	–0.21	0.0
	(0.78)	(0.48)	(–0.41)	
United Kingdom	–0.27	0.41	1.58	28.5
	(–2.31)	(3.22)	(2.93)	
United States	–0.22	0.51	0.78	25.5
	(–3.38)	(5.41)	(2.62)	
EW7	0.02	–0.06	1.08	22.5
	(0.32)	(–0.51)	(3.08)	
VW7	0.25	–0.51	–0.05	25.0
	(4.18)	(–3.97)	(–0.16)	
C. 1990–2004: 1-year subsequent real returns				
France	–1.48	2.86	5.08	20.8%
	(–4.71)	(5.63)	(2.73)	
Germany	0.02	–0.67	4.42	8.5
	(0.07)	(–0.87)	(1.84)	
Greece	–0.35	1.03	1.14	7.6
	(–1.30)	(2.61)	(0.54)	
Italy	0.07	–0.75	6.37	13.0
	(0.31)	(–1.65)	(2.22)	
Japan	–2.17	3.10	44.91	60.0
	(–6.61)	(5.46)	(7.68)	
Netherlands	–0.47	0.85	2.47	5.6
	(–1.49)	(1.57)	(1.81)	
Portugal	–0.12	0.42	0.06	0.3
	(–0.53)	(0.93)	(0.38)	
Spain	–0.12	0.13	2.49	4.0
	(–0.41)	(0.21)	(1.72)	
Switzerland	–0.02	0.31	0.86	–0.9
	(–0.04)	(0.25)	(0.39)	

(continued)

Table 12. Subsequent Real Returns as a Function of Payout Ratio and Earnings Yield (continued)
(*t*-statistics in parentheses)

Country	Constant	PR	EY	Adjusted R^2
United Kingdom	–0.67	0.67	5.63	28.7%
	(–4.09)	(3.02)	(3.93)	
United States	–0.19	0.12	5.46	13.4
	(–1.26)	(0.60)	(2.65)	
EW11	–0.27	0.67	0.53	12.8
	(–1.52)	(2.53)	(0.18)	
VW11	–0.13	7.75	0.24	5.4
	(–0.76)	(0.92)	(1.34)	

Overall, the results of our introduction of a variable to control for market valuation suggest that a positive relationship exists between PR and subsequent returns, but the evidence of a significant relationship is weak except for the United States. Therefore, predicting future returns from the payout ratio is problematic.

Conclusion

We extended the work of Arnott and Asness in the U.S. market to an additional 10 countries, and this international evidence generally supports A&A's findings—despite the very different institutional, tax, and legal environments of our sample. In short, substantial reinvestment of retained earnings does not lead to faster future real earnings growth, although it does lead to faster real dividend growth. Investing in countries with higher payout ratios is also observed to result in higher earnings growth than investing in markets with low payout ratios.

Unfortunately, these findings did not translate to return predictability in a persuasive fashion: The results vary for different countries and time periods. The notable exception appears to be the U.S. market, where the payout ratio is significantly related to subsequent 5-year and 10-year returns. In general, predicting real earnings and dividend growth is the easy part; valuing them is quite another matter!

Currently, the components of the S&P 500 are paying out around one-third of their earnings as dividends, well below the post–World War II average of 50–60 percent. Therefore, our findings suggest that the outlook for earnings growth in the next few years is ominous.

This article qualifies for 1 PD credit.

Notes

1. Recent articles (e.g., Currier 2004; Perkins and Gavrina 2004) have begun to change this trend by placing greater emphasis on aggregate payout ratios.
2. A detailed discussion of the various tax structures is available from the authors on request.
3. For Japan, Switzerland, and the United Kingdom, we used, respectively, a US$/¥, US$/SFr, or US$/£ exchange rate. For the remaining countries, a US$/€ exchange rate was used. Datastream applied a synthetic euro exchange rate to the series prior to the introduction of the euro in 1999. Because the US$/€ exchange rate came into existence only in January 1999, we built a historical US$/€ exchange rate as follows. From January 1978 to December 1998, the European Currency Unit (ECU) was the precursor of the euro; when the euro was established in 1999, it replaced the ECU at a 1:1 ratio. Therefore, for the 1978–98 period, we used a US$/ECU exchange rate. The US$/€ exchange rate we used for 1973–1977 was based on the German mark because of its dominance in the ECU.
4. The United States and the United Kingdom were the only common-law countries in our sample.
5. These regressions were run for only the first two periods because data for Period 3 were insufficient.
6. See Kaplan and Reishus (1990) for the potential consequences of cutting dividends.

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Surprise! Higher Dividends = Higher Earnings Growth

Robert D. Arnott and Clifford S. Asness

We investigate whether dividend policy, as observed in the payout ratio of the U.S. equity market portfolio, forecasts future aggregate earnings growth. The historical evidence strongly suggests that expected future earnings growth is fastest when current payout ratios are high and slowest when payout ratios are low. This relationship is not subsumed by other factors, such as simple mean reversion in earnings. Our evidence thus contradicts the views of many who believe that substantial reinvestment of retained earnings will fuel faster future earnings growth. Rather, it is consistent with anecdotal tales about managers signaling their earnings expectations through dividends or engaging, at times, in inefficient empire building. Our findings offer a challenge to market observers who see the low dividend payouts of recent times as a sign of strong future earnings to come.

Since 1995, and until a recent uptick arising from plunging earnings, marketwide dividend-payout ratios in the United States have been in the lowest historical decile, reaching unprecedented low levels from late 1999 to mid-2001. Alternatively stated, earnings-retention rates have recently been at or near all-time highs. Meanwhile, price-to-earnings ratios and price-to-dividend ratios are high by historical standards, despite the sharp fall in stock prices since early 2000. With recent valuation ratios at such high levels and dividend payouts so low, the only way future long-term equity returns are likely to rival historical norms is if future earnings growth is considerably faster than normal. Some market observers, including some leading Wall Street strategists, do indeed forecast exceptional long-term growth. As a cause for this optimism, they point to, among other things, the recent policies of low dividend-payout ratios.

Consider the well-known constant-growth valuation model of Gordon (1962):

$$R = \frac{D}{P} + G. \quad (1)$$

Expected return, R, equals the dividend yield, D/P, plus an assumed constant expected growth term, G. Now, the dividend yield itself can be thought of as the product of the dividend-payout ratio, D/E (the ratio of dividends to earnings), and the earnings yield, E/P (the inverse of P/E):

$$R = \left(\frac{D}{E}\right)\left(\frac{E}{P}\right) + G. \quad (2)$$

Equation 1 and Equation 2 can be applied to a given company or to the market portfolio itself. We focus on the latter application. Assuming dividend policy does not affect the expected return on the market portfolio (and assuming the payout ratio is constant through time, so earnings and dividend growth are equal), a low payout (D/E) must be offset either by a high E/P (low P/E) or by high expected growth.

As we will show, in the past 130 years, U.S. equity market P/Es have not offset variation in payout ratios. For instance, recent P/Es have been very high, whereas to offset today's low payout, they would have to be quite low. Thus, the task of offsetting the low payout is left to G, growth.

Some interpret this forecasted marketwide inverse relationship of current dividend-payout policy to future growth as an intertemporal extension of the Modigliani and Miller (1961) dividend irrelevance theorem.[1,2] For example, imagine an instantaneous pervasive change in dividend policy

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that permanently alters the market *D/E* from paying out 50 percent of earnings to paying out 25 percent of earnings. Because current earnings do not change (and, according to Miller and Modigliani, price should not change), the task of keeping expected return constant is again left to growth. For instance, suppose the market was selling for a P/E of 15 at the time of this change (about the historical average). Thus, E/P was 6.7 percent (1/15); 25 percent of 6.7 percent is 1.7 percent. In other words, in a market with a P/E of 15, for the market's expected return to be unaltered and current prices and earnings to remain unchanged, a permanent change in payout policy from 50 percent to 25 percent would have to be offset by a permanent increase in expected growth of 1.7 percent.

For a single company, this increase in growth is clearly possible—if the business is easily scalable or if offsetting transactions (e.g., share buybacks) are undertaken—and investment policy is unaffected. By similar reasoning, many observers would accordingly expect a strong and reliably negative relationship between payout ratios and future earnings growth for the market as a whole. Looking at the recent policy of low payouts, this view, if true, would offer grounds for optimism regarding future earnings growth.

Implicit in this view is a world of perfect capital markets. For instance, this reasoning assumes that investment policy is unaltered by the amount of dividends paid, that information is equal and shared (meaning the dividend does not convey managers' private information), that tax treatment is the same for retained or distributed earnings, that managers act in the best interests of the shareholders, that markets are priced efficiently, and so forth. When the assumption of perfection is relaxed, a host of behavioral or information-based hypotheses arise as potential explanations for how the market's payout ratio might relate to expected future earnings growth. Thus, we turned to the historical data to answer the question of how marketwide payout ratios have related to future earnings growth.[3]

Data

We used three sources of dividend yield and stock total-return data—Schwert (1990), Shiller (2000; updated data from aida.econ.yale.edu/~shiller/data.htm), and Ibbotson Associates (2001).[4] In calculating real earnings growth, we began with a calculation of real earnings for an index portfolio. We did so in the following steps:

1. constructing a total return index for stocks,
2. subtracting out the monthly dividend income on stocks, based on the data from Schwert, Shiller, and Ibbotson, which gave us a stock price index from 1871 to date,
3. dividing through by the U.S. Consumer Price Index (CPI) to impute a real stock price series, and
4. multiplying the real price series by the earnings-yield data from Shiller.[5]

This process generated a history of the EPS of the S&P 500 Index.

Because earnings and the forecasting of earnings growth is the crux of our article, more discussion of our definition of EPS is in order. We conduct tests of whether certain variables, notably the payout ratio, can be used to forecast the growth in the aggregate EPS number derived in Step 4. This aggregate EPS series is not the same as the earnings growth on a static portfolio of stocks. The economy at large is dynamic; a "market" portfolio must adjust to acknowledge this fact. By focusing on a portfolio that an investor might choose as a market portfolio, we were tacitly selling the companies that were no longer an important factor in the market or economy to make room for those that had become an important factor. Standard and Poor's does exactly the same by adding "new-economy" stocks (whatever the new economy is at each point in time), dropping "old-economy" stocks, and changing the divisor for the index. Changing the divisor each time the index composition is changed is equivalent to a pro rata sale of existing holdings to rebalance into new holdings. So, when we were examining 10-year real earnings growth (the forecasting horizon we primarily focused on), we were not looking at the growth of earnings on a fixed set of stocks bought at the outset. "Growth" in our approach is analogous to the growth an investor might have seen on the EPS of an index fund portfolio that held the assets selected by Standard and Poor's since 1926 (and by Cowles, retrospectively, from 1871 to 1925). It is the rate of growth in this index fund's EPS that we attempted to forecast in this study (and generally what we refer to as "earnings growth").

Another way to think about what we did is to recognize the distinction between the market and a specific index portfolio. The market, in aggregate, shows earnings and dividend growth wholly consistent with growth in the overall economy (Bernstein 2001a). If that same market portfolio were unitized, however, the unit values would not grow as fast as the total capitalization because of the dilution associated with new assets in the market portfolio (new companies in an index are almost always larger than the companies that they

replace). Similarly, the "per share" earnings and dividends of an index fund portfolio (per "share" of the unitized index fund) will not keep pace with the growth in the aggregate dollar earnings and dividends of the companies that constitute the market. Why? Because when one stock is dropped and another added, the added stock is typically larger and more profitable than the deletion, which increases the divisor for constructing the index.

Precisely the same thing happens in the management of an actual index fund. When a stock is replaced, the proceeds from the deleted stock rarely suffice to fund the purchase of the added stock. Accordingly, all stocks are trimmed slightly to fund the new purchase—the implied consequence of the change in the divisor for an index. This mechanism drives a persistent wedge between, on the one hand, the growth of the aggregate dollar earnings and dividends for the market portfolio (which will keep pace with GDP growth over time) and, on the other hand, the per share growth of earnings and dividends for the market index (which will not keep pace with GDP growth—see Arnott and Bernstein 2002).

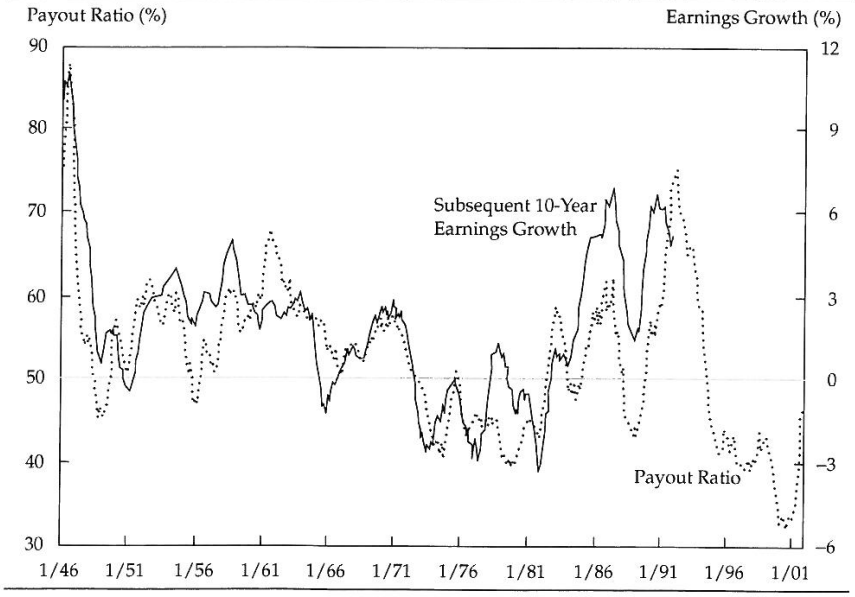
Entrepreneurial capitalism created the companies that we had to add to the market portfolio (or brought down those that had to be removed), thereby changing our divisor. Thus, a persistent difference exists between our measure of EPS and aggregate dollar earnings or GDP, with our EPS growing slower than aggregate dollar earnings or GDP growth over long periods. Differences in levels of growth ended up in the unexamined intercepts of our regressions, however, and only covariance of this differential with our *ex ante* predictive measures affected our tests (the robustness checks to follow provide some comfort that this issue is not important).

For some of our tests, we used both bond yields and the CPI. Our two sources of bond yields were the National Bureau of Economic Research (NBER) and Ibbotson Associates.[6] In cases of differences, we averaged the yield data. We used the same two sources for CPI data.[7] GDP data were drawn from the NBER.[8]

The Payout Ratio for Forecasting Earnings Growth

We defined the payout ratio in this study as last year's trailing dividends divided by last year's trailing earnings. Dividends are "sticky"; they tend not to fall in notional terms, although they can fall during severe earnings downturns and can fall in real terms during periods of high inflation. Because earnings are more volatile than dividends, payout ratios are relatively volatile, although they have been far less volatile since 1946 than before. **Figure 1** shows the payout ratio of the S&P 500 from 1946 through year-end 2001 and subsequent 10-year growth in real earnings. Note that the payout ratio

Figure 1. Payout Ratio and Subsequent 10-Year Earnings Growth, 1946–2001



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falls to the lowest levels ever seen near the end of our sample period, before a recovery in late 2001, because of plunging current earnings.

This discussion will focus on 1946–2001 (the post-World War II period) as the "modern period," for which our confidence in data quality and applicability to current times are highest. The period before 1946 was one of two world wars, the Great Depression, unregulated markets, and a host of other differences from the post-1945 era. Where possible, however, we will also show results for earlier and longer periods.

Figure 1 shows empirically that forecasts of a natural inverse relationship between dividend payout and future earnings growth are not correct. **Figure 2**, which plots subsequent 10-year real earnings growth against starting payout ratios as a scatterplot, rejects this elegant thesis even more vividly. Obviously, rather than inverse, the relationship of current payout to future earnings growth is strongly positive. **Table 1** contains the monthly regression corresponding to Figure 1 of the rolling 10-year real earnings growth of the S&P 500 on the starting payout ratio, *PR*, for the past 50–130 years.[9] The link seen in the plots and regressions is compelling, particularly because it has the "wrong" sign.[10]

Examining our main 1946–2001 period another way, we divided all rolling 10-year periods starting in January 1946 and ending in December 1991 into four quartiles by starting payout ratio (Quartile 1 being the low payout ratio and Quartile 4, the high). **Table 2** reports the average 10-year earnings growth and the worst and best 10-year earnings growth achieved when starting in each respective payout-ratio quartile. The average earnings growth obviously increases with a rising starting payout ratio, which corresponds to the regression in Table 1 and scatterplot in Figure 2. We suspect that many readers will be surprised that starting in the bottom quartile of payout ratios, the average subsequent real earnings growth is actually negative. Needless to say, negative real earnings growth for a 10-year span falls far below what most investors would find acceptable, let alone expect *ex ante* one quarter of the time.

The worst and best 10-year spans also show the same monotonic relationship with the starting payout ratio: The higher the payout ratio, the better the average subsequent 10-year earnings growth and the better the best and the worse the worst outcomes. A striking example is that the worst 10-year growth when starting in the highest-payout-ratio quartile is better than the average earnings growth when starting in the lowest-payout-ratio quartile. Conversely, the best 10-year growth starting in the lowest-payout quartile is not as good as the average growth when starting in the highest-payout quartile.

In general, when starting from very low payout ratios, the equity market has delivered dismal

Figure 2. Scattergram of Payout Ratio vs. Subsequent 10-Year Real Earnings Growth, 1946–2001 Data

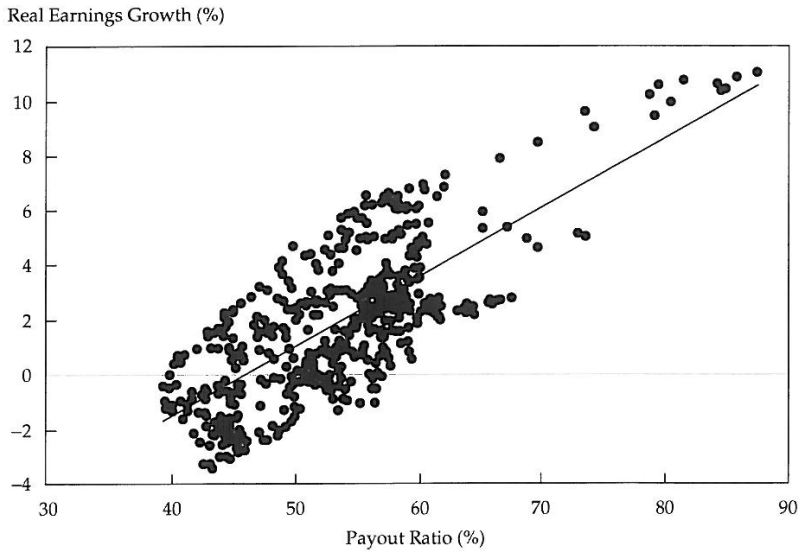

Table 1. Subsequent 10-Year Earnings Growth as a Function of Payout Ratio: Regression Coefficients
(*t*-statistics in parentheses)

Regression Span	*a*	*b*	Adjusted R^2
1946–2001	–11.6%	0.25*PR*	54.6%
	(–7.2)	(8.6)	
1871–2001	–3.1	0.07*PR*	14.2
	(–3.1)	(4.5)	
1871–1945	–5.1	0.09*PR*	19.5
	(–4.4)	(7.5)	

Note: The regression equation is

10-Year earnings growth = Constant term + (*b*) × Preceding payout ratio, or

$EG_{10} = a + b(PR)$.

Table 2. Payout Ratios and Subsequent 10-Year Earnings Growth: Quartile Comparisons, 1946–1991

Starting Payout Quartile	Average	Worst	Best
1 (low)	–0.4%	–3.4%	+3.2%
2	+1.3	–2.4	+5.7
3	+2.7	–1.1	+6.6
4 (high)	+4.2	+0.6	+11.0

real earnings growth over the next decade; growth has actually fallen 0.4 percent a year on average—ranging from a worst case of truly terrible –3.4 percent compounded annual real earnings for the next 10 years to a best case of only 3.2 percent real growth a year over the next decade. From a starting point of very high payout ratios, the opposite has occurred: strong average real growth (4.2 percent), a worst case of positive 0.6 percent, and a maximum that is a spectacular 11.0 percent real growth a year for 10 years. Indeed, the very early evidence from the last few quarters (late 2001) would suggest that the recent record low payout ratio and earnings growth are falling into the classic pattern. Contrary to the arguments of the "new paradigm" advocates, earnings have been tumbling, not soaring, since earnings retention reached record levels. Of course, the most recent 10-year observations from these payout-ratio lows remain to be seen.

Potential Explanations

Many hypotheses might explain the (perhaps surprising) positive relationship between current payout ratio and future real earnings growth. The following list, although clearly incomplete, represents a beginning effort to explain this phenomenon:

- Corporate managers are loath to cut dividends (Lintner 1956). Perhaps a high payout ratio indicates managerial confidence in the stability and growth of future earnings and a low payout ratio suggests the opposite. This confidence (or lack of it) might be based on public information but also private information (see, for example, Miller and Rock 1985).
- Another hypothesis consistent with the relationship we empirically observed is that companies sometimes retain too much of their earnings as a result of the managers' desires to build empires (Jensen 1986).[11] There need not be anything nefarious in this behavior: An otherwise benign coincidental policy of earnings retention may end up encouraging empire building by creating an irresistible cash hoard burning a hole in the corporate pocket. Conversely, financing through share issuance and paying substantial dividends, although perhaps less tax efficient, may subject management to more scrutiny, reduce conflicts of interest, and thus curtail empire building. (The assumption is, of course, that inefficient empire building lays the foundation for poor earnings growth in the future whereas discipline and a minimization of conflicts has the opposite, salutary effect.)
- Perhaps the positive relationship is driven by sticky dividends (see Lintner) combined with mean reversion in more volatile earnings. Temporary peaks and troughs in earnings, subsequently reversed, could cause the payout ratio to be positively correlated with future earnings growth (i.e., temporarily low earnings today cause a high payout ratio, thus forecasting the earnings snapback tomorrow). The testable difference between this hypothesis and the first two is that dividend policy has no special standing, so any reasonable measure of mean reversion in earnings should work to forecast future earnings growth.
- Perhaps our data or experimental design are in error. For instance, perhaps our results are time-period specific (either as to the years covered by our study or the length of our forecasting period). Or maybe our results merely proxy for other, more fundamental variables that forecast economic activity. Or perhaps our results are just random noise.

Clearly, distinguishing the first two hypotheses from each other, or confirming or rejecting either, is beyond the scope of this article.[12] We simply note that each of these stories fits the data. Next, we carry out some very preliminary

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investigations but leave more precise tests, or the introduction of new explanations, to future work.

Robustness Tests

Readers might and should be skeptical of a relationship that consists of forecasting overlapping 10-year earnings growth over a 55-year span when strongly serially correlated payout ratios are used. Arguably, we have only slightly more than five truly independent observations. Although statistical tools can adjust regression *t*-statistics for this phenomenon and R^2 measures remain legitimate, relationships of this type may seem statistically significant even when they are not. A diligent mining of the available data without economic intuition or finding results that spuriously proxy for some other more basic relationship could deliver our findings without the causality that we infer. Because this possibility can never be completely dismissed and because we know our results are the opposite of what so many would intuitively expect, we carried out extensive robustness checks. The checks included methodologically motivated tests (e.g., tests in out-of-sample periods, tests for small specification changes that might change results, etc.) and economically motivated tests (tests of whether the power of the payout ratio is coming from the reasons we hypothesized or from other sources).

Methodological Tests. The simplest robustness check is an out-of-sample test. We favored the post-WWII period in the discussion so far because of our confidence in the data quality and its relevance to today's world, but we do have data back to 1871. Accordingly, Table 1 shows in the last row the same regression for the prior, entirely separate, 1871–1945 period. The coefficients and the R^2 value are smaller, which might make sense in light of the more volatile earnings and noisier data before 1946. But the *t*-statistics are still quite strong, and the relationship still explains 19.5 percent of the variance of earnings. Most importantly, the coefficient has the same counterintuitive positive sign.

Also, as is evident in the scatterplot of Figure 2, eliminating the most extreme (highest and lowest 10 percent) of payout ratios from the 1946–2001 data (i.e., dropping those observations) would have little effect on the regressions.

Sensitivity to 10-Year Forecasting Horizon. We focused on 10-year periods because we were ultimately interested in the impact of real growth on fair valuation. Transient short-term peak-and-trough earnings should have little impact on the proper price to pay for stocks; only long-term earnings prospects should matter. We arbitrarily chose 10-year spans to balance two conflicting goals—a span long enough to be of economic significance (the long term) but short enough to have a reasonable number of independent periods and to have some relevance to an investor's career horizon.

For a robustness check, we repeated our tests on 5-year real earnings growth. In so doing, we probably sacrificed some economic relevance; strong statements about 10-year earnings growth are more important to fair value than statements about 5-year growth. But we doubled the number of nonoverlapping periods. The first two rows of **Table 3**, which contain results for 1946–2001 and 1871–2001, demonstrate that the link we identified holds up nicely for shorter earnings-growth periods.

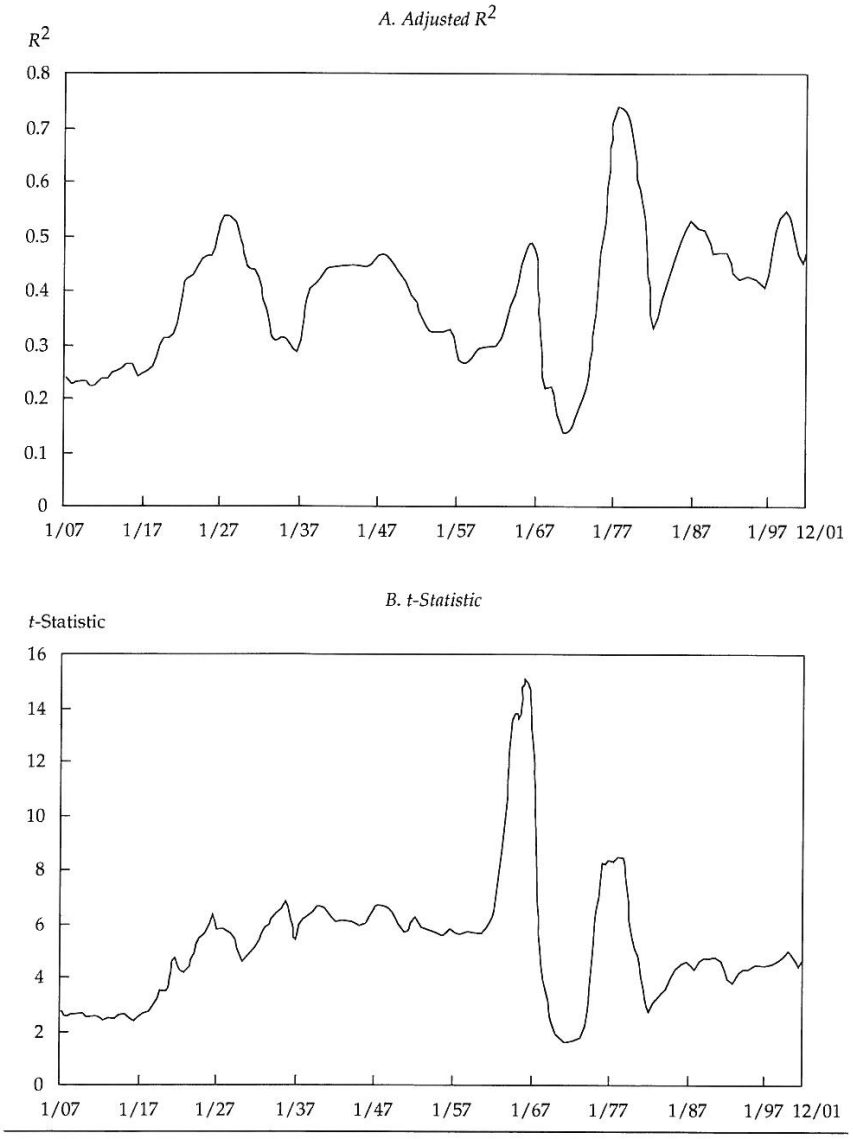
Table 3. Five-Year Earnings Growth as a Function of Payout Ratios: Regression Coefficients
(*t*-statistics in parentheses)

Regression Span	*a*	*b*	Adjusted R^2
1946–2001	–21.3%	0.44*PR*	53.8%
	(–6.0)	(7.3)	
1871–2001	–11.3	0.19*PR*	24.0
	(–5.2)	(6.7)	
1871–1945	–18.0	0.26*PR*	34.1
	(–4.7)	(5.8)	
1946–1979	–22.2	0.45*PR*	61.1
	(–5.6)	(6.8)	
1871–1979	–12.9	0.21*PR*	26.8
	(–5.1)	(6.6)	
1980–2001	–21.1	0.46*PR*	49.6
	(–3.5)	(4.4)	

Note: Regression equation is $EG_5 = a + b(PR)$.

Predictive Consistency. For testing the consistency of our R^2 and *t*-statistic results, we again used five-year results so that we could consider more independent data points. We performed the monthly regression of five-year real S&P 500 earnings growth on the starting payout ratio on a rolling 30-year basis for every 30-year span from 1871 through 2001.[13] Panel A of **Figure 3** traces the R^2 and Panel B traces the *t*-statistics on the coefficient for the payout ratio from each of these rolling regressions. Results indicate substantial variation over time, as one would expect: The statistical noise in the relationship should cause such variability, and the fundamental relationship may strengthen or weaken with changes in the economic, tax, or

Figure 3. Consistency of 30-Year Regressions: $EG_5 = a + b(PR)$, 1871–2001



political environment. Nevertheless, the basic message exhibits considerable stability: When payout ratios are low, future earnings growth tends to be slow, and high payout ratios go hand in hand with rapid subsequent earnings growth. The lowest *t*-statistic is still a respectable (certainly for an order statistic) 1.6; similarly, the R^2, although variable, is always economically meaningful. The lowest R^2 and highest R^2 are, respectively, 13 percent and 74 percent. Most importantly, the sign never changes.

Proxy for Mean Reversion? Mean reversion in earnings might be caused by true mean reversion or by transient errors in reported earnings that would induce apparent mean reversion in the contiguously measured changes. A temporary drop in earnings could raise expected future compound earnings growth from this lower base. The temporary earnings drop would simultaneously raise the current payout ratio, *D/E*, because sticky dividends do not fall as much as earnings. Finding this kind of mean reversion might still be interesting, but dividend policy would have no special standing as a predictor. We tested for this case by adding direct measures of mean reversion in earnings to our regressions and comparing their

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significance with the remaining significance of the payout ratio.

First, we added prior-10-year real earnings growth to the regression as lagged earnings growth (LEG_{10}). If the mean-reversion hypothesis is true, then adding prior earnings growth as an additional right-hand-side variable could explicitly show the mean reversion we are looking for (through a negative coefficient as poor prior 10-year real growth forecasts superior subsequent growth and vice versa) and might cause the payout ratio to lose much of its importance in bivariate tests. Panel A of **Table 4** shows that simple mean reversion in 10-year earnings growth has the expected negative sign but is a weak predictive variable. Specifically, this measure neither approaches the efficacy of the payout ratio over any time period nor materially crowds out the efficacy of the payout ratio, particularly for the 1946–2001 period.

We constructed a second proxy for mean reversion in earnings by dividing the prior-1-year real earnings (also used to construct our payout-ratio variable) by the average of real earnings over the past 20 years (MA_{20}).[14] We hypothesized that when this variable is high, the temporary component of earnings will be high, and we expected this variable to forecast lower subsequent real earnings growth.[15] Panel B of Table 4 shows the results: For the most recent and most relevant period, 1946–2001, the payout ratio is the clear victor. The ratio MA_{20} has the expected negative sign (meaning that when earnings are below their long-term average, better growth over the next 10 years is forecasted), but the relationship is weak and does not at all ameliorate the power of the payout ratio. Including periods prior to 1946 produces more-competitive results; the two variables enter with similar power and the "right" signs (positive for payout, negative for MA_{20}), although the payout ratio is still the clear victor. Multicolinearity makes the *t*-statistics and the relative contribution of each variable difficult to determine, particularly for the earlier period (the correlations between payout and MA_{20} are –0.44 for 1946–2001, –0.63 for 1871–2001, and –0.69 for 1871–1945).

The payout ratio's predictive power admirably survives head-to-head competition against two reasonable proxies for simple mean reversion in earnings (although MA_{20}, in particular, shows some competitive forecasting power when a very old sample period is included). Although the payout ratio is (and, intuitively, should be) highly correlated with measures of simple mean reversion in real earnings, the data show important marginal information contained in dividend policy, indeed more information (and much more in the modern time period) than provided by other measures of mean reversion.[16]

Note that, in some sense, these tests should not be viewed as "payout ratio versus mean reversion." Clearly, the payout ratio can be interpreted as one measure of how depressed or how strong earnings are (in this case, dividends are used as a yardstick) and thus how much we might expect them to revert to the mean. In other words, rather than view these

Table 4. Ten-Year Earnings Growth as a Function of Payout Ratios and Direct Measure of Mean Reversion: Regression Coefficients
(*t*-statistics in parentheses)

Regression Span	a	b_1	b_2	Adjusted R^2
A. Reversion as prior-10-year earnings growth: $EG_{10} = a + b_1(PR) + b_2(LEG_{10})$				
1946–2001	–11.0%	0.25*PR*	–0.09LEG_{10}	55.3%
	(–5.7)	(7.9)	(–0.6)	
1871–2001	–2.0	0.06*PR*	–0.09LEG_{10}	15.3
	(–1.9)	(3.9)	(–0.9)	
1871–1945	–4.5	0.08*PR*	–0.06LEG_{10}	19.4
	(–2.6)	(6.1)	(–0.4)	
B. Reversion as current earnings/20-year average: $EG_{10} = a + b_1(PR) + b_2(MA_{20})$				
1946–2001	–9.0%	0.24*PR*	–0.02MA_{20}	56.6%
	(–2.8)	(7.0)	(–1.3)	
1871–2001	2.3	0.05*PR*	–0.03MA_{20}	22.8
	(0.7)	(2.6)	(–1.7)	
1871–1945	2.0	0.05*PR*	–0.04MA_{20}	26.2
	(0.4)	(2.1)	(–1.4)	

results as a refutation of mean reversion and an affirmation of the payout ratio as a predictor, the finding can be viewed as the discovery that scaling earnings by dividends (the payout ratio) produces an effective and consistent measure of mean reversion in earnings—more effective and consistent than several other reasonable candidates, particularly in the modern era. Earnings do indeed seem to revert to the mean but may revert most strongly in terms of their ratio to dividends.

Stock Repurchases. Share buybacks were a far smaller part of the market prior to 1980 (see, for instance, Bagwell and Shoven 1989 and Fama and French 2002). The increase in share buybacks in recent years is one potential pitfall for our study. If buybacks substitute for regular dividends, then our measure of the payout ratio may be effectively understated when buyback activity is high. Buybacks can also raise EPS growth. If stock buybacks are substituting for dividends, then changes in buyback activity should weaken our results: Falling payout ratios in the 1980–2001 span, if attributable to share buybacks, could correspond to increases in subsequent earnings growth.

We were able to test for the influence of a changing buyback atmosphere only indirectly. If the relationship between payout ratio and future earnings growth is similar in the pre- and post-1980 periods, we could feel comfortable that the relatively new phenomenon of large-scale share buybacks was not unduly influencing our results (in either direction). Therefore, we recomputed the results for the regression of five-year earnings growth as a function of the payout ratio for only the 1946–1979 period and 1871–1979 (we used five-year data because we had even fewer data for this test). The results are shown in the fourth and fifth rows of Table 3. In these earlier periods, which experienced far fewer share buybacks than the 1980–2001 period, the link between payout ratios and real earnings growth worked almost exactly as well as over the longer span.[17] Table 3 also presents, in the last row, evidence for the relatively short period associated with a large amount of buybacks, 1980–2001. Here again, despite the paucity of data, we found strong results of a link.

To be fair, one cannot know the impact of the increase in buybacks, assuming the increase is permanent, until far more data are available than this brief 20-year history. From the initial evidence, however, stock buybacks have apparently not made the importance of the dividend payout ratio "different this time."

The Payout Ratio against the Yield-Curve Slope. Other research (e.g., Harvey 1991) has shown that the slope of the U.S. Treasury yield curve is a strong positive forecaster of economic growth.[18] This finding invites two questions relating to our research. If the yield-curve slope forecasts economic growth, does it also forecast earnings growth? If so, does the yield-curve slope augment or subsume the power of payout ratios for forecasting earnings growth? Either could happen if, for example, the curve is very steep during recessions, precisely when the payout ratio is larger than average (because of depressed earnings and sticky dividends).

To answer these two questions, we began by defining the yield-curve slope as the difference between the 10-year T-bond yield and the 3-month T-bill yield at the start of any period. We tested the forecasting power of the yield-curve slope (*YCS*) for both 10-year and 5-year real earnings growth. **Table 5** presents the results.

This discussion will focus on the 1946–2001 period because interest rates were not always freely floating before this period, but Table 5 also presents results for the earlier 1871–1945 period and the full 1871–2001 period. Panel A shows that the yield-curve slope, when used alone to forecast earnings growth, generally has the anticipated sign. Not only does a steeper yield curve suggest a stronger future economy, as found by other authors, but it also suggests faster real earnings growth, although the yield curve has much more power for forecasting 5-year growth than 10-year growth. This finding conforms with the work of Fama and French (1989), who noted that the yield-curve slope seems to be correlated with relatively high-frequency elements of the business cycle. As Panel B of Table 5 makes clear, however, the yield curve's power does not come close to driving out the much stronger power present in the payout ratio.

The bottom line is that yield-curve slope has the right sign from 1946–2001 (and most other periods) but is a relatively weak predictor of earnings growth. The yield-curve slope does not approach the univariate forecasting power of the payout ratio, nor does it erode the efficacy of the payout ratio when included in bivariate forecasting regressions.

The Payout Ratio against Stock Market Valuation Levels. Should the market's earnings yield, instead of the payout ratio, predict earnings growth? If future real earnings growth is going to be faster than normal, investors should perhaps pay a higher P/E multiple than normal and, hence, accept a lower earnings yield on their investments.[19] Thus,

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Table 5. Earnings Growth as a Function of the Yield-Curve Slope and Payout Ratio: Regression Coefficients
(*t*-statistics in parentheses)

Time Span	a	b_1	b_2	Adjusted R^2
A. Earnings growth as a function of yield-curve slope				
Ten-year earnings growth: $EG_{10} = a + b_1(YCS)$				
1946–2001	1.56%	0.38*YCS*		2.0%
	(2.8)	(1.2)		
1871–2001	1.3	0.44*YCS*		2.2
	(2.0)	(1.4)		
1871–1945	1.2	0.43*YCS*		1.8
	(1.3)	(1.0)		
Five-year earnings growth: $EG_5 = a + b_1(YCS)$				
1946–2001	0.6%	1.70*YCS*		14.0%
	(0.7)	(2.5)		
1871–2001	0.3	2.09*YCS*		11.3
	(0.3)	(3.6)		
1871–1945	0.3	2.20*YCS*		10.5
	(0.2)	(2.9)		
B. Earnings growth as a function of yield-curve slope and payout ratio				
Ten-year earnings growth: $EG_{10} = a + b_1(YCS) + b_2(PR)$				
1946–2001	–11.6%	0.14*YCS*	0.25*PR*	54.8%
	(–7.0)	(0.5)	(7.8)	
1871–2001	–3.0	0.17*YCS*	0.07*PR*	14.5
	(–3.0)	(0.7)	(4.1)	
1871–1945	–5.5	–0.24*YCS*	0.09*PR*	19.9
	(–3.8)	(–0.7)	(6.9)	
Five-year earnings growth: $EG_5 = a + b_1(YCS) + b_2(PR)$				
1946–2001	–20.8%	0.99*YCS*	0.41*PR*	58.2%
	(–6.3)	(2.2)	(6.9)	
1871–2001	–10.8	1.46*YCS*	0.17*PR*	29.2
	(–5.1)	(2.8)	(5.2)	
1871–1945	–17.0	0.53*YCS*	0.24*PR*	34.5
	(–3.9)	(0.7)	(4.4)	

in an efficient market with constant expected equity returns, a low earnings yield may be a good predictor of higher future real earnings growth. **Table 6** shows the results from a regression of 10-year earnings growth on the payout ratio and the earnings yield, *E/P*, for various periods. The relationship is as expected: For the modern period, a low earnings yield (high P/E) signals high future 10-year real earnings growth, with a *t*-statistic of –2.5. This finding supports the view that the market correctly anticipates faster future earnings growth and pays up for it. Results for the other time periods offer additional support for this finding.

This relationship is far weaker, however, than the link we found between the starting payout ratio and future earnings growth, and the relationship suffers greatly in multiple regression tests, as Panel B shows. In the tests for forecasting 10-year earnings growth using both the starting payout ratio and the earnings yield, the payout ratio completely drives out the earnings yield for the 1946–2001 period. The sign for E/P actually reverses, so conditional on payout ratio, a lower E/P (higher P/E) presages slightly lower earnings growth. The success of E/P is greater when older data are included, as shown especially for the full period. On balance, however, the verdict is clear: The power of market valuation levels to forecast future returns is weaker than the power of the payout ratio—particularly in the modern period. For the post-WWII period, the difference is startling.[20]

We found this result extremely interesting. Suppose real earnings growth is strong and the market expects this trait to continue. Investors might then be willing to pay a premium multiple of these strong earnings, which would result in a

Table 6. Ten-Year Earnings Growth as a Function of Earnings Yield and Payout Ratio, Regression Coefficients
(*t*-statistics in parentheses)

Regression Span	a	b_1	b_2	Adjusted R^2
A. Ten-year earnings growth as a function of earnings yield: $EG_{10} = a + b_1(E/P)$				
1946–2001	5.1%	–0.38(*E*/*P*)		17.5%
	(3.2)	(–2.5)		
1871–2001	5.5	–0.50(*E*/*P*)		10.2
	(3.3)	(–3.0)		
1871–1945	6.3	–0.65(*E*/*P*)		10.5
	(2.3)	(–2.2)		
B. Ten-year earnings growth as a function of earnings yield and payout ratio: $EG_{10} = a + b_1(E/P) + b_2(PR)$				
1946–2001	–11.8%	0.01(*E*/*P*)	0.25*PR*	54.5%
	(–2.9)	(0.1)	(5.2)	
1871–2001	0.2	–0.28(*E*/*P*)	0.05*PR*	16.6
	(0.1)	(–1.9)	(3.1)	
1871–1945	–2.5	–0.22(*E*/*P*)	0.07*PR*	20.2
	(–0.6)	(–0.7)	(4.5)	

lower-than-normal earnings yield (high P/E). Now suppose that, at this same time, many companies are unwilling to pay out high dividends—possibly in an effort to optimize the tax treatment of their shareholders but perhaps because the managers know the good times will not last or are, conversely, caught up in the "irrational exuberance" of the good times and are spending those retained earnings on inefficient empire building. In this case, the P/E is optimistic about the future but the payout ratio is not. Which should one believe?

The regression results in Table 6 suggest that for forecasting future real earnings growth, look at managers' dividend policies rather than what the market will pay for each dollar of earnings. More often than not, it is the payout ratio, not the valuation level, that gets it right.

Link to the Macro Economy. Recall that the empire-building hypothesis says that when payout ratios are low, the reason may be that companies are retaining cash to invest in unwise, low-return projects, perhaps building up a large organization to benefit the managers rather than shareholders. In addition, perhaps building an empire with retained cash is easier than paying dividends and issuing stock to finance expansion (which would subject the managers to the added scrutiny of the capital markets).

In what must be viewed as preliminary tests of this conjecture, we examined whether the payout ratio is correlated through time with a measure of economy-wide investment. For each quarter since 1947 (when our data source begins), using the St. Louis Federal Reserve Bank's FRED database, we formed the ratio of gross private domestic investment (GPDI) to GDP. We summed the last four quarterly observations to form annual investment and GDP figures, and we now focus on this ratio:

$$\frac{\text{Investment}}{\text{GDP}} = \frac{\text{Last four quarters of GPDI}}{\text{Last four quarters of GDP}}.$$

The idea was to form a simple measure of whether current investment is running high or low. If the empire-building hypothesis is true, we should see a positive correlation between investment/GDP and the retention ratio (1.0 minus the payout ratio). In other words, the more earnings companies are retaining, the more investment we should see. But this is not necessarily true. For instance, if tax optimization is driving recent low payouts, not the desire to invest more than usual, low payouts could simply be being offset by other forms of distribution (e.g., buybacks, less issuance of new shares, etc.).

Figure 4, which is a plot of aggregate investment to GDP and the retention ratio on separate axes, indicates that the correlation between these two variables, at +0.66, is strong. Interestingly, such a correlation with payout largely vanished when we compared investment/GDP with our proxies for mean reversion in S&P 500 earnings. The correlation of investment/GDP with lagged 10-year earnings growth, current earnings divided by their long-term moving average, and current earnings divided by current GDP were all found to be less than half the 0.66 correlation of investment/GDP with the payout ratio. Clearly, times of high cash retention (low dividends) are also times of high investment for the economy at large, but times of

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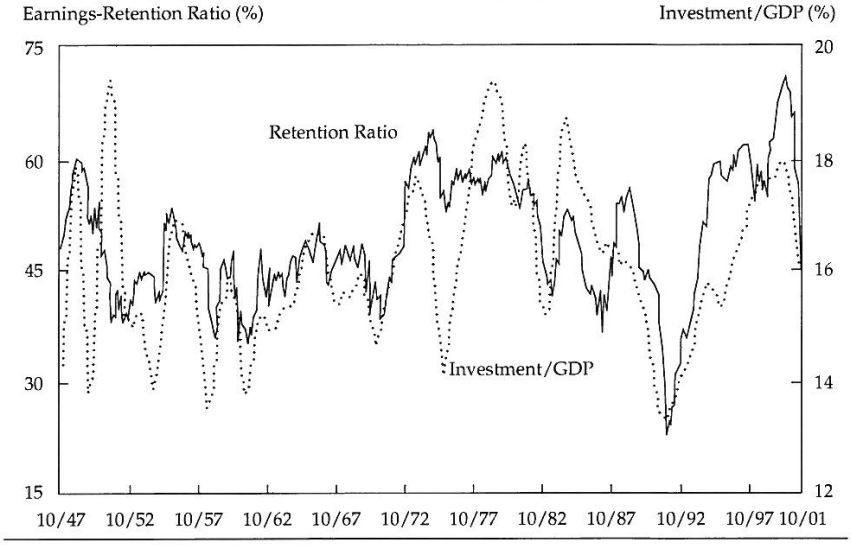
Figure 4. S&P 500 Earnings-Retention Ratio and Aggregate Investment/GDP, 1947–2001



high investment are not necessarily times of depressed earnings. Note, in particular, that in late 1999 and early 2000 (prior to the technology bubble bursting), both series were very high, indicating that the high retention rates at corporations were not simply the result of tax optimization (i.e., substituting capital gains for dividend income) but did, in fact, coincide with higher-than-normal investment. On this measure, dividend policy and investment policy (at least at the macroeconomic level) are not even close to independent.

An interesting aspect is that, as **Table 7** and **Table 8** show, the payout ratio and investment/GDP (*INVEST/GDP*) both forecast 10-year real earnings growth *and* 10-year real GDP growth with signs consistent with our story (that is, more retention is a forecast of lower earnings and more investment is a forecast of lower GDP growth).[21] And, as for the payout ratio, the sign for *INVEST/GDP* is again "wrong"!

As with earnings growth, our findings for GDP are not being driven by simple mean reversion. Forecasts of the next 10 years' real GDP growth based on the previous 10 years' growth shows a modest continuation effect rather than mean reversion; also, errors in GDP that were later reversed would lead to a high *INVEST/GDP*, forecasting positive, not negative, future growth. Instead, as with earnings and dividends, we found the counterintuitive result that when investment is high as a percentage of GDP, future GDP growth is low. Although we are reporting only an initial investigation, we consider it interesting corroborating evidence for the empire-building explanation of the payout ratio's power.

Table 7. Ten-Year Earnings Growth as a Function of Investment/GDP and Payout Ratio: Regression Coefficients, 1947–2001 Data
(*t*-statistics in parentheses)

Earnings Growth	a	b_1	b_2	Adjusted R^2
A. $EG_{10} = a + b_1(INVEST/GDP)$				
EG_{10}	12.9%	–0.70(*INVEST/GDP*)		18.3%
	(6.4)	(–5.3)		
B. $EG_{10} = a + b_1(PR) + b_2(INVEST/GDP)$				
EG_{10}	–9.8%	0.22*PR*	–0.02(*INVEST/GDP*)	41.5%
	(–1.0)	(2.9)	(–0.1)	

Table 8. Ten-Year GDP Growth as a Function of Investment/GDP and Payout Ratio: Regression Coefficients, 1947–2001 Data
(*t*-statistics in parentheses)

Earnings Growth	a	b_1	b_2	Adjusted R^2
A. $GDP_{10} = a + b_1(INVEST/GDP)$				
GDP_{10}	8.9%	–0.36(*INVEST/GDP*)		22.0%
	(5.3)	(–3.9)		
B. $GDP_{10} = a + b_1(PR)$				
GDP_{10}	–0.1% +	0.08*PR*		22.0%
	(–1.2)	(4.3)		
C. $GDP_{10} = a + b_1(PR) + b_2(INVEST/GDP)$				
GDP_{10}	4.4%	0.05*PR*	–0.22(*INVEST/GDP*)	26.2%
	(1.5)	(1.8)	(–2.0)	

This investment/GDP result is also a significant robustness check on our earlier work. Our main results are for forecasting a version of index fund EPS. Regardless of our other robustness checks, EPS changes still could, because of index changes or corporate actions, be contaminating our data. Similarly, although the results are seemingly robust through time, the possibility that tax changes or changing sensitivity to, or awareness of, tax optimization could skew the decision to retain versus pay out earnings. Importantly, although perhaps bringing its own baggage, the ratio of investment to starting GDP as a forecast of real GDP growth suffers from none of these potential problems. The fact that the results indicate a phenomenon occurring that is very similar to the payout-ratio forecasting earnings growth is quite reassuring for fans of the empire-building story. Similarly, the fact that investment/GDP is highly correlated with the payout ratio but not with other measures, such as lagged earnings growth or current earnings versus a moving average, is a blow to those who might otherwise believe that our results for the payout ratio are driven by simple mean reversion in earnings.

Implications

What are the implications of our findings for investors and for the equity markets? After a painful two-year bear market dating from March 2000, some might now, as of the writing of this article in early 2002, judge equities to be cheap by comparing today's prices with the unprecedented levels of late 1999 and early 2000. Noting the dramatic fall, one might now favor the purchase of equities as a "contrarian" recommendation. Compared with history, however, stocks are anything but cheap, as is evident by the history of P/Es in Panel A of **Figure 5**.

Panel A shows that P/Es based on one-year trailing earnings are at their highest level ever; despite falling prices, the plunge in recent earnings has driven the S&P 500's P/E to an extreme. Some might argue that this picture overstates the case, because recent earnings are perhaps abnormally low (or, if we may be provocative, the 1999/2000 earnings were abnormally high). The P/E based on 10 years of trailing real earnings shown in Panel B, however, shows valuations comparable to right before the crash of 1929 and higher than at all times in history except during the bubble preceding 1929—or the bubble of 1999–2000. Arguing that today's 10-year P/E value is overstated would be hard. Other metrics are similar. Basically, compared with history, stocks remain expensive.[22]

Will the premium price be rewarded? Many authors and observers (e.g., Shiller 2000; Arnott and Ryan 2001; Arnott and Bernstein 2002; Asness 2000a) have noted that the high prices of equities today, coupled with a historically reasonable estimate of future earnings growth, have led to low estimates of future real returns and of the future equity risk premium. Some, taking a stance based on efficient markets (notably, Ibbotson and Chen 2003), disagree. In effect, they combine (1) the assumption of market efficiency, (2) the assumption that the Miller and Modigliani propositions hold intertemporally (that is, that high retention rates imply high future growth rates), and (3) the assumption that expected market returns do not vary through time. Based on these three assumptions, they contend that recent high P/Es do not alter the likely future rates of return. Low payout ratios will lead to faster earnings growth and recent high P/Es also mean that future earnings growth will make up for the low earnings yield. In other words, the omniscient invisible hand of an efficient market will adjust growth to compensate for any

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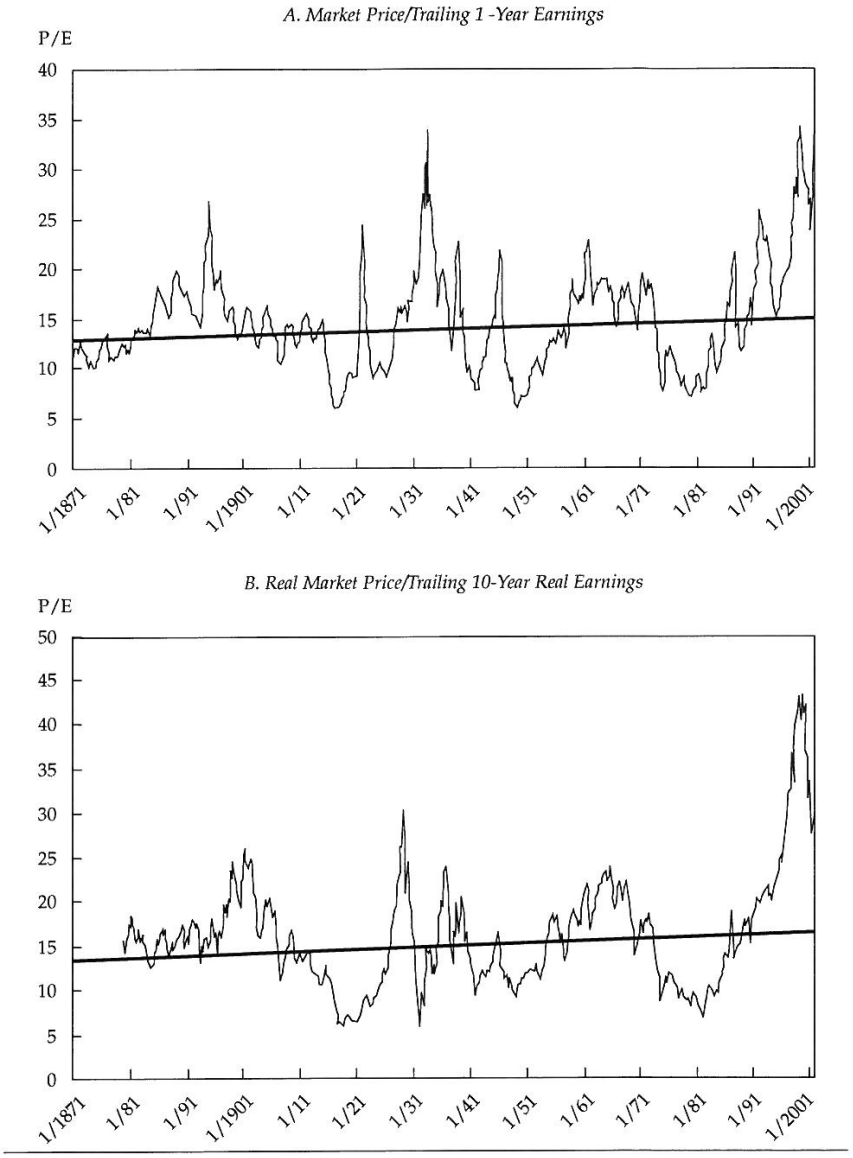
Figure 5. Price to Earnings, 1871–2001



valuation level or payout, thereby providing a constant expected return!

This reasoning, this set of assumptions, and this forecast for high growth, which are sound in theory, are clearly rejected by our empirical work. We find no historical empirical support for the rationale. Ibbotson and Chen, via their intertemporal interpretation of Miller and Modigliani, would forecast higher-than-normal real earnings growth as a direct result of lower-than-normal dividend payouts. Our empirical results show the opposite. Similarly, a high P/E, contrary to the assumptions of Ibbotson and Chen, has almost no power to forecast future earnings growth in the presence of the payout ratio.

Essentially, prior to the plunge in earnings in late 2001, investors faced a situation of very high P/Es and very low payout ratios. History says such a period is a time of poor expected long-term future earnings growth. By the very end of 2001, the situation had changed; one-year earnings had plunged, sending payout ratios somewhat upward but sending P/Es into the stratosphere. In either situation, our results imply that forward-looking forecasts of the equity premium are very low compared with history.

The recent condition of very high P/Es and very low payout ratios combines expensive valuation and a low forecast of earnings growth. History suggests that this combination is clearly a recipe for low expected returns. The current condition, now that earnings have tumbled and payout ratios have returned closer to "normal," suggests more reasonable forecasts of earnings growth but from a now-reduced earnings base. With a historically off-the-charts P/E, this change provides little solace.

Finally, what do our findings mean for the ongoing controversy over executive stock options?[23] One nuance of the issuance of executive stock options is that they may provide an incentive to managers not to pay dividends, because dividends reduce the stock price on which their options are valued. Recall that one leading explanation for the perverse predictive power we found for the payout ratio is that some executives probably engage in unproductive empire building when they do not pay out sufficient dividends. The potential danger of such behavior when combined with the disincentive to pay dividends that might accompany executive stock options is as obvious as it is worrisome.

Conclusion

We did not start out trying to forecast gloom and doom. We started out by looking at the optimists' assertion that today's low payout ratios are a strong positive signal for future growth. Unfortunately, this view is emphatically inconsistent with the historical evidence.

Unlike optimistic new-paradigm advocates, we found that low payout ratios (high retention rates) historically precede low earnings growth. This relationship is statistically strong and robust. We found that the empirical facts conform to a world in which managers possess private information that causes them to pay out a large share of earnings when they are optimistic that dividend cuts will not be necessary and to pay out a small share when they are pessimistic, perhaps so that they can be confident of maintaining the dividend payouts. Alternatively, the facts also fit a world in which low payout ratios lead to, or come with, inefficient empire building and the funding of less-than-ideal projects and investments, leading to poor subsequent growth, whereas high payout ratios lead to more carefully chosen projects. The empire-building story also fits the initial macroeconomic evidence quite well. At this point, these explanations are conjectures; more work on discriminating among competing stories is appropriate.

Sometimes the world really does change. For instance, the recent low market payout ratios may indeed be the result of a new sensitivity to shareholder tax optimization, not a result of more negative forces (e.g., empire building, manager pessimism). In such a case, expected growth from recent low payout ratios might be much better than history would suggest, perhaps even strong enough to offset high prices and/or low payouts and deliver historically normal returns. But those forecasting this optimistic result are running into a headwind of 130 years of history; thus, the burden of proof should fall on them. They must show why high cash retention is no longer a negative for future growth (or even a neutral event for future growth) but is now, rather, a significant positive omen. In effect, they must show that change has created a truly new paradigm. With P/Es still extraordinarily high by any measure, this burden is not a light one.

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Notes

1. Miller and Modigliani posited and proved that in an ideal world, and in the absence of tax arbitrage considerations, dividend policy should not matter. Why? Because capital is fungible: A company has no reason to care whether it garners capital for projects from bond issuance, from stock issuance, or from retained earnings; therefore, the company should go wherever the risk-adjusted cost of capital is lowest. Reciprocally, an investor has no reason to care whether an investment pays a dividend that the investor can reinvest or whether the company reinvests earnings itself to fuel earnings growth equivalent to the forgone dividend yield. Thus, changes in dividend policy should not affect firm value. Similarly, investment policy and dividend policy should be independent.
2. Miller and Modigliani focused neither on intertemporal comparisons nor on dividend policy at an aggregate market level. The oft-cited intertemporal argument we examine is an extrapolation of Miller and Modigliani theory suggested by many analysts and strategists to justify rapid future earnings growth for the broad stock market. Ibbotson and Chen (2003) sum up this viewpoint well when they state that for the market as a whole, "Furthermore, our forecasts

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are consistent with Miller and Modigliani (1961) theory, in that dividend-payout ratios do not affect P/Es and high earnings-retention rates (usually associated with low yields) imply higher per share future growth." (p. 00)

3. For more discussion of current approaches to estimating future returns, see the presentations and discussions at www.aimrpubs.org/ap/home.html from AIMR's *Equity Risk Premium Forum*.
4. The Schwert data are for January 1802 through December 1925; the Shiller data are for February 1871 through March 2001; and the Ibbotson data are for January 1926 through December 2000. Each source provides broad capitalization-weighted stock market yields and total returns; Shiller's data also include earnings. With regard to Shiller's data, monthly dividend and earnings data were computed from the S&P 500 Index four-quarter totals for the quarters since 1926, with linear interpolation to monthly figures. Dividend and earnings data before 1926 are from Cowles (1939) and interpolated from annual data.
5. These data came from Standard and Poor's for 1926 to date and from Cowles for periods before 1926.
6. Yields on 10-year government bonds came from the NBER for January 1800 through May 2001. Note: data were annual until 1843; we interpolated the data for monthly estimates. Long-term government bond yields and returns for January 1926 through December 2000 came from Ibbotson Associates.
7. NBER data spanned January 1801 through May 2001. Note: data were annual until 1950; we interpolated the data for monthly estimates. Ibbotson Associates data spanned 1926 through December 2000. We gave Ibbotson data primary (two-thirds) weighting for 1926–1950 because the NBER data are annual through 1950.
8. We used NBER data for January 1800 through March 2001. The NBER data are annual GNP figures through 1920 (which we interpolated July to July for our monthly data) and quarterly GDP figures for 1921–2001.
9. All *t*-statistics in this article have been adjusted for overlapping observations (the Newey–West 1987 correction).
10. Benartzi, Michaely, and Thaler (1997) found a different but related result for the cross-section of companies, namely, that dividend changes across stocks are not strong forecasters of cross-sectional differences in future earnings growth. In contrast and with results more similar to our findings, Nissim and Ziv (2001) found that dividend changes do contain information about future profitability. Although similar in spirit to our approach, these papers differ in two important ways from our tests. First, our tests are on the level of payout ratio policy, not dividend changes. Second, our results are for the aggregate market, not the cross-section of differential company growth.
11. Brealey and Myers (2000) described empire building as follows: "Other things equal, managers prefer to run large businesses rather than small ones. Getting from small to large may not be a positive-NPV undertaking" (p. 321). They went on to quote Jensen with, "The problem is how to motivate managers to disgorge the cash rather than investing it below the cost of capital or wasting it in organizational inefficiencies" (p. 323). In addition to the 1986 Jensen paper, see also Jensen and Meckling (1976).
12. Note, however, that the third and fourth explanations can be tested.
13. The start was 1901 because the 30-year window goes back to our data beginning in 1871. The first sample period is 1871–1901, and the most recent is 1971–2001. Thus, we had 100 years of rolling 30-year spans and at least four completely nonoverlapping periods.
14. Dividing by 10 years of real earnings led to similar inferences.
15. Both the payout ratio and MA_{20} are scaled versions of current earnings. One scales on dividends, and the other scales on past average real earnings. So, our test was whether scaling by average historical earnings or scaling by dividends is the more effective forecaster.
16. We ran three more tests of whether simple mean reversion (unrelated to dividends) is driving the strong 1946–2001 results. First, instead of using last year's earnings as the *E* to calculate the payout ratio, we used a three-year average of real earnings. If transitory components of *E* are driving the payout ratio's predictive power, then using a longer, more stable version of *E* might drive out this power. Second, in a draconian test, we simply lagged the payout ratio by one full year, greatly reducing the chance of highly transitory components of *E* driving our results. Third, we tried real earnings divided by real GDP as another proxy for whether earnings were high or low and likely to reverse. In each case, the payout ratio's power survived. Of course, averaging in older earnings data or arbitrarily skipping a year reduced the statistical significance of our tests somewhat, but the *t*-statistics on payout defined in these ways were still quite striking (always greater than 3.0). The results for *E/GDP* were similar to the results reported in the text. The variable had the hypothesized negative sign but did not work nearly as well as the payout ratio and did not significantly reduce the payout ratio's power in bivariate tests.
17. Also recall from Figure 2 that our 10-year results held up well for 1871–1945.
18. Harvey found that the term structure of interest rates can account for more than half of the variation in GNP growth in many G-7 countries. He noted that this explanatory power is a great deal higher than the explanatory power offered by a model based on past GNP growth rates. He also found the term structure forecasts to compare favorably with alternative forecasts.
19. Because the earnings yield, *E/P*, is the reciprocal of P/E, if the P/E is 25, stocks are delivering $1 of earnings for each $25 of stock valuation, or a 4 percent earnings yield. We prefer using earnings yield to using P/E because it is more directly comparable with bond or cash yields, is more stable over time, and behaves more sensibly during times of deeply depressed earnings. If the earnings of a $100 stock fall from $5 a share to $1 a share, the P/E is a relatively meaningless 100×; if earnings fall farther to a $1 loss per share, the P/E is completely meaningless. In contrast, in these hypothetical cases, the earnings yield falls from 5 percent to 1 percent to –1 percent, all of which have a simple economic meaning: The earnings yield tells how much in earnings an investor can expect on each $100 invested.
20. Campbell and Shiller (1998, 2001) found, similarly, that valuation ratios do a poorer job than fans of efficient markets might have expected of forecasting earnings growth, dividend growth, and productivity growth.
21. These results are also consistent with the company-by-company results of Titman, Wei, and Xie (2001) that companies that invest more tend to produce lower risk-adjusted returns. Like us, these authors also tested for and favored the empire-building story as an explanation for their counterintuitive results.
22. Some market observers have suggested that investors are more tolerant of equity market risk today and, therefore, valuation levels can easily be higher than in the past. Figure 5 also shows an exponential line of best fit (regression line) that may suggest that the "normal" P/E has risen by at least 25 percent over the past 130 years. This rise is a material change in fair value, which we think is entirely plausible, although it could also be a function of end points, notably the 2000 bubble. But in both panels, such a change would still place the "normal" P/E at just over half the recent levels.
23. The controversy covers both the efficacy of such options (do the positive incentives outweigh the negative ones?) and whether such options should be expensed (clearly, they should be).

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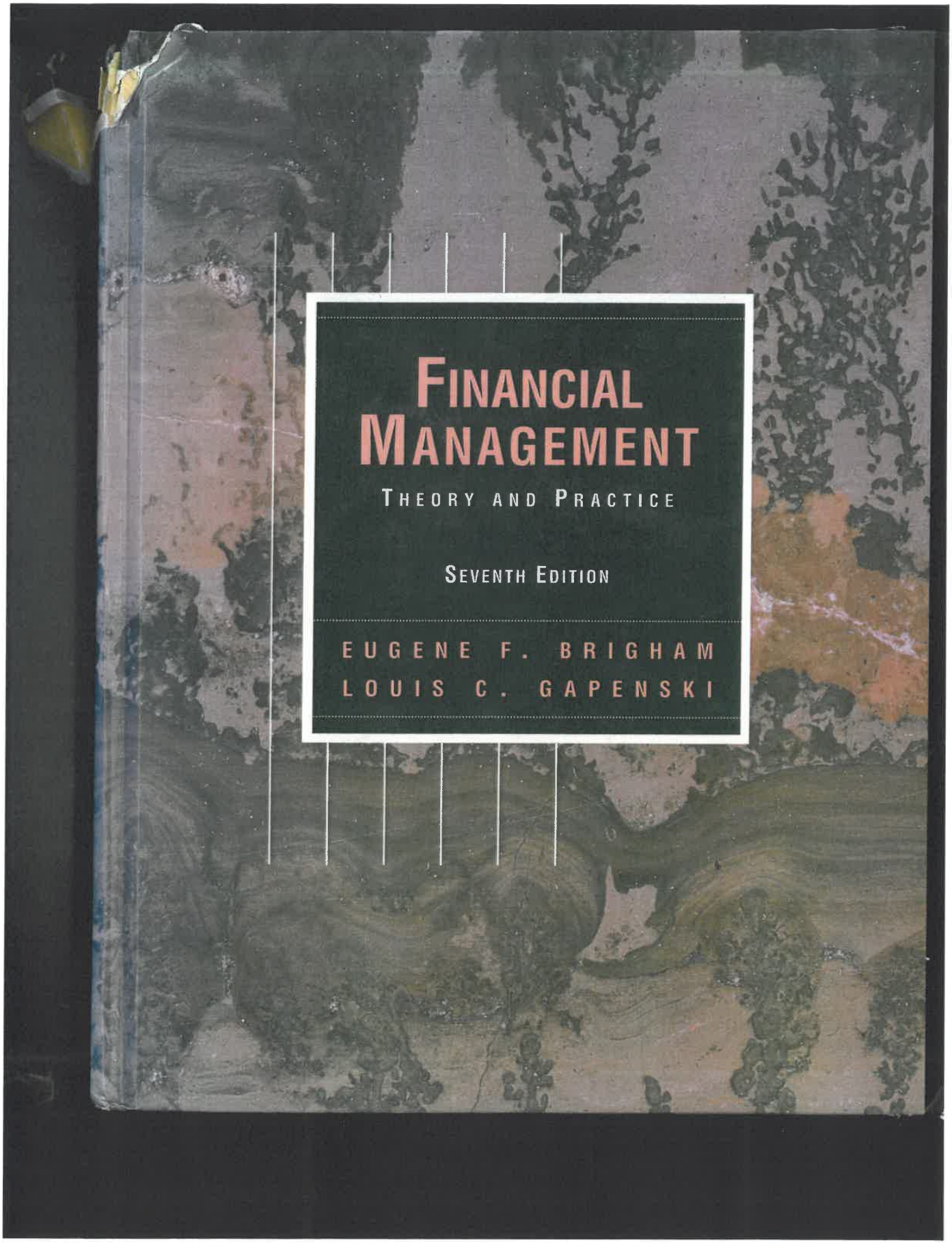
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INFORMATION CONTENT, OR SIGNALING, HYPOTHESIS

When MM set forth their dividend irrelevance theory, they assumed, among other things, that everyone—investors and managers alike—have identical expectations about the firm's future earnings and dividend stream. In reality, however, investors have conflicting opinions regarding both the level of future dividend payments and the degree of uncertainty inherent in those payments, and managers often have better information about future prospects than public stockholders. This is the same sort of *asymmetric information* situation that we discussed in Chapter 13 in connection with the announcement of new stock issues.

It has been observed that an increase in the dividend is often accompanied by an increase in the price of the stock, while a dividend cut generally leads to a stock price decline. This could indicate that investors, in the aggregate, prefer dividends to capital gains. However, MM argued differently. They noted the well-established fact that corporations are reluctant to cut dividends, hence do not raise dividends unless they anticipate equal or higher earnings in the future. Thus, MM argued that a higher-than-expected dividend increase is a "signal" to investors that the firm's management forecasts good future earnings.[8] Conversely, a dividend reduction, or a smaller-than-expected increase, is a signal that management is forecasting poor earnings in the future. Thus, MM claimed that investors' reactions to changes in dividend policy do not necessarily show that investors prefer dividends to retained earnings. Rather, the fact that price changes follow dividend actions simply indicated to MM that there is an important *information,* or *signaling, content* in dividend announcements.

To illustrate the signaling content of dividend announcements, consider the case of Clabir Corporation, a conglomerate with an odd mixture of businesses ranging from the manufacture of tank ammunition to the production of food products such as the Klondike ice cream bar. Clabir had been troubled by losses in its defense business, and the firm recently announced an annual dividend cut from 72 cents to only 16 cents a share. After this bad news had been digested, the stock was selling for about $3.00 a share. Then, Clabir announced that it planned to completely omit dividends for the coming year. Although the near-term cash flow loss to stockholders was relatively small, only 16 cents in annual dividends, the firm's stock price dropped almost immediately from $3.00 to $1.00. Clearly, investors viewed the dividend announcement as a signal that the company was in for very rough times ahead, and this caused them to lower their expectations about Clabir's future profitability, and hence to cut the value of its stock.

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[8]Stephen Ross has suggested that managers can use capital structure as well as dividends to give signals concerning firms' future prospects. For example, a firm with good earnings prospects can carry more debt than a similar firm with poor earnings prospects. This theory, called *incentive-signaling,* rests on the premise that signals with cash-based variables (either debt interest or dividends) cannot be mimicked by unsuccessful firms because such firms do not have the future cash-generating power to maintain the announced interest or dividend payment. Thus, investors are more likely to believe a glowing verbal report when it is accompanied by a dividend increase or a debt-financed expansion program. See Stephen A. Ross, "The Determination of Financial Structure: The Incentive-Signaling Approach," *The Bell Journal of Economics,* Spring 1977, 23–40.

Investor growth expectations: Analysts vs. history

Analysts' growth forecasts dominate past trends in predicting stock prices.

James H. Vander Weide and Willard T. Carleton

For the purposes of implementing the Discounted Cash Flow (DCF) cost of equity model, the analyst must know which growth estimate is embodied in the firm's stock price. A study by Cragg and Malkiel (1982) suggests that the stock valuation process embodies analysts' forecasts rather than historically based growth figures such as the ten-year historical growth in dividends per share or the five-year growth in book value per share. The Cragg and Malkiel study is based on data for the 1960s, however, a decade that was considerably more stable than the recent past.

As the issue of which growth rate to use in implementing the DCF model is so important to applications of the model, we decided to investigate whether the Cragg and Malkiel conclusions continue to hold in more recent periods. This paper describes the results of our study.

STATISTICAL MODEL

The DCF model suggests that the firm's stock price is equal to the present value of the stream of dividends that investors expect to receive from owning the firm's shares. Under the assumption that investors expect dividends to grow at a constant rate, g, in perpetuity, the stock price is given by the following simple expression:

$$P_s = \frac{D(1+g)}{k-g} \quad (1)$$

where:

P_s = current price per share of the firm's stock;

D = current annual dividend per share;

g = expected constant dividend growth rate; and

k = required return on the firm's stock.

Dividing both sides of Equation (1) by the firm's current earnings, E, we obtain:

$$\frac{P_s}{E} = \frac{D}{E} \cdot \frac{(1+g)}{k-g} \quad (2)$$

Thus, the firm's price/earnings (P/E) ratio is a nonlinear function of the firm's dividend payout ratio (D/E), the expected growth in dividends (g), and the required rate of return.

To investigate what growth expectation is embodied in the firm's current stock price, it is more convenient to work with a linear approximation to Equation (2). Thus, we will assume that:

$$P/E = a_0(D/E) + a_1 g + a_2 k. \quad (3)$$

(Cragg and Malkiel found this assumption to be reasonable throughout their investigation.)

Furthermore, we will assume that the required

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rate of return, k, in Equation (3) depends on the values of the risk variables B, Cov, Rsq, and Sa, where B is the firm's Value Line beta; Cov is the firm's pretax interest coverage ratio; Rsq is a measure of the stability of the firm's five-year historical EPS; and Sa is the standard deviation of the consensus analysts' five-year EPS growth forecast for the firm. Finally, as the linear form of the P/E equation is only an approximation to the true P/E equation, and B, Cov, Rsq, and Sa are only proxies for k, we will add an error term, e, that represents the degree of approximation to the true relationship.

With these assumptions, the final form of our P/E equation is as follows:

$$P/E = a_0(D/E) + a_1 g + a_2 B + a_3 Cov + a_4 Rsq + a_5 Sa + e. \quad (4)$$

The purpose of our study is to use more recent data to determine which of the popular approaches for estimating future growth in the Discounted Cash Flow model is embodied in the market price of the firm's shares.

We estimated Equation (4) to determine which estimate of future growth, g, when combined with the payout ratio, D/E, and risk variables B, Cov, Rsq, and Sa, provides the best predictor of the firm's P/E ratio. To paraphrase Cragg and Malkiel, we would expect that growth estimates found in the best-fitting equation more closely approximate the expectation used by investors than those found in poorer-fitting equations.

DESCRIPTION OF DATA

Our data sets include both historically based measures of future growth and the consensus analysts' forecasts of five-year earnings growth supplied by the Institutional Brokers Estimate System of Lynch, Jones & Ryan (IBES). The data also include the firm's dividend payout ratio and various measures of the firm's risk. We include the latter items in the regression, along with earnings growth, to account for other variables that may affect the firm's stock price.

The data include:

Earnings Per Share. Because our goal is to determine which earnings variable is embodied in the firm's market price, we need to define this variable with care. Financial analysts who study a firm's financial results in detail generally prefer to "normalize" the firm's reported earnings for the effect of extraordinary items, such as write-offs of discontinued operations, or mergers and acquisitions. They also attempt, to the extent possible, to state earnings for different firms using a common set of accounting conventions.

We have defined "earnings" as the consensus analyst estimate (as reported by IBES) of the firm's earnings for the forthcoming year.[1] This definition approximates the normalized earnings that investors most likely have in mind when they make stock purchase and sell decisions. It implicitly incorporates the analysts' adjustments for differences in accounting treatment among firms and the effects of the business cycle on each firm's results of operations. Although we thought at first that this earnings estimate might be highly correlated with the analysts' five-year earnings growth forecasts, that was not the case. Thus, we avoided a potential spurious correlation problem.

Price/Earnings Ratio. Corresponding to our definition of "earnings," the price/earnings ratio (P/E) is calculated as the closing stock price for the year divided by the consensus analyst earnings forecast for the forthcoming fiscal year.

Dividends. Dividends per share represent the common dividends declared per share during the calendar year, after adjustment for all stock splits and stock dividends). The firm's dividend payout ratio is then defined as common dividends per share divided by the consensus analyst estimate of the earnings per share for the forthcoming calendar year (D/E). Although this definition has the deficiency that it is obviously biased downward — it divides this year's dividend by next year's earnings — it has the advantage that it implicitly uses a "normalized" figure for earnings. We believe that this advantage outweighs the deficiency, especially when one considers the flaws of the apparent alternatives. Furthermore, we have verified that the results are insensitive to reasonable alternative definitions (see footnote 1).

Growth. In comparing historically based and consensus analysts' forecasts, we calculated forty-one different historical growth measures. These included the following: 1) the past growth rate in EPS as determined by a log-linear least squares regression for the latest year,[2] two years, three years, . . ., and ten years; 2) the past growth rate in DPS for the latest year, two years, three years, . . ., and ten years; 3) the past growth rate in book value per share (computed as the ratio of common equity to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; 4) the past growth rate in cash flow per share (computed as the ratio of pretax income, depreciation, and deferred taxes to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; and 5) plowback growth (computed as the firm's retention ratio for the current year times the firm's latest annual return on common equity).

We also used the five-year forecast of earnings

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per share growth compiled by IBES and reported in mid-January of each year. This number represents the consensus (i.e., mean) forecast produced by analysts from the research departments of leading Wall Street and regional brokerage firms over the preceding three months. IBES selects the contributing brokers "because of the superior quality of their research, professional reputation, and client demand" (IBES *Monthly Summary Book*).

Risk Variables. Although many risk factors could potentially affect the firm's stock price, most of these factors are highly correlated with one another. As shown above in Equation (4), we decided to restrict our attention to four risk measures that have intuitive appeal and are followed by many financial analysts: 1) B, the firm's beta as published by Value Line; 2) Cov, the firm's pretax interest coverage ratio (obtained from Standard & Poor's Compustat); 3) Rsq, the stability of the firm's five-year historical EPS (measured by the R^2 from a log-linear least squares regression); and 4) Sa, the standard deviation of the consensus analysts' five-year EPS growth forecast (mean forecast) as computed by IBES.

After careful analysis of the data used in our study, we felt that we could obtain more meaningful results by imposing six restrictions on the companies included in our study:

1. Because of the need to calculate ten-year historical growth rates, and because we studied three different time periods, 1981, 1982, and 1983, our study requires data for the thirteen-year period 1971-1983. We included only companies with at least a thirteen-year operating history in our study.
2. As our historical growth rate calculations were based on log-linear regressions, and the logarithm of a negative number is not defined, we excluded all companies that experienced negative EPS during any of the years 1971-1983.
3. For similar reasons, we also eliminated companies that did not pay a dividend during any one of the years 1971-1983.
4. To insure comparability of time periods covered by each consensus earnings figure in the P/E ratios, we eliminated all companies that did not have a December 31 fiscal year-end.
5. To eliminate distortions caused by highly unusual events that distort current earnings but not expected future earnings, and thus the firm's price/earnings ratio, we eliminated any firm with a price/earnings ratio greater than 50.
6. As the evaluation of analysts' forecasts is a major part of this study, we eliminated all firms that IBES did not follow.

Our final sample consisted of approximately sixty-five utility firms.[3]

RESULTS

To keep the number of calculations in our study to a reasonable level, we performed the study in two stages. In Stage 1, all forty-one historically oriented approaches for estimating future growth were correlated with each firm's P/E ratio. In Stage 2, the historical growth rate with the highest correlation to the P/E ratio was compared to the consensus analyst growth rate in the multiple regression model described by Equation (4) above. We performed our regressions for each of three recent time periods, because we felt the results of our study might vary over time.

First-Stage Correlation Study

Table 1 gives the results of our first-stage correlation study for each group of companies in each of the years 1981, 1982, and 1983. The values in this table measure the correlation between the historically oriented growth rates for the various time periods and the firm's end-of-year P/E ratio.

The four variables for which historical growth rates were calculated are shown in the left-hand column: EPS indicates historical earnings per share growth, DPS indicates historical dividend per share growth, BVPS indicates historical book value per share growth, and CFPS indicates historical cash flow per share growth. The term "plowback" refers to the product of the firm's retention ratio in the currennt year and its return on book equity for that year. In all, we calculated forty-one historically oriented growth rates for each group of firms in each study period.

The goal of the first-stage correlation analysis was to determine which historically oriented growth rate is most highly correlated with each group's year-end P/E ratio. Eight-year growth in CFPS has the highest correlation with P/E in 1981 and 1982, and ten-year growth in CFPS has the highest correlation with year-end P/E in 1983. In all cases, the plowback estimate of future growth performed poorly, indicating that — contrary to generally held views — plowback is not a factor in investor expectations of future growth.

Second-Stage Regression Study

In the second stage of our regression study, we ran the regression in Equation (4) using two different measures of future growth, g: 1) the best historically oriented growth rate (g_h) from the first-stage correlation study, and 2) the consensus analysts' forecast (g_a) of five-year EPS growth. The regression results, which are shown in Table 2, support at least

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TABLE 1

Correlation Coefficients of All Historically Based Growth Estimates by Group and by Year with P/E

Current Year	*Historical Growth Rate Period in Years* 1	2	3	4	5	6	7	8	9	10
1981										
EPS	−0.02	0.07	0.03	0.01	0.03	0.12	0.08	0.09	0.09	0.09
DPS	0.05	0.18	0.14	0.15	0.14	0.15	0.19	0.23	0.23	0.23
BVPS	0.01	0.11	0.13	0.13	0.16	0.18	0.15	0.15	0.15	0.15
CFPS	−0.05	0.04	0.13	0.22	0.28	0.31	0.30	0.31	−0.57	−0.54
Plowback	0.19									
1982										
EPS	−0.10	−0.13	−0.06	−0.02	−0.02	−0.01	−0.03	−0.03	0.00	0.00
DPS	−0.19	−0.10	0.03	0.05	0.07	0.08	0.09	0.11	0.13	0.13
BVPS	0.07	0.08	0.11	0.11	0.09	0.10	0.11	0.11	0.09	0.09
CFPS	−0.02	−0.08	0.00	0.10	0.16	0.19	0.23	0.25	0.24	0.07
Plowback	0.04									
1983										
EPS	−0.06	−0.25	−0.25	−0.24	−0.16	−0.11	−0.05	0.00	0.02	0.02
DPS	0.03	−0.10	−0.03	0.08	0.15	0.21	0.21	0.21	0.22	0.24
BVPS	0.03	0.10	0.04	0.09	0.15	0.16	0.19	0.21	0.22	0.21
CFPS	−0.08	0.01	0.02	0.08	0.20	0.29	0.35	0.38	0.40	0.42
Plowback	−0.08									

two general conclusions regarding the pricing of equity securities.

First, we found overwhelming evidence that the consensus analysts' forecast of future growth is superior to historically oriented growth measures in predicting the firm's stock price. In every case, the R^2 in the regression containing the consensus analysts' forecast is higher than the R^2 in the regression containing the historical growth measure. The regression coefficients in the equation containing the consensus analysts' forecast also are considerably more significant than they are in the alternative regression. These results are consistent with those found by Cragg and Malkiel for data covering the period 1961-1968. Our results also are consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy–and–sell decisions.

TABLE 2

Regression Results
Model I

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	−6.42*	10.31*	7.67*	3.24	0.54*	1.42*	57.43	0.83	46.49
	(5.50)	(14.79)	(2.20)	(2.86)	(2.50)	(2.85)	(4.07)		
1982	−2.90*	9.32*	8.49*	2.85	0.45*	−0.42	3.63	0.86	65.53
	(2.75)	(18.52)	(4.18)	(2.83)	(2.60)	(0.05)	(0.26)		
1983	−5.96*	10.20*	19.78*	4.85	0.44*	0.33	32.49	0.82	45.26
	(3.70)	(12.20)	(4.83)	(2.95)	(1.89)	(0.50)	(1.29)		

Part B: *Analysis*

$P/E = a_0 + a_1 D/E + a_2 g_a + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	−4.97*	10.62*	54.85*	−0.61	0.33*	0.63*	4.34	0.91	103.10
	(6.23)	(21.57)	(8.56)	(0.68)	(2.28)	(1.74)	(0.37)		
1982	−2.16*	9.47*	50.71*	−1.07	0.36*	−0.31	119.05*	0.90	97.62
	(2.59)	(22.46)	(9.31)	(1.14)	(2.53)	(1.09)	(1.60)		
1983	−8.47*	11.96*	79.05*	2.16	0.56*	0.20	−34.43	0.87	69.81
	(7.07)	(16.48)	(7.84)	(1.55)	(3.08)	(0.38)	(1.44)		

Notes:
* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

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Second, there is some evidence that investors tend to view risk in traditional terms. The interest coverage variable is statistically significant in all but one of our samples, and the stability of the operating income variable is statistically significant in six of the twelve samples we studied. On the other hand, the beta is never statistically significant, and the standard deviation of the analysts' five-year growth forecasts is statistically significant in only two of our twelve samples. This evidence is far from conclusive, however, because, as we demonstrate later, a significant degree of cross-correlation among our four risk variables makes any general inference about risk extremely hazardous.

Possible Misspecification of Risk

The stock valuation theory says nothing about which risk variables are most important to investors. Therefore, we need to consider the possibility that the risk variables of our study are only proxies for the "true" risk variables used by investors. The inclusion of proxy variables may increase the variance of the parameters of most concern, which in this case are the coefficients of the growth variables.[4]

To allow for the possibility that the use of risk proxies has caused us to draw incorrect conclusions concerning the relative importance of analysts' growth forecasts and historical growth extrapolations, we have also estimated Equation (4) with the risk variables excluded. The results of these regressions are shown in Table 3.

Again, there is overwhelming evidence that the consensus analysts' growth forecast is superior to the historically oriented growth measures in predicting the firm's stock price. The R^2 and t-statistics are higher in every case.

CONCLUSION

The relationship between growth expectations and share prices is important in several major areas of finance. The data base of analysts' growth forecasts collected by Lynch, Jones & Ryan provides a unique opportunity to test the hypothesis that investors rely more heavily on analysts' growth forecasts than on historical growth extrapolations in making security buy–and–sell decisions. With the help of this data base, our studies affirm the superiority of analysts' forecasts over simple historical growth extrapolations in the stock price formation process. Indirectly, this finding lends support to the use of valuation models whose input includes expected growth rates.

TABLE 3

Regression Results
Model II

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	−1.05	9.59	21.20	0.73	82.95
	(1.61)	(12.13)	(7.05)		
1982	0.54	8.92	12.18	0.83	167.97
	(1.38)	(17.73)	(6.95)		
1983	−0.75	8.92	12.18	0.77	107.82
	(1.13)	(12.38)	(7.94)		

Part B: *Analysis*

$P/E + a_0 + a_1 D/E + a_2 g_a$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	3.96	10.07	60.53	0.90	274.16
	(8.31)	(8.31)	(20.91)	(15.79)	
1982	−1.75	9.19	44.92	0.88	246.36
	(4.00)	(4.00)	(21.35)	(11.06)	
1983	−4.97	10.95	82.02	0.83	168.28
	(6.93)	(6.93)	(15.93)	(11.02)	

Notes:
* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

[1] We also tried several other definitions of "earnings," including the firm's most recent primary earnings per share prior to any extraordinary items or discontinued operations. As our results were insensitive to reasonable alternative definitions of "earnings" we report only the results for the IBES consensus.

[2] For the latest year, we actually employed a point-to-point growth calculation because there were only two available observations.

[3] We use the word "approximately," because the set of available firms varied each year. In any case, the number varied only from zero to three firms on either side of the figures cited here.

[4] See Maddala (1977).

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Expectations and the Structure of Share Prices

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4 Empirical Connection of the Growth Forecasts with Share-Valuation Models

We suggested in chapter 3 that a relationship should exist between the earnings growth expectations we have collected and the market values of the corresponding shares. The present chapter reports on our empirical investigation of this relationship. This investigation may be regarded in one of two ways. Assuming that growth-rate expectations are a major input used by investors to form expected security returns, our empirical work tests the validity of the valuation models. Conversely, if we maintain the validity of the valuation models, we may be regarded as testing the hypothesis that earnings growth expectations do play a major role, along with the other specified variables, in investors' evaluations of expected security returns.

We begin by investigating the expected rate of return measure suggested by equation (3.3-14) and obtained by using the averages of the long-term expected growth rates. We are particularly concerned with whether the relationship between expected return and the systematic risk variables represented by various regression coefficients holds when expected return is measured with our analysts' forecasts. First, in section 4.1 we specify more precisely exactly what measures of risk will be employed. Next, in section 4.2, we examine the prima facie evidence in favor of hypotheses suggested by the diversification model. Section 4.3 then adopts a more structural approach, which takes into account some econometric problems that were discussed in section 3.4. We switch in section 4.4 to the alternative specification (3.3-15), which we suggested might also give a good representation of the model. This price-earnings ratio formulation allows us to enquire whether other growth forecasts might give a closer explanation of valuation relationships than the expectations data we collected. Failure to find such improvement allows us to conclude that our growth measures are closest to the actual expectations that enter market valuation.

Having a model for prices also allows us to investigate whether knowledge of the model and access to the expectations data would have allowed superior stock selection. The fact that they would not comes as no surprise, but the reasons are of considerable interest. These are the subject of section 4.5. The various findings of these investigations are summarized in section 4.6.

4.1 The Risk Measures Used

It is not clear from the diversification model exactly what measures of risk would be most appropriate. We did provide, in section 3.4, a theoretical justification for the general approach that we shall take. Nevertheless, some empirical investigation is needed before we can ascertain what specific measures are most appropriate: that is, we need to select the exact form of the regression equation whose estimated coefficients will stand for the factor coefficients. We begin by exploring relationships between security returns and some economic variables that are of interest whatever valuation model is appropriate. Once we have established the variables to be used, we proceed to explore the valuation relationships suggested by the theory.

The first set of variables employed are measures of so-called market risk derived from the regressions of the realized rates of return on various market-wide variables.[1] We experimented with several market indicators including the Standard & Poor's 500 Stock Index, the Dow Jones Industrial Average (of 30 stocks), and the (value) weighted and unweighted indexes made available by the University of Chicago's Center for Research in Security Prices (CRSP). The realized rates of return were obtained from the CRSP. Our results turned out not to be sensitive to use of the alternative market indexes, so we report here only the results for the CRSP weighted index. This index tended to give results as strong as any in terms of r^2 for the regressions of company returns on the index and provided coefficients which were marginally stronger for the subsequent simple regressions reported in section 4.2.

Correlation with other types of variables may also yield needed risk measures whether the extended CAPM (involving nonmarketable income streams) or the diversification model is assumed. We selected three such additional variables. They are the rate of change of National Income (NI), the short-term interest rate measured by the ninety-day Treasury Bill rate, and the rate of inflation measured by the increase of the Consumer Price Index.[2] These may be considered typical measures of

1. These are the "beta" coefficients often calculated allegedly to give content to the CAPM.

2. We used alternatively the rate of change of GNP as opposed to NI; the long rate as opposed to the short; and the GNP deflator as opposed to the CPI. The alternative series were so highly correlated that it made little difference which we employed.

some risks to which investors are subject, stemming from variation in other sources of income, from changes in interest rates, and from changes in inflation.

The period over which the regression coefficients should be calculated is not clear a priori. It is not even clear that only past values should be used. The theory involves the covariances of returns with various quantities in the future. These parameters could safely be estimated from past data if they did not change or if investors did not perceive change. Such stability is unlikely. Changes in the nature and type of activities that corporations pursue and alterations in the structure of the economy make it likely that the appropriate regression coefficients change through time. Insofar as investors can perceive and even anticipate these changes, they are unlikely simply to extrapolate past betas into the future. Indeed, many of the popular "beta services" in the financial community explicitly adjust the betas calculated from past data, on the basis of changes that are known to have occurred in the structure of the business. Thus, in calculating the relevant betas at any time, it might be sensible to use values estimated with data following the time at which the valuation took place. Fortunately, our expectations data are not based on calculations using the realizations over the forecast period so we do not have to worry about spurious correlations being found between the expected return and these future values.

We adopted a compromise approach after some experimentation. The regression coefficients are calculated using quarterly observations over ten-year periods. The periods used covered the three years prior to the valuation date and the seven years following it. The results reported in the next section are not very sensitive to variations in the details of this procedure. Almost the same results were obtained, for example, when we took five years before and after the valuation date. Nevertheless, we did find that use of data entirely from past periods gave less satisfactory results than those obtained by including some future data. Extending the estimation period into the future improved the values of r^2 and was particularly important for obtaining some precision in evaluating the effect of inflation.

We also tried monthly rather than quarterly observations and shorter time periods over which to make the calculations of covariances with the market index. Again we found that the results improved when future data were included in the calculations, i.e., when some foresight regarding the future was assumed. However, the use of the shorter period made no substantial difference to the results. Since it is desirable to calculate all the regression coefficients over the same period so that the variance-covariance matrices of these estimates can be easily obtained for use in testing certain hypotheses, and since National Income is available only quarterly, we pursued the quarterly calculations.

4.2 Association of Expected Return and Risk

4.2.1 Strength of Individual Measures

The first question we investigate is the relationship between expected return and each of the various risk measures. The critical questions are whether the regression coefficients specified in the previous section are related to expected return and whether other types of risk measures (not suggested by the CAPM) are more important.

The expected return variable we use is suggested by equation (3.3-14). Let $\bar{g}_{jt}$ be the average of the long-term predicted (percentage) rates of growth available for company j at time t, D_{jt-1} be the dividends expected to be paid per share in the course of the next year (as estimated by the predictor which furnished data in all years), and P_{jt} be the end-of-year closing price (ex dividend where appropriate) for the shares of company j. Then the expected percentage rate of return, $\bar{\rho}_{jt}$, is calculated as

$$\bar{\rho}_{jt} = \bar{g}_{jt} + 100(D_{jt-1}/P_{jt}). \tag{4.2-1}$$

Simple regressions of this expected return measure on the various risk proxies are summarized in table 4.1. The sort of cross-sectional data we are using makes us vulnerable to heteroscedasticity, which can produce some seriously misleading results from our data if the problem is ignored. To avoid the difficulties produced by heteroscedasticity, we calculated the standard errors of the coefficients in the way advocated by White (1980) that allows for any heteroscedasticity that may be present. We report in table 4.1 the asymptotic t-values for the regression coefficients calculated in this way. Because of the adjustment for heteroscedasticity, the coefficient of determination r^2 is not a monotonic transformation of these t-values. The values of r^2 did nevertheless tend to parallel the t-values.

The first risk measure is the regression coefficient of the (excess) rate of return of each security on the (excess) rate of return to the CRSP value-weighted market index. It is denoted by $\hat{\beta}_{Mj}$ and was obtained by estimating the equation

$$\pi_{jt} - \rho_t = \beta_{Mj}(\pi_{Mt} - \rho_t) + u_{jt} \tag{4.2-2}$$

for each company j over forty quarters, that is, forty values of t. Here π_{jt} is the ex post return to company j, ρ_t is the short-term (ninety-day) Treasury Bill rate taken to represent the risk-free rate of interest, and π_{Mt} is the rate of return of the CRSP index. This β_{Mj} coefficient is, of course, the measure suggested by the CAPM if one ignores the problem that the market index must provide complete coverage of marketable securities. We then proceed to estimate the equation

$$\bar{\rho}_{jt} = a_0 + a_1\hat{\beta}_{Mj} + v_{jt}. \tag{4.2-3}$$

Table 4.1 **Risk Measures and Naive Expected Return (asymptotic *t*-values adjusted for heteroscedasticity)**

A. Using Regression Coefficients

Year	$\dot{\beta}_M$	$\dot{\beta}_Y$	$\dot{\beta}_r$	$\dot{\beta}_p$
1961	4.04	2.37	−.59	−1.13
1962	2.01	1.82	.92	−.54
1963	1.74	.96	−.33	−.59
1964	2.21	.77	−1.45	−1.08
1965	1.92	1.48	−1.52	−1.40
1966	3.99	2.48	−4.04	−4.33
1967	3.11	2.93	−4.44	−3.83
1968	3.91	1.98	−4.27	−4.02

B. Using Variance Measures

Year	s_g^2	s_g	s_e	s_r^2
1961	1.90	.99	2.89	1.68
1962	3.63	3.63	1.56	−.32
1963	2.39	2.09	.52	1.51
1964	6.47	2.42	.83	−3.14
1965	4.76	3.30	1.21	−.91
1966	2.21	2.76	1.60	
1967	2.82	3.91	1.35	
1968	8.21	6.98	2.68	

$\dot{\beta}_M$ = coefficient of the CRSP value weighted index.
$\dot{\beta}_Y$ = coefficient of the rate of change of National Income.
$\dot{\beta}_r$ = coefficient of the Treasury Bill rate.
$\dot{\beta}_p$ = coefficient of the rate of change of prices.
s_g^2 = variance of the long-term growth predictions.
s_g = standard deviations of the long-term growth predictions.
s_e = standard error of regression of return on four variables.
s_r^2 = variance of the short-term growth predictions.

This equation is estimated separately for each year t on the basis of all companies j for which we had data in that year. The resulting t-values for a_1 appear in table 4.1.

The t-values obtained from estimating equation (4.2-3) are positive and usually significant. The strength of the association is not great, however: the value of r^2 corresponding to the highest t-value is only 0.16. The weakness of these associations could arise from the particular market index and periods used. However, as noted above, the results did not vary substantially if alternative indexes were used in place of the CRSP weighted index, and seemed more apt to be weaker than stronger. They also were not substantially changed by using the coefficient obtained by regressing individual returns on the market return rather than using excess returns in each case. Moreover, the results were not very sensitive

to changing the period over which the coefficients were estimated, provided that at least some observations following the date at which the growth forecasts were made were included.

Although the regression coefficients with the CRSP index give significant results, strong t-values (and coefficients of determination) are sometimes obtained from using the regression coefficients of the securities' returns on the rate of change of National Income, indicated by $\hat{\beta}_Y$ in table 4.1, in place of $\hat{\beta}_M$ in estimating equation (4.2-3). These t-values are not, however, as strong as those for the coefficient of the CRSP index.

Our next risk measures come from estimating the regression of each security's rate of return on the rate of inflation ($\hat{\beta}_p$) and on the Treasury Bill rate ($\hat{\beta}_r$). Systematic relationships between security returns and inflation and interest rates are consistent with the wider specification of returns being associated with a variety of factors, as we argued in chapter 3. Table 4.1 indicates that these alternative risk measures do not do as well as the standard $\hat{\beta}_M$ measure during the early years. They do, however, tend to have a much stronger influence later in the 1960s when inflation rates and interest rates begin to soar. The signs of β_r and β_p can be expected to be negative if they do not also stand as proxies for other risk measures. A higher value of β_p indicates that a stock provides a better inflation hedge, which is a desirable attribute. Similarly, a positive value of β_r indicates that the stock does well when interest rates rise and hence is negatively correlated with realized returns from fixed income securities.

These results clearly indicate that the various regression coefficients are indeed related to expected return. The next question is whether other types of risk measure have still closer associations. Part B of table 4.1 summarizes the results obtained by using various variance measures for risk instead of regression coefficients.

The first of these alternative risk measures is the variance of the predictions of long-term growth, s_g^2. This quantity may possibly be interpreted as a measure of own variance and thus of specific risk. Nevertheless, the decomposition shown in equation (3.4-14) suggests that it may instead be a particularly good expectational proxy for systematic risk. For the years 1962 through 1965, when our sample was widest, s_g^2 gives stronger results than any of the regression risk measures. It also shows positive associations with expected rates of return in other years, which are clearly significant except in 1961.

Equation (3.4-14), which provides the basis for the possible interpretation of s_g^2 as representing systematic risk, also indicates that s_g^2 would be a quadratic rather than a linear combination of the factor coefficients γ_{jk}. This might suggest that the standard deviations of growth forecasts might be stronger measures of systematic risk than the variances. However, as the column of table 4.1 headed s_g shows, there was no reliable tendency for this to be the case.

If s_x^2 should represent specific risk rather than systematic risk, one might expect a better measure to be provided by the residual variances or standard errors of estimate of the regressions of the rates of return on the various systematic variables. Our findings do not, however, support this supposition. The standard errors from the regression of return on the four variables used to calculate the β coefficients produced weaker results than did s_x^2. They are shown in the column of table 4.1 headed s_e. The residual variances, that is, s_e^2, gave no stronger results.

The success of the variance of the long-term predictors makes one wonder whether the variance of the short-term growth predictions could also be used to provide a useful measure. This did not prove to be the case. The results, given in the final column of table 4.1, show mixed signs and are generally not significant. This risk measure quite clearly is weaker than the variance of the long-term predictions.

4.2.2 Use of Several Risk Measures

These results already have some interesting implications despite the simplistic approach used. There is, however, no reason to limit ourselves to only one risk measure. We now turn to the wider specification where in the first step the realized rate of return is regressed on all the suggested variables.[3] Before looking in the next section at the more structural aspects of this specification, we examine the prima facie case that all these variables are relevant to valuation, even though these inferences may turn out to be influenced by errors-in-variables difficulties.

The coefficients were obtained from the multiple regression of the rate of return of each security on the CRSP value-weighted index (M), on the rate of change of National Income (DY), on the Treasury Bill rate (r), and on the rate of inflation (DP). The equation fitted for each company is

$$\pi_{jt} = \delta_{0j} + \delta_{Mj}M_t + \delta_{Yj}DY_t + \delta_{rj}r_t + \delta_{pj}DP_t + u_{jt}. \tag{4.2-4}$$

and the estimated regression coefficient $\hat{\delta}_{ij}$ serves as risk measures. The cross-section specification for $\bar{\rho}_{jt}$ is expanded from (4.2-3) to

$$\bar{\rho}_{jt} = a_0 + a_1\hat{\delta}_{Mj} + a_2\hat{\delta}_{Yj} + a_3\hat{\delta}_{rj} + a_4\hat{\delta}_{pj}. \tag{4.2-5}$$

Estimates of this equation are given in table 4.2.

A number of findings indicated by table 4.2 are worth emphasizing. Of most importance, each type of coefficient is significant in some years. In the first part of the period only the market coefficient is significant. However, toward the end of the period other coefficients tend to be important, especially those measuring systematic relationships with inflation and interest rates. When these results are taken at face value, two

3. These are the regressions from which the standard errors of estimate referred to in table 4.1 were obtained.

Table 4.2 Regression Estimates for Extended Model for the Expected Rate of Return (asymptotic t-ratios adjusted for heteroscedasticity)

Year	Constant	$\hat{\delta}_w$	$\hat{\delta}_y$	$\hat{\delta}_r$	$\hat{\delta}_p$	R^2
1961	7.01	1.58	.23	−.02	−.03	.15
	(12.75)	(2.78)	(1.47)	(−.73)	(−.59)	
1962	7.82	1.19	.20	.02	−.02	.10
	(10.82)	(1.59)	(1.61)	(.54)	(−.29)	
1963	6.94	1.63	.05	−.03	−.01	.07
	(14.85)	(3.04)	(.44)	(−.46)	(−.12)	
1964	6.00	2.58	−.06	−.08	−.06	.12
	(10.22)	(3.80)	(−.74)	(−1.27)	(−.68)	
1965	8.31	.79	.11	−.07	−.10	.07
	(18.31)	(1.57)	(1.14)	(−1.25)	(−1.04)	
1966	9.85	.90	.17	−.09	−.19	.19
	(21.18)	(2.11)	(1.92)	(−3.25)	(−3.60)	
1967	9.82	1.26	.25	−.15	−.30	.26
	(17.46)	(2.11)	(2.55)	(−4.19)	(−3.67)	
1968	8.83	3.98	.42	−.24	−.52	.28
	(11.70)	(4.69)	(3.28)	(−4.19)	(−3.77)	

explanations for them come to mind. First, in the more stable early part of the period, estimates of the δ coefficients may be sufficiently imprecise that in the subsequent estimation of equation (4.2-5) the relatively greater errors of measurement lead to lack of significance. Second, investors may have become more concerned about the other sources of risk, such as inflation and interest-rate instability, as the decade proceeded.[4] Overall, the results suggest strongly that all influences play a role, though it is an open question whether this is because they act as proxies for other variables.

The signs of the coefficients tend to be the same across the different equations. Although with errors in variables we must be cautious in attaching much importance to the signs of particular coefficients, the patterns obtained do usually conform to the signs suggested by intuition. Positive association with either the market return or income raises the expected rate of return. Correspondingly, positive partial correlation with the rate of inflation, indicating that the stock tends to act as a hedge against inflation, lowers the expected rate of return. Finally, the coefficient for the Treasury Bill rate usually has the expected negative sign. There is, however, a good deal of correlation across securities (roughly about 0.6) between the coefficients for the Treasury Bill rate and for the rate of inflation so that one may be partly serving as an additional proxy for the other. This correlation is sufficiently low, however, that one cannot legitimately presume that variations in the rate of change of prices and in the short-term rate of interest necessarily represent the same

4. Inflation, as measured by the annual rate of change in the Consumer Price Index, remained below the 2 percent level through 1965. Later in the decade, inflation increased to the 6 percent level.

variable. Except for this fairly mild correlation, multicollinearity problems are small, making it less plausible that all the different measures serve as proxies for some single variable.

Inclusion of all these different regression coefficients does not account for the strength we found earlier for the variance of the predictions. When that variable was included in (4.2-5) along with the four $\hat{\delta}$ variables measuring various systematic risks, it usually was highly significant with a positive coefficient. The a coefficients for the four $\hat{\delta}$ variables tended to retain the same signs, though with lessened significance. The apparent importance of s_g^2 may in part result from errors-in-variables problems or misspecification. Nevertheless, it may also indicate that s_g^2 is a particularly useful expectational proxy for several of the systematic risk measures. What is important is that the values of R^2 are sufficiently high and so very highly significant that there is no question about there being some underlying systematic association among the variables included in the specification.

4.3 Structural Relations between Expected Return and Risk Coefficients

The results reported in the previous section may arise because the market actually takes a multifaceted approach to risk. In contrast, they may simply be the outcome of using poor data. To investigate this question, we proceed in two stages. First, we examine the extent to which our risk coefficients exhibit the linear structure that we indicated in section 3.4 would be found if there were fewer factors than the number of independent variables used in the regressions in which the $\hat{\delta}_j$ coefficients were calculated. Establishment of the number of factor coefficients is also needed in order to proceed to take account of the errors of estimation of the $\hat{\delta}$ coefficients. The second stage involves estimating the valuation model allowing for the presence of these errors.

4.3.1 The Number of Factor Coefficients

We showed in equation (3.4-12) that the variance-covariance matrix of the regression coefficients has a particular structure under the common-factor model for rates of return. Let $\bar{\delta}$ be the average of the $\hat{\delta}_j$ vectors, and let $\bar{\alpha}$ be the average of the α_j vectors whose elements α_{jk} are the coefficients of the common K factors in the (true) rate-of-return equation (3.2-16). Letting $\bar{h} = \sum_{j=1}^{J} h_j/J$, where h_j is the residual variance, we can rewrite equation (3.4-12) as

$$V = E\left[\sum_{j=1}^{J} (\hat{\delta}_j - \bar{\delta})(\hat{\delta}_j - \bar{\delta})'/J\right] \tag{4.3-1}$$

$$= \Xi'\left[\sum_{j=1}^{J} (\alpha_j - \bar{\alpha})(\alpha_j - \bar{\alpha})'/J\right]\Xi + \bar{h}(X'X)^{-1}.$$

Table 4.3 Significance Levels for the Hypothesis That More Than Specified Numbers of Factors Are Present in the Regression Coefficients

	Number of Factors			
Years	0	1	2	3
1959–68	.000	.816	.594	.174
1960–69	.000	.134	.266	.126
1961–70	.000	.890	.784	.303
1962–71	.000	.935	.839	.951
1963–72	.000	.767	.789	.305
1964–73	.000	.001	.059	.694
1965–74	.000	.068	.196	.992
1966–75	.000	.005	.065	.398
1967–76	.000	.006	.053	.317

Since $(X'X)$, the cross-product matrix of the variables used to estimate the coefficients, is known,[5] we can investigate the hypothesis that this common-factor structure does apply[6] to the variance-covariance matrix of the estimated coefficients calculated for the different companies. Assuming that the coefficients are normally distributed across companies, we performed likelihood-ratio tests of a variety of hypotheses. In doing so we used the value of $\bar{h}$, the average of the estimates coming from the estimates of the individual regressions, rather than jointly estimating this parameter in the factor analysis. No substantial differences in results occur when instead $\bar{h}$ is estimated from the $\hat{\delta}$ data.

The regression coefficients used for different years are far from being independent, since thirty-six of the quarterly observations are the same in regressions for adjacent years. Nevertheless, the patterns that occur over time are of interest. When we tested the hypothesis that there are less than four factors represented by the four regression coefficients, the data strongly supported the hypothesis that there are fewer factors. These tests are summarized in table 4.3 in terms of the smallest significance levels at which one could reject the (null) hypothesis of only zero, one, two, and three factors over the alternative hypothesis of at least four different factors being present.[7]

The hypothesis of only one factor is very strongly indicated in the early part of the period. However, when observations from the 1970s begin to

5. Of course, when the $\hat{\delta}$ vector being investigated does not contain the constant term, the appropriate row and column are first removed from $(X'X)^{-1}$.

6. Specifically, the procedure involves the principal components of $\Sigma_{i=1}^{J}(\hat{\delta}_i - \bar{\delta})(\hat{\delta}_i - \bar{\delta})'/J$ in the metric of $(X'X)^{-1}$. See Anderson and Rubin (1956) for a discussion of maximum likelihood estimates of the model. The fact that $\bar{h}(X'X)^{-1}$ is known makes more factors identifiable than would usually be the case.

7. Qualitatively similar results are obtained when we test three versus four factors, two versus three, etc.

play an important part. the data indicate that at least two factors are present and would reject at the 0.10 level the hypothesis of two factors in favor of three factors for some of the estimations.

The reason for the success of a one common-factor model in the early estimates was not that the correlations of different quantities, which themselves all varied significantly, could be fully attributed to a single factor. Rather, it was the case that some of the estimated coefficients varied so little across companies, relative to their errors of estimation, that both the variances across companies of their true values, δ_{jk}, and their correlations with other coefficients could be treated as zero.

This problem is illustrated by the data from the 1960s shown in table 4.4. There we present the matrices

$$\sum_{j=1}^{J} (\dot{\delta}_j - \bar{\delta})(\dot{\delta}_j - \bar{\delta})'/J$$

and

$$\left[\sum_{j=1}^{J} (\dot{\delta}_j - \bar{\delta})(\dot{\delta}_j - \bar{\delta})'/J - \bar{h}(X'X)^{-1}\right].$$

All the variances of the $\dot{\delta}_r$ and $\dot{\delta}_p$ coefficients can be attributed to estimation errors, and the hypothesis that the variance across companies in the true coefficients was zero could not be rejected. Indeed, all the variance can be so attributed for $\dot{\delta}_p$, the coefficients of inflation. Later, as interest rates and inflation rates themselves showed more variation, this ceased to be the case and all coefficients showed variation across companies significant beyond the 0.05 level. As noted earlier, while short-term interest rates and inflation may primarily reflect the same factor (as might be the case if the real rate of interest is constant), the magnitude of measurement errors in each variable must then be very substantial since collinearity problems in the data were mild and do not clearly account for the

Table 4.4 **Covariance Matrices of the Regression Coefficients Fitted for 1960–69**

	$\dot{\delta}_w$	$\dot{\delta}_y$	$\dot{\delta}_r$	$\dot{\delta}_p$
A. Unadjusted				
$\dot{\delta}_w$	.09			
$\dot{\delta}_y$	.17	4.46		
$\dot{\delta}_r$	.47	−3.78	58.9	
$\dot{\delta}_p$	−.03	1.27	−22.9	19.3
B. After Subtraction of Estimation Error				
$\dot{\delta}_w$	.05			
$\dot{\delta}_y$	.13	1.08		
$\dot{\delta}_r$	.61	1.63	5.13	
$\dot{\delta}_p$	−.25	−1.21	4.73	−4.25

difficulties. Furthermore, the results about the number of factors were repeated when we dropped the interest-rate variable from the original regressions. The 1964–73 period and later ones indicated the presence of at least two and possibly three factors. Prior to that period, the variance-covariance matrices suggest only a single factor.

Earlier investigations of the appropriateness of the common-factor model to security returns suggested that several factors would be found. King (1966) as well as Roll and Ross (1980) each found support for such a hypothesis. Hence one may suspect that our results for the early years reflect the peculiarities of the data on some of the independent variables in that period.

These tests have involved the variance-covariance matrices of the regression coefficients. This was appropriate in view of our desire to use the adjusted matrices subsequently in estimation where it is necessary to avoid using singular matrices. However, the original hypothesis applies also to the averages (across companies) of the coefficients, that is, to

$$E\left[\sum_{j=1}^{J} \hat{\delta}_j\hat{\delta}_j'/J - \bar{h}(X'X)^{-1}\right].$$

When we investigated the number of factors, recognizing that the means of the regression coefficients should have the same factor structure, we found evidence for two factors rather than only one in the early years. That is, the hypothesis of only one factor can be rejected well beyond the 0.05 level, but not that of there being only two factors. The results for the later years did not change appreciably. We can still conclude that there are certainly two, and possibly three, common factors.

4.3.2 Results Allowing for Estimation Error

The previous findings about the number of factor coefficients present in the rate of return regressions pose a dilemma for the next part of our investigation. We suspect that the reason for finding only one factor in the early years is that the other factors happened to have very little variation in the 1960s. However, if the risk was still present that they would vary, then their coefficients should still enter the valuation equation. Using a one-factor model would then involve misspecification. Testing the hypothesis that more than one factor is actually present does require that the data clearly involve more than one factor. A procedure developed in Cragg (1982) that allows for estimation errors in $\hat{\delta}$ involves the use of

$$\left[\sum_{j=1}^{J} (\hat{\delta}_j - \bar{\delta})(\hat{\delta}_j - \bar{\delta})'/J - h(X'X)^{-1}\right]^{-1}.$$

The procedure makes sense only if the matrix is clearly positive definite. When this is the case, we can allow for the estimation error to see what inferences stand up even when its effects are recognized. In doing so, we

shall use the simplification, discussed in Cragg (1982), in which the u_{jt} of equation (4.2-4) are assumed to be normally distributed.

We resolve the dilemma posed by our findings about the structure of the $\hat{\delta}_j$ coefficients by fitting two types of model, allowing in each case for the estimation errors of the regression coefficients. First, we estimate the equations for the expected rate of return using only the regression coefficient for the market and the variance of the long-term predictors; i.e., we fit the equation

$$\bar{\rho}_{jt} = a_0 + a_1\beta_{Mj} + a_2 s_{gj}^2. \tag{4.3-2}$$

Here, the β_{Mj} are based on the three years before and the seven years after the valuation. Second, we use the coefficients for the 1966–75 period, estimated without the interest-rate variable; that is, we estimate

$$\bar{\rho}_{jt} = b_0 + b_1\gamma_{Mj} + b_2\gamma_{Yj} + b_3\gamma_{pj} + b_4 s_{gj}^2, \tag{4.3-3}$$

where the γ_j are calculated from the regression

$$\pi_{jt} = \gamma_{0j} + \gamma_{Mj}\pi_M + \gamma_{Yj}DY + \gamma_{pj}DP + v_{jt} \tag{4.3-4}$$

for the period 1966–75. As we noted, there γ coefficients do support (though not strongly) the conclusion that a three-factor model is appropriate.

The first approach does little to resolve the puzzle. In the early part of the period, β_M was not significant while s_g^2 was always stronger and usually significant. For 1966 and subsequent years, when the number of predictors available on which to base s_g^2 becomes small, β_M is highly significant, and positive, as is s_g^2 in the last two years. These results suggest that s_g^2 is not simply another proxy for the systematic risk measured with considerable estimation error by β_M. Instead, it suggests that a model with two or more factors is appropriate—or that there is another relevant risk concept proxied by s_g^2.

The results of the second approach shed quite a bit more light on the matter. When adjustment was made for errors in variables and allowance was made for heteroscedasticity, it usually turned out that none of the coefficients was significantly different from zero. At best, but one would be, and then only just at the 0.05 level. This was true whether s_g^2 was included or not. Overall, however, when s_g^2 was included in the equation, the hypothesis that all γ_j parameters had zero coefficients in equation (4.3-3) could be rejected beyond the 0.01 level, except in 1963 and 1965. When s_g^2 was not included, the hypothesis could sometimes be rejected at the 0.10 level and sometimes not.

Part of the difficulty stems from multicollinearity. As lack of certainty about the number of underlying factors indicated, the "corrected" $\hat{\gamma}_j$ coefficients are correlated with each other. Moreover, there is some correlation with s_g^2, though it is small. The technique used involves much

more complicated standard errors than ordinary regression, and for a given covariance matrix of explanatory variables these standard errors are considerably larger. More coherent results were obtained when the γ_Y coefficient for National Income was eliminated from (4.3-3). A pattern then emerged in which the coefficient of inflation and the variance of the predictors were significant, but the coefficient for the market index was not. Eliminating this coefficient as well as the one for national income then produced the results shown in table 4.5.

The results shown in table 4.5 are similar in nature for the different years. The risk variable s_g^2 has a positive and usually significant effect. The notable change in its magnitude in 1966 corresponds to the change in the number of predictors from which the forecast data were collected. The sensitivity of the security's rate of return to the rate of inflation as measured by γ_p had a negative effect as we would expect.

These results suggest that at least two factors are relevant in valuation. One may be equated broadly to inflation and its associated effects. The other, possibly representing market risk, seems to be better represented by the variance of the predictions of long-term growth than by any of the regression coefficients. Its exact nature therefore remains a bit of a puzzle. The first factor has a negative sign and is usually significant at the 0.10 level. This was true even in the early years when the experienced variations in the inflation rate were very small. The second factor is very strongly positive and highly significant.

Table 4.5 Equation for Expected Rates of Return Allowing for Estimation Error in $\bar{\gamma}_t$ (asymptotic t-values adjusted for heteroscedasticity)

Year	Constant	γ_p	s_g^2	$\bar{R}^2$*	r_e†
1961	9.26	−1.13	.63	.56	—
	(12.62)	(−1.72)	(6.30)		
1962	8.40	−.46	.67	.38	.88
	(30.87)	(−1.70)	(4.96)		
1963	8.18	−.61	.72	.34	.89
	(32.30)	(−1.58)	(2.98)		
1964	8.55	−.74	.63	.54	.84
	(21.17)	(−1.92)	(18.77)		
1965	9.01	−.74	.62	.61	.90
	(24.20)	(−1.99)	(29.39)		
1966	10.72	−.20	.05	.08	.68
	(28.48)	(−.73)	(1.48)		
1967	11.35	−.53	.03	.25	.67
	(24.88)	(−1.65)	(2.05)		
1968	11.93	−.75	.05	.70	.48
	(17.74)	(−1.82)	(7.44)		

*$\bar{R}^2$ is 1 − (estimated residual variance)/(variance of ρ_{it}).

†r_e is correlation of residuals with previous year's residuals.

These results have been corrected for the errors of measurement in the regression coefficients, but errors in s_g^2 have been ignored. The interpretation we have been giving to that variable means that we cannot calculate the variance of errors in its measurement by assuming that it is simply the sampling variance of predictions which all have the same mean for each firm. We did, however, attempt to deal with this measurement error by the use of instrumental variables while continuing to allow for the estimation errors in the regression coefficients. To do so, we used as instruments the regression coefficients γ_M and γ_Y and the residual variances s_e^2, whose usefulness we explored earlier, in table 4.1.

The main difficulty with the instrumental-variable approach in this case was that the proposed instruments are not closely associated with s_g^2. The value of R^2 obtained from regressing s_g^2 on all the instruments and γ_ρ varied from 0.05 to 0.31. The main effect of this weakness on the estimates of the equations for expected return was to reduce the standard errors of the coefficients of s_g^2 sharply. These findings strengthen the impression that s_g^2 contains relevant information about risk not readily available in other forms. However, the significance levels of γ_ρ were not affected by the use of instrumental variables, and the results were qualitatively much the same as those shown in table 4.5 in terms of the signs and magnitudes of the coefficients.

4.3.3 Constancy over Time

One of the interesting questions about valuation equations is whether the coefficients remain the same each year or whether they change. There is nothing in the valuation theory to suggest that they should be constant. The opportunity sets faced by investors, extending beyond simply the financial securities available to them, probably change and so may their preferences and concerns about various types of risk. The results of tables 4.2 and 4.5 give an impression of considerable variation. We now test for variability explicitly.

The residuals from the equations shown in table 4.5 for different years are correlated even after allowance is made for the effects of estimation errors of $\hat{\gamma}_\rho$. Problems of missing observations mean that we can simultaneously calculate the equations for a common set of companies in all years only at the expense of losing a large number of companies. Pairwise comparisons indicated that the residuals for adjacent years are quite highly correlated. The correlations of these residuals are recorded in table 4.5 in the column headed r_ϵ. It gives the correlations of the residuals in one year with those of the year immediately preceding. The quantities tabulated are the correlations of residuals using a common set of companies to estimate the regression coefficients in the two years. The exact values of the coefficients used differ slightly from those shown in table 4.5 because of the reduced number of observations used in their calculation.

The correlations of residuals, which are highly significant, complicate the problem of inquiring into the stability of the regression coefficients over time. Zellner's (1962) "seemingly unrelated regression technique" can be adapted in a straightforward way to the estimation of our equations even when allowing for estimation error of the original regression coefficients as well as for heteroscedasticity. To avoid the extensive loss of observations involved when all equations are fitted simultaneously, only pairs of equations were fitted.

Pairwise estimation of the equations usually produced significant differences in the coefficients of the valuation equation for different years. The main exceptions, where rejection did not occur even at the 0.10 level, are the 1964–65 comparison and the 1962–63 one. The coefficient for 1963 did differ from that for 1964 significantly at the 0.01 level even though the values shown in table 4.5 indicate the same qualitative findings in the sense that the coefficients are of similar magnitude.

The different estimation procedure used in these tests, which involve estimating the coefficients of each of two years jointly, did not change the conclusions about risk that were derived from our regressions in section 4.3.2 for the individual years. Indeed, these estimates indicated stronger support than the ones in table 4.5 for the hypothesis that two types of risk measures are indicated by the data.

4.3.4 Average Realized Return and Risk

The constant term $\hat{\delta}_{0t}$ obtained when equation (4.2-4) was fitted to obtain the other $\hat{\delta}$ coefficient contains implicitly another estimate of the expected rate of return. It is the average rate of return realized over the period, which many empirical studies of valuation presume corresponds to the return expected *ex ante* by investors. We can use this estimate to investigate the *ex post* validity of the APT, or diversification model, which suggests that we should find the same number of factors in the $\hat{\delta}_t$ vector when $\hat{\delta}_{0t}$ is included as when it is not. This consideration induces us to repeat the investigations carried out in section 4.3.1 with the other coefficients, but now including the constant $\hat{\delta}_{0t}$ as well.[8]

The estimates for the earlier periods included in our investigation tend to confirm the model fully in the sense that exactly the same number of factors is significantly present in the covariance matrix including the constant as we found when only the regression coefficients were used. This support for the model is less than might appear to be the case, however. As was the case for some of the coefficients, significant variation across companies was not present in the average rates of return in the

8. All independent variables are measured as deviations from their averages, so the constant term is also the average quarterly rate of return in the period over which the regression coefficients are calculated.

early years. In the final two years, the wider covariance matrix indicated that at least five factors were needed to account for the covariances of the constants with the other coefficients.

With the companies altering their natures over time and with the market valuation of risk quite possibly changing substantially over the decade of the seventies, such a finding should not be surprising even if the common-factor model is a correct description of security returns. However, it does not seem feasible to use these "objective," *ex post* measures of returns to obtain comparisons with the very successful results obtained from the *ex ante* measures we have employed. These estimated average *ex post* returns are not closely correlated with the *ex ante* measures derived from using the long-term growth predictions. The strong and interesting results we have obtained with these *ex ante* measures of expected returns and the fact that the *ex post* ones are not closely related to them emphasize the importance of using genuinely *ex ante* expectations of returns for studying security valuation.

4.4 An Alternative Valuation Specification

The derivation of the valuation model in chapter 3 suggested that the expected return formulation we have been investigating is only one approximation to the underlying model and that an alternative model may also be usefully estimated. The alternative approximation produces a more traditional formulation in which the price-earnings ratio is the dependent variable and earnings (dividend) growth, the payout ratio, and our various risk measures are treated as explanatory variables. The expected return formulation is particularly convenient for focusing on the risk structure suggested by the diversification model. The alternative allows us to ask whether growth-rate expectations are more relevant for valuation than other measures. It also allows us to investigate the role of the short-term growth predictions as well as to examine again which risk measures appear to be strongest.

An empirical analysis of the price-earnings model is also desirable because of an ambiguity of interpretation of the expected return models we have been studying. The results of the return model indicate partly that predicted earnings growth is connected with the regression coefficients giving the associations of rates of return to various economic indicators. Recall, however, that we found evidence in chapter 2 that a common-factor model may fit the growth predictions of security analysts. Our findings for the expected rates of return may reflect this feature of the data, even though the expected rate of return includes the dividend yield as well as the expected growth rate. Thus it is not entirely clear that we have actually been investigating a valuation relationship.

Implementation of the alternative model involved dividing both end-

Table 4.6 Risk Measures in Stock Price Regressions (asymptotic t-values for alternative risk variables in equation (4.4-1))

Year	β_w	β_r	β_c	β_p	s_r^2
1961	−.32	1.10	1.25	.01	−.41
1962	−4.54	−.71	.59	2.58	−5.79
1963	−.33	.74	−.43	.28	−2.37
1964	−2.38	−2.76	−.88	1.65	−9.75
1965	1.43	1.32	−.70	−.43	−1.24
1966	−1.49	−.37	.14	.33	−.19
1967	1.34	.74	−2.29	−2.34	−8.67
1968	2.29	−.22	−1.41	−2.74	−1.12

of-year prices (P) and the dividends projected to be paid (D) by average normalized earnings[9] ($\overline{NE}$) to give the equation

$$P/\overline{NE} = a_0 + a_1\bar{g}_p + a_2 D/\overline{NE} + a_3 RISK. \tag{4.4-1}$$

where $RISK$ stands for the various risk variables used.

4.4.1 Risk Measures

We begin our investigation of equation (4.4-1) by treating each of the risk measures we have been using as alternatives, just as we did when considering equation (4.2-1). In these regressions, both the average expected five-year growth rate and the dividend payout ratio almost always had positive and significant coefficients throughout the sample period.

The pattern for the risk measures is more complicated than earlier. Table 4.6 corresponds to table 4.1. In these regressions, a negative sign should be expected for the risk measures based on covariance with the market index and with national income, since higher risk should, ceteris paribus, lower price-earnings multiples. Although both $\hat{\beta}$ measures have the correct negative values more often than not, the t-values indicate that they are only occasionally significant. Positive signs should be expected for the risk measures based on reported inflation and interest rates. As was found in the regressions in table 4.1, these risk measures are only significant toward the end of the period studied, but their signs are often incorrect in these valuation regressions.

These findings indicate the difficulties of using the simple regression coefficients as risk measures in a specification also containing several other variables. In contrast to these ambiguous results, the variance of

9. The "normalized" earnings were furnished by two of the forecasters and were described in chapter 1. When more than one forecaster's estimates of "normalized" earnings were available for a company, the estimates were averaged. The results are little different (but a bit poorer) if reported earnings over the most recent twelve-month period are substituted for "normalized" earnings.

Table 4.7 *P/VE* Regression Estimates of Equation (4.4-1) (asymptotic *t*-ratios adjusted for heteroscedasticity)

Year	Constant	$\bar{g}_p$	$D/\overline{VE}$	s_g^2	R^2
1961	1.88	3.91	1.22	−.57	.81
	(.64)	(7.51)	(.24)	(−.41)	
1962	3.30	2.23	8.41	−1.17	.75
	(1.75)	(16.69)	(2.91)	(−5.79)	
1963	2.85	2.70	6.71	−.59	.77
	(.94)	(11.20)	(1.75)	(−2.37)	
1964	2.53	2.15	13.16	−1.09	.77
	(1.73)	(23.94)	(6.13)	(−9.71)	
1965	1.76	2.52	4.73	−.66	.67
	(.62)	(6.98)	(1.14)	(−1.24)	
1966	.22	1.74	7.42	−.01	.57
	(.09)	(9.62)	(2.79)	(−.19)	
1967	1.88	2.35	−1.05	−.09	.69
	(.67)	(13.28)	(−.35)	(−8.67)	
1968	2.18	1.78	5.13	−.04	.52
	(.56)	(8.10)	(.99)	(−1.12)	

the predictions always has a negative sign. Its significance does vary considerably across years, primarily reflecting variation in the magnitude of its coefficient. The important point, which agrees with our previous results with the expected return measures, is that s_g^2 provided a better single risk proxy than the regression coefficients based on more objective calculations. It also provided a more significant and consistent measure than the residual variances of the regressions, s_e^2.

Table 4.7 shows the full estimates of equation (4.4-1) using s_g^2 as the risk variable. The growth-rate variable is highly significant in each of the years covered. The payout ratio has the expected sign except in one year but is usually insignificant.[10] As we have already noted, the risk variable always has the correct negative sign and is often significant.

4.4.2 Alternative Growth Measures

The extent to which using truly expectational data is important for valuation models is indicated in table 4.8. Here we show the values of R^2

10. The positive sign of the dividend coefficient should not be interpreted as evidence that dividend policy can affect the value of the shares. This coefficient indicates only that a ceteris paribus change in dividend payout will increase the price of the shares. Among the things held constant in this equation is the growth rate of earnings and dividends per share. A positive dividend coefficient thus indicates only that *given* the future growth rate in earnings and dividends, the price of a share should be higher, the higher is the current percentage of earnings that can be paid out. The famous "dividend irrelevancy" theorem of Miller and Modigliani (1961) says that an increase in dividend payout will tend to reduce the growth rate of earnings per share since new shares will now have to be sold to make up for the extra funds paid out in dividends. A positive dividend coefficient is thus in no way inconsistent with the dividend irrelevancy theorem.

Table 4.8 Values of R^2 for Alternative Specifications of the Valuation Equation

	Specification		
Year	1	2	3
1961	.42	.45	.81
1962	.50	.53	.75
1963	.49	.50	.77
1964	.37	.43	.77
1965	.29	.31	.67
1966	.31	.44	.57
1967	.32	.36	.69
1968	.33	.41	.52

NOTE. See text for specifications.

for various combinations of historical and expectational data. The first specification (column 2) involved regressing the price-earnings multiple on three historic figures: the past ten-year growth rate of cash earnings, the average (over the preceding seven years) historic dividend-payout rate, and β_M, estimated using only previous data. The third column substitutes the expectational variable s_g^2 for the β_M coefficient. The fourth column repeats the specification of equation (4.4-1) with s_g^2 as the risk variables, $\bar{g}_p$ and $D/\overline{NE}$ in place of historic growth and payout, and $P/\overline{NE}$ as the dependent variable in place of P/E. These r^2 values are the same as in table 4.7.

The dramatic change in the value of r^2 for the valuation equation occurs when $\bar{g}_p$ is used for the growth rate. Other variations have comparatively minor effects. There are, of course, a large number of ways of calculating past growth. Our findings hold up for the wide variety of historical growth rate we tried as well as the one reported in table 4.8. Using the average predicted growth rates substantially improves the fit of the regression. It is therefore safe to conclude that insofar as the market does value growth, the growth rates involved are far better represented by actual predictions made by security analysts than by any mechanically calculated rate.

One may wonder whether we would have done better to use only one forecaster rather than the average we have employed. Problems of missing observations again hinder this investigation. One of the advantages of using the average is that it allows us to include most of the companies in the regressions. However, it is also the case that closer fits tended to be obtained by using the average growth rates of all predictors than by employing the forecasts of any single firm. This suggests that our survey was useful in getting closer to what might be considered the expectations of a "representative" investor.

4.4.3 Role of Short-Term Predictions

In addition to the long-term growth estimates, which have played such an important role in our empirical valuation work thus far, we also collected short-term predictions for earnings in the next year. These were described and analyzed in chapters 1 and 2. Given the long-term growth rate, a stock should sell for a higher price if more of that growth is expected to be realized earlier in the period. Therefore we augmented our valuation equation (4.4-1) to include the term $\bar{E}_{t+1}/\overline{NE}$, the ratio of next year's average predicted earnings ($\bar{E}_{t+1}$) to average normalized earnings (for the present period). Equation (4.4-1) then becomes

$$P/\overline{NE} = a_0 + a_1 g_p + a_2 \bar{E}_{t+1}/\overline{NE} + a_3 D/\overline{NE} + a_4 s_g^2. \tag{4.4-2}$$

The results obtained with this specification are presented in table 4.9. The addition of a term for short-term growth does add some explanatory power to the regression, although the significant t-statistic for the coefficient of $\bar{E}_{t+1}/\overline{NE}$ comes partly at the expense of the long-term growth coefficient. The dividend and risk terms generally retain their usual signs, though they are often not significant.

4.4.4 Variations of Specification

The success of the short-term growth variable raises the question whether more generally a nonlinear specification might be appropriate. As we noted in section 3.4, the linear form of the equation is only an approximation to some more complicated true form. To investigate this

Table 4.9 $P/\overline{NE}$ Regression Estimates of Equation (4.4-2) (asymptotic t-values adjusted for heteroscedasticity)

Year	Constant	$\bar{g}_p$	$\bar{E}_{t+1}/\overline{NE}$	$D/\overline{NE}$	s_g^2	R^2
1961	−35.02	3.07	41.31	−1.58	−.71	.88
	(−4.16)	(11.94)	(4.78)	(−.35)	(−.75)	
1962	−3.36	1.99	8.57	6.96	−1.00	.75
	(−.82)	(14.05)	(2.15)	(1.97)	(−4.20)	
1963	−11.43	2.58	13.66	7.22	−.53	.81
	(−2.61)	(12.25)	(4.33)	(1.57)	(−2.16)	
1964	−7.21	2.13	8.56	13.19	−.84	.81
	(−2.46)	(18.67)	(3.90)	(5.41)	(−2.52)	
1965	−14.53	2.82	10.53	8.20	−1.09	.78
	(−1.89)	(7.12)	(1.73)	(1.82)	(.99)	
1966	−7.67	1.83	6.51	8.94	−.02	.58
	(−1.94)	(10.41)	(2.00)	(3.59)	(−.28)	
1967	−8.55	2.31	9.33	1.15	−.08	.72
	(−1.41)	(12.78)	(1.67)	(.33)	(−7.18)	
1968	−15.77	1.57	18.20	4.66	−.03	.55
	(2.54)	(6.74)	(3.12)	(.96)	(−.86)	

possibility, we used a quadratic specification for the growth and dividend-payout variables. That is, we added the squares of $\overline{g}_p$ and of $D/\overline{NE}$ and their cross-product to the specification (4.4-2).

Use of these nonlinear terms did little to improve the explanatory power of the equation, though in some instances they did have significant coefficients. Stability was found neither in which variables were significant nor in their signs. Since undoubtedly our variables have substantial measurement errors, these findings may well represent little more than the problems such errors produce.

It is not surprising in view of these findings that we sometimes found that breaking the sample into various groups produced significant differences between the groups. Thus, when the equation was run separately for low-dividend/high-growth and high-dividend/low-growth companies, (where the dividing lines are the medians of the variables), we did find some significant differences in coefficients. Similarly, fitting the equation for different industry groups produced some significant differences across industries in the coefficients (e.g., dividends were more highly valued in public utility companies). Since in each case the classifications tended to reduce the variances of the independent variables, the significant differences may arise simply from the changed importance of the variances of the measurement errors relative to the variances of the true underlying variables.

4.4.5 Measurement and Estimation Error

Allowing for errors of estimation in calculating the regression coefficients did not relieve the problems we encountered when we introduced the risk measures (based on regression coefficients) directly in estimating equation (4.4-1). Using either $\hat{\beta}_M$ or the $\hat{\gamma}$ coefficients defined in equation (4.3-4), whether alone or in conjunction with s_ε^2, produced neither stable nor significant coefficients for these variables when they were added to (4.4-2). It is far from clear that the reason for this finding was that such risk terms do not also play a role in valuation; in other words, we cannot conclude that a model with only one factor is appropriate. Instead, we may ascribe the findings, at least partially, to multicollinearity, particularly with the payout ratio. When these regression coefficients were added to the specification, the coefficient of $D/\overline{NE}$ usually became completely insignificant and it was highly correlated with the coefficients for $\hat{\beta}_M$ or for the $\hat{\gamma}_j$ coefficients. As we noted earlier, the growth variable $\overline{g}_p$ is also somewhat correlated with these risk proxies. In this connection, it is interesting to note that Rosenberg and Guy (1976) have suggested that both dividend payout and growth potential are important systematic risk variables.

Measurement errors are far from being confined to the risk variables. Clearly our growth variables are subject to error and the payout variable

also is only an approximation to what the market could perceive to be the payout rate. These errors may account for some of the problems we have encountered.

As was also the case when we sought instruments for s_g^2, finding good instruments for the growth rate and the payout variables was not easy. We have already seen that $\bar{g}_p$ contains useful information not available from mechanically calculated growth rates. As a result, satisfactory instruments for it are unlikely to be found. We tried using past four- and ten-year calculated growth rates as instruments for $\bar{g}_p$ and the lagged value of $D/\overline{NE}$ for the current value of this variable. When we used the specification (4.4-1), we also included $\bar{E}_{t-1}/\overline{NE}$ as an instrumental variable. We could also take advantage of some of the correlations of risk with growth and payout by treating $\hat{\gamma}_m$ and $\hat{\gamma}_Y$ as additional instruments when only $\hat{\gamma}_p$ and s_g^2 were used as risk measures.

Using instrumental variables to deal with these measurement errors did not substantially alter our findings. What we obtained were equations qualitatively similar to those shown in tables 4.7 and 4.9, but with much larger standard errors for the coefficients. This finding may be taken to indicate, at least, that errors in variables have not produced seriously misleading results in those tables. When the problems of multicollinearity of the growth and dividend variables with the risk ones were combined with the complicated variances of the coefficients that were the result of making allowance for the estimation error of the risk parameters, it is small wonder that more precise results could not be obtained about the precise specification of risk.

4.4.6 Stability over Time

We found earlier that the coefficients of the expected return model varied over time. The question of the constancy of the valuation equation is particularly interesting in the present form, where prices are the dependent variable. Stability of the coefficients is also important to those who wish to make practical use of valuation equations in connection with assigned values of the independent variables to estimate the "intrinsic worth" of a security. Furthermore, constancy of the relationship is important if a firm is to seek to follow policies that will maximize the values of its shares, since it will find it hard to please investors if their desires are changing.

An inspection of tables 4.7 and 4.9 indicates that the coefficients of our equations do change considerably from year to year, and in a manner that is consistent with the changing standards of value in vogue at the different times. We may illustrate this finding by the regression results of table 4.9. At the end of 1961, "growth stocks" were in high favor, and it is not surprising to find that the coefficient of the growth rate (3.07) is highest in this year. During 1962, however, there was a conspicuous change in the

structure of share prices that was popularly called "the revaluation of growth stocks." This revaluation is reflected in the decline of the growth-rate coefficient for 1962 to 1.99. At the same time, dividend payout became more highly valued in 1962 than it had been in 1961, the dividend coefficient rising from −1.58 to 6.96. Nineteen sixty-two was also the year when the coefficient of the risk measure was most strongly negative.

In order to test formally whether the coefficients of the valuation equation were the same over time, we again had to recognize that the residuals in different years were not independent. The correlations, which are shown in table 4.10, are somewhat smaller than those found in section 4.3 when we were investigating the expected rates of return, but they are significantly different from zero. They again raise the need to use an appropriate technique for assessing the stability of the coefficients and the problem that calculating all the equations simultaneously for a common set of companies entails the loss of a large proportion of the observations.

Using the seemingly unrelated regression technique for a pair of years, we could reject the hypothesis of equality of the coefficients in each pair of years at least at the 0.01 level. When all years were considered simultaneously, rejection occurred beyond the 0.0001 level despite the large loss of observations. Thus it seems clear that valuation relationships do change over time. While this finding may, of course, be due to problems with the data being used, it certainly lends no credence to the proposition that the parameters do not change.

4.5 Use of the Valuation Model for Security Selection

One of the most intriguing questions concerning empirical valuation models is whether they can be used to aid investors in security selection. The estimated valuation equation shows us, at a moment in time, the average way in which variables, such as growth, payout, and risk, influence market price-earnings multiples. Given the value of these vari-

Table 4.10 Correlations of Residuals in Adjacent Years and with Subsequent Returns

Year	Residuals from (4.4-1)	Residuals from (4.4-2)	Residuals of (4.4-2) with Future Returns
1961/62	.52	.62	−.20
1962/63	.56	.57	.09
1963/64	.41	.46	−.25
1964/65	.30	.39	−.06
1965/66	.37	.32	.06
1966/67	.50	.48	−.03
1967/68	.60	.64	−.10
1968/69	—	—	.20

ables applicable to any specific security, we can compute an estimated price-earnings ratio based on the empirical valuation equation. The next step is to compare the actual price-earnings multiple with that predicted by the valuation equation. If the actual multiple is greater than the predicted one, we might suppose that the security is temporarily overpriced and recommend sale. If the actual price-earnings multiple is less than the predicted multiple, we might designate the security as temporarily underpriced and recommend its purchase.

Even on a priori grounds, it is possible to think of many reasons why such a procedure would prove fruitless. For example, if high growth-rate stocks tended to be overpriced during one particular period, the estimated growth-rate coefficient would be larger (by assumption) than that which is warranted. However, the recommended procedure will not indicate that these stocks are overpriced because "normal" market-determined earnings multiples for these securities will be higher than is warranted. Nevertheless, in view of the popularity of these techniques with some practitioners, it seems worthwhile to try some experiments using our data.

The results of some of our experiments are shown in table 4.10. We measured the degree of "over-" or "underpricing" as the predicted ratio of the residual from the valuation equation (4.4-2) to the predicted earnings multiple, that is, as $(P/\overline{NE} - \hat{P}/\overline{NE})/(\hat{P}/\overline{NE})$. A percentage measure was chosen in view of the considerable variance in actual earnings multiples. If the model is useful in measuring underpricing, then underpriced securities, determined according to this criterion, ought to outperform overpriced issues over some subsequent period. We picked one year as the appropriate horizon and measured subsequent returns in the usual manner as

$$P_{t+1} = (P_{t+1} - P_t + D_{t+1})/P_t. \tag{4.5-1}$$

If the empirical valuation model is successful in selecting securities for purchase, the percentage residual (degree of overvaluation) from the valuation equation ought to be negatively related to these subsequent returns. As the fourth column of table 4.10 indicates, in only five of the eight years for which this experiment was performed was the relationship negative, and the degree of association was low. There was a positive relationship for the other three years.[11] Two of these correlations are significant at the 0.05 level: the negative one in 1963/64 and the positive one for 1968/69. The 1961/62 correlation just misses significance at this level. We would not consider these significant correlations as representing forecasting success. As we argue below, we suspect strongly that we

11. We were no more successful at finding wrongly priced securities using expectations data for the individual predictors rather than the average expectations of the particular group.

have left out some common factors and that this omission could lead to correlations over particular periods of time. Unless one can forecast these changes in a way not already available to the general market participant, one can hardly exploit these changes. It is therefore particularly indicative that one of the significant correlations had the "wrong" sign.

Supplementary tests conducted by the type of equation or industry and other groupings produced similar results. For example, subsequent returns were still unrelated to the residuals when we first split the sample into high and low growth and dividend groupings. Similar results were obtained when the experiment was attempted for separate industries. We also found that the residuals from the equations employing historical data in place of our expectational data were no more successful in predicting subsequent performance. Moreover, these results were unaltered when the subsequent returns were measured over alternative time periods such as one-quarter ahead or two or more years ahead. The technique simply did not produce excess returns in any consistent or reliable fashion over any time period in the future. These findings are what we should expect in a reasonably efficient market.

Some statistics are presented in table 4.11 that may be helpful in interpreting the reason for our predictive failures. We note, using the 1963 valuation equation as an example, that the percentage degree of under- or overpricing is not highly correlated with subsequent returns, the coefficient of determination being only 0.06. It is possible to isolate four reasons for our lack of forecasting success.

1. The first reason is that the valuation relationship changes over time. We might be unable to select truly underpriced securities because by the next year the norms of valuation have been significantly altered. Thus what was cheap on the basis of the 1963 relationship may no longer represent good value on the basis of the 1964 equation. To test how important this change might be, we performed the following experiment: We assumed that investors knew at the end of 1963 exactly what the

Table 4.11 Analysis of Lack of Forecasting Success

Year	Description	r^2*
1963	Valuation equation with 1963 predictions	.06
1964	Valuation equation with 1963 data (assumes next year's valuation relationship is known)	.10
1963	Valuation equation with realized growth rates (assumes perfect foresight regarding future long-term growth and next year's earnings)	.14
1963	Valuation equation with 1964 predictions (assumes perfect foresight regarding market expectations next year)	.27

*Percent residuals versus 1964 return.

market valuation relationship would be for the end of 1964; that is, we assumed perfect foresight regarding next year's valuation equation. Then, on the basis of the 1964 valuation equation, we used the 1963 data to calculate warranted $P/\overline{NE}$ multiples, which could then be compared with actual multiples to determine whether each security was appropriately priced. Correlating the percentage residuals with subsequent returns, we found that the coefficient of determination nearly doubled. 10 percent of the variance in subsequent returns now being explained.

2. A second reason for lack of success might be the quality of the expectations data employed. As indicated in chapter 2, the growth-rate forecasts used in the present study were not accurate predictors of realized growth. To determine how much better off we would have been with more accurate forecasts, we assumed perfect foresight regarding the future long-term growth rate of the company. Thus the 1963 empirical valuation equation was used to determine "normal" value, but in place of $\bar{g}_p$ we substituted the realized long-term growth rate through 1968. Using these realized data to determine warranted price-earnings multiples, we correlated the percentage residuals therefrom with future returns. As expected, an even greater improvement in forecasting future returns was found. The $\bar{r}^2$ rises to 0.14.

3. As a further experiment, perfect foresight was assumed not about the actual rate of growth of earnings but rather regarding what the market expectations of growth would be next year, that is, about $\bar{g}_p$ next year. Calculating the degree of overpricing as before, we find a much greater improvement in prediction of future returns. Twenty-seven percent of the variability of future returns is now explained, compared with only 6 percent in the original experiment. We conclude that if one wants to explain returns over a one-year horizon, it is far more important to know what the market will think the growth rate of earnings will be next year rather than to know the realized long-term growth rate. This observation brings us back to Keynes's celebrated newspaper contest. What matters is not one's personal criteria of beauty but what the average opinion will expect average opinion to think is beautiful at the close of the contest.

4. A final source of error is that the valuation model does not capture all the significant determinants of value for each individual company. Despite our success in accounting for approximately three-quarters of the variance in market price-earnings multiples, there are likely to be special features applicable to many individual companies that cannot be captured quantitatively. For example, it turned out that the stock of many tobacco companies always appeared to be underpriced. The reason for this is not difficult to conjecture. There is a risk of government sanctions against the tobacco industry that weighs heavily in the minds of investors, but that is not related to the risk measures we have employed. Such an explanation is not at variance with the underlying approach to risk

valuation that we have been using. The common susceptibility of the tobacco companies to an identifiable but ignored hazard is simply an important factor which we have omitted from our data.

This problem of omitted variables may account for the correlations of residuals which we found in the equations. If certain factors specific to individual companies were consistently missing, the residuals from the valuation equations could be expected to be positively correlated over time. This is exactly what we found in table 4.10. Thus, despite our success in using expectations data to estimate a valuation equation which has far more explanatory ability than those based on historic information, it is still quite clear that certain systematic valuation factors are missing from the analysis. Consequently, it cannot be said that all deviations of actual from predicted price-earnings ratios are simply manifestations of temporary over- or underpricing.

4.6 Conclusion

Our investigations of valuation models, while not without some ambiguous results, suggest several notable conclusions. These conclusions concern the role in market valuation of the sort of earnings forecasts we have collected, the nature of risk valuation, and the efficiency of the market.

4.6.1 Valuation of Expected Growth

One of our major findings is that the average of the expected long-term growth rates, together with the risk measure provided by the variance of the growth-rate predictions, gives a closer account of the valuation of common stocks than do alternatives. These growth rates were clearly superior in accounting for prices to any of the simple alternatives we considered. More closely fitting equations are the results that one would expect from smaller errors of measurement or from using data that contain more relevant information in place of less germane measures. Hence one can safely presume that our data are more similar to the expectations being valued in the market than are measures based on *ex post* realized growth or regression coefficients. This conclusion, based on the ability to "explain" prices, is buttressed by noticing that the overall risk-free expected rates of return suggested by the estimates of the expected return regressions are of plausible orders of magnitude.

The finding that prices reflect expected growth occurred in spite of the difficulties we encountered from the large variations in which companies were covered by each of the various predictors. Earlier we saw that there is a great deal of diversity of expectations among forecasters, an aspect of reality with which valuation models do not usually cope. We also found that, while hardly being strong predictions, the expectations data appear to yield forecasts at least as accurate as, and often better than, naive forecasts based on *ex post* realizations. Furthermore, we found that we

could not calculate a linear combination of different types of forecasts whose superior forecasting performance continued over time.

Efficient market hypotheses suggest that valuation should reflect the information available to investors. Insofar as analysts' forecasts are more precise than other types we should therefore expect their differences from other measures to be reflected in the market. It is therefore noteworthy that our regression results do support the hypothesis that analysts' forecasts are needed even when calculated growth rates are available. As we noted when we described the data, security analysts do not use simple mechanical methods to obtain their evaluations of companies. The growth-rate figures we obtained were distilled from careful examination of all aspects of the companies' records, evaluation of contingencies to which they might be subject, and whatever information about their prospects the analysts could glean from the companies themselves or from other sources. It is therefore notable that the results of their efforts are found to be so much more relevant to the valuation than the various simpler and more "objective" alternatives that we tried.

We saw in section 3.2.3 that diversity of expectations together with market imperfections might invalidate the valuation model. However, we also argued that there were theoretical grounds for supposing that the model would still hold for the average of investors' expectations. It is therefore of particular interest that our empirical results do support the hypothesis that prices reflect average expectations.

It is no surprise that we found roles for both short- and long-term expected rates of growth. Models of valuation using only long-term growth rates are clearly only simplifications of the more complicated processes that earnings and dividends follow over time, and we would expect market valuation to reflect the more complicated processes.

4.6.2 Risk Measures and Valuation

The results did not provide wholly unambiguous support for the specific valuation models developed here. A number of aspects of our results about risk are particularly intriguing. It is clear from our results that expected returns do seem to be related to various systematic risk factors. Equally clearly, our results do not give straightforward support to the simple form of the CAPM. It would appear that systematic risk is not entirely captured by single measures of covariance with the market index. This has important implications for those who attempt to use the modern investment technology in practical problems of portfolio selection. One such suggestion, which had attracted a considerable following in the investment community by the 1980s, was the proposal for a yield-tilted index fund.

The reasoning behind the yield-tilted index fund seems appealingly plausible. Since dividends are generally taxed more highly than capital gains and since the market equilibrium is presumably achieved on the

basis of after-tax returns, the equilibrium pretax returns for stocks that pay high dividends ought to be higher than for securities that produce lower dividends and correspondingly higher capital gains. Hence the tax-exempt investor is advised to buy a diversified portfolio of high-dividend-paying stocks. In order to avoid the assumption of any greater risk than is involved in buying the market index, the tax-exempt investor is also advised to purchase a yield-tilted index fund, that is, a very broadly diversified portfolio of high-dividend-paying stocks that mirrors the market index in the sense that it has a beta coefficient β_M precisely equal to unity.

Even on a priori grounds one might question the logic of the yield-tilted index fund. Many of the largest investors in the market are tax-exempt (such as pension and endowment funds) and others (such as corporations) actually pay a lower tax on capital gains than on dividend income.[12] Thus it is far from clear that the marginal investor in the stock market prefers to receive income through capital gains rather than through dividend payments. Our theoretical arguments in chapter 3 also indicated that great care must be taken with arguments involving "marginal" investors and pointed out that the diversification theory gives no presumption that dividends and capital gains will be valued differently. But apart from these a priori arguments, our empirical results can be interpreted as providing another argument against the yield-tilted index fund.

If the traditional beta calculation (β_M) does not provide a full description of systematic risk, the yield-tilted index fund may well fail to mirror the market index. Specifically, during periods when inflation and interest rates rise, it may well be the case that high-dividend stocks are particularly vulnerable; that is, they have high δ_p and δ_r coefficients. Public-utility common stocks are a good example. While they are known as "low-beta" stocks, they are likely to have high systematic risk with respect to interest rates and inflation. This is so not only because they are good substitutes for fixed-income securities, but also because public utilities are vulnerable to a profits squeeze during periods of rising inflation because of regulatory lags and increased borrowing costs. Hence the yield-tilted index fund with $\beta_M = 1$ may not mirror the market index when inflation accelerates.

The actual experience of yield-tilted index funds during the 1979–80 period shows that these funds did not live up to expectations and their performance was significantly worse than the market. Of course, we should not reject a model simply because of its failure over any specific short-term period. Nevertheless, we believe that an understanding of the wider aspects of systematic risk, such as those analyzed here, would have

12. For corporate investors, 85 percent of dividend income is excluded from taxable income while capital gains are taxed at normal gains rates.

helped prevent what turned out to be (at least over the short term) some serious investment errors.

Our findings on systematic risk still leave some major and intriguing perplexities. We found in both versions of the valuation model that the most important aspect of risk for valuation was that represented by the extent to which forecasters were not in agreement about the future growth of the company. Exactly what is the basis for this finding is not clear.

It might be quite reasonable to interpret s_g^2 as representing specific risk. In that case, the findings go against most recent models of valuation including both the CAPM and the APT. On the other hand, it may indirectly measure sensitivity to underlying common factors and thus serve as a very effective proxy for a variety of systematic risks. Finally, it may arise from technical difficulties having to do with undetected biases in our data. It seems unlikely that this would fully account for the strength we found for this variable, but it cannot be ruled out. Further investigation probably requires a data set less beset by problems of missing observations and an adequately specified model of earnings. Overall, our results do suggest that risk undoubtedly has dimensions not fully captured by the covariances with market indexes or other variables that have dominated recent work on valuation. They also suggest that the variance of analysts' forecasts may represent the most effective risk proxy available.

4.6.3 Efficient Markets

We find it encouraging that we were unable to use the expectations data to select securities with subsequent above- or below-average performance characteristics. We would not expect that analysts' forecasts would be sounder than those apparently used by the market or that they would be irrelevant to market valuations. Apparently, the expectations formed by Wall Street professionals get quickly and thoroughly impounded into the prices of securities. Implicitly, we have found that the evaluations of companies that analysts make are the sorts of ones on which market valuation is based. Thus, while our work raises questions about some currently popular valuation theories, it strongly supports the view that the market is reasonably efficient in incorporating into present prices whatever information there is about the future.

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American States Water Company NYSE:AWR

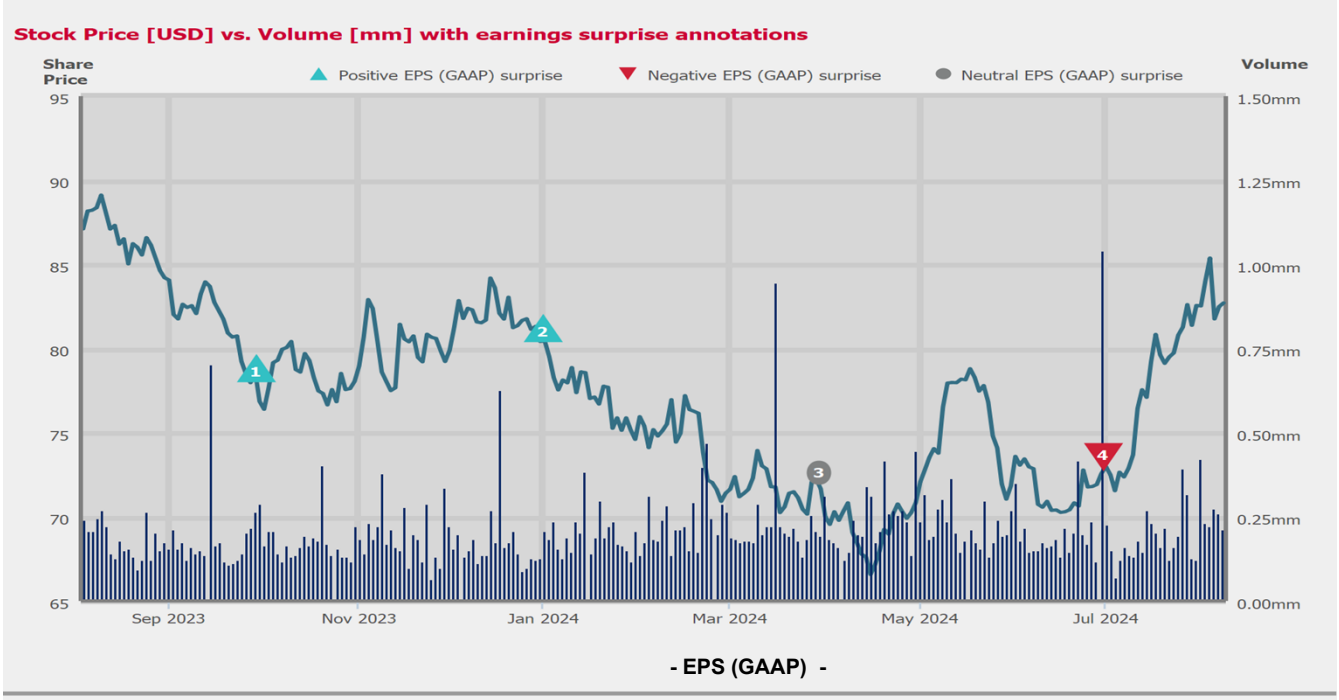
FQ2 2024 Earnings Call Transcripts

Wednesday, August 7, 2024 6:00 PM GMT

S&P Global Market Intelligence Estimates

	-FQ2 2024-			-FQ3 2024-	-FY 2024-	-FY 2025-
	CONSENSUS	ACTUAL	SURPRISE	CONSENSUS	CONSENSUS	CONSENSUS
EPS (GAAP)	0.87	0.85	(2.30 %)	0.98	3.03	NA
Revenue (mm)	138.00	155.33	12.56	161.00	588.20	NA

Currency: USD
Consensus as of Aug-08-2024 12:54 PM GMT



- EPS (GAAP) -

	CONSENSUS	ACTUAL	SURPRISE
FQ3 2023	0.83	0.85	1 2.41 %
FQ4 2023	0.52	0.55	2 5.77 %
FQ1 2024	0.62	0.62	3 0.00 %
FQ2 2024	0.87	0.85	4 (2.30 %)

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Presentation

Operator

Ladies and gentlemen, thank you for standing by. Welcome to the American States Water Company conference call discussing the company's second quarter 2024 results. The call is being recorded. If you would like to listen to a replay of this call. We'll begin this afternoon at 5:00 p.m. Eastern Time and run through Wednesday, August 14, 2024, on the company's website, www.aswater.com. The slides that the company will be referring to are also available on the website. [Operator Instructions] Today's call will be limited to 1 hour.

Presenting today from American States Water Company are Bob Sprowls, President and Chief Executive Officer; and Eva Tang, Senior Vice President of Finance and Chief Financial Officer.

As a reminder, certain matters discussed during this conference call may be forward-looking statements intended to qualify for the safe harbor from liability established by the Private Securities Litigation Reform Act of 1995. Please review a description of the company's risks and uncertainties in our most recent Form 10-K and Form 10-Q on file with the Securities and Exchange Commission.

In addition, this conference call will include a discussion of certain measures that are not prepared in accordance with generally accepted accounting principles or GAAP in the United States and constitute non-GAAP financial measures under SEC rules. These non-GAAP financial measures are derived from consolidated financial information but are not presented in our financial statements that are prepared in accordance with GAAP. For more details, please refer to the press release.

At this time, I'd like to turn the floor over to Bob Sprowls, President and Chief Executive Officer of American States Water Company.

Robert J. Sprowls
CEO, President & Director

Thank you, Jamie. Welcome, everyone, and thank you for joining us today. I'll begin with some brief comments on the quarter. Eva will then discuss some financial details, and then I'll wrap it up with updates on regulatory activity, ASUS dividends, and then we'll take your questions.

Second quarter was notably productive for the company as our largest subsidiary, Golden State Water reached a settlement in principle with the Public Advocates Office of the California Public Utilities Commission, or Cal Advocates for short, in connection with Golden State Water's general rate case that will set new water rates for the years 2025 to 2027. As a result of these efforts, on July 12, the company and Cal Advocates filed a joint motion to adopt the settlement agreement with the California Public Utilities Commission, or CPUC, proposed settlement agreement, if approved by the CPUC, resolves most of the issues related to the 2025 annual revenue requirement, leaving only 2 unresolved issues, which will be discussed later.

Among other items, the settlement authorizes Golden State Water to invest approximately $573.1 million in capital infrastructure over the 3-year capital cycle. This allows the company to continue to provide safe and reliable water utility service to our customers.

We're also very pleased at our contracted services segment commenced management of the water and wastewater systems on our 2 military bases -- on 2 new military bases in April as we successfully completed our transition at Naval Air Station Patuxent River, also known as Pax River and Joint Base Cape Cod. For the systems at Pax River, we have a 50-year firm fixed price contract with an initial estimated value at $349 million, which was increased to $378 million in July upon completion of a joint inventory adjustment.

Contract to serve Joint Base Cape Cod is for 15 years with a maximum firm fixed price value of $75 million through the issuance of annual task orders. We look forward to supporting both installations and consider it a privilege to leverage our broad utility expertise to make significant contributions to the military and their respective missions at these locations.

This was a unique quarter where recorded earnings for the second quarter were lower compared to the recorded and adjusted earnings for the second quarter of last year as the unfavorable effects of higher operating expenses, some of which is due to timing, higher interest costs, favorable nonrecurring water regulatory adjustments recorded in the second quarter of 2023 and a delay in receiving a decision in the pending electric general rate case were partially offset by an increase in third year 2024 water rates and higher earnings at ASUS. Eva will discuss the adjusted results in more detail.

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At the regulated utilities, we continue to invest in our infrastructure to strengthen our water and electric systems and remain focused on operating the water and electric businesses safely, efficiently and for the long term. We are committed to the goal of spending $170 million to $200 million on capital expenditures this year at our regulated utilities.

I'm also pleased to report that last week, our Board approved another sizable dividend increase by increasing the company's third quarter cash dividend to $0.4655 per share from $0.43 per share. The annualized dividend rate after this increase is $1.862 per share, which represents an 8.3% increase from the current annualized dividend rate of $1.72 per share.

This significant dividend increase reflects our Board's confidence in the company's ability to achieve long-term sustainable earnings growth. We believe a growing dividend allows the company to attract capital for investments in its infrastructure that enable us to provide safe and reliable service to our customers and return value to our shareholders.

American States Water has paid dividends every year since 1931, increasing the dividends received by shareholders each calendar year now for 70 consecutive years, which places it in an exclusive group of companies on the New York Stock Exchange that have achieved that result.

With that, I will turn the call over to Eva to discuss earnings and liquidity.

Eva G. Tang
Senior VP of Finance, CFO, Corporate Secretary & Treasurer

Thank you, Bob. Hello, everyone. Let me start with our second quarter results. Consolidated earnings as recorded were $0.85 per share for the second quarter as compared to $1.04 per share for the second quarter of 2023. Included in the results of last year's second quarter was $0.18 per share related to the impact of the final cost of capital decision for the water segment that made all adjustments to rate perspective.

The cost of capital decision resulted in the reversal in June of 2023, of revenues subject to refund of $9.3 million or $0.18 per share recorded during 2022 and the first quarter of 2023. Including this item, adjusted consolidated earnings for the second quarter of 2023 were $0.86 per share as compared to recorded earnings of $0.85 per share for the second quarter, a decrease of $0.01 per share. For our water utility Golden State Water reported earnings were $0.67 per share as compared to $0.91 per share for the second quarter of 2023.

Factoring in the same effect from the adjusted items for 2023, earnings for the second quarter of 2024 at Golden State Water were $0.67 per share, a decrease of $0.06 per share as compared to adjusted earnings of $0.73 per share for the second quarter of last year. The $0.06 per share decrease was largely due to favorable nonrecurring regulatory adjustments recorded during the second quarter of last year that did not recur this year. Higher operating and interest expenses and lower other income with less gains generated from investments held for retirement plan, partially offset by an increase in third year water rate in 2024.

Lastly, there was also a decrease in earnings of approximately $0.01 per share due to the dilutive effect from the issuance of equity under AWR at-the-market offering program.

Our Electric segment earnings were $0.01 per share for the quarter as compared to $0.03 per share for the same period in 2023, largely resulting from not having new rates in effect as we await the pending electric GRC that will set new rates for 2023 through 2026, while also experiencing continued increases in overall operating expenses and interest costs. When the decision is issued in the electric GRC, new rates are expected to be retracted to January 2023 and cumulative adjustments will be recorded at that time.

Earnings from ASUS increased $0.07 per share for the quarter, largely from higher management fee revenues resulting from the resolution of various economic price adjustments, timing of when construction work was performed compared to the same period last year and the commencement of operations at the 2 new bases, which Bob will discuss further.

Consolidated revenue for the second quarter decreased by $2.1 million as compared to 2023. Revenues for the Water segment decreased by $6.5 million, mainly due to the reversal of previously recorded estimated revenue subject to refund as a result of final cost of capital decision of $9.3 million recorded in the second quarter of 2023 and favorable nonrecurring regulatory adjustments of approximately $2 million, also recorded during the second quarter of last year, partially offset by an increase in water revenues largely due to third year rate increases for this year.

Electric revenues decreased slightly as we await a decision on the electric general rate case, while there was an increase in revenues from ASUS of $4.5 million, largely due to higher management fee revenues resulting from the resolution of various economic price adjustments and the commencement of operations at 2 new bases and timing differences in performing construction work.

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Turning to Slide 10 and looking at total operating expenses other than supply costs, consolidated expenses increased [$4.4] million as compared to the second quarter of 2023. The increase was largely attributable to an increase in other operating expenses, largely related to the commencement of operations at a new basis, an increase to property and other taxes due in large part to favorable property tax adjustments recorded in the second quarter of 2023 with no such adjustments this year and higher administrative and general expenses due mostly to higher outside services costs related to the pending water general rate case proceedings and other regulatory filings.

In addition, there was an increase in expenses that have corresponding and offsetting increases in surcharge revenues to recover previously incurred costs resulting in known impact to earnings. Interest expense, net of interest income, increased by $2.1 million due to increases in average interest rates and overall borrowing level during the quarter. Other income net of other expenses decreased by $200,000, largely because of lower gains recorded on investments held to fund a retirement plan in this quarter.

Slide 11 shows the EPS bridge comparing recorded and adjusted EPS for the second quarter of 2024 against adjusted EPS for 2023. Consolidated year-to-date earnings as recorded were $1.47 per share as compared to $1.97 per share for the same period of 2023. Included in the results of the first quarter of last year was $0.38 per share related to the impact of retroactive rate from the finance decision in the water GRC for the full year of 2022 and reversal of $0.13 per share for revenue subject to refund recorded in 2022 as a result of the final cost of capital decision in June last year.

Excluding these 2 items mentioned above from the year-to-date 2023 earnings recorded an adjusted consolidated earnings for the 6 months ended June 30, 2024, were $1.47 per share as compared to adjusted earnings of $1.46 per share for the same period in 2023, an increase of $0.01 per share.

Turning to liquidity on Slide 13. Net cash provided by operating activity towards $70.5 million for the first half of 2024 as compared to $17.8 million for the same period of 2023. The increase in operating cash flow was largely as a result of Golden State Water having implemented new rates in 2023 and 2024 as well as the collection of surcharge to recover retroactive revenues from 2022 through July 30, 2023. The increase in cash flow from operating activity also resulted from differences in timing of billing and cash receipts for construction work at military bases at ASUS and the timing of its vendor payment.

For investing activities, our regulated utility invested $105.1 million on company-funded capital projects during the first half of 2024, and we project company-funded capital expenditures at our regulated utilities to be $170 million to $200 million this year.

American State Water's at-the-market offering program to sell common shares remain ongoing as this program allows us at its sole discretion to sell up to $200 million over a 3-year period. During the first half of 2024, AWR raised proceeds of approximately $32 million, net of issuance costs. In June, Golden State Water issued $65 million in unsecured private placement notes with a coupon rate of 5.5% maturing in June of 2027.

American States Water currently maintain a credit rating of A stable with Standard and Poor's Global Ratings or S&P, while Golden State Water maintained A-plus stable ratings with S&P and A2 stable rating with Moody's investor service which of these ratings has been affirmed during 2024. These are some of the highest credit ratings in the U.S. investor of the water utility industry.

With that, I'll turn the call back to Bob.

Robert J. Sprowls
CEO, President & Director

Thank you, Eva. I will start with Golden State Water's settlement agreement with Cal Advocates on Golden State's general rate case. As I mentioned earlier, Golden State Water and Cal Advocates filed a joint motion in July to adopt the settlement agreement between the 2 parties in connection with the general rate case that determines water rates for the years 2025 through 2027. If approved, the settlement resolved most of the issues related to the 2025 annual revenue requirement.

The settlement authorizes Golden State Water to invest approximately $573.1 million in capital infrastructure over the 3-year capital cycle. This amount, as settled includes $17.7 million of advice letter capital investments to be filed for revenue recovery during the second and third year attrition increases when those projects are completed. In addition, the settlement agreement authorizes advice letter capital investments already under construction at the beginning of 2023 of $58.2 million to be filed for revenue recovery during the second and third year attrition increases when those projects are completed.

Excluding revenues for advice letter capital projects, adopted operating revenues less water supply cost for 2025 are projected to increase by approximately $23 million when compared to 2024. Also, there are potential additional revenue increases of

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approximately $20 million for each of the years 2026 and 2027 based on inflation factors without factoring in the revenues from those advice letter capital projects.

The 2 remaining unresolved 2025 revenue requirement issues related to the sales forecast and supply mix. In addition, there were 4 regulatory mechanisms that Golden State Water requested and are being litigated. First, a full sales and revenue decoupling mechanism and full cost balancing account for water supply. Second, the sales reconciliation mechanism. Third, a supply mix adjustment mechanism and fourth, a request to modify the existing PFAS memorandum account to track carrying costs on capital investments needed to comply with the new PFAS regulations. A decision in the water general case is scheduled to be issued by the end of 2024, with new rates to become effective January 1, 2025.

As you may know, in 2020, the CPUC issued a decision that mandated the discontinuation of existing full revenue decoupling mechanisms, also known as the water revenue adjustment mechanism and the modified cost balancing account. Modified cost balancing account allows Golden State Water to recover costs from the supply mix and rate changes from wholesale suppliers. In response to the procedures, the CPUC followed in arriving at this decision Gold State Water and 3 other investor-owned water utilities and the California Water Association, each filed a petition in 2021 with the California Supreme Court to review the CPUC's decision-making processes that resulted in discontinuing the use of the water revenue adjustment mechanism and modified cost balancing count.

Last month, the court issued a ruling that set aside the previously issued order by the CPUC and vacated portions of the CPUC's decision related to the discontinued use of both mechanisms. As mentioned, Golden State Water has continued to request the use of both mechanisms in this general rate case application, which is subject to CPUC approval.

Our electric utility subsidiary filed its general rate case application on August 30, 2022 for new rates for the period 2023 through 2026. The application includes additional capital expenditures of $68.2 million for the 4-year rate cycle and a new cost of capital. We have also requested the recovery of more than $23.5 million in capital already spent related to the wildfire mitigation plans. The new rates once approved, will be retroactive to January 1, 2023. Decision on the electric general rate case is scheduled to be issued in 2024.

Turning our attention to Slide 17, we present the growth in Golden State Water's adopted average water rate base from 2018 to 2024. Golden State Water's authorized average rate base increased from $752.2 million in 2018 to $1.3575 billion in 2024. That is a compound annual growth rate of 10.3% for the 6-year period. Golden State Water anticipates a robust and sustained growth in its rate base in the next few years.

Let's continue to ASUS. I'm pleased to announce that ASUS contributed earnings of $0.19 per share for the second quarter of 2024 as compared to $0.12 per share for the same period in 2023. The increase was largely due to higher management fee revenue resulting from the resolution of various economic price adjustments and the commencement of operations at the new bases and an increase in construction activity from timing differences of when construction work was performed in 2024 as compared to the same period of 2023, partially offset by higher overall operating expenses, excluding construction expenses and higher interest costs. For the year-to-date June 2024, ASUS' earnings were $0.32 per share as compared to $0.27 per share for the same period in 2023.

We continue to project ASUS to contribute $0.50 to $0.54 per share this year, and we remain confident that we can effectively compete for new military-based contract awards based on our proven track record of managing water and wastewater related services for military bases since 2004.

I would like to turn our attention to dividends, which I touched on earlier. Last week, we announced an 8.3% increase in the third quarter dividend. This increase is consistent with our policy to achieve a compound annual growth rate in the dividend of more than 7% over the long term. Our strong dividend history is something that the company is proud of and is a continued asset to our shareholders. This strong track record has allowed us -- has allowed us to achieve an 8.8% compound annual growth rate in our quarterly dividend rate to shareholders over the last 5 years since the third quarter of 2019.
I'd like to conclude our prepared remarks by thanking you for your interest in American States Water, and we'll now turn the call over to the operator for questions.

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Question and Answer

Operator

[Operator Instructions] And our first question today comes from Jonathan Reeder from Wells Fargo.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

I wanted to ask you like what do you believe the prospects are of the CPUC reauthorizing fully decoupled rates. Has there been any indication of how commissioners might be leaning following the California Supreme Court's decision? And do you expect that California Americans rate case will be the first indication of how the CPUC is thinking?

Robert J. Sprowls
CEO, President & Director

Yes. So we don't really know how the PUC is leaning at this point. We do have the Governor Newsom signing the bill to allow us to ask for full decoupling. We do have the Supreme Court case that came back in the utility's favor. So those are sort of 2 things on the plus side. But it's still, I think, a question mark at this point. I believe the PUC can still possibly deny the use of -- the use of full decoupling. I do think it will be instructive to hear where they come out on the Cal American case. They're a year ahead of us in that case. I can just sort of speak a little bit about our case, Jonathan, but just a comment or 2 when the public advocates office denied our request for the full WRAM in their report, they almost singularly cited to the 2020 Lira case decision.

The company -- our company has now filed a motion to strike that because Lira decision with regard to removing the WRAM has been I guess, eliminated or are push back to the PUC. So -- what we struggle with is what's in the record at this point to say that we don't deserve to get the full WRAM. But the PUC will do -- I mean, they'll follow the rules, but it's just -- we're kind of in a little bit of new territory, I would say.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Yes. No, I think the -- and not surprising, I guess, PAO's testament is obviously pretty consistent with Cal Americans citing that 2020 order that is no longer valid. So it does make it interesting. Switching to your other GRC for bare value -- or sorry, bare value. Any update on the timing of that? I know after Q1, you mentioned how it's tough to kind of even get PAO to engage in settlement discussions just given the small size and PAO being stretched in with some of the larger electrics. Any kind of updates on what's going on there?

Robert J. Sprowls
CEO, President & Director

Yes. So a decision has to be under PUC rules, a decision has to be issued in September. However, as you know, Jonathan, they do have the ability to move that date out. So I don't really know -- we aren't getting a strong feeling that there's a proposed decision in the offing. But I think the size of the company there relative to what the commission has to deal with probably works against us in terms of getting a decision more quickly than what -- we hope to get a decision by the end of the year, but I doubt if it will be in the next month or 2.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Yes. Is that kind of a similar situation with trying to engage in settlement discussions still have been able to really get PAO's attention there for similar reasons?

Robert J. Sprowls
CEO, President & Director

Yes. We struggled -- we've been working on this for quite some time. And -- we do get the sense we're clearly not on the top of their to-do list just whenever one of the bigger companies file something, it's, a, we got to do -- they've got to deal with those things. And we understand that. We understand they don't have enough people and the electrics are so much -- the 3 big electrics are so much

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bigger than Bear Valley Electric. It's all pretty logical, to be honest. And we've been very, I would say, understanding. And they're a good group to work with. It's just we understand they get pulled in a lot of different directions.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Yes. No. I mean, it's logical, but at the same time, it does impact not just your business, but then your customers and then the pancaking of rates and everything like that, when a decision is finally kind of handed to them?

Robert J. Sprowls
CEO, President & Director

That's right, Jonathan. And we make that argument with them a lot, and they understand it and they don't push back on that argument. It's just -- they can only do what they can do. I think it's probably the way to look at it.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Preaching to the choir here. So any sense of like how big of an impact like the delayed Bear Valley GRC has had on like your first half '24 EPS. I know the recovery of the wildfire mitigation costs made this case larger than it has been in the past. Obviously, it depends on like what the outcome would be. So maybe asked a different way, if the case was approved as filed, like how big of a bump would it be or would it have been to the first half '24 EPS or full year '24 EPS?

Robert J. Sprowls
CEO, President & Director

Well, another thing to throw into the mix relative to prior rate cases that just the interest costs are higher these days than they were. And so we're having to cover a significant amount of rate base that's in the ground that isn't getting a recovery of. Yes, we really are not -- we're really not gone public with how big the impact might be and just probably a little bit dangerous to do that given that the requested increase is pretty significant, and there's just sort of have to wait and see what the proposed and final decisions look like in this case, I think.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Right. I mean, Bear Valley is $0.03 lower on a year-to-date basis. And had you had the relief, I would assume you would expect Bear Valley to be large last year. So yes, just trying to get a sense when we hopefully do get an order by year-end and we get that retroactive component, how helpful that would be. I mean, it's not immaterial at this point, I don't think.

Robert J. Sprowls
CEO, President & Director

No. It's very significant. It's very significant for Bear Valley Electric, I would say. Yes.

Eva G. Tang
Senior VP of Finance, CFO, Corporate Secretary & Treasurer

We're putting a lot of wildfire mitigation plan under the -- base on the PUC regulation, and we're funding that ourselves at this point until the final decision comes about.

Robert J. Sprowls
CEO, President & Director

Yes. And think about it, there's -- well, if you're looking at the 2024 effect, of course, let's say, we could go all the way at the end of September. That's 21 months delay. So you're going to get 21 months' worth of increase that -- I mean, we think it will be an increase. I'm sure it will be an increase. It's just how large it is. And we are a bit surprised that it's taking this long, given that the way I think about it, and I haven't studied the big electrics, but I believe we were one of the last companies to come in for a rate case since the wildfire mitigation activities started in a big way.

So one would think the commission would have dealt with this for 3 or 4 or 5 companies prior to us coming forward. I think that's an advantage for us in that -- certainly, they're going to expect that, that first year increase is going to be very sizable. And we've made

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the arguments that, listen, it's potentially going to be higher for us than other companies because we've gone the longest without that increase.

But again, I'm -- commissioner will do what they're going to do, and they have -- I do have great respect for all the things they have to deal with there in -- at the commission. It's a big state with a lot of issues to regulate, and there's only 5 commissioners to deal with it.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Last question for me here then. Any insight into potential new base additions at ASUS? I mean I think the Cape Cod award, which is the 15-year variety kind of snuck up on us.

Robert J. Sprowls
CEO, President & Director

Well, yes, I can talk a little bit about that. We have a sense that the Army and the Air Force had sort of taken this strategic pause to evaluate whether this -- whether the typical utility privatization contract, the 50-year variety is something they want to continue to do. We have a sense from meetings that have been held, public meetings that they're both interested in moving forward on utility privatization. With that said, I don't think we have a belief that there will be a new privatization from either the Army or the Air Force on the street this year, but we would look to next year to see some new utility privatizations there.

As we've talked in the past, the Navy has embraced a 50-year utility privatization activities. And they are -- although it isn't going to be a bunch, they are very interested in continuing that process. At this point, I don't believe there's a single 50-year utility privatization contract on the street.

Now there is talk -- there is potentially one-off like the JBCC contract, but I don't think there'll be any -- personally, I don't think there'll be any contract awards in 2024 by any of the big 3. And of course, JBCC is International Guard. So it would be sort of a fourth arm of the Department of Defense. That's -- I don't know if that's helpful, Jonathan.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

So do the 15-year ones do those potentially come quicker than the 50 year in terms of the lead up and the way that they're kind of competitively bid and all that?

Robert J. Sprowls
CEO, President & Director

Well, I'll just say the first one did not -- we worked on that for years and years. But we were -- we felt like we were the pioneer and we and our partner developed the template for that. Now the template is out there, and it's possible these will be done more quickly. But more quickly than they had been done, not more quickly than your standard utility privatization.

One other thing, the standard utility privatization typically runs through the Defense Logistics Agency Energy. They're sort of the one group that manages the standard 50-year utility privatization. On these exchange agreements or the one we did, it's sort of based on who's doing it, and it typically doesn't roll through the DLA-E. So there's always a little bit of reinventing the wheel, I guess, that will go on. So -- but like I said, we've worked with our partner to establish the template, and it should be quicker to do the second one than the first one, to the degree, there's an appetite for that.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. And it doesn't sound like anything imminent, though.

Robert J. Sprowls
CEO, President & Director

Yes. I would say that's a good assessment.

Operator

[Operator Instructions] and ladies and gentlemen, at this time and showing no additional questions, I'd like to turn the floor back over to Bob Sprowls for any closing comments.

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Robert J. Sprowls
CEO, President & Director

Yes. Thank you, Jamie, and I just want to thank everyone for their participation today. And let you know, we look forward to speaking with you next quarter. Thank you, everyone.

Operator
And ladies and gentlemen, with that, we'll conclude today's conference call and presentation. We do thank you for joining. You may now disconnect your lines.

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American Water Works Company, Inc.

NYSE:AWK

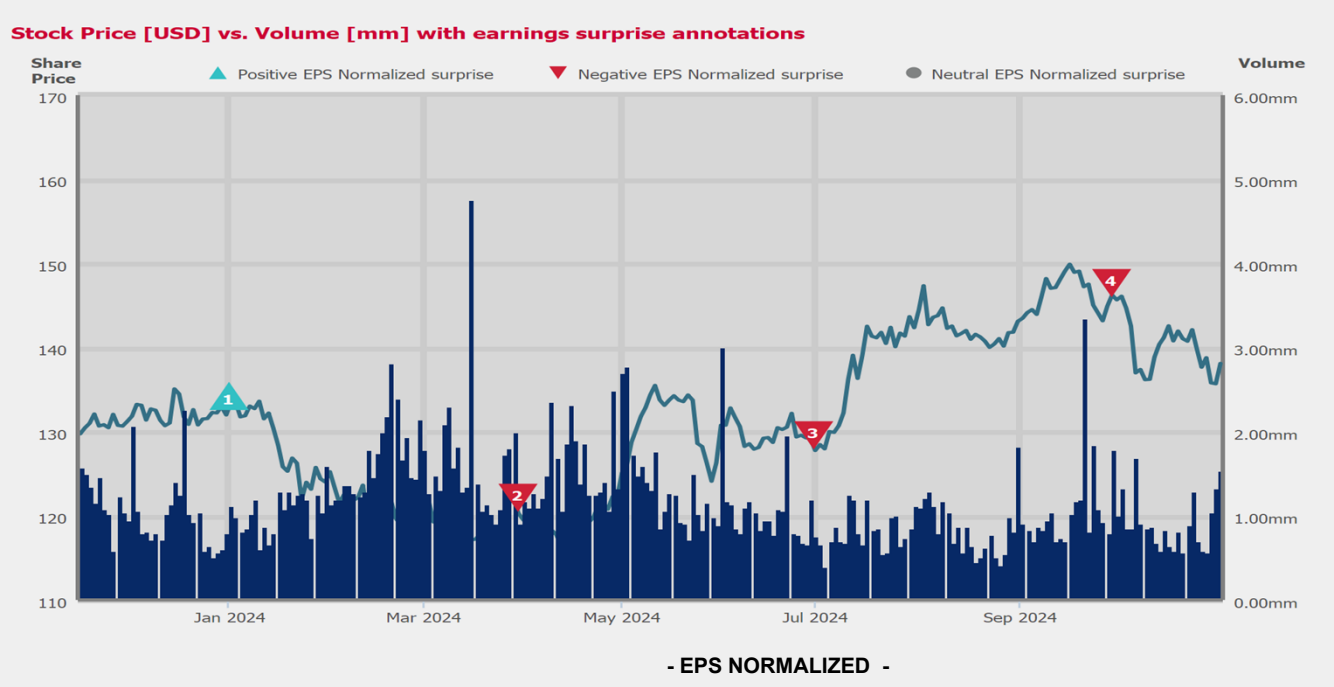
FQ3 2024 Earnings Call Transcripts

Thursday, October 31, 2024 1:00 PM GMT

S&P Global Market Intelligence Estimates

	-FQ3 2024-			-FQ4 2024-	-FY 2024-	-FY 2025-
	CONSENSUS	ACTUAL	SURPRISE	CONSENSUS	CONSENSUS	CONSENSUS
EPS Normalized	1.84	1.80	▼ (2.17 %)	1.08	5.27	NA
Revenue (mm)	1228.17	1323.00	▲ 7.72	1102.63	4557.46	NA

Currency: USD
Consensus as of Oct-31-2024 8:46 PM GMT



- EPS NORMALIZED -

	CONSENSUS	ACTUAL	SURPRISE
FQ4 2023	0.83	0.88	▲1 6.02 %
FQ1 2024	0.98	0.95	▼2 (3.06 %)
FQ2 2024	1.46	1.42	▼3 (2.74 %)
FQ3 2024	1.84	1.80	▼4 (2.17 %)

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Presentation

Operator

Good morning, and welcome to American Water's Third Quarter 2024 Earnings Conference Call. [Operator Instructions] As a reminder, this call is being recorded and is also being webcast with an accompanying slide presentation through the company's Investor Relations website. The audio webcast archive will be available for 1 year on American Water's Investor Relations website.

I would now like to introduce your host for today's call, Aaron Musgrave, Vice President of Investor Relations. Mr. Musgrave, you may begin.

Aaron Musgrave
Vice President of Investor Relations

Thank you, Cindy. Good morning, everyone, and thank you for joining us for today's call. At the end of our prepared remarks, we will open the call for your questions.

Let me first go over some safe harbor language. Today, we will be making forward-looking statements that represent our expectations regarding our future performance or other future events. These statements are predictions based on our current expectations, estimates and assumptions. However, since these statements deal with future events, they are subject to numerous known and unknown risks, uncertainties and other factors that may cause the actual results to be materially different from the results indicated or implied by such statements. Additional information regarding these risks, uncertainties and factors as well as a more detailed analysis of our financials and other important information is provided in the third quarter earnings release and in our September 30 Form 10-Q each filed yesterday with the SEC.

And finally, all statements during this presentation related to earnings and earnings per share referred to diluted earnings and diluted earnings per share. John Griffith, our President, will share highlights of the third quarter and year-to-date results and will comment on our 2025 EPS guidance and longer-term targets.

David Bowler, our Executive Vice President and CFO, will discuss our year-to-date financial results in more detail, general rate case updates, our 2025 outlook and our 5-year financing plan. Cheryl Norton, our Executive Vice President and COO, will then discuss our new capital investment plan, including the expected impact of EPA's Lead and Copper Rule Improvements, and we'll conclude with comments on customer affordability and our acquisition outlook. Susan Hardwick, our CEO, will conclude with a look at our compelling investment thesis. After our prepared remarks, we'll then close by answering your questions.

With that, I'll turn the call over to American Water's President, John Griffith.

John C. Griffith
President

Thanks, Aaron, and good morning, everyone. Let me start by saying how happy we are to have David in the role of CFO after having served as our Deputy CFO and Treasurer, you'll hear more from David shortly. And likewise, as we noted last quarter, I'm pleased to hand the business development baton to Cheryl, whose oversight of our state presidents in her role as Chief Operating Officer, is key to our business development activities as we continue to drive enhanced focus on origination activities at the state level.

Let's turn to Slide 5, and I'll start by covering some highlights from the third quarter and year-to-date periods. As we announced yesterday, we delivered strong financial results in the third quarter, in line with our expectations adding to an already strong 2024. Earnings were $1.80 per share for the quarter compared to $1.66 for the same period last year. In the first 9 months of 2024, earnings were $4.17 per share compared to $4.03 for the same period last year.

Our results reflect the clear execution of our plan in 2024, which David and Cheryl will discuss further. These results give us confidence to affirm our 2024 EPS guidance of $5.25 to $5.30 per share, which as you'll recall from last quarter, represents our narrowing of guidance to the top half of the previous guidance range. As a reminder, our 2024 and 2025, EPS guidance ranges include $0.10 per share of incremental interest income from the amendment of the HOS note earlier this year, which is on top of the interest income from the original note terms that we are replacing with earnings from the regulated business.

As we said in the past, repayment of the note is a component of our long-term financing plan as a source of funding for our growth. I also want to highlight that just a few days ago we closed the $230 million acquisition of the wastewater system assets of Butler

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Area Sewer Authority in Pennsylvania. Our Pennsylvania team, assisted by the corporate business development team worked hard to complete this deal, which adds 15,000 customers who we are pleased to begin serving.

Turning to Slide 6. We are initiating our 2025 earnings guidance of $5.65 to $5.75 per share. This represents 8% EPS growth in 2025 compared to our weather-normalized 2024 EPS guidance, which David will discuss in further detail. As we roll out our updated 5-year plan today, we are affirming our long-term targets, including 7% to 9% EPS and dividend compounded annual growth rates as the regulated water and wastewater utility rate base growth regulatory and capital execution and operational excellence are the key drivers of growth for our company.

We expect to achieve 8% to 9% rate base growth over the next decade, driven by the accelerated CapEx plan we put forth 3 years ago to meet reliability, resiliency and compliance needs. Our rate base growth includes our regulated acquisition strategy, which drives a growing customer base as well as the organic revenue growth opportunities we expect from our Military Services Group. Along with our affordability and sustainability leadership, we believe these are the drivers of American Water's very competitive and sustainable shareholder return. In today's closing remarks, Susan will share her thoughts on our position as a premium regulated utility.

In closing, on Slide 7, I want to emphasize that we expect to achieve consistent EPS growth within the 7% to 9% range through 2029 and beyond. We are demonstrating in 2024 and with our guidance for 2025 that the business plan we set forth following the sale of HOS is strong and compelling. Our commitment to solving problems for our customers remains steadfast, including addressing PFOS, Lead and Copper and aging infrastructure, among other challenges. No other water and wastewater utility has the combination of the scale, geographic diversity and expertise that we have. This foundation, coupled with the capital investment needs in our industry uniquely positions American Water to achieve consistently strong earnings growth for many years to come.

One final note before I turn it over to David. As you know, earlier this month, we notified stakeholders of unauthorized activity within our computer networks and systems, which we determined to be the result of a cybersecurity incident. Importantly, none of the company's water or wastewater facilities were impacted by this incident. While the investigation of the incident by a dedicated team of professionals is ongoing, we do not expect that this incident will have a material effect on the company or its financial condition or results of operations.

With that, I'll hand it over to David to cover our financial results and plans in further detail. David?

David M. Bowler
Executive VP & CFO

Thanks, John, and good morning, everyone. Before I get started with results, let me first say how excited I am to assume the role of CFO at American Water and continued my work with this great team. I also look forward to meeting many of you at EEI in a couple of weeks.

Turning to Slide 9, let me provide a few more details on year-to-date results. Consolidated earnings were $4.17 per share, up $0.14 per share compared to the same period in 2023 and up $0.18 per share on a weather on a normalized basis. As noted, earnings in 2024 were higher by an estimated $0.07 per share as a result of weather in the second and third quarters as compared to $0.11 per share of favorable weather in the second and third quarters of 2023. Excluding the impacts of weather, revenues increased by $0.84 per share, driven primarily by general rate case outcomes in 2023 and thus far in 2024.

In net operating cost, O&M was higher by $0.19 per share, driven primarily by employee-related costs and other increases to support growth in the business as we expected. Reduction costs related to fuel, power and chemicals, were also slightly higher compared to this period in 2023. Next, general taxes, which are comprised of property and gross receipt taxes were higher by $0.06 per share with the increase in property tax tied to the level of capital investment and higher gross receipts tax driven by higher revenue, primarily in New Jersey.

Depreciation increased $0.21 per share and long-term financing costs increased $0.28 per share as both as expected in support of our investment growth. The higher long-term financing costs includes interest on the $1 billion convertible note issuance from last June, the $1.4 billion senior note issuance in this February as well as $0.07 of dilution from last year's equity issuance. And finally, we had $0.07 per share of additional interest income from the February 2024 amendment of the seller note related to the sale of Homeowner Services.

As we've stated, we will continue to break this out quarterly, so investors can track the ongoing growth of American Water from its core regulated strategy without this additional interest income. I will also note in the appendix, you will find details on the third quarter EPS, which has many of the same drivers as the year-to-date results.

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On Slide 10, I will review the latest regulatory activity in our states. First, on completed cases. We received an order from the New Jersey commission in September, approving without modification, our settlement agreement of an additional $80 million in annualized revenues that was effective September 15. The commission again approved an allowed return on equity of 9.6% and an equity letter of 55%. New Jersey continues to be a constructive state that is supportive of investment to serve our customers well.

Turning to active cases. You can see we have general rate cases and progress in 7 jurisdictions. These cases are centered around the capital investments we have made and will continue to make in these states. In Missouri, we originally filed a rate case with a proposal for a full future test year, which a commission declined to accept at this time. However, the commission provided an allowance for discrete adjustments that recognized investments through May 2025. While not the ruling we wanted in this case, we are encouraged by the conversations we have with the commission and are continuing to work on a legislative path for a future test year in Missouri. Otherwise, our pace in Missouri is progressing as expected.

In Illinois, we received a proposed decision from the administrative law judge on October 24, recommending a 9.84% return on equity and a 49% equity layer. The final order in this case is expected no later than December 17 with new rates implemented January 1, 2025.

In Virginia, on September 20, we filed a black box settlement with the Virginia Commission, which agreed to a $15 million annualized increase in revenues compared to our ask of $20 million. The settlement stipulation also specified a return on equity of 9.7%, which matches the current allowed return and a capital structure with an equity component of 45.67% and compares to the current approved cap structure of 40.73%. The settlement remains subject to emission review and approval.

In California, we expect the final rate case decision on December 5 with new rates retroactive to January 1, 2024. As a reminder, we reached a partial settlement agreement in November 2023 with the CPUC's Public Advocates Office that would address our revenue requirement request but did not address rate design or certain other matters, including our quest for continuation of a revenue stabilization mechanism. Decoupling is a critical tool for conservation efforts in California as it supports reliability and protection of water supply, which will help shape the future economic and environmental health of the communities we serve there. Once we receive the order later this year, we will determine whether we need to proceed further recourse in the state related to decoupling.

On Slide 11, we provide some considerations regarding our outlook for 2025 results and our newly established EPS guidance range of $5.65 to $5.75 per share. First, as you would expect, our growth will be driven by the returns on the capital invested to serve our customers. Cheryl will walk you through how our capital investment has grown and the specifics of the plan included in this update. As we talked about previously, 2024 is year 3 of our accelerated capital plan following the 2021 HOS sale. So we see that ramp up partially reflected in earnings in 2025 in both from base rate cases and infrastructure mechanisms. Recent regulated acquisitions that are being incorporated into active or just completed rate cases will also drive growth next year.

Also critical to our growth strategy is our ability to prudently manage the operating cost that takes to serve our customers. While we continue to have a strong culture of operating efficiencies and cost management, we do expect O&M increases in 2025 from higher production costs including purchased water, fuel and power, annual wage increases as well as additional costs to serve our customers from recent acquisitions.

Focus on operating cost efficiencies goes to the heart of the customer affordability construct we want to protect, which is closely aligned with the interest of regulators and ultimately, investors in managing affordability of customer bills. The increases in general taxes, depreciation and long-term financing are driven by the continued capital investments in the system.

And while not called out on this slide, I'd like to note that our Military Services Group still adds incrementally to our earnings growth expectation as shown in our growth outlook. MSG's great work on 18 military installations, it serves has built trust and resulted in the U.S. government allocating additional funds for improvement projects driving increased revenues.

Turning to Slide 12. I will provide -- a look at our balance sheet and liquidity profile before closing with a 5-year financing plan update. Our total debt-to-capital ratio as of September 30, net of the $127 million of cash on hand remains at 56%, which is well within our target of less than 60%. Expected dividend payout ratio for 2024 at 58% is also within our target range of 55% to 60%.

I want to affirm that investors can expect our company to continue to be focused on these targets over the long term. With our continued focus on maintaining the strong balance sheet, we also remain confident that we will have access to capital for the foreseeable future. In fact, we just extended the maturity of our revolving credit facility, which has a capacity of $2.75 billion by 1 year to October 2029.

Our diversified banking relationships with some of the largest and strongest banks in the world, coupled with our fully regulated business model and strong credit ratings gives us great confidence in our -- around our liquidity. In addition, our laddered approach

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to long-term debt financing over the years has been very important in environments like the current one in managing cash flows and minimizing interest rate risk, which contributes to managing customer affordability. And our short duration between general rate cases driven by our investment allows us to minimize the lag we may experience related to recovery of financing costs.

From this position of balance sheet strength, let's turn to Slide 13 for a review of our 5-year financing plan that will fund the increased capital plan. In our prior 5-year plan covering 2024 to 2028, we expected a total of $1 billion of equity financing in the middle of that plan. That amount and timing remains unchanged. Our updated financing plan now covering 2025 to 2029 includes an estimated total of $2.5 billion of external equity issuances with the additional $1.5 billion expected near the end of the plan and all, of course, subject to market conditions.

The level and timing of anticipated external equity is tied very simply to our need to fund growth and maintain our strong financial position. Investors should expect equity financing to occur routinely as determined by our investment program, rate case cycle and is appropriate to maintain our strong balance sheet and credit me metrics. Since we're already in alignment with our targets for debt to cap and dividend payout, we have the flexibility to adjust these plans and respond to market conditions when they change for the benefit of customers and investors alike.

Finally, I'll wrap up noting that our current financing plan for calendar year 2025 includes $1.5 billion to $2 billion of long-term debt financing and no equity financing.

With that I'll turn it over to Cheryl to talk more about our 5-year capital plan, our recent acquisition activity and outlook and affordability. Cheryl?

Cheryl D. Norton
Executive VP & COO

Thanks, David, and good morning, everyone. On Slide 15, I'll start with a discussion of our current long-term capital plan. For 2025, we expect our investment spending level to be $3.3 billion. From 2025 to 2029, we expect to invest $17 billion to $18 billion, an increase of about $1 billion over our previous 5-year plan. This level of spending reflects the result of our consistent risk-based project planning.

Along with risks, customer affordability is a key variable in our analysis, which I'll speak more about shortly. The increase in the current plan compared to last year is a combination of increased spending to meet compliance requirements for EPA's Lead and Copper Rule Improvements or LCRI, and rolling the plan forward a year. As you are aware, in October, the EPA issued the final LCRI which sets a deadline near the end of 2037 for lead replacement by water utility providers for assets under their control, among other stipulations.

American Water consistently meets water quality standards related to Lead and Copper Rules across our footprint, and we are supportive of new or revised water quality standards, such as LCRI. Removing the risk of lead service lines over time is absolutely the right thing to do for the health and safety of our customers. We are now expecting to spend about $1 billion over the next 5 years related to LCRI or about twice the rate of our recent annual spending, and we are still planning to invest approximately $1 billion in capital to comply with EPA's PFAS rule.

In total, looking out over the next decade, we expect to invest about $40 billion to $42 billion in our regulated systems and acquisitions, which is $5 billion higher than the previous 10-year plan. One of our key initiatives with this higher level of investment is the expansion of our infrastructure renewal and replacement programs.

I want to finish this slide by acknowledging that our teams have done a great job executing our accelerated capital investment plans for these last few years. We have consistently met our capital deployment goal each year, and we're on pace to do it again by spending $3.3 billion this year, which includes acquisition investments. These investments are crucial to continuing to deliver safe and clean water and ensure continued reliability of service to our customers.

On Slide 16, I want to emphasize the timely capital recovery, which for us covers about 75% of our capital investments. It's foundational to promoting consistently excellent customer service and affordability. Investing in needed infrastructure on a continuous basis drives consistency of reliability of our services and of water quality. It also enables us to mitigate the size of general rate increases for our customers, which helps promote affordable monthly bills. And by reducing regulatory lag, timely capital recovery allows us to more closely earn our allowed returns and better deliver consistent earnings growth.

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The pie chart on the right side of the page shows the breakdown of our capital spend by purpose over the next decade. While the vast majority of our capital is dedicated to basic replacement of aging pipes, we are also focused on fortifying our systems through resilient spending and preparing our systems for environmental compliance through investments in water quality.

For example, we've recently invested $9 million in Sheridan in Indiana to help solve the community sewer overflow issues that have restricted the community from growing due to EPA noncompliance. And at Hopewell, Virginia, we constructed a 2.5 million gallon storage tanks to support proper water storage capacity. We have dozens of stories just like this that demonstrate the vital need for the capital investments we're making. And as we approach the 50th anniversary of the Safe Drinking Water Act later this year, we know there is still much work to be done in our country and our expertise in helping communities solve their drinking water issues will be needed for decades to come.

Turning to Slide 17. You can see that we expect these capital investments in infrastructure and in acquisitions will grow regulated rate base at a long-term rate of 8% to 9%. Rate base growth, of course, will drive earnings growth. We believe the higher degree of visibility to our capital investment plan, combined with the low risk nature of the plan, uniquely positioned American Water in the utility sector and is fundamental to our investment thesis.

Turning to Slide 18, where I'll cover customer affordability. We remain very focused on balancing customer affordability and the magnitude of the necessary investments in our plans. As I mentioned, customer affordability is a key variable in our annual capital planning analysis. We once again believe that the average residential water bill across our footprint as a percentage of median household income will continue to be below 1% throughout our 5-year plan.

Another recent example of the affordability programs we offer is in Pennsylvania. Pennsylvania American Water expanded its H2O Help to Others discount program to customers with an income of up to 200% of the federal poverty level, up from [150%] of that level. This change will expand discounted service to an additional 55,000 Pennsylvania American Water customers. We also expanded the H2O Help to Others grant program for customers up to 250% of the federal poverty level from 200%.

Of note, as part of its acquisition of BASA, Pennsylvania American Water already committed to increase shareholder contribution to the H2O Help to Others grant program by $3.5 million over 5 years, which will assist more customers through this important affordability program.

Turning to our discussion of growth through acquisitions. Let me first say that I'm excited to lead our growing business development teams at the state and corporate level. On Slide 19, you'll see that we have successfully closed on 6 systems totaling $349 million through October 30, which added almost 50,000 new customers so far this year. Included in the total, as John mentioned earlier, is the big news in Pennsylvania from just a few days ago that we closed on the Butler Area Sewer Authority wastewater system acquisition for $230 million. We remain very confident in our Pennsylvania acquisition pipeline and our ability to grow there.

Looking ahead, we also continue to be well positioned for strong growth through acquisitions across many states with 43,400 customer connections, totaling $169 million under agreement as of yesterday. Two quick highlights there. We have received commission approval of the acquisition of the Silver Creek Indiana water system and expect to close on it very soon. And in Maryland, we received commission approval in our first fair market value acquisition in the state, and we look forward to serving the former sovereign water company customers.

As we've mentioned over the last 18 to 24 months, we have invested more resources and added personnel to our business development teams and are starting to see that investment bear fruit with increased opportunities across our footprint. This expanded team along with the more focused process for deal origination is driving a larger pipeline of potential acquisitions, now over 1.5 million connections compared to the previous pipeline of 1.3 million customers.

With that, I'll turn it over to Susan for some closing thoughts. Susan?

M. Susan Hardwick
CEO & Director

Thanks, Cheryl, and I'm happy to be batting cleanup for us here today. You've heard from John, David and Cheryl, a recap of our long-term strategy, and it should sound very consistent. Beyond our words, though, we have a proven track record of execution on our plans, including achieving our EPS guidance year after year. I fully expect 2025 to be another successful year, demonstrating consistent execution of our plans.

Slide 21 is a compilation of the unique competitive advantages that we have at American Water that make us stand out as a premium utility. I've been on all sides of the regulated utility industry in the U.S. throughout my 40-year career, gas, electric and now water and

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wastewater. I know very well that there are some other great companies in the utility industry, one that can cite 3, 4 or maybe more of these qualities on their own resume.

But what makes American Water unique from all of the others, though, in my opinion, is the collection of all of these attributes in a single investment opportunity. Let me be specific and call out just a few of these key attributes. American Water without any disputes is a top-tier performer on earnings and dividend growth. We have a geographic and resulting regulatory diversity that is rivaled by few. That diversity reduces risk, period. And speaking of risk, our capital plan is low risk on a number of measures like decades of need and basic infrastructure renewal at the core of our plan.

Our investment appeal based on our company's mission, values and these distinguishing fundamentals is compelling. Our mission is to provide safe, clean, reliable and affordable services to the customers we are privileged to serve and to those that we hope to serve in the future that today are in need of the services we deliver. We can fulfill this mission and provide a fair return to our investors.

Look, American Water has been doing this work since 1886. That's nearly 140 years. But there's much left to be done. Some may question and some do still today, the sense of urgency that we exhibit as we execute this investment plan. The sense of urgency is driven by the tremendous need, simply put. We will continue to do this work and deliver the superior returns our investors expect. It is a privilege to lead the 6,500 member team that is committed to and focused on delivering solutions to our customers and you, our investors, make it possible for this important work to continue.
And with that, I'll turn it back to our operator to begin Q&A and take any questions you may have.

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Question and Answer

Operator

[Operator Instructions] The first question comes from Richard Sunderland of JPMorgan.

Richard Wallace Sunderland
JPMorgan Chase & Co, Research Division

So we've been getting a lot of questions on the financing plan. And hoping you can walk through the $1.5 billion equity increase versus the $1 billion CapEx increase. Are there any timing factors to the financing play in driving equity higher than the incremental CapEx like maybe capturing some of the years 6 to 10 equity in this current 5-year plan?

M. Susan Hardwick
CEO & Director

Yes, it's a good question, Rich. And obviously, we've seen a lot of commentary on that overnight and this morning as you all have been digesting the new plan here. I think it's as simple as a continued growing investment plan, as you've noted, and our continued focus on the strong balance sheet. We take very seriously the strength in the balance sheet and the metrics associated with that, and we've been very transparent on what those are. And we'll continue to finance the plan, the growing plan to maintain those expectations.

I think it's pretty simple to think about it in those terms. The timing, I think, is maybe what's tripping people up a bit, but I think you just need to think about the size of our plan, long-term nature of our plan, the outlook that we provided from a long-term perspective here and our continued focus on that balance sheet. It's all just directly tied to those key objectives we have. And David, John, anything to add from your perspective here?

David M. Bowler
Executive VP & CFO

No, I think you've really covered it, Susan.

John C. Griffith
President

Yes. Maybe I'll just add one comment, Rich, which is, if we think about the $1 billion increase in our 5-year plan investment plan, keep in mind that even if we increased -- we didn't -- if we did not increase the 5-year plan at all, right, we would still intend to raise equity in the latter part of the new plan period. We are growing the company 8% to 9% rate base growth. We generate a lot of internal cash flow. We raised debt, but we'll always be raising equity periodically to fund what we consider to be a robust capital plan.

So I'd say the $1 billion increase in the 5-year plan incrementally increased the amount of equity that we will be raising, but we'll always be in the business of periodically raising equity.

Richard Wallace Sunderland
JPMorgan Chase & Co, Research Division

No, got it. That's very clear. And maybe I'll pick up on that last point and just unpack that a little bit more. I think if you look at last year's update and then this year's update on the kind of full balance of sources. The cash flow guidance uptick last year was larger than the uptick this year, maybe $2 billion versus $1 billion.

I'm curious if you could just unpack a little bit more of what's going on there in terms of your assumptions and expectations embedded in that? Are there any factors we should think about the roll forward last year versus the roll forward this year purely on the cash flow guidance?

David M. Bowler
Executive VP & CFO

Rich, I think one factor that we have incorporated in here would be related to the alternative minimum tax as a driver, where we fully expect to be a cash tax payer starting in 2025.

John C. Griffith

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President

Yes. And Rich, I would just add to that -- yes. As you recall, Rich, when we first accelerated our CapEx plan back in 2021 what we found is that we are investing even more capital than that accelerated plan. And so that the enhanced capital investment that we're seeing is generating additional internal cash flow.

Operator

The next question comes from Durgesh Chopra of Evercore ISI.

Durgesh Chopra
Evercore ISI Institutional Equities, Research Division

David, congrats and look forward -- Susan, nice job batting -- the closing remarks there. And David, congrats and look forward to working with you. So just -- yes. Yes, absolutely. So maybe just give your perspective on the strategy in Pennsylvania, as you kind of roll this plan forward, how are you thinking about CapEx in the state versus previous assumptions? And then the rate case filing strategy in light of the [indiscernible] just any color you can offer there would be great.

M. Susan Hardwick
CEO & Director

Yes, Rich, probably not a lot to add from our discussion last quarter. As we've continued to emphasize our capital planning process is really risk-based. We're really looking at where the need is the greatest, and we'll allocate capital first according to that need. And then to the extent there are opportunities to continue to enhance service in those areas. Other areas, we'll look at those opportunities. I think that process has continued, and I think you'll continue to see us make significant investment in Pennsylvania. So no change there.

And I'd also say, again, we talked about this last quarter as it relates to our rate case outcome there, while the ROE might have been lower than we had hoped for, we certainly have that built in this plan. And you can see us continue to emphasize strong growth rates year-over-year. Our 2025 expected growth at 8% all fully reflected in our plan. So we're moving forward.

Durgesh Chopra
Evercore ISI Institutional Equities, Research Division

That's helpful, Susan. And then, David, maybe I could just quickly follow up. You talked about the AMT and being a full cash tax paying 2025. Could you help us with what the dollar amount of cash payments are you expecting in 2025 and going forward?

David M. Bowler
Executive VP & CFO

Yes. I think you can think about in the range of $100 million, plus or minus, a year and the cash taxes paid as part of AMT.

Operator

[Operator Instructions] Our next question comes from Angie Storozynski of Seaport.

Agnieszka Anna Storozynski
Seaport Research Partners

So just one somewhat of a random question. So I'm just wondering, if you guys are making any plans or any changes on how you procure electricity, I mean I'm looking at the states where you operate, it seems like you will be exposed to quite an inflation in the cost of electricity. And so are you trying to maybe lock in some of those prices ahead of time? And are you concerned about, for example, the affordability argument when the electric electricity prices were to go meaningfully up?

M. Susan Hardwick
CEO & Director

Angie, yes, good question. And we might have touched on this a little bit. I think, last quarter. But certainly, it's a major focus for us. Electricity costs are a big cost associated with the work that we do. And to that end, we have multiple long-term contracts already in place, I think some as far out as 2029. So we have this risk, I'd say, fairly well mitigated through our current contracting strategy.

Agnieszka Anna Storozynski
Seaport Research Partners

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Okay. Changing topics. So you've obviously extended your growth rate. I think we're all looking at your earnings power beyond '26, right, when you lose the benefit of interest income I mean, what shows up that the $0.10? Is it that you sort of step up the level of spending? Is it that you're hopeful for additional municipal M&A. I'm just wondering, again, how you [couldn't] bridge the gap?

M. Susan Hardwick
CEO & Director

Yes, Angie, we certainly have addressed this, I think, a couple of times. I'll ask John to sort of reiterate what our view is here.

John C. Griffith
President

Thanks for the question, Angie. If you recall back in 2021 when we put the note into place, we accelerated our capital plan at that point in time, increasing the 5-year plan by a couple of billion dollars at that point. And in the context of another question earlier, what we found is we've not only achieved that, I would say, but more. And so when you -- and we're always injecting equity into our operating companies to generate incremental regulated earnings. And that's really what's driving our ability to replace the interest income from the note.

If you think about the interest income from the note, a lot of people look at it on an incremental basis and say, okay, gee, there's effectively $0.20 of earnings going away, and that's from the $720 million note at 7% interest that we built into our 7% to 9% guidance forecast back in 2021. What people need to remember is we are bringing in $795 million, which is the original $720 million plus, the earnout payment that was rolled into the note. And if you think about that $795 million as that's avoiding incremental capital issuance, whether it's equity or debt.

So if you -- if you assume that we're avoiding long-term debt with that $795 million pick a long-term interest rate, 5.5%, whatever you want to make up is a long-term debt interest rate. That result -- that offsets that $0.20, not all of it but it gets you, call it, $0.17 or so. And we're really only filling kind of a $0.03 hole there, nothing -- and so people kind of can't forget about the right side of the page, that yes, the interest income is going away. But we do have capital that we're avoiding incremental debt with.

I would also note, Angie, that it's good for people to keep in mind that the final maturity date on the note is December 2026. But the borrower can call the note as of December 2025. And so it -- we'll see when the note gets taken out. But that's something just -- we could see it earlier than December 2026.

Agnieszka Anna Storozynski
Seaport Research Partners

Okay. And then lastly, on the frequency of rate cases. So again, we're trying to sort of understand what happened with the last rate case in Pennsylvania. And obviously, some of it would see the frequency of the rate key filings. I'm just wondering one could argue that you're filling rate cases more often, not just in Pennsylvania, but in other states because you really have to hit your allowed ROEs, the realized ROE has to be close -- as close as possible to be allowed.

So I mean how do you see it in your plan? I mean, are you assuming that in every jurisdiction, you basically hit that allowed ROE, and that's what drives the earnings growth? What if there is some slippage in those rate cases or the negative outcome of some of them?

M. Susan Hardwick
CEO & Director

Yes. Angie, on the rate case strategy, and I think we've been trying to make this point for a couple of years now. What really drives our rate case cycling is the need and the investment. We just continue to believe there is such tremendous need to do the work that we're doing that we've accelerated our capital investment program accordingly. And the more investment we make, the greater the growth in the rate base and the need for timely recovery.

Now we have mechanisms and other approaches that get essentially 75% of that investment recovered what we would call sort of more timely through periodic adjustments. But we still have the remaining investment that is subject to traditional regulatory process and the need to get timely recovery of that investment along with the size of the investment is what drives that cycling.

So we don't build a rate case cycle just to hit a rate of return. We build it because that's how we're investing, and that's what the regulatory process calls for. So that's really what's behind the strategy. It's the need.

Operator

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This concludes our question and answer session, and American Water's third quarter 2024 earnings conference call. Thank you for attending today's presentation. You may now disconnect.

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Market Intelligence

California Water Service Group NYSE:CWT

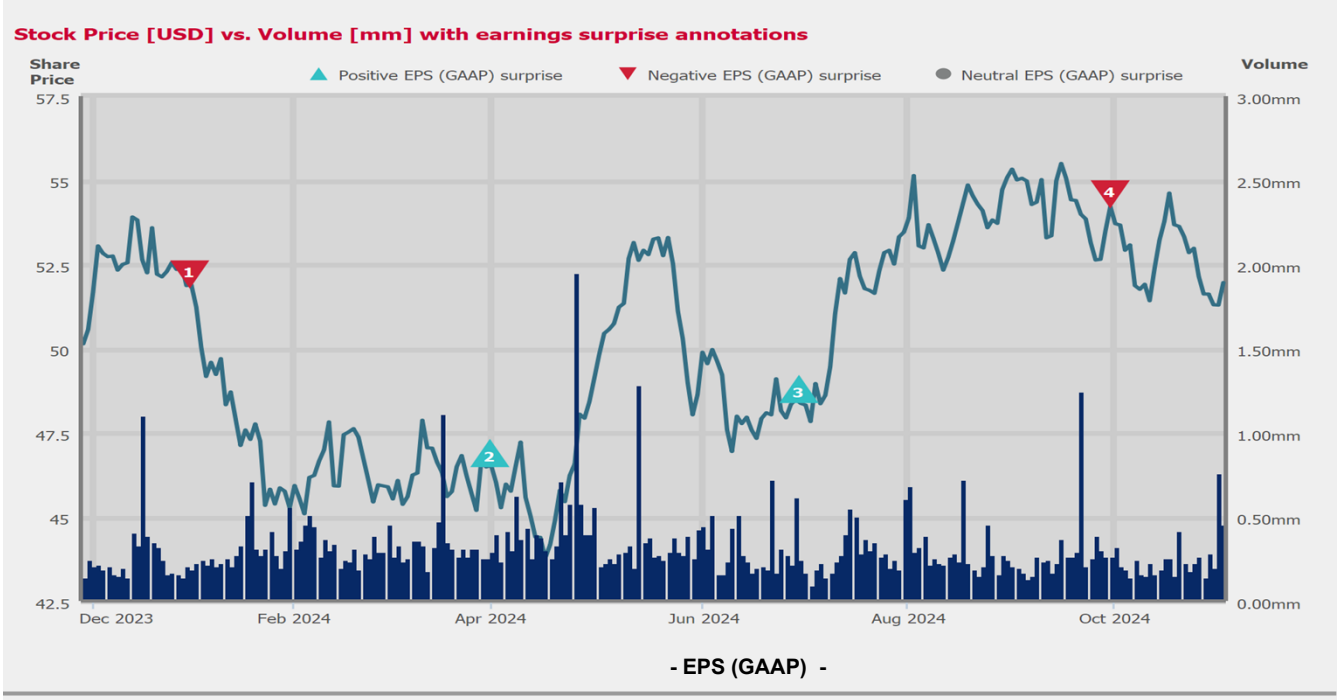
FQ3 2024 Earnings Call Transcripts

Thursday, October 31, 2024 3:00 PM GMT

S&P Global Market Intelligence Estimates

	-FQ3 2024-			-FQ4 2024-	-FY 2024-	-FY 2025-
	CONSENSUS	ACTUAL	SURPRISE	CONSENSUS	CONSENSUS	CONSENSUS
EPS (GAAP)	1.05	1.03	(1.90 %)	0.36	2.99	NA
Revenue (mm)	289.55	299.56	3.46	230.90	1021.00	NA

Currency: USD
Consensus as of Oct-29-2024 6:30 AM GMT



- EPS (GAAP) -

	CONSENSUS	ACTUAL	SURPRISE
FQ4 2023	1.53	0.52	(66.01 %)
FQ1 2024	0.50	1.21	142.00 %
FQ2 2024	0.42	0.70	66.67 %
FQ3 2024	1.05	1.03	(1.90 %)

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Presentation

Operator

Thank you for standing by. My name is Kathleen, and I will be your conference operator today. At this time, I would like to welcome everyone to the California Water Service Group Third Quarter 2024 Earnings Call. [Operator Instructions] Now I would like to turn the call over to Jim Lynch, Senior Vice President and Chief Financial Officer. Please go ahead, sir.

James Patrick Lynch
Senior VP, CFO & Treasurer

Thank you, Kathleen. Welcome, everyone, to our third quarter 2024 results call for California Water Service Group. With me today is Marty Kropelnicki, our Chairman and CEO; and Greg Milleman, Vice President of Rates and Regulatory Affairs.

Replay dial-in information for this call can be found in our quarterly results earnings release, which was issued earlier today. A replay will be available until December 30, 2024. As a reminder, before we begin, the company has a slide deck to accompany today's earnings call. The slide deck was furnished with an 8-K and is also available at the company's website at www.calwatergroup.com.

Before looking at third quarter 2024 results, I'd like to take a few moments to address forward-looking statements. During the course of the call, the company may make certain forward-looking statements. Because these statements deal with future events, they are subject to various risks and uncertainties, and actual results could differ materially from the company's current expectations.

As a result, the company strongly advises all current shareholders as well as interested parties to carefully read and understand the company's disclosures on risks and uncertainties found in our Form 10-K, Form 10-Qs, press releases and other reports filed from time to time with the Securities and Exchange Commission.

And now I'll turn the call over to Marty.

Martin A. Kropelnicki
Chairman, President & CEO

Thanks, Jim. Good morning, everyone, and happy Halloween. We're happy you can join us here today. I'm very pleased to share with you our results for the third quarter of 2024. There's really 5 main topics that we want to cover today.

The first one being our strong third quarter financial performance that continues to benefit from the regulatory release in the State of California. We want to give an update on the 2024 general rate case, where during the quarter, we had our initial pre-conference hearing and we've been assigned an administrative law judge and a commissioner to oversee our case.

We received approval of certain advice letters from the California Public Utilities Commission that's going to allow us to collect $94.2 million in certain regulatory balances through 2027. We want to talk about the record amount of capital that we've invested this year and what that looks like going into year-end. And then lastly, take a moment to talk about our continued environmental leadership and corporate recognition and talk about a few awards that we won during the quarter.

But to start things off, let's do like we typically do and have Jim Lynch take you through some of the financial analysis that highlights the quarterly results. Jim, back to you.

James Patrick Lynch
Senior VP, CFO & Treasurer

So as Marty mentioned, our Q3 2024 financial results continue to benefit from new rates and the rate structure authorized in our 2021 California GRC.

As a result, our operating revenue for the quarter increased 17.5% to $299.6 million compared to our prior year Q3 operating revenue of $255 million. Net income for the quarter was $60.7 million or $1.03 per diluted share compared to $34.4 million or $0.60 per diluted share in Q3 of 2023. The $44.6 million increase in Q3 2024 revenue was driven primarily by a $42.2 million increase in rates billed to customers as authorized in our regulatory filings and an increase in customer usage, including usage by new customers of $9.6 million. These increases were offset by a $9.4 million reduction in our Monterrey Water Rate Adjustment Mechanism, or our MWRAM.

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Recall that the MWRAM is a rate adjustment mechanism that includes a tiered rate structure tied to usage. In periods of warm dry weather when usage increases, the MWRAM typically decreases. The balance typically increases in cooler wet weather when usage declines.

Q3 2024 operating expenses were $232.8 million compared to Q3 2023 operating expenses of $211.5 million. The $21 million increase was primarily driven by $2.7 million in higher water production costs due to an increase in wholesale rates and higher customer usage, a $3.2 million increase in depreciation and amortization due to new assets placed in service and $11.5 million in higher income taxes related to higher pretax earnings.

In addition, net other income increased $3.8 million during the third quarter primarily due to an increase in unrealized gains on nonqualified benefit plan investments of $5 million.

The impact of the Q3 2024 activity on diluted earnings per share is presented on Slide 6. The more significant growth drivers were rate and usage increases of $0.56 and $0.13 per diluted share, respectively. In addition, gains on nonqualified benefit plan investments contributed $0.09 per diluted share. These drivers were partially offset by the change in MWRAM balance of $0.12 per diluted share and increases in water production expenses and depreciation and amortization expenses of $0.04 per diluted share, respectively.

Year-to-date 2024 results benefited from the same regulatory mechanisms as the quarterly results. Year-to-date operating revenue increased $234.5 million to $814.6 million in 2024 compared to $580 million year-to-date in 2023. Year-to-date 2024 net income was $171.1 million or $2.93 diluted share compared to year-to-date net income in 2023 of $21 million or $0.38 per diluted share.

The growth in revenue was primarily driven by cumulative rate increases, including 2024 IRMA of $95 million, 2023 interim rate relief from the 2021 GRC of $87.5 million and the recognition of deferred WRAM revenue of $15.6 million.

In addition, the change in our 2024 MWRAM balance added $12.4 million and increased usage contributed $8.8 million. Year-to-date, 2024 operating expenses were $621.8 million compared to year-to-date 2023 operating expenses of $538.2 million. The $83.6 million increase was primarily driven by an increase in water production cost of $15.4 million due to increases in wholesale water rates and higher usage.

Water production costs increased an additional $3.3 million due to the incremental cost balancing account or ICBA, that was authorized in the 2021 GRC. We also recognized $13.1 million in deferred costs associated with the recognition of deferred WRAM revenue and higher depreciation and amortization expense of $9.3 million.

Also, year-to-date income tax increased $41.1 million, primarily due to higher pretax earnings. The impact of year-to-date 2024 activity on diluted earnings per share is presented on Slide 8. The more significant earnings drivers include cumulative rate increases in 2023 interim rate relief and recognized deferred WRAM revenue of $1.29, $1.19 and $0.21 diluted earnings per share, respectively.

The change in our 2024 MWRAM balance and increased usage added another $0.17 and $0.12 diluted earnings per share, respectively. These increases were partially offset by higher water production expenses and the recognition of RAM related deferred water expenses of $0.25 and $0.18 diluted earnings per share, respectively and higher depreciation and amortization of $0.13 diluted earnings per share.

As a reminder, our 2021 GRC was adopted in Q1 2024 and included 2023 interim rate relief, totaling $64 million. $15.2 million of the interim rate relief was attributed to Q3 2023 and $50.4 million would have been attributable to the 2023 9-month period year-to-date.

Turning to our capital. We continue to make significant investments in our water infrastructure to help ensure the delivery of safe and reliable water service. Company capital investments during the 9-month period ended September 30, 2024, totaled $332.2 million which is 86% of our $385 million 2024 capital budget.

As a reminder, our planned 2024 capital investments and our estimated capital investments for the period from 2025 through 2027, do not include $226 million of estimated PFOS projects that will be constructed over multiple years beginning in the fourth quarter of 2024. Greg will discuss planned 2025 and 2027 increases applied for in the 2024 GRC and infrastructure improvement plan later on in the call.

The positive impact of our capital investment program is having on regulated rate base is presented on Slide #10. Our overall rate base is projected to grow to $2.36 billion by the end of 2024. This is an increase of 7.3% over 2023. If approved, as requested, the 2024 California GRC and infrastructure improvement plan, coupled with planned capital investments in our utilities and other states would result in a compounded annual rate base growth of 11.7%.

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Moving to Slide 11. We continue to maintain a strong balance sheet with a capital structure of 61% equity and 39% debt. During the quarter, the CPUC issued a final decision granting Cal Water Authority to issue up to $1.3 billion in new debt and equity securities to finance water system infrastructure investments from 2023 to 2027.

We raised approximately $34.5 million during the quarter from the sale of 639,000 shares of common stock under our at-the-market or our ATM stock equity program. Year-to-date, we've raised approximately $86.5 million from the sales of [1.6 million -- 390,000] shares under the ATM program. We have approximately $43.1 million remaining under the program that can be raised for general corporate purposes in the future, including planned capital investments and strategic opportunities.

On the debt side, Cal Water completed the sale and issuance of $125 million of first mortgage bonds, the bonds in a private placement that closed October 22, 2024. The bonds bear interest at a rate of 5.22% and mature on October 22, 2054. Cal Water is the bond proceeds to refinance certain existing borrowings on its short-term bank line of credit.

And just to note, yesterday, our Board of Directors declared a $0.28 per share dividend for stockholders of record on November 11, 2024. I believe that's November 12, 2024. This is our 319th consecutive quarterly dividend.

Moving to Slide 12. We continue to maintain a strong liquidity position. As of September 30, 2024, the company had cash and cash equivalents of $105.2 million of which $45.6 million was classified as restricted. Further, we had additional short-term borrowing capacity on our company and Cal Water lines of credit of $340 million.

With that, I'll turn the call over to Greg to give an update on our 2024 general rate case and other regulatory matters. Greg?

Greg A. Milleman
Vice President of Rates & Regulatory Affairs

Thanks, Jim. On Slide 13, we discuss the 2024 General Rate Case. I'm pleased to report that we continue to make progress with our 2024 General Rate Case filing. We've completed the initial prehearing conference and a judge and Commissioner have been assigned to our case. The assigned commissioner to the case is Commissioner Baker. We are pleased with this assignment given his past work at the California public advocates to educate CPUC on a negative customer impacts associated with rate case delays.

As Jim mentioned earlier, we're proposing to invest $1.6 billion in our districts from 2025 to 2027, including approximately $1.3 billion of newly proposed capital investments to continue providing reliable, high-quality water service. This application includes our innovative low-use water equity program designed to decouple revenue from water sales while keeping rates affordable and reinforcing conservation goals.

Our proposal includes rate increases to generate an additional $140.6 million for 2026, $74.2 million for 2027 and $83.6 million for 2028. We are now 4 months into the standard 18-month review process with the PUC and are actively responding to data requests. We've completed all our district tours and are preparing for public participation hearings later in the year.

With that, I'll return the call back to Marty.

Martin A. Kropelnicki
Chairman, President & CEO

Greg, just out of curiosity, the volume of data requests kind of consistent with past rate cases.

Greg A. Milleman
Vice President of Rates & Regulatory Affairs

Yes, consistent with past rate cases.

Martin A. Kropelnicki
Chairman, President & CEO

Moving ahead, I'm on Slide 14. I want to take a moment to talk about our cost of capital for 2025. As many of you know, we have in California, what's called a cost of capital adjustment mechanism. Cost of capital adjustment mechanism basically tracks the utilities AA -- utilities bond index from October 1 to September 30, the following year. In the event there's a 100 basis point change or greater the company can make -- apply for an adjustment to its ROE, both up and down.

So I'm very happy to report that the period ended September 30, it was less than 100 basis point change and therefore, it locks in our ROE for 2025 at 10.27%, which we think is a very good ROE.

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Moving on to the next slide. Other regulatory mechanisms. There's a few things that happened in the quarter that I think are important. As I mentioned in my opening comments, we filed a number of advice letters for recovery that have been approved by the CPUC here in California. There's 3 primary filings that I want to emphasize. One is the IRMA, which is the incremental rates memo account, the 2023 MWRAM balance and the 2023 Incremental Cost Balance Account. The combination of those 3 things total approximately $94.2 million that we will be collecting over the next 3 years. For 2024, we expect to collect about $11.6 million from these balances as we move into the new year.

Going on to Slide #16, I want to take a moment to talk about our environmental leadership and corporate recognition. First of all, I continue to be very proud of the recognition we received for our environmental stewardship and workplace excellence. The Alliance for Water Efficiency recently posted a study that highlighted the important impact of our conservation programs, which have reduced customer bills by approximately 21% over the last 15 years compared to projections with customers that did not have the same type of conservation program. So we're very happy with the results of the survey and what we've helped our customers has achieved over the last 15 years.

In addition, the U.S. Environmental Protection Agency awarded California Water Service the WaterSense Excellence Award for the second consecutive year. This recognizes the promotion of our water-efficient products that we have in our conservation programs. The products that we've implemented to date will save an additional 395 million gallons over the life of the devices useful life for our customers.

Additionally, during the quarter, we were named one of the World’s Most Trustworthy Companies by Newsweek for its second consecutive year. This places us among only 5 water utilities that are recognized and honored in the energy and utility category. And then lastly, for the ninth consecutive year, we were recognized as a great place to work, reflecting our ongoing commitment to creating an exceptional workplace environment and supporting our employees.

I think as many of you have probably heard me say that, yes, we are a company of fixed assets, pipes and pumps, but our most important assets are our employees, because they're the ones that make it all happen and they're the ones that interface with our customers.

Lastly, I want to take a moment to mention our 8-K that we filed during the quarter that announced the retirement of Ron Webb, who is our Vice President and Chief Human Resource Officer. Ron will be retiring on April 1, 2025. Ron has done an excellent job as our Head of HR and has been an outstanding HR colleague and friend who has made countless contributions here at Cal Water.

I want to take a moment to personally thank Ron and wish him all the best as him and his wife, Tina, prepare for retirement, and he will be dearly, dearly missed. I think as everyone can appreciate, as the CEO, one of your closest confidence is your HR executive. And Ron, it's been just a fantastic 10 years working with you, and I'm going to miss working with you and wish you all the best in retirement.

Having said that, we have started a national search for Ron's replacement, and I hope to be in a position to announce his replacement by year-end or early 2025.

So where does that take us for the quarter? Very happy with the results for the quarter. Results were in line with our expectations. They are a little bit confusing. I think Jim did a good job laying out all the moving parts and how they fit together, given the delayed 2021 general rate case.

Moving forward, it's really simple. The strategy is focused on getting the capital on the ground as in the press release. And as Jim mentioned, we've invested a record amount of capital this year. So we're going in the fourth quarter very strong and doing investments in our infrastructure improvement plan. We want to stay focused on customer service and servicing our customers and then also on the 2024 General Rate Case.

As Greg said, so far, things are moving and tracking the plan. We want to make sure we do everything we can to make sure that we conclude that rate case by the end of 2025 with new rates in effect 1/1/26.

So there's a lot going on. The other thing I'd just point out is, as Jim said, on the rate base growth side. We've historically been about the depreciation rate, investment rate, and that's bumping up in this next cycle or 2. And it's given that the growth of the internal capital needs of the existing infrastructure plus the incremental $226 million. That's not reflected in that 11.7% CAGR number on rate base growth that will be incremental.

So overall, we have a lot of stuff happening within the company, and it's really -- the strategy really straight forward. We're going to stick to what we do, which is getting the capital on the ground and serving the customers. And I guess one thing I'd wrap up before we

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open the comments. It's just fire season this year. Surprisingly, for our service areas have been -- has been relatively light. We had 3 major fires this year that were close to our service areas, none of which did damage to our service areas, at the Thomson Fire, the Park Fire and the Boreal fire.

So nothing major that affected our service territory. I'm very happy to report that we are getting the first snowfall this week in the Sierra, which is a good sign that winter's off to a start will help bring down the last few weeks of fire season that we have here, which typically goes on until the end of November.
So with that, Kathleen, we will open it up for questions, please.

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Question and Answer

Operator

[Operator Instructions] your first question comes from the line of Jonathan Reeder of Wells Fargo.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

I wanted to start out just to get your view on the CPUC's recent decision to hold the PD and CalAm's rate case? I know the PDs language was pretty strongly against restoring pool decoupling. But do you think there are enough commissioners that are supportive of decoupling? Or might we just see some of the rationale language in that section revised?

Greg A. Milleman
Vice President of Rates & Regulatory Affairs

Jonathan, this is Greg. And the kind of feeling of the industry right now is -- it was a strong sign that the PD was held almost a little over a month, maybe 2 months to the December meeting. But there is not a consensus on exactly what that could mean. That could potentially mean that we are tightening up the language around disallowing it or going the other way and putting in the language that would allow it. It's just too soon to tell.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. Fair enough. I can't tell either.

Martin A. Kropelnicki
Chairman, President & CEO

Jonathan, one thing I would add to that, and I haven't read the full decoupling application for any of our peer companies in California. But I do know in our application, we were keenly focused on 2 things that I think are important. And I think this may be a strategy differential for us.

One, we were very focused on conservation as we originally were when we originally decoupled back in the early 2012, I guess [indiscernible] that was number one. The other thing we focused on in our new rate design in our application was kind of underserved communities and having a rate design that helps low-income customers with kind of a lifeline rate that first year.

So in our application, it wasn't just about conservation. It was also about low-income communities and making sure there's like a lifeline rate there that reduces customers on the lower term of the economic -- or the lower range of the economic spectrum. And we think that's going to be really, really important.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Yes. No. And that's where, I think, if it is even just softening the language in that BD, it kind of then opens the door to right -- some of these reimagined ways of, I guess, designing the decoupling where it really focuses on some of the goals you just mentioned, Marty.

Martin A. Kropelnicki
Chairman, President & CEO

Right, right. And I think what's important about this community piece for the people on the lower economic scale is -- that's a stated goal of the commission. It's -- they've made that very public. They're very interested in it. And I give the team here a lot of credit, we took that to heart in the design of our decoupling mechanism that we filed for in our rate case.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. Great. I look forward to that -- to see how that plays out. Also, I know the CPUC recently issued a decision lowering the energy utilities allowed ROEs by 42 basis points in 2025 by effectively reducing the magnitude of the 2024 cost of capital mechanism increase. Is there any avenue for the CPUC to do something similar for the waters for 2025?

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Martin A. Kropelnicki
Chairman, President & CEO

I'll go first, Greg, and you can add a comment. I mean, I think that's always a possibility. Our ROEs have historically lagged the energy industries. So we're not coming off real high ROEs. In fact, I think our ROE at $10.27 is about where it was when I joined the company back in 2006, and then it went down for a number of years and recently went back up above 10% just recently.

So I think that's a possibility. I think there's a number of factors going on in the electric industry. It's a little different than water. One, as you see, we have a growing appetite to get capital in the ground and we have to kind of step it up, getting that capital on the ground just to keep up with our current demands that we have in the existing rate case, which is great for stockholders. That means we're growing rate base and potentially future earnings for customers.

I think the other thing, though, on the electric side is in California, you have a lot of wildfire costs that are being recovered in electrical rates, which have put multiple layers of rate increases on customers and I think there may be some pressure on the commission and just political pressure overall in California, given some of the incremental increases that were outside the general rate case that were added to electric bills.

And so I don't think we know until we get there. But I think for us, we will most likely have to file a cost of capital application in 2025. It would be great if we can defer it again, but that -- I think that might be hard to do and we'll do our best to defend the company's position on its ROE. Greg, anything you want to add on that?

Greg A. Milleman
Vice President of Rates & Regulatory Affairs

The only thing else I would add is the -- unlike the water companies, the energies have an option to file an application to change their cost of capital in between their scheduled time. And they did that, I believe, in 2022 if there's an emergency, which was COVID. And so I think that might also be to why there's different treatment on the cost of capital between the 2 of us, energies as well and water.

Martin A. Kropelnicki
Chairman, President & CEO

Right. So obviously, Jonathan, this will be a hot topic for '25, and we'll provide updates on our cost of capital as we go through the process with the commission in 2025.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Yes. I think the takeaway, at least in the near term, is that for 2025, we have the 10.27% in terms of -- as Marty mentioned, in terms of the recalculation this year at September 30, we didn't trigger any kind of movement from what we are currently experiencing in our ROE now.

Martin A. Kropelnicki
Chairman, President & CEO

And I think we haven't had any pushback from the commission about the 10.27%. Have we Greg?

Greg A. Milleman
Vice President of Rates & Regulatory Affairs

No, we made a filing to demonstrate just what Jim said and haven't heard back from them.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. So good. So it sounds like -- or the 10.27% is safe for 2025 and then, yes, we'll just see if there's -- I mean, I guess, would you be open to an extension that maybe include some sort of adjustment to the ROE maybe in exchange, you get some sort of multiyear certainty extension in whatever that new ROE would be?

Martin A. Kropelnicki
Chairman, President & CEO

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It's hard to speculate on something like that on the future. I will say, I have been a big supporter of the cost of capital adjustment mechanism because it does float up and down, and it's a 2-way mechanism. And again, our ROEs have lagged the electric industry, and we have a growing need to increase our capital investment.

So I think -- obviously, we'd love to settle anything if we can because it's just a cleaner process that we can do it. But it's really hard to speculate because we don't have any facts and circumstances around it. And obviously, what we want to do is what's right for Cal Water, which is make sure we have an ROE that's appropriate enough that allows us to attract capital to allow us to continue our rate base growth.

So I think we'll have a lot more certainty on it as we get into it, but it's really hard to speculate not being in a dialogue with the commission about it.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Sure. And then last on kind of the cost of capital. Slide 11 kind of indicates your authorized California capital structures, 60.8% equity. How does that reconcile with the 53.4% approved under the last cost of capital [indiscernible]?

Martin A. Kropelnicki
Chairman, President & CEO

Yes. That's our actual cap structure as of right now. So Jim, you can talk a little bit about that?

James Patrick Lynch
Senior VP, CFO & Treasurer

Yes. And again, Jonathan, that's at group, right? So if you -- we are working to kind of manage that structure to mirror as close as possible, our authorized amounts in other -- our operating utilities. I mentioned on the call, subsequent to the quarter end, we did a first mortgage bond in which we raised $125 million in debt financing. So we're starting to balance the debt and the equity.

And really, it's -- to get it more in line with what our authorized amount is at the operating utilities to get that more in line with what we've got at group. And we'll kind of work through the capital structure at group to take the most optimal path to get that closer in line, but the first step was this $125 million that we issued subsequent to quarter end.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. Great. I appreciate that clarity. And then last question for me. What are the potential impacts on the CapEx budget from the EPA's recently finalized lead and copper rule? Is that a major issue for your California service area?

Martin A. Kropelnicki
Chairman, President & CEO

It's really not. I mean, frankly, one of the nice things about being out on the West Coast is our infrastructure is newer than the East Coast. So based on what we've seen in all of our updated testing, we have one district that has hit that action level. But as we went in the testing in that district, our wells and our purchased water is fine, we think it's more associated with a couple of customers' homes.

So I don't think it's that big of an impact for us, which, frankly, is nice because PFOS is the big kahuna for us in the next 20 -- the next 3 years because that's an incremental $226 million we got to invest, and we want to be ahead of schedule on that. So I'm not losing too much sleep on the lead and copper rule being [out West].

Operator

[Operator Instructions] There are no questions at this. I will now turn the conference back over to Martin Kropelnicki, Chairman and CEO, for closing remarks.

Martin A. Kropelnicki
Chairman, President & CEO

Kathleen, thank you. Thanks everyone for joining today. Please if you have questions, feel free to reach out to one of us and we'll answer them the best that we can. Just closing, we closed the third quarter strong. We're going into the fourth quarter with a lot of momentum. But again, the overall goal going into the fourth quarter is just stay focused on the core business plan of the company

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and executing our existing strategy and we look forward to giving everyone an update at the end of February when we announce our earnings results for 2024. So happy Halloween. Be safe, and we'll talk to everyone soon. Thank you.

Operator
Ladies and gentlemen, that concludes today's call. Thank you all for joining. You may now disconnect.

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Market Intelligence

Essential Utilities, Inc. NYSE:WTRG

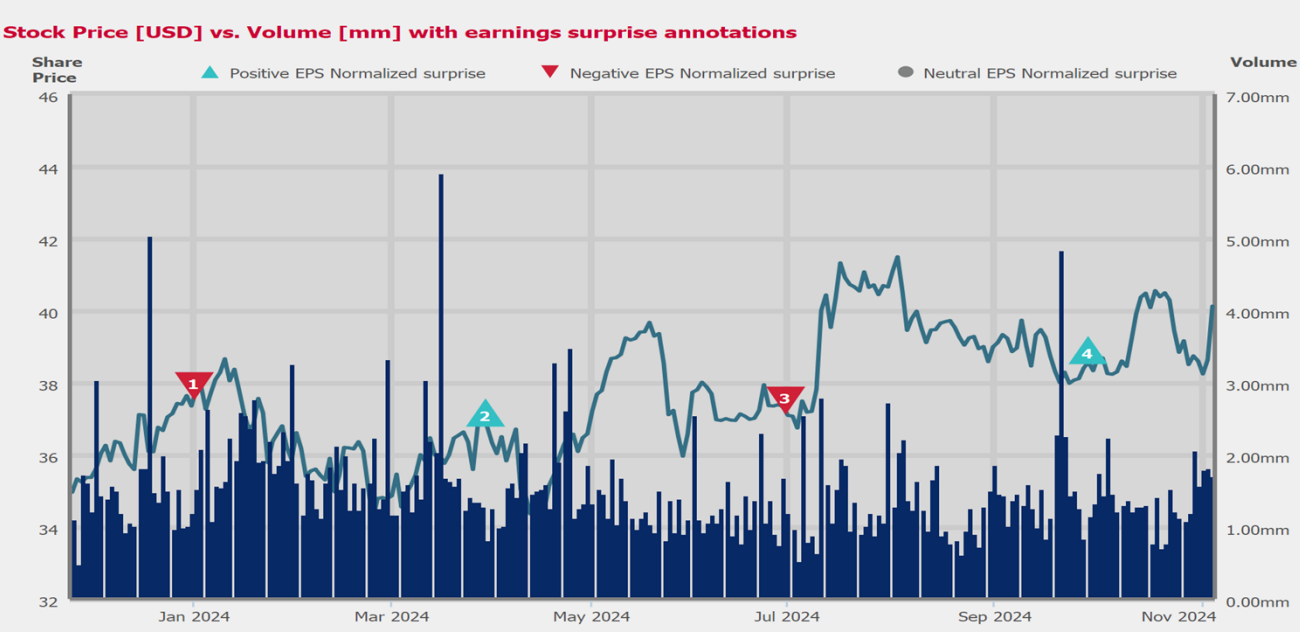
FQ3 2024 Earnings Call Transcripts

Tuesday, November 5, 2024 4:00 PM GMT

S&P Global Market Intelligence Estimates

	-FQ3 2024-			-FQ4 2024-	-FY 2024-	-FY 2025-
	CONSENSUS	ACTUAL	SURPRISE	CONSENSUS	CONSENSUS	CONSENSUS
EPS Normalized	0.24	0.25	4.17	0.66	1.99	NA
Revenue (mm)	424.43	435.26	2.55	636.94	2145.21	NA

Currency: USD
Consensus as of Nov-06-2024 12:22 PM GMT



- EPS NORMALIZED -

	CONSENSUS	ACTUAL	SURPRISE
FQ4 2023	0.51	0.50	1 (1.96 %)
FQ1 2024	0.76	0.97	2 27.63 %
FQ2 2024	0.33	0.28	3 (15.15 %)
FQ3 2024	0.24	0.25	4 4.17 %

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Presentation

Operator

Thank you for standing by. My name is Ellie, and I will be your conference operator for today. At this time, I would like to welcome everyone to the Essential Utilities Third Quarter 2024 Earnings Call. [Operator Instructions]

I would now like to turn the conference over to Brian Dingerdissen. You may now begin.

Brian Dingerdissen
Vice President of Investor Relations & Treasurer

Good morning, everyone, and thank you for joining us for Essential Utilities' Third Quarter 2024 Earnings Call, during which we'll provide an update on new long-term guidance. The slides that we will be referencing and a webcast of this event can be found on our website.

As a reminder, some of the matters discussed during this call may include forward-looking statements that involve risks, uncertainties and other factors that may cause the actual results to be materially different from any future results expressed or implied by such forward-looking statements. Please refer to our most recent 10-Q, 10-K and other SEC filings for a description of such risks and uncertainties.

During the course of this call, reference may be made to certain non-GAAP financial measures. A reconciliation of any non-GAAP to GAAP financial measures is posted in the Investor Relations section of the company's website.

We will begin the call today with Chris Franklin, our Chairman and CEO, who will provide an update on the company; and then Dan Schuller, our CFO, who will provide an update on the financial results, before Chris closes the call with our guidance.

With that, I will turn the call over to Chris Franklin.

Christopher H. Franklin
Chairman, President & CEO

Thanks, Brian, and welcome, everyone. We've got some really exciting news to share with you today. I've got some more color, but let me just run through it in a very, very brief summary on top here.

We had a great quarter. Financially, we had a strong capital investment so far this year, and we have an approved Pennsylvania gas rate case that included a weather normalization mechanism. We had a settlement in our Pennsylvania water rate case, yielding us $73 million, and we are reinstating our multiyear EPS guidance at a 5% to 7% growth rate through 2027, which importantly, does not include DELCORA -- any earnings associated with DELCORA. And then we're also going to talk a little bit about our strong recovery from the Hurricane Helene that hit North Carolina. So a lot of good things to talk about for the quarter. So let me get into the details.

First, we posted $0.25 in earnings per share for the quarter, which was above expectations. Our capital spending remains right on schedule this year. We have invested $932.5 million through the end of the third quarter, and we'll spend about $1.3 billion to $1.4 billion to improve water, wastewater and natural gas infrastructure this year. Dan will get into more details about the financials for the quarter in just a few minutes.

So in September, the Pennsylvania PUC unanimously approved the first rate case for people's natural gas under our ownership. The approval included an annualized revenue increase of $93 million and a weather normalization mechanism. You probably know this mechanism because others have it. It's designed to provide a greater financial stability and predictability for both our customers and our investors by mitigating the financial volatility associated with abnormal weather impacts.

I know you'll recall that both this year and last year have been unusually warm weather and have impacted our results. However, it could have just as easily gone the other way, and we could have had 2 abnormally cold years, which would have negatively impacted our customers. So this new mechanism will provide the ability to mitigate these abnormalities in weather and should assist with reducing the volatility for all parties going forward.

Now I do want to mention that the Office of the Consumer Advocate filed a petition for review of the approval and the PNG case. Dan will talk a little bit more about that in a minute, but I did want to mention that.

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Let's also talk about the water rate case, the Aqua Pennsylvania rate case. We filed our briefs on October 28. And in those documents, you'll see that we have a settlement agreement designed to provide a total annualized revenue increase of $73 million from our water and wastewater operations. We expect the settlement agreement to be filed formally on November 7 and available on the PUC website at that time. It's important to note that this settlement agreement, as all settlements would be, remains subject to a recommended decision by the administrative law judges and approval by the PUC.

I should also mention that East Whiteland, you'll recall that acquisition, it's a wastewater acquisition in Pennsylvania, was excluded from the settlement and will be fully litigated in front of the PUC, with an expected decision on that coincident with the rate case decision in February.

Now on the next slide, our significant progress on the 2 Pennsylvania rate cases have provided us the opportunity to reestablish long-term guidance. This guidance, which I'll review in more detail later, includes EPS growing at a compound annual growth rate of 5% to 7% for the next 3 years, that's through 2027, continued rate base growth of over 8% combined and our continued commitment to improving and upgrading water, wastewater and natural gas infrastructure by investing $7.8 billion over the next 5 years through 2029.

Importantly, we expect to achieve this EPS growth without including any action to the EPS from the DELCORA transaction. So to be clear, we remain confident that our valid and enforceable asset purchase agreement will ultimately prevail and that we will close the DELCORA transaction, but we want to remove any potential overhang that might be associated with the delayed closing of DELCORA so we've taken it out of our numbers.

And we believe this guidance communicates the right balance of growth for our investors built on the right level of infrastructure investment that ultimately results in rates that are affordable for our customers. So truly a win-win. As this slide indicates, we've consistently executed our plan to grow earnings between 5% and 7% every year. We've delivered these results despite elevated inflation, higher interest rates and some of the warmest weather on record in our natural gas territory.

Hopefully, our most recent achievements and the continued strong results indicated on this slide underscore our ability to execute and our regulatory credibility in the jurisdictions where we operate.

All right. Just to take a moment, we were hit hard by the hurricane, and so many people were in our country, particularly in the South. I want to talk a little bit about the impact of Hurricane Helene on our North Carolina operations. Thankfully, our team was quick to respond, clearing trees and other debris that allowed us to do some damage assessments early on after the storm had passed. We prioritized communications with our customers, most importantly, providing regular updates through our disruption map and other forms of electronic communication and physical communication, signage, et cetera.

We also dispatched a special reconnaissance team equipped with drones to inspect damage in areas that were either inaccessible or unsafe, particularly in the more mountainous communities where we serve. Now in total, 90 of our systems in North Carolina were impacted. But through really strong work by our teams, all but 6 systems were back up in just 5 days after the storm. And as of October 19, everything was back in power and repaired and fully functional. We're grateful for the patience of our customers and the understanding they provided, and we also appreciate the dedication and extensive work effort of our North Carolina team.

And with that, let me turn to Dan, and he's going to cover our financials for the quarter and some regulatory matters. Dan?

Daniel J. Schuller
Executive VP & CFO

Thanks, Chris, and good morning, everyone. As Chris mentioned, we're pleased with the financial results for the quarter. On this slide, I'll discuss high-level Q3 financial highlights, and then I'm going to into the details with the waterfalls.

Our revenues for the third quarter of 2024 were $435.3 million, marking an increase of about 6% compared to $411.3 million in the third quarter of 2023. This increase was driven by rates and surcharges, increased water sales, an increase in the price of gas and water customer growth. These factors far offset the minor revenue decline from lower natural gas sales.

The quarterly operations and maintenance expenses decreased for the third quarter compared to the third quarter of 2023. This decrease was primarily due to a reduction in bad debt expense and a decrease in expenses associated with the West Virginia gas utility assets and the Pittsburgh area energy projects, both of which we have divested.

We achieved quarterly earnings per share of $0.25, which compared to $0.30 in earnings per share in the third quarter of 2023. So while we had an increase in revenue and a decrease in O&M expenses, last year's EPS in the third quarter was positively impacted by significant onetime tax repair benefits associated with the natural gas safe harbor, which, of course, didn't repeat this year.

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Next, let's look to the waterfall. It's going to be first, the revenue waterfall. Moving left to right, we have regulatory recoveries of over $11 million, with the vast majority of this increase coming from the regulated water segment, plus over $10 million in increased water segment volumes and about $4 million coming from an increase in purchased gas costs as well as acquisitions and organic growth in the water business. This was offset slightly by lower volume of gas sales due to the warmer-than-normal weather as well as the other category.

Revenues from the regulated water segment increased just shy of 8% for the third quarter of 2024 compared to the same period in 2023. We saw excessive warm and dry weather at various times in the mid-Atlantic as well as in Ohio, which in turn led to higher water volume, but we experienced lower consumption in Texas and in North Carolina.

Next, let's look at the O&M on Slide 10. We saw a relatively modest increase of approximately $1.6 million in water production costs due to the higher volumes previously discussed. And among the smaller increases to O&M were the impact of the customer rider in the gas business, routine increases in employee-related costs and customer growth in the water segment. The overall reduction to O&M costs was primarily due to a decrease in bad debt expenses and a reduction in expenses related to the now divested West Virginia gas utility assets and the Pittsburgh area energy project.

Importantly, our year-to-date O&M performance is quite strong, expenses only up about 1% over the previous year, which demonstrates our continued commitment to operating efficiency.

Next, let's look at the EPS waterfall on Slide 11. Starting on the left of the EPS waterfall with $0.30 from last year, the next thing we see is the nearly $0.03 increase from regulatory recovery and close to $0.03 from increased water volume, the benefit of $0.006 from the decline in expenses and $0.003 in customer growth in the water segment. These increases were offset slightly by decreased gas consumption and then more materially by nearly $0.11 from other, which reflects lower tax repair benefits and increased depreciation and interest expenses. As I noted earlier, the lower repair tax benefits this year are mainly the result of the timing of the natural gas safe harbor impact in 2023.

In conclusion, we're pleased with the performance for the quarter, given strong results in the water business and slightly lower expenses year-over-year. More importantly, we remain on track per year, in line with our guidance and investor expectations once we adjust for the sale of the energy project and normalized weather for the gas business.

Let's review the guidance we provided in February, updated in May and reconfirmed in August as well as today. We provided guidance for 2024 net income per diluted common share to be $1.96 to $2. We expect to achieve this once we consider the gain on sale and weather impact.

So think about it this way, due to the energy project sale, GAAP earnings per share will exceed our guidance range, but if we subtract the $0.24 gain from that figure and add back $0.08 to reflect the warmer-than-normal weather in Q1 and Q2, we'd expect to result into the $1.96 to $2 EPS guidance range. As Chris mentioned, in 2024, we expect to invest between $1.3 billion and $1.4 billion. We're on track to do this as we've already invested over $932 million through September.

Turning to the next slide, let's look at regulatory activity. The Pennsylvania natural gas, or P&G rate case was filed in December 2023, and we received an order from the Pennsylvania Public Utility Commission back in September. This order included an annualized revenue increase of $93 million, mainly due to the doubling of rate base, due to replacing aging infrastructure since the last case as well as weather normalization, which is good for both customers and investors. This order also fully incorporates the repair tax benefit into the revenue requirement, thus benefiting our customers.

This case has a fully projected future test year that extends through September of 2025. Rates went into effect on September 27, so you'll see the increased revenue from the rate case in our Q4 results. Unfortunately, as Chris mentioned, in a highly unusual action, one of the parties that didn't sign on to the settlement agreement, the Office of the Consumer Advocate, has appealed the PUC's order to the Commonwealth Court and has asked for a remand to the PUC, essentially claiming that the PUC needed to include more information to support its findings to approve the rate case.

We believe that the order is very sound, and while based on a nonunanimous settlement with all parties, except for the OCA, it was supported by both the administrative law judge and the commissioners who voted 5-0 to approve the order. We'll be supporting the commission and its order on appeal, and we're closely monitoring the situation. The company does not expect accounting implications related to this appeal process.

Moving on to the next slide. As Chris mentioned, we've reached a settlement for the rate case that we filed for Aqua Pennsylvania in May of 2024. The settlement would be reviewed by the assigned administrative law judge and then the commission. Once approved, we expect the new rates from this settlement to go into effect in February of 2025. This rate case includes a fully projected test year

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through the end of 2025. The settlement is designed to provide an annualized revenue increase of $73 million on the water and wastewater operation.

It's important to note the East Whiteland wastewater system is excluded from this settlement, and thus is being addressed separately, but we'll conclude with the rate case outcome in February.

Moving on to the next slide. In 2024, our regulated water segment received rate orders or infrastructure surcharges in several states, including Illinois, New Jersey, Ohio, North Carolina, Texas, Virginia and Pennsylvania, totaling $51 million. This does not include the settled rate amount for the Aqua Pennsylvania case that we discussed a moment ago.

Our regulated natural gas segment also received infrastructure surcharges in Kentucky and Pennsylvania, totaling approximately $22 million, in addition to the $93 million that we just discussed, for a total of approximately $115 million in increased annualized revenue.

Looking ahead, we currently have rate cases or infrastructure surcharges pending in Illinois and Ohio and the pending Aqua Pennsylvania rate case settlement for our regulated water segment. Combined, the revenue requests in these cases is $149.2 million. We also have an infrastructure surcharge spending in Kentucky in the amount of $465,000 for our regulated gas segment.

And with that, I'll hand the mic back to Chris.

Christopher H. Franklin
Chairman, President & CEO

All right. Thanks, Dan, and let me talk a little bit about growth. As of this call, we have 7 signed asset purchase agreements across 3 states: Pennsylvania, Texas and Ohio, in which we already have existing water and wastewater operations. These agreements are projected to add over 213,000 customers or customer equivalents and total approximately $360 million in purchase price.

And just a reminder that the federal bankruptcy court judge in the bankruptcy of the City of Chester continues to have a stay on all proceedings related to DELCORA. But I'll also remind you that we said a couple of times, we've removed all financial impacts from DELCORA in our new EPS guidance.

Now you'll notice that we recently signed a deal with Integra Water to acquire the wastewater system in Los Milagros, Texas. This system is expected to add about 1,100 customers to our network and comes with a purchase price of about $4.4 million. We've also entered into an agreement with the Village of Midvale to acquire their water system in Midvale, Ohio. This system is expected to add about 900 customers to our network and has a purchase price of $3 million.

Now although a couple of these most recent systems are on the small side, we continue to have a robust pipeline of potential water and wastewater municipal acquisitions that we are actively pursuing. These potential acquisitions continue to represent nearly 400,000 total customers and will result in a significant expansion of our current customer base, assuming we get them completed.

Now since 2015, our growth by acquisition strategy has allowed us to add over $500 million in rate base and more than 129,000 new customers or customer equivalents to our footprint. In addition to municipal growth activity, we're seeing great developer opportunities in several of our states, especially in Texas and North Carolina.

Really worth mentioning. In the past 3 years, we've negotiated deals with Texas developers to be the water and/or wastewater utility operator and owner for communities that are expected to build over 30,000 homes. Growth like this is as valuable as any acquisition we would do. Texas has been growing significantly over the last 20 years. And you've probably seen the numbers, adding roughly 1 million people every 2 years. And so also of note is that our service territory is within what they call the Texas Triangle. This is the most rapidly growing areas of Texas, including Austin, San Antonio, Houston and the Dallas-Fort Worth Metroplex.

All right. In closing, let me share with you our multiyear financial and growth guidance. You've heard some of it already. We are reestablishing guidance as promised, and we believe it will give you a clear line of sight to the opportunities in front of us. In 2025, we expect earnings per share to be between $2.07 and $2.11. Importantly, now that we have a weather normalization mechanism in place, the volatility in earnings associated with unusual weather should be dramatically reduced. We're guiding longer-term EPS at a compounded annual growth rate of 5% to 7%, and that is for the 3-year period through 2027. Once again, this does not include DELCORA.

As we look to the next 5 years through 2029, we plan to make regulated infrastructure investment of about $7.8 billion. We expect our 2025 capital spending on infrastructure to be approximately $1.4 billion to $1.5 billion. Through 2029, we expect the regulated water segment rate base growth at a compound annual growth rate of about 6%. This projection only includes the acquisitions listed on the

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previous slide and are scheduled to close in 2025 and excludes DELCORA. This projection does include the crucial work that we're doing to remediate PFAS across the systems we currently own and operate.

For our regulated natural gas segment, we expect the rate base to grow at a compound annual growth rate of approximately 11% through 2029. And I'll tell you, the team at Peoples continues to amaze us with their ability to execute on their capital plans, and we have the opportunity to continue the important work of replacing aging natural gas pipes well past the next decade. On a combined basis, that's water and gas, we project rate base growth at a compound annual growth rate of over 8% through 2029. This growth will be driven by our ongoing investments in infrastructure and our commitment to operational excellence.

I would expect that when we look back in 5 years on what we've done, we will have completed even more given the acquisition pipeline that is not factored into our rate base growth projections.

We believe that the growth we're describing can be accomplished while we keep customer rates at affordable levels. We anticipate that our water customer base will continue to grow at an average annual growth rate of between 2% and 3% over the long term because of the continued consolidation opportunity in water, wastewater and strong organic customer growth, especially in Texas and North Carolina. We expect our regulated natural gas customer base to remain stable.

Now to support our growth and meet our credit metrics, we plan to raise equity through our multiyear ATM program through 2027. Specifically, between 2024 and 2025, we expect to issue approximately $350 million in equity through the ATM. I know that, that's probably smaller than some of you expected, but we believe our strong regulatory outcomes allow us now to do about $350 million between the 2 years, and we believe that, that will satisfy our capital needs, fund our growth initiatives and maintain a strong balance sheet and credit profile.

I'll tell you, we remain committed to our sustainability goals as we outlined in our annual sustainability report. And we're just very, very excited about providing all this guidance to you today. We are very optimistic about the future of our company and the opportunities that lie ahead.
And so with that, I look forward to your questions. And operator, please open the line for questions.

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Question and Answer

Operator

[Operator Instructions] Your first question comes from Julien Dumoulin-Smith from Jefferies.

Julien Patrick Dumoulin-Smith
Jefferies LLC, Research Division

Chris, Dan, the whole team here, guys, really incredible outcome here. Really nicely done to get back on that EPS CAGR horse. So kudos on that pivot.

With that said, guys, a lot of comments here. I want to come back to a couple of them. On the equity financing expectations, just want to understand, am I seeing a little bit of a shift here? I mean in terms of '24 and pushing into '25 a little bit, with this $350 million between '24 and '25. And how do you think about that fitting with the rating agencies out there? I just want to speak to having reviewed the new plan with Moody's potentially, how are they reacting? How are you thinking about your equity timing with their outlook as it stands?

Daniel J. Schuller
Executive VP & CFO

Yes. Thanks, Julien. It's Dan here. So we're staying quite close to the rating agencies at this point in time just to make sure that we are in sync. And what we put out here is that we would raise $350 million between '24 and '25. And so we stood up the ATM back in August, we raised some equity on that already and then it gives us the opportunity to be -- to pick the advantageous times between now and the end of 2025 to raise that $350 million that we noted.

Christopher H. Franklin
Chairman, President & CEO

We feel confident that Moody's feels good about our plan.

Daniel J. Schuller
Executive VP & CFO

Correct. Thanks, Chris.

Julien Patrick Dumoulin-Smith
Jefferies LLC, Research Division

Got it. Is that any kind of subtle shift from your earlier $1 billion multiyear equity? Just to dig it out a second further.

Daniel J. Schuller
Executive VP & CFO

Well, when we put that -- when we talked about the $1 billion, and we put the $1 billion ATM in place, what we said was that we would use that over an approximately 3-year period of time, depending on acquisitions and other facts, really see it as a pivot at all or changed from what we had indicated before.

Christopher H. Franklin
Chairman, President & CEO

And we hope if we're raising that kind of equity, we're doing some really nice acquisitions. So it gives us some optionality, Julien.

Julien Patrick Dumoulin-Smith
Jefferies LLC, Research Division

Yes, absolutely. In fact, do you want to speak to that a little bit because I've heard you comment about that a bit. I mean, how do you think about the equity expectations under the base versus your updated thinking about core of some of these acquisitions, right? I mean what is sort of that ex M&A dynamic on equity versus inclusive?

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And then I know you mentioned DELCORA here as being kind of incremental or the cherry on top, if you will. Is there a sense that as far as you're concerned that you could get this done in a given time? Or are you going to hold off from providing any more prescriptive time line at this place?

Christopher H. Franklin
Chairman, President & CEO

Yes. The way I think about it is we have a very strong asset purchase agreement, as you know, and it's been declared by several levels of courts to be valid and enforceable. The frustrating part is this federal bankruptcy court judge, not even on DELCORA. Obviously, it's on the City of Chester. And so we have no control over that.

Now there is a hearing later this week. And we do believe that the stay will be lifted on the Supreme Court's ability to determine who is the owner of the Chester Water Authority. So that's helpful. We need to get the stay lifted on PUC proceedings on DELCORA. But given the fact that we're not in control, it's difficult for us to have that influence. And so we backed that out of our numbers for that reason. But most certainly, if we can get that stay lifted and get it moving at the public utility commission, we feel confident that it will go -- remember, it's a onetime rate base case so that new RRR won't really have any influence and this should fit nicely with it.

And if we were to do that, if we could move it forward, call that in late '25, '26, then most certainly, we would need equity and we want to be able to have access to ways to raise that equity. Like I said, it gives us optionality. When we put that ATM in place at that size, we really thought about how do we do this efficiently? How do we save legal costs? And how do we set these things up in a manner where we had access to it even if we didn't need to use the entirety of it.

Daniel J. Schuller
Executive VP & CFO

And I guess, Julien, what I would add is when we put that out there, we talked about the 3 years, said it's a multiyear program, but it did contemplate at the time that we would have acquisitions in there. So what I wouldn't do if I were you is say, are you at $1 billion. Now you're allocating $350 million to '24 and '25, so that means $650 million in 2026. I would not go down sort of in that direction. As we've said, it's a multiyear program, and it contemplates having some room for acquisitions as well. So...

Julien Patrick Dumoulin-Smith
Jefferies LLC, Research Division

Got it. And last clarification here. As you think -- yes, I know it's great. And last clarification. As you pivot off of DELCORA, is that kind of the bulk of the delta here? I know you have the segment rate base CAGR of -- you moved from the 8% to 10% to the 6% and 11%, respectively, for water and gas. Is that kind of reflected principally as a function of pulling DELCORA out there in terms of the composition mix?

Daniel J. Schuller
Executive VP & CFO

Yes, that is, Julien. So we don't have DELCORA and thus, we don't have any follow-on capital related to DELCORA either. As Chris said, we remain extremely confident that we will ultimately close DELCORA and have that in our future, but it's not in the plan.

Operator

Your next question comes from Durgesh Chopra from Evercore ISI.

Durgesh Chopra
Evercore ISI Institutional Equities, Research Division

Congrats on the settlement in the water rate case. Well done. Just maybe on equity. Dan, can you clarify, so what have you issued year-to-date? And is that $350 million that you guided [indiscernible]?

Daniel J. Schuller
Executive VP & CFO

Sorry, you -- it was a little garbled there at the end. We've issued a relatively modest amount of equity between August and now just given blackout periods and some stock price volatility. So we've taken some off of that $350 million, but it's not a tremendous amount.

Durgesh Chopra
Evercore ISI Institutional Equities, Research Division

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Okay. Got it. That's all I wanted to ask. And then just the 5% to 7% EPS growth CAGR. The starting point is, just to confirm, is it the 2024 guidance midpoint, is that fair?

Daniel J. Schuller
Executive VP & CFO

Yes. I guess the way I would think about that. We haven't finished 2024 yet. So we don't yet have the final EPS. And of course, as we've said, it's going to be a number that is above our guidance range because of the sale of the energy project assets. So we don't know the final EPS.

But if you think about it this way, if you think you start with the 2025 EPS guidance range that Chris talked about, the $2.07 to $2.11, and then you use the 5% to 7% growth, you can back-calculate a 2024 EPS of $1.97 or you can go back further another year and you'd get to $1.86, which was our actual result for 2023. So that should provide you with some insights into how we're thinking about it.

Durgesh Chopra
Evercore ISI Institutional Equities, Research Division

Got it. Okay. That's helpful. Essentially, it's close to the 2024 EPS guidance midpoint, the way you just described it, $1.97 versus $1.98. Okay. That's helpful. And then finally, just -- thank you for explaining. I was just going to ask you on the water rate-based delta. It looks like it's just not DELCORA, but DELCORA plus future investments in DELCORA that's driving that rate base delta.

Just one last question for me is just on the Moody's metric basis, Dan. So where do you expect to shake out? I know that they had a negative outlook early in the year and you have this equity plan. Where are you expecting to shake out? Are you expecting to shake out above that [indiscernible] downgrade threshold as we think about 2025? If you could just clarify that for us.

Daniel J. Schuller
Executive VP & CFO

Yes. No, it's a great question. So yes, in 2025, when we've got the additional cash flow created by the PNG and Aqua Pennsylvania rate cases and some other things, we'd expect to see FFOs to debt that are above 12%. And then we'd expect to ultimately have the negative outlook resolved probably into 2026 at some point.

Christopher H. Franklin
Chairman, President & CEO

Pulling out our current level.

Daniel J. Schuller
Executive VP & CFO

Correct.

Durgesh Chopra
Evercore ISI Institutional Equities, Research Division

Excellent. Congrats again on this solid regulatory process in PA.

Operator

Your next question comes from Travis Miller from Morningstar.

Travis Miller
Morningstar Inc., Research Division

You answered most of my questions. I appreciate all the information, the guidance and such. High-level question and timely here. PFAS, if there were to be a Republican administration, what are your thoughts, not necessarily in terms of the limits being reconsidered, but implementation time line and some of the maybe federal aid that would come your way to help with that?

Christopher H. Franklin
Chairman, President & CEO

Yes. I would say, if anything, we would not expect a backing off on the limit. So the 4 parts per trillion probably stays in place, at least to our best estimate. But even if there was a slowing in the compliance period, we would expect to continue to meet the current pace.

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We've talked to our regulators in the states that are particularly impacted by this and regulators, both on the environmental side and on the economic side have suggested that we stay the course and complete the work and then get it recovered.

In the meantime, as you know, we have been in for low interest loans and grants and also sued the polluters, and we'll continue to pursue all of the above.

In terms of federal money, as you probably know, that flowed down through the agencies, the SRFs or state revolving loan funds. And we don't see a big change there in terms of what we -- with the federal money flowing through the states. So I guess no matter who's elected today, we don't expect a big change, and we fully expect to still invest that, call it, roughly $450 million to overcome the PFAS issue. And again, that will be funded in a number of different ways here, as I just suggested.

Travis Miller
Morningstar Inc., Research Division

Okay. That's helpful. And then one more kind of bigger picture also on acquisitions. Your big peer kind of is -- I don't know if I don't want to put words in their mouth, but slowed or at least plateaued acquisitions.

Clearly, you have plateaued or slowed acquisitions. Is there something going on fundamentally over the last year or 2 in the water business where any acquisitions are now reaching a new level, low level? Or I don't know if you could just characterize kind of what we're hearing from kind of the big water utilities on that side.

Christopher H. Franklin
Chairman, President & CEO

Yes. I think in Pennsylvania, most certainly, that is the case, as people figure out how the new regulation will impact them. The new, they call it RRR in Pennsylvania, which is essentially a cap, it's not formally a cap, but it's essentially a cap. I think the transactions that were already in place are being figured out. Can they come across troubled? Do they have to be renegotiated? So that's a little bit of effort for everybody.

And then new -- those who are considering selling their systems thinking about, okay, what's my DOC and what's 1.68x that DOC, and then is that enough for me to sell. We believe from our ongoing discussions that it will be enough for people to continue to sell because it's still a good multiple. And we also believe it will have a positive impact on the ultimate rate impact.

So I think it's a temporary lull. And I think our ongoing discussions, not only in Pennsylvania, but the other states, would indicate that we see some really positive things in Ohio, Illinois, even down south that hopefully will materialize in the coming year here.

Travis Miller
Morningstar Inc., Research Division

Okay. So yes, I understand that's structural in PA, but nothing structural in those other states, like you said, that would indicate something new?

Christopher H. Franklin
Chairman, President & CEO

Yes. I feel good about it, Travis. I think we're in a little bit of a lull here, but I do think that it will recover nicely.

Operator

Your next question comes from David Sunderland from Baird.

Davis B Sunderland
Robert W. Baird & Co. Incorporated, Research Division

Congrats on a very strong quarter and getting the long-term guidance back out there. Just one from me. I was wondering if you guys could talk maybe a bit about how the PUC is handling the separated estimated costs for PFAS. Maybe just any thoughts on if these will go through a similar rate base process and eventually be folded into the rate base? Or just how we think about those costs could be recovered if through a different mechanism, anything there?

Christopher H. Franklin
Chairman, President & CEO

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Yes. Listen, I guess let's start with we're assured that we will get recovery in each of the states where we've made the investments. And I think there's a couple of considerations here. One, how will the proceeds from the lawsuits, which we expect to be in the $100 million range, how will those be treated when those dollars actually come across? We know how they -- generally, how they'll be allocated, but will the commissions want that applied to an offset to rate base? Or will it be offset to O&M? And I don't think that's been fully determined at this point. But in terms of our actual capital investment in that mitigation, Dan, happy to get your opinion on that. But I think there are various approaches depending on the state.

Daniel J. Schuller
Executive VP & CFO

There are various approaches depending on the state, and we're working toward in most of our states, Davis, is really the ability to have deferred accounting treatment on these things. So we would take these investments, we put them on the balance sheet and then we would either stall depreciation, not start depreciation or we depreciate into this regulatory asset for recovery later.

So that's the typical approach is to look for deferred accounting in other places where we're able to incorporate some of these things into our recovery mechanism in a future-looking year.

Operator

Your next question comes from Gregg Orrill from UBS.

Gregg Gillander Orrill
UBS Investment Bank, Research Division

Could you talk about the process or time line around the Peoples Gas appeal?

Christopher H. Franklin
Chairman, President & CEO

Yes, that's an unusual one. And so it's an appeal to the Commonwealth Court. And I'll tell you, listen, any time these things come up, you don't like to see them. But it is not -- certainly not of paramount concern to us. It would probably play out over a year, but there's some moving parts to it as well.

Today, being election day, there is a race for Attorney General here in Pennsylvania. And the 2 people running for Attorney General, the Democrat and the Republican, would both be a new Attorney General. In other words, the existing Attorney General is not running again. And so the -- the one who is appealing this is the Consumer Advocate who is hired by the Attorney General. So that's another moving part, might this Consumer Advocate not be in place after the 2 new Attorney General candidates, one of them would be elected and then sworn in.

So I think that's another factor in here, but it would probably play out over a year period. I think probably the most important takeaway is that the high probability, even the request of the OCA in this situation is a remand back to the PUC, and they had a 5-0 very strong decision. So I think, in all likelihood, there will be some -- maybe more really support for that decision from the PUC.

Daniel J. Schuller
Executive VP & CFO

Yes, it would give an opportunity to document their support of the order, effectively.

Operator

[Operator Instructions] Your next question comes from Jonathan Reeder from Wells Fargo.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

First off, is the entire $73 million water and wastewater base rate increase for the settlement to be effective in late February? Or is it perhaps phased in at all?

Daniel J. Schuller
Executive VP & CFO

No, that will be implemented at one time in February. I think it's February 20.

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Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. So I guess just with the new TA rates in 2025 for both electric and gas, I'm a little surprised that the '25 guidance wasn't a little higher. So maybe can you talk about what the '25 headwinds are to EPS growth that we should be thinking about off of, call it, the original '24 guidance range midpoint of $1.98?

Daniel J. Schuller
Executive VP & CFO

Yes. I guess I'd just touched on maybe one area, Jonathan. We're still in the process of finalizing our budget for 2025. And -- but one thing we are seeing is a few areas where we're having O&M headwinds that we haven't had in the past. And let me take you through a couple of those.

One is purchased power. So we've had a very advantageous multiyear agreement in our PJM states for purchased power. That agreement comes to an end here and we'll have -- we have a new contract in effect. And as you know, purchase power prices have increased. And so we're facing that headwind as we go into 2025.

And then we're seeing things like -- another example is chemicals, just some new costs. So we haven't historically had PFAS-related chemicals. We're going to see some costs at our large surface water plants in 2025 to feed powder activated carbon as an O&M expense to reduce PFAS in the water. So that's 2 areas. And then probably, you've followed some of the news, insurance costs have continued to increase. And so those are a few of the headwinds that, I would say, help to explain our guidance range of the $2.07 to $2.11 for 2025.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. Great. That's helpful. I was wondering, too, if you could give a breakdown of the 5-year $7.8 billion CapEx budget between water and gas.

Daniel J. Schuller
Executive VP & CFO

Yes. So one thing to note is that $7.8 million CapEx only includes a few signed acquisitions. And of course, we've taken DELCORA out of that. So any follow-on CapEx for DELCORA is not included. So if we look at the $7.8 billion, it is slightly biased toward water. And I'd say relatively close to 50-50, biased a bit toward water. But we would expect with acquisitions, it biases even more toward water over time, but that's not in our plan at this moment.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. Great. And then last question. I guess I saw the parts of Pennsylvania just issued a drought watch. How much of a concern is this to you guys right now? I mean I know discretionary water use is getting lower this time of the year, but how should we be thinking about that?

Christopher H. Franklin
Chairman, President & CEO

Yes, not a great concern to us. I mean listen, we're -- conservation is at heart. We're an environmental company. And we always were guarded against any problems that would happen. But this is unusual weather. It really is unusual to us. And so we have put some warnings out on our own to our customers, but we're in good state.

We're -- there's not a major concern that we would run low on water or anything like that. That's not an issue here at Pennsylvania for us. But certainly, we'll comply with the warnings and support the warnings. And -- but as you just indicated, this is not a high consumption period for us either. So we don't anticipate a major impact.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. Not just the supply side, but also on the revenue side, it shouldn't be too big, right?

Daniel J. Schuller

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Executive VP & CFO

Yes, that's correct. We don't expect a financial impact to speak of.

Operator

I'd like to hand back over to Chris Franklin for closing remarks.

Christopher H. Franklin
Chairman, President & CEO

Thank you, and thank you all for joining us. As we're always available for follow-up calls, Brian, [Haley,] Dan and I at any time. So thanks for joining us, and take care.

Operator
Thank you for attending today's call. You may now disconnect. Have a wonderful day.

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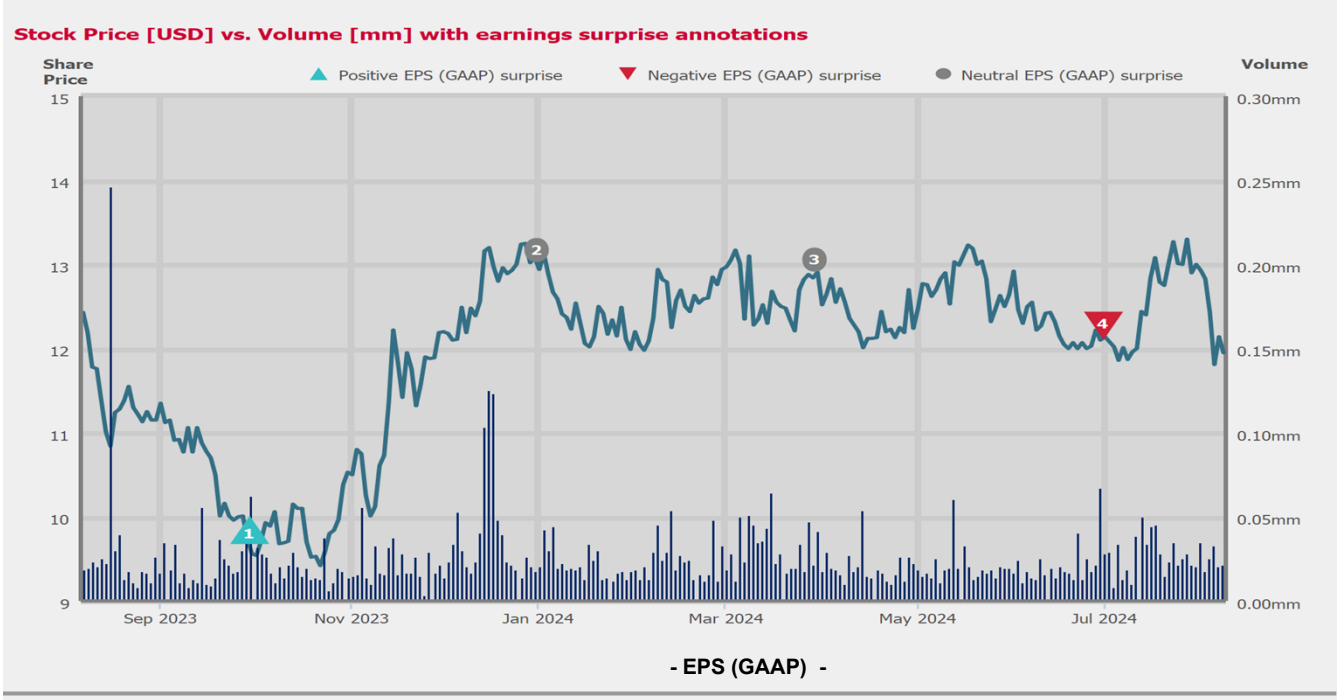
Global Water Resources, Inc. NasdaqGM:GWRS FQ2 2024 Earnings Call Transcripts

Thursday, August 8, 2024 5:00 PM GMT

S&P Global Market Intelligence Estimates

	-FQ2 2024-			-FQ3 2024-	-FY 2024-	-FY 2025-
	CONSENSUS	ACTUAL	SURPRISE	CONSENSUS	CONSENSUS	CONSENSUS
EPS (GAAP)	0.08	0.07	▼ (12.50 %)	0.11	0.28	NA
Revenue (mm)	13.60	13.15	▼ (3.31 %)	14.80	53.40	NA

Currency: USD
Consensus as of Aug-07-2024 2:01 PM GMT



- EPS (GAAP) -

	CONSENSUS	ACTUAL	SURPRISE
FQ3 2023	0.08	0.11	▲1 37.50 %
FQ4 2023	0.04	0.05	2 0.00 %
FQ1 2024	0.02	0.03	3 0.00 %
FQ2 2024	0.08	0.07	▼4 (12.50 %)

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Presentation

Operator

Greetings, ladies and gentlemen. Thank you for standing by. Welcome to the Global Water Resources, Inc. 2024 Second Quarter Conference Call. [Operator Instructions] I would like to remind everyone that this call is being recorded on August 8, 2024, at 1:00 p.m. Eastern Time.

I would now like to turn the conference over to Joanne Ellsworth, Executive Vice President, Corporate Affairs. Please go ahead.

Joanne Ellsworth
Executive Vice President of Corporate Affairs

Welcome, everyone, and thank you for joining us on today's call. Yesterday, we issued our 2024 second quarter financial results by press release, a copy of which is available on our website at www.gwresources.com.

Speaking today is Ron Fleming, President and Chief Executive Officer; Michael Liebman, Chief Financial Officer; and Christopher Krygier, Chief Operating Officer. Ron will summarize the key operational events of the quarter, Mike will review the financial results for the second quarter, and Chris will review strategic initiatives and Arizona Corporation Commission activity for the quarter. Ron, Mike and Chris will be available to answer questions at the end of the call.

Before we begin, I would like to remind you that certain information presented today may include forward-looking statements. Such statements reflect the company's current expectations, estimates, projections and assumptions regarding future events. These forward-looking statements involve a number of assumptions, risks, uncertainties, estimates and other factors that could cause actual results to differ materially from those contained in the forward-looking statements. Accordingly, investors are cautioned not to place undue reliance on any forward-looking statements, which reflect management's views as of the date hereof and are not guarantees of future performance. For additional information regarding factors that may affect future results, please read the sections regarding Risk Factor and Management's Discussion and Analysis of Financial Conditions and Results of Operations, included within our latest Form 10-Q filed with the SEC. Such filings are available at www.sec.gov.

Certain non-GAAP measures may be included within today's call. For a reconciliation of these measures to the comparable GAAP financial measures see the tables included in yesterday's earnings release, which is also available on our website. I will now turn the call over to Ron.

Ron L. Fleming
Chairman, CEO & President

Thank you, Joanne. Good morning, everyone, and thank you for joining us today. We are very pleased to report the results for the second quarter of 2024. I will start with some operational highlights. Total active service connections increased 4.9% to 63,256 as of June 30, 2024, from the 12 months prior. The 2024 annualized growth rate is 4.7%. While organic growth rate remains strong in the face of higher interest rates, it's also important to highlight that our year-over-year regulated revenue growth rate continues to trend even higher, which is up 5.3%. Mike will provide the details on regulated revenue growth drivers.

Year-to-date, we've invested $12.2 million into our infrastructure, improving our existing utilities to provide safe and reliable service. And finally, with public health and safety being our top mandate, we are very proud of our compliance record. For the quarter, we had 0 significant compliance events, continuing our streak from 2023 and prior, and in fact, this means it has been nearly 7 years without a significant compliance event.

Now I want to discuss organic customer growth and what is going on in our core utilities. The single-family dwelling unit market ended 2023 with approximately 22,582 building permits issued in the Phoenix greater metro area. For the first half of this year, this market realized 14,433 building permits, representing a 43% increase from Q2 of 2023.

In 2023, the City of Maricopa issued 888 single-family dwelling building permits. For the first half of the year, this market realized 559 building permits, representing a 43% increase from the first half of 2023. As you can see, the year-to-date Q2 2024 permit data was strong in both Metro Phoenix and the City of Maricopa. However, with interest rates inching back up because of the continued inflation fight, it is hard to anticipate the potential significance this will have on the housing market in the near term. However, there is a strong consensus that there remains a housing shortage in Metro Phoenix, and thus, over time, Metro Phoenix will retain an annual

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run rate approaching 30,000 housing units per year to keep pace with net immigration and the job growth. This demand must be met by a combination of single-family dwelling units and multifamily.

On this note, as previously reported, there is a significant shift occurring in the City of Maricopa to large-scale, high-density multifamily dwelling complexes along with more commercial and retail businesses. We believe this shift will be notable, and, at some level, supplant the reduction in single-family home growth. In fact, the year-to-date 2024 multifamily housing unit data was also strong in the City of Maricopa, with 1,176 units permitted compared to 315 units permitted in the first half of 2023. This represented an increase of 861 units permitted or 273%. Looking ahead, this is a record number of additional multifamily projects in some stage of development.

The fact is the booming economy and net immigration that Arizona continues to realize requires more and more places for people to live, work and play. That is why large-scale multifamily housing, commercial and recreational projects continue to accelerate at an extremely high pace in Metro Phoenix and in our service areas.

Additionally, the industrial manufacturing boom also continues. Previously, 2022 was the single best year for Arizona all time from an industrial economic development investment perspective, and that was eclipsed in 2023 with $40.7 billion invested in the state just last year. There has been significant further announcements made in 2024, including additional planned expansions at TSMC and Intel as the chip industry continues to explode here. Frankly, what continues to occur here in Arizona is unprecedented. Because of these things, we remain bullish on the future potential of our Inland Port Arizona service area, where Nikola Motor Corp facility and Procter & Gamble recently acquired land.

Additionally, the City of Maricopa recently announced and gave a public presentation on a very large industrial complex they are preparing to bring to market right in the center of the City of Maricopa. Initial plans include over 1,200 acres of an industrial corridor with a smart rail park as it is adjacent to a double railroad. Recently, the city ran a request for interest process on the land, and they had more interest than land available.

Respondents included a half dozen large reputable existing businesses that are looking for large property in Arizona to relocate to. If you're interested in learning more, I recommend you visit the City of Maricopa's YouTube page and watch the video recording of Rick Horst presentation to the City Council on July 16. More information to come on this exciting project in the future.

Based on all of these trends, we believe that in the years to come, we will continue to see considerable large-scale commercial, multifamily and industrial growth in addition to the return of even stronger organic housing growth.

As I mentioned in our earnings release, yes, high inflation and other cost drivers have caught up with us and impacted our earnings growth a bit so far this year. However, it's important to recognize that 2024 is a test year for our largest utilities whose last test year was 5 years ago in 2019. We need new rates to address all the cost increases over that time period and the significant investments we have made.

So while 2024 will be another solid year for Global Water, putting all of these things together, and that means the 4 ways we grow: organic, new service areas, acquisitions and the subsequent rate cases on all of that, you can see how Global Water is going to be able to grow earnings considerably in the years to come as we continue to advance our mission of growing and aggregating water and wastewater utilities so that the customers can realize the benefits of consolidation, regionalization and environmental stewardship in the face of this rapid growth, water scarcity, challenging regulations and aging infrastructure.

I will now turn the call over to Mike for financial highlights.

Michael J. Liebman
Senior VP, CFO & Corporate Secretary

Thanks, Ron. Hello, everyone. Total revenue for the second quarter of 2024 was $13.5 million, which is up $500,000 or 3.9% compared to Q2 of 2023. The increase in revenue was primarily attributable to the 4.9% organic growth in our service areas, offset by lower consumption from construction and irrigation customers.

Operating expenses for Q2 2024 were $10.7 million compared to $10.0 million in Q2 of 2023. This is an increase of approximately $700,000 or 7.2%. Notable changes in operating expenses include $291,000 increase and depreciation and amortization expense tied to our capital expenditure program, a portion of which is related to the activation of the Southwest plant in July 2023. Additionally, we amortized approximately $81,000 of intangible assets in Q2 2024 that didn't occur in Q2 2023.

Increased operating and maintenance costs by $304,000, which is primarily attributable to increased repairs and maintenance costs, medical expenses, salaries and wages as well as higher utility and chemical expenses, which increase as we grow.

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Increased general and administrative costs by $128,000, which was primarily attributable to increased salary and wages and hiring and moving expenses. These were partially offset by lower deferred compensation expense.

Now to discuss other income and expense. Other expense for Q2 2024 was $469,000, which was lower compared to the $540,000 of expense in Q2 2023. This reduction was driven by an increase in interest income, offset by higher interest expense tied to the $20 million note we executed at the beginning of the year.

Net income for Q2 2024 was $1.7 million or $0.07 per diluted share, which is consistent with Q2 2023.

Now to talk about adjusted EBITDA, which adjusts for nonrecurring items such as ICFA revenue as well as noncash items such as restricted stock expense. Adjusted EBITDA was $6.8 million in Q2 2024 and was $6.7 million in Q2 2023.

And lastly, as I mentioned on our previous earnings call, as part of our current Southwest plant depreciation deferral docket, we discovered that in 2007, $7.8 million of our Southwest plant infrastructure was prematurely included as plant and service for ratemaking purposes. As a result, these costs were inadvertently included in rates as part of our 2010 rate order as well as our 2014 and 2022 rate orders. We met with the Arizona Corporation Commission staff on March 1 to bring this to their attention. And then we subsequently filed an application with the Arizona Corporation Commission on April 25, requesting a customer bill credit that would reduce our monthly revenues by approximately $47,000. The ACC issued decision #79424 on July 18, 2024, approving the bill credit with an effective date of August 1, 2024, which will reduce revenue earned subsequent to the order by approximately $570,000 a year. The bill credit will be in place until the conclusion of the next Global Water, Palo Verde rate case, which decision #79424 requires Global Water, Palo Verde to file no later than December 31, 2025.

While the exact outcome and resolution cannot be predicted and could be material, we believe the approval of this bill credit is a positive first step in resolving this issue amicably in a way that is fair to all of our stakeholders, including customers and shareholders.

This concludes our update on the second quarter 2024 financial results. I'll now pass the call to Chris to review the remaining regulatory activity and strategic initiatives for the quarter.

Christopher D. Krygier
Chief Operating Officer

Thank you, Mike. Hello, everyone. It has been a very busy quarter at the Arizona Corporation Commission since the last time we spoke. First, we received the final commission decision for the Global Water, saguaro District rate case. The commission voted unanimously to approve the settlement agreement with minor modifications. We started charging these new rates effective July 1. We appreciate the hard work by the utility division staff and the commission on this case, especially since it was the first settlement agreement approved by the commission in a number of years.

Second, as we mentioned last quarter, we were actively underway preparing a rate case for the Global Water Farmers utility. On June 27, 2024, we filed that rate case with the commission, requesting a revenue increase of approximately $1.3 million. On July 25, 2024, the ACC utilities division staff determined that our rate case meant administrative sufficiency and the case is now following the typical process. The staff estimates filing their testimony in December 2024.

As is always the case with rate case filings, we cannot guarantee what action the commission may or may not take.

Third, as previously discussed, and you heard Ron mention earlier, we are in a test year for Global Water, Santa Cruz, and Global Water, Palo Verde, our 2 largest utilities. We continue our proactive customer outreach efforts and stakeholder outreach efforts to educate the community on the investments we are making to ensure we continue providing safe, reliable service and stay ahead of growth. We anticipate filing that case in the first half of 2025.

Finally, on May 10, 2024, we filed an application at the ACC, requesting approval of the Tucson acquisition, and that case is now processing as well.

This concludes my update on strategic initiatives and regulatory activity for the quarter. I'll now pass the call back to Ron.

Ron L. Fleming
Chairman, CEO & President

Thank you, Chris. It remains clear we continue to achieve meaningful growth despite the headwinds. As we execute our growth plan, we intend to remain at the forefront of the water management industry, and advance our mission of achieving efficiency and consolidation. We truly believe that expanding our total water management platform and applying our expertise throughout our regional service areas and to new utilities will be beneficial to all stakeholders involved. We appreciate your investment and support

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of us as we grow Global Water to address important utility, water resource and economic development matters along the Arizona Sun Corridor, allowing our communities to thrive.
That highlight concludes our prepared remarks. Thank you. We're now available to answer your questions.

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Question and Answer

Operator

[Operator Instructions] Our first question comes from Gerry Sweeney with ROTH Capital.

Gerard J. Sweeney
ROTH MKM Partners, LLC, Research Division

I only had one real question, and wanted to see if you could discuss acquisition, acquisition pipeline and anything that's happening in that space.

Christopher D. Krygier
Chief Operating Officer

Gerry, this is Chris. Thanks for the question. Yes, right now, there are still opportunities out there. As you know, Arizona is highly fragmented. I think the commission number is still over 300 utilities is the number that they reference in the state. Right now, we're pretty focused on getting the Tucson acquisition approved at the commission. We filed that earlier in the quarter. And then I think as we go through getting that closer to the finish line, integrating it, we'll start to think about what the next steps in the process look for us in continuing that journey.

Gerard J. Sweeney
ROTH MKM Partners, LLC, Research Division

Got you. Did you give an indication of when you think the Tucson acquisition would be approved and closed? If you didn't, do you have one?

Christopher D. Krygier
Chief Operating Officer

Yes. Good question. So we're generally targeting either end of the year or early in the first quarter, sometime around then.

Operator

[Operator Instructions] Seeing no further questions, I'd like to now turn the call back over to Mr. Fleming. Sir, please go ahead.

Ron L. Fleming
Chairman, CEO & President

Thank you, operator. Just want to thank everybody for participating on the call and for your ongoing support of Global Water. Thanks, and we look forward to speaking with you again.

Operator
This concludes today's conference call. You may disconnect your lines. Thank you for participating, and have a great rest of your day.

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SJW Group NasdaqGS:SJW

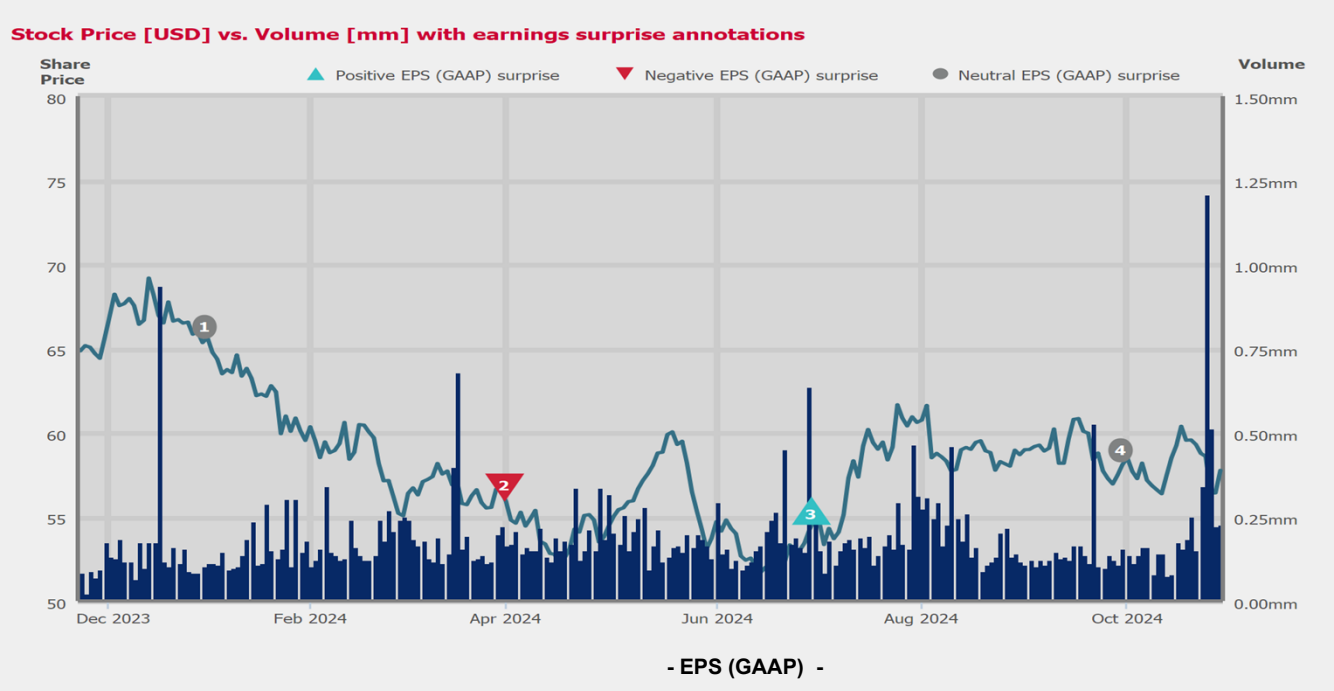
FQ3 2024 Earnings Call Transcripts

Monday, October 28, 2024 6:00 PM GMT

S&P Global Market Intelligence Estimates

	-FQ3 2024-			-FQ4 2024-	-FY 2024-	-FY 2025-
	CONSENSUS	ACTUAL	SURPRISE	CONSENSUS	CONSENSUS	CONSENSUS
EPS (GAAP)	1.17	1.17	0.00	0.55	2.74	NA
Revenue (mm)	213.50	225.06	5.41	186.50	705.00	NA

Currency: USD
Consensus as of Oct-29-2024 10:40 AM GMT



- EPS (GAAP) -

	CONSENSUS	ACTUAL	SURPRISE
FQ4 2023	0.59	0.59	1 0.00 %
FQ1 2024	0.38	0.36	2 (5.26 %)
FQ2 2024	0.57	0.64	3 12.28 %
FQ3 2024	1.17	1.17	4 0.00 %

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Presentation

Operator

Good day and thank you for standing by. Welcome to the SJW Group Q3 2024 Earnings Conference Call. [Operator Instructions] Please be advised today's conference is being recorded.

I would now like to hand the conference over to your speaker today, Andrew Walters, Chief Financial Officer and Treasurer. Please go ahead.

Andrew F. Walters
CFO & Treasurer

Thank you, operator. Welcome to our third quarter 2024 financial results conference call for SJW Group. I will be presenting today with Eric Thornburg, Chair of the Board, President, and Chief Executive Officer. For those who would like to follow along, slides accompanying our remarks are available on our website at sjwgroup.com.

Before we begin today, I would like to remind you that this presentation and related materials posted on our website may contain forward-looking statements. These statements are based on estimates and assumptions made by the company in light of its experience, historical trends, current conditions, and expected future results, as well as other factors that the company believes are appropriate under the circumstances.

Many factors could cause the company's actual results and performance to differ materially from those expressed or implied by the forward-looking statements. For a description of some of the factors that could cause actual results to be different from statements in this presentation, we refer you to the financial results press release and to our most recent forms 10-K, 10-Q, and 8-K filed with the Securities and Exchange Commission, copies of which may be obtained on our website. All forward-looking statements are made as of today and SJW Group disclaims any duty to update or revise such statements.

You will have an opportunity to ask questions at the end of the presentation. This webcast is being recorded and an archive of the webcast will be available until January 20, 2025. You can access the press release and the webcast at SJW Group's website.

In addition, some of the information discussed today includes the non-GAAP financial measures of adjusted net income and adjusted diluted earnings per share that have not been calculated in accordance with Generally Accepted Accounting Principles in the United States or GAAP. These non-GAAP financial measures should be considered as a supplement to the financial information prepared on a GAAP basis rather than an alternative to respective GAAP. financial measures. Reconciliations of these non-GAAP financial measures to the most directly comparable GAAP financial measures are presented in the table in the appendix of our presentation.

I will now turn the call over to Eric.

Eric W. Thornburg
Chairman, President & CEO

Welcome, everyone, and thank you for joining us. My name is Eric Thornburg, and it is my honor to serve as Chair, President, and CEO of SJW Group. I'm pleased to share that in the third quarter of 2024, we continued to meet drinking water and environmental regulations, deliver on our public health and environmental stewardship commitments, and provide high-quality water and service to customers.

We also delivered strong financial results, including a 7% increase in net income from this time last year. Our performance reflects our continued execution of our successful growth strategy, which is focused on investments in our infrastructure and water systems across our national footprint and constructive engagement and consensus building with key local stakeholders. For example, in California, we filed a settlement agreement with the California Public Utilities Commission for San Jose Water's 2025 through 2027 general rate case that we constructively negotiated with the Public Advocates Office, resolving all but 2 issues together.

We also filed our second system improvement charge in Texas and received approval for infrastructure recovery mechanism filings in both Connecticut and Maine that together covered almost 18 miles of pipe replacement in New England.

Year-to-date, we have invested $252 million or approximately 76% of our $332 million capital expenditure plan for 2024 in water and wastewater utility infrastructure across all 4 states, and we're steadily advancing our 5-year plan of investing $1.6 billion.

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Also, our California operation anticipates receiving a grant of approximately $8 million through the Grid Resilience and Innovation Partnerships program, or GRIP, for advancing clean energy infrastructure. We anticipate matching that amount for a total $16 million investment to increase operational resilience and reduce energy costs.

Additionally, SJW Group was 1 of 2 water utilities recognized by Newsweek in its list of America's Greenest Companies 2025, and our Connecticut operations received a Top Workplace award from the Hartford Courant for the fourth consecutive year. Importantly, we delivered earnings per diluted share of $1.17 and adjusted non-GAAP earnings per diluted share of $1.18 in the third quarter.

Now while I'm proud of our accomplishments, our culture is not one of complacency. Our industry is facing significant challenges with the need to meet new water quality standards and replace aging infrastructure while also maintaining affordability for our customers. We know that regulators, legislators and other policymakers are looking to us to be leaders to find creative, resourceful and efficient solutions to balance these at times competing needs, and we are up for that challenge.

We are focused on forward-thinking solutions that prioritize public health and safety while optimizing operational efficiency, whether through the use of AI technology, economies of scale or other continual improvement exercises.

Our industry-leading scientists and engineers are busy designing PFAS treatment facilities that meet the highest regulatory expectations while also tackling emerging contaminants such as microplastics through groundbreaking research. In parallel, we're diligently evaluating our pioneering income assistance programs in California and Connecticut to see how we can do more for a greater number of customers across our national footprint.

We also continue to be dedicated to constructive engagement and partnership with our local stakeholders to ensure that we are all well positioned to achieve our shared mission of serving our communities effectively. That is our culture, and it's also our competitive advantage.

With that, I will pass it over to Andrew to review our detailed financial results and regulatory updates in our state operations. Andrew?

Andrew F. Walters
CFO & Treasurer

Thank you, Eric. This morning, before the market opened, we released our third quarter 2024 operating results. In the third quarter, we reported revenue of $225.1 million, a 10% increase from the $204.8 million reported in the same quarter of 2023. The increase was largely driven by rate increases, including higher pass-through water cost. We also experienced higher water production expense.

Net income for the quarter was $38.7 million, which was a 7% increase over the $36.2 million reported in the third quarter of 2023. Diluted earnings per share was $1.17 compared to $1.13 in 2023.

Third quarter merger and acquisition expenses and real estate transactions that netted $0.3 million after-tax loss have been excluded in non-GAAP results reflected in adjusted net income of $39 million and adjusted diluted earnings per share of $1.18.

Turning to third quarter EPS bridge. You can see the $0.49 of the revenue increase was driven primarily by rate increases in California and Connecticut and lower income tax expense because of tax accounting method change that yielded $0.11. The revenue increase was offset by higher water production cost of $0.38 and $0.06 in higher maintenance costs compared to the same period last year.

Year-over-year revenue increased by 10%. Approximately $8.5 million of the revenue increase was pass-through charges for purchased water, and $8.5 million of the increase was from general rate cases and infrastructure recovery mechanisms.

Water production expense in the quarter increased 16% compared to 2023. The increase was principally driven by rate increases from our water wholesaler in California and higher production volume.

Total other operating expenses increased 8% year-over-year and was primarily driven by higher maintenance, administration and general costs and depreciation. Year-to-date, we reported revenue of $550.6 million, a 10% increase over the $499 million reported in the same period of 2023. As we noted for the quarter, the increase was largely driven by rate increases, including higher pass-through water cost.

Net income for the year-to-date was $71 million, an 8% increase. Diluted earnings per share was $2.18 compared to $2.09 in 2023.

As mentioned earlier, real estate transaction and merger and acquisition expenses that netted a $0.9 million after-tax loss year-to-date have been excluded in non-GAAP results. Adjusted net income was $72 million and adjusted diluted earnings per share was $2.21.

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As you can see, $1.11 of the revenue increase was driven primarily by rate increases in California and Connecticut. Higher usage and customer growth added $0.20, changes in the allowance for uncollectible customer accounts contributed $0.19 and $0.10 was from lower income tax expense because of a tax accounting method change related to the repairs tax deduction.

The revenue increase was partially offset by higher water production cost of $0.73, an increase in administrative and general expense of $0.18 as well as an increase in depreciation and amortization, maintenance cost, interest expense and the release of an income tax reserve in 2023. Approximately $65 million in gross equity proceeds was raised year-to-date through our at-the-market equity program, or ATM. Our current ATM program is set to expire on November 17. We intend to enter into an agreement for a new ATM program prior to that date.

At the end of third quarter, we had $93 million drawn on our $350 million bank lines of credit, which left $257 million available for short-term financing of utility plant additions and operating activities.

In the third quarter, we raised a total of $125 million through long-term debt offerings in California and Connecticut that were primarily used to pay down our bank lines of credit. By the end of 2024, we plan to raise an additional $35 million in long-term debt that will be used to pay down the line of credit further.

The average borrowing rate for the line of credit advances year-to-date through September was approximately 6.53%. The average borrowing rate in the same period of 2023 was 6.16%. The effective consolidated income tax rates for the third quarter of 2024 and 2023 were approximately 5% and 11%, respectively.

As Eric mentioned earlier, a settlement agreement negotiated with the Public Advocates Office has been filed with the CPUC for San Jose Water's 2025 through 2027 general rate case. Only 2 policy issues remain to be litigated, chemical and waste disposal cost in the full cost balancing account and adjusting the service charge calculation.

The settlement agreement also authorizes a $450 million capital expenditure budget that would address several key needs such as treating PFAS to meet drinking water standards finalized by the U.S. EPA earlier this year, reducing greenhouse gas emissions through solar generation, energy storage systems to replace diesel generators, fleet electrification and advanced acoustic leak detection and advancing the CPUC's Environmental and Social Justice action plan to improve access to high-quality water service, climate resiliency and economic and workforce development.

It also allows greater revenue recovery through the service charge and further aligns authorized to actual usage through a lower sales forecast. The settlement agreement includes a $53.1 million or 9.4% total revenue increase at the 2025 through 2027 authorized sales and customer forecast. The annual step increase ranged between approximately 2.6% to 3.9%.

The application we filed with the CPUC in January of 2024 requested a $103 million revenue increase over the 3 years and proposed a 3-year $540 million capital expenditure program. We view the settlement agreement as a testament to our ability to work with stakeholders and regulators to achieve constructive outcomes that are beneficial to our customers and local communities while also delivering shareholder value. If approved, the settlement agreement positions us well to continue our robust and necessary investment in our water system infrastructure. A CPUC decision is expected in the fourth quarter of 2024 with new rates effective January 1, 2025.

San Jose Water reached an agreement with the City of Cupertino, California to manage the city's water system that became effective on October 1, 2024. The initial term of the agreement is 12 years with a provision to extend it for an additional 8 years. Under the new agreement, we will continue to operate and maintain the city's water system and pay an upfront fee of $22.1 million concession fee, which will be funded with equity through our ATM, and we will make annual payments of approximately $1.8 million, subject to increases each year based on a specified construction cost index.

We first entered into an agreement with Cupertino in 1997. Since then, this arrangement has proven beneficial to our customers of San Jose Water and customers of Cupertino. As a large neighboring water system, we bring scale and efficiency to the city's water system operation and increased scale that helps San Jose Water serve its customers as well.

A CPUC-authorized annualized revenue increase of $768,000 became effective on July 1, 2024. The revenue increase was related to a requested rate base increase of approximately $4.8 million for Advanced Metering Infrastructure project. We are planning to invest approximately $27 million in this project in 2024. It is a $100 million project that is separate from the general rate case, capital budget and majority of the installation is expected through 2026.

On September 18, 2024, the Connecticut Public Utilities Regulatory Authority authorized a $4.3 million increase in annualized revenue through the Water Infrastructure and Conservation Adjustment, or WICA. The WICA surcharge became effective on October

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1 and stands at 3.43%. The revenue increase was for approximately $41.9 million in completed infrastructure replacement projects that are in service and providing benefit to our customers.

As we mentioned in the second quarter, Connecticut Water's general rate case became effective on July 1, 2024. As a reminder, the general rate case provided an annual revenue increase of $6.5 million with an opportunity to earn an additional $1.1 million by achieving certain performance metrics, a 9.3% return on equity and it maintained our 53% to 47% equity-to-debt capital structure.

This past week, Maine Water filed a general rate case application for the Camden/Rockland division with the Maine Public Utilities Commission. Maine Water is requesting a revenue increase of $1.1 million or 15.9% above current authorized revenue. A decision is expected in the second quarter of 2025.

On September 30, 2024, a Water Infrastructure Charge or WISC application was filed for the Millinocket division to increase annualized revenues by $46,000. The decision is expected in the fourth quarter of 2024. On August 1, 2024, WISC increases were authorized in 2 divisions for a total annual revenue increase of $52,000.

I also want to share that Maine Water intends to file a petition with the Maine Public Utilities Commission before the end of the year, requesting consolidation of the tariffs in the company's 10 rate districts. It is a move that would streamline general rate case and WISC applications, which are currently filed on a district-by-district basis. The company typically files 2 to 4 general rate case and WISC filings each year. This will improve administrative efficiency, reduce regulatory lag and increase the burden on regulatory agencies and their staffs and ease the burden.

Texas Water filed for a second System Improvement Charge or SIC, this past September. An SIC is an infrastructure recovery mechanism that is similar to WICA in Connecticut and WISC in Maine. We are requesting a $4.3 million increase in annual revenues for more than $41 million invested in completed infrastructure projects. We are targeting the decision in the first half of 2025.

We have filed for a sale, transfer and merger application with the Public Utility Commission of Texas to close on the acquisition of 3009. The closing has not yet been scheduled. We expect to fund the acquisition of 3009 with equity through our ATM program.

We have been experiencing drought in our Texas service area and had water conservation measures in place for much of 2024. As a result, we will see lower water usage in 2024 compared to 2023.

As you will recall, our KT Water Resources acquisition in 2023 has a projected 6,000 acre feet of untapped water supply in the heart of Comal County. Bringing the supply online to serve customers is a priority for us. It will be a multiphase project, and our goal is to complete it by the end of 2026. KT Water Resources was initially acquired by our unregulated subsidiary in Texas Water Resources.

In the third quarter of this year, our regulated utility purchased the assets of KT Water Resources from our regulated -- unregulated subsidiary. The regulated utility will fund the capital expenditures to bring the additional supply online.

2024 guidance for GAAP is currently at $2.65 to $2.75 per diluted share, and we reaffirm our guidance of $2.68 to $2.78 per diluted share on a non-GAAP basis. As mentioned earlier, we have reached our $65 million in gross proceeds from equity issuances, which was at the top of our -- end of our guidance, excluding acquisitions.

We maintain a 5-year capital investment outlook of $1.6 billion, which includes approximately $230 million in estimated PFAS remediation, based on finalized maximum contaminant levels.

The remaining factors underlying our 2024 guidance include potential for reduced usage based on conservation and other factors as well as strategic reinvestments in our business in 2024, such as approximately $1.1 million in customer-related software expended year-to-date.

I would like to highlight that our guidance range is consistent with our long-term growth rate and is independent of real estate sales or merger and acquisition activities.

Further, we reaffirm our stated long-term growth rate of 5% to 7% that is anchored off our 2022 diluted earnings per share of $2.43, which is nonlinear because of rate case cycles. I want to note that our recent settlement in California does provide a flatter rate impact than in years past.

With that, I will turn the call over to Eric.

Eric W. Thornburg
Chairman, President & CEO

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Thank you, Andrew. Well done. One of the ways we measure our impact and success as a company is how have we been a force for good. Just a couple of weeks ago, Newsweek notified us that SJW Group has been selected as one of America's Greenest Companies 2025. We are 1 of only 2 water utilities selected for this prestigious recognition. Only companies that meet the European Union's stringent sustainability criteria considered the most advanced globally were eligible. This recognition reflects the passion and dedication of our people who take our responsibility as environmental stewards very seriously.

Another exciting new development is that San Jose Water, along with several of our California regulated private utility peers, were awarded a $50 million grant through the Grid Resilience and Innovation Partnerships, or GRIP program for the installation of battery energy storage systems at critical high-power use pumping stations.

Established by the bipartisan infrastructure law, GRIP is a significant federal investment focused on modernizing and strengthening the resilience of the U.S. electric grid. The GRIP program will integrate battery storage energy storage systems at various sites operated by San Jose Water and our peers.

To meet the GRIP cost share requirements and secure these funds, San Jose Water has committed to match its anticipated $8 million share of the grant, bringing the total investment to an anticipated $16 million. This funding represents a substantial investment in sustainability and operational flexibility for San Jose Water, significantly enhancing resilience while driving down energy costs. Only 3 California applicants were awarded grants through this very competitive program.

Other green achievements that I'd like to highlight include between 2019 and 2022, we reduced our greenhouse gas emissions by over 20%, and we're on track for a further reduction in 2023. We will share that result after it's been audited. And our goal is a 50% reduction by 2030 from a 2019 baseline.

In California, our advanced leak detection program, which leverages AI technology continues to be leading-edge with water loss to leaks or non-revenue water below 10% compared to an industry benchmark of 15% and we are fostering the expanded use of recycled water for irrigation to better preserve drinking water supplies.

In Connecticut, we've been recognized as a Top Workplace for the fourth consecutive year by the Hartford Courant. We're especially humbled that the award is based on the results of an anonymous employee survey conducted by an independent third party. The survey asked employees about company culture, career development and the organization's purpose and values. We appreciate our employees' partnership in creating a work environment that sets us up for world-class service and success.

We'd like to extend a warm welcome to PURA Commissioner, David Arconti, and express our deep appreciation to outgoing Commissioner and Vice Chairman, Jack Betkoski, for his nearly 4 decades of public service, including 27 years at PURA. We look forward to working with Commissioner Arconti and his fellow commissioners to best serve Connecticut residents and communities.

Over the last several years, we've built a strong national platform to support our growing local operations through the good times and the inevitable headwinds. And with a lot of effort and intention, we've maintained our fundamental values and culture through this growth. And that culture continues to guide us and distinguish us as we make business decisions that build trust with stakeholders.

I continue to be inspired by the contributions of our talented teams across our local operations as they consistently provide an essential service with integrity, reliability, genuine care and transparency.

I'm confident our team's commitment to serving customers, communities and the environment will continue to excel SJW Group's ability to deliver value to our stakeholders and reinforce our strong position for a successful future.
And with that, I'll turn the call back over to our operator.

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Question and Answer

Operator

[Operator Instructions] Our first question comes from Richard Sunderland with JPMorgan.

Richard Wallace Sunderland
JPMorgan Chase & Co, Research Division

Starting with the usage trends in Texas, can you speak a little bit about the sales there relative to the 2024 guidance assumptions? Are they on track ahead or behind? And I guess, similarly, how those trends, the GRC settlements and other recent developments position you on a 2025 basis relative to the 5% to 7% long-term growth rate?

Andrew F. Walters
CFO & Treasurer

That's an excellent question, Richard. So let's start with 2024. We've definitely suffered some decreases due to usage and conservation in Texas this year. We are coming into the fourth quarter, so that impact becomes less in terms of the total dollar amount, but it still remains in place. It is helpful to the fact that it's going to Stage 3 from Stage 4, but there's always some variation within the Texas area because there's different areas that have different drought levels. But that's still a positive development.

So as we look at the fourth quarter this year, that will be something that we will continue to monitor. We are not adjusting our guidance range due to that. And so, I would expect us to be kind of consistent with where we've talked about so far.

Now for 2025, however, we would expect the drought conditions to persist. We will have the benefit of the settled rate case, knock on wood, that will happen according to when we expect it to and we will also have the full year of the Connecticut rate case. So we are fully on track for meeting our long-term growth.

I would say the one highlight that I put into this comments today was to talk about the fact that the California rate increases this year or this coming year starts in 2025 at 3.91% assuming that, that gets approved, that compares to a 13.35% that happened the last time that we had an approved rate case in 2022.

So the benefit of that is it flattens out our overall kind of earnings and revenue growth over a 3-year cycle. So that's something I just want to highlight. It's good for customers and it's good -- it's better for us too as we look at our earnings growth over a period of time.

Richard Wallace Sunderland
JPMorgan Chase & Co, Research Division

Got it. Great. Yes, very helpful. The main process that you highlight in the slides there on the tariff consolidation effort. I'm curious if you have any sense on how long that process could take? And would it require a rate case after receiving approval kind of across the new consolidated jurisdiction? Any other color there on sort of the relative rate levels would be helpful, too.

Andrew F. Walters
CFO & Treasurer

Yes. Look, I think from our perspective, it's still early days in order to be able to comment on rate levels or those types of things. But here's the benefit of this. This is a huge strategic move for our company to get this onto one rate cycle, and it really will help the communities in Maine as well, as we can further socialize the cost of the entire operation across the entire group of customers because there are some very small systems that are disadvantaged by not having such a large base of customers to distribute those costs over.

Given that, what I would expect to see is an ability, like we talked about, to reduce the load on not only our team, but on customers and then also on the Maine Public Utility Commission staff as we prosecute rate cases. You can imagine that we're going down from multiples down to a single rate case and single WICA filings across all these, and that will really be beneficial for everybody involved.

Richard Wallace Sunderland
JPMorgan Chase & Co, Research Division

Got it. Very clear.

Eric W. Thornburg

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Chairman, President & CEO

Richard, the one thing I would add, I wouldn't expect us to bring everybody to the same level of rates immediately. That can be done gradually over time. But going forward, we'll, as Andrew said, really smooth out the administrative aspects of filing multiple cases as opposed to just a single case. So it will be good for everyone.

Richard Wallace Sunderland
JPMorgan Chase & Co, Research Division

Got it. That's very clear. And then one last one from me. I recognize this came up several times on 2Q, but just curious if there are any updates you can offer on Aquarion. Your interest in the assets and potential time line?

Andrew F. Walters
CFO & Treasurer

Yes. Thank you, Richard. I think if I recall now, the Eversource team announced about February of 2024 that they were looking to sell Aquarion. And I think they've said publicly that they would like to wrap that up, at least announce who the successful bidder was by the end of 2024. We do remain interested in the assets there. And while I can't comment specifically on the process, it certainly would seem reasonable to know by the end of the year who the successful purchaser is. And then, of course, regulatory approval would commence in 2025.

So we really believe that it would be a great acquisition for our shareholders, but at the same time, commit to remain disciplined and decisive about it going forward.

Operator

Our next question comes from Jonathan Reeder with Wells Fargo.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Just, I guess, piggybacking off of the last one with Aquarion. I know I've seen some Connecticut towns express concern over RWA's interest in buying Aquarion and what kind of impact that might have on their tax revenues and customer rates. How influential do you think those concerns are to the process?

Eric W. Thornburg
Chairman, President & CEO

Yes. Thank you, Jonathan. Yes, I saw the same articles. And for those who may not have followed along, for example, a company such as ours, Connecticut Water in this case, we pay property taxes to communities based upon the assets invested to serve that community. And it is part of our rate recovery approach.

Many municipalities do not pay, of course, themselves or in this case, if it was a different quasi-municipal utility, wouldn't pay the same level in property taxes to that community. And so, if you're a community leader and you see that the potential is there that future property tax receipts would decrease, then you would rightfully be quite concerned about that. So it's one of the ways that we participate in the communities and assist them.

And I think it's a real issue. I think community leaders in Bridgeport and Stamford and Greenwich and Torrington and on and on can -- could be quite concerned about it. But if there were a Regional Water Authority in place, they, of course, could try to make some amends to those communities and help out. So I do think it will be a consequential matter, but I don't think it would be determinative, Jonathan.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. Great. And then I guess, shifting over to California, the CPUC recently issued the decision that lowers the energy utilities allowed ROEs by 42 basis points in 2025 by effectively reducing the magnitude of that 2024 cost of capital mechanism increase. Is there any avenue for the CPUC to do something similar for the waters for 2025?

Eric W. Thornburg
Chairman, President & CEO

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Jonathan, I'll start and see if Andrew might want to add to it. But -- so of course, we've been tracking this proceeding as well. And at this time, I have no indication that a similar change is contemplated for the water utilities. We don't expect the energy decision to impact the way our WCCM is calculated. And similar to the energy decision, any change to the methodology used to calculate our adjustment would have to be issued via commission order. And there's, again, nothing teed up at this moment that would suggest that or facilitate that.

And we'd obviously engage at any time that we did sense or see that there was a change being considered or proposed. So, so far like I said, no indication at this time that we'd have a similar track.

Andrew F. Walters
CFO & Treasurer

I might just add a couple of things, Eric, that since the mechanism of recent time has been out, there's been 3 adjustments, 2 up and 1 down. We started off with the down actually and had 2 ups in the most recent time around. The thing that I commend about the mechanism is a 2-way mechanism. It goes up and down, so it allows people to participate.

In terms of the next adjustment, I don't know where the economy is ultimately going to go. If I could forecast interest rates, I might not be talking to you on this call. But odds are greater that there's more downside pressure than upside pressure. And so, if I were an electric utility, I would understand the need to do this. And if you compare the outcomes of where our cost of debt has been and some of the other cost of capital mechanisms, the 20 basis points might be actually more consistent with what we're seeing today in the marketplace. But those can change over time. So that's the thing to keep in mind. It's -- while it might be here today, it can change in the future.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. Great. And just kind of sticking along those lines, can you discuss what SJW's -- I know you kind of coordinate with the broader water utilities in the state, but with the potential cost of capital strategy. Do you think the new applications are likely to be filed in 2025 as scheduled? Or might there be a possibility to reach an agreement with PAO to defer the full-blown proceeding maybe possibly in exchange for a reduction in the allowed ROEs?

Andrew F. Walters
CFO & Treasurer

Look, I think the odds are greater than that. Like we'll have to see where things are at, at the time and also what the commission workload is relative to us. So it's a discussion that needs to happen. So that being said, I think the odds are likely -- more likely that we will be -- end up filing in 2025. But that's a personal opinion, and that's one without having that interaction to kind of find out what the workload is of the commission as well.

Jonathan Garrett Reeder
Wells Fargo Securities, LLC, Research Division

Okay. And then last one for me. I appreciate that answer, Andrew. Any potential impacts on the CapEx budget from the EPA's recently finalized lead and copper rule?

Andrew F. Walters
CFO & Treasurer

Yes. Look, I think there's -- that's something we will talk about the -- we'll give a revised 5-year forecast in our next quarter's earnings as part of our also revised earnings forecast for 2025. But for sure, we are seeing continued increases in capital investment requirements. And whether it's for lead and copper or inflation pressures related to the PFAS as well as, quite frankly, growth and other things that are going on in our system that's very exciting but are going to require some very significant investments for us going forward. So I think overall, we're seeing certainly a more positive movement when it comes to that.

Now coupled with that, and this is very important for us, Eric talked about affordability as well. And I'm sure he'll add some more comments to this, but I would tell you that affordability is a key issue that we all are facing from a utility industry. And we are zeroed in on things that we can do to further make the bills affordable for our customers. And so we're trying to look through everything that we do and increase our efficiency for the benefit of our customers and to allow that investment to happen not all on the backs of the customers, but on a shared basis.

Eric W. Thornburg

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Chairman, President & CEO

Well said, Andrew, I think we're viewing affordability as a strategic issue that we really need to think about comprehensively and propose solutions to the commissions and to our communities. And so, by working hard to reduce operating expense, it opens up a little headroom then in the bill to continue to invest to provide safe and adequate drinking water. So all on the table to do our best to meet the affordability test for our communities.

Operator

Our next question comes from Angie Storozynski with Seaport.

Agnieszka Anna Storozynski
Seaport Research Partners

So 2 questions. One is, I understand the change in the earnings profile in California. But Andrew, you still kept your nonlinear growth profile comments. I'm just wondering why that is if California is more smoothed out?

And then number 2 is, is there any exposure that you guys have in California or any other jurisdiction to the data centers? And the growth in water demand that those might have? Again, I don't know exactly which jurisdiction, but I'm assuming either California or Texas.

Andrew F. Walters
CFO & Treasurer

So I'll start off with the comment on the nonlinear. We still have 2 big divisions and 1 smaller division, Angie. So no matter how you look at it, that's going to be the case, and we will have nonlinear growth. But it's not as nonlinear as it was before just because of this current decision. But in general, it's something that's going to happen. And you can understand the comment that I said before, last time we started with a 13% increase when we first started our rate case in California, now we're only at 3.91%. So -- but that's -- we're very happy with kind of where that's come out. There's nothing wrong. It's just the fact that we're making things more smooth for our customers. That's not necessarily always going to be the case, and it just depends how well we do of continuing to drive down expenses, which helps offset those potential first year adjustments when you go in for a rate case. So, so far, so good.

The second question, do you want to take that one?

Eric W. Thornburg
Chairman, President & CEO

Yes. On the data centers, it's a great question, Angie. But I would not expect to see volume increases driven by data centers using water for cooling. I wouldn't expect to see significant volumetric changes resulting from that. But I would say that the economic development aspects and inevitably the growth that comes with that, there would definitely be infrastructure demands around that to support that community's growth and development. And so, more of a secondary effect for us, Angie.

Operator

And I'm not showing any further questions at this time. I'd like to turn the call back over to Eric Thornburg for any closing remarks.

Eric W. Thornburg
Chairman, President & CEO

Well, thank you, operator. Really appreciate that. And thank you, everyone, for joining us today. We're in the home stretch of 2024, but there's still much to look forward to, including a CPUC decision on our settlement agreement in our California GRC, implementation of our AMI initiative, progress with bringing greater water supply online in Texas and applying for consolidation of our tariffs in Maine, and advancing our PFAS remediation strategy.

We will also continue to invest in our infrastructure, aiming to replace 1% of our pipe nationwide annually and explore the possibilities of how to ensure continued affordability for our customers as the capital needs of operations in the water utility industry continues to increase.

SJW Group proudly leverages our national platform to support our distinct local operations and our shared mission to reliably serve high-quality water to 1.6 million people across 4 states. And while we do this, we make sure we execute our growth strategy and deliver shareholder value, including paying a dividend, which we have faithfully done for 80 straight years, and we've raised that

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dividend for 56 consecutive years. I recognize that it's our culture of service to our customers and the local communities that underlies our success, and I'm very proud of our people who make it all possible.

Thank you again for your time today and your questions. We look forward to sharing our progress with you next quarter. In the meantime, Andrew and I, along with the rest of the SJW Group team are always available for follow-up. Thank you again for your interest in SJW Group.

Operator
Thank you. Ladies and gentlemen, this does conclude today's presentation. You may now disconnect, and have a wonderful day.

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U.S. Securities and Exchange Commission

Securities and Exchange Commission

17 CFR PART 242

[Release Nos. 33-8193; 34-47384; File No. S7-30-02]

RIN 3235-AI60

Regulation Analyst Certification

Agency: Securities and Exchange Commission.

Action: Final rule.

Summary: The Securities and Exchange Commission ("Commission" "SEC" or "we") is adopting new Regulation Analyst Certification ("Regulation AC"). Regulation AC requires that brokers, dealers, and certain persons associated with a broker or dealer include in research reports certifications by the research analyst that the views expressed in the report accurately reflect his or her personal views, and disclose whether or not the analyst received compensation or other payments in connection with his or her specific recommendations or views. Broker-dealers would also be required to obtain periodic certifications by research analysts in connection with the analyst's public appearances. By requiring these certifications and disclosures, Regulation AC should promote the integrity of research reports and investor confidence in those reports.

Effective Date: April 14, 2003.

For Further Information Contact: James Brigagliano, Thomas Eidt, or Racquel Russell in the Office of Risk Management and Control, Division of Market Regulation, at (202) 942-0772.

Supplementary Information: We are adopting new Regulation Analyst Certification[1] under the Securities Act of 1933 ("Securities Act") and the Securities Exchange Act of 1934 ("Exchange Act").

I. Introduction and Summary of Regulation Analyst Certification

During 1999, the Commission and Congress began to closely examine research analysts' conflicts of interest. We were particularly concerned that many investors who rely on analysts' recommendations may not know, among other things, that favorable research coverage could be used to market the investment banking services provided by an analyst's firm, and that an analyst's compensation may be based significantly on generating investment banking business. Moreover, news reports stated that some analysts had issued reports that did not reflect their true beliefs and communicated to institutional investors views that differed materially from those expressed in their research reports.[2] Regulation AC, together with other efforts, is intended to address these issues. [3]

On May 10, 2002, we approved rule changes filed by the NYSE and NASD

governing analyst conflicts of interest.[4] On December 31, 2002, we noticed for comment a second set of proposed rules filed by the NYSE and NASD to further address research analyst conflicts of interest.[5] These self-regulatory organization rules are part of an ongoing process on our part and that of the NYSE and NASD to address conflicts of interest affecting the integrity and objectivity of research by securities firms. Regulation AC is intended to complement other rules governing conflicts of interest disclosure by research analysts, including NYSE Rule 472, NASD Rule 2711, and the anti-fraud provisions of the federal securities law.

On July 30, 2002, President Bush signed into law the Sarbanes-Oxley Act of 2002 ("SOA").[6] Section 501 of the SOA requires that rules governing analyst conflicts be adopted within a year of enactment, including rules: limiting the supervision and compensatory evaluation of securities analysts; defining periods in which brokers or dealers engaged in a public offering of a security as underwriter or dealer may not publish research on such security; and requiring securities analysts and brokers or dealers to disclose specified conflicts of interest. The Commission voted to propose Regulation AC on July 24, 2002, before the passage of the SOA. [7] In the Proposing Release, the Commission noted that it would abide by the directives of the SOA as it continues to address analyst conflicts of interest issues, including with respect to the possible adoption of Regulation AC.

The Commission received twenty-one comment letters in response to the Proposing Release,[8] which generally supported the proposed regulation. After considering the comments, we are adopting Regulation AC with modifications to the rule to reflect commenters' concerns and to clarify and limit certain provisions. We are also providing interpretive guidance requested by commenters.

A. Certifications in Connection with Research Reports

As adopted, Regulation Analyst Certification requires that brokers, dealers, and their associated persons that are "covered persons"[9] that publish,[10] circulate, or provide research reports include in those research reports:

> (A) a statement by the research analyst (or analysts) certifying that the views expressed in the research report accurately reflect such research analyst's personal views about the subject securities and issuers; and
>
> (B) a statement by the research analyst (or analysts) certifying either:
>
> > (1) that no part of his or her compensation was, is, or will be directly or indirectly related to the specific recommendations or views contained in the research report; or
> >
> > (2) that part or all of his or her compensation was, is, or will be directly or indirectly related to the specific recommendations or views contained in the research report. If the analyst's compensation was, is, or will be directly or indirectly related to the specific recommendations or views contained in the research report, the statement must include the source, amount, and purpose of such compensation, and further disclose that it may influence the recommendation in the research report.

All certifications must be clear and prominent.[11] If the analyst is unable to

certify that the report accurately reflects his or her personal views, distribution of the report by the broker-dealer or covered person would be in violation of Regulation AC. Similarly, if the report does not contain one of the two alternative compensation certifications, distribution of the report by the broker-dealer or covered person would be in violation of Regulation AC.[12]

Research reports generally contain an analyst's summary rating of the security based on his or her particular firm's rating system, as well as an analysis. The summary rating or recommendation is often one word (e.g., buy, sell, overweight), while the analysis may be very detailed and lengthy. Generally, the analysis explains the basis for the rating and provides extensive supplementary information, which, in some instances, significantly qualifies or conditions the stated rating. The Regulation AC certification that the views in the report accurately reflect the analyst's personal views applies to the analysis as reflected in the rating as well as the substance of a research report.

A rating is designed to be a severable summary statement of the analysis in the report. In situations where the analysis significantly qualifies or conditions the stated rating, a communication by the firm or the analyst of only the rating to an investor as representing the analyst's views about the security could be misleading.[13] Further, where the analysis contradicts the stated rating, an analyst and the firm could be in violation of the anti-fraud provisions of the federal securities laws. A rating that contradicts the analysis could also render false the analyst's certification, because the analyst's certification reflects both the analysis as well as the rating.

B. Certifications in Connection with Public Appearances

Under Regulation AC, broker-dealers must make and keep records related to public appearances by research analysts. Specifically, if a broker-dealer publishes, circulates, or provides a research report prepared by a research analyst employed by the broker-dealer or a covered person, the broker-dealer is required to make a record within thirty days after each calendar quarter in which the research analyst made any public appearance, that includes:

- A statement by the research analyst attesting that the views expressed by the research analyst in all public appearances during the calendar quarter accurately reflected the research analyst's personal views at that time about any and all of the subject securities or issuers; and

- A written statement by the research analyst certifying that no part of such research analyst's compensation was, is, or will be directly or indirectly related to any specific recommendations or views expressed in any such public appearance.

In cases where the broker-dealer does not obtain a statement by the research analyst in connection with public appearances as described above, the broker-dealer must promptly notify its examining authority, designated pursuant to Section 17(d) of the Exchange Act and Rule 17d-2 thereunder, that the analyst did not provide certification in connection with public appearances. In addition, for 120 days following such notification, the broker-dealer must disclose in any research report it distributes authored by that analyst that the analyst did not provide certification specified in Rule 502 (a) of Regulation AC. Further, broker-dealers must keep and maintain

these records pursuant to Rule 17a-4.

II. Response to Comments on Regulation Analyst Certification

In the Proposing Release, the Commission sought comment on specific aspects of the proposed regulation, as well as general comments. We received twenty-one comment letters in response to the release. Many commenters expressed support for Regulation AC, although a number also expressed concerns regarding one or more aspects of the proposal, and some suggested alternatives for addressing particular issues. We are adopting Regulation AC with modifications from the proposal that clarify or limit provisions or reflect commenters' views.

A. Defined Terms

We requested comment on whether the proposed definitions of "research report," "research analyst," or "public appearance" should be broader or narrower than proposed. Eleven commenters discussed the scope of the definitions proposed in Regulation AC and noted differences in certain respects compared to definitions contained in the self-regulatory organization ("SRO") rules and the SOA.[14] Generally, commenters believed that compliance efforts would be significantly enhanced by the use of consistent terminology throughout the rules wherever possible.[15] The Commission has conformed the terminology and definitions of Regulation AC to the SRO rules and the SOA wherever appropriate.

1. Definition of "Research Analyst"

Commenters noted that Regulation AC defines "research analyst" more broadly than do the current SRO analyst rules and the SOA. Specifically, the Regulation AC definition as proposed covers "any natural person," rather than only "associated persons of a member" (in the case of the SRO rules) or "associated persons of a registered broker or dealer" (in the case of the SOA). Commenters argued that Regulation AC applies to any person, including employees of investment advisers, foreign entities, or any other third party that prepares a research report that is circulated by a broker-dealer or associated persons.[16]

In this regard, Regulation AC is designed to be broader than the SRO rules and the SOA in that it applies to brokers, dealers, and certain associated persons[17], which may also include investment advisers and others that prepare research reports. We believe that the broad scope of Regulation AC is warranted because Regulation AC imposes core standards of integrity that should pertain to all research distributed by broker-dealers and covered persons. On the other hand, we note that Regulation AC is narrower than the SRO rules and the SOA in that its certification requirements apply only to the research analyst or analysts primarily responsible for the content of a research report; junior analysts are not required to certify.[18] This distinction is reasonable because the core integrity standards promoted by Regulation AC are achieved where the analysts primarily responsible for the views expressed in the research report are required to certify. In comparison, the coverage of junior analysts by the SRO rules is appropriate because the concerns those provisions seek to address (for example, trading ahead of research reports) exist with respect to all analysts associated with a member firm and those persons who report to analysts.

2. Definition of "Covered Person"

In response to comments, we have added the definition of "covered person" to narrow the scope of persons to which Regulation AC applies. Covered person means persons associated with a broker or dealer,[19] but not including an associated person that has no officers or employees in common with the broker or dealer and where the broker or dealer maintains and enforces written policies and procedures reasonably designed to prevent the broker or dealer or any of its controlling persons, officers, or employees from influencing the activities of research analysts and the content of research reports prepared by the associated person. In adopting Regulation AC, we have sought to focus the rule on research that appears to be most susceptible to pressures that might compromise its integrity, for example pressures to generate investment banking business.

We believe that it is unnecessary to apply Regulation AC to research published, circulated, or provided by associated persons who have a sufficient level of independence from the broker or dealer with which they are associated. Associated persons who meet the independence criteria in this definition should have a sufficient level of independence so that pressures from the broker-dealer with which they are associated should not compromise their research. In order to avoid the possibility that an associated person might incorrectly believe that the broker-dealer had policies and procedures to prevent influencing the research of the associated person and, therefore, fail to certify when certification was required, we have added a provision to Regulation AC (Rule 504) that requires a broker or dealer to notify its associated persons that issue research reports as to whether the broker or dealer maintains and enforces such written policies and procedures and whether the associated person has any officers (or persons performing similar functions) or employees in common with the broker or dealer who can influence the activities of research analysts or the content of research reports and, if so, the identity of those persons.[20] We also would not expect that such policies and procedures would interfere with other communications between the associated person and the broker-dealer made in the ordinary course of business and not in violation of any other provision of the securities laws.

We have also excluded from the rule investment advisers that are prohibited under Section 203A of the Investment Advisers Act of 1940[21] ("Advisers Act") from registering with the Commission as investment advisers and not otherwise registered or required to be registered as a broker-dealer. Section 203A was added to the Advisers Act by the National Securities Markets Improvement Act of 1996 ("NSMIA"), which amended the Advisers Act to divide responsibility for regulating investment advisers between the Commission and state securities authorities.[22] Section 203A of the Advisers Act effects this division by generally prohibiting investment advisers from registering with us unless they have at least $25 million of assets under management or advise a registered investment company.[23] Advisers prohibited from registering with us are subject to the regulation of state securities authorities, but also continue to be subject to the federal securities laws, including the anti-fraud provisions of the federal securities laws.

We also make clear that no provision of the regulation shall apply to the publisher of any newspaper, news magazine, or business or financial publication of general and regular circulation that is not registered or

required to be registered with the Commission as a broker or dealer or investment adviser. Regulation AC was never intended to govern media coverage of issuers.[24]

3. Definition of "Research Report"

The Commission requested comment on whether the definition of "research report" should be broader or narrower than proposed. Commenters discussed several aspects of the proposed definition, including whether it should cover debt securities, whether it should include electronic communications, and guidance concerning what will and will not be considered a research report.

a. Application to Debt Securities

We specifically requested comment on whether the proposed definition of "research report" should be limited to cover only equity securities. Five commenters discussed the application of Regulation AC to fixed income and all supported the application to debt to some extent.[25]

The Commission has determined that applying the requirements of Regulation AC to debt securities as well as equity securities would benefit investors because it would provide to debt investors the same benefits as equity investors by promoting the integrity of research reports and confidence in research analyst recommendations.

b. Electronic Communications

Commenters noted that, unlike the SRO rules, the proposed definition of "research report" in Regulation AC did not explicitly include "electronic communications," and requested that the Commission clarify that the regulation would apply to research reports transmitted electronically.

The Commission believes that electronic communications were included under proposed Regulation AC's definition of "research report." However, in response to commenters' concerns, the Commission has modified the proposed definition of "research report" to explicitly include written communications in electronic form.

c. What Constitutes a Research Report?

The Commission has deleted the "recommendation" element from Regulation AC's proposed definition of "research report" to conform to the definition in the SOA. Therefore, "research report" is defined as "a written communication (including an electronic communication) that includes an analysis of a security or an issuer and provides information reasonably sufficient upon which to base an investment decision."

Commenters requested that the Commission provide guidance concerning what types of communications the rule is not intended to cover.[26] Commenters also requested clarification that Regulation AC would not apply to internal communications.

It is not possible to provide a complete list of all types of communications that would or would not fall within the definition of "research report."

Whether a particular communication constitutes a research report for the purposes of Regulation AC will turn on the individual facts and circumstances surrounding that communication. In general, however, the following communications would not be research reports if they do not include an analysis of, or recommend or rate, individual securities or companies:

- Reports discussing broad-based indices, such as the Russell 2000 or S&P 500 index.
- Reports commenting on economic, political, or market conditions.
- Reports commenting on or analyzing particular types of debt securities or characteristics of debt securities.
- Technical analysis concerning the demand and supply for a sector, index, or industry based on trading volume and price.
- Reports that recommend increasing or decreasing holdings in particular industries or sectors or types of securities.

The following communications would generally not be research reports even if they recommend or rate individual securities or companies:

- Statistical summaries of multiple companies' financial data (including listings of current ratings) that do not include any analysis of individual companies' data.
- An analysis prepared for a specific person or a limited group of fewer than fifteen persons.[27]
- Periodic reports or other communications prepared for investment company shareholders or discretionary investment account clients discussing past performance or the basis for previously made discretionary investment decisions.
- Internal communications that are not given to customers.

4. Definition of "Third party research analyst"

In response to commenters' concerns, we have added a definition of "third party research analyst" in order to refine the scope of Regulation AC. A "third party research analyst" is, with respect to a particular broker or dealer, any research analyst not employed by that broker or dealer or any associated person of that broker or dealer. With respect to a covered person, a "third party research analyst" is any research analyst not employed by that covered person, by the broker or dealer with whom that covered person is associated, or by any other associated person of the broker or dealer with whom that covered person is associated. We believe that research prepared by third party research analysts will not be susceptible to pressures from broker-dealers who distribute their research provided that the analyst's employer meets certain independence criteria.

B. Discussion of Certification Requirements

1. Certification by the Primarily Responsible Analyst

Commenters requested clarification on identifying the research analyst that

would be required to make the certifications. Commenters argued that multiple certifications would likely be confusing or have other undesirable effects.[28]

Regulation AC requires that the analyst or analysts primarily responsible for the preparation of the content of a research report comply with the certification requirements. Thus, certification by junior analysts involved in the preparation of a research report is not necessary.[29] In some cases, however, there may be more than one research analyst primarily responsible for the content of a research report. In such instances, all analysts who are primarily responsible for the views expressed in the report must provide the certifications. Removing the names of all analysts from a report would not allow the firm to avoid including the required certifications and disclosures; the analyst or analysts primarily responsible for the report must certify.

2. Quantitative and Technical Research

Commenters argued that research based on quantitative and technical models may not be attributed to a particular analyst, may not reflect an analyst's views, and therefore, requested that the Commission provide guidance that these types of research would not be covered.[30] One commenter suggested, as an alternative, that Regulation AC should require a certification by the firm that the views expressed in the report are derived from the firm's systematic quantitative research model.[31]

The Commission has determined that, in cases where there is no identified analyst because the report is based on the firm's quantitative or technical model, the firm itself may provide the certifications that the views expressed in the research report accurately reflect the firm's quantitative research model, and that no part of the firm's compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views disclosed in the research report.

However, tying an analyst's compensation to the performance of a quantitative or technical model would indicate that the report is the product of the analyst's subjective views (reflected by the design of the model employed). In that case, that analyst must certify the report containing the model's results in accordance with Rule 501 of Regulation AC.

C. Certifications or Disclosures During Public Appearances

We requested comment on what, if any, disclosures should be required during public appearances by analysts. The four commenters that addressed this issue generally were opposed to requiring certifications during analyst public appearances. [32] We have determined not to require certifications during public appearances by analysts.

The Commission believes that the proposed quarterly certification requirements in connection with analyst public appearances are sufficient. If the analyst does not provide a certification in connection with public appearances, Rule 502 of Regulation AC requires the broker-dealer to provide readers of research reports that it distributes, as well as the broker-dealer's designated examining authority, with notice that the analyst did not provide the certifications.[33] A Rule 502(b) notice in a research report must be in plain English.

D. Compendium Reports

The Commission requested comment on whether Regulation AC should make allowances for compendium research reports covering six or more securities. Commenters that discussed the treatment of certifications in compendium research reports believed that Regulation AC should permit the required disclosures to appear in a place other than the report itself. [34] Most of these commenters specifically supported treatment of compendium reports for the purpose of Regulation AC similar to the treatment allowed under SRO rules. Under SRO rules, members are not obligated to include disclosures in compendiums if the report directs readers to a toll-free number or postal address to write for required disclosures.[35] Electronic compendiums may instead include a hyperlink and paper compendiums may also include a web address where disclosures are located. Two commenters suggested the use of a combined certification that each analyst referenced in the report certifies that the analysis attributed to him or her accurately reflects his or her views.[36]

The Commission has determined not to permit treatment of compendium research reports in a manner similar to that permitted by the SROs because, unlike the SRO rules, the certifications required by Regulation AC are very concise. Nonetheless, when a research report covers more than one company and each research analyst required to certify with respect to the views expressed in a portion of the report is able to certify that: (a) the views expressed in the research report accurately reflect such research analyst's personal views about the subject securities and companies; and (b) that no part of his or her compensation was, is, or will be directly or indirectly related to the specific recommendation or views contained in the research report, the firm may comply with Regulation AC by including one clear and prominent combined certification that, as to each company covered, the respective research analyst (or analysts) certifies as to (a) and (b) above.[37]

E. Application of Regulation AC to Investment Advisers and Banks

Regulation AC is directed at brokers, dealers, and covered persons, because we believe that these entities are subject to the greatest conflicts. Therefore, investment advisers and banks, among others, may be required to comply with the regulation if they are covered persons of a broker-dealer. The Commission noted in the Proposing Release that the term "research analyst" would not include personnel of an investment adviser, such as a mutual fund portfolio manager, who are not principally responsible for preparing research reports, even if the individuals are registered persons of a broker-dealer (similar to the guidance provided by the SROs in the joint interpretive memorandum).[38] The Commission requested comment on whether the regulation should cover banks that are not associated persons and other independent entities, and whether the rule should explicitly exclude investment advisers.

Commenters who addressed the application of Regulation AC to investment advisers generally opposed the rule's coverage of investment advisers and investment advisory personnel.[39] Some commenters called for the specific exclusion of investment advisers.[40] Commenters who addressed the application of Regulation AC to banks generally opposed the rule's coverage of banks.[41] One commenter favored the application of Regulation AC to investment advisers and banks.[42]

The Commission has determined that Regulation AC should not exclude all

investment advisers or banks that are associated with broker-dealers. However, as discussed above, the definition of "covered person" substantially narrows the scope of persons associated with a broker-dealer, such as investment advisers and banks, that are subject to Regulation AC. Where the broker-dealer has informational and structural separations from its associated person, the rule does not apply to that associated person. Where the protections are lacking, however, with respect to a person associated with a broker-dealer, that person is a covered person.[43] Accordingly, if an investment adviser or bank is a covered person and publishes, circulates, or provides research reports, the research report certification provisions of Regulation AC will apply. We believe those investment advisers and banks that do not meet the independence criteria that would exclude them from the definition of "covered person" may be subject to greater conflicts than are other investment advisers and banks. Specifically, a broker-dealer's investment banking department could pressure these investment adviser or bank affiliates to comment favorably in a research report or public appearance about a client or prospective client. Moreover, if associated persons that are covered persons were not subject to the certification requirements of Regulation AC, broker-dealers could attempt to funnel research through them to avoid complying with Regulation AC.[44]

F. Application of Regulation AC to Third Party Research

In Proposing Regulation AC, we did not propose to treat research prepared by third parties but distributed by a broker-dealer differently from research produced by the broker-dealer itself. Commenters argued that broker-dealers should not be responsible for certifying research by independent third parties. Moreover, they pointed out practical problems, including the difficulty of tracking analysts employed by third parties.[45] They also cited increased costs. They argued that firms would discontinue providing the valuable service of making third party research available to customers.[46]

We have determined not to apply Regulation AC where a broker-dealer distributes research prepared by a third party research analyst whose employer satisfies certain independence criteria. The independence criteria require that the third party research analyst's employer does not have officers or employees in common with the broker-dealer or covered person distributing its research, and that the broker-dealer has written policies and procedures designed to prevent the broker-dealer, its controlling persons, officers, and employees from influencing the activities of the third party research analyst and the content of his or her research reports. We believe that research analysts employed by these independent third parties will not be sufficiently susceptible to pressures from distributing broker-dealers to warrant certification. Where a broker-dealer distributes the research of a third party that does not meet the independence criteria, however, the broker-dealer must confirm that the research report includes the same research analyst certification as required by Regulation AC.

Commenters argued that it would be difficult to track analysts employed by third parties, some of whom are overseas, in order to monitor their public appearances and obtain written statements from them. In response to commenters' concerns, we have determined that broker-dealers who distribute third party research are not required to obtain the public appearance certifications required by Rule 502 of Regulation AC with respect to public appearances by third party research analysts.

G. Application of Regulation AC to Foreign Research

In proposing Regulation Analyst Certification, the Commission did not distinguish between research that was issued by a U.S. entity and research that was issued by a non-U.S. entity. Several commenters raised the issue of the Regulation's effect on research originating from a foreign entity. These commenters generally opposed the proposed scope of Regulation AC, which captured foreign entities (and their associated persons) that issue research reports, including those who are not required to be registered with the Commission under Section 15 of the Exchange Act.[47]

In light of these comments, we have created a narrow exception for foreign persons that are located outside of the United States and are not associated with a registered broker-dealer that prepares and provides research on foreign securities[48] to major United States institutions in the U.S. in accordance with the provisions of Rule 15a-6(a)(2). In these instances, the foreign person is excepted from the requirements of Regulation AC.

In addition, in the case of a research analyst employed outside the United States by a foreign person located outside the United States, Rule 502 of Regulation AC only applies to public appearances while the research analyst is physically present in the United States.

H. Supervision and Oversight

Commenters requested that the Commission clarify that the certification pertaining to the analyst's personal views is not intended to prevent research supervisors or review committees from seeking changes to the research product.[49] One commenter argued that Regulation AC should not impede the ability of a supervisor or a review committee to require that a report follow a written firm policy on when a research report can upgrade or downgrade a rating, or when it must withhold a rating to prevent conflicts or for other reasons.[50] Commenters argued that certification also should not preclude the ability of an analyst or a firm to modify the report to due to a change in the analyst's opinion or to remove statements that create legal or regulatory concerns.[51]

The certification required by Rule 501 of Regulation AC does not impede the oversight or review of research reports. If, at the end of the revision process, the analyst still believes that the report accurately reflects his or her personal views about the subject securities or issuers, then that analyst may certify and the firm may use the research report. If, however, after the review process the research report no longer reflects the analyst's personal views, then that analyst would be unable to certify and the firm would not be in compliance with Regulation AC if it uses the research report without a certification.

I. Regulation AC and Fraud Liability Under Federal Securities Laws

Several commenters requested that the Commission reiterate the position stated in the Proposing Release that Regulation AC does not impose new liability on analysts or their firms.[52] Regulation AC formalizes and potentially adds rigor to analysts' responsibilities to express their views truthfully and without guile.[53] Regulation AC makes explicit the representations that are already implicit when an analyst publishes his or her views — that the analysis of a security published by the analyst reflects the analyst's honestly held views.[54]

Regulation AC does not alter any other existing obligation under the federal securities laws for research analysts or broker-dealers.[55] A research report contains an inherent representation that the views expressed in the report are not knowingly false and do not omit material facts necessary in order to make statements made not misleading.[56] Thus, even without Regulation AC, analysts may be found to have violated the anti-fraud provisions of the federal securities laws if they make baseless recommendations or recommendations that they disbelieve.[57]

J. Performance-based Compensation

Commenters expressed concern that Regulation AC could be read to require disclosure of analyst compensation arrangements based on the accuracy or performance of the views expressed as to the subject company's prospects.[58] Commenters thought that the compensation disclosure provision should be clarified to only require disclosure of compensation that was intended to influence or induce the particular view expressed in the research report.[59]

In the Proposing Release, the Commission noted that Regulation AC does not preclude an analyst from providing otherwise permissible services to his or her firm's investment banking department, and it does not prohibit analysts generally from receiving compensation for covering issuers or for preparing research reports. Instead, Regulation AC focuses on disclosure where the analyst compensation that is related to the specific recommendations or views expressed by the research analyst in the research report. Regulation AC is not intended to address compensation based on the performance of the views expressed regarding the securities discussed.

III. Paperwork Reduction Act

Regulation AC contains "collection of information" requirements within the meaning of the Paperwork Reduction Act of 1995 ("PRA").[60] We have submitted the proposal to the Office of Management and Budget ("OMB") for review in accordance with the PRA.[61] An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a currently valid OMB control number.

In the Proposing Release, the Commission solicited comments on the collection of information requirements. In response to comments, the Commission has revised the estimates published in the Proposing Release regarding the collection of information burdens associated with the new rule.

A. Summary of Collection of Information

Regulation AC generally requires that research reports published, circulated, or provided by a broker or dealer or covered person contain a statement attesting that the views expressed in each research report accurately reflect the analyst's personal views and whether or not the research analyst received or will receive any compensation in connection with the views or recommendations expressed in the research report. Regulation AC also requires broker-dealers to, on a quarterly basis, make, keep, and maintain records of research analyst statements regarding whether the views expressed in public appearances accurately reflected the analyst's personal views, and whether any part of the analyst's compensation is related to the specific recommendations or views expressed in the public appearance.

B. Reporting and Cost Burden Estimates

Regulation AC provides that brokers, dealers, and covered persons must include in research reports they publish, circulate, or provide certain certifications and disclosures about the analyst's views expressed in the research reports and any relationship between the analyst's compensation and the specific recommendations or views expressed. The regulation also requires broker-dealers to periodically make, keep, and maintain records of research analyst certifications and disclosures in connection with public appearances.

The staff of the Commission believes that the average amount of time it would take to include the required certifications and disclosures in each research report is one minute per report. In the Proposing Release, the Commission staff estimated that broker-dealers publish approximately 657,000 research reports per year. One commenter provided the Commission with data in response to the Proposing Release.[62] After considering this additional information, the staff of the Commission believes that broker-dealers publish approximately 1,375,865 research reports per year.[63] Therefore, the Commission estimates that the total annual burden in hours for broker-dealers to comply with the research report certification and disclosure requirements is approximately 22,930 hours per year [(1 minute x 1,375,865 reports) / 60 minutes].

The Commission staff expects that research analysts will likely be the employees primarily charged with executing certifications and including them in research reports. According to industry sources, research analysts, on average, earn $189,250 per year, for an hourly pay rate of approximately $90. Including 35% overhead, Commission staff estimates that the hourly pay rate for a research analyst would be approximately $121.50. Therefore, the Commission estimates that the total annual burden in dollars for broker-dealers to comply with the research report certification and disclosure requirements is approximately $2,785,995.00[64] per year [22,930 hours x $121.50 per hour].

Rule 501 of Regulation AC, which applies to research reports, may also impose requirements on certain entities if they are associated with a broker-dealer and meet the definition of "covered person." However, "covered persons" are not subject to Rule 502 of Regulation AC, which addresses pubic appearances. The Commission estimates that approximately 2,650 SEC registered investment advisers are associated with a broker-dealer. We believe that not all of these entities write research reports, and that those who do write research reports write relatively few. Of those investment advisers that are associated with a broker-dealer and that write research reports, we do not believe that all of them will meet the definition of a "covered person," as defined by Regulation AC. As a conservative estimate, however, if all SEC registered investment advisers are covered persons and on average publish as many research reports per year as the average broker-dealer (250 research reports), the estimated total number of research reports published by SEC registered investment advisers who are associated with a broker-dealer would be approximately 662,500 [250 x 2,650].[65] Therefore, the Commission estimates that the total annual analyst certification burden in hours for these investment advisers would be 11,040 hours [(1 minute x 662,500 research reports) / 60 minutes]. The Commission estimates that the annual burden in dollars of complying with the research report certification and disclosure requirements for SEC registered investment advisers is approximately $1,341,360 per year[66] [11,040 x

$121.50]. Unlike Rule 501, Rule 502 of Regulation AC (public appearances) does not apply to covered persons. We note, however, that we believe that a significant number of associated persons would not be "covered person[s]," as defined in Rule 500 of Regulation AC and, as a result, the aggregate burden for persons associated with broker-dealers to comply with the research report certification and disclosure requirements will be significantly lower.

The staff of the Commission believes that the research analyst will prepare the quarterly statement required for public appearances. The staff estimates that the average amount of time it would take a research analyst to prepare the quarterly statements regarding public appearances as required by the regulation is ten minutes per analyst. The staff of the Commission believes that, on average, approximately 519 public appearances by research analysts occur per quarter,[67] or about 2,076 per year. Therefore, the Commission believes that the total annual burden for broker-dealers in hours of complying with the public appearance certification and disclosure requirements would be approximately 346 hours per year [(10 minutes x 2076 appearances) / 60 minutes].

In cases where the broker or dealer does not obtain a statement by the research analyst in connection with public appearances as described above, the broker-dealer must promptly notify its examining authority, designated pursuant to Section 17(d) of the Exchange Act and Rule 17d-2 thereunder, that the analyst did not provide certification in connection with public appearances. In addition, for 120 days following such notification, the broker-dealer must disclose in any research report it distributes authored by that analyst that the analyst did not provide certification specified in Rule 502(a) of Regulation AC. Further, broker-dealers must keep and maintain these records pursuant to Rule 17a-4(b)(4). Broker-dealers are also expected to have records that document the process they followed in producing each research analyst certification. The staff of the Commission believes that there will be few, if any, instances where a broker-dealer will provide notification to their examining authority, as analysts and their firms will have strong incentives to avoid having to make the type of disclosures required to be provided to their examining authority. Therefore, the total annual burden, in dollars, of complying with the public appearance certification requirements would be approximately $42,039 [346 hours x $121.50].

The regulation requires that the records of statements regarding public appearances be preserved in accordance with Exchange Act Rule 17a-4(b)(4). Exchange Act Rule 17a-4(b)(4) requires that any communication relating to a broker-dealer's business, including inter-office communications, must be kept for at least three years. In light of the existing record preservation requirement for brokers and dealers under Exchange Act Rule 17a-4(b)(4),[68] the staff of the Commission believes that any additional costs to preserve the records of the certifications required by the regulation would be minimal.

Rule 500 of Regulation AC includes a definition of "covered person," which limits the scope of the regulation's application. Rule 504 of Regulation AC requires a broker-dealer to notify its associated persons that issue research reports as to whether associated persons would meet the definition of "covered persons" under Regulation AC, and, therefore, be subject to the rule. Specifically, the broker-dealer must inform its associated persons whether the broker or dealer maintains and enforces written policies and procedures reasonably designed to prevent the broker or dealer or any of its

controlling persons, officers, or employees from influencing the activities of research analysts and the content of research reports prepared by associated persons. Broker-dealers must also inform its associated persons whether associated persons have any officers or employees in common with the broker or dealer who can influence the activities of research analysts or the content of research reports and, if so, the identity of those persons.

The staff has not obtained data on the amount of time it would take for broker-dealers to make the necessary determinations and to draft and provide the notification required under Rule 504 of Regulation AC. For PRA purposes, the below calculations represent the staff's estimates of the amount of time that would be required for broker-dealers to comply with Rule 504. The staff estimates that there are approximately 2,650 investment advisers that are associated with at least one broker-dealer. The staff estimates that it would take approximately one hour per year for each of the approximately 2,650 broker-dealers to determine whether it maintains and enforces written policies and procedures reasonably designed to prevent the broker or dealer or any of its controlling persons, officers, or employees from influencing the activities of research analysts and the content of research reports prepared by associated persons. The staff estimates that it would take approximately thirty minutes per year for each broker-dealer to determine whether its associated persons have any officers or employees in common with the broker or dealer who can influence the activities of research analysts or the content of research reports and, if so, the identity of those persons.[69]

The staff estimates that it would take fifteen minutes per year for each broker-dealer to draft and provide the required notification to its associated persons. The Commission staff expects that a compliance officer will likely be the employee primarily charged with making the necessary determinations, and drafting and providing the required notification. According to industry sources, in 2002, compliance officers, on average, earned approximately $82.00/per hour. Including 35% overhead, Commission staff estimates that the hourly pay rate for a compliance officer would be $110.70 per hour. Therefore, the Commission estimates that the annual burden for broker-dealers in hours of complying with the notification requirements would be approximately 4,638 hours [(2,650 x 105 minutes) / 60]. The staff estimates that the annual burden for broker-dealers of complying with the notification requirements in dollars would be approximately $513,427.00 [4,638 hours x $110.70].

Therefore, the Commission estimates that the regulation would result in a total annual burden in hours of approximately 38,954 hours [22,930 hours for broker-dealers to comply with the research report requirements + 11,040 hours for investment advisers to comply with the research report requirements + 346 hours for broker-dealers to comply with the public appearance requirements + 4,638 hours for broker-dealers to comply with the notification requirements], for a total annual cost in dollars of approximately $4,682,821 [$2,785,995 for broker-dealers to comply with the research report requirements + $1,341,360 for investment advisers to comply with research the report requirements + $42,039 for broker-dealers to comply with the public appearance requirements + $513,427 for broker-dealers to comply with the notification requirements].

IV. Costs and Benefits of Adopted Regulation Analyst Certification

To assist the Commission in evaluating the costs and benefits that may

result from adopting Regulation AC, the Commission sought comment on any potential costs, as well as any potential benefits, resulting from the proposal for investors, issuers, broker-dealers, other securities industry professionals, SROs, or others. The Commission also requested that commenters provide analysis and data to support their views. Regulation AC is part of an ongoing process by the Commission to address conflicts of interest affecting the production and dissemination of research by securities firms, and to provide increased disclosure to investors. Regulation AC includes a requirement that broker-dealers and covered persons include in research reports they publish certain certifications and disclosures about the analyst's views expressed in the research reports and any relationship between the analyst's compensation and the specific recommendations or views expressed. Regulation AC would also require broker-dealers to make, keep, and maintain records of research analyst certifications and disclosures in connection with public appearances. We are sensitive to the costs and benefits that result from our rules. The Commission initially identified certain costs and benefits relating to the proposals and encouraged commenters to discuss any additional costs or benefits. We discuss these costs and benefits below.

A. Costs

The Commission received letters from twenty-one commenters concerning Regulation AC. Only one commenter provided actual data to quantify the costs identified. This commenter believed that the estimates set forth in the proposing release were low primarily because the estimated number of research reports per year did not capture, among other things, reports by investment advisers and certain full-text reports.[70] The Commission modified its estimates in response to these comments.

The Commission also requested comment on how many public appearance certifications would likely be submitted to brokerage firms per quarter, and how many of those statements would be required to be provided to the firm's examining authority. One commenter believed that the estimate of the number of public appearances was too low, but did not provide specific data in support of its views.[71]

While Regulation AC may lead to some additional costs for brokers, dealers, and covered persons, we continue to believe that any costs should not be significant. In light of current requirements for broker-dealers under SRO rules, the Commission estimates that, beyond the paperwork costs described above, any additional costs to broker-dealers that would result from the required certifications and disclosures would be minimal. In the Proposing Release, the staff estimated that broker-dealers publish approximately 657,000 research reports per year. One commenter provided information that suggests that broker-dealers publish as many as 1,375,865 research reports per year.[72] Given the refined scope of Regulation AC, the staff believes that these two estimates represent a reasonable range with which to estimate research reports affected by the rule. Accordingly, the Commission estimates the total direct costs to be approximately $2.5 million to $4.7 million.[73] In addition, because the rule is minimally burdensome, the Commission believes that, beyond the paperwork costs described above, any additional costs to associated persons that would result from certifications and disclosures would be minimal.

Moreover, with respect to the compensation certifications and disclosures that are required by Regulation AC, brokers-dealers are already required to make certain disclosures regarding research analyst compensation under SRO

rules. For example, SRO rules currently require that firms disclose in research reports if the associated person preparing the report received compensation that is based upon (among other factors) the member's overall investment banking revenues.[74] Further, SRO rules prohibit members from offering favorable research to a company as consideration or inducement for the receipt of business or for compensation.[75] Additionally, Exchange Act Rule 17a-3(a)(19) currently requires broker-dealers to maintain a record of all agreements pertaining to the relationship between each associated person and the broker-dealer, including a summary of each associated person's compensation arrangement or plan.

In response to commenters' concerns, we modified the proposed rule text to include a definition of "covered person," which limits the scope of the regulation's application. Rule 504 of Regulation AC requires broker-dealers to notify its associated persons that issue research reports as to whether the broker-dealer maintains and enforces written policies and procedures reasonably designed to prevent the broker or dealer or any of its controlling persons, officers, or employees from influencing the activities of research analysts and the content of research reports prepared by the associated person, and to inform associated persons as to whether the associated person has any officers (or persons performing similar functions) or employees in common with the broker or dealer who can influence the activities of research analysts or the content of research reports and, if so, the identity of those persons. Broker-dealers may incur costs in providing this notification to each of its associated persons. As noted previously, the staff estimates that the paperwork costs for broker-dealers of complying with the notification requirements in dollars would be approximately $513,427.00. Any additional costs should not be significant in part because associated persons of an SRO member are required under SRO rules to provide prompt notice to his or her employer of employment with any other persons as a result of a business activity.[76]

With respect to public appearances, current SRO rules require analysts to make certain disclosures during public appearances, such as the member's or the analyst's ownership interests in the subject company. SRO rules also require analysts to disclose any other actual, material conflict of interest of which the research analyst knows, or has reason to know, at the time of the public appearance.[77]

Broker-dealers should already have in place procedures necessary to comply with many components of Regulation AC due to existing obligations under SRO rules, although these procedures might require some minor modifications to conform with Regulation AC. As noted previously, the Commission estimates that the annual paperwork costs in dollars of complying with the regulation would be approximately $4,682,821.

B. Benefits

We believe that investor confidence in the integrity of research has suffered because there is evidence that, in some cases, research analyst objectivity has been compromised due to, among other things, analysts' personal compensation and firms' investment banking relationships with issuers that are the subjects of research reports. Requiring research analysts to certify that the views expressed in research reports reflect their personal views, and requiring disclosure of information regarding whether analyst compensation is related to the specific recommendations made, should help bolster investor confidence in the quality of research. This, in turn, should

help increase investor confidence in the securities markets.

The Commission requested comment on whether the certification and disclosure requirements, if adopted, would promote investor confidence in the views expressed by research analysts and provide investors with useful information with which to evaluate potential biases. Ten commenters expressed support for Regulation AC. Generally, these commenters were of the view that Regulation AC would promote the integrity of research and investor confidence.[78] Three commenters did not agree that Regulation AC would advance investor protection and/or investor confidence to any significant degree.[79]

Regulation AC requires that broker-dealers and covered persons include certifications in research reports regarding the truthfulness of the views expressed in research reports and whether or not the analyst received compensation in connection with his or her specific recommendations or views. Many investors rely on the research reports and recommendations provided by their brokers and covered persons. To the extent that the Regulation AC requires disclosures that provide more transparency than provided by current regulation, these disclosures should provide investors with important information with which to determine the value of the research available to them.[80]

Regulation AC may result in an increase in the overall quality of the research available to the public because broker-dealers and covered persons would be in violation of Regulation AC when issuing research reports unless the reports include the required certifications and disclosures. The requirement that the research analyst (or analysts) primarily responsible for preparing the research report personally certify that the views expressed in the report accurately reflect his or her personal views creates an incentive for analysts to examine, even more carefully, the basis and foundations for his or her recommendations in preparing research reports.

Regulation AC may also result in an increase in the quality of research because of competitive reasons. Firms that publish research reports that do not contain certain analyst certifications will be in violation of the regulation, and firms whose research analysts' compensation is related to the specific recommendations or views provided in research reports (to the extent allowed by SRO rules) may lose some business to firms that are less conflicted. Regulation AC is intended to enhance investor confidence in the integrity of the research available to them. We believe that by requiring research analysts to certify as to the truthfulness of the views expressed in research reports, investor confidence in the securities markets should be enhanced, thereby leading to the benefit of more liquid and efficient markets. The Commission does not have data to quantify the value of the benefits described above. The Commission requested, but did not receive, comment on how it may quantify these benefits. The Commission also requested, but did not receive, comment concerning any benefits, not already identified, that may result from the adoption of Regulation AC.

V. Regulatory Flexibility Act Certification

Pursuant to Section 605(b) of the Regulatory Flexibility Act[81], the Commission certified that Regulation AC will not have a significant economic impact on a substantial number of small entities. This certification, including the reasons supporting the certification, were set forth in the Proposing Release.

The Commission solicited comments on the potential impact of Regulation AC on small entities in the Proposal. No comments were received that discussed the Regulatory Flexibility Act Certification. However, in response to other comments, the Commission has revised its estimates and believes that the total burden in hours required to comply with proposed Regulation AC would be approximately 5.78 hours per year, per small firm, as compared to the original estimate of two hours and two minutes per year, per small firm.

VI. Consideration of Burden on Competition, and Promotion of Efficiency, Competition and Capital Formation

Section 3(f) of the Exchange Act[82] requires us, when engaging in rulemaking where we are required to consider or determine whether an action is necessary or appropriate in the public interest, to consider whether the action will promote efficiency, competition, and capital formation. In addition, Section 23(a)(2)[83] of the Exchange Act requires the Commission to consider the impact any rule would have on competition. Further, the law requires that the Commission not adopt any rule that would impose a burden on competition not necessary or appropriate in furtherance of the purposes of the Exchange Act.

In the Proposing Release, the Commission solicited comment on the proposal's effect on competition, efficiency, and capital formation. Three commenters believed that Regulation AC would impose an inappropriate burden on competition.[84] One commenter asserted that the scope of Regulation AC was overly broad and would apply unnecessarily to, and be an onerous burden on, broker-dealer firms that are not subject to the conflicts the regulation is designed to address.[85] Another commenter asserted that Regulation AC may serve as a barrier to entry and an impediment to competition for firms seeking to provide an alternative to sell-side research.[86]

Regulation AC is intended to enhance investor confidence in the integrity of the research available to them. Further, we have modified the rule from the proposal and have limited the scope of its application. We believe that requiring broker-dealers and covered persons to include analyst certifications in research reports, as well as the other disclosures required by Regulation AC, should enhance investor confidence in the securities markets, thereby leading to a more efficient market.

The Commission has considered Regulation AC in light of the standards in Section 23(a)(2) and believes that it would not impose any burden on competition not necessary or appropriate in furtherance of the purposes of the Exchange Act. As discussed above in the Cost-Benefit section, the Commission recognizes that Regulation AC may lead to some additional costs for broker-dealers and covered persons. On balance, we think that the application of Regulation AC is tailored to those situations where the conflicts are most likely to affect research. As such, we do not believe that the rule would create an unreasonable burden on competition. Further, we believe that providing the benefits that will result from the rule in those conflict-laden situations will further the purposes of the rule, including enhancing investor confidence in the market, thereby leading to a more efficient market.

VII. Statutory Authority

Regulation AC is being adopted pursuant to Sections 3, 15, 17, and 23 of

the Exchange Act and pursuant to Sections 17 and 19 of the Securities Act.

TEXT OF THE RULE

List of Subjects in 17 CFR Part 242

Securities.

For the reasons set out in the preamble, Title 17, Chapter II, of the Code of Federal Regulations is amended as follows.

Part 242 — REGULATIONS M, ATS, and AC and CUSTOMER MARGIN REQUIREMENTS FOR SECURITY FUTURES

1. The authority citation for part 242 continues to be read as follows:

Authority: 15 U.S.C. 77g, 77q(a), 77s(a), 78b, 78c, 78g(c)(2), 78i(a), 78j, 78k-1(c), 78l, 78m, 78mm, 78n, 78o(b), 78o(c), 78o(g), 78q(a), 78q(b), 78q(h), 78w(a), 78dd-1, 80a-23, 80a-29, and 80a-37.

2. The part heading for part 242 is revised as set forth above.

3. Part 242 is amended by adding Regulation AC, §§ 242.500 through 242.505 to read as follows:

Sec.

242.500 Definitions.

242.501 Certifications in connection with research reports.

242.502 Certifications in connection with public appearances.

242.503 Certain foreign research reports.

242.504 Notification to associated persons.

242.505 Exclusion for news media.

Regulation AC -- Analyst Certification

§ 242.500 Definitions.

For purposes of Regulation AC (§§ 242.500 through 242.505 of this chapter) the term:

Covered person of a broker or dealer means an associated person of that broker or dealer but does not include:

(1) An associated person:

(i) If the associated person has no officers (or persons performing similar functions) or employees in common with the broker or dealer who can influence the activities of research analysts or the content of research reports; and

(ii) If the broker or dealer maintains and enforces written policies and procedures reasonably designed to prevent the broker or dealer, any controlling persons, officers (or persons performing similar functions), and employees of the broker or dealer from influencing the activities of research analysts and the content of research reports prepared by the associated

person.

(2) An associated person who is an investment adviser:

(i) Not registered with the Commission as an investment adviser because of the prohibition of section 203A of the Investment Advisers Act of 1940 (15 U.S.C. 80b-3a); and

(ii) Not registered or required to be registered with the Commission as a broker or dealer.

Note to definition of covered person: An associated person of a broker or dealer who is not a covered person continues to be subject to the federal securities laws, including the anti-fraud provisions of the federal securities laws.

Foreign person means any person who is not a U.S. person.

Foreign security means a security issued by a foreign issuer for which a U.S. market is not the principal trading market.

Public appearance means any participation by a research analyst in a seminar, forum (including an interactive electronic forum), or radio or television or other interview, in which the research analyst makes a specific recommendation or provides information reasonably sufficient upon which to base an investment decision about a security or an issuer.

Registered broker or dealer means a broker or dealer registered or required to register pursuant to section 15 or section 15B of the Securities Exchange Act of 1934 (15 U.S.C. 78o or 78o-4) or a government securities broker or government securities dealer registered or required to register pursuant to section 15C(a)(1)(A) of the Securities Exchange Act of 1934 (15 U.S.C. 78o-5(a)(1)(A)).

Research analyst means any natural person who is primarily responsible for the preparation of the content of a research report.

Research report means a written communication (including an electronic communication) that includes an analysis of a security or an issuer and provides information reasonably sufficient upon which to base an investment decision.

Third party research analyst means:

(1) With respect to a broker or dealer, any research analyst not employed by that broker or dealer or any associated person of that broker or dealer; and

(2) With respect to a covered person of a broker or dealer, any research analyst not employed by that covered person, by the broker or dealer with whom that covered person is associated, or by any other associated person of the broker or dealer with whom that covered person is associated.

United States has the meaning contained in § 230.902(l) of this chapter.

U.S. person has the meaning contained in § 230.902(k) of this chapter.

§ 242.501 Certifications in connection with research reports.

(a) A broker or dealer or covered person that publishes, circulates, or

provides a research report prepared by a research analyst to a U.S. person in the United States shall include in that research report a clear and prominent certification by the research analyst containing the following:

(1) A statement attesting that all of the views expressed in the research report accurately reflect the research analyst's personal views about any and all of the subject securities or issuers; and

(2)(i) A statement attesting that no part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by the research analyst in the research report; or

(ii) A statement:

(A) Attesting that part or all of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by the research analyst in the research report;

(B) Identifying the source, amount, and purpose of such compensation; and

(C) Further disclosing that the compensation could influence the recommendations or views expressed in the research report.

(b) A broker or dealer or covered person that publishes, circulates, or provides a research report prepared by a third party research analyst to a U.S. person in the United States shall be exempt from the requirements of this section with respect to such research report if the following conditions are satisfied:

(1) The employer of the third party research analyst has no officers (or persons performing similar functions) or employees in common with the broker or dealer or covered person; and

(2) The broker or dealer (or, with respect to a covered person, the broker or dealer with whom the covered person is associated) maintains and enforces written policies and procedures reasonably designed to prevent the broker or dealer, any controlling persons, officers (or persons performing similar functions), and employees of the broker or dealer from influencing the activities of the third party research analyst and the content of research reports prepared by the third party research analyst.

§ 242.502 Certifications in connection with public appearances.

(a) If a broker or dealer publishes, circulates, or provides a research report prepared by a research analyst employed by the broker or dealer or covered person to a U.S. person in the United States, the broker or dealer must make a record within thirty days after any calendar quarter in which the research analyst made a public appearance that contains the following:

(1) A statement by the research analyst attesting that the views expressed by the research analyst in all public appearances during the calendar quarter accurately reflected the research analyst's personal views at that time about any and all of the subject securities or issuers; and

(2) A statement by the research analyst attesting that no part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by the research analyst in such public appearances.

(b) If the broker or dealer does not obtain a statement by the research analyst in accordance with paragraph (a) of this section:

(1) The broker or dealer shall promptly notify in writing its examining authority, designated pursuant to section 17(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78q(d)) and § 240.17d-2 of this chapter, that the research analyst did not provide the certifications specified in paragraph (a) of this section; and

(2) For 120 days following notification pursuant to paragraph (b)(1) of this section, the broker or dealer shall disclose in any research report prepared by the research analyst and published, circulated, or provided to a U.S. person in the United States that the research analyst did not provide the certifications specified in paragraph (a) of this section.

(c) In the case of a research analyst who is employed outside the United States by a foreign person located outside the United States, this section shall only apply to a public appearance while the research analyst is physically present in the United States.

(d) A broker or dealer shall preserve the records specified in paragraphs (a) and (b) of this section in accordance with § 240.17a-4 of this chapter and for a period of not less than 3 years, the first 2 years in an accessible place.

§ 242.503 Certain foreign research reports.

A foreign person, located outside the United States and not associated with a registered broker or dealer, who prepares a research report concerning a foreign security and provides it to a U.S. person in the United States in accordance with the provisions of § 240.15a-6(a)(2) of this chapter shall be exempt from the requirements of this regulation.

§ 242.504 Notification to associated persons.

A broker or dealer shall notify any person with whom that broker or dealer is associated who publishes, circulates, or provides research reports:

(a) Whether the broker or dealer maintains and enforces written policies and procedures reasonably designed to prevent the broker or dealer, any controlling persons, officers (or persons performing similar functions), or employees of the broker or dealer from influencing the activities of research analysts and the content of research reports prepared by the associated person; and

(b) Whether the associated person has any officers (or persons performing similar functions) or employees in common with the broker or dealer who can influence the activities of research analysts or the content of research reports and, if so, the identity of those persons.

§ 242.505 Exclusion for news media.

No provision of this Regulation AC shall apply to any person who:

(a) Is the publisher of any bona fide newspaper, news magazine or business or financial publication of general and regular circulation; and

(b) Is not registered or required to be registered with the Commission as a broker or dealer or investment adviser.

By the Commission.

Margaret H. McFarland
Deputy Secretary

Dated: February 20, 2003

Endnotes

1 17 CFR 242.500 through 505.

2 *See, e.g.*, Gretchen Morgenson, "NASD Sues Star Analyst Over Research," *The New York Times* at A1 (September 24, 2002).

3 On December 20, 2002, the Commission, New York Attorney General, North American Securities Administrators Association, New York Stock Exchange ("NYSE"), National Association of Securities Dealers ("NASD"), and state securities regulators announced an agreement in principle that, if approved by the Commission, would result in a settlement with major investment firms to resolve issues of conflicts of interest relating to the production of research reports. Securities and Exchange Commission Press Release No. 2002-179 (December 20, 2002).

4 Securities Exchange Act Release No. 45908 (May 10, 2002), 67 FR 34968 (May 16, 2002).

5 Securities Exchange Act Release No. 47110 (December 31, 2002)*, 68 FR 826 (January 7, 2003).* The Commission will consider action on these proposed rules after the close of the comment period, which is March 10, 2003.

6 Pub. L. 107-204 (2002).

7 Securities Exchange Act Release No. 46301 (August 2, 2002), 67 FR 51510 (August 8, 2002) ("Proposing Release").

8 *See* Letters to Jonathan G. Katz, Secretary, Commission, from: The Alliance in Support of Independent Research, dated September 20, 2002 ("Alliance"); Association for Investment Management and Research, dated September 30, 2002 ("AIMR"); The Bond Market Association, dated September 23, 2002 ("TBMA"); Charles Schwab &Co., Inc., dated September 23, 2002 ("Schwab"); Cleary, Gottlieb, Steen & Hamilton, dated September 12, 2002 ("Cleary"); Credit Suisse First Boston, dated September 23, 2002 ("CSFB"); David Norr Inc., dated August 16, 2002 ("David Norr"); Goldman Sachs, dated September 23, 2002 ("Goldman"); Investment Company Institute, dated September 23, 2002 ("ICI"); Investment Counsel Association of America, letters dated September 23, 2002 and January 13, 2003 ("ICAA"); Investorside Research Association, dated September 20, 2002 ("Investorside"); Karr Tuttle Campbell, dated September 27, 2002 ("Karr Tuttle"); Rupert Kenna, dated October 10, 2002; Merrill Lynch, dated September 18, 2002 ("Merrill"); North American Securities Administrators Association, Inc., dated September 23, 2002 ("NASAA"); Salomon Smith Barney, dated September 27, 2002 ("SSB"); Securities Industry Association, dated September 23, 2002 ("SIA"); Sullivan & Cromwell, dated September 23, 2002 ("Sullivan"); Thomson Financial, dated September 23, 2002; and Weiss Ratings, Inc., dated September 10, 2002 ("Weiss").

[9] "Covered person" is defined in Rule 500 of Regulation AC, and is discussed in detail below at II.A.2.

[10] Publish means to disseminate by any means, including though any third party.

[11] Regulation AC, 17 CFR 242.501(a). The Commission expects that the certifications will be included on the front page of the research report, or that the front page will specify the page or pages on which each certification is found. Disclosures and references to disclosures must be clear and prominent. Electronic research reports may utilize hyperlinks to this disclosure, provided that the first screen that the investor sees clearly and prominently labels the hyperlinks to the required disclosures. When hyperlinks are not possible (such as a report in PDF format), firms should follow the requirements for paper reports. *See* NYSE Information Memo No. 02-26 (June 26, 2002), and NASD Notice to Members 02-39 (July 2002).

[12] Communications relating to the certifications should be treated as being within the purview of Exchange Act Rule 17a-4(b)(4). *See* Exchange Act Rule 17a-4(b)(4), 17 CFR 240.17a-4(b)(4).

[13] *Cf. Hanly v. SEC*, 415 F.2d 589, 597 (2d Cir. 1969).

[14] *See* Alliance, AIMR, Cleary, Goldman, ICI, ICAA, SIA, SSB, Schwab, Sullivan, and Thomson Financial.

[15] *See, e.g.*, Cleary and SIA.

[16] *See, e.g.*, Cleary, ICAA, SSB, Sullivan, and Thomson Financial.

[17] *See* Rule 500 of Regulation AC (definition of "covered person").

[18] The proposed definition of "research analyst" referred to any natural person "principally" responsible for research reports; the adopted definition refers to any natural person "primarily" responsible. This modification clarifies that, whether or not a natural person is considered to be principally responsible for research reports as a job description, any natural person who is primarily responsible for the preparation of the content of any research report is a research analyst for the purposes of Regulation AC unless otherwise exempted.

[19] The term "person associated with a broker or dealer" is defined in Exchange Act Section 3(a)(18), 15 U.S.C. 78c(a)(18).

[20] Associated persons of a member are required under SRO rules to provide prompt notice to his or her employer of employment with any other persons as a result of a business activity. *See* NASD Rule 3030.

[21] 15 U.S.C. 80b-3a.

[22] Pub. L. No. 104-290, 110 Stat. 3416 (1996) (codified in scattered sections of the United States Code). Section 203A was designed to allow the Commission to better use its limited resources by concentrating its regulatory responsibilities on advisers with national businesses, and to reduce the burden to investment advisers of the overlapping and duplicative regulation existing prior to the enactment of NSMIA. *See* S. Rep. No. 293,

104th Cong., 2d Sess. 2-4 (1996). In conjunction with implementing NSMIA, the Commission amended several "prophylactic" anti-fraud rules under the Advisers Act to make them inapplicable to state-registered advisers because "application of these provisions to state-registered advisers is more appropriately a matter for state law." Investment Advisers Act Release No. 1633 (May 15, 1997), 62 FR 28112 (May 22, 1997).

[23] Pursuant to authority under Advisers Act Section 203(a)(1)(A) the Commission adopted Advisers Act Rule 203A-1, which made SEC registration optional for certain investment advisers that have between $25 and $30 million of assets under management. *See* Advisers Act Rule 203A-1(a)(1), 17 CFR 275.203A-1(a)(1).

[24] It is possible that a broker or dealer or covered person could provide a research report to a media entity intending that it be published. In that case, the report must be certified by the research analyst.

[25] *See* CSFB, Goldman, NASAA, SSB, and TBMA. We note that the SOA and the SRO rules apply only to equity securities.

[26] *See* SIA and Schwab.

[27] We have focused on a group of fewer than fifteen persons in part because Congress made a determination that an investment adviser who, during the course of the preceding twelve months, has had fewer than fifteen clients and who, among other things, does not hold themselves out generally to the public as an investment adviser, does not have to register with the Commission as an investment adviser. *See* Advisers Act Rule 203(b)(3), 15 U.S.C. 80b-3(b)(3).

[28] *See, e.g.*, SIA and SSB.

[29] The Commission notes that any person not required to comply with the certification requirements of Regulation AC (*e.g.*, junior analysts) would nonetheless be subject to the antifraud provisions of the federal securities laws.

[30] *See* Schwab and SIA.

[31] *See* Schwab.

[32] *See* AIMR, Goldman, SIA, and SSB.

[33] The Commission believes that merely citing to the rule provision would not constitute an adequate notice.

[34] *See* CSFB, Cleary, Goldman, SIA, SSB, and Schwab.

[35] *See* CSFB, Cleary, SIA, SSB, and Schwab.

[36] *See* SIA and SSB.

[37] This certification must be in plain English. The Commission would expect that broker-dealers would be able to demonstrate that the combined certification in the report is accurate.

[38] *See* NYSE Information Memo No. 02-26 (June 26, 2002), and NASD Notice to Members 02-39 (July 2002).

[39] *See* Alliance, ICAA, ICI, Investorside, SIA, SSB, Sullivan, and Thomson Financial.

[40] *See, e.g.*, ICAA and ICI.

[41] *See* Investorside, SSB, Sullivan, and Thomson Financial.

[42] *See* NASAA.

[43] As discussed above, Regulation AC requires a broker-dealer to inform its associated persons as to whether or not it maintains and enforces the informational barriers described in Regulation AC.

[44] Regulation AC is directed at those regulated persons that prepare research reports, as well as persons associated with regulated persons who might be used if attempts were made to improperly circumvent the rule. *See also* Exchange Act Section 20(b), 15 U.S.C. 78t(b).

[45] *See* Alliance and Thomson Financial.

[46] *See, e.g.*, Schwab.

[47] *See, e.g.*, Cleary and Thomson Financial.

[48] As defined in the rule, for purposes of Regulation AC, "foreign security" means a security issued by a foreign company for which a U.S. market is not the principal trading market.

[49] *See, e.g.*, SIA and SSB.

[50] *See* SIA.

[51] *See* SIA and SSB.

[52] *See, e.g.*, Karr Tuttle, NASAA, SIA, and SSB.

[53] As the Commission stated in the Proposing Release, Regulation AC is not intended to create new duties under Section 10(b) of the Exchange Act. As a result, no private liability will arise from a broker, dealer, or associated person's failure to make the required disclosure, or make, keep, and maintain required records. However, Regulation AC is subject to the full range of the Commission's enforcement authority. With regard to the enforcement of Regulation AC by the SROs, nothing in Regulation AC is inconsistent with Exchange Act Rule 19g2-1. *See* 17 CFR 240.19g2-1.

[54] The use of a certification process echoes and is consistent with one approach employed in the Sarbanes-Oxley Act of 2002, which requires certifications by officers of corporations relating to issuers' financial statements. *See* Sarbanes-Oxley Act Sections 302 and 906, Pub. L. 107-204 (2002).

[55] *See, e.g.*, Securities Act Sections 17(a) and 17(b), 15 U.S.C. 77q; Exchange Act Section 10(b), 15 U.S.C. 78j(b), and Rule 10b-5, 17 CFR

240.10b-5.

56 *See, e.g.*, Securities Act Section 17(a), 15 U.S.C. 77q(a); Exchange Act Rule 10b-5, 17 CFR 240.10b-5; Exchange Act Section 15(c)(1)(A), 15 U.S.C. 78*o*(c)(1)(A); and Exchange Act Rule 15c1-2(b), 17 CFR 240.15c1-2.

57 *See* Securities Exchange Act Release No. 45908 (May 10, 2002), 67 FR 34968, 34977 (May 16, 2002); Proposing Release at 51512; *Cf. Hanly*, supra, note 13, at 597. *See also In the Matter of Robertson Stephens, Inc.*, Administrative Proceeding File No. 3-11003 (January 9, 2003) (settled fraud action against broker-dealer where Commission found that a research analyst employed by the broker-dealer issued recommendations about a public company that were inconsistent with his privately communicated beliefs about the company.)

58 *See, e.g.*, Goldman and Merrill.

59 *See, e.g.*, Cleary, SIA, SSB, and Sullivan.

60 44 U.S.C. Section 3501 *et seq*.

61 44 U.S.C. Section 3507(d) and 5 CFR 1320.11.

62 Thomson Financial asserted in its comment letter that the Commission's cost estimate in the Proposing Release was too low. Thomson Financial noted that the Commission cited data from Thomson Financial First Call and estimated that broker-dealers publish 657,000 research reports per year. Thomson Financial asserted that, while this estimate may accurately reflect equity research on U.S. securities transmitted via First Call Notes, it did not capture fixed-income research, research on non-U.S. equities or full-text reports transmitted through First Call Research Direct. Thomson Financial asserted that, when these additional sell-side reports are accounted for, the total exceeds 2 million reports a year. Thomson Financial suggested that the compliance costs for sell-side firms could run as high as $4,116,784.50.

63 After further consultation with Thomson Financial, they have revised their total estimated number of research reports per year for 2001 to range between 1,375,865 and 1,540,150. The staff believes that the overall calculations are over-inclusive and possibly duplicative. As a result, we are basing our estimates on the lower-end of the range of the number of research reports per year. The staff believes that this estimate continues to be conservative.

64 The estimated total annual burden in dollars for broker-dealers to comply with the research report certification and disclosure requirements would be approximately $3,118,642.00 if calculated using the high-end of the estimated range for the number of research reports.

65 We believe that including all SEC registered investment advisers in calculating the paperwork burden as to covered persons is over-inclusive as to investment advisers, and that this estimate is therefore sufficient to account for other types of entities who would meet the definition of "covered person."

66 The estimated total annual burden in dollars for SEC registered investment advisers to comply with the research report certification and disclosure requirements would be approximately $1,501,518.00 if calculated using the

high-end of the estimated range for the number of research reports.

67 519 is approximately 10% of the estimated 5,186 research analysts employed in the U.S., which is based on information provided by Nelson Information. One commenter believes that this estimate is low, but did not provide specific data in support of its views. *See* Thomson Financial.

68 OMB Control No. 3235- 0279.

69 Broker-dealers should already have mechanisms in place to determine whether such persons exist and, if so, the identity of those persons because of NASD Rule 3030. *See* NASD Rule 3030.

70 *See* Thomson Financial.

71 *Id.*

72 *See* Thomson Financial and footnote 63 for a discussion of revisions to the original estimate.

73 The total burden range of approximately $2.5 million to $4.7 million is obtained by applying both the low and the high research report estimates. Costs are proportionate to the number of research reports assumed to be issued each year. For purposes of the Paperwork Reduction Act analysis, we used the estimate of 1,375,865 research reports to obtain the high end of the burden range. If we instead substitute the low estimate of 657,000 research reports in place of the high estimate, the low end of the burden range is approximately $2.5 million. The low research report estimate is approximately 48% of the high estimate and the resulting total annual cost burden is approximately $2.5 million [$1,337,278 for broker-dealers to comply with the research report requirements + $643,853 for investment advisers to comply with the research report requirements + $42,039 for broker-dealers to comply with the public appearance requirements + $513,427 for broker-dealers to comply with the notification requirements = $2,536,596].

74 NASD 2711 (h)(2)(A)(i); NYSE 472 (k) (2).

75 NASD Rule 2711(e); NYSE Rule 472(g).

76 *See* NASD Rule 3030.

77 NASD Rule 2711(h); NYSE 472(k)(1).

78 *See* AIMR, CSFB, Goldman, ICAA, ICI, Merrill, SIA, SSB, Schwab, and TBMA.

79 *See* David Norr, NASAA, and Thomson Financial.

80 *See* Securities Exchange Act Release No. 45908 (May 10, 2002), 67 FR 34968 (May 16, 2002).

81 5 U.S.C. 605(b).

82 15 U.S.C. Section 78c(f).

83 15 U.S.C. Section 78w(a)(2).

84 *See* Alliance, Investorside, and Thomson Financial.

85 *See* Alliance.

86 *See* Investorside.

http://www.sec.gov/rules/final/33-8193.htm

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Do Analyst Conflicts Matter? Evidence from Stock Recommendations

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Abstract

We examine whether conflicts of interest with investment banking and brokerage businesses induce sell-side analysts to issue optimistic stock recommendations and, if so, whether investors are misled by such biases. Using quantitative measures of potential conflicts constructed from a novel data set containing revenue breakdowns of analyst employers, we find that recommendation levels are indeed positively related to conflict magnitudes. The optimistic bias stemming from investment banking conflicts was especially pronounced during the late-1990s stock market bubble. However, evidence from the response of stock prices and trading volumes to upgrades and downgrades suggests that the market recognizes analysts' conflicts and properly discounts analysts' opinions. This pattern persists even during the bubble period. Moreover, the 1-year stock performance following revised recommendations is unrelated to the magnitude of conflicts. Overall, our findings do not support the view that conflicted analysts are able to systematically mislead investors with optimistic stock recommendations.

1. Introduction

In April 2003, 10 of the largest Wall Street firms reached a landmark settlement with state and federal securities regulators on the issue of conflicts of interest

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faced by stock analysts.[1] The settlement requires the firms to pay a record $1.4 billion in compensation and penalties in response to government charges that the firms issued optimistic stock research to win favor with potential investment banking (IB) clients. Part of the settlement funds are earmarked for investor education and for provision of research from independent firms. In addition to requiring large monetary payments, the settlement mandates structural changes in the firms' research operations and requires the firms to disclose conflicts of interest in analysts' research reports.

The notion that investors are victims of biased stock research presumes that (1) analysts respond to the conflicts by inflating their stock recommendations and (2) investors take analysts' recommendations at face value. Even if analysts are biased, it is possible that investors understand the conflicts of interest inherent in stock research and rationally discount analysts' opinions. This alternative viewpoint, if accurate, would lead to very different conclusions about the consequences of analysts' research. Indeed, investors' rationality and self-interested behavior imply that stock prices should accurately reflect a consensus about the informational quality of public announcements (Grossman 1976; Grossman and Stiglitz 1980). Rational investors would recognize and adjust for analysts' potential conflicts of interest and thereby largely avoid the adverse consequences of biased stock recommendations.

In this article, we provide evidence on the extent to which analysts and investors respond to conflicts of interest in stock research. We address four questions. First, is the extent of optimism in stock recommendations related to the magnitudes of analysts' conflicts of interest? Second, to what extent do investors discount the opinions of more conflicted analysts? In particular, do stock prices and trading volumes react to recommendation revisions in a manner that rationally reflects the degree of analysts' conflicts? Third, is the medium-term (that is, 3- to 12-month) performance of recommendation revisions related to conflict severity? And, finally, did conflicts of interest affect analysts or investors differently during the late-1990s stock bubble than during the postbubble period? The answers to these questions are clearly of relevance to stock market participants, public policy makers, regulators, and the academic profession.

We use a unique, hand-collected data set that contains the annual revenue breakdown for 232 public and private analyst employers. This information allows us to construct quantitative measures of the magnitude of potential conflicts not only from IB business but also from brokerage business. We analyze a sample of over 110,000 stock recommendations issued by over 4,000 analysts during the 1994–2003 time period. Using univariate tests as well as cross-sectional regressions that control for the size of the company followed and individual analysts' experience, resources, workloads, and reputations, we attempt to shed

[1] Two more securities firms (Deutsche Bank Securities Inc. and Thomas Weisel Partners LLC) were added to the formal settlement in August 2004.

light both on how analysts respond to pressures from IB and brokerage businesses and on how investors compensate for the existence of such conflicts of interest.

A number of studies (for example, Dugar and Nathan 1995; Lin and McNichols 1998; Michaely and Womack 1999; Dechow, Hutton, and Sloan 2000; Bradley, Jordan, and Ritter 2008) focus on conflicts faced by analysts in the context of existing underwriting relationships (see also Malmendier and Shanthikumar 2007; Cliff 2007).[2] Our article complements this literature in several ways. First, we take into account the pressure to generate underwriting business from both current and potential client companies. Even if an analyst's firm does not currently do IB business with a company that the analyst tracks, it might like to do so in the future. Second, we examine the conflict between research and all IB services (including advice on mergers, restructuring, and corporate control), rather than just underwriting. Third, we examine conflicts arising from brokerage business in addition to those from IB.[3]

Fourth, the prior empirical finding that underwriter analysts tend to be more optimistic than other analysts is consistent with two alternative interpretations: (*a*) an optimistic report on a company by an underwriter analyst is a reward for past IB business or an attempt to win future IB business by currying favor with the company or (*b*) a company chooses an underwriter whose analyst already likes the stock. The second interpretation implies that underwriter choice is endogenous and does not necessarily imply a conflict of interest. We sidestep this issue of endogeneity by not focusing on underwriting relations between an analyst's firm and the company followed. Instead, our conflict measures focus on the importance to the analyst's firm of IB and brokerage businesses, as measured by the percentage of its annual revenue derived from IB business and from brokerage commissions. Unlike underwriting relations between an analyst's firm and the company followed, the proportions of the entire firm's revenues from each of these businesses can reasonably be viewed as given, exogenous variables from the viewpoint of an individual analyst. Finally, our approach yields substantially larger sample sizes than those used in prior research, and it therefore leads to greater statistical reliability of the results.

Several articles adopt an approach that is similar in spirit to ours. For example, Barber, Lehavy, and Trueman (2007) find that recommendation upgrades (downgrades) by investment banks—which typically also have brokerage businesses—

[2] Bolton, Freixas, and Shapiro (2007) theoretically analyze a different type of conflict of interest in financial intermediation, one faced by a financial advisor whose firm also produces financial products (such as in-house mutual funds). Mehran and Stulz (2007) provide an excellent review of the literature on conflicts of interest in financial institutions.

[3] Hayes (1998) analyzes how pressure on analysts to generate brokerage commissions affects the availability and accuracy of earnings forecasts. Both Irvine (2004) and Jackson (2005) find that analysts' optimism increases a brokerage firm's share of the trading volume. Ljungqvist et al. (2007) find that analysts employed by larger brokerage houses issue more optimistic recommendations and more accurate earnings forecasts. However, none of these articles examines how investors' responses to analysts' recommendations and the investment performance of recommendations vary with the severity of brokerage conflicts, issues that we investigate here.

underperform (outperform) similar recommendations by non-IB brokerages and independent research firms. Cowen, Groysberg, and Healy (2006) find that full-service securities firms—which have both IB and brokerage businesses—issue less optimistic forecasts and recommendations than do non-IB brokerage houses. Finally, Jacob, Rock, and Weber (2008) find that short-term earnings forecasts made by investment banks are more accurate and less optimistic than those made by independent research firms. We extend this line of research by quantifying the reliance of a securities firm on IB and brokerage businesses. This is an important feature of our article for at least two reasons. First, given that many securities firms operate in multiple lines of business, it is difficult to classify them by business lines. By separately measuring the magnitudes of both IB and brokerage conflicts in each firm, our approach avoids the need to rely on a classification scheme. Second, since the focus of this research is on the consequences of analysts' conflicts, the measurement of those conflicts is important. Our conclusions sometimes differ from those in classification-based studies.

We find that analysts do indeed seem to respond to pressures from IB and brokerage businesses: larger potential conflicts of interest from these businesses are associated with more positive stock recommendations. We also document that the distortive effects of IB conflicts were larger during the late-1990s stock bubble than during the postbubble period. Nonetheless, the empirical analysis yields several pieces of evidence to suggest that investors are sophisticated enough to adjust for these biases. First, the short-term reactions of both stock prices and trading volumes to recommendation upgrades are negatively and statistically significantly related to the magnitudes of potential IB or brokerage conflicts. For downgrades, the corresponding relation is negative for stock prices but positive for trading volumes. Second, the 1-year investment performance after recommendation revisions bears no systematic relation to the magnitude of conflicts. Finally, investors continued to discount conflicted analysts' opinions during the bubble period, even amid the euphoria prevailing in the market at the time. Together these results strongly support the idea that the marginal investor, taking analysts' conflicts into account, rationally discounts optimistic stock recommendations.[4]

The remainder of the article is organized as follows. We discuss the issues in Section 2 and describe our sample and data in Section 3. Section 4 examines the relation between recommendation levels and the degree of IB or brokerage conflict faced by analysts. Section 5 analyzes how conflicts are related to the response of stock prices or trading volumes to recommendation revisions. Section

[4] In a companion paper (Agrawal and Chen 2005), we find that analysts appear to respond to conflicts when making long-term earnings growth projections but not short-term earnings forecasts. This finding is consistent with the idea that, with short-term forecasts, analysts worry about their deception being revealed with the next quarterly earnings release, but they have greater leeway with long-term forecasts. We also find that the frequency of forecast revisions is positively related to the magnitude of brokerage conflicts, and several tests suggest that analysts' trade generation incentives impair the quality of stock research.

6 investigates the relation between conflicts and the investment performance of recommendation revisions. Section 7 presents our results for the late-1990s stock bubble and postbubble periods, and Section 8 concludes.

2. Issues and Hypotheses

Investment banking activity is a potential source of analyst conflict that has received widespread attention in the financial media (for example, Gasparino 2002; Maremont and Bray 2004) as well as the academic literature (for example, Lin and McNichols 1998; Michaely and Womack 1999). When IB business is an important source of revenue for a securities firm, a stock analyst employed by the firm often faces pressure to inflate his or her recommendations. This pressure is due to the fact that the firm would like to sell IB services to a company that the analyst tracks.[5] The company, in turn, would like the analyst to support its stock with a favorable opinion. Thus, we expect that the more critical is IB revenue to an analyst's employer, the greater the incentives an analyst faces to issue optimistic recommendations.[6]

Analysts also face a potential conflict with their employers' brokerage businesses. Here, the pressure on analysts originates not from the companies that they follow but from within their employing firms. Brokerage business generates a large portion of most securities firms' revenues, and analyst compensation schemes are typically related explicitly or implicitly to trading commissions. Thus, analysts have incentives to increase trading volumes in both directions (that is, buys and sells). Given the many institutional constraints that make short sales relatively costly, many more investors participate in stock purchases than in stock sales.[7] Indeed, it is mostly existing shareholders of a stock who sell. This asymmetry between purchases and sales implies that the more important brokerage business is to an analyst's employer, the more pressure the analyst faces to be bullish when issuing recommendations.

Analysts who respond to the conflicts they face by issuing blatantly misleading stock recommendations can develop bad reputations that reduce their labor income and hurt their careers.[8] Stock recommendations, however, are not as easily evaluated as other outputs of analysts' research, such as 12-month price targets or quarterly earnings forecasts, which can be judged against public, near-

[5] Throughout this article, we refer to an analyst's employer as a "firm" and a company followed by an analyst as a "company."

[6] Ljungqvist, Marston, and Wilhelm (2006, forthcoming) find that, while optimistic recommendations do not help the analyst's firm win the lead underwriter or comanager positions in general, they help the firm win the comanager position in deals in which the lead underwriter is a commercial bank.

[7] Numerous regulations in the United States increase the cost of selling shares short (see, for example, Dechow et al. 2001). Therefore, the vast majority of stock sales are regular sales rather than short sales. For example, over the 1994–2001 period, short sales comprised only about 10 percent of the annual New York Stock Exchange trading volume (New York Stock Exchange 2002).

[8] See Jackson (2005) for a theoretical model showing that analysts' concerns about their reputations can reduce optimistic biases arising from brokerage business.

term realizations. So it is not clear whether analysts' career concerns can completely prevent them from responding to pressures to generate IB or brokerage business.

The relation between conflict severity and the short-term (2- or 3-day) stock price impact of a recommendation should depend on whether investors react to the opinion rationally or naively.[9] Under the rational discounting hypothesis, the relation should be asymmetric for upgrades and downgrades. For upgrades, the stock price response should be negatively related to the degree of conflict. This implication arises because analysts who face greater pressure from IB or brokerage business are likely to be more bullish in their recommendations, and rational investors should discount an analyst's optimism more heavily. For downgrades, however, the story is different. When an analyst downgrades a stock despite facing large conflicts, rational investors should find the negative opinion more convincing and should be more likely to revalue the stock accordingly. This implies that the short-term stock price response to a downgrade should be negatively related to the degree of conflict.

The rational discounting hypothesis also predicts cross-sectional relations between conflict severity and the short-term trading volume responses to recommendations. As Kim and Verrecchia (1991) demonstrate in a rational expectations model of trading, the more precise a piece of news, the more individuals will revise their prior beliefs and, hence, the more trading that will result. In the present context, investor rationality implies that an upgrade by a highly conflicted analyst represents less precise news to investors, and so such a revision should be followed by a relatively small abnormal volume. But when an analyst downgrades a stock despite a substantial conflict, the signal is regarded as being more precise, and thus the downgrade should lead to relatively large abnormal trading.

By contrast, under the naive investor hypothesis, investors are largely ignorant of the distortive pressures that analysts face and accept analysts' recommendations at face value. This implies that there should be no relation between conflict severity and the short-term response of either stock prices or trading volume to recommendation revisions. Furthermore, the absence of a systematic relation should hold true for both upgrades and downgrades.

What are the implications of the two hypotheses for the medium-term (3- to 12-month) investment performance of analysts' recommendations? Under the rational discounting hypothesis, there should be no systematic relation between the magnitude of conflicts faced by an analyst and the performance of his or her stock recommendations: the market correctly anticipates the potential distortions up front and accordingly adjusts its response. But the naive investor hypothesis predicts that performance should be negatively related to conflict

[9] This framework follows Kroszner and Rajan (1994) and Gompers and Lerner (1999), who analyze the conflicts that a bank faces in underwriting securities of a company when the bank owns a (debt or equity) stake in it.

severity for both upgrades and downgrades. That is, investors ignore analysts' conflicts up front and pay for their ignorance later.

3. Sample and Data

3.1. Sample

Our sample of stock recommendations comes from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file. This file contains data on newly issued recommendations as well as revisions and reiterations of existing recommendations made by individual analysts over the period 1993–2003. Although the exact wording of recommendations can vary considerably across brokerage houses, I/B/E/S classifies all recommendations into five categories ranging from strong buy to strong sell. We rely on the I/B/E/S classification and encode recommendations on a numerical scale from 5 (strong buy) to 1 (strong sell).

Since we are primarily interested in examining how the nature and consequences of analysts' recommendations are related to IB or brokerage business, we require measures of the importance of these business lines to analysts' employers. Under U.S. law, all registered broker-dealer firms must file audited annual financial statements with the Securities and Exchange Commission (SEC) in x-17a-5 filings.[10] These filings contain information on broker-dealer firms' principal sources of revenue, broken down into revenue from IB, brokerage commissions, and all other businesses (such as asset management and proprietary trading). We use these filings to obtain various financial data, including data on our key explanatory variables: the fractions of total brokerage house revenues from IB and from brokerage commissions. Beginning with the names of analyst employers contained in the I/B/E/S Broker Translation file,[11] we search for all available revenue information in x-17a-5 filings from 1994 to 2003.[12] For publicly traded broker-dealer firms, we also use 10-K annual report filings over the sample period to gather information on revenue breakdowns, if necessary. We thus obtain annual data from 1994 to 2003 on IB revenue, brokerage revenue, and other revenue for 188 privately held and 44 publicly traded brokerage houses.[13] For each brokerage house, we match recommendations to the latest broker-year revenue data preceding the recommendation date. Over the sample period, we

[10] The Securities Exchange Act, sections 17(a)–17(e), requires these filings. We accessed them from Thomson Financial's Global Access database and the Securities and Exchange Commission's (SEC's) public reading room in Washington, D.C.

[11] We use the file supplied directly by the Institutional Brokers Estimate System (I/B/E/S) on CD-ROM. This file does not recode the name of an acquired brokerage firm to that of its acquirer for years before the merger.

[12] The electronic availability of x-17a-5 filings is very limited prior to 1994, the year the SEC first mandated electronic form filing. Hence, we do not search for revenue information prior to 1994.

[13] We exclude a small number of firm-years in which the total revenue is negative (for example, because of losses from proprietary trading).

are able to match in this fashion 110,493 I/B/E/S recommendations issued by 4,089 analysts.

All broker-dealer firms are required to publicly disclose their balance sheets as part of their x-17a-5 filings. But a private broker-dealer firm can withhold the public disclosure of its income statement, which contains the revenue breakdown information needed for this study, if the SEC deems that such disclosure would harm the firm's competitive position. Thus, our sample of private securities firms is limited to broker-dealers that disclose their revenue breakdowns in x-17a-5 filings. We examine whether this selection bias affects our main results by separately analyzing the subsample of publicly traded securities firms, for which public disclosure of annual revenue information is mandatory. Our findings do not appear to be affected by this selection bias. All of our results for the subsample of publicly traded securities firms are qualitatively similar to the results for the full sample reported in the article. In the Appendix, we describe the characteristics of disclosing and nondisclosing private securities firms, shed some light on the firms' income statement disclosure decisions, and use a selectivity-corrected probit model to examine whether the resulting selection bias can explain analysts' response to conflicts in these private firms. We find no evidence that selection bias affects our results for these firms.

3.2. Characteristics of Analysts, Their Employers, and Companies Followed

We next measure characteristics of analysts, their employers, and the companies they cover. Prior research (for example, Clement 1999; Jacob, Lys, and Neale 1999) finds that analysts' experience and workloads affect the accuracy and credibility of their research. Using the I/B/E/S Detail History files, we measure an analyst's experience and workloads in terms of all research activity reported in I/B/E/S, including stock recommendations, quarterly and annual earnings-per-share forecasts, and long-term earnings growth forecasts. We measure general research experience as the number of days since an analyst first issued research on any company in the I/B/E/S database and company-specific research experience as the number of days since an analyst first issued research on a particular company. We measure an analyst's workload as the number of different companies or the number of different four-digit I/B/E/S sector industry groups (S/I/Gs)[14] for which the analyst issued research in a given calendar year.

The amount of resources devoted to investment research within brokerage houses also affects the quality of analysts' research (Clement 1999). Larger houses have access to better technology, information, and support staff. Accordingly, we use three measures of brokerage house size: the number of analysts issuing stock recommendations for a brokerage house over the course of a calendar year, book value of total assets, and net sales. All of our subsequent results are qual-

[14] The I/B/E/S sector industry group numbers are six-digit codes that provide information on the industry sectors and subsectors for companies in the I/B/E/S database. We use the first four digits, which correspond to broad industry groupings.

Table 1
Revenue Sources (%) of Analysts' Employers

Recommendation Level	Investment Banking		Brokerage Commission		Sample Size
	Mean	Median	Mean	Median	
5 (Strong buy)	13.94	11.81	29.87	24.09	28,901
4 (Buy)	13.81	11.21	26.68	17.22	37,478
3 (Hold)	12.68	11.13	28.44	24.07	37,883
2 (Sell)	11.61	10.55	23.13	16.12	4,875
1 (Strong sell)	16.27	14.90	33.44	24.95	1,356
p-Value (4 and 5) versus (1 and 2)	.0000	.0000	.0000	.0023	

Note. Shown are the percentages of analyst employer revenues from investment banking and brokerage commissions, by recommendation level. Data are for 110,493 stock recommendations and are drawn from the Institutional Brokers Estimate System U.S. Detail Recommendations History file for 1994–2003.

itatively similar under each of the three size measures. To save space, we report results only of tests based on the first size measure.

To capture the degree to which investors believe that individual analysts have skill in providing timely and accurate research, we use two measures of analysts' reputation. The first is based on *Institutional Investor* (*II*) magazine's All-America Research Team designation. Each year around October 15, *II* mails an issue to subscribers that lists the names of analysts who receive the most votes in a poll of institutional money managers. About 300–400 analysts are identified. We construct a variable that indicates, for each recommendation revision, whether the recommending analyst was named to the first, second, third, or honorable mention team in the latest annual survey. As a complementary, objective measure of analysts' reputation, we use a variable based on the *Wall Street Journal*'s (*WSJ*'s) annual All-Star Analysts Survey. The *WSJ* All-Star Analysts are determined by an explicit set of criteria relating to past stock-picking performance and forecasting accuracy.[15] The survey covers about 50 industries annually and names the top five stock pickers and top five earnings forecasters in each industry.[16]

Tables 1 and 2 report summary data on the characteristics of our sample. In Table 1, both the mean and the median percentages of analyst employer revenues derived from IB decline monotonically over the first four recommendation levels, but these values are the highest for strong sell recommendations. Similarly, it is the brokerage firms issuing strong sell recommendations that generally derive

[15] We recognize that the performance metrics used in the *Wall Street Journal* (*WSJ*) All-Star Analysts Survey are public information and can, in principle, be replicated by investors. However, to the extent that computing and evaluating analysts' performance is a costly activity, being named an All-Star Analyst can still affect an analyst's reputation and credibility.

[16] Since the I/B/E/S Broker Translation File provides only analysts' last names and first initials, in some instances it is not possible to ascertain from the I/B/E/S data alone whether an analyst in our sample was named to the *Institutional Investor* (*II*) or *WSJ* team. For these cases, we determine team membership of analysts from NASD BrokerCheck, an online database (http://www.nasd.com, accessed October 2004) that provides the full names of registered securities professionals as well as their employment and registration histories for the past 10 years. The database also keeps track of analysts' name changes (such as those resulting from marriage).

Table 2
Characteristics of Analysts, Firms, and Companies Followed

Characteristic	Mean	Median	SD	Sample Size
Investment banking revenue (%)	13.60	11.25	11.93	94,892
Brokerage commission revenue (%)	28.74	24.07	24.75	94,892
Analyst's company-specific experience (years)	2.42	1.20	3.29	85,531
Analyst's general experience (years)	6.41	4.90	5.32	85,531
Analysts employed by a firm	86.34	60	79.73	94,618
Companies followed by an analyst	17.24	15	12.93	84,016
Four-digit I/B/E/S S/I/Gs followed by an analyst	3.05	3	1.90	84,014
Institutional Investor All-America stock picker	.005	0	.07	85,531
Institutional Investor All-America Research Team member	.035	0	.18	85,531
Wall Street Journal All-Star stock picker	.018	0	.13	85,531
Wall Street Journal All-Star Analyst	.136	0	.34	85,531
Market capitalization ($ millions)	8,804.46	1,367.22	27,758.81	81,333
Analyst following	9.14	7	6.88	92,869

Note. Data are for 94,892 recommendation revisions and are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Recommendation revisions include recommendation changes as well as initiations, resumptions, and discontinuations of coverage. Analysts' experience is measured from all analyst research activity reported in I/B/E/S, including earnings-per-share forecasts, long-term earnings growth forecasts, and stock recommendations. An analyst is considered to be a top stock picker or team member if he or she appeared in the relevant portion of the most recent analyst survey by *Institutional Investor* or the *Wall Street Journal* at the time of a recommendation revision. Market capitalization is measured 12 months before the end of the current month, and analyst following is measured on the basis of stock recommendation coverage. Market capitalization values are inflation adjusted (with Consumer Price Index numbers and with 2003 as the base year). S/I/G = sector industry group.

the highest percentage of their total revenues from brokerage commissions. Notably, in each of the five categories, the mean percentage of revenue from commissions is about twice as large as the mean percentage of revenue from IB. This fact underscores the importance of trading commissions as a source of revenue for many securities firms. The last column shows that about 95 percent of the recommendations in the sample are at levels 5 (strong buy), 4 (buy), or 3 (hold). Levels 1 (strong sell) and 2 (sell) represent only about 1 percent and 4 percent of all recommendations, respectively.

The data in Table 2 provide a flavor of our sample of analysts and their employers. As noted by Hong, Kubik, and Solomon (2000), careers as analysts tend to be relatively short. The median recommendation is made by an analyst with under 5 years of experience, of which just over a year was spent following a given stock. Stock analysts tend to be highly specialized, following a handful of companies in a few industries. The median recommendation is made by an analyst following 15 companies in three industries who works for a securities firm employing 60 analysts. Being named as an All-America Research Team member by *II* is a rare honor, received by under 5 percent of all analysts in our sample. Finally, the typical company followed is large, with mean (median) market capitalization of about $8.8 billion ($1.4 billion) in inflation-adjusted

2003 dollars. Over the time span of a year, a company is tracked by a mean (median) of 9.1 (7) analysts.

4. Conflicts and the Levels of Analyst Recommendations Net of the Consensus

In this section, we examine whether the level of an analyst's stock recommendation net of the consensus (that is, median) recommendation level is related to the conflicts that he or she faces. We start by ascertaining the level of the outstanding recommendation on each stock by each analyst following it at the end of each quarter (March, June, September, December) from 1995 through 2003. An analyst's recommendation on a stock is included only if it is newly issued, reiterated, or revised in the preceding 12 months.

We estimate a regression explaining individual analysts' net stock recommendation levels at the end of a quarter (which is the recommendation level minus the median recommendation level across all analysts following a stock during the quarter).[17] The regression pools observations across analysts, stocks, and quarters and includes our two main explanatory variables: the percentage of an analyst employer's total revenues from IB and the percentage from brokerage commissions. Following Jegadeesh et al. (2004) and Kadan et al. (forthcoming), who find that momentum is an important determinant of analysts' recommendations, we control for the prior 6-month stock return.

The regression also controls for other factors that can affect the degree of analysts' optimism, such as the size of the company followed and the resources, reputation, experience, and workload of an analyst. As a measure of the resources available to an analyst, a dummy variable is used for a large brokerage house, and it equals one if the firm ranks in the top quartile of all houses in terms of the number of analysts employed during the year. The size of the company followed is measured by the natural logarithm of its market capitalization, measured 12 months before the end of the month. We measure an analyst's reputation by dummy variables that equal one if the recommending analyst was named in the most recent year as an All-America Research Team member by *II* or as an All-Star Analyst by the *WSJ*. An analyst's company-specific research experience is measured by the natural logarithm of one plus the number of days an analyst has been producing research (including earnings-per-share forecasts, long-term growth forecasts, or stock recommendations) on the company. We measure an analyst's workload by the natural logarithm of one plus the number of companies for which he or she produces forecasts or recommendations in the current year.

Finally, we control for industry and time period effects by adding dummy variables for I/B/E/S two-digit S/I/G industries and for each calendar quarter (March 1995, June 1995, and so forth). Since net recommendation levels can

[17] To ensure meaningful variation in the dependent variable, we omit stocks followed by only one analyst in a quarter.

Table 3
Ordered Probit Analysis of Recommendation Levels Net of the Consensus

Explanatory Variable	Coefficient	*z*-Statistic
Investment banking revenue (%)	.4167	17.35
Brokerage commission revenue (%)	.0363	3.00
Prior 6-month stock return	−.0068	−2.89
Large brokerage house dummy	−.0639	−8.60
Company size	.0038	2.89
Institutional Investor All-America Research Team dummy	.0032	.15
Wall Street Journal All-Star Analyst dummy	−.0196	−2.23
Company-specific research experience	.0012	1.42
Number of companies followed	.0070	4.64

Note. The results are from ordered probit regressions explaining individual analysts' stock recommendation levels net of the consensus (that is, median) recommendation level at the end of each quarter (March, June, September, December) for 1995–2003. Observations are excluded if the analyst issued no new or revised recommendation in the preceding 12 months. The regression includes observations pooled across analysts, stocks, and quarters. Data on recommendations are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Investment banking or brokerage commission revenue refer to the percentage of the brokerage firm's total revenues derived from investment banking or brokerage commissions. The large brokerage house dummy is an indicator variable that equals one if a brokerage house is in the top quartile of all houses, based on the number of analysts issuing stock recommendations listed in I/B/E/S in a given calendar year. Company size is the natural logarithm of the market capitalization of the company followed, measured 12 months prior to the end of the current month. The *Institutional Investor* All-America Research Team and *Wall Street Journal* All-Star Analyst dummies are indicator variables that equal one if the recommending analyst was listed as an All-America Research Team member or All-Star Analyst in the most recent analyst ranking. Company-specific research experience is the natural log of one plus the number of days that an analyst has been issuing I/B/E/S research on a company. Number of companies followed equals the natural log of one plus the number of companies followed by an analyst in the current calendar year. The regression includes dummy variables for two-digit I/B/E/S sector industry group industries and for calendar quarters. Test statistics are based on a robust variance estimator. The number of observations is 213,011; the *p*-value of the χ^2 test is <.0001.

take ordered values from −4 (strongly pessimistic) to 4 (strongly optimistic) in increments of .5, we estimate the regression as an ordered probit model.[18] The *Z*-statistics are based on a robust (Huber-White sandwich) variance estimator.

Table 3 shows the regression estimate. The coefficients of IB revenue percentage and commission revenue percentage are both positive. This finding implies that greater conflicts with IB and brokerage businesses lead an analyst to issue a higher recommendation on a stock relative to the consensus. Stocks followed by busier analysts and stocks of larger companies receive higher recommendations relative to the consensus. Stocks that experience a price run-up over the prior 6 months, stocks followed by analysts at large brokerage houses, and stocks followed by *WSJ* All-Star Analysts all receive lower recommendations relative to the consensus. All of these relations are highly statistically significant.

To provide a sense of the magnitude of the main effects of interest, we show in Table 4 the derivatives of the probability of each net recommendation level

[18] Notice that recommendation levels can take integer values from 1 to 5, and the median recommendation can take values from 1 to 5 in increments of .5. See Greene (2003) for a detailed exposition of the ordered probit model.

Table 4

Marginal Effects and Sample Distribution for the Ordered Probit Regression in Table 3

	Recommendation Level Net of the Consensus														
	−4	−3.5	−3	−2.5	−2	−1.5	−1	−.5	0	.5	1	1.5	2	2.5	3
Investment banking revenue (%)	−.00031	−.0002	−.0026	−.0010	−.0199	−.0086	−.0744	−.0321	.0123	.0325	.0671	.0077	.0188	.0002	.0003
Brokerage commission revenue (%)	−.00003	−.00001	−.0002	−.00009	−.0017	−.0008	−.0065	−.0028	.0011	.0028	.0059	.0007	.0016	.00002	.00003
Observed frequency	.0001	.0001	.0016	.0007	.0176	.0094	.1241	.0948	.4940	.0937	.1289	.0111	.0233	.0002	.0003

Note. Shown is the derivative of the probability of each net recommendation level with respect to investment banking or brokerage revenue percentage, estimated from the ordered probit regression in Table 3. Investment banking and brokerage commission revenue refer to the percentage of the brokerage firm's total revenues derived from investment banking and brokerage commissions. The last row shows observed frequency of each net recommendation level as a proportion of the sample of 213,011 observations.

with respect to IB revenue and commission revenue percentages.[19] Thus, for example, a 1-standard-deviation increase in IB revenue percentage increases the probability of an optimistic recommendation (that is, a net recommendation level greater than zero) by .1193 × (.0325 + .0671 + . . . + .0003) = .0151. Compared to the unconditional probability of an optimistic recommendation by an analyst, this represents an increase of about 5.9 percent (.0151/.2575). The effect of a change in commission revenue percentage is much smaller. A 1-standard-deviation increase in commission revenue percentage increases the probability of an optimistic recommendation by .2475 × .01105 = .0027, or about 1 percent (.0027/.2575) of the unconditional probability. Thus, despite possible concerns about a loss of reputation, analysts seem to respond to conflicts of interest, particularly those stemming from IB.

5. Conflicts and Investor Response to Recommendation Revisions

5.1 Stock Price Response

This section examines whether an analyst's credibility with investors is related to the degree of conflict faced. We interpret the reaction of stock prices to a recommendation revision as an indication of an analyst's credibility. Our analysis focuses on revisions in recommendation levels, rather than on recommendation levels per se, because revisions are discrete events that are likely to be salient for investors, and previous research finds that revisions have significant information content (see, for example, Womack 1996; Jegadeesh et al. 2004). To capture the effects of the most commonly observed and economically important types of revisions, we structure our tests around four basic categories: added to strong buy, added to buy or strong buy, dropped from strong buy, and dropped from buy or strong buy.[20] These four categories are defined to include initiations, resumptions, and discontinuations of coverage because such events also reflect analysts' positive or negative views about a company.[21] Thus, for example, we consider a stock to be added to strong buy under two scenarios: (*a*) the recommendation level is raised to strong buy from a lower level or (*b*) coverage is

[19] Notice that, for each explanatory variable, these derivatives sum to zero across all the net recommendation levels.

[20] Our analysis focuses on these four types of revisions instead of the other four (added to strong sell, and so forth) because, as shown in Table 1, sell and strong sell recommendations are quite rare. But note that dropped-from-buy and dropped-from-buy-or-strong-buy revisions can entail movement to the sell or strong sell category.

[21] We use the I/B/E/S Stopped Recommendations file to determine instances in which a brokerage firm discontinued coverage of a company. This file contains numerous cases in which an analyst stops coverage of a stock only to issue a new recommendation a month or two later. Conversations with I/B/E/S representatives indicate that such events likely represent pauses in coverage due to company quiet periods or analysts' reassignments within a brokerage house. We define a stopped coverage event to be a true stoppage only if the analyst does not issue a recommendation on the stock over the subsequent 6 months.

initiated or resumed at the level of strong buy.[22] Defining revisions in this fashion yields a sample of 94,892 recommendation revisions made over the 1994–2003 period.

5.1.1. Average Response

We compute the abnormal return on an upgraded or downgraded stock over day t as the return (including dividends) on the stock minus the return on the Center for Research in Security Prices equal-weighted market portfolio of New York Stock Exchange (NYSE), American Stock Exchange, and NASDAQ stocks. The cumulative abnormal return (CAR) on the stock over days t_1 to t_2 relative to the revision date (day 0) is measured as the sum of the abnormal returns over those days. Table 5 shows mean and median CARs for three windows: days -1 to 0, -1 to 1, and -5 to 5. The t-statistics for the difference of the mean abnormal returns from zero are computed as in Brown and Warner (1985) and are shown in parentheses. The p-values for the Wilcoxon test are reported in parentheses with the medians.

It is clear from Table 5 that recommendation revisions have large effects on stock prices. For example, when a stock is added to the strong-buy list, it experiences a mean abnormal return of about 2 percent over the 2-day revision period. Downgrades have even larger effects on stock prices than do upgrades. Strikingly, the 2-day mean abnormal return around the dropped-from-strong-buy list is -4 percent. Median values are consistently smaller in magnitude than are means, and this finding indicates that some revisions lead to price reactions of a very large magnitude. Mean and median 2-day abnormal returns are statistically different from zero for all four groups of forecast revisions. The magnitudes of abnormal returns are somewhat larger over the 3-day and 11-day windows than over the 2-day window. Overall, these returns are consistent with those found by prior research that examines the average stock price impact of recommendation revisions (for example, Womack 1996; Jegadeesh et al. 2004).

5.1.2. Cross-Sectional Analysis

Table 6 contains cross-sectional regressions of stock price reactions to recommendation revisions over days -1 to 1. The main explanatory variables of interest in these regressions are our revenue-based measures of the magnitudes of IB and brokerage conflicts. We include controls for the size of an analyst's employer, the size of the company followed, and measures of an analyst's reputation, experience, and workload.[23] We estimate a separate regression for each

[22] Note that the definitions of our four recommendation revision groups imply that stocks can be added to a group more than once on a given day. Nonetheless, excluding days on which a stock experiences multiple revisions does not change any of our qualitative results.

[23] Prior research finds that analysts who have more experience, carry lower workloads, or are employed by larger firms tend to generate more precise research (see, for example, Clement 1999; Jacob, Lys, and Neale 1999; Mikhail, Walther, and Willis 1997). In addition, more reputed analysts tend to generate timelier and more accurate research (see, for example, Stickel 1992; Hong and Kubik 2003). We expect such analysts to be more influential with investors.

Table 5
Cumulative Abnormal Returns surrounding Revisions in Analyst Stock Recommendations

	Days −1 to 0			Days −1 to 1			Days −5 to 5		
Recommendation Revision	Mean (*t*-Statistic)	Median (*p*-Value)	*N*	Mean (*t*-Statistic)	Median (*p*-Value)	*N*	Mean (*t*-Statistic)	Median (*p*-Value)	*N*
Upgrades:									
Added to strong buy	.0207	.0109	24,560	.0240	.0130	24,556	.0263	.0187	24,499
	(49.53)*	(.000)		(46.89)*	(.000)		(26.84)*	(.000)	
Added to buy or strong buy	.0149	.0071	36,879	.0165	.0085	36,875	.0207	.0128	36,780
	(46.47)*	(.000)		(42.01)*	(.000)		(27.53)*	(.000)	
Downgrades:									
Dropped from buy or strong buy	−.0337	−.0126	33,322	−.0358	−.0155	33,262	−.0491	−.0287	33,197
	(−56.21)*	(.000)		(−48.75)*	(.000)		(−34.92)*	(.000)	
Dropped from strong buy	−.0399	−.0153	22,825	−.0427	−.0183	22,795	−.0570	−.0326	22,767
	(−49.88)*	(.000)		(−43.58)*	(.000)		(−30.38)*	(.000)	

Note. The sample of recommendation revisions is drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Recommendation revisions include recommendation changes and initiations, resumptions, and discontinuations in coverage. Day 0 is the revision date. Recommendation revisions are classified according to the level of any existing recommendation and whether coverage is being initiated or dropped. For example, a revision by an analyst is classified as added to strong buy if the new recommendation is strong buy and (*a*) the previous recommendation was lower than strong buy or (*b*) analyst coverage by the brokerage house is resumed or initiated. A recommendation is classified as dropped from strong buy if the previous recommendation was strong buy and (*a*) the new recommendation is lower than strong buy or (*b*) research coverage on the company is stopped. The *t*-statistics for the difference from zero are computed as in Brown and Warner (1985). The *p*-values for the difference from zero are from a Wilcoxon test.

*Statistically significant at the 1% level in two-tailed tests.

Table 6

Cross-Sectional Regressions of Cumulative Abnormal Returns over Days −1 to +1 surrounding Recommendation Revisions

Explanatory Variable	Added to Strong Buy	Added to Buy or Strong Buy	Dropped from Buy or Strong Buy	Dropped from Strong Buy
Intercept	.0369	.0412	−.2294	−.2224
	(7.66)**	(11.21)**	(−31.31)**	(−29.25)**
Investment banking revenue (%)	−.0262	−.0139	−.0200	−.0354
	(−5.65)**	(−3.57)**	(−2.74)**	(−3.92)**
Brokerage commission revenue (%)	−.0187	−.0148	−.0089	−.0013
	(−6.51)**	(−6.43)**	(−2.39)*	(−.29)
Large brokerage house dummy	.0116	.0088	−.0242	−.0220
	(7.46)**	(6.88)**	(−12.79)**	(−10.25)**
Company size	−.0056	−.0041	−.0004	.0018
	(−16.13)**	(−15.40)**	(−.97)	(3.77)**
Institutional Investor All-America Research Team dummy	.0159	.0122	−.0148	−.0207
	(4.11)**	(3.82)**	(−2.93)**	(−3.28)**
Wall Street Journal All-Star Analyst dummy	.0015	.0013	−.0011	.0045
	(.81)	(.84)	(−.48)	(1.78)
Company-specific research experience	.0017	.0019	.0039	.0018
	(8.42)**	(12.49)**	(7.37)**	(3.21)**
Number of companies followed	−.0012	−.0016	.0007	.0008
	(−2.97)**	(−5.37)**	(1.49)	(1.31)
Observations	19,440	28,665	28,618	19,632
Adjusted R^2	.038	.0240	.028	.035
P-Value of *F*-test	<.0001	<.0001	<.0001	<.0001

Note. Shown are coefficient estimates and (in parentheses) *t*-statistics from ordinary least squares regressions. Day 0 is the recommendation revision date. Data on recommendations are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Investment banking and brokerage commission revenue refer to the percentages of a brokerage firm's total revenues derived from investment banking and brokerage commissions. The large brokerage house dummy is an indicator variable that equals one if a brokerage house is in the top quartile of all houses, based on the number of analysts issuing stock recommendations listed in I/B/E/S in a given calendar year. Company size is the natural logarithm of the market capitalization of the company followed, measured 12 months prior to the end of the current month. The *Institutional Investor* All-America Research Team and *Wall Street Journal* All-Star Analyst dummies are indicator variables that equal one if the recommending analyst was listed as an All-America Research Team member or All-Star Analyst in the most recent analyst ranking. Company-specific research experience is the natural log of one plus the number of days that an analyst has been issuing I/B/E/S research on a company. Number of companies followed equals the natural log of one plus the number of companies followed by an analyst in the current calendar year. All regressions include dummy variables for calendar-year and two-digit I/B/E/S sector industry group industries (not reported). The *t*-statistics are based on a robust variance estimator.

* Statistically significant at the 5% level in two-tailed tests.

** Statistically significant at the 1% level in two-tailed tests.

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of the four groups of recommendation revisions. The *t*-statistics based on a robust variance estimator are reported in parentheses.

The coefficient on IB revenue percentage is statistically significantly negative for both upgrades and downgrades. The coefficient on brokerage commission revenue percentage is also negative in all four regressions; it is statistically significant in all cases, except for the dropped-from-strong-buy revisions.[24] Collectively, these results favor the rational discounting hypothesis over the naive investor hypothesis. The magnitudes of these effects are nontrivial. For instance, a 1-standard-deviation increase in IB revenue percentage leads to a change of about −.31 (−.42) percentage points in the 3-day abnormal return around the move to (from) a strong buy recommendation. Similarly, a 1-standard-deviation increase in brokerage commission revenue percentage leads to a change of about −.37 (−.22) percentage points in the corresponding abnormal return around the move to (from) a buy or strong buy recommendation.[25]

The results for control variables are also noteworthy. The dummy variable for a large analyst employer is positively (negatively) related to the market reaction to upgrades (downgrades). This finding is consistent with the idea that revisions by analysts employed at larger brokerage houses (which tend to be more reputable) have more credibility with investors. The size of the company followed is negatively (positively) related to the market reaction to upgrades (downgrades), which is consistent with the notion that, for larger companies, an analyst's recommendation competes with more alternative sources of information and advice.

Revisions by *II* All-America Research Team analysts are positively (negatively) related to the stock price reaction to upgrades (downgrades), which suggests that they wield more influence with investors. This is a notable finding; we are unaware of previous work documenting a relation between an analyst's reputation and the stock price reaction to both upgrades and downgrades. As the coefficient on the *WSJ* All-Star Analyst dummy indicates, however, being designated as a *WSJ* All-Star Analyst does not seem to enhance the credibility of an analyst's recommendations.[26] The absence of an effect here is somewhat

[24] These and all subsequent regression results in this article are qualitatively similar when we winsorize the dependent variable at the first and ninety-ninth percentiles of its distribution.

[25] For each group of revisions (such as added to strong buy), we also estimate the regression after excluding similar revision events that a stock experiences within 3 days of a given revision event. These results are qualitatively similar to those reported in Tables 6 and 8. We also examine the possibility that investors perceived the conflicts to be more severe, and hence discounted them more, in securities firms that were charged by regulators (that is, the 10 firms that were part of the global analyst settlement) than in other firms. We do this by interacting both investment banking (IB) revenue percentage and brokerage commission revenue percentage variables in the regression with binary (0, 1) dummy variables for securities firms that are part of the global analyst settlement and firms that are not. We find no significant differences between the two groups of firms in their coefficients on IB revenue percentage and commission revenue percentage.

[26] Although *II* All-America Research Team and *WSJ* All-Star Analyst dummies both measure aspects of an analyst's reputation, they are not highly correlated. The correlation coefficient is .14 across all upgrades and .13 across all downgrades.

surprising given that the *WSJ* has a much broader readership base than that of *II*. One explanation is that *II* analyst rankings are based on an opinion poll of money managers, who control substantial assets and therefore directly affect stock prices, while *WSJ* rankings are based on strictly quantitative measures of analysts' past stock-picking or forecasting performance.

The market reaction to upgrades is positively related to an analyst's company-specific research experience. This finding suggests that more experienced analysts tend to be more influential with investors. But the reaction to downgrades is also positively related to analysts' experience. Finally, the stock price reaction to upgrades is negatively related to analysts' workload. This finding suggests that busier analysts' opinions tend to get discounted by the market. All of these relations are statistically significant.

5.2. Response of Trading Volume

In this section, we measure analysts' credibility via changes in the volume of trade around recommendation revisions.[27] Revisions of analysts' recommendations can affect trading volumes by inducing investors to rebalance their portfolios to reflect updated beliefs.

5.2.1. Average Response

We compute the abnormal volume for a trading day t as the mean-adjusted share turnover for stock i:[28]

$$e_{it} = v_{it} - v_i, \tag{1}$$

where v_{it} is the trading volume of stock i over day t divided by common shares outstanding on day t and v_i is the mean of v_{it} over days -35 to -6.

The cumulative abnormal volume (CAV) for stock i over days t_1 to t_2 is measured in the following way:

$$\mathrm{CAV}^i t_1, t_2 = \sum_{t=t_1}^{t_2} e_{it}. \tag{2}$$

Table 7 shows mean and median CAV values over three windows surrounding revisions in analyst stock recommendations. Over the 2-day revision period, the mean abnormal volume is positive for both upgrades and downgrades, but its magnitude is substantially larger for downgrades. The move to (from) the strong-buy list increases a stock's trading volume by a mean of about .9 percent (2.6 percent) of the outstanding shares, compared to a normal day's volume. For longer windows, the mean abnormal volumes are substantially higher for down-

[27] Many prior studies have used trading volume to examine investors' response to informational events (see, for example, Shleifer 1986; Jain 1988; Jarrell and Poulsen 1989; Meulbroek 1992; Sanders and Zdanowicz 1992).

[28] This approach has been used in a number of prior studies (for example, Shleifer 1986; Vijh 1994; Michaely and Vila 1996).

Table 7

Cumulative Abnormal Trading Volumes surrounding Announcements of Revisions in Stock Recommendations by Analysts

	Days −1 to 0			Days −1 to 1			Days −5 to 5		
Recommendation revision	Mean (*t*-Statistic)	Median (*p*-Value)	*N*	Mean (*t*-Statistic)	Median (*p*-Value)	*N*	Mean (*t*-Statistic)	Median (*p*-Value)	*N*
Upgrades:									
Added to strong buy	.0086	.0011		.0097	.0015		.0071	.0030	
	(8.89)*	(.000)	24,506	(8.18)*	(.000)	24,502	(3.13)*	(.000)	24,488
Added to buy or strong buy	.0053	.0002		.0058	.0004		.0020	.0008	
	(5.08)*	(.000)	36,800	(4.54)*	(.000)	36,796	(.818)	(.000)	36,766
Downgrades:									
Dropped from buy or strong buy	.0217	.0010		.0265	.0014		.0381	.0039	
	(114.47)*	(.000)	33,291	(114.14)*	(.000)	33,232	(85.70)*	(.000)	33,175
Dropped from strong buy	.0259	.0017		.0315	.0025		.0453	.0057	
	(128.76)*	(.000)	22,808	(127.86)*	(.000)	22,779	(96.03)*	(.000)	22,756

Note. The abnormal volume for stock i on day t is computed from daily Center for Research in Security Prices data as $e_{it} = v_{it} - v_i$, where v_{it} is the volume on day t and v_i is the average volume over days −35 to −6 relative to the recommendation revision date (day 0). All share volumes are normalized by dividing by common shares outstanding on the same day. The *p*-values are from a Wilcoxon test.

*Statistically significant at the 1% level in two-tailed tests.

grades. The median values are lower than the mean values. Each mean and median abnormal volume is statistically greater than zero, with a *p*-value below .01. Clearly, revisions of stock recommendations by analysts generate trading.

5.2.2. Cross-Sectional Analysis

Table 8 presents cross-sectional regressions explaining CAVs over days −1 to 1 surrounding the recommendation revisions. The explanatory variables in the regressions are the same as in regressions of CARs in Section 5.1.2. The results provide strong support for the rational discounting hypothesis. The coefficients on both the IB revenue percentage and commission revenue percentage variables are generally statistically significant and negative (positive) for both groups of upgrades (downgrades). The magnitudes of these effects are nontrivial. For example, a 1-standard-deviation increase in IB revenue percentage leads to a change in the 3-day abnormal volume around the addition (omission) of a stock to (from) the strong-buy list of about −.12 percent (.36 percent) of the outstanding shares; a corresponding change in the commission revenue percentage results in a change in the abnormal volume of about −.15 percent (.22 percent).

Recommendation revisions by larger brokerage houses generate more trading. The abnormal volume is also larger for revisions involving smaller companies. Revisions by *II* All-America Research Team members generate statistically significantly more abnormal volume for the dropped from buy or strong-buy group. Upgrades (downgrades) by more experienced analysts result in larger (smaller) abnormal volumes, and upgrades by busier analysts are less credible.

6. Conflicts and the Performance of Recommendation Revisions

We next consider the investment performance of analysts' recommendation revisions over periods of up to 12 months. Here, the choice of the benchmark used to compute abnormal returns is somewhat more important than it is in Section 5.1, where we measure abnormal returns over a few days around the revision. But the results here are likely to be less sensitive to the benchmark employed than are those in studies of long-run stock performance, where the time period of interest can be as long as 5–10 years (see, for example, Agrawal, Jaffe, and Mandelker 1992; Agrawal and Jaffe 2003).

6.1. Average Performance

We use an approach similar to Barber, Lehavy, and Trueman (2007). To evaluate the performance of stocks over a given window, say, months 1–12 following the month of their inclusion (month 0) in a given group of revisions such as the added-to-strong-buy list, we form a portfolio *p* that initially invests $1 in each recommendation. Each recommended stock remains in the portfolio until month 12 or the month that the stock is either downgraded or dropped from coverage by the securities firm, whichever is earlier. If multiple securities firms recommend a stock in a given month, the stock appears multiple times in the

Table 8

Cross-Sectional Regressions of Cumulative Abnormal Trading Volumes over Days −1 to +1 surrounding Recommendation Revisions

Explanatory Variable	Added to Strong Buy	Added to Buy or Strong Buy	Dropped from Buy or Strong Buy	Dropped from Strong Buy
Intercept	.0083	.0042	.0946	.0828
	(2.65)**	(1.90)	(13.72)**	(15.01)**
Investment banking revenue (%)	−.0100	−.0085	.0140	.0304
	(−3.31)**	(−2.26)*	(2.18)*	(3.63)**
Brokerage commission revenue (%)	−.0057	−.0059	.0087	.0055
	(−1.76)	(−4.13)**	(2.76)**	(1.45)
Large brokerage house dummy	.0058	.0038	.0168	.0171
	(3.72)**	(4.50)**	(11.12)**	(9.48)**
Company size	−.0031	−.0018	−.0023	−.0041
	(−9.54)**	(−12.30)**	(−7.60)**	(−11.40)**
Institutional Investor All-America Research Team dummy	.0035	.0033	.0084	.0046
	(1.74)	(1.88)	(2.32)*	(1.21)
Wall Street Journal All-Star Analyst dummy	.0008	.0013	.0023	−.0006
	(.74)	(1.42)	(1.36)	(−.29)
Company-specific research experience	.0010	.0010	−.0041	−.0019
	(8.39)**	(11.19)**	(−6.18)**	(−4.11)**
Number of companies followed	−.0009	−.0013	−.0001	−.0005
	(−3.49)**	(−6.23)**	(−.38)	(−.99)
Observations	19,431	28,653	28,594	19,619
Adjusted R^2	.025	.019	.030	.042
p-Value of *F*-test	<.0001	<.0001	<.0001	<.0001

Note. Shown are coefficient estimates and (in parentheses) *t*-statistics from ordinary least squares regressions. Day 0 is the recommendation revision date. Data on recommendations are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Investment banking and brokerage commission revenue refer to the percentage of brokerage firm's total revenues derived from investment banking and brokerage commissions. The large brokerage house dummy is an indicator variable that equals one if a brokerage house is in the top quartile of all houses, based on the number of analysts issuing stock recommendations listed in I/B/E/S in a given calendar year. Company size is the natural logarithm of the market capitalization of the company followed, measured 12 months prior to the end of the current month. The *Institutional Investor* All-America Research Team and *Wall Street Journal* All-Star Analyst dummies are indicator variables that equal one if the recommending analyst was listed as an All-America Research Team member or All-Star Analyst in the most recent analyst ranking. Company-specific research experience is the natural log of one plus the number of days that an analyst has been issuing I/B/E/S research on a company. Number of companies followed equals the natural log of one plus the number of companies followed by an analyst in the current calendar year. All regressions include dummy variables for calendar-year and two-digit I/B/E/S sector industry group industries (not reported). The *t*-statistics are based on a robust variance estimator.

*Statistically significant at the 5% level in two-tailed tests.

**Statistically significant at the 1% level in two-tailed tests.

portfolio that month, once for each securities firm with a strong buy recommendation. The portfolio return for calendar month t is given by

$$R_{pt} = \sum_{i=1}^{n_t} x_{it} \times R_{it} \Big/ \sum_{i=1}^{n_t} x_{it}, \tag{3}$$

where R_{it} is the month t return on recommendation i, x_{it} is one plus the compound return on the recommendation from month 1 to month $t-1$ (that is, x_{it} equals one for a stock that was recommended in month t), and n_t is the number of recommendations in the portfolio. This calculation yields a time series of monthly returns for portfolio p.

We compute the abnormal performance of portfolio p as the estimate of the intercept term α_p from the Fama and French (1993) three-factor model. Accordingly, we estimate the following time-series regression for portfolio p:

$$R_{pt} - R_{ft} = \alpha_p + \beta_{1p}(R_{mt} - R_{ft}) + \beta_{2p}\text{SMB}_t + \beta_{3p}\text{HML}_t + \varepsilon_{pt},$$
$$t = \text{January 1994 to December 2003}, \tag{4}$$

where R_f is the risk-free rate, R_m is the return on the value-weighted market index, SMB equals the monthly return on a portfolio of small firms minus the return on a portfolio of big firms, and HML is the monthly return on a portfolio of firms with high book-to-market ratio minus the return on a portfolio of firms with low book-to-market ratio. The error term in the regression is denoted ε. The time series of monthly returns on $R_m - R_f$, SMB, and HML are obtained from Kenneth French's Web site.[29] We repeat this procedure for each time window of interest, such as months 1–3, and for each group of revisions, such as the dropped-from-strong-buy list.

Table 9 shows the performance of analysts' recommendation revisions. Over the period of 3 months following the month of recommendation revision, the average abnormal returns for upgrades are positive, and the returns for downgrades are negative. The magnitudes of these returns are nontrivial. For example, the addition of a stock to the strong-buy list has an abnormal monthly return of about .875 percent, or about 2.62 percent over the 3-month period. The pattern is generally similar over longer windows. For example, over months 1–12, the abnormal monthly return for the added-to-strong-buy list is .679 percent, or about 8.15 percent over the 12-month period. The abnormal returns are significantly different from zero for upgrades in all cases; they are statistically insignificant for downgrades in all cases except one.

[29] Kenneth R. French, Fama/French Factors (file F-F_Research_Data_Factors.zip at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

Table 9
Medium-Term Investment Performance of Recommendation Revisions

	Months 1–3		Months 1–6		Months 1–12	
Portfolio	Abnormal Monthly Return (%)	*t*-Statistic	Abnormal Monthly Return (%)	*t*-Statistic	Abnormal Monthly Return (%)	*t*-Statistic
Added to strong buy	.875	6.12**	.758	6.12**	.679	5.70**
Added to buy or strong buy	.586	4.49**	.511	4.82**	.503	5.38**
Dropped from buy or strong buy	−.361	−1.60	−.260	−1.28	−.072	−.44
Dropped from strong buy	−.367	−1.58	−.395	−2.00*	−.231	−1.49

Note. Abnormal returns are reported for three event windows relative to the month of revision (month 0) and are computed using an approach similar to that in Barber, Lehavy, and Trueman (2007). The abnormal return is the estimated intercept from a time-series regression of 114 monthly portfolio returns using the Fama and French (1993) three-factor model.
* Statistically significant at the 5% level in two-tailed tests.
** Statistically significant at the 1% level in two-tailed tests.

6.2. Cross-Sectional Analysis

Table 10 shows the results of a regression similar to that in Section 5.1.2, except that the dependent variable here is the average monthly abnormal return for a firm over months 1–12 following the month of a recommendation revision. We compute this abnormal return by estimating a time-series regression similar to that in equation (4) over months 1–12 for each stock in a sample of recommendation revisions. The intercept from this regression is our estimate of the performance of the recommendation revision. Observations involving recommendation revisions on a stock that occur within 12 months of an earlier revision are omitted from each regression.[30]

In each regression result reported in Table 10, the coefficients of IB revenue percentage and commission revenue percentage are not statistically significantly different from zero. These results favor the rational discounting hypothesis, at least for the marginal investor. The performance of both groups of recommendation upgrades is negatively related to company size; the performance of one group of downgrades is positively related to the dummy variable for *WSJ* All-Star Analysts. None of the other variables is statistically significant.

7. Bubble versus Postbubble Periods

We next exploit the fact that our sample spans both the late-1990s U.S. stock bubble and a postbubble period. During the bubble period, initial public offerings, merger activities, and stock prices were near record highs, and media attention was focused on analysts' pronouncements. We therefore examine whether analysts' behavior and investors' responses to analysts' recommendations differed during the bubble and postbubble periods. Given the euphoria on Wall

[30] The results are qualitatively similar when we include these observations.

Table 10

Cross-Sectional Regressions of Average Monthly Abnormal Returns following Recommendation Revisions over Months 1–12

Explanatory Variable	Added to Strong Buy	Added to Buy or Strong Buy	Dropped from Buy or Strong Buy	Dropped from Strong Buy
Intercept	.0523	.0089	−.0646	−.0821
	(1.81)	(.49)	(−6.81)**	(−6.55)**
Investment banking revenue (%)	−.0089	−.0018	.0042	−.0068
	(−1.23)	(−.29)	(.64)	(−.87)
Brokerage commission revenue (%)	.0064	.0059	.0057	.0031
	(1.32)	(1.54)	(1.21)	(.75)
Large brokerage house dummy	.0009	−.0027	.0016	.0015
	(.38)	(−1.32)	(.72)	(.77)
Company size	−.0013	−.0017	−.0007	−.0007
	(−2.74)**	(−4.18)**	(−1.71)	(−1.54)
Institutional Investor All-America analyst dummy	−.0029	.0001	−.0016	−.0009
	(−.58)	(.01)	(−.44)	(−.23)
Wall Street Journal All-Star Analyst dummy	.0031	.0002	−.0029	.0056
	(1.24)	(.12)	(−1.42)	(2.29)*
Company-specific research experience	.0004	.0004	.0004	.0004
	(1.08)	(1.80)	(.76)	(.92)
Number of companies followed	−.0011	−.0008	−.0002	−.0002
	(−1.61)	(−1.79)	(−.45)	(−.47)
Observations	6,411	8,851	10,644	8,368
Adjusted R^2	.026	.023	.019	.020
p-Value of *F*-test	<.0001	<.0001	<.0001	<.0001

Note. Shown are the coefficient estimates and (in parentheses) *t*-statistics from ordinary least squares regressions. Month 0 is the month of recommendation revision. The abnormal return is the estimated intercept from a time-series regression of monthly portfolio returns in accordance with the Fama and French (1993) three-factor model. Data on recommendations are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Investment banking and brokerage commission revenue data refer to the percentage of the brokerage firm's total revenues derived from investment banking and brokerage commissions. The large brokerage house dummy is an indicator variable that equals one if a brokerage house is in the top quartile of all houses, based on the number of analysts issuing stock recommendations on I/B/E/S in a given calendar year. Company size is the natural logarithm of the market capitalization of the company followed, measured 12 months prior to the end of the current month. The *Institutional Investor* All-America Research Team and *Wall Street Journal* All-Star Analyst dummies are indicator variables that equal one if the recommending analyst was listed as an All-America Research Team member or All-Star Analyst in the most recent analyst ranking. Company-specific research experience is the natural log of one plus the number of days that an analyst has been issuing I/B/E/S research on a company. Number of companies followed equals the natural log of one plus the number of companies followed by an analyst in the current calendar year. All regressions include dummy variables for calendar-year and two-digit I/B/E/S sector industry group industries (not reported). The *t*-statistics are based on a robust variance estimator.

* Statistically significant at the 5% level in two-tailed tests.

** Statistically significant at the 1% level in two-tailed tests.

Table 11
Ordered Probit Regression of Recommendation Levels Net of the Consensus for Bubble versus Postbubble Periods

	Bubble	Postbubble	*p*-Value
Investment banking revenue (%)	.5103*	.3089*	<.001
Brokerage revenue (%)	−.1868*	.2286*	<.001

Note. The explanatory variables are as in Table 3, except that (*a*) the investment banking revenue and brokerage commission revenue percentage variables are interacted with dummy variables for the bubble or postbubble period and (*b*) calendar-quarter dummies are replaced with a postregulation indicator (which is equal to one for quarters after May 2002). Shown are the coefficient estimates of investment banking and brokerage revenue percentage variables for the bubble and postbubble periods and the *p*-value for the difference in the coefficient estimate between the two periods. All test statistics use robust variance estimators.
* Statistically significant at the 1% level in two-tailed tests.

Street and among investors during the bubble, analysts appear to have been under acute pressure to generate IB fees and brokerage commissions. As for the response of investors, the rational discounting hypothesis predicts greater discounting of analysts' opinions during this period in response to heightened conflicts, while the naive investor hypothesis predicts less discounting.

We estimate regressions similar to those for relative recommendation levels (Table 3), those for announcement abnormal returns (Table 6), those for announcement abnormal volumes (Table 8), and those for 12-month investment performance of recommendation revisions (Table 10), except that we now interact IB revenue percentage and commission revenue percentage with dummy variables for the bubble (January 1996–March 2000) and postbubble (April 2000–December 2003) periods. Accordingly, we restrict the sample period for these regressions to January 1996–December 2003. For regressions corresponding to those with results shown in Table 3, we also replace the calendar-quarter dummies with a postregulation indicator (equal to one for quarters ending after May 2002). In May 2002, both the NYSE and the National Association of Securities Dealers considerably tightened the regulations on the production and dissemination of sell-side analyst research.[31] The findings of Barber et al. (2006) and Kadan et al. (forthcoming) suggest that these regulations exerted a downward pressure on recommendation levels. The regression results are presented in Tables 11 and 12. To save space, we report only the coefficient estimates for IB revenue percentage and commission revenue percentage.

The results in Table 11 show that analysts appear to have inflated their recommendations in response to IB conflicts during both the bubble and postbubble periods. But the magnitude of this effect is substantially greater during the bubble period than during the postbubble period. This difference is statistically significant. The magnitude of the effect is smaller for brokerage conflicts than for IB conflicts during both periods. In fact, the effect for brokerage conflicts is negative

[31] See NYSE Amended Rule 472, "Communications with the Public," and National Association of Securities Dealers Rule 2711, "Research Analysts and Research Reports."

Table 12

Ordinary Least Squares Regressions of Abnormal Returns, Abnormal Volumes, and Abnormal Stock Performance for Bubble and Postbubble Periods

	Added to Strong Buy			Added to Buy or Strong Buy			Dropped from Buy or Strong Buy			Dropped from Strong Buy		
	Bubble	Postbubble	*p*-Value	Bubble	Postbubble	*p*-Value	Bubble	Postbubble	*p*-Value	Bubble	Postbubble	*p*-Value
CARs, days −1 to 1:												
Investment banking revenue (%)	−.0248**	−.0120	.083	−.0121**	−.0080	.517	−.0125	−.0379**	.027	−.0361**	−.0345**	.908
Brokerage revenue (%)	−.0114**	−.0105**	.827	−.0099**	−.0110**	.720	−.0063	−.0208**	.003	.0017	−.0114*	.024
CAVs, days −1 to 1:												
Investment banking revenue (%)	−.0076	−.0052	.655	−.0065	−.0082*	.699	.0257**	.0130	.214	.0555**	.0153	.002
Brokerage revenue (%)	−.0042	−.0008	.376	−.0054**	−.0031	.179	.0106*	.0139**	.521	.0046	.0141**	.056
Average monthly CARs, months 1–12:												
Investment banking revenue (%)	−.0016	−.0151	.273	.00001	.0083	.420	−.0085	.0223**	.003	−.0123	−.0051	.564
Brokerage revenue (%)	.0069	.0108	.511	.0086	.0096	.842	.0035	.0136	.101	−.0036	.0091	.019

Note. The explanatory variables are as in Tables 6, 8, and 10, except that the investment banking revenue and brokerage commission revenue percentage variables are interacted with dummy variables for the bubble or postbubble period. Shown are the coefficient estimates of the investment banking and brokerage revenue percentage variables for the bubble and postbubble periods and the *p*-value for the difference in the coefficient estimate between the two periods. Day (month) 0 is the recommendation revision date. All test statistics use robust variance estimators. CAR = cumulative abnormal return; CAV = cumulative abnormal volume.

*Statistically significant at the 5% level in two-tailed tests.

**Statistically significant at the 1% level in two-tailed tests.

during the bubble; it is positive and statistically significantly higher during the postbubble period.

Table 12 shows that, in regressions of 3-day abnormal returns, the coefficients of both IB revenue percentage and commission revenue percentage are negative and statistically significant during the bubble period for both groups of upgrades. For the added-to-strong-buy group, the coefficient of IB revenue percentage is significantly lower during the bubble period than during the postbubble period. For downgrades, the coefficients of both variables are generally negative in both periods, and they are statistically significantly lower during the postbubble period.

In regressions of 3-day abnormal volumes, the coefficients of IB revenue percentage and commission revenue percentage are negative for upgrades and positive for downgrades in all cases, both during and after the bubble. These coefficients are not statistically significantly different between the bubble and postbubble periods for both groups of upgrades and one group of downgrades. For the dropped-from-strong-buy group, the coefficient of IB revenue percentage is statistically significantly larger during the bubble period than during the postbubble period, but the coefficient of the commission revenue percentage is statistically significantly smaller. In regressions of 12-month postrecommendation stock performance, the coefficients of both variables are statistically insignificant both during and after the bubble period in nearly all cases, and this finding is consistent with the results shown in Table 10 for the full sample period.

Overall, analysts appear to respond to IB conflicts both during and after the bubble, but the magnitude of their response declines during the postbubble period. Perversely, while analysts do not seem to respond to brokerage conflicts during the bubble, they appear to do so after the bubble. Perhaps the intense regulatory and media focus on IB conflicts has led analysts to look for alternative avenues. Did investors discount conflicted analysts' opinions more during the bubble than in the postbubble period? The answer to this question is unclear. However, our evidence does not support the notion that investors threw caution to the wind during the bubble.

8. Summary and Conclusions

Following the collapse of the late-1990s U.S. stock market bubble, there has been a widespread hue and cry from investors and regulators over the conflicts of interest faced by Wall Street stock analysts. The discovery of e-mail messages, in which analysts were privately disparaging stocks that they were touting publicly, led to the landmark $1.4 billion settlement between a number of leading Wall Street firms and securities regulators in April 2003. The settlement requires the firms to disclose IB conflicts in analyst reports and imposes a variety of restrictions designed to strengthen the firewalls that separate research from IB. Part of the settlement funds are set aside for investor education and for research produced by independent firms. The settlement basically presumes that analysts

respond to the conflicts by inflating their stock recommendations and that investors take analysts' recommendations at face value.

Consistent with the view of the media and regulators, we find that optimism in stock recommendations is positively related to the importance of both IB and brokerage businesses to an analyst's employer. This pattern is more pronounced during the late-1990s stock market bubble with respect to IB conflicts. However, we provide several pieces of empirical evidence that suggest that investors are sophisticated enough to adjust for this bias. First, the short-term reactions of both stock prices and trading volumes to recommendation upgrades vary negatively with the magnitude of potential IB or brokerage conflicts faced by analysts. For instance, over the 3 days surrounding an upgrade to strong buy, a 1-standard-deviation increase in the proportion of revenue from IB is associated with a .31 percentage point decrease in abnormal returns and a .12 percentage point decrease in abnormal volume. These results suggest that investors ascribe lower credibility to an analyst's upgrade when the analyst is subject to greater pressures to issue an optimistic view. For downgrades, conflict severity varies negatively with the short-term stock price reaction and positively with the short-term trading volume impact. This pattern is consistent with the idea that investors perceive an analyst to be more credible if he or she is willing to voice an unfavorable opinion on a stock despite greater pressures to be optimistic.

Second, we find no evidence that the 1-year investment performance of recommendation revisions is related to the magnitude of analysts' conflicts, either for upgrades or for downgrades. This finding suggests that, on average, investors properly discount an analyst's opinions for potential conflicts at the time the opinion is issued. Finally, investors discounted conflicted analysts' opinions during the late-1990s stock bubble, even in the face of the prevailing market euphoria. This evidence does not support the popular view that recommendations of sell-side analysts led investors to throw caution to the wind during the bubble period.

Overall, our empirical findings suggest that while analysts do respond to IB and brokerage conflicts by inflating their stock recommendations, the market discounts these recommendations after taking analysts' conflicts into account. These findings are reminiscent of the story of the nail soup told by Brealey and Myers (1991), except that here analysts (rather than accountants) are the ones who put the nail in the soup and investors (rather than analysts) are the ones to take it out. Our finding that the market is not fooled by biases stemming from conflicts of interest echoes similar findings in the literature on conflicts of interest in universal banking (for example, Kroszner and Rajan 1994, 1997; Gompers and Lerner 1999) and on bias in the financial media (for example, Bhattacharya et al., forthcoming; Reuter and Zitzewitz 2006). Finally, while we cannot rule out the possibility that some investors may have been naive, our findings do not support the notion that the marginal investor was systematically misled over the last decade by analysts' recommendations.

Appendix

This Appendix describes the characteristics of disclosing and nondisclosing private securities firms, sheds some light on their decisions to publicly disclose their income statements, and examines whether the resulting selection bias affects our main results in Table 3. Table A1 provides summary statistics of recommendation levels and characteristics of disclosing and nondisclosing private securities firms. Compared with nondisclosing firms, disclosing firms tend to be smaller and more liquid and issue somewhat more optimistic stock recommendations. The mean recommendation level is slightly higher for disclosing firms than for nondisclosing firms. The median disclosing firm is smaller and holds more liquid assets than the median nondisclosing firm. All these differences are statistically significant. The two groups of firms have similar financial leverage ratios and 2-year growth rates in total assets.

We next examine cross-sectional determinants of a private securities firm's decision to disclose its income statement. In an excellent review of the corporate disclosure literature, Healy and Palepu (2001) point out that a firm is more willing to voluntarily disclose financial information when it needs to raise external financing and when it is less concerned that the disclosure would damage its competitive position in product markets. Ceteris paribus, firms with greater growth opportunities, higher financial leverage, and less liquid resources are more likely to need external financing. They are more likely to be open with potential investors by disclosing financial information, including their income statements. Similarly, smaller firms are likely to have greater need for external financing as they try to grow. In addition, given the intense competition in the securities business, smaller private firms are also likely to be more willing to disclose their profits and profitability because they have less business at stake. For both reasons, smaller firms are likely to be more willing to disclose financial information. We control for firm size by the natural logarithm of one plus total assets in millions of dollars, for growth opportunities by the 2-year growth rate of total assets, for financial leverage by the ratio of long-term debt to total assets, and for liquidity by the ratio of cash and equivalents to total assets. We estimate a probit regression of DISCLOSER, which equals one for a disclosing firm and is zero otherwise.

In accordance with the predictions of corporate disclosure theory, the coefficients on firm size and liquidity are negative, and the coefficient on growth is positive. Contrary to the prediction, however, the coefficient on leverage is negative. All of these coefficients are highly statistically significant. The pseudo-R^2-value of this model is .08. To save space, these results are not shown in a table.

Finally, we examine whether the selection bias caused by a private securities firm's disclosure choice (and, consequently, the availability of data on IB revenue percentage and commission revenue percentage) affects our main results in Table 3. While there is no Heckman selectivity correction for the ordered probit model, there is one for the regular probit model. So we define a binary variable to

Table A1
Summary Statistics for Disclosing and Nondisclosing Private Securities Firms

	Mean			Median			Sample Size	
Variable	Disclosers	Nondisclosers	*P*-Value of *t*-Test	Disclosers	Nondisclosers	*p*-Value of Rank Sum Test	Disclosers	Nondisclosers
Recommendation level:								
Level	3.902	3.810	<.001	4	4	<.001	62,417	181,068
Level minus median level	.036	.010	<.001	0	0	<.001	62,417	181,068
Firm size:								
Total assets ($ millions)	383.37	1,863.52	<.001	4.05	28.43	<.001	365	615
Book equity ($ millions)	26.40	68.98	<.001	1.97	10.56	<.001	365	615
Financial leverage:								
Long-term debt to total assets	.0539	.0653	.253	0	.002	.004	365	615
Total debt to total assets	.0685	.1823	.295	0	.018	<.001	365	615
Liquidity: cash and equivalents to total assets	.2392	.1816	.001	.101	.052	.0001	365	615
2-Year growth rate	.0849	.0697	.440	.052	.020	.099	246	541

Note. Disclosers are brokers that publicly disclose their income statements, while nondisclosers are brokers that do not disclose them. The statistics for recommendation level are computed from individual analysts' recommendation levels at the end of each quarter in the sample. The median recommendation level is computed at the end of each quarter and is based on all analysts recommending a stock. The statistics for broker characteristics are computed across broker years. The firm size statistics are inflation adjusted (with Consumer Price Index numbers and with 2003 as the base year). The 2-year growth rate is $(\text{Total assets}_t / \text{Total assets}_{t-2})^{1/2} - 1$.

measure an optimistic recommendation that equals one if an analyst's recommendation level on a stock exceeds the consensus level and equals zero otherwise. We then replace the dependent variable in the regression in Section 4 with this optimistic recommendation dummy. Using the subsample of private securities firms, we estimate the resulting equation in two ways: (*a*) with a regular probit model and (*b*) with a Heckman selectivity-corrected probit model, where we use the equation described in the second paragraph of this Appendix as the selection equation. When we use approach *b,* the coefficient of the selection term (that is, the inverse Mills ratio) is statistically significant in the second-stage probit regression. What is more important for our purposes is that the sign, magnitude, and statistical significance of our main explanatory variables, the IB revenue percentage and the commission revenue percentage, are similar in the regular probit and the Heckman-corrected probit regressions. These results do not support the idea that our main findings are driven by the selection bias caused by a private securities firm's decision to disclose its revenue breakdown. To save space, these results are not shown in a table.

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The relationship between systematic risk and expected return can also be expressed mathematically. The CAPM describes the cost of equity for any company's stock as equal to the riskless rate plus an amount proportionate to the systematic risk an investor assumes.

$$k_s = r_f + (\beta_s \times ERP)$$

where:

k_s = the cost of equity for company **s**,
r_f = the expected return of the riskless asset,
β_s = the beta of the stock of company **s**; and
ERP = the expected equity risk premium, or the amount by which investors expect the future return on equities to exceed that on the riskless asset

Since the CAPM has only three variables—the expected return on the riskless asset, the beta of the stock, and the expected equity risk premium—it is one of the easiest models to implement in practice. However, an estimate of each of the above three variables must be formed. Like all components of the cost of capital, these variables should be measured on a forward-looking basis. Chapters 5 and 6 are devoted to estimating the equity risk premium and beta, respectively. Factors to consider in estimating the riskless rate are covered below.

Risk-Free Rate

In general, most valuators can agree that the risk-free rate is a forward looking rate that factors in long-term expectations on growth and inflation. The CAPM implicitly assumes the presence of a single riskless asset—that is, an asset perceived by all investors as having no risk. The ability of the U.S. government to create money to fulfill its debt obligations under virtually any scenario makes U.S. Treasury securities practically default-free. While interest rate changes cause government obligations to fluctuate in price, investors face essentially no default risk as to either coupon payment or return of principal. Asset values can vary significantly depending upon the type of risk-free interest rate selected and cash distribution characteristics of the subject asset being valued, the time horizon, and how a valuation practitioner applies this rate into his or her model.

Type of Interest Rate

A common choice for the nominal riskless rate is the yield on a U.S. Treasury security. Should the yield on a Treasury bond or a Treasury STRIPS be used to represent the riskless rate? In most cases, the yield on a Treasury coupon bond is most appropriate. If the asset being measured spins off cash periodically, the Treasury bond most closely replicates this characteristic. On the other hand, if the asset being measured provides a single payoff at the end of a specified term, the yield on a Treasury STRIPS would be more appropriate.

Time Horizon

The traditional thinking regarding the time horizon of the chosen Treasury security is that it should match the time horizon of whatever is being valued. When valuing a business that is being treated as a going concern, the appropriate Treasury yield should be that of a long-term Treasury bond. Note that the horizon is a function of the investment, not the investor. If an investor plans to hold stock in a company for only five years, the yield on a five-year Treasury note would not be appropriate, since the company will continue to exist beyond those five years.

A different vantage point of the time horizon is that the risk-free rate should best match the distribution of the periodic cash flows of the asset being valued, in which case applying a yield curve may be more appropriate.

Table 4-1: Current Yields or Expected Riskless Rates

Yield (Riskless Rate)	(%)*
Long-Term (20-year) U.S. Treasury Coupon Bond Yield	2.41
Long-Term (10-year) U.S. Treasury Coupon Bond Yield	1.78
Intermediate-Term (5-year) U.S. Treasury Coupon Note Yield	0.46
Short-term (30-day) U.S. Treasury Bill Yield	0.02

Data as of December 31, 2012
*Maturities are approximate

It is also important to note that in February 1977, the Treasury began to issue 30-year Treasury securities. Prior to this date, the longest-term Treasury security was 20 years, which was the standard Ibbotson used for its data series. To remain consistent with Ibbotson's historical data series, the *Ibbotson® Stocks, Bonds, Bills, and Inflation® Classic Yearbook* continued to base the yield

Chapter 5

The Equity Risk Premium

The expected equity risk premium can be defined as the additional return an investor expects to receive to compensate for the additional risk associated with investing in equities as opposed to investing in riskless assets. It is an essential component in several cost of equity estimation models, including the buildup method, the capital asset pricing model (CAPM), and the Fama-French three factor model. It is important to note that the expected equity risk premium, as it is used in discount rates and cost of capital analysis, is a forward-looking concept. That is, the equity risk premium that is used in the discount rate should be reflective of what investors think the risk premium will be going forward.

Unfortunately, the expected equity risk premium is unobservable in the market and therefore must be estimated. Typically, this estimation is arrived at through the use of historical data. The historical equity risk premium can be calculated by subtracting the long-term average of the income return on the riskless asset (Treasuries) from the long-term average stock market return (measured over the same period as that of the riskless asset). In using a historical measure of the equity risk premium, one assumes that what has happened in the past is representative of what might be expected in the future. In other words, the assumption one makes when using historical data to measure the expected equity risk premium is that the relationship between the returns of the risky asset (equities) and the riskless asset (Treasuries) is stable. The stability of this relationship will be examined later in this chapter.

Since the expected equity risk premium must be estimated, there is much controversy regarding how the estimation should be conducted. A variety of different approaches to calculating the equity risk premium have been utilized over the years. Such studies can be categorized into four groups based on the approaches they have taken. The first group of studies tries to derive the equity risk premium from historical returns between stocks and bonds as was mentioned above. The second group, embracing a supply side model, uses fundamental information such as earnings, dividends, or overall economic productivity to measure the expected equity risk premium. A third group adopts demand side models that derive the expected returns of equities through the payoff demanded by investors for bearing the risk of equity investments.[1] The opinions of financial professionals through broad surveys are relied upon by the fourth and final group.

The range of equity risk premium estimates used in practice is surprisingly large. Using a low equity risk premium estimate as opposed to a high estimate can have a significant impact on the estimated value of a stream of cash flows. This chapter addresses many of the controversies surrounding estimation of the equity risk premium and focuses primarily on the historical calculation but also discusses the supply side model.

Calculating the Historical Equity Risk Premium

In measuring the historical equity risk premium one must make a number of decisions that can impact the resulting figure; some decisions have a greater impact than others. These decisions include selecting the stock market benchmark, the risk-free asset, either an arithmetic or a geometric average, and the time period for measurement. Each of these factors has an impact on the resulting equity risk premium estimate.

The Stock Market Benchmark

The stock market benchmark chosen should be a broad index that reflects the behavior of the market as a whole. Two examples of commonly used indexes are the S&P 500® and the New York Stock Exchange Composite Index. Although the Dow Jones Industrial Average is a popular index, it would be inappropriate for calculating the equity risk premium because it is too narrow.

We use the total return of our large company stock index (currently represented by the S&P 500) as our market benchmark when calculating the equity risk premium. The S&P 500 was selected as the appropriate market benchmark because it is representative of a large sample of companies across a large number of industries. The S&P 500 is also one of the most widely accepted market benchmarks. In short, the S&P 500 is a good measure of the equity market as a

FIFTH EDITION

PRINCIPLES OF CORPORATE FINANCE

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Principles of Corporate Finance

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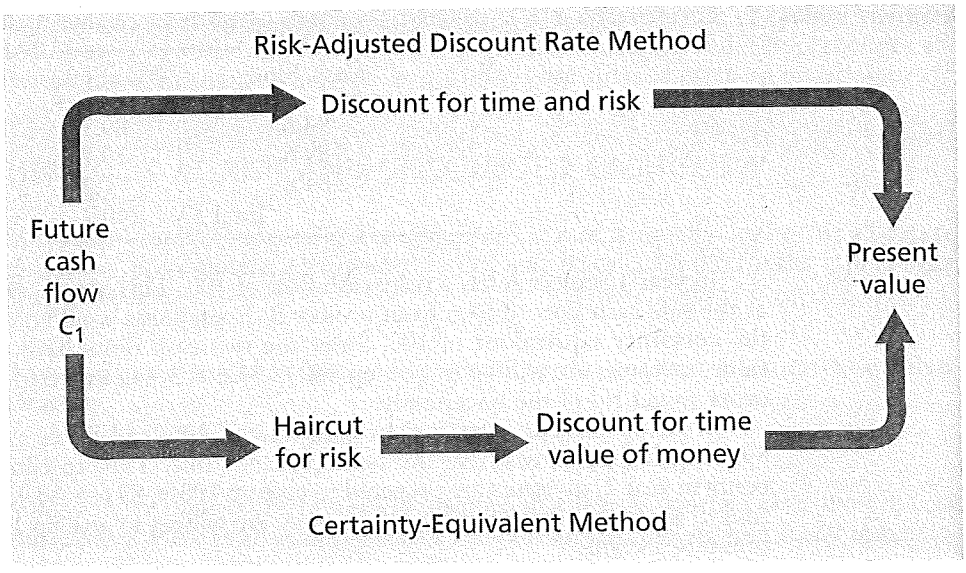

Figure 9-7 Two ways to calculate present value.

If the cash flow is risky, the normal procedure is to discount its forecasted (expected) value at a *risk-adjusted discount rate* r which is greater than r_f.[23] The risk-adjusted discount rate adjusts for both time and risk. This is illustrated by the clockwise route in Figure 9-7.

The alternative certainty-equivalent method makes separate adjustments for risk and time. This is illustrated by the counterclockwise route in Figure 9-7. When you use this method, you should ask, "What is the smallest *certain* payoff for which I would exchange the risky cash flow C_1?" This is called the *certainty equivalent* of C_1, denoted by CEQ_1.[24]

Since CEQ_1 is the value equivalent of a safe cash flow, it is discounted at the risk-free rate r_f. Thus we have two identical expressions for PV:

$$\text{PV} = \frac{C_1}{1 + r} = \frac{\text{CEQ}_1}{1 + r_f}$$

For cash flows 2, 3, or t years away,

$$\text{PV} = \frac{C_t}{(1 + r)^t} = \frac{\text{CEQ}_t}{(1 + r_f)^t}$$

But if we are to use the same discount rate for every future cash flow, then the certainty equivalents must decline steadily as a fraction of the cash flow. We saw this with project A, where the ratio of the certainty-equivalent cash flow to the forecasted flow declined by 5.4 percent a year:

---

[23]The quantity r can be less than r_f for assets with negative betas. But the betas of the assets which corporations hold are almost always positive.

[24]CEQ_1 can be calculated directly from the capital asset pricing model. The formula is given in the Appendix to this chapter.

COST OF CAPITAL

Applications and Examples
Third Edition

SHANNON P. PRATT

ROGER J. GRABOWSKI

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Common academic practice in empirical studies of rates of return realized on portfolios of stocks in excess of a risk-free rate is to benchmark stock returns against realized monthly returns of "risk-free" 90-day T-bills or one-year government bonds. A T-bill rate is the purest risk-free base rate because it contains essentially no maturity risk. If inflation is high, it does reflect the inflation component, but it contains little compensation for inflation uncertainty. Problems in using such a risk-free security as a benchmark are that (1) T-bill rates may not reflect market-determined investor return requirements on long-term investments due to central bank actions affecting the short-term interest rates, and (2) rates on short-term securities tend to be more volatile than yields on longer maturities.

Long-term government bonds are free of default risk but are not "risk-free." Long-term government bonds are sensitive to future interest fluctuations. Investors are not sure of the purchasing power of the dollars they will receive upon maturity or the reinvestment rate that will be available to them to reinvest the interest payments received over the life of the bond. As a result, the long-term empirical evidence is that returns on long-term government bonds on the average exceed the returns on T-bills.[5]

The long-term premium of government bond returns in excess of the average expected interest rates on T-bills (average of future forward rates) is commonly referred to as the *horizon premium.* The horizon premium compensates the investor for the maturity risk of the bond. The horizon premium equals the added return expected *on the average* on long-term bonds due to inflation and interest rate risk. As interest rates change unexpectedly in the future, the bond price will vary. That is, bonds are subject to market risk due to unexpected changes in interest rates. The horizon premium compensates investors for that market risk.

MATCHING RISK-FREE RATE WITH ERP

In theory, when determining the risk-free rate and the matching ERP you should be matching the risk-free security and the ERP with the period in which the investment cash flows are expected. For example (where b is a risk measure for the investment):

Short-term cash flows: Current T-bill rate $+ b \times$ (RPm over T-bills)

Cash flows expected in:

Year 1: 1-year government bond rate $+ b \times$ (RPm over1-year bonds)

Year 2: 2-year forward rate on government bonds $+ b \times$ (RPm over 2-year bonds)

Year 3: 3-year forward rate on government bonds $+ b \times$ (RPm) over3-year bonds), and so on

Cash flows expected in the long-term: Current long-term government bond rate $+ b$ $\times$ (RPm over long-term government bonds)

MEASURING THE AVERAGE PERIOD OF THE EXPECTED CASH FLOWS

Can one measure the "average" period of expected cash flows and use an average maturity period for the risk-free security and the ERP? One measure of the length of planning horizon over which cash flows are expected is the *duration* of cash flows. We introduced the concept of duration in Chapter 6 as a measure of the effective time period over which you receive cash flows from bonds.

In a similar manner, you can calculate the expected duration of any stream of expected cash flows for any project. For valuation of a "going-concern" business, for example, assume you expect the cash flow in the first year following the valuation date of $1 million to increase at an average

[5] When short-term interest rates exceed long-term rates, the yield curve is "inverted."

FINANCIAL QUARTERLY
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Comparable Earnings: New Life for an Old Precept

by
Frank J. Hanley
Pauline M. Ahern

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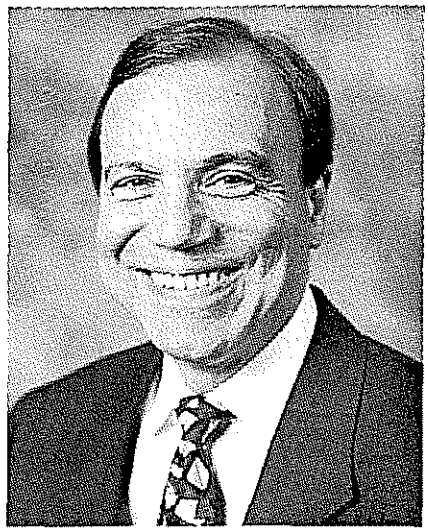
Comparable Earnings: New Life for an Old Precept

Accelerating deregulation has greatly increased the investment risk of natural gas utilities. As a result, the authors believe it more appropriate than ever to employ the comparable earnings model. We believe our application of the model overcomes the greatest traditional objection to it — lack of comparability of the selected non-utility proxy firms. Our illustration focuses on a target gas pipeline company with a beta of 0.96 — almost equal to the market's beta of 1.00.



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Introduction

The comparable earnings model used to determine a common equity cost rate is deeply rooted in the standard of "corresponding risk" enunciated in the landmark *Bluefield* and *Hope* decisions of the U.S. Supreme Court.[1] With such solid grounding in the foundations of rate of return regulation, comparable earnings should be accepted as a principal model, along with the currently popular market-based models, provided that its most common criticism, non-comparability of the proxy companies, is overcome.

Our comparable earnings model overcomes the non-comparability issue of the non-utility firms selected as a proxy for the target utility, in this example, a gas pipeline company. We should note that in the absence of common stock prices for the target utility (as with a wholly-owned subsidiary), it is appropriate to use the average of a proxy group of similar risk gas pipeline companies whose common stocks are actively traded. As we will demonstrate, our selection process results in a group of domestic, non-utility firms that is comparable in total risk, the sum of business and financial risk, which reflects both non-diversifiable systematic, or market, risk as well as diversifiable unsystematic, or firm-specific, risk.

Embedded in the Landmark Decisions

As stated in *Bluefield* in 1922: "A public utility is entitled to such rates as will permit it to earn a return ... on investments in other business undertakings which are attended by corresponding risks and uncertainties ..."

In addition, the court stated in *Hope* in 1944: "By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks."

Thus, the "corresponding risk" precept of *Bluefield* and *Hope* predates the use of such market-based cost-of-equity models as the Discounted Cash Flow (DCF) and Capital Asset Pricing (CAPM), which were developed later and are currently popular in rate-base/rate-of-return regulation. Consequently, the comparable earnings model has a longer regulatory and judicial history. However, it has far greater relevance now than ever before in its history because significant deregulation has substantially increased natural gas utilities' investment risk to a level similar to that of non-utility firms. As a result, it is

Comparable Earnings *from page 4*

more important than ever to look to similar-risk non-utility firms for insight into common equity cost rate, especially in view of the deficiencies inherent in the currently popular market-based cost of common equity models, particularly the DCF model.

Despite the fact that the landmark decisions are still regarded as having set the standards for determining a fair rate of return, the comparable earnings model has experienced decreased usage by expert witnesses, as well as less regulatory acceptance over the years. We believe the decline in the popularity of the comparable earnings model, in large measure, is attributable to the difficulty of selecting non-utility proxy firms that regulators will accept as comparable to the target utility. Regulatory acceptance is difficult to gain when the selection process is arbitrary. Our application of the model is objective and consistent with fundamental financial tenets.

Principles of Comparable Earnings

Regulation is a substitute for the competition of the marketplace. Moreover, regulated public utilities compete in the capital markets with all firms, including unregulated non-utilities. The comparable earnings model is based upon the opportunity cost principle; i.e., that the true cost of an investment is the return that could have been earned on the next best available alternative investment of similar risk. Consequently, the comparable earnings model is consistent with regulatory and financial principles, as it is a surrogate for the competition of the marketplace, and investors seek the greatest available rate of return for bearing similar risk.

The selection of comparable firms is the most difficult step in applying the comparable earnings model, as noted by Phillips[2] as well as by Bonbright, Danielsen and Kamerschen.[3] The selection of non-utility proxy firms should result in a sufficiently broad-based group in order to minimize the effect of company-specific aberrations. However, if the selection process is arbitrary, it likely would result in a proxy group that is too broad-based, such as the Standard & Poor's 500 Composite Index or the Value Line Industrial Composite. The use of such groups would require subjective adjustments to the comparable earnings results to reflect risk differences between the group(s) and the target utility, a gas pipeline company in this example.

Authors' Selection Criteria

We base the selection of comparable non-utility firms on market-based, objective, quantitative measures of risk resulting from market prices that subsume investors' assessments of all elements of risk. Thus, our approach is based upon the principle of risk and return; namely, that firms of comparable risk should be expected to earn comparable returns. It is also consistent with the "corresponding risk" standard established in *Bluefield* and *Hope*. We measure total investment risk as the sum of non-diversifiable systematic and diversifiable unsystematic risk. We use the unadjusted beta as a measure of systematic risk and the standard error of the estimate (residual standard error) as a measure of unsystematic risk. Both the unadjusted beta and the residual standard error are derived from a regression of the target utility's security returns relative to the market's returns, which takes the general form:

$$r_{it} = a_i + b_i r_{mt} + e_{it}$$

where:

- r_{it} = tth observation of the ith utility's rate of return
- r_{mt} = tth observation of the market's rate of return
- e_{it} = tth random error term
- a_i = constant least-squares regression coefficient
- b_i = least-squares regression slope coefficient, the unadjusted beta.

As shown by Francis,[4] the total variation or risk of a firm's return, Var (r_i), comes from two sources:

Var (r_i) = total risk of ith asset

$= \text{var}(a_i + b_i r_m + e)$
substituting $(a_i + b_i r_m + e)$ for r_i
$= \text{var}(b_i r_m) + \text{var}(e)$ since $\text{var}(a_i) = 0$
$= b_i^2 \text{ var}(r_m) + \text{var}(e)$ since $\text{var}(b_i r_m) = b_i^2 \text{ var}(r_m)$
= systematic + unsystematic risk

Francis[5] also notes: "The term $\sigma^2(r_i|r_m)$ is called the *residual variance around the regression line* in statistical terms or *unsystematic risk* in capital market theory language. $\sigma^2 (r_i|r_m) = \ldots = \text{var}(e)$. The residual variance is the squared standard error in regression language, a measure of unsystematic risk." Application of these criteria results in a group of non-utility firms whose average total investment risk is indeed comparable to that of the target gas pipeline.

As a measure of systematic risk, we use the Value Line unadjusted beta. Beta measures the extent to which market-wide or macro-economic events affect a firm's stock price. We use the unadjusted beta of the target utility as a starting point because it results from the regression of the target utility's security returns relative to the market's returns. Thus, the resulting standard deviation of beta relates to the unadjusted beta. We use the standard deviation of the unadjusted beta to determine the range around it as the selection criterion based on systematic risk.

We use the residual standard error of the regression as a measure of unsystematic risk. The residual standard error reflects the extent to which events specific to the firm's operations affect a firm's stock price. Thus, it is a measure of diversifiable, unsystematic, firm-specific risk.

An Illustration of Authors' Approach

Step One: We begin our approach by establishing the selection criteria as a range of both unadjusted beta and residual standard error of the target gas

continued on page 6

Comparable Earnings *from page 5*

pipeline company.

As shown in table 1, our target gas pipeline company has a Value Line unadjusted beta of 0.90, whose standard deviation is 0.1250. The selection criterion range of unadjusted beta is the unadjusted beta plus (+) and minus (-) three of its standard deviations. By using three standard deviations, 99.73 percent of the comparable unadjusted betas is captured.

Three standard deviations of the target utility's unadjusted beta equals 0.38 (0.1250 x 3 = 0.3750, rounded to 0.38). Consequently, the range of unadjusted betas to be used as a selection criteria is 0.52 - 1.28 (0.52 = 0.90 - 0.38) and (1.28 = 0.90 + 0.38).

Likewise, the selection criterion range of residual standard error equals the residual standard error plus (+) and minus (-) three of its standard deviations. The standard deviation of the residual standard error is defined as: $\sigma/\sqrt{2N}$.

As also shown in table 1, the target gas pipeline company has a residual standard error of 3.7867. According to the above formula, the standard deviation of the residual standard error would be 0.1664 (0.1664 = 3.7867/ $\sqrt{2(259)}$ = 3.7867/22.7596, where 259 = N, the number of weekly price change observations over a period of five years). Three standard deviations of the target utility's residual standard error would be 0.4992 (0.1664 x 3 = .4992). Consequently, the range of residual standard errors to be used as a selection criterion is 3.2875 - 4.2859 (3.2875 = 3.7867 - 0.4992) and (4.2859 = 3.7867 + 0.4992).

Step Two: The step one criteria are applied to Value Line's data base of nearly 4,000 firms for which Value Line derives unadjusted betas and residual standard errors on a weekly basis. All firms with unadjusted betas and residual standard errors within the criteria ranges are then selected.

Step Three: In the regulatory ratemaking environment, authorized common equity return rates are applied to a book-value rate base. Thus, the earnings rates on book common equity, or net worth, of competitive, non-utility firms are highly relevant provided those firms are indeed comparable in total risk to the target gas pipeline. The use of the return rates of other utilities has no relevance because their allowed, and hence subsequently achieved, earnings rates are dependent upon the regulatory

table 1

Summary of the Comparable Earnings Analysis for the Proxy Group of 248 Non-Utility Companies Comparable in Total Risk to the Target Gas Pipeline Company[1]

	1	2	3	4	5	6	7	8
			residual	rate of return on net worth				
	adj. beta	unadj. beta	standard error	3-year average[2]	4-year average[2]	5-year average[2]	5-year projected[3]	
average for the proxy group of 248 non-utility companies comparable in total risk to the target gas pipeline company	0.97	0.92	3.7705					
target gas pipeline company	0.96	0.90[4]	3.7867					
median				11.7%	12.0%	12.6%	15.5%	
average of the median historical returns					12.1%			
conclusion[5]								13.8%

[1]The criteria for selection of the non-utility group was that the non-utility companies be domestic and included in *Value Line Investment Survey*. The non-utility group was selected based on an unadjusted beta range of 0.52 to 1.28 and a residual standard error range of 3.2875 to 4.2859.
[2]Ending 1992.
[3]1996-1998/1997-1999.
[4]The average standard deviation of the target gas pipeline company's unadjusted beta is 0.1250.
[5]Equal weight given to both the average of the 3-, 4- and 5-year historical medians (12.1%) and 5-year projected median rate of return on net worth (15.5%). Thus, 13.8% = (12.1% + 15.5% / 2).
Source: Value Line Inc., March 15, 1994
Value Line Investment Survey

Comparable Earnings *from page 6*

process. Consequently, we believe all utilities must be eliminated to avoid circularity. Moreover, we believe non-domestic firms must be eliminated because their reporting methods differ significantly from U.S. firms.

Step Four: We then eliminated those firms for which Value Line does not publish a "Ratings & Report" in *Value Line Investment Survey* so that the historical and projected returns on net worth[6] are from a consistent source. We use historical returns on net worth for the most recent five years, as well as those projected three to five years into the future. We believe it is logical to evaluate both historical and projected return rates because it is reasonable to assume that investors avail themselves of both when they are available from widely disseminated information services, such as Value Line Inc. The use of Value Line's return rates on net worth understates the common equity return rates for two reasons. First, preferred stock is included in net worth. Second, the net worth return rates are as of the end of each period. Thus, the use of average common equity return rates would yield higher results.

Step Five: Median returns based on the historical average three, four and five years ending 1992 and projected 1996-1998 or 1997-1999 rates of return on net worth are then determined as shown in columns 4 through 7 of table 1. The median is used due to the wide variations and skewness in rates of return on net worth for the non-utility firms as evidenced by the frequency distributions of those returns as shown in illustration 1.

However, we show the average unadjusted beta, 0.92, and residual standard error, 3.7705, for the proxy group in columns 2 and 3 of table 1 because their frequency distributions are not significantly skewed, as shown in illustration 2.

Step Six: Our conclusion of a com-

continued on page 8

Illustration 1

Rates of Return on Net Worth for the Proxy Group of 248 Non-Utility Companies[1]

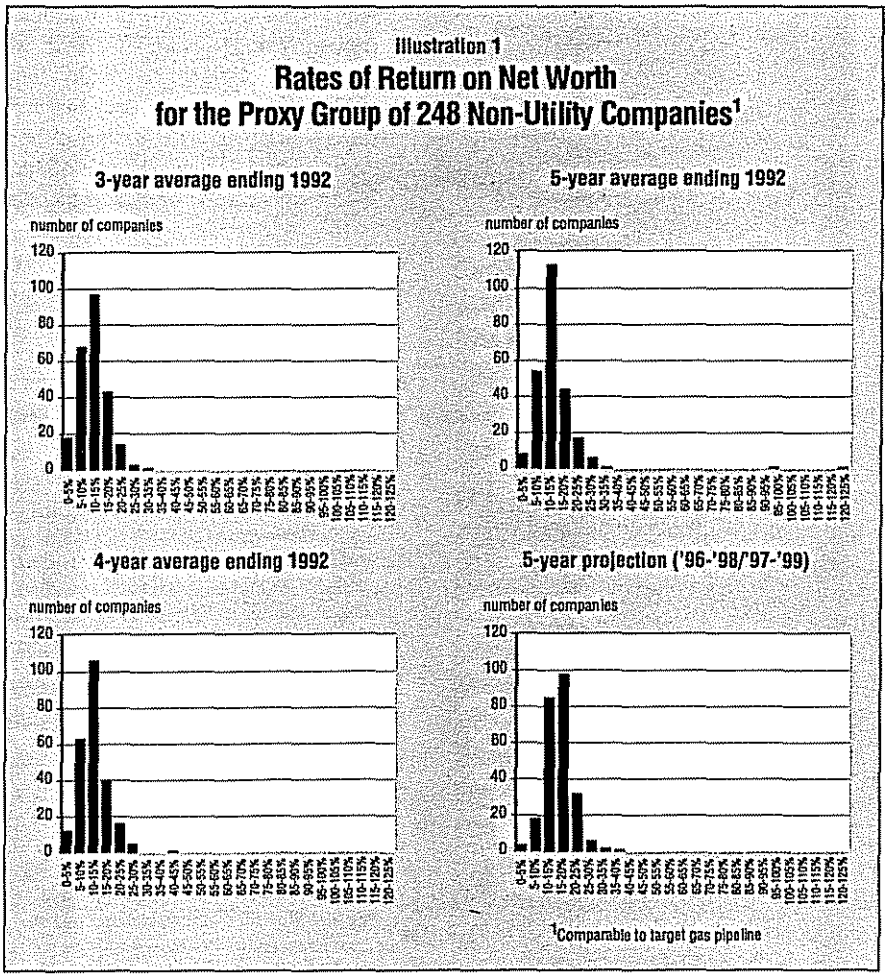
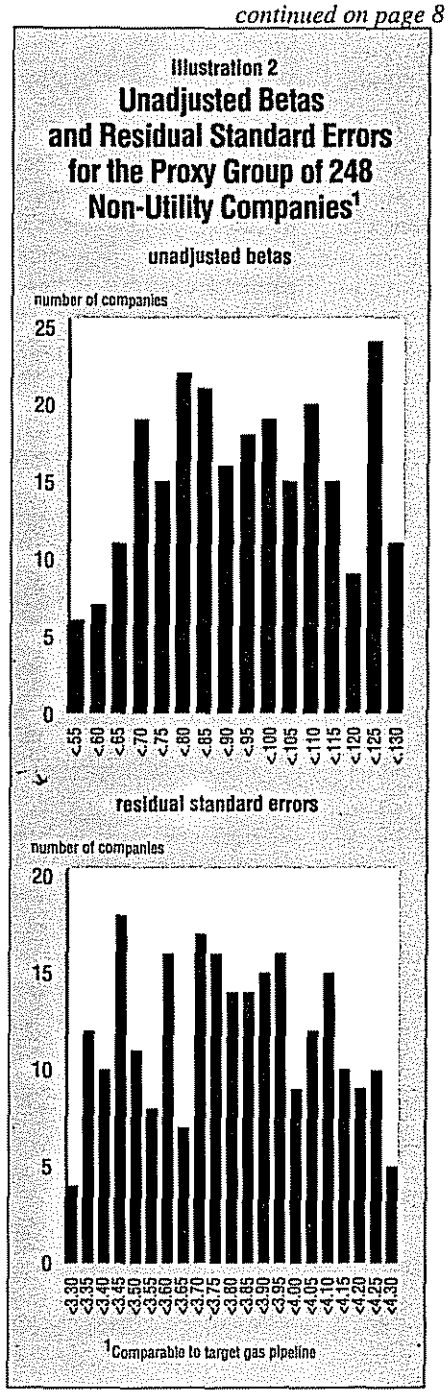


Illustration 2

Unadjusted Betas and Residual Standard Errors for the Proxy Group of 248 Non-Utility Companies[1]



Comparable Earnings *from page 7*

parable earnings cost rate is based upon the mid-point of the average of the median three-, four- and five-year historical rates of return on net worth of 12.1 percent as shown in column 5 and the median projected 1996-1998/1997-1999 rate of return on net worth of 15.5 percent as shown in column 7 of table 1. As shown in column 8, it is 13.8 percent.

Summary

Our comparable earnings approach demonstrates that it is possible to select a proxy group of non-utility firms that is comparable in total risk to a target utility. In our example, the 13.8 percent comparable earnings cost rate is very conservative as it is an expected achieved rate on book common equity (a regulatory allowed rate should be greater) and because it is based on end-of-period net worth. A similar rate on average net worth would be about 20 to 40 basis points higher (i.e., 14.0 to 14.2 percent) and still understate the appropriate regulatory allowed rate of return on book common equity.

Our selection criteria are based upon measures of systematic and unsystematic risk, specifically unadjusted beta and residual standard error. They provide the basis for the objective selection of comparable non-utility firms. Our selection criteria rely on changes in market prices over approximately five years. We compare the aggregate total risk, or the sum of systematic and unsystematic risk, which reflects investors' aggregate assessment of both business and financial risk. Thus, no adjustments are necessary to the proxy group results to compensate for the differences in business risk and financial risk, such as accounting practices and debt/equity ratios. Moreover, it is inappropriate to attempt a comparison of the target utility with any individual firm, or subset of firms, in the proxy group because only the average firm of the group is relevant.

Because the comparable earnings model is firmly anchored in the "corresponding risk" precept established in the landmark court decisions, it is worthy of consideration as a principal model for use in estimating the cost rate of common equity capital of a regulated utility. Our approach to the comparable earnings model produces a proxy group that is indeed comparable in total risk because the selection process is objective and quantitative. It therefore overcomes criticism linked to arbitrary selection processes.

All cost-of-common-equity models, including the DCF and CAPM, are fraught with deficiencies, usually stemming from the many necessary but unrealistic assumptions that underlie them. The effects of the deficiencies of individual models can be mitigated by using more than one model when estimating a utility's common equity cost rate. Therefore, when the non-comparability issue is overcome, the comparable earnings model deserves to receive the same consideration as a primary model, as do the currently popular market-based models. ■

[1] *Bluefield Water Works Improvement Co. v. Public Service Commission*. 262 U.S. 679 (1922) and *Federal Power Commission v. Hope Natural Gas Co.* 320 U.S. 519 (1944).

[2] Charles F. Phillips Jr., The Regulation of Public Utilities: Theory and Practice. Public Utilities Reports Inc., 1988. p. 379.

[3] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen. Principles of Public Utilities Rates. 2nd edition. Public Utilities Reports Inc. 1988, p. 329.

[4] Jack Clark Francis. Investments: Analysis and Management. 3rd edition. McGraw-Hill Book Co., 1980, p. 363.

[5] Id., p. 548.

[6] Returns on net worth must be used when relying on Value Line data because returns on book common equity for non-utility firms are not available from Value Line.

Report Lists Pipeline, Storage Projects

More than $9 billion worth of projects to expand the nation's natural gas pipeline network are in various stages of development, according to an A.G.A. report. These projects involve nearly 8,000 miles of new pipelines and capacity additions to existing lines and represent 15.3 billion cubic feet (Bcf) per day of new pipeline capacity.

During 1993 and early 1994, construction on 3,100 miles of pipeline was completed or under way, at a cost of nearly $4 billion, says A.G.A. These projects are adding 5.4 Bcf in daily delivery capacity nationwide.

Among the projects completed in 1993 were Pacific Gas Transmission Co.'s 805 miles of looping that allows increased deliveries of Canadian gas to the West Coast; Northwest Pipeline Corp.'s addition of 433 million cubic feet of daily capacity for customers in the Pacific Northwest and Rocky Mountain areas; and the 156-mile Empire State Pipeline in New York.

In addition, major construction projects were started on the systems of Texas Eastern Transmission Corp. and Algonquin Gas Transmission Co. — both subsidiaries of Panhandle Eastern Corp. — and along Florida Gas Transmission Co.'s pipeline.

The report goes on to discuss another $5 billion in proposed projects, which, if completed, will add nearly 5,000 miles of pipeline and 9.8 Bcf per day in capacity, much of it serving Florida and West Coast markets.

A.G.A. also identifies 47 storage projects and says that if all of them are built, existing storage capacity will increase by more than 500 Bcf, or 15 percent.

For a copy of *New Pipeline Construction: Status Report 1993-94* (#F00103), call A.G.A. at (703) 841-8490. Price per copy is $6 for employees of member companies and associates and $12 for other customers.

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Investments: Analysis and Management

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Beta Measurements The beta coefficient is an *index of systematic risk.* Beta coefficients may be used for ranking the systematic risk of different assets. If the beta is larger than 1, $b > 1.0$, then the asset is more volatile than the market and is called an **aggressive asset.** If the beta is less than 1, $b < 1.0$, the asset is a **defensive asset;** its price fluctuations are less volatile than the market's. Figure 10-1 illustrates the characteristic lines for three different assets that have low, medium, and high levels of beta (or undiversifiable risk).

Figure 10-2 shows that IBM is a stock with an average amount of systematic risk. IBM's beta of 1.02 indicates that its return tends to increase 2 percent more than the return on the market average when the market is rising. When the market falls, IBM's return tends to fall 2 percent more than the market's. The characteristic line for IBM has an above average correlation coefficient of $\rho = .7495$, indicating that the returns on this security follow its particular characteristic line slightly more closely than those of the average stock.

Partitioning Risk Total risk can be measured by the variance of returns, denoted Var(r). This measure of *total risk is partitioned into its systematic and unsystematic components in Equation (10-8).*[7]

$$\begin{aligned}\text{Var}(r_i) &= \text{total risk of } i\text{th asset} \\ &= \text{Var}(a_i + b_i r_{m,t} + e_{i,t}) \\ &\quad \text{by substituting } (a_i + b_i r_{m,t} + e_{i,t}) \text{ for } r_{i,t} \\ &= 0 + \text{Var}(b_i r_{m,t}) + \text{Var}(e_{i,t}) \\ &\quad \text{since Var}(a_i) = 0 \end{aligned} \tag{10-8}$$

$$\begin{aligned}\text{Var}(r_i) &= b_i^2\,\text{Var}(r_m) + \text{Var}(e) \qquad \text{since Var}(b_i r_m) = b_i^2\,\text{Var}(r_m) \\ &= \text{systematic} + \text{unsystematic risk}\end{aligned} \tag{10-8a}$$

$$.01389 = .00780 + .00609 \qquad \text{for IBM}$$

The unsystematic risk measure Var(e) is called in regression language the *residual variance* or, synonymously, the *standard error squared.*

Undiversifiable Proportion The percentage of total risk that is systematic can be measured by the coefficient of determination ρ^2 (that is, the characteristic line's squared correlation coefficient).

[7]In this context, **partition** is a technical statistical term that means to divide the total variance into *mutually exclusive* and *exhaustive* pieces. This partition is only possible if the returns from the market are statistically independent from the residual error terms that occur simultaneously, $\text{Cov}(r_{m,t}, e_{i,t}) = 0$. The mathematics of regression analysis will orthogonalize the residuals and thus ensure that the needed statistical independence exists.

64 S.Ct. 281
51 P.U.R.(NS) 193, 320 U.S. 591, 64 S.Ct. 281, 88 L.Ed. 333
(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

Supreme Court of the United States
FEDERAL POWER COMMISSION et al.
v.
HOPE NATURAL GAS CO.
CITY OF CLEVELAND
v.
SAME.
Nos. 34 and 35.

Argued Oct. 20, 21, 1943.
Decided Jan. 3, 1944.

Separate proceedings before the Federal Power Commission by such Commission, by the City of Cleveland and the City of Akron, and by Pennsylvania Public Utility Commission wherein the State of West Virginia and its Public Service Commission were permitted to intervene concerning rates charged by Hope Natural Gas Company which were consolidated for hearing. An order fixing rates was reversed and remanded with directions by the Circuit Court of Appeals, 134 F.2d 287, and Federal Power Commission, City of Akron and Pennsylvania Public Utility Commission in one case and the City of Cleveland in another bring certiorari.

Reversed.

Mr. Justice REED, Mr. Justice FRANKFURTER and Mr. Justice JACKSON, dissenting.

On Writs of Certiorari to the United States Circuit Court of Appeals for the Fourth Circuit.

West Headnotes

[1] **Public Utilities 317A 120**

317A Public Utilities
317AII Regulation
317Ak119 Regulation of Charges
317Ak120 k. Nature and Extent in General. Most Cited Cases
(Formerly 317Ak7.1, 317Ak7)
Rate-making is only one species of price-fixing which, like other applications of the police power, may reduce the value of the property regulated, but that does not render the regulation invalid.

[2] **Public Utilities 317A 123**

317A Public Utilities
317AII Regulation
317Ak119 Regulation of Charges
317Ak123 k. Reasonableness of Charges in General. Most Cited Cases
(Formerly 317Ak7.4, 317Ak7)
Rates cannot be made to depend upon fair value, which is the end product of the process of rate-making and not the starting point, when the value of the going enterprise depends on earnings under whatever rates may be anticipated.

[3] **Gas 190 14.3(2)**

190 Gas
190k14 Charges
190k14.3 Administrative Regulation
190k14.3(2) k. Federal Power Commission. Most Cited Cases
(Formerly 190k14(1))
The rate-making function of the Federal Power Commission under the Natural Gas Act involves the making of pragmatic adjustments, and the Commission is not bound to the use of any single formula or combination of formulae in determining rates. Natural Gas Act, § § 4(a), 5(a), 6, 15 U.S.C.A. § § 717c(a), 717d(a), 717e.

[4] **Gas 190 14.5(6)**

190 Gas
190k14 Charges
190k14.5 Judicial Review and Enforcement of Regulations
190k14.5(6) k. Scope of Review and Trial De Novo. Most Cited Cases
(Formerly 190k14(1))
When order of Federal Power Commission fixing natural gas rates is challenged in the courts, the question is whether order viewed in its entirety meets the requirements of the Natural Gas Act. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), 15 U.S.C.A. § § 717c(a), 717d(a), 717e, 717r(b).

[5] **Gas 190 14.4(1)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges

(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

190k14.4(1) k. In General. Most Cited Cases
(Formerly 190k14(1))
Under the statutory standard that natural gas rates shall be "just and reasonable" it is the result reached and not the method employed that is controlling. Natural Gas Act § § 4(a), 5(a), 15 U.S.C.A. § § 717c(a), 717d(a).

[6] **Gas 190 14.5(6)**

190 Gas
190k14 Charges
190k14.5 Judicial Review and Enforcement of Regulations
190k14.5(6) k. Scope of Review and Trial De Novo. Most Cited Cases
(Formerly 190k14(1))
If the total effect of natural gas rates fixed by Federal Power Commission cannot be said to be unjust and unreasonable, judicial inquiry under the Natural Gas Act is at an end. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), 15 U.S.C.A. § § 717c(a), 717d(a), 717e, 717r(b).

[7] **Gas 190 14.5(7)**

190 Gas
190k14 Charges
190k14.5 Judicial Review and Enforcement of Regulations
190k14.5(7) k. Presumptions. Most Cited Cases
(Formerly 190k14(1))
An order of the Federal Power Commission fixing rates for natural gas is the product of expert judgment, which carries a presumption of validity, and one who would upset the rate must make a convincing showing that it is invalid because it is unjust and unreasonable in its consequences. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), 15 U.S.C.A. § § 717c(a), 717d(a), 717e, 717r(b).

[8] **Gas 190 14.4(1)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(1) k. In General. Most Cited Cases
(Formerly 190k14(1))
The fixing of just and reasonable rates for natural gas by the Federal Power Commission involves a balancing of the investor and the consumer interests. Natural Gas Act, § § 4(a), 5(a), 15 U.S.C.A. § § 717c(a), 717d(a).

[9] **Gas 190 14.4(9)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(9) k. Depreciation and Depletion. Most Cited Cases
(Formerly 190k14(1))
As respects rates for natural gas, from the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business, which includes service on the debt and dividends on stock, and by such standard the return to the equity owner should be commensurate with the terms on investments in other enterprises having corresponding risks, and such returns should be sufficient to assure confidence in the financial integrity of the enterprise so as to maintain its credit and to attract capital. Natural Gas Act, § § 4(a), 5(a), 15 U.S.C.A. § § 717c(a), 717d(a).

[10] **Gas 190 14.4(9)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(9) k. Depreciation and Depletion. Most Cited Cases
(Formerly 190k14(1))
The fixing by the Federal Power Commission of a rate of return that permitted a natural gas company to earn $2,191,314 annually was supported by substantial evidence. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), 15 U.S.C.A. § § 717c(a), 717d(a), 717e, 717r(b).

[11] **Gas 190 14.4(9)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(9) k. Depreciation and Depletion. Most Cited Cases
(Formerly 190k14(1))
Rates which enable a natural gas company to operate successfully, to maintain its financial integrity, to attract capital and to compensate its investors for the risks assumed cannot be condemned as invalid, even though they might produce only a meager return on the so-called "fair value" rate base. Natural Gas Act,

(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

§ § 4(a), 5(a), 6, 19(b), 15 U.S.C.A. § § 717c(a), 717d(a), 717e, 717r(b).

[12] **Gas 190 14.4(4)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(4) k. Method of Valuation. Most Cited Cases
(Formerly 190k14(1))
A return of only 3 27/100 per cent. on alleged rate base computed on reproduction cost new to natural gas company earning an annual average return of about 9 per cent. on average investment and satisfied with existing gas rates suggests an inflation of the base on which the rate had been computed, and justified Federal Power Commission in rejecting reproduction cost as the measure of the rate base. Natural Gas Act, § § 4(a), 5(a), 15 U.S.C.A. § § 717c(a), 717d(a).

[13] **Gas 190 14.4(9)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(9) k. Depreciation and Depletion. Most Cited Cases
(Formerly 190k14(1))
There is no constitutional requirement that owner who engages in a wasting-asset business of limited life shall receive at the end more than he has put into it, and such rule is applicable to a natural gas company since the ultimate exhaustion of its supply of gas is inevitable. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), 15 U.S.C.A. § § 717c(a), 717d(a), 717e, 717r(b).

[14] **Gas 190 14.4(9)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(9) k. Depreciation and Depletion. Most Cited Cases
(Formerly 190k14(1))
In fixing natural gas rate the basing of annual depreciation on cost is proper since by such procedure the utility is made whole and the integrity of its investment is maintained, and no more is required. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), 15 U.S.C.A. § § 717c(a), 717d(a), 717e, 717r(b).

[15] **Gas 190 14.3(4)**

190 Gas
190k14 Charges
190k14.3 Administrative Regulation
190k14.3(4) k. Findings and Orders. Most Cited Cases
(Formerly 190k14(1))
There are no constitutional requirements more exacting than the standards of the Natural Gas Act which are that gas rates shall be just and reasonable, and a rate order which conforms with the act is valid. Natural Gas Act, § § 4(a), 5(a), 6, 19(b), 15 U.S.C.A. § § 717c(a), 717d(a), 717e, 717r(b).

[16] **Commerce 83 62.2**

83 Commerce
83II Application to Particular Subjects and Methods of Regulation
83II(B) Conduct of Business in General
83k62.2 k. Gas. Most Cited Cases
(Formerly 83k13)
The purpose of the Natural Gas Act was to provide through the exercise of the national power over interstate commerce an agency for regulating the wholesale distribution to public service companies of natural gas moving in interstate commerce not subject to certain types of state regulation, and the act was not intended to take any authority from state commissions or to usurp state regulatory authority. Natural Gas Act, § 1 et seq., 15 U.S.C.A. § 717 et seq.

[17] **Mines and Minerals 260 92.5(3)**

260 Mines and Minerals
260III Operation of Mines, Quarries, and Wells
260III(A) Statutory and Official Regulations
260k92.5 Federal Law and Regulations
260k92.5(3) k. Oil and Gas. Most Cited Cases
(Formerly 260k92.7, 260k92)
Under the Natural Gas Act, the Federal Power Commission has no authority over the production or gathering of natural gas. Natural Gas Act, § 1(b), 15 U.S.C.A. § 717(b).

[18] **Gas 190 14.1(1)**

190 Gas
190k14 Charges
190k14.1 In General
190k14.1(1) k. In General; Amount and

(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

Regulation. Most Cited Cases
(Formerly 190k14(1))
The primary aim of the Natural Gas Act was to protect consumers against exploitation at the hands of natural gas companies and holding companies owning a majority of the pipe-line mileage which moved gas in interstate commerce and against which state commissions, independent producers and communities were growing quite helpless. Natural Gas Act, § § 4, 6-10, 14, 15 U.S.C.A. § § 717c, 717e-717i, 717m.

[19] **Gas 190 14.1(1)**

190 Gas
190k14 Charges
190k14.1 In General
190k14.1(1) k. In General; Amount and Regulation. Most Cited Cases
(Formerly 190k14(1))
Apart from the express exemptions contained in § 7 of the Natural Gas Act considerations of conservation are material where abandonment or extensions of facilities or service by natural gas companies are involved, but exploitation of consumers by private operators through maintenance of high rates cannot be continued because of the indirect benefits derived therefrom by a state containing natural gas deposits. Natural Gas Act, § § 4, 5, and § 7 as amended 15 U.S.C.A. § § 717c, 717d, 717f.

[20] **Commerce 83 62.2**

83 Commerce
83II Application to Particular Subjects and Methods of Regulation
83II(B) Conduct of Business in General
83k62.2 k. Gas. Most Cited Cases
(Formerly 83k13)
A limitation on the net earnings of a natural gas company from its interstate business is not a limitation on the power of the producing state, either to safeguard its tax revenues from such industry, or to protect the interests of those who sell their gas to the interstate operator, particularly where the return allowed the company by the Federal Power Commission was a net return after all such charges. Natural Gas Act, § § 4, 5, and § 7, as amended, 15 U.S.C.A. § § 717c, 717d, 717f.

[21] **Gas 190 14.4(1)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(1) k. In General. Most Cited Cases
(Formerly 190k14(1))
The Natural Gas Act granting Federal Power Commission power to fix "just and reasonable rates" does not include the power to fix rates which will disallow or discourage resales for industrial use. Natural Gas Act, § § 4(a), 5(a), 15 U.S.C.A. § § 717c(a), 717d(a).

[22] **Gas 190 14.4(1)**

190 Gas
190k14 Charges
190k14.4 Reasonableness of Charges
190k14.4(1) k. In General. Most Cited Cases
(Formerly 190k14(1))
The wasting-asset nature of the natural gas industry does not require the maintenance of the level of rates so that natural gas companies can make a greater profit on each unit of gas sold. Natural Gas Act, § § 4(a), 5(a), 15 U.S.C.A. § § 717c(a), 717d(a).

[23] **Federal Courts 170B 452**

170B Federal Courts
170BVII Supreme Court
170BVII(B) Review of Decisions of Courts of Appeals
170Bk452 k. Certiorari in General. Most Cited Cases
(Formerly 106k383(1))
Where the Federal Power Commission made no findings as to any discrimination or unreasonable differences in rates, and its failure was not challenged in the petition to review, and had not been raised or argued by any party, the problem of discrimination was not open to review by the Supreme Court on certiorari. Natural Gas Act, § 4(b), 15 U.S.C.A. § 717c(b).

[24] **Constitutional Law 92 74**

92 Constitutional Law
92III Distribution of Governmental Powers and Functions
92III(B) Judicial Powers and Functions
92k71 Encroachment on Executive
92k74 k. Powers, Duties, and Acts Under Legislative Authority. Most Cited Cases
(Formerly 15Ak226)
Congress has entrusted the administration of the

(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

Natural Gas Act to the Federal Power Commission and not to the courts, and apart from the requirements of judicial review, it is not for the Supreme Court to advise the Commission how to discharge its functions. Natural Gas Act, § § 1 et seq., 19(b), 15 U.S.C.A. § § 717 et seq., 717r(b).

[25] **Gas 190 14.5(3)**

190 Gas
190k14 Charges
190k14.5 Judicial Review and Enforcement of Regulations
190k14.5(3) k. Decisions Reviewable. Most Cited Cases
(Formerly 190k14(1))
Under the Natural Gas Act, where order sought to be reviewed does not of itself adversely affect complainant but only affects his rights adversely on the contingency of future administrative action, the order is not reviewable, and resort to the courts in such situation is either premature or wholly beyond the province of such courts. Natural Gas Act, § 19(b), 15 U.S.C.A. § 717r(b).

[26] **Gas 190 14.5(4)**

190 Gas
190k14 Charges
190k14.5 Judicial Review and Enforcement of Regulations
190k14.5(4) k. Persons Entitled to Relief; Parties. Most Cited Cases
(Formerly 190k14(1))
Findings of the Federal Power Commission on lawfulness of past natural gas rates, which the Commission was without power to enforce, were not reviewable under the Natural Gas Act giving any "party aggrieved" by an order of the Commission the right of review. Natural Gas Act, § 19(b), 15 U.S.C.A. § 717r(b).

****283 *592** Mr. Francis M. Shea, Asst. Atty. Gen., for petitioners Federal Power Com'n and others.
***593** Mr. Spencer W. Reeder, of Cleveland, Ohio, for petitioner City of cleveland.
Mr. William B. Cockley, of Cleveland, Ohio, for respondent.
Mr. M. M. Neeley, of Charleston, W. Va., for State of West Virginia, as amicus curiae by special leave of Court.

Mr. Justice DOUGLAS delivered the opinion of the Court.
The primary issue in these cases concerns the validity under the Natural Gas Act of 1938, 52 Stat. 821, 15 U.S.C. s 717 et seq., 15 U.S.C.A. s 717 et seq., of a rate order issued by the Federal Power Commission reducing the rates chargeable by Hope Natural Gas Co., 44 P.U.R.,N.S., 1. On a petition for review of the order made pursuant to s 19(b) of the Act, the ***594** Circuit Court of Appeals set it aside, one judge dissenting. 4 Cir., 134 F.2d 287. The cases ****284** are here on petitions for writs of certiorari which we granted because of the public importance of the questions presented. City of Cleveland v. Hope Natural Gas Co., 319 U.S. 735, 63 S.Ct. 1165.

Hope is a West Virginia corporation organized in 1898. It is a wholly owned subsidiary of Standard Oil Co. (N.J.). Since the date of its organization, it has been in the business of producing, purchasing and marketing natural gas in that state. FN1 It sells some of that gas to local consumers in West Virginia. But the great bulk of it goes to five customer companies which receive it at the West Virginia line and distribute it in Ohio and in Pennsylvania. FN2 In July, 1938, the cities of Cleveland and Akron filed complaints with the Commission charging that the rates collected by Hope from East Ohio Gas Co. (an affiliate of Hope which distributes gas in Ohio) were excessive and unreasonable. Later in 1938 the Commission on its own motion instituted an investigation to determine the reasonableness of all of Hope's interstate rates. In March ***595** 1939 the Public Utility Commission of Pennsylvania filed a complaint with the Commission charging that the rates collected by Hope from Peoples Natural Gas Co. (an affiliate of Hope distributing gas in Pennsylvania) and two non-affiliated companies were unreasonable. The City of Cleveland asked that the challenged rates be declared unlawful and that just and reasonable rates be determined from June 30, 1939 to the date of the Commission's order. The latter finding was requested in aid of state regulation and to afford the Public Utilities Commission of Ohio a proper basic for disposition of a fund collected by East Ohio under bond from Ohio consumers since June 30, 1939. The cases were consolidated and hearings were held.

FN1 Hope produces about one-third of its annual gas requirements and purchases the rest under some 300 contracts.

FN2 These five companies are the East Ohio Gas Co., the Peoples Natural Gas Co., the

River Gas Co., the Fayette County Gas Co., and the Manufacturers Light & Heat Co. The first three of these companies are, like Hope, subsidiaries of Standard Oil Co. (N.J.). East Ohio and River distribute gas in Ohio, the other three in Pennsylvania. Hope's approximate sales in m.c.f. for 1940 may be classified as follows:

Local West Virginia. sales.	11,000,000
East Ohio.	40,000,000
Peoples.	10,000,000
River.	400,000
Fayette.	860,000
Manufacturers.	2,000,000

Local West Virginia

Hope's natural gas is processed by Hope Construction & Refining Co., an affiliate, for the extraction of gasoline and butane. Domestic Coke Corp., another affiliate, sells coke-oven gas to Hope for boiler fuel.

On May 26, 1942, the Commission entered its order and made its findings. Its order required Hope to decrease its future interstate rates so as to reflect a reduction, on an annual basis of not less than $3,609,857 in operating revenues. And it established 'just and reasonable' average rates per m.c.f. for each of the five customer companies. [FN3] In response to the prayer of the City of Cleveland the Commission also made findings as to the lawfulness of past rates, although concededly it had no authority under the Act to fix past rates or to award reparations. 44 P.U.R.,U.S., at page 34. It found that the rates collected by Hope from East Ohio were unjust, unreasonable, excessive and therefore unlawful, by $830,892 during 1939, $3,219,551 during 1940, and $2,815,789 on an annual basis since 1940. It further found that just, reasonable, and lawful rates for gas sold by Hope to East Ohio for resale for ultimate public consumption were those required ***596** to produce $11,528,608 for 1939, $11,507,185 for 1940 and $11.910,947 annually since 1940.

FN3 These required minimum reductions of 7¢ per m.c.f. from the 36.5¢ and 35.5¢ rates previously charged East Ohio and Peoples, respectively, and 3¢ per m.c.f. from the 31.5¢ rate previously charged Fayette and Manufacturers.

The Commission established an interstate rate base of $33,712,526 which, it found, represented the 'actual legitimate cost' of the company's interstate property less depletion and depreciation and plus unoperated acreage, working capital and future net capital additions. The Commission, beginning with book cost, made ****285** certain adjustments not necessary to relate here and found the 'actual legitimate cost' of the plant in interstate service to be $51,957,416, as of December 31, 1940. It deducted accrued depletion and depreciation, which it found to be $22,328,016 on an 'economic-service-life' basis. And it added $1,392,021 for future net capital additions, $566,105 for useful unoperated acreage, and $2,125,000 for working capital. It used 1940 as a test year to estimate future revenues and expenses. It allowed over $16,000,000 as annual operating expenses-about $1,300,000 for taxes, $1,460,000 for depletion and depreciation, $600,000 for exploration and development costs, $8,500,000 for gas purchased. The Commission allowed a net increase of $421,160 over 1940 operating expenses, which amount was to take care of future increase in wages, in West Virginia property taxes, and in exploration and development costs. The total amount of deductions allowed from interstate revenues was $13,495,584.

Hope introduced evidence from which it estimated reproduction cost of the property at $97,000,000. It also presented a so-called trended 'original cost' estimate which exceeded $105,000,000. The latter was designed 'to indicate what the original cost of the property would have been if 1938 material and labor prices had prevailed throughout the whole period of the piece-meal construction of the company's property since 1898.' 44 P.U.R.,N.S., at pages 8, 9. Hope estimated by the 'percent condition' method accrued depreciation at about 35% of ***597** reproduction cost new. On that basis Hope contended for a rate base of $66,000,000. The Commission refused to place any reliance on reproduction cost new, saying that it was 'not predicated upon facts' and was 'too conjectural and illusory to be given any weight in these proceedings.' Id., 44 P.U.R.,U.S., at page 8. It likewise refused to give any 'probative value' to trended 'original cost' since it was 'not founded in fact' but was 'basically erroneous' and produced 'irrational results.' Id., 44 P.U.R., N.S., at page 9. In determining the amount of accrued depletion and depreciation the Commission, following Lindheimer v. Illinois Bell

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Telephone Co., 292 U.S. 151, 167-169, 54 S.Ct. 658, 664-666, 78 L.Ed. 1182; Federal Power Commission v. Natural Gas Pipeline Co., 315 U.S. 575, 592, 593, 62 S.Ct. 736, 745, 746, 86 L.Ed. 1037, based its computation on 'actual legitimate cost'. It found that Hope during the years when its business was not under regulation did not observe 'sound depreciation and depletion practices' but 'actually accumulated an excessive reserve' [FN4] of about $46,000,000. Id., 44 P.U.R.,N.S., at page 18. One member of the Commission thought that the entire amount of the reserve should be deducted from 'actual legitimate cost' in determining the rate base. [FN5] The majority of the ***598** Commission concluded, however, that where, as here, a business is brought under regulation for the first time and where incorrect depreciation and depletion practices have prevailed, the deduction of the reserve requirement (actual existing depreciation and depletion) rather than the excessive reserve should be made so as to ****286** lay 'a sound basis for future regulation and control of rates.' Id., 44 P.U.R.,N.S., at page 18. As we have pointed out, it determined accrued depletion and depreciation to be $22,328,016; and it allowed approximately $1,460,000 as the annual operating expense for depletion and depreciation. [FN6]

FN4 The book reserve for interstate plant amounted at the end of 1938 to about $18,000,000 more than the amount determined by the Commission as the proper reserve requirement. The Commission also noted that 'twice in the past the company has transferred amounts aggregating $7,500,000 from the depreciation and depletion reserve to surplus. When these latter adjustments are taken into account, the excess becomes $25,500,000, which has been exacted from the ratepayers over and above the amount required to cover the consumption of property in the service rendered and thus to keep the investment unimpaired.' 44 P.U.R.,N.S., at page 22.

FN5 That contention was based on the fact that 'every single dollar in the depreciation and depletion reserves' was taken 'from gross operating revenues whose only source was the amounts charged customers in the past for natural gas. It is, therefore, a fact that the depreciation and depletion reserves have been contributed by the customers and do not represent any investment by Hope.' Id., 44 P.U.R.,N.S., at page 40. And see Railroad Commission v. Cumberland Tel. & T. Co., 212 U.S. 414, 424, 425, 29 S.Ct. 357, 361, 362, 53 L.Ed. 577; 2 Bonbright, Valuation of Property (1937), p. 1139.

FN6 The Commission noted that the case was 'free from the usual complexities involved in the estimate of gas reserves because the geologists for the company and the Commission presented estimates of the remaining recoverable gas reserves which were about one per cent apart.' 44 P.U.R.,N.S., at pages 19, 20.

The Commission utilized the 'straight-line-basis' for determining the depreciation and depletion reserve requirements. It used estimates of the average service lives of the property by classes based in part on an inspection of the physical condition of the property. And studies were made of Hope's retirement experience and maintenance policies over the years. The average service lives of the various classes of property were converted into depreciation rates and then applied to the cost of the property to ascertain the portion of the cost which had expired in rendering the service.

The record in the present case shows that Hope is on the lookout for new sources of supply of natural gas and is contemplating an extension of its pipe line into Louisiana for that purpose. The Commission recognized in fixing the rates of depreciation that much material may be used again when various present sources of gas supply are exhausted, thus giving that property more than scrap value at the end of its present use.

Hope's estimate of original cost was about $69,735,000-approximately $17,000,000 more than the amount found by the Commission. The item of $17,000,000 was made up largely of expenditures which prior to December 31, 1938, were charged to operating expenses. Chief among those expenditures was some $12,600,000 expended ***599** in well-drilling prior to 1923. Most of that sum was expended by Hope for labor, use of drilling-rigs, hauling, and similar costs of well-drilling. Prior to 1923 Hope followed the general practice of the natural gas industry and charged the cost of drilling wells to operating expenses. Hope continued that practice until the Public Service Commission of West Virginia in 1923 required it to capitalize such expenditures, as does the Commission under its present Uniform System of Accounts. [FN7] The Commission refused to add such items to the rate base stating that 'No greater injustice to consumers could be done than to allow items as operating expenses and at a later date include them in the rate base, thereby placing multiple charges upon the consumers.' Id., 44 P.U.R.,N.S., at page 12. For the same reason the Commission excluded from the rate base about $1,600,000 of expenditures on properties which Hope acquired from other utilities, the latter having charged those payments to operating expenses. The Commission disallowed certain other overhead items amounting to

over $3,000,000 which also had been previously charged to operating expenses. And it refused to add some $632,000 as interest during construction since no interest was in fact paid.

FN7 See Uniform System of Accounts prescribed for Natural Gas Companies effective January 1, 1940, Account No. 332.1.

Hope contended that it should be allowed a return of not less than 8%. The Commission found that an 8% return would be unreasonable but that 6 1/2% was a fair rate of return. That rate of return, applied to the rate base of $33,712,526, would produce $2,191,314 annually, as compared with the present income of not less than $5,801,171.

The Circuit Court of Appeals set aside the order of the Commission for the following reasons. (1) It held that the rate base should reflect the 'present fair value' of the ***600** property, that the Commission in determining the 'value' should have considered reproduction cost and trended original cost, and that 'actual legitimate cost' (prudent investment) was not the proper measure of 'fair value' where price levels had changed since the investment. (2) It concluded that the well-drilling costs and overhead items in the amount of some $17,000,000 should have been included in the rate base. (3) It held that accrued depletion and depreciation and the annual allowance for that expense should be computed on the basis of 'present fair value' of the property not on the basis of 'actual legitimate cost'.

****287** The Circuit Court of Appeals also held that the Commission had no power to make findings as to past rates in aid of state regulation. But it concluded that those findings were proper as a step in the process of fixing future rates. Viewed in that light, however, the findings were deemed to be invalidated by the same errors which vitiated the findings on which the rate order was based.

Order Reducing Rates. Congress has provided in s 4(a) of the Natural Gas Act that all natural gas rates subject to the jurisdiction of the Commission 'shall be just and reasonable, and any such rate or charge that is not just and reasonable is hereby declared to be unlawful.' Sec. 5(a) gives the Commission the power, after hearing, to determine the 'just and reasonable rate' to be thereafter observed and to fix the rate by order. Sec. 5(a) also empowers the Commission to order a 'decrease where existing rates are unjust * * * unlawful, or are not the lowest reasonable rates.' And Congress has provided in s 19(b) that on review of these rate orders the 'finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive.' Congress, however, has provided no formula by which the 'just and reasonable' rate is to be determined. It has not filled in the ***601** details of the general prescription FN8 of s 4(a) and s 5(a). It has not expressed in a specific rule the fixed principle of 'just and reasonable'.

FN8. Sec. 6 of the Act comes the closest to supplying any definite criteria for rate making. It provides in subsection (a) that, 'The Commission may investigate the ascertain the actual legitimate cost of the property of every natural-gas company, the depreciation therein, and, when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation and the fair value of such property.' Subsection (b) provides that every natural-gas company on request shall file with the Commission a statement of the 'original cost' of its property and shall keep the Commission informed regarding the 'cost' of all additions, etc.

[1] [2] When we sustained the constitutionality of the Natural Gas Act in the Natural Gas Pipeline Co. case, we stated that the 'authority of Congress to regulate the prices of commodities in interstate commerce is at least as great under the Fifth Amendment as is that of the states under the Fourteenth to regulate the prices of commodities in intrastate commerce.' 315 U.S. at page 582, 62 S.Ct. at page 741, 86 L.Ed. 1037. Rate-making is indeed but one species of price-fixing. Munn v. Illinois, 94 U.S. 113, 134, 24 L.Ed. 77. The fixing of prices, like other applications of the police power, may reduce the value of the property which is being regulated. But the fact that the value is reduced does not mean that the regulation is invalid. Block v. Hirsh, 256 U.S. 135, 155-157, 41 S.Ct. 458, 459, 460, 65 L.Ed. 865, 16 A.L.R. 165; Nebbia v. New York, 291 U.S. 502, 523-539, 54 S.Ct. 505, 509-517, 78 L.Ed. 940, 89 A.L.R. 1469, and cases cited. It does, however, indicate that 'fair value' is the end product of the process of rate-making not the starting point as the Circuit Court of Appeals held. The heart of the matter is that rates cannot be made to depend upon 'fair value' when the value of the going enterprise depends on earnings under whatever rates may be anticipated. FN9

FN9 We recently stated that the meaning of the word 'value' is to be gathered 'from the purpose for which a valuation is being made. Thus the question in a valuation for rate making is how much a utility will be allowed to earn. The basic

> question in a valuation for reorganization purposes is how much the enterprise in all probability can earn.' Institutional Investors v. Chicago, M., St. P. & P.R. Co., 318 U.S. 523, 540, 63 S.Ct. 727, 738.

***602** [3] [4] [5] [6] [7] We held in Federal Power Commission v. Natural Gas Pipeline Co., supra, that the Commission was not bound to the use of any single formula or combination of formulae in determining rates. Its rate-making function, moreover, involves the making of 'pragmatic adjustments.' Id., 315 U.S. at page 586, 62 S.Ct. at page 743, 86 L.Ed. 1037. And when the Commission's order is challenged in the courts, the question is whether that order 'viewed in its entirety' meets the requirements of the Act. Id., 315 U.S. at page 586, 62 S.Ct. at page 743, 86 L.Ed. 1037. Under the statutory standard of 'just and reasonable' it is the result reached not the method employed which is controlling. Cf. ****288**Los Angeles Gas & Electric Corp. v. Railroad Commission, 289 U.S. 287, 304, 305, 314, 53 S.Ct. 637, 643, 644, 647, 77 L.Ed. 1180; West Ohio Gas Co. v. Public Utilities Commission (No. 1), 294 U.S. 63, 70, 55 S.Ct. 316, 320, 79 L.Ed. 761; West v. Chesapeake & Potomac Tel. Co., 295 U.S. 662, 692, 693, 55 S.Ct. 894, 906, 907, 79 L.Ed. 1640 (dissenting opinion). It is not theory but the impact of the rate order which counts. If the total effect of the rate order cannot be said to be unjust and unreasonable, judicial inquiry under the Act is at an end. The fact that the method employed to reach that result may contain infirmities is not then important. Moreover, the Commission's order does not become suspect by reason of the fact that it is challenged. It is the product of expert judgment which carries a presumption of validity. And he who would upset the rate order under the Act carries the heavy burden of making a convincing showing that it is invalid because it is unjust and unreasonable in its consequences. Cf. Railroad Commission v. Cumberland Tel. & T. Co., 212 U.S. 414, 29 S.Ct. 357, 53 L.Ed. 577; Lindheimer v. Illinois Bell Tel. Co., supra, 292 U.S. at pages 164, 169, 54 S.Ct. at pages 663, 665, 78 L.Ed. 1182; Railroad Commission v. Pacific Gas & E. Co., 302 U.S. 388, 401, 58 S.Ct. 334, 341, 82 L.Ed. 319.

***603** [8] [9] The rate-making process under the Act, i.e., the fixing of 'just and reasonable' rates, involves a balancing of the investor and the consumer interests. Thus we stated in the Natural Gas Pipeline Co. case that 'regulation does not insure that the business shall produce net revenues.' 315 U.S. at page 590, 62 S.Ct. at page 745, 86 L.Ed. 1037. But such considerations aside, the investor interest has a legitimate concern with the financial integrity of the company whose rates are being regulated. From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock. Cf. Chicago & Grand Trunk R. Co. v. Wellman, 143 U.S. 339, 345, 346, 12 S.Ct. 400, 402, 36 L.Ed. 176. By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital. See State of Missouri ex rel. South-western Bell Tel. Co. v. Public Service Commission, 262 U.S. 276, 291, 43 S.Ct. 544, 547, 67 L.Ed. 981, 31 A.L.R. 807 (Mr. Justice Brandeis concurring). The conditions under which more or less might be allowed are not important here. Nor is it important to this case to determine the various permissible ways in which any rate base on which the return is computed might be arrived at. For we are of the view that the end result in this case cannot be condemned under the Act as unjust and unreasonable from the investor or company viewpoint.

We have already noted that Hope is a wholly owned subsidiary of the Standard Oil Co. (N.J.). It has no securities outstanding except stock. All of that stock has been owned by Standard since 1908. The par amount presently outstanding is approximately $28,000,000 as compared with the rate base of $33,712,526 established by ***604** the Commission. Of the total outstanding stock $11,000,000 was issued in stock dividends. The balance, or about $17,000,000, was issued for cash or other assets. During the four decades of its operations Hope has paid over $97,000,000 in cash dividends. It had, moreover, accumulated by 1940 an earned surplus of about $8,000,000. It had thus earned the total investment in the company nearly seven times. Down to 1940 it earned over 20% per year on the average annual amount of its capital stock issued for cash or other assets. On an average invested capital of some $23,000,000 Hope's average earnings have been about 12% a year. And during this period it had accumulated in addition reserves for depletion and depreciation of about $46,000,000. Furthermore, during 1939, 1940 and 1941, Hope paid dividends of 10% on its stock. And in the year 1942, during about half of which the lower rates were in effect, it paid dividends of 7 1/2%. From 1939-1942 its earned surplus increased from $5,250,000 to about $13,700,000, i.e., to almost half the par value of its outstanding stock.

As we have noted, the Commission fixed a rate of return which permits Hope to earn $2,191,314 annually. In determining that amount it stressed the importance of maintaining the financial integrity of the ****289** company. It considered the financial history of Hope and a vast

array of data bearing on the natural gas industry, related businesses, and general economic conditions. It noted that the yields on better issues of bonds of natural gas companies sold in the last few years were 'close to 3 per cent', 44 P.U.R.,N.S., at page 33. It stated that the company was a 'seasoned enterprise whose risks have been minimized' by adequate provisions for depletion and depreciation (past and present) with 'concurrent high profits', by 'protected established markets, through affiliated distribution companies, in populous and industralized areas', and by a supply of gas locally to meet all requirements,***605** 'except on certain peak days in the winter, which it is feasible to supplement in the future with gas from other sources.' Id., 44 P.U.R.,N.S., at page 33. The Commission concluded, 'The company's efficient management, established markets, financial record, affiliations, and its prospective business place it in a strong position to attract capital upon favorable terms when it is required.' Id., 44 P.U.R.,N.S., at page 33.

[10] [11] [12] In view of these various considerations we cannot say that an annual return of $2,191,314 is not 'just and reasonable' within the meaning of the Act. Rates which enable the company to operate successfully, to maintain its financial integrity, to attract capital, and to compensate its investors for the risks assumed certainly cannot be condemned as invalid, even though they might produce only a meager return on the so-called 'fair value' rate base. In that connection it will be recalled that Hope contended for a rate base of $66,000,000 computed on reproduction cost new. The Commission points out that if that rate base were accepted, Hope's average rate of return for the four-year period from 1937-1940 would amount to 3.27%. During that period Hope earned an annual average return of about 9% on the average investment. It asked for no rate increases. Its properties were well maintained and operated. As the Commission says such a modest rate of 3.27% suggests an 'inflation of the base on which the rate has been computed.' Dayton Power & Light Co. v. Public Utilities Commission, 292 U.S. 290, 312, 54 S.Ct. 647, 657, 78 L.Ed. 1267. Cf. Lindheimer v. Illinois Bell Tel. Co., supra, 292 U.S. at page 164, 54 S.Ct. at page 663, 78 L.Ed. 1182. The incongruity between the actual operations and the return computed on the basis of reproduction cost suggests that the Commission was wholly justified in rejecting the latter as the measure of the rate base.

In view of this disposition of the controversy we need not stop to inquire whether the failure of the Commission to add the $17,000,000 of well-drilling and other costs to ***606** the rate base was consistent with the prudent investment theory as developed and applied in particular cases.

[13] [14] [15] Only a word need be added respecting depletion and depreciation. We held in the Natural Gas Pipeline Co. case that there was no constitutional requirement 'that the owner who embarks in a wasting-asset business of limited life shall receive at the end more than he has put into it.' 315 U.S. at page 593, 62 S.C. at page 746, 86 L.Ed. 1037. The Circuit Court of Appeals did not think that that rule was applicable here because Hope was a utility required to continue its service to the public and not scheduled to end its business on a day certain as was stipulated to be true of the Natural Gas Pipeline Co. But that distinction is quite immaterial. The ultimate exhaustion of the supply is inevitable in the case of all natural gas companies. Moreover, this Court recognized in Lindheimer v. Illinois Bell Tel. Co., supra, the propriety of basing annual depreciation on cost. [FN10] By such a procedure the ****290** utility is made whole and the integrity of its investment maintained. [FN11] No more is required. [FN12] We cannot approve the contrary holding ***607** of United Railways & Electric Co. v. West, 280 U.S. 234, 253, 254, 50 S.Ct. 123, 126, 127, 74 L.Ed. 390. Since there are no constitutional requirements more exacting than the standards of the Act, a rate order which conforms to the latter does not run afoul of the former.

FN10 Chief Justice Hughes said in that case (292 U.S. at pages 168, 169, 54 S.Ct. at page 665, 78 L.Ed. 1182): 'If the predictions of service life were entirely accurate and retirements were made when and as these predictions were precisely fulfilled, the depreciation reserve would represent the consumption of capital, on a cost basis, according to the method which spreads that loss over the respective service periods. But if the amounts charged to operating expenses and credited to the account for depreciation reserve are excessive, to that extent subscribers for the telephone service are required to provide, in effect, capital contributions, not to make good losses incurred by the utility in the service rendered and thus to keep its investment unimpaired, but to secure additional plant and equipment upon which the utility expects a return.'

FN11 See Mr. Justice Brandeis (dissenting) in United Railways & Electric Co. v. West, 280 U.S. 234, 259-288, 50 S.Ct. 123, 128-138, 74 L.Ed. 390, for an extended analysis of the problem.

FN12 It should be noted that the Act provides no specific rule governing depletion and depreciation. Sec. 9(a) merely states that the

> Commission 'may from time to time ascertain and determine, and by order fix, the proper and adequate rates of depreciation and amortization of the several classes of property of each natural-gas company used or useful in the production, transportation, or sale of natural gas.'

The Position of West Virginia. The State of West Virginia, as well as its Public Service Commission, intervened in the proceedings before the Commission and participated in the hearings before it. They have also filed a brief amicus curiae here and have participated in the argument at the bar. Their contention is that the result achieved by the rate order 'brings consequences which are unjust to West Virginia and its citizens' and which 'unfairly depress the value of gas, gas lands and gas leaseholds, unduly restrict development of their natural resources, and arbitrarily transfer their properties to the residents of other states without just compensation therefor.'

West Virginia points out that the Hope Natural Gas Co. holds a large number of leases on both producing and unoperated properties. The owner or grantor receives from the operator or grantee delay rentals as compensation for postponed drilling. When a producing well is successfully brought in, the gas lease customarily continues indefinitely for the life of the field. In that case the operator pays a stipulated gas-well rental or in some cases a gas royalty equivalent to one-eighth of the gas marketed. FN13 Both the owner and operator have valuable property interests in the gas which are separately taxable under West Virginia law. The contention is that the reversionary interests in the leaseholds should be represented in the rate proceedings since it is their gas which is being sold in interstate ***608** commerce. It is argued, moreover, that the owners of the reversionary interests should have the benefit of the 'discovery value' of the gas leaseholds, not the interstate consumers. Furthermore, West Virginia contends that the Commission in fixing a rate for natural gas produced in that State should consider the effect of the rate order on the economy of West Virginia. It is pointed out that gas is a wasting asset with a rapidly diminishing supply. As a result West Virginia's gas deposits are becoming increasingly valuable. Nevertheless the rate fixed by the Commission reduces that value. And that reduction, it is said, has severe repercussions on the economy of the State. It is argued in the first place that as a result of this rate reduction Hope's West Virginia property taxes may be decreased in view of the relevance which earnings have under West Virginia law in the assessment of property for tax purposes. FN14 Secondly, it is pointed out that West Virginia has a production tax FN15 on the 'value' of the gas exported from the State. And we are told that for purposes of that tax 'value' becomes under West Virginia law 'practically the substantial equivalent of market value.' Thus West Virginia argues that undervaluation of Hope's gas leaseholds will cost the State many thousands of dollars in taxes. The effect, it is urged, is to impair West Virginia's tax structure for the benefit of Ohio and Pennsylvania consumers. West Virginia emphasizes, moreover, its deep interest in the conservation of its natural resources including its natural gas. It says that a reduction of the value of these leasehold values will jeopardize these conservation policies in three respects: (1) ****291** exploratory development of new fields will be discouraged; (2) abandonment of lowyield high-cost marginal wells will be hastened; and (3) secondary recovery of oil will be hampered. ***609** Furthermore, West Virginia contends that the reduced valuation will harm one of the great industries of the State and that harm to that industry must inevitably affect the welfare of the citizens of the State. It is also pointed out that West Virginia has a large interest in coal and oil as well as in gas and that these forms of fuel are competitive. When the price of gas is materially cheapened, consumers turn to that fuel in preference to the others. As a result this lowering of the price of natural gas will have the effect of depreciating the price of West Virginia coal and oil.

> FN13 See Simonton, The Nature of the Interest of the Grantee Under an Oil and Gas Lease (1918), 25 W.Va.L.Quar. 295.
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> FN14 West Penn Power Co. v. Board of Review, 112 W.Va. 442, 164 S.E. 862.
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> FN15 W.Va.Rev.Code of 1943, ch. 11. Art. 13, ss 2a, 3a.

West Virginia insists that in neglecting this aspect of the problem the Commission failed to perform the function which Congress entrusted to it and that the case should be remanded to the Commission for a modification of its order. FN16

> FN16 West Virginia suggests as a possible solution (1) that a 'going concern value' of the company's tangible assets be included in the rate base and (2) that the fair market value of gas delivered to customers be added to the outlay for operating expenses and taxes.

We have considered these contentions at length in view of the earnestness with which they have been urged upon us. We have searched the legislative history of the Natural

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Gas Act for any indication that Congress entrusted to the Commission the various considerations which West Virginia has advanced here. And our conclusion is that Congress did not.

[16] [17] We pointed out in Illinois Natural Gas Co. v. Central Illinois Public Service Co., 314 U.S. 498, 506, 62 S.Ct. 384, 387, 86 L.Ed. 371, that the purpose of the Natural Gas Act was to provide, 'through the exercise of the national power over interstate commerce, an agency for regulating the wholesale distribution to public service companies of natural gas moving interstate, which this Court had declared to be interstate commerce not subject to certain types of state regulation.' As stated in the House Report the 'basic purpose' of this legislation was 'to occupy' the field in which such cases as ***610**State of Missouri v. Kansas Natural Gas Co., 265 U.S. 298, 44 S.Ct. 544, 68 L.Ed. 1027, and Public Utilities Commission v. Attleboro Steam & Electric Co., 273 U.S. 83, 47 S.Ct. 294, 71 L.Ed. 549, had held the States might not act. H.Rep. No. 709, 75th Cong., 1st Sess., p. 2. In accomplishing that purpose the bill was designed to take 'no authority from State commissions' and was 'so drawn as to complement and in no manner usurp State regulatory authority.' Id., p. 2. And the Federal Power Commission was given no authority over the 'production or gathering of natural gas.' s 1(b).

[18] The primary aim of this legislation was to protect consumers against exploitation at the lands of natural gas companies. Due to the hiatus in regulation which resulted from the Kansas Natural Gas Co. case and related decisions state commissions found it difficult or impossible to discover what it cost interstate pipe-line companies to deliver gas within the consuming states; and thus they were thwarted in local regulation. H.Rep., No. 709, supra, p. 3. Moreover, the investigations of the Federal Trade Commission had disclosed that the majority of the pipe-line mileage in the country used to transport natural gas, together with an increasing percentage of the natural gas supply for pipe-line transportation, had been acquired by a handful of holding companies. [FN17] State commissions, independent producers, and communities having or seeking the service were growing quite helpless against these combinations. [FN18] These were the types of problems with which those participating in the hearings were pre-occupied. [FN19] Congress addressed itself to those specific evils.

FN17 S.Doc. 92, Pt. 84-A, ch. XII, Final Report, Federal Trade Commission to the Senate pursuant to S.Res.No. 83, 70th Cong., 1st Sess.

FN18 S.Doc. 92, Pt. 84-A, chs. XII, XIII, op. cit., supra, note 17.

FN19 See Hearings on H.R. 11662, Subcommittee of House Committee on Interstate & Foreign Commerce, 74th Cong., 2d Sess.; Hearings on H.R. 4008, House Committee on Interstate & Foreign Commerce, 75th Cong., 1st Sess.

611** The Federal Power Commission was given*292** broad powers of regulation. The fixing of 'just and reasonable' rates (s 4) with the powers attendant thereto [FN20] was the heart of the new regulatory system. Moreover, the Commission was given certain authority by s 7(a), on a finding that the action was necessary or desirable 'in the public interest,' to require natural gas companies to extend or improve their transportation facilities and to sell gas to any authorized local distributor. By s 7(b) it was given control over the abandonment of facilities or of service. And by s 7(c), as originally enacted, no natural gas company could undertake the construction or extension of any facilities for the transportation of natural gas to a market in which natural gas was already being served by another company, or sell any natural gas in such a market, without obtaining a certificate of public convenience and necessity from the Commission. In passing on such applications for certificates of convenience and necessity the Commission was told by s 7(c), as originally enacted, that it was 'the intention of Congress that natural gas shall be sold in interstate commerce for resale for ultimate public consumption for domestic, commercial, industrial, or any other use at the lowest possible reasonable rate consistent with the maintenance of adequate service in the public interest.' The latter provision was deleted from s 7(c) when that subsection was amended by the Act of February 7, 1942, 56 Stat. 83. By that amendment limited grandfather rights were granted companies desiring to extend their facilities and services over the routes or within the area which they were already serving. Moreover, s 7(c) was broadened so as to require certificates***612** of public convenience and necessity not only where the extensions were being made to markets in which natural gas was already being sold by another company but in other situations as well.

FN20 The power to investigate and ascertain the 'actual legitimate cost' of property (s 6), the requirement as to books and records (s 8), control over rates of depreciation (s 9), the requirements for periodic and special reports (s 10), the broad powers of investigation (s 14) are among the chief powers supporting the rate making function.

[19] These provisions were plainly designed to protect the consumer interests against exploitation at the hands of private natural gas companies. When it comes to cases of abandonment or of extensions of facilities or service, we may assume that, apart from the express exemptions [FN21] contained in s 7, considerations of conservation are material to the issuance of certificates of public convenience and necessity. But the Commission was not asked here for a certificate of public convenience and necessity under s 7 for any proposed construction or extension. It was faced with a determination of the amount which a private operator should be allowed to earn from the sale of natural gas across state lines through an established distribution system. Secs. 4 and 5, not s 7, provide the standards for that determination. We cannot find in the words of the Act or in its history the slightest intimation or suggestion that the exploitation of consumers by private operators through the maintenance of high rates should be allowed to continue provided the producing states obtain indirect benefits from it. That apparently was the Commission's view of the matter, for the same arguments advanced here were presented to the Commission and not adopted by it.

FN21 Apart from the grandfather clause contained in s 7(c), there is the provision of s 7(f) that a natural gas company may enlarge or extend its facilities with the 'service area' determined by the Commission without any further authorization.

We do not mean to suggest that Congress was unmindful of the interests of the producing states in their natural gas supplies when it drafted the Natural Gas Act. As we have said, the Act does not intrude on the domain traditionally reserved for control by state commissions; and the Federal Power Commission was given no authority over***613** 'the production or gathering of natural gas.' s 1(b). In addition, Congress recognized the legitimate interests of the States in the conservation of natural gas. By s 11 Congress instructed the Commission to make reports on compacts between two or more States dealing with the conservation, production and transportation of natural gas. [FN22] The Commission was also ****293** directed to recommend further legislation appropriate or necessary to carry out any proposed compact and 'to aid in the conservation of natural-gas resources within the United States and in the orderly, equitable, and economic production, transportation, and distribution of natural gas.' s 11(a). Thus Congress was quite aware of the interests of the producing states in their natural gas supplies. [FN23] But it left the protection of ***614** those interests to measures other than the maintenance of high rates to private companies. If the Commission is to be compelled to let the stockholders of natural gas companies have a feast so that the producing states may receive crumbs from that table, the present Act must be redesigned. Such a project raises questions of policy which go beyond our province.

FN22 See P.L. 117, approved July 7, 1943, 57 Stat. 383 containing an 'Interstate Compact to Conserve Oil and Gas' between Oklahoma, Texas, New Mexico, Illinois, Colorado, and Kansas.

FN23 As we have pointed out, s 7(c) was amended by the Act of February 7, 1942, 56 Stat. 83, so as to require certificates of public convenience and necessity not only where the extensions were being made to markets in which natural gas was already being sold by another company but to other situations as well. Considerations of conservation entered into the proposal to give the Act that broader scope. H.Rep.No. 1290, 77th Cong. 1st Sess., pp. 2, 3. And see Annual Report, Federal Power Commission (1940) pp. 79, 80; Baum, The Federal Power Commission and State Utility Regulation (1942), p. 261.
The bill amending s 7(c) originally contained a subsection (h) reading as follows: 'Nothing contained in this section shall be construed to affect the authority of a State within which natural gas is produced to authorize or require the construction or extension of facilities for the transportation and sale of such gas within such State: Provided, however, That the Commission, after a hearing upon complaint or upon its own motion, may by order forbid any intrastate construction or extension by any natural-gas company which it shall find will prevent such company from rendering adequate service to its customers in interstate or foreign commerce in territory already being served.' See Hearings on H.R. 5249, House Committee on Interstate & Foreign Commerce, 77th Cong., 1st Sess., pp. 7, 11, 21, 29, 32, 33. In explanation of its deletion the House Committee Report stated, pp. 4, 5: 'The increasingly important problems raised by the desire of several States to regulate the use of the natural gas produced therein in the interest of consumers within such States, as against the Federal power to regulate interstate commerce in the interest of both interstate and intrastate consumers, are deemed by the committee to warrant further intensive study and probably a more retailed and comprehensive plan for the handling thereof than that which would have been provided by the stricken subsection.'

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[20] It is hardly necessary to add that a limitation on the net earnings of a natural gas company from its interstate business is not a limitation on the power of the producing state either to safeguard its tax revenues from that industry [FN24] or to protect the interests of those who sell their gas to the interstate operator. [FN25] The return which ****294** the Commission***615** allowed was the net return after all such charges.

FN24 We have noted that in the annual operating expenses of some $16,000.000 the Commission included West Virginia and federal taxes. And in the net increase of $421,160 over 1940 operating expenses allowed by the Commission was some $80,000 for increased West Virginia property taxes. The adequacy of these amounts has not been challenged here.

FN25 The Commission included in the aggregate annual operating expenses which it allowed some $8,500,000 for gas purchased. It also allowed about $1,400,000 for natural gas production and about $600,000 for exploration and development.

It is suggested, however, that the Commission in ascertaining the cost of Hope's natural gas production plant proceeded contrary to s 1(b) which provides that the Act shall not apply to 'the production or gathering of natural gas'. But such valuation, like the provisions for operating expenses, is essential to the rate-making function as customarily performed in this country. Cf. Smith, The Control of Power Rates in the United States and England (1932), 159 The Annals 101. Indeed s 14(b) of the Act gives the Commission the power to 'determine the propriety and reasonableness of the inclusion in operating expenses, capital, or surplus of all delay rentals or other forms of rental or compensation for unoperated lands and leases.'

It is suggested that the Commission has failed to perform its duty under the Act in that it has not allowed a return for gas production that will be enough to induce private enterprise to perform completely and efficiently its functions for the public. The Commission, however, was not oblivious of those matters. It considered them. It allowed, for example, delay rentals and exploration and development costs in operating expenses. [FN26] No serious attempt has been made here to show that they are inadequate. We certainly cannot say that they are, unless we are to substitute our opinions for the expert judgment of the administrators to whom Congress entrusted the decision. Moreover, if in light of experience they turn out to be inadequate for development of new sources of supply, the doors of the Commission are open for increased allowances. This is not an order for all time. The Act contains machinery for obtaining rate adjustments. s 4.

FN26 See note 25, supra.

[21] [22] But it is said that the Commission placed too low a rate on gas for industrial purposes as compared with gas for domestic purposes and that industrial uses should be discouraged. It should be noted in the first place that the rates which the Commission has fixed are Hope's interstate wholesale rates to distributors not interstate rates to industrial users [FN27] and domestic consumers. We hardly ***616** can assume, in view of the history of the Act and its provisions, that the resales intrastate by the customer companies which distribute the gas to ultimate consumers in Ohio and Pennsylvania are subject to the rate-making powers of the Commission. [FN28] But in any event those rates are not in issue here. Moreover, we fail to find in the power to fix 'just and reasonable' rates the power to fix rates which will disallow or discourage resales for industrial use. The Committee Report stated that the Act provided 'for regulation along recognized and more or less standardized lines' and that there was 'nothing novel in its provisions'. H.Rep.No.709, supra, p. 3. Yet if we are now to tell the Commission to fix the rates so as to discourage particular uses, we would indeed be injecting into a rate case a 'novel' doctrine which has no express statutory sanction. The same would be true if we were to hold that the wasting-asset nature of the industry required the maintenance of the level of rates so that natural gas companies could make a greater profit on each unit of gas sold. Such theories of rate-making for this industry may or may not be desirable. The difficulty is that s 4(a) and s 5(a) contain only the conventional standards of rate-making for natural gas companies. [FN29] The ***617** Act of February 7, 1942, by broadening s 7 gave the Commission some additional authority to deal with the conservation aspects of the problem. [FN30] But s 4(a) and s 5(a) were not changed. If the standard****295** of 'just and reasonable' is to sanction the maintenance of high rates by a natural gas company because they restrict the use of natural gas for certain purposes, the Act must be further amended.

FN27 The Commission has expressed doubts over its power to fix rates on 'direct sales to industries' from interstate pipelines as distinguished from 'sales for resale to the industrial customers of distributing companies.' Annual Report, Federal Power Commission (1940), p. 11.

FN28. Sec. 1(b) of the Act provides: 'The provisions of this Act shall apply to the transportation of natural gas in interstate commerce, to the sale in interstate commerce of natural gas for resale for ultimate public consumption for domestic, commercial, industrial, or any other use, and to natural-gas companies engaged in such transportation or sale, but shall not apply to any other transportation or sale of natural gas or to the local distribution of natural gas or to the facilities used for such distribution or to the production or gathering of natural gas.' And see s 2(6), defining a 'natural-gas company', and H.Rep.No. 709, supra, pp. 2, 3.

FN29 The wasting-asset characteristic of the industry was recognized prior to the Act as requiring the inclusion of a depletion allowance among operating expenses. See Columbus Gas & Fuel Co. v. Public Utilities Commission, 292 U.S. 398, 404, 405, 54 S.Ct. 763, 766, 767, 78 L.Ed. 1327, 91 A.L.R. 1403. But no such theory of rate-making for natural gas companies as is now suggested emerged from the cases arising during the earlier period of regulation.

FN30 The Commission has been alert to the problems of conservation in its administration of the Act. It has indeed suggested that it might be wise to restrict the use of natural gas 'by functions rather than by areas.' Annual Report (1940) p. 79.

The Commission stated in that connection that natural gas was particularly adapted to certain industrial uses. But it added that the general use of such gas 'under boilers for the production of steam' is 'under most circumstances of very questionable social economy.' Ibid.

[23] [24] It is finally suggested that the rates charged by Hope are discriminatory as against domestic users and in favor of industrial users. That charge is apparently based on s 4(b) of the Act which forbids natural gas companies from maintaining 'any unreasonable difference in rates, charges, service, facilities, or in any other respect, either as between localities or as between classes of service.' The power of the Commission to eliminate any such unreasonable differences or discriminations is plain. s 5(a). The Commission, however, made no findings under s 4(b). Its failure in that regard was not challenged in the petition to review. And it has not been raised or argued here by any party. Hence the problem of discrimination has no proper place in the present decision. It will be time enough to pass on that issue when it is presented to us. Congress has entrusted the administration of the Act to the Commission not to the courts. Apart from the requirements of judicial review it is not ***618** for us to advise the Commission how to discharge its functions.

Findings as to the Lawfulness of Past Rates. As we have noted, the Commission made certain findings as to the lawfulness of past rates which Hope had charged its interstate customers. Those findings were made on the complaint of the City of Cleveland and in aid of state regulation. It is conceded that under the Act the Commission has no power to make reparation orders. And its power to fix rates admittedly is limited to those 'to be thereafter observed and in force.' s 5(a). But the Commission maintains that it has the power to make findings as to the lawfulness of past rates even though it has no power to fix those rates. FN31 However that may be, we do not think that these findings were reviewable under s 19(b) of the Act. That section gives any party 'aggrieved by an order' of the Commission a review 'of such order' in the circuit court of appeals for the circuit where the natural gas company is located or has its principal place of business or in the United States Court of Appeals for the District of Columbia. We do not think that the findings in question fall within that category.

FN31 The argument is that s 4(a) makes 'unlawful' the charging of any rate that is not just and reasonable. And s 14(a) gives the Commission power to investigate any matter 'which it may find necessary or proper in order to determine whether any person has violated' any provision of the Act. Moreover, s 5(b) gives the Commission power to investigate and determine the cost of production or transportation of natural gas in cases where it has 'no authority to establish a rate governing the transportation or sale of such natural gas.' And s 17(c) directs the Commission to 'make available to the several State commissions such information and reports as may be of assistance in State regulation of natural-gas companies.' For a discussion of these points by the Commission see 44 P.U.R.,N.S., at pages 34, 35.

[25] [26] The Court recently summarized the various types of administrative action or determination reviewable as orders under the Urgent Deficiencies Act of October 22, ***619** 1913, 28 U.S.C. ss 45, 47a, 28 U.S.C.A. ss 45, 47a, and kindred statutory provisions. Rochester Tel. Corp. v. United States, 307 U.S. 125, 59 S.Ct. 754, 83 L.Ed. 1147. It was there pointed out that where 'the order sought to be reviewed does not of itself adversely affect complainant but only affects his rights adversely on the contingency of future administrative action', it is not

reviewable. Id., 307 U.S. at page 130, 59 S.Ct. at page 757, 83 L.Ed. 1147. The Court said, 'In view of traditional conceptions of federal judicial power, resort to the courts in these situations is either premature or wholly beyond their province.' ****296**Id., 307 U.S. at page 130, 59 S.Ct. at page 757, 83 L.Ed. 1147. And see United States v. Los Angeles s.l.r. c/o., 273 U.S. 299, 309, 310, 47 S.Ct. 413, 414, 415, 71 L.Ed. 651; Shannahan v. United States, 303 U.S. 596, 58 S.Ct. 732, 82 L.Ed. 1039. These considerations are apposite here. The Commission has no authority to enforce these findings. They are 'the exercise solely of the function of investigation.' United States v. Los Angeles & S.L.R. Co., supra, 273 U.S. at page 310, 47 S.Ct. at page 414, 71 L.Ed. 651. They are only a preliminary, interim step towards possible future action-action not by the Commission but by wholly independent agencies. The outcome of those proceedings may turn on factors other than these findings. These findings may never result in the respondent feeling the pinch of administrative action.

Reversed.

Mr. Justice ROBERTS took no part in the consideration or decision of this case.

Opinion of Mr. Justice BLACK and Mr. Justice MURPHY.

We agree with the Court's opinion and would add nothing to what has been said but for what is patently a wholly gratuitous assertion as to Constitutional law in the dissent of Mr. Justice FRANKFURTER. We refer to the statement that 'Congressional acquiescence to date in the doctrine of Chicago, etc., R. Co. v. Minnesota, supra (134 U.S. 418, 10 S.Ct. 462, 702, 33 L.Ed. 970), may fairly be claimed.' That was the case in which a majority of this Court was finally induced to expand the meaning ***620** of 'due process' so as to give courts power to block efforts of the state and national governments to regulate economic affairs. The present case does not afford a proper occasion to discuss the soundness of that doctrine because, as stated in Mr. Justice FRANKFURTER'S dissent, 'That issue is not here in controversy.' The salutary practice whereby courts do not discuss issues in the abstract applies with peculiar force to Constitutional questions. Since, however, the dissent adverts to a highly controversial due process doctrine and implies its acceptance by Congress, we feel compelled to say that we do not understand that Congress voluntarily has acquiesced in a Constitutional principle of government that courts, rather than legislative bodies, possess final authority over regulation of economic affairs. Even this Court has not always fully embraced that principle, and we wish to repeat that we have never acquiesced in it, and do not now. See Federal Power Commission v. Natural Gas Pipeline Co., 315 U.S. 575, 599-601, 62 S.Ct. 736, 749, 750, 86 L.Ed. 1037.

Mr. Justice REED, dissenting.

This case involves the problem of rate making under the Natural Gas Act. Added importance arises from the obvious fact that the principles stated are generally applicable to all federal agencies which are entrusted with the determination of rates for utilities. Because my views differ somewhat from those of my brethren, it may be of some value to set them out in a summary form.

The Congress may fix utility rates in situations subject to federal control without regard to any standard except the constitutional standards of due process and for taking private property for public use without just compensation. Wilson v. New, 243 U.S. 332, 350, 37 S.Ct. 298, 302, 61 L.Ed. 755, L.R.A.1917E, 938, Ann.Cas.1918A, 1024. A Commission, however, does not have this freedom of action. Its powers are limited not only by the constitutional standards but also by the standards of the delegation. Here the standard added by the Natural Gas Act is that the rate be 'just ***621** and reasonable.' [FN1] Section 6 [FN2] ****297** throws additional light on the meaning of these words.

FN1 Natural Gas Act, s 4(a), 52 Stat. 821, 822, 15 U.S.C. s 717c(a), 15 U.S.C.A. s 717c(a).

FN2 52 Stat. 821, 824, 15 U.S.C. s 717e, 15 U.S.C.A. s 717e:

'(a) The Commission may investigate and ascertain the actual legitimate cost of the property of every natural-gas company, the depreciation therein, and, when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation and the fair value of such property.

'(b) Every natural-gas company upon request shall file with the Commission an inventory of all or any part of its property and a statement of the original cost thereof, and shall keep the Commission informed regarding the cost of all additions, betterments, extensions, and new construction.'

When the phrase was used by Congress to describe allowable rates, it had relation to something ascertainable. The rates were not left to the whim of the Commission. The rates fixed would produce an annual return and that annual return was to be compared with a theoretical just and reasonable return, all risks considered, on the fair value of the property used and useful in the public service at the time of the determination.

Such an abstract test is not precise. The agency charged

with its determination has a wide range before it could properly be said by a court that the agency had disregarded statutory standards or had confiscated the property of the utility for public use. Cf. Chicago, M. & St. P.R. Co. v. Minnesota, 134 U.S. 418, 461-466, 10 S.Ct. 462, 702, 703-705, 33 L.Ed. 970, dissent. This is as Congress intends. Rates are left to an experienced agency particularly competent by training to appraise the amount required.

The decision as to a reasonable return had not been a source of great difficulty, for borrowers and lenders reached such agreements daily in a multitude of situations; and although the determination of fair value had been troublesome, its essentials had been worked out in fairness to investor and consumer by the time of the enactment***622** of this Act. Cf. Los Angeles G. & E. Corp. v. Railroad Comm., 289 U.S. 287, 304 et seq., 53 S.Ct. 637, 643 et seq., 77 L.Ed. 1180. The results were well known to Congress and had that body desired to depart from the traditional concepts of fair value and earnings, it would have stated its intention plainly. Helvering v. Griffiths, 318 U.S. 371, 63 S.Ct. 636.

It was already clear that when rates are in dispute, 'earnings produced by rates do not afford a standard for decision.' 289 U.S. at page 305, 53 S.Ct. at page 644, 77 L.Ed. 1180. Historical cost, prudent investment and reproduction cost [FN3] were all relevant factors in determining fair value. Indeed, disregarding the pioneer investor's risk, if prudent investment and reproduction cost were not distorted by changes in price levels or technology, each of them would produce the same result. The realization from the risk of an investment in a speculative field, such as natural gas utilities, should be reflected in the present fair value. [FN4] The amount of evidence to be admitted on any point was of course in the agency's reasonable discretion, and it was free to give its own weight to these or other factors and to determine from all the evidence its own judgment as to the necessary rates.

> FN3 'Reproduction cost' has been variously defined, but for rate making purposes the most useful sense seems to be, the minimum amount necessary to create at the time of the inquiry a modern plant capable of rendering equivalent service. See I Bonbright, Valuation of Property (1937) 152. Reproduction cost as the cost of building a replica of an obsolescent plant is not of real significance.

'Prudent investment' is not defined by the Court. It may mean the sum originally put in the enterprise, either with or without additional amounts from excess earnings reinvested in the business.

> FN4 It is of no more than bookkeeping significance whether the Commission allows a rate of return commensurate with the risk of the original investment or the lower rate based on current risk and a capitalization reflecting the established earning power of a successful company and the probable cost of duplicating its services. Cf. American T. & T. Co. v. United States, 299 U.S. 232, 57 S.Ct. 170, 81 L.Ed. 142. But the latter is the traditional method.

***623** I agree with the Court in not imposing a rule of prudent investment alone in determining the rate base. This leaves the Commission free, as I understand it, to use any available evidence for its finding of fair value, including both prudent investment and the cost of installing at the present time an efficient system for furnishing the needed utility service.

My disagreement with the Court arises primarily from its view that it makes no ****298** difference how the Commission reached the rate fixed so long as the result is fair and reasonable. For me the statutory command to the Commission is more explicit. Entirely aside from the constitutional problem of whether the Congress could validly delegate its rate making power to the Commission, in toto and without standards, it did legislate in the light of the relation of fair and reasonable to fair value and reasonable return. The Commission must therefore make its findings in observance of that relationship.

The Federal Power Commission did not, as I construe their action, disregard its statutory duty. They heard the evidence relating to historical and reproduction cost and to the reasonable rate of return and they appraised its weight. The evidence of reproduction cost was rejected as unpersuasive, but from the other evidence they found a rate base, which is to me a determination of fair value. On that base the earnings allowed seem fair and reasonable. So far as the Commission went in appraising the property employed in the service, I find nothing in the result which indicates confiscation, unfairness or unreasonableness. Good administration of rate making agencies under this method would avoid undue delay and render revaluations unnecessary except after violent fluctuations of price levels. Rate making under this method has been subjected to criticism. But until Congress changes the standards for the agencies, these rate making bodies should continue the conventional theory of rate ***624** making. It will probably be simpler to improve present methods than to devise new ones.

But a major error, I think was committed in the disregard

by the Commission of the investment in exploratory operations and other recognized capital costs. These were not considered by the Commission because they were charged to operating expenses by the company at a time when it was unregulated. Congress did not direct the Commission in rate making to deduct from the rate base capital investment which had been recovered during the unregulated period through excess earnings. In my view this part of the investment should no more have been disregarded in the rate base than any other capital investment which previously had been recovered and paid out in dividends or placed to surplus. Even if prudent investment throughout the life of the property is accepted as the formula for figuring the rate base, it seems to me illogical to throw out the admittedly prudent cost of part of the property because the earnings in the unregulated period had been sufficient to return the prudent cost to the investors over and above a reasonable return. What would the answer be under the theory of the Commission and the Court, if the only prudent investment in this utility had been the seventeen million capital charges which are now disallowed?

For the reasons heretofore stated, I should affirm the action of the Circuit Court of Appeals in returning the proceeding to the Commission for further consideration and should direct the Commission to accept the disallowed capital investment in determining the fair value for rate making purposes.

Mr. Justice FRANKFURTER, dissenting.
My brother JACKSON has analyzed with particularity the economic and social aspects of natural gas as well as ***625** the difficulties which led to the enactment of the Natural Gas Act, especially those arising out of the abortive attempts of States to regulate natural gas utilities. The Natural Gas Act of 1938 should receive application in the light of this analysis, and Mr. Justice JACKSON has, I believe, drawn relevant inferences regarding the duty of the Federal Power Commission in fixing natural gas rates. His exposition seems to me unanswered, and I shall say only a few words to emphasize my basic agreement with him.

For our society the needs that are met by public utilities are as truly public services as the traditional governmental functions of police and justice. They are not less so when these services are rendered by private enterprise under governmental regulation. Who ultimately determines the ways of regulation, is the decisive aspect in the public supervision of privately-owned utilities. Foreshadowed nearly sixty years ago, Railroad Commission Cases (Stone v. Farmers' Loan & Trust Co.), 116 U.S. 307, 331, 6 S.Ct. 334, 344, 388, 1191, 29 L.Ed. 636, it was decided more than fifty ****299** years ago that the final say under the Constitution lies with the judiciary and not the legislature. Chicago, etc., R. Co. v. Minnesota , 134 U.S. 418, 10 S.Ct. 462, 702, 33 L.Ed. 970.

While legal issues touching the proper distribution of governmental powers under the Constitution may always be raised, Congressional acquiescence to date in the doctrine of Chicago, etc., R. Co. v. Minnesota, supra, may fairly be claimed. But in any event that issue is not here in controversy. As pointed out in the opinions of my brethren, Congress has given only limited authority to the Federal Power Commission and made the exercise of that authority subject to judicial review. The Commission is authorized to fix rates chargeable for natural gas. But the rates that it can fix must be 'just and reasonable'. s 5 of the Natural Gas Act, 15 U.S.C. s 717d, 15 U.S.C.A. s 717d. Instead of making the Commission's rate determinations final, Congress***626** specifically provided for court review of such orders. To be sure, 'the finding of the Commission as to the facts, if supported by substantial evidence' was made 'conclusive', s 19 of the Act, 15 U.S.C. s 717r; 15 U.S.C.A. s 717r. But obedience of the requirement of Congress that rates be 'just and reasonable' is not an issue of fact of which the Commission's own determination is conclusive. Otherwise, there would be nothing for a court to review except questions of compliance with the procedural provisions of the Natural Gas Act. Congress might have seen fit so to cast its legislation. But it has not done so. It has committed to the administration of the Federal Power Commission the duty of applying standards of fair dealing and of reasonableness relevant to the purposes expressed by the Natural Gas Act. The requirement that rates must be 'just and reasonable' means just and reasonable in relation to appropriate standards. Otherwise Congress would have directed the Commission to fix such rates as in the judgment of the Commission are just and reasonable; it would not have also provided that such determinations by the Commission are subject to court review.

To what sources then are the Commission and the courts to go for ascertaining the standards relevant to the regulation of natural gas rates? It is at this point that Mr. Justice JACKSON'S analysis seems to me pertinent. There appear to be two alternatives. Either the fixing of natural gas rates must be left to the unguided discretion of the Commission so long as the rates it fixes do not reveal a glaringly had prophecy of the ability of a regulated utility to continue its service in the future. Or the Commission's rate orders must be founded on due consideration of all the elements of the public interest which the production and distribution of natural gas involve just because it is natural gas. These elements are reflected in the Natural Gas Act, if that Act be applied as

an entirety. See, for ***627** instance, ss 4(a)(b)(c)(d), 6, and 11, 15 U.S.C. ss 717c(a)(b)(c)(d), 717e, and 717j, 15 U.S.C.A. ss 717c(a-d), 717e, 717j. Of course the statute is not concerned with abstract theories of ratemaking. But its very foundation is the 'public interest', and the public interest is a texture of multiple strands. It includes more than contemporary investors and contemporary consumers. The needs to be served are not restricted to immediacy, and social as well as economic costs must be counted.

It will not do to say that it must all be left to the skill of experts. Expertise is a rational process and a rational process implies expressed reasons for judgment. It will little advance the public interest to substitute for the hodge-podge of the rule in Smyth v. Ames, 169 U.S. 466, 18 S.Ct. 418, 42 L.Ed. 819, an encouragement of conscious obscurity or confusion in reaching a result, on the assumption that so long as the result appears harmless its basis is irrelevant. That may be an appropriate attitude when state action is challenged as unconstitutional. Cf. Driscoll v. Edison Light & Power Co., 307 U.S. 104, 59 S.Ct. 715, 83 L.Ed. 1134. But it is not to be assumed that it was the design of Congress to make the accommodation of the conflicting interests exposed in Mr. Justice JACKSON'S opinion the occasion for a blind clash of forces or a partial assessment of relevant factors, either before the Commission or here.

The objection to the Commission's action is not that the rates it granted were too low but that the range of its vision was too narrow. And since the issues before the Commission involved no less than the ****300** total public interest, the proceedings before it should not be judged by narrow conceptions of common law pleading. And so I conclude that the case should be returned to the Commission. In order to enable this Court to discharge its duty of reviewing the Commission's order, the Commission should set forth with explicitness the criteria by which it is guided ***628** in determining that rates are 'just and reasonable', and it should determine the public interest that is in its keeping in the perspective of the considerations set forth by Mr. Justice JACKSON.

By Mr. Justice JACKSON.

Certainly the theory of the court below that ties rate-making to the fair-value-reproduction-cost formula should be overruled as in conflict with Federal Power Commission v. Natural Gas Pipeline Co. [FN1] But the case should, I think, be the occasion for reconsideration of our rate-making doctrine as applied to natural gas and should be returned to the Commission for further consideration in the light thereof.

FN1 315 U.S. 575, 62 S.Ct. 736, 86 L.Ed. 1037.

The Commission appears to have understood the effect of the two opinions in the Pipeline case to be at least authority and perhaps direction to fix natural gas rates by exclusive application of the 'prudent investment' rate base theory. This has no warrant in the opinion of the Chief Justice for the Court, however, which released the Commission from subservience to 'any single formula or combination of formulas' provided its order, 'viewed in its entirety, produces no arbitrary result.' 315 U.S. at page 586, 62 S.Ct. at page 743, 86 L.Ed. 1037. The minority opinion I understood to advocate the 'prudent investment' theory as a sufficient guide in a natural gas case. The view was expressed in the court below that since this opinion was not expressly controverted it must have been approved. [FN2] I disclaim this imputed***629** approval with some particularity, because I attach importance at the very beginning of federal regulation of the natural gas industry to approaching it as the performance of economic functions, not as the performance of legalistic rituals.

FN2 Judge Dobie, dissenting below, pointed out that the majority opinion in the Pipeline case 'contains no express discussion of the Prudent Investment Theory' and that the concurring opinion contained a clear one, and said, 'It is difficult for me to believe that the majority of the Supreme Court, believing otherwise, would leave such a statement unchallenged.' (134 F.2d 287, 312.) The fact that two other Justices had as matter of record in our books long opposed the reproduction cost theory of rate bases and had commented favorably on the prudent investment theory may have influenced that conclusion. See opinion of Mr. Justice Frankfurter in Driscoll v. Edison Light & Power Co., 307 U.S. 104, 122, 59 S.Ct. 715, 724, 83 L.Ed. 1134, and my brief as Solicitor General in that case. It should be noted, however, that these statements were made, not in a natural gas case, but in an electric power case-a very important distinction, as I shall try to make plain.

I.

Solutions of these cases must consider eccentricities of the industry which gives rise to them and also to the Act of Congress by which they are governed.

The heart of this problem is the elusive, exhaustible, and irreplaceable nature of natural gas itself. Given sufficient money, we can produce any desired amount of railroad,

bus, or steamship transportation, or communications facilities, or capacity for generation of electric energy, or for the manufacture of gas of a kind. In the service of such utilities one customer has little concern with the amount taken by another, one's waste will not deprive another, a volume of service and be created equal to demand, and today's demands will not exhaust or lessen capacity to serve tomorrow. But the wealth of Midas and the wit of man cannot produce or reproduce a natural gas field. We cannot even reproduce the gas, for our manufactured product has only about half the heating value per unit of nature's own. FN3

FN3 Natural gas from the Appalachian field averages about 1050 to 1150 B.T.U. content, while by-product manufactured gas is about 530 to 540. Moody's Manual of Public Utilities (1943) 1350; Youngberg, Natural Gas (1930) 7.

****301** Natural gas in some quantity is produced in twenty-four states. It is consumed in only thirty-five states, and is ***630** available only to about 7,600,000 consumers. FN4 Its availability has been more localized than that of any other utility service because it has depended more on the caprice of nature.

FN4 Sen.Rep. No. 1162, 75th Cong., 1st Sess., 2.

The supply of the Hope Company is drawn from that old and rich and vanishing field that flanks the Appalachian mountains. Its center of production is Pennsylvania and West Virginia, with a fringe of lesser production in New York, Ohio, Kentucky, Tennessee, and the north end of Alabama. Oil was discovered in commercial quantities at a depth of only 69 1/2 feet near Titusville, Pennsylvania, in 1859. Its value then was about $16 per barrel. FN5 The oil branch of the petroleum industry went forward at once, and with unprecedented speed. The area productive of oil and gas was roughed out by the drilling of over 19,000 'wildcat' wells, estimated to have cost over $222,000,000. Of these, over 18,000 or 94.9 per cent, were 'dry holes.' About five per cent, or 990 wells, made discoveries of commercial importance, 767 of them resulting chiefly in oil and 223 in gas only. FN6 Prospecting for many years was a search for oil, and to strike gas was a misfortune. Waste during this period and even later is appalling. Gas was regarded as having no commercial value until about 1882, in which year the total yield was valued only at about $75,000. FN7 Since then, contrary to oil, which has become cheaper gas in this field has pretty steadily advanced in price.

FN5 Arnold and Kemnitzer, Petroleum in the United States and Possessions (1931) 78.

FN6. Id. at 62-63.

FN7. Id. at 61.

While for many years natural gas had been distributed on a small scale for lighting, FN8 its acceptance was slow, ***631** facilities for its utilization were primitive, and not until 1885 did it take on the appearance of a substantial industry. FN9 Soon monopoly of production or markets developed. FN10 To get gas from the mountain country, where it was largely found, to centers of population, where it was in demand, required very large investment. By ownership of such facilities a few corporate systems, each including several companies, controlled access to markets. Their purchases became the dominating factor in giving a market value to gas produced by many small operators. Hope is the market for over 300 such operators. By 1928 natural gas in the Appalachian field commanded an average price of 21.1 cents per m.c.f. at points of production and was bringing 45.7 cents at points of consumption. FN11 The companies which controlled markets, however, did not rely on gas purchases alone. They acquired and held in fee or leasehold great acreage in territory proved by 'wildcat' drilling. These large marketing system companies as well as many small independent owners and operators have carried on the commercial development of proved territory. The development risks appear from the estimate that up to 1928, 312,318 proved area wells had been sunk in the Appalachian field of which 48,962, or 15.7 per cent, failed to produce oil or gas in commercial quantity. FN12

FN8 At Fredonia, New York, in 1821, natural gas was conveyed from a shallow well to some thirty people. The lighthouse at Barcelona Harbor, near what is now Westfield, New York, was at about that time and for many years afterward lighted by gas that issued from a crevice. Report on Utility Corporations by Federal Trade Commission, Sen.Doc. 92, Pt. 84-A, 70th Cong., 1st Sess., 8-9.

FN9 In that year Pennsylvania enacted 'An Act to provide for the incorporation and regulation of natural gas companies.' Penn.Laws 1885, No. 32, 15 P.S. s 1981 et seq.

FN10 See Steptoe and Hoffheimer's Memorandum for Governor Cornwell of West Virginia (1917) 25 West Virginia Law Quarterly 257; see also Report on Utility Corporations by

(Cite as: 51 P.U.R.(NS) 193, 64 S.Ct. 281)

Federal Trade Commission, Sen.Doc. No. 92, Pt. 84-A, 70th Cong., 1st Sess.

FN11 Arnold and Kemnitzer, Petroleum in the United States and Possessions (1931) 73.

FN12. Id. at 63.

***632** With the source of supply thus tapped to serve centers of large demand, like Pittsburgh, Buffalo, Cleveland, Youngstown, Akron, and other industrial communities, the distribution of natural gas fast became big business. Its advantages as a ****302** fuel and its price commended it, and the business yielded a handsome return. All was merry and the goose hung high for consumers and gas companies alike until about the time of the first. World War. Almost unnoticed by the consuming public, the whole Appalachian field passed its peak of production and started to decline. Pennsylvania, which to 1928 had given off about 38 per cent of the natural gas from this field, had its peak in 1905; Ohio, which had produced 14 per cent, had its peak in 1915; and West Virginia, greatest producer of all, with 45 per cent to its credit, reached its peak in 1917. FN13

FN13. Id. at 64.

Western New York and Eastern Ohio, on the fringe of the field, had some production but relied heavily on imports from Pennsylvania and West Virginia. Pennsylvania, a producing and exporting state, was a heavy consumer and supplemented her production with imports from West Virginia. West Virginia was a consuming state, but the lion's share of her production was exported. Thus the interest of the states in the North Appalachian supply was in conflict.

Competition among localities to share in the failing supply and the helplessness of state and local authorities in the presence of state lines and corporate complexities is a part of the background of federal intervention in the industry. FN14 West Virginia took the boldest measure. It legislated a priority in its entire production in favor of its own inhabitants. That was frustrated by an injunction***633** from this Court. FN15 Throughout the region clashes in the courts and conflicting decisions evidenced public anxiety and confusion. It was held that the New York Public Service Commission did not have power to classify consumers and restrict their use of gas. FN16 That Commission held that a company could not abandon a part of its territory and still serve the rest. FN17 Some courts admonished the companies to take action to protect consumers. FN18 Several courts held that companies, regardless of failing supply, must continue to take on customers, but such compulsory additions were finally held to be within the Public Service Commission's discretion. FN19 There were attempts to throw up franchises and quit the service, and municipalities resorted to the courts with conflicting results. FN20 Public service commissions of consuming states were handicapped, for they had no control of the supply. FN21

FN14 See Report on Utility Corporations by Federal Trade Commission, Sen.Doc. No. 92, Pt. 84-A, 70th Cong., 1st Sess.

FN15 Commonwealth of Pennsylvania v. West Virginia, 262 U.S. 553, 43 S.Ct. 658, 67 L.Ed. 1117, 32 A.L.R. 300. For conditions there which provoked this legislation, see 25 West Virginia Law Quarterly 257.

FN16 People ex rel. Pavilion Natural Gas Co. v. Public Service Commission, 188 App.Div. 36, 176 N.Y.S. 163.

FN17 Village of Falconer v. Pennsylvania Gas Company, 17 State Department Reports, N.Y., 407.

FN18 See, for example, Public Service Commission v. Iroquois Natural Gas Co., 108 Misc. 696, 178 N.Y.S. 24; Park Abbott Realty Co. v. Iroquois Natural Gas Co., 102 Misc. 266, 168 N.Y.S. 673; Public Service Commission v. Iroquois Natural Gas Co., 189 App.Div. 545, 179 N.Y.S. 230.

FN19 People ex rel. Pennsylvania Gas Co. v. Public Service Commission, 196 App.Div. 514, 189 N.Y.S. 478.

FN20 East Ohio Gas Co. v. Akron, 81 Ohio St. 33, 90 N.E. 40, 26 L.R.A., N.S., 92, 18 Ann.Cas. 332; Village of New-comerstown v. Consolidated Gas Co., 100 Ohio St. 494, 127 N.E. 414; Gress v. Village of Ft. Laramie, 100 Ohio St. 35, 125 N.E. 112, 8 A.L.R. 242; City of Jamestown v. Pennsylvania Gas Co., D.C., 263 F. 437; Id., D.C., 264 F. 1009. See, also, United Fuel Gas Co. v. Railroad Commission, 278 U.S. 300, 308, 49 S.Ct. 150, 152, 73 L.Ed. 390.

FN21 The New York Public Service Commission said: 'While the transportation of natural gas through pipe lines from one state to another state is interstate commerce * * *, Congress has not taken over the regulation of

that particular industry. Indeed, it has expressly excepted it from the operation of the Interstate Commerce Commissions Law (Interstate Commerce Commissions Law, section 1). It is quite clear, therefore, that this Commission can not require a Pennsylvania corporation producing gas in Pennsylvania to transport it and deliver it in the State of New York, and that the Interstate Commerce Commission is likewise powerless. If there exists such a power, and it seems that there does, it is a power vested in Congress and by it not yet exercised. There is no available source of supply for the Crystal City Company at present except through purchasing from the Porter Gas Company. It is possible that this Commission might fix a price at which the Potter Gas Company should sell if it sold at all, but as the Commission can not require it to supply gas in the State of New York, the exercise of such a power to fix the price, if such power exists, would merely say, sell at this price or keep out of the State.' Lane v. Crystal City Gas Co., 8 New York Public Service Comm.Reports, Second District, 210, 212.

****303 *634** Shortages during World War I occasioned the first intervention in the natural gas industry by the Federal Government. Under Proclamation of President Wilson the United States Fuel Administrator took control, stopped extensions, classified consumers and established a priority for domestic over industrial use. FN22 After the war federal control was abandoned. Some cities once served with natural gas became dependent upon mixed gas of reduced heating value and relatively higher price. FN23

FN22 Proclamation by the President of September 16, 1918; Rules and Regulations of H. A. Garfield, Fuel Administrator, September 24, 1918.

FN23 For example, the Iroquois Gas Corporation which formerly served Buffalo, New York, with natural gas ranging from 1050 to 1150 b.t.u. per cu. ft., now mixes a by-product gas of between 530 and 540 b.t.u. in proportions to provide a mixed gas of about 900 b.t.u. per cu. ft. For space heating or water heating its charges range from 65 cents for the first m.c.f. per month to 55 cents for all above 25 m.c.f. per month. Moody's Manual of Public Utilities (1943) 1350.

Utilization of natural gas of highest social as well as economic return is domestic use for cooking and water ***635** heating, followed closely by use for space heating in homes. This is the true public utility aspect of the enterprise, and its preservation should be the first concern of regulation. Gas does the family cooking cheaper than any other fuel. FN24 But its advantages do not end with dollars and cents cost. It is delivered without interruption at the meter as needed and is paid for after it is used. No money is tied up in a supply, and no space is used for storage. It requires no handling, creates no dust, and leaves no ash. It responds to thermostatic control. It ignites easily and immediately develops its maximum heating capacity. These incidental advantages make domestic life more liveable.

FN24 The United States Fuel Administration made the following cooking value comparisons, based on tests made in the Department of Home Economics of Ohio State University:
Natural gas at 1.12 per M. is equivalent to coal at $6.50 per ton.
Natural gas at 2.00 per M. is equivalent to gasoline at 27¢ per gal.
Natural gas at 2.20 per M. is equivalent to electricity at 3¢ per k.w.h.
Natural gas at 2.40 per M. is equivalent to coal oil at 15¢ per gal.
Use and Conservation of Natural Gas, issued by U.S. Fuel Administration (1918) 5.

Industrial use is induced less by these qualities than by low cost in competition with other fuels. Of the gas exported from West Virginia by the Hope Company a very substantial part is used by industries. This wholesale use speeds exhaustion of supply and displaces other fuels. Coal miners and the coal industry, a large part of whose costs are wages, have complained of unfair competition from low-priced industrial gas produced with relatively little labor cost. FN25

FN25 See Brief on Behalf jof Legislation Imposing an Excise Tax on Natural Gas, submitted to N.R.A. by the United Mine Workers of America and the National Coal Association.

Gas rate structures generally have favored industrial users. In 1932, in Ohio, the average yield on gas for domestic consumption was 62.1 cents per m.c.f. and on industrial,***636** 38.7. In Pennsylvania, the figures were 62.9 against 31.7. West Virginia showed the least spread, domestic consumers paying 36.6 cents; and industrial, 27.7. FN26 Although this spread is less than ****304** in other parts of the United States, FN27 it can hardly be said to be

self-justifying. It certainly is a very great factor in hastening decline of the natural gas supply.

FN26 Brief of National Gas Association and United Mine Workers, supra, note 26, pp. 35, 36, compiled from Bureau of Mines Reports.

FN27 From the source quoted in the preceding note the spread elsewhere is shown to be:

State.	Industrial	Domestic
Illinois.	29.2	1.678
Louisiana.	10.4	59.7
Oklahoma.	11.2	41.5
Texas.	13.1	59.7
Alabama.	17.8	1.227
Georgia.	22.9	1.043

About the time of World War I there were occasional and short-lived efforts by some hard-pressed companies to reverse this discrimination and adopt graduated rates, giving a low rate to quantities adequate for domestic use and graduating it upward to discourage industrial use. FN28 ***637** These rates met opposition from industrial sources, of course, and since diminished revenues from industrial sources tended to increase the domestic price, they met little popular or commission favor. The fact is that neither the gas companies nor the consumers nor local regulatory bodies can be depended upon to conserve gas. Unless federal regulation will take account of conservation, its efforts seem, as in this case, actually to constitute a new threat to the life of the Appalachian supply.

FN28 In Corning, New York, rates were initiated by the Crystal City Gas Company as follows: 70¢ for the first 5,000 cu. ft. per month; 80¢ from 5,000 to 12,000; $1 for all over 12,000. The Public Service Commission rejected these rates and fixed a flat rate of 58¢ per m.c.f. Lane v. Crystal City Gas Co., 8 New York Public Service Comm. Reports, Second District, 210.
The Pennsylvania Gas Company (National Fuel Gas Company group) also attempted a sliding scale rate for New York consumers, net per month as follows: First 5,000 feet, 35¢ ; second 5,000 feet, 45¢ ; third 5,000 feet, 50¢ ; all above 15,000, 55¢ . This was eventually abandoned, however. The company's present scale in Pennsylvania appears to be reversed to the following net monthly rate; first 3 m.c.f., 75¢ ; next 4 m.c.f., 60¢ ; next 8 m.c.f., 55¢ ; over 15 m.c.f., 50¢ . Moody's Manual of Public Utilities (1943) 1350. In New York it now serves a mixed gas.
For a study of effect of sliding scale rates in reducing consumption see 11 Proceedings of Natural Gas Association of America (1919) 287.

II.

Congress in 1938 decided upon federal regulation of the industry. It did so after an exhaustive investigation of all aspects including failing supply and competition for the use of natural gas intensified by growing scarcity. FN29 Pipelines from the Appalachian area to markets were in the control of a handful of holding company systems. FN30 This created a highly concentrated control of the producers' market and of the consumers' supplies. While holding companies dominated both production and distribution they segregated those activities in separate ***638** subsidiaries, FN31 the effect of which, if not the purpose, was to isolate ****305** some end of the business from the reach of any one state commission. The cost of natural gas to consumers moved steadily upwards over the years, out of proportion to prices of oil, which, except for the element of competition, is produced under somewhat comparable conditions. The public came to feel that the companies were exploiting the growing scarcity of local gas. The problems of this region had much to do with creating the demand for federal regulation.

FN29 See Report on Utility Corporations by Federal Trade Commission, Sen. Doc. 92, Pt. 84-A, 70th Cong., 1st Sess.

FN30 Four holding company systems control over 55 per cent of all natural gas transmission lines in the United States. They are Columbia Gas and Electric Corporation, Cities Service Co., Electric Bond and Share Co., and Standard Oil Co. of New Jersey. Columbia alone controls nearly 25 per cent, and fifteen companies account for over 80 per cent of the total. Report on Utility Corporations by Federal Trade Commission, Sen. Doc. 92, Pt. 84-A, 70th Cong., 1st Sess., 28.
In 1915, so it was reported to the Governor of West

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Virginia, 87 per cent of the total gas production of that state was under control of eight companies. Steptoe and Hoffheimer, Legislative Regulation of Natural Gas Supply in West Virginia, 17 West Virginia Law Quarterly 257, 260. Of these, three were subsidiaries of the Columbia system and others were subsidiaries of larger systems. In view of inter-system sales and interlocking interests it may be doubted whether there is much real competition among these companies.

FN31 This pattern with its effects on local regulatory efforts will be observed in our decisions. See United Fuel Gas Co. v. Railroad Commission, 278 U.S. 300, 49 S.Ct. 150, 73 L.Ed. 390; United Fuel Gas Co. v. Public Service Commission, 278 U.S. 322, 49 S.Ct. 157, 73 L.Ed. 402; Dayton Power & Light v. Public Utilities Commission, 292 U.S. 290, 54 S.Ct. 647, 78 L.Ed. 1267; Columbus Gas & Fuel Co. v. Public Utilities Commission, 292 U.S. 398, 54 S.Ct. 763, 78 L.Ed. 1327, 91 A.L.R. 1403, and the present case.

The Natural Gas Act declared the natural gas business to be 'affected with a public interest,' and its regulation 'necessary in the public interest.' FN32 Originally, and at the time this proceeding was commenced and tried, it also declared 'the intention of Congress that natural gas shall be sold in interstate commerce for resale for ultimate public consumption for domestic, commercial, industrial, or any other use at the lowest possible reasonable rate consistent with the maintenance of adequate service in the public interest.' FN33 While this was later dropped, there is nothing to indicate that it was not and is not still an accurate statement of purpose of the Act. Extension or improvement of facilities may be ordered when 'necessary or desirable in the public interest,' abandonment of facilities may be ordered when the supply is 'depleted to the extent that the continuance of service is unwarranted, or that the present or future public convenience or necessity ***639** permit' abandonment and certain extensions can only be made on finding of 'the present or future public convenience and necessity.' FN34 The Commission is required to take account of the ultimate use of the gas. Thus it is given power to suspend new schedules as to rates, charges, and classification of services except where the schedules are for the sale of gas 'for resale for industrial use only,' FN35 which gives the companies greater freedom to increase rates on industrial gas than on domestic gas. More particularly, the Act expressly forbids any undue preference or advantage to any person or 'any unreasonable difference in rates * * * either as between localities or as between classes of service.' FN36 And the power of the Commission expressly includes that to determine the 'just and reasonable rate, charge, classification, rule, regulation, practice, or contract to be thereafter observed and in force.' FN37

FN32 15 U.S.C. s 717(a), 15 U.S.C.A. s 717(a). (Italics supplied throughout this paragraph.)

FN33 s 7(c), 52 Stat. 825, 15 U.S.C.A. s 717f(c).

FN34 15 U.S.C. s 717f, 15 U.S.C.A. s 717f.

FN35 Id., s 717c(e).

FN36 Id., s 717c(b).

FN37 Id., s 717d(a).

In view of the Court's opinion that the Commission in administering the Act may ignore discrimination, it is interesting that in reporting this Bill both the Senate and the House Committees on Interstate Commerce pointed out that in 1934, on a nationwide average the price of natural gas per m.c.f. was 74.6 cents for domestic use, 49.6 cents for commercial use, and 16.9 for industrial use. FN38 I am not ready to think that supporters of a bill called attention to the striking fact that householders were being charged five times as much for their gas as industrial users only as a situation which the Bill would do nothing to remedy. On the other hand the Act gave to the Commission what the Court aptly describes as 'broad powers of regulation.'

FN38 Sen. Rep. No. 1162, 75th Cong., 1st Sess. 2.

***640** III.

This proceeding was initiated by the Cities of Cleveland and Akron. They alleged that the price charged by Hope for natural gas 'for resale to domestic, commercial and small industrial consumers in Cleveland and elsewhere is excessive, unjust, unreasonable, greatly in excess of the price charged by Hope to nonaffiliated companies at wholesale for resale to domestic, commercial and small industrial consumers, and greatly in excess of the price charged by Hope to East Ohio for resale to certain favored industrial consumers in Ohio, and therefore is further unduly discriminatory between consumers and between classes of service' (italics supplied). The company answered admitting differences in prices to affiliated and nonaffiliated companies and justifying them by differences in conditions of delivery.****306** As to the allegation that the contract price is 'greatly in excess of the price charged by Hope to East Ohio for resale to

certain favored industrial consumers in Ohio,' Hope did not deny a price differential, but alleged that industrial gas was not sold to 'favored consumers' but was sold under contract and schedules filed with and approved by the Public Utilities Commission of Ohio, and that certain conditions of delivery made it not 'unduly discriminatory.'

The record shows that in 1940 Hope delivered for industrial consumption 36,523,792 m.c.f. and for domestic and commercial consumption, 50,343,652 m.c.f. I find no separate figure for domestic consumption. It served 43,767 domestic consumers directly, 511,521 through the East Ohio Gas Company, and 154,043 through the Peoples Natural Gas Company, both affiliates owned by the same parent. Its special contracts for industrial consumption, so far as appear, are confined to about a dozen big industries.

***641** Hope is responsible for discrimination as exists in favor of these few industrial consumers. It controls both the resale price and use of industrial gas by virtue of the very interstate sales contracts over which the Commission is exercising its jurisdiction.

Hope's contract with East Ohio Company is an example. Hope agrees to deliver, and the Ohio Company to take, '(a) all natural gas requisite for the supply of the domestic consumers of the Ohio Company; (b) such amounts of natural gas as may be requisite to fulfill contracts made with the consent and approval of the Hope Company by the Ohio Company, or companies which it supplies with natural gas, for the sale of gas upon special terms and conditions for manufacturing purposes.' The Ohio company is required to read domestic customers' meters once a month and meters of industrial customers daily and to furnish all meter readings to Hope. The Hope Company is to have access to meters of all consumers and to all of the Ohio Company's accounts. The domestic consumers of the Ohio Company are to be fully supplied in preference to consumers purchasing for manufacturing purposes and 'Hope Company can be required to supply gas to be used for manufacturing purposes only where the same is sold under special contracts which have first been submitted to and approved in writing by the Hope Company and which expressly provide that natural gas will be supplied thereunder only in so far as the same is not necessary to meet the requirements of domestic consumers supplied through pipe lines of the Ohio Company.' This basic contract was supplemented from time to time, chiefly as to price. The last amendment was in a letter from Hope to East Ohio in 1937. It contained a special discount on industrial gas and a schedule of special industrial contracts, Hope reserving the right to make eliminations therefrom and agreeing that others might be added from time to ***642** time with its approval in writing. It said, 'It is believed that the price concessions contained in this letter, while not based on our costs, are under certain conditions, to our mutual advantage in maintaining and building up the volumes of gas sold by us (italics supplied).' [FN39]

FN39 The list of East Ohio Gas Company's special industrial contracts thus expressly under Hope's control and their demands are as follows:

****307** The Commission took no note of the charges of discrimination and made no disposition of the issue tendered on this point. It ordered a flat reduction in the price per m.c.f. of all gas delivered by Hope in interstate commerce. It made no limitation, condition, or provision as to what classes of consumers should get the benefit of the reduction. While the cities have accepted and are defending the reduction, it is my view that the discrimination of which they have complained is perpetuated and increased by the order of the Commission and that it violates the Act in so doing.

The Commission's opinion aptly characterizes its entire objective by saying that 'bona fide investment figures now become all-important in the regulation of rates.' It should be noted that the all-importance of this theory is not the result of any instruction from Congress. When the Bill to regulate gas was first before Congress it contained***643** the following: 'In determining just and reasonable rates the Commission shall fix such rate as will allow a fair return upon the actual legitimate prudent cost of the property used and useful for the service in question.' H.R. 5423, 74th Cong., 1st Sess. Title III, s 312(c). Congress rejected this language. See H.R. 5423, s 213 (211(c)), and H.R. Rep. No. 1318, 74th Cong., 1st Sess. 30.

The Commission contends nevertheless that the 'all important' formula for finding a rate base is that of prudent investment. But it excluded from the investment base an amount actually and admittedly invested of some $17,000,000. It did so because it says that the Company recouped these expenditures from customers before the days of regulation from earnings above a fair return. But it would not apply all of such 'excess earnings' to reduce the rate base as one of the Commissioners suggested. The reason for applying excess earnings to reduce the investment base roughly from $69,000,000 to $52,000,000 but refusing to apply them to reduce it from that to some $18,000,000 is not found in a difference in the character of the earnings or in their reinvestment. The reason assigned is a difference in bookkeeping treatment many years before the Company was subject to regulation. The $17,000,000, reinvested chiefly in well

drilling, was treated on the books as expense. (The Commission now requires that drilling costs be carried to capital account.) The allowed rate base thus actually was determined by the Company's bookkeeping, not its investment. This attributes a significance to formal classification in account keeping that seems inconsistent with rational rate regulation. [FN40] Of ***644** course, the ****308** Commission would not and should not allow a rate base to be inflated by bookkeeping which had improperly capitalized expenses. I have doubts about resting public regulation upon any rule that is to be used or not depending on which side it favors.

> FN40 To make a fetish of mere accounting is to shield from examination the deeper causes, forces, movements, and conditions which should govern rates. Even as a recording of current transactions, bookkeeping is hardly an exact science. As a representation of the condition and trend of a business, it uses symbols of certainty to express values that actually are in constant flux. It may be said that in commercial or investment banking or any business extending credit success depends on knowing what not to believe in accounting. Few concerns go into bankruptcy or reorganization whose books do not show them solvent and often even profitable. If one cannot rely on accountancy accurately to disclose past or current conditions of a business, the fallacy of using it as a sole guide to future price policy ought to be apparent. However, our quest for certitude is so ardent that we pay an irrational reverence to a technique which uses symbols of certainty, even though experience again and again warns us that they are delusive. Few writers have ventured to challenge this American idolatry, but see Hamilton, Cost as a standard for Price, 4 Law and Contemporary Problems 321, 323-25. He observes that 'As the apostle would put it, accountancy is all things to all men. * * * Its purpose determines the character of a system of accounts.' He analyzes the hypothetical character of accounting and says 'It was no eternal mold for pecuniary verities handed down from on high. It was-like logic or algebra, or the device of analogy in the law-an ingenious contrivance of the human mind to serve a limited and practical purpose.' 'Accountancy is far from being a pecuniary expression of all that is industrial reality. It is an instrument, highly selective in its application, in the service of the institution of money making.' As to capital account he observes 'In an enterprise in lusty competition with others of its kind, survival is the thing and the system of accounts has its focus in solvency. * * * Accordingly depreciation, obsolescence, and other factors which carry no immediate threat are matters of lesser concern and the capital account is likely to be regarded as a secondary phenomenon. * * * But in an enterprise, such as a public utility, where continued survival seems assured, solvency is likely to be taken for granted. * * * A persistent and ingenious attention is likely to be directed not so much to securing the upkeep of the physical property as to making it certain that capitalization fails in not one whit to give full recognition to every item that should go into the account.'

***645** The Company on the other hand, has not put its gas fields into its calculations on the present-value basis, although that, it contends, is the only lawful rule for finding a rate base. To do so would result in a rate higher than it has charged or proposes as a matter of good business to charge.

The case before us demonstrates the lack of rational relationship between conventional rate-base formulas and natural gas production and the extremities to which regulating bodies are brought by the effort to rationalize them. The Commission and the Company each stands on a different theory, and neither ventures to carry its theory to logical conclusion as applied to gas fields.

IV.

This order is under judicial review not because we interpose constitutional theories between a State and the business it seeks to regulate, but because Congress put upon the federal courts a duty toward administration of a new federal regulatory Act. If we are to hold that a given rate is reasonable just because the Commission has said it was reasonable, review becomes a costly, time-consuming pageant of no practical value to anyone. If on the other hand we are to bring judgment of our own to the task, we should for the guidance of the regulators and the regulated reveal something of the philosophy, be it legal or economic or social, which guides us. We need not be slaves to a formula but unless we can point out a rational way of reaching our conclusions they can only be accepted as resting on intuition or predilection. I must admit that I possess no instinct jby which to know the 'reasonable' from the 'unreasonable' in prices and must seek some conscious design for decision.

The Court sustains this order as reasonable, but what makes it so or what could possibly make it otherwise,

***646** I cannot learn. It holds that: 'it is the result reached not the method employed which is controlling'; 'the fact that the method employed to reach that result may contain infirmities is not then important' and it is not 'important to this case to determine the various permissible ways in which any rate base on which the return is computed might be arrived at.' The Court does lean somewhat on considerations of capitalization and dividend history and requirements for dividends on outstanding stock. But I can give no real weight to that for it is generally and I think deservedly in discredit as any guide in rate cases. FN41

FN41 See 2 Bonbright, Valuation of Property (1937) 1112.

Our books already contain so much talk of methods of rationalizing rates that we must appear ambiguous if we announce results without our working methods. We are confronted with regulation of a unique type of enterprise which I think requires considered rejection of much conventional utility doctrine and adoption of concepts of 'just and reasonable' rates and practices and of the 'public interest' that will take account of the peculiarities of the business.

The Court rejects the suggestions of this opinion. It says that the Committees in reporting the bill which became the Act said it provided 'for regulation along recognized and more or less standardized lines' and that there was 'nothing novel in its provisions.' So saying it sustains a rate calculated on a novel variation of a rate base theory which itself had at the time of enactment of the legislation been recognized only in dissenting opinions. Our difference seems to be between unconscious innovation, FN42 and the purposeful ****309** and deliberate innovation I ***647** would make to meet the necessities of regulating the industry before us.

FN42 Bonbright says, '* * * the vice of traditional law lies, not in its adoption of excessively rigid concepts of value and rules of valuation, but rather in its tendency to permit shifts in meaning that are inept, or else that are ill-defined because the judges that make them will not openly admit that they are doing so.' Id., 1170.

Hope's business has two components of quite divergent character. One, while not a conventional common-carrier undertaking, is essentially a transportation enterprise consisting of conveying gas from where it is produced to point of delivery to the buyer. This is a relatively routine operation not differing substantially from many other utility operations. The service is produced by an investment in compression and transmission facilities. Its risks are those of investing in a tested means of conveying a discovered supply of gas to a known market. A rate base calculated on the prudent investment formula would seem a reasonably satisfactory measure for fixing a return from that branch of the business whose service is roughly proportionate to the capital invested. But it has other consequences which must not be overlooked. It gives marketability and hence 'value' to gas owned by the company and gives the pipeline company a large power over the marketability and hence 'value' of the production of others.

The other part of the business-to reduce to possession an adequate supply of natural gas-is of opposite character, being more erratic and irregular and unpredictable in relation to investment than any phase of any other utility business. A thousand feet of gas captured and severed from real estate for delivery to consumers is recognized under our law as property of much the same nature as a ton of coal, a barrel of oil, or a yard of sand. The value to be allowed for it is the real battleground between the investor and consumer. It is from this part of the business that the chief difference between the parties as to a proper rate base arises.

It is necessary to a 'reasonable' price for gas that it be anchored to a rate base of any kind? Why did courts in the first place begin valuing 'rate bases' in order to 'value' something else? The method came into vogue ***648** in fixing rates for transportation service which the public obtained from common carriers. The public received none of the carriers' physical property but did make some use of it. The carriage was often a monopoly so there were no open market criteria as to reasonableness. The 'value' or 'cost' of what was put to use in the service by the carrier was not a remote or irrelevant consideration in making such rates. Moreover the difficulty of appraising an intangible service was thought to be simplified if it could be related to physical property which was visible and measurable and the items of which might have market value. The court hoped to reason from the known to the unknown. But gas fields turn this method topsy turvy. Gas itself is tangible, possessible, and does have a market and a price in the field. The value of the rate base is more elusive than that of gas. It consists of intangibles-leaseholds and freeholds-operated and unoperated-of little use in themselves except as rights to reach and capture gas. Their value lies almost wholly in predictions of discovery, and of price of gas when captured, and bears little relation to cost of tools and supplies and labor to develop it. Gas is what Hope sells and it can be directly priced more reasonably and easily and accurately than the

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components of a rate base can be valued. Hence the reason for resort to a roundabout way of rate base price fixing does not exist in the case of gas in the field.

But if found, and by whatever method found, a rate base is little help in determining reasonableness of the price of gas. Appraisal of present value of these intangible rights to pursue fugitive gas depends on the value assigned to the gas when captured. The 'present fair value' rate base, generally in ill repute, [FN43] is not even ****310** urged by the gas company for valuing its fields.

> FN43 'The attempt to regulate rates by reference to a periodic or occasional reappraisal of the properties has now been tested long enough to confirm the worst fears of its critics. Unless its place is taken by some more promising scheme of rate control, the days of private ownership under government regulation may be numbered.' 2 Bonbright, Valuation of Property (1937) 1190.

***649** The prudent investment theory has relative merits in fixing rates for a utility which creates its service merely by its investment. The amount and quality of service rendered by the usual utility will, at least roughly, be measured by the amount of capital it puts into the enterprise. But it has no rational application where there is no such relationship between investment and capacity to serve. There is no such relationship between investment and amount of gas produced. Let us assume that Doe and Roe each produces in West Virginia for delivery to Cleveland the same quantity of natural gas per day. Doe, however, through luck or foresight or whatever it takes, gets his gas from investing $50,000 in leases and drilling. Roe drilled poorer territory, got smaller wells, and has invested $250,000. Does anybody imagine that Roe can get or ought to get for his gas five times as much as Doe because he has spent five times as much? The service one renders to society in the gas business is measured by what he gets out of the ground, not by what he puts into it, and there is little more relation between the investment and the results than in a game of poker.

Two-thirds of the gas Hope handles it buys from about 340 independent producers. It is obvious that the principle of rate-making applied to Hope's own gas cannot be applied, and has not been applied, to the bulk of the gas Hope delivers. It is not probable that the investment of any two of these producers will bear the same ratio to their investments. The gas, however, all goes to the same use, has the same utilization value and the same ultimate price.

To regulate such an enterprise by undiscriminatingly transplanting any body of rate doctrine conceived and ***650** adapted to the ordinary utility business can serve the 'public interest' as the Natural Gas Act requires, if at all, only by accident. Mr. Justice Brandeis, the pioneer juristic advocate of the prudent investment theory for man-made utilities, never, so far as I am able to discover, proposed its application to a natural gas case. On the other hand, dissenting in Commonwealth of Pennsylvania v. West Virginia, he reviewed the problems of gas supply and said, 'In no other field of public service regulation is the controlling body confronted with factors so baffling as in the natural gas industry, and in none is continuous supervision and control required in so high a degree.' 262 U.S. 553, 621, 43 S.Ct. 658, 674, 67 L.Ed. 1117, 32 A.L.R. 300. If natural gas rates are intelligently to be regulated we must fit our legal principles to the economy of the industry and not try to fit the industry to our books.

As our decisions stand the Commission was justified in believing that it was required to proceed by the rate base method even as to gas in the field. For this reason the Court may not merely wash its hands of the method and rationale of rate making. The fact is that this Court, with no discussion of its fitness, simply transferred the rate base method to the natural gas industry. It happened in Newark Natural Gas & Fuel Co. v. City of Newark, Ohio, 1917, 242 U.S. 405, 37 S.Ct. 156, 157, 61 L.Ed. 393, Ann.Cas.1917B, 1025, in which the company wanted 25 cents per m.c.f., and under the Fourteenth Amendment challenged the reduction to 18 cents by ordinance. This Court sustained the reduction because the court below 'gave careful consideration to the questions of the value of the property * * * at the time of the inquiry,' and whether the rate 'would be sufficient to provide a fair return on the value of the property.' The Court said this method was 'based upon principles thoroughly established by repeated secisions of this court,' citing many cases, not one of which involved natural gas or a comparable wasting natural resource. Then came issues as to state power to ***651** regulate as affected by the commerce clause. Public Utilities Commission v. Landon, 1919, 249 U.S. 236, 39 S.Ct. 268, 63 L.Ed. 577; Pennsylvania Gas Co. v. Public Service Commission, 1920, 252 U.S. 23, 40 S.Ct. 279, 64 L.Ed. 434. These questions settled, the Court again was called upon in natural gas cases to consider state rate-making claimed to be invalid under the Fourteenth Amendment. United Fuel Gas Co. v. Railroad Commission of Kentucky, 1929, 278 U.S. 300, 49 S.Ct. 150, 73 L.Ed. 390; United Fuel Gas Company v. Public Service Commission of West Virginia, 1929, 278 U.S. 322, 49 S.Ct. 157, 73 L.Ed. 402. Then, as now, the differences were 'due ****311** chiefly to the difference in value ascribed by each to the gas rights and leaseholds.' 278 U.S. 300, 311, 49 S.Ct. 150, 153, 73 L.Ed. 390. No one seems to have questioned that the rate

base method must be pursued and the controversy was at what rate base must be used. Later the 'value' of gas in the field was questioned in determining the amount a regulated company should be allowed to pay an affiliate therefor-a state determination also reviewed under the Fourteenth Amendment. Dayton Power & Light Co. v. Public Utilities Commission of Ohio, 1934, 292 U.S. 290, 54 S.Ct. 647, 78 L.Ed. 1267; Columbus Gas & Fuel Co. v. Public Utilities Commission of Ohio, 1934, 292 U.S. 398, 54 S.Ct. 763, 78 L.Ed. 1327, 91 A.L.R. 1403. In both cases, one of which sustained, and one of which struck down a fixed rate the Court assumed the rate base method, as the legal way of testing reasonableness of natural gas prices fixed by public authority, without examining its real relevancy to the inquiry.

Under the weight of such precedents we cannot expect the Commission to initiate economically intelligent methods of fixing gas prices. But the Court now faces a new plan of federal regulation based on the power to fix the price at which gas shall be allowed to move in interstate commerce. I should now consider whether these rules devised under the Fourteenth Amendment are the exclusive tests of a just and reasonable rate under the federal statute, inviting reargument directed to that point ***652** if necessary. As I see it now I would be prepared to hold that these rules do not apply to a natural gas case arising under the Natural Gas Act.

Such a holding would leave the Commission to fix the price of gas in the field as one would fix maximum prices of oil or milk or coal, or any other commodity. Such a price is not calculated to produce a fair return on the synthetic value of a rate base of any individual producer, and would not undertake to assure a fair return to any producer. The emphasis would shift from the producer to the product, which would be regulated with an eye to average or typical producing conditions in the field.

Such a price fixing process on economic lines would offer little temptation to the judiciary to become back seat drivers of the price fixing machine. The unfortunate effect of judicial intervention in this field is to divert the attention of those engaged in the process from what is economically wise to what is legally permissible. It is probable that price reductions would reach economically unwise and self-defeating limits before they would reach constitutional ones. Any constitutional problems growing out of price fixing are quite different than those that have heretofore been considered to inhere in rate making. A producer would have difficulty showing the invalidity of such a fixed price so long as he voluntarily continued to sell his product in interstate commerce. Should he withdraw and other authority be invoked to compel him to part with his property, a different problem would be presented.

Allowance in a rate to compensate for gas removed from gas lands, whether fixed as of point of production or as of point of delivery, probably best can be measured by a functional test applied to the whole industry. For good or ill we depend upon private enterprise to exploit these natural resources for public consumption. The function which an allowance for gas in the field should perform ***653** for society in such circumstances is to be enough and no more than enough to induce private enterprise completely and efficiently to utilize gas resources, to acquire for public service any available gas or gas rights and to deliver gas at a rate and for uses which will be in the future as well as in the present public interest.

The Court fears that 'if we are now to tell the Commission to fix the rates so as to discourage particular uses, we would indeed be injecting into a rate case a 'novel' doctrine * * *.' With due deference I suggest that there is nothing novel in the idea that any change in price of a service or commodity reacts to encourage or discourage its use. The question is not whether such consequences will or will not follow; the question is whether effects must be suffered blindly or may be intelligently selected, whether price control shall have targets at which it deliberately aims or shall be handled like a gun in the hands of one who does not know it is loaded.

We should recognize 'price' for what it is-a tool, a means, an expedient. In public****312** hands it has much the same economic effects as in private hands. Hope knew that a concession in industrial price would tend to build up its volume of sales. It used price as an expedient to that end. The Commission makes another cut in that same price but the Court thinks we should ignore the effect that it will have on exhaustion of supply. The fact is that in natural gas regulation price must be used to reconcile the private property right society has permitted to vest in an important natural resource with the claims of society upon it-price must draw a balance between wealth and welfare.

To carry this into techniques of inquiry is the task of the Commissioner rather than of the judge, and it certainly is no task to be solved by mere bookkeeping but requires the best economic talent available. There would doubtless be inquiry into the price gas is bringing in the ***654** field, how far that price is established by arms' length bargaining and how far it may be influenced by agreements in restraint of trade or monopolistic influences. What must Hope really pay to get and to replace gas it delivers under this order? If it should get more or less than that for its own, how much and why? How far are such prices influenced by pipe line access to

markets and if the consumers pay returns on the pipe lines how far should the increment they cause go to gas producers? East Ohio is itself a producer in Ohio. [FN44] What do Ohio authorities require Ohio consumers to pay for gas in the field? Perhaps these are reasons why the Federal Government should put West Virginia gas at lower or at higher rates. If so what are they? Should East Ohio be required to exploit its half million acres of unoperated reserve in Ohio before West Virginia resources shall be supplied on a devalued basis of which that State complains and for which she threatens measures of self keep? What is gas worth in terms of other fuels it displaces?

FN44 East Ohio itself owns natural gas rights in 550,600 acres, 518,526 of which are reserved and 32,074 operated, by 375 wells. Moody's Manual of Public Utilities (1943) 5.

A price cannot be fixed without considering its effect on the production of gas. Is it an incentive to continue to exploit vast unoperated reserves? Is it conducive to deep drilling tests the result of which we may know only after trial? Will it induce bringing gas from afar to supplement or even to substitute for Appalachian gas? [FN45] Can it be had from distant fields as cheap or cheaper? If so, that competitive potentiality is certainly a relevant consideration. Wise regulation must also consider, as a private buyer would, what alternatives the producer has ***655** if the price is not acceptable. Hope has intrastate business and domestic and industrial customers. What can it do by way of diverting its supply to intrastate sales? What can it do by way of disposing of its operated or reserve acreage to industrial concerns or other buyers? What can West Virginia do by way of conservation laws, severance or other taxation, if the regulated rate offends? It must be borne in mind that while West Virginia was prohibited from giving her own inhabitants a priority that discriminated against interstate commerce, we have never yet held that a good faith conservation act, applicable to her own, as well as to others, is not valid. In considering alternatives, it must be noted that federal regulation is very incomplete, expressly excluding regulation of 'production or gathering of natural gas,' and that the only present way to get the gas seems to be to call it forth by price inducements. It is plain that there is a downward economic limit on a safe and wise price.

FN45 Hope has asked a certificate of convenience and necessity to lay 1140 miles of 22-inch pipeline from Hugoton gas fields in southwest Kansas to West Virginia to carry 285 million cu. ft. of natural gas per day. The cost was estimated at $51,000,000. Moody's Manual of Public Utilities (1943) 1760.

But there is nothing in the law which compels a commission to fix a price at that 'value' which a company might give to its product by taking advantage of scarcity, or monopoly of supply. The very purpose of fixing maximum prices is to take away from the seller his opportunity to get all that otherwise the market would award him for his goods. This is a constitutional use of the power to fix maximum prices, ****313**Block v. Hirsh, 256 U.S. 135, 41 S.Ct. 458, 65 L.Ed. 865, 16 A.L.R. 165; Marcus Brown Holding Co. v. Feldman, 256 U.S. 170, 41 S.Ct. 465, 65 L.Ed. 877; International Harvester Co. v. Kentucky, 234 U.S. 216, 34 S.Ct. 853, 58 L.Ed. 1284; Highland v. Russell Car & Snow Plow Co., 279 U.S. 253, 49 S.Ct. 314, 73 L.Ed. 688, just as the fixing of minimum prices of goods in interstate commerce is constitutional although it takes away from the buyer the advantage in bargaining which market conditions would give him. United States v. Darby, 312 U.S. 100, 657, 61 S.Ct. 451, 85 L.Ed. 609, 132 A.L.R. 1430; Mulford v. Smith, 307 U.S. 38, 59 S.Ct. 648, 83 L.Ed. 1092; United States v. Rock Royal Co-operative, Inc., 307 U.S. 533, 59 S.Ct. 993, 83 L.Ed. 1446; Sunshine Anthracite Coal Co. v. Adkins, 310 U.S. 381, 60 S.Ct. 907, 84 L.Ed. 1263. The Commission has power to fix ***656** a price that will be both maximum and minimum and it has the incidental right, and I think the duty, to choose the economic consequences it will promote or retard in production and also more importantly in consumption, to which I now turn.

If we assume that the reduction in company revenues is warranted we then come to the question of translating the allowed return into rates for consumers or classes of consumers. Here the Commission fixed a single rate for all gas delivered irrespective of its use despite the fact that Hope has established what amounts to two rates-a high one for domestic use and a lower one for industrial contracts. [FN46] The Commission can fix two prices for interstate gas as readily as one-a price for resale to domestic users and another for resale to industrial users. This is the pattern Hope itself has established in the very contracts over which the Commission is expressly given jurisdiction. Certainly the Act is broad enough to permit two prices to be fixed instead of one, if the concept of the 'public interest' is not unduly narrowed.

FN46 I find little information as to the rates for industries in the record and none at all in such usual sources as Moody's Manual.

The Commission's concept of the public interest in natural

gas cases which is carried today into the Court's opinion was first announced in the opinion of the minority in the Pipeline case. It enumerated only two 'phases of the public interest: (1) the investor interest; (2) the consumer interest,' which it emphasized to the exclusion of all others. 315 U.S. 575, 606, 62 S.Ct. 736, 753, 86 L.Ed. 1037. This will do well enough in dealing with railroads or utilities supplying manufactured gas, electric, power, a communications service or transportation, where utilization of facilities does not impair their future usefulness. Limitation of supply, however, brings into a natural gas case another phase of the public interest that to my mind overrides both the owner ***657** and the consumer of that interest. Both producers and industrial consumers have served their immediate private interests at the expense of the long-range public interest. The public interest, of course, requires stopping unjust enrichment of the owner. But it also requires stopping unjust impoverishment of future generations. The public interest in the use by Hope's half million domestic consumers is quite a different one from the public interest in use by a baker's dozen of industries.

Prudent price fixing it seems to me must at the very threshold determine whether any part of an allowed return shall be permitted to be realized from sales of gas for resale for industrial use. Such use does tend to level out daily and seasonal peaks of domestic demand and to some extent permits a lower charge for domestic service. But is that a wise way of making gas cheaper when, in comparison with any substitute, gas is already a cheap fuel? The interstate sales contracts provide that at times when demand is so great that there is not enough gas to go around domestic users shall first be served. Should the operation of this preference await the day of actual shortage? Since the propriety of a preference seems conceded, should it not operate to prevent the coming of a shortage as well as to mitigate its effects? Should industrial use jeopardize tomorrow's service to householders any more than today's? If, however, it is decided to cheapen domestic use by resort to industrial sales, should they be limited to the few uses ****314** for which gas has special values or extend also to those who use it only because it is cheaper than competitive fuels? FN47 And how much cheaper should industrial***658** gas sell than domestic gas, and how much advantage should it have over competitive fuels? If industrial gas is to contribute at all to lowering domestic rates, should it not be made to contribute the very maximum of which it is capable, that is, should not its price be the highest at which the desired volume of sales can be realized?

> FN47 The Federal Power Commission has touched upon the problem of conservation in connection with an application for a certificate permitting construction of a 1500-mile pipeline from southern Texas to New York City and says: 'The Natural Gas Act as presently drafted does not enable the Commission to treat fully the serious implications of such a problem. The question should be raised as to whether the proposed use of natural gas would not result in displacing a less valuable fuel and create hardships in the industry already supplying the market, while at the same time rapidly depleting the country's natural-gas reserves. Although, for a period of perhaps 20 years, the natural gas could be so priced as to appear to offer an apparent saving in fuel costs, this would mean simply that social costs which must eventually be paid had been ignored.
> 'Careful study of the entire problem may lead to the conclusion that use of natural gas should be restricted by functions rather than by areas. Thus, it is especially adapted to space and water heating in urban homes and other buildings and to the various industrial heat processes which require concentration of heat, flexibility of control, and uniformity of results. Industrial uses to which it appears particularly adapted include the treating and annealing of metals, the operation of kilns in the ceramic, cement, and lime industries, the manufacture of glass in its various forms, and use as a raw material in the chemical industry. General use of natural gas under boilers for the production of steam is, however, under most circumstances of very questionable social economy.' Twentieth Annual Report of the Federal Power Commission (1940) 79.

If I were to answer I should say that the household rate should be the lowest that can be fixed under commercial conditions that will conserve the supply for that use. The lowest probable rate for that purpose is not likely to speed exhaustion much, for it still will be high enough to induce economy, and use for that purpose has more nearly reached the saturation point. On the other hand the demand for industrial gas at present rates already appears to be increasing. To lower further the industrial rate is merely further to subsidize industrial consumption and speed depletion. The impact of the flat reduction ***659** of rates ordered here admittedly will be to increase the industrial advantages of gas over competing fuels and to increase its use. I think this is not, and there is no finding by the Commission that it is, in the public interest.

There is no justification in this record for the present discrimination against domestic users of gas in favor of industrial users. It is one of the evils against which the Natural Gas Act was aimed by Congress and one of the evils complained of here by Cleveland and Akron. If

Hope's revenues should be cut by some $3,600,000 the whole reduction is owing to domestic users. If it be considered wise to raise part of Hope's revenues by industrial purpose sales, the utmost possible revenue should be raised from the least consumption of gas. If competitive relationships to other fuels will permit, the industrial price should be substantially advanced, not for the benefit of the Company, but the increased revenues from the advance should be applied to reduce domestic rates. For in my opinion the 'public interest' requires that the great volume of gas now being put to uneconomic industrial use should either be saved for its more important future domestic use or the present domestic user should have the full benefit of its exchange value in reducing his present rates.

Of course the Commission's power directly to regulate does not extend to the fixing of rates at which the local company shall sell to consumers. Nor is such power required to accomplish the purpose. As already pointed out, the very contract the Commission is altering classifies the gas according to the purposes for which it is to be resold and provides differentials between the two classifications. It would only be necessary for the Commission to order ****315** that all gas supplied under paragraph (a) of Hope's contract with the East Ohio Company shall be ***660** at a stated price fixed to give to domestic service the entire reduction herein and any further reductions that may prove possible by increasing industrial rates. It might further provide that gas delivered under paragraph (b) of the contract for industrial purposes to those industrial customers Hope has approved in writing shall be at such other figure as might be found consistent with the public interest as herein defined. It is too late in the day to contend that the authority of a regulatory commission does not extend to a consideration of public interests which it may not directly regulate and a conditioning of its orders for their protection. Interstate Commerce Commission v. Railway Labor Executives Ass'n, 315 U.S. 373, 62 S.Ct. 717, 86 L.Ed. 904; United States v. Lowden, 308 U.S. 225, 60 S.Ct. 248, 84 L.Ed. 208.

Whether the Commission will assert its apparently broad statutory authorization over prices and discriminations is, of course, its own affair, not ours. It is entitled to its own notion of the 'public interest' and its judgment of policy must prevail. However, where there is ground for thinking that views of this Court may have constrained the Commission to accept the rate-base method of decision and a particular single formula as 'all important' for a rate base, it is appropriate to make clear the reasons why I, at least, would not be so understood. The Commission is free to face up realistically to the nature and peculiarity of the resources in its control, to foster their duration in fixing price, and to consider future interests in addition to those of investors and present consumers. If we return this case it may accept or decline the proffered freedom. This problem presents the Commission an unprecedented opportunity if it will boldly make sound economic considerations, instead of legal and accounting theories, the foundation of federal policy. I would return the case to the Commission and thereby be clearly quit of what now may appear to be some responsibility for perpetrating a shortsighted pattern of natural gas regulation.

U.S. 1944.
Federal Power Commission v. Hope Natural Gas Co.
51 P.U.R.(NS) 193, 320 U.S. 591, 64 S.Ct. 281, 88 L.Ed. 333

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KROLL

U.S. Capital Markets Performance
by Asset Class 1926–2022

2023

SBBI® Yearbook

STOCKS, BONDS, BILLS, AND INFLATION®

Roger G. Ibbotson

Exhibit 6.8: Total Returns, Income Returns, and Capital Appreciation Returns of the SBBI® Asset Classes; Summary Statistics of Annual Returns (%)
1926–2022

	Geometric Mean (%)	Arithmetic Mean (%)	Deviation (%)	Serial Correlation
Large-Cap Stocks				
Total Return	10.1	12.0	19.8	0.00
Income	3.9	3.9	1.6	0.92
Capital Appreciation	6.1	7.9	19.1	0.00
Small-Cap Stocks (TR)	11.8	16.0	31.2	0.05
Long-term Corp Bonds (TR)	5.7	6.1	9.0	0.05
Long-term Gov't Bonds				
Total Return	5.2	5.6	10.3	-0.11
Income	4.8	4.9	2.6	0.96
Capital Appreciation	0.2	0.6	9.3	-0.21
Inter-term Gov't Bonds				
Total Return	4.9	5.0	5.7	0.17
Income	4.2	4.3	2.9	0.96
Capital Appreciation	0.5	0.6	4.6	-0.13
U.S. Treasury Bills (TR)	3.2	3.3	3.1	0.92
Inflation	2.9	3.0	4.0	0.63

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In general, risk is rewarded by a higher return over the long term. For example, Exhibit 6.8 shows that over the 1926–2022 time horizon small-cap stocks were the riskiest asset class with a standard deviation of 31.2%, but also provided the greatest rewards to long-term investors, with an arithmetic mean annual return of 16.0%. Comparably, the risk (as measured by standard deviation) of large-cap stocks was significantly lower at 19.8%, and the reward (as measured by arithmetic average annual return) of large-cap stocks was correspondently lower at 12.0%.

U.S. Treasury bills, with a standard deviation of 3.1%, were nearly riskless and had the lowest arithmetic mean annual return at 3.3%.

Inflation-Adjusted Series Summary Statistics

Inflation-adjusted basic series summary statistics are presented in Exhibit 6.9. Note that the real rate of interest is close to zero (0.4%) on average. For the 97-year period, the geometric and arithmetic means are lower by the amount of inflation than those of the nominal series.

Appendix A-1

Large-Capitalization Stocks: Total Return
From 1926 to 2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1926	0.0000	-0.0385	-0.0575	0.0253	0.0179	0.0457	0.0479	0.0248	0.0252	-0.0284	0.0347	0.0196	1926	0.1162
1927	-0.0193	0.0537	0.0087	0.0201	0.0607	-0.0067	0.0670	0.0515	0.0450	-0.0502	0.0721	0.0279	1927	0.3749
1928	-0.0040	-0.0125	0.1101	0.0345	0.0197	-0.0385	0.0141	0.0803	0.0259	0.0168	0.1292	0.0049	1928	0.4361
1929	0.0583	-0.0019	-0.0012	0.0176	-0.0362	0.1140	0.0471	0.1028	-0.0476	-0.1973	-0.1246	0.0282	1929	-0.0842
1930	0.0639	0.0259	0.0812	-0.0080	-0.0096	-0.1625	0.0386	0.0141	-0.1282	-0.0855	-0.0089	-0.0706	1930	-0.2490
1931	0.0502	0.1193	-0.0675	-0.0935	-0.1279	0.1421	-0.0722	0.0182	-0.2973	0.0896	-0.0798	-0.1400	1931	-0.4334
1932	-0.0271	0.0570	-0.1158	-0.1997	-0.2196	-0.0022	0.3815	0.3869	-0.0346	-0.1349	-0.0417	0.0565	1932	-0.0819
1933	0.0087	-0.1772	0.0353	0.4256	0.1683	0.1338	-0.0862	0.1206	-0.1118	-0.0855	0.1127	0.0253	1933	0.5399
1934	0.1069	-0.0322	0.0000	-0.0251	-0.0736	0.0229	-0.1132	0.0611	-0.0033	-0.0286	0.0942	-0.0010	1934	-0.0144
1935	-0.0411	-0.0341	-0.0286	0.0980	0.0409	0.0699	0.0850	0.0280	0.0256	0.0777	0.0474	0.0394	1935	0.4767
1936	0.0670	0.0224	0.0268	-0.0751	0.0545	0.0333	0.0701	0.0151	0.0031	0.0775	0.0134	-0.0029	1936	0.3392
1937	0.0390	0.0191	-0.0077	-0.0809	-0.0024	-0.0504	0.1045	-0.0483	-0.1403	-0.0981	-0.0866	-0.0459	1937	-0.3503
1938	0.0152	0.0674	-0.2487	0.1447	-0.0330	0.2503	0.0744	-0.0226	0.0166	0.0776	-0.0273	0.0401	1938	0.3112
1939	-0.0674	0.0390	-0.1339	-0.0027	0.0733	-0.0612	0.1105	-0.0648	0.1673	-0.0123	-0.0398	0.0270	1939	-0.0041
1940	-0.0336	0.0133	0.0124	-0.0024	-0.2289	0.0809	0.0341	0.0350	0.0123	0.0422	-0.0316	0.0009	1940	-0.0978
1941	-0.0463	-0.0060	0.0071	-0.0612	0.0183	0.0578	0.0579	0.0010	-0.0068	-0.0657	-0.0284	-0.0407	1941	-0.1159
1942	0.0161	-0.0159	-0.0652	-0.0400	0.0796	0.0221	0.0337	0.0164	0.0290	0.0678	-0.0021	0.0549	1942	0.2034
1943	0.0737	0.0583	0.0545	0.0035	0.0552	0.0223	-0.0526	0.0171	0.0263	-0.0108	-0.0654	0.0617	1943	0.2590
1944	0.0171	0.0042	0.0195	-0.0100	0.0505	0.0543	-0.0193	0.0157	-0.0008	0.0023	0.0133	0.0374	1944	0.1975
1945	0.0158	0.0683	-0.0441	0.0902	0.0195	-0.0007	-0.0180	0.0641	0.0438	0.0322	0.0396	0.0116	1945	0.3644
1946	0.0714	-0.0641	0.0480	0.0393	0.0288	-0.0370	-0.0239	-0.0674	-0.0997	-0.0060	-0.0027	0.0457	1946	-0.0807
1947	0.0255	-0.0077	-0.0149	-0.0363	0.0014	0.0554	0.0381	-0.0203	-0.0111	0.0238	-0.0175	0.0233	1947	0.0571
1948	-0.0379	-0.0388	0.0793	0.0292	0.0879	0.0054	-0.0508	0.0158	-0.0276	0.0710	-0.0961	0.0346	1948	0.0550
1949	0.0039	-0.0296	0.0328	-0.0179	-0.0258	0.0014	0.0650	0.0219	0.0263	0.0340	0.0175	0.0486	1949	0.1879
1950	0.0197	0.0199	0.0070	0.0486	0.0509	-0.0548	0.0119	0.0443	0.0592	0.0093	0.0169	0.0513	1950	0.3171
1951	0.0637	0.0157	-0.0156	0.0509	-0.0299	-0.0228	0.0711	0.0478	0.0013	-0.0103	0.0096	0.0424	1951	0.2402
1952	0.0181	-0.0282	0.0503	-0.0402	0.0343	0.0490	0.0196	-0.0071	-0.0176	0.0020	0.0571	0.0382	1952	0.1837
1953	-0.0049	-0.0106	-0.0212	-0.0237	0.0077	-0.0134	0.0273	-0.0501	0.0034	0.0540	0.0204	0.0053	1953	-0.0099
1954	0.0536	0.0111	0.0325	0.0516	0.0418	0.0031	0.0589	-0.0275	0.0851	-0.0167	0.0909	0.0534	1954	0.5262
1955	0.0197	0.0098	-0.0030	0.0396	0.0055	0.0841	0.0622	-0.0025	0.0130	-0.0284	0.0827	0.0015	1955	0.3156
1956	-0.0347	0.0413	0.0710	-0.0004	-0.0593	0.0409	0.0530	-0.0328	-0.0440	0.0066	-0.0050	0.0370	1956	0.0656
1957	-0.0401	-0.0264	0.0215	0.0388	0.0437	0.0004	0.0131	-0.0505	-0.0602	-0.0302	0.0231	-0.0395	1957	-0.1078

Appendix A-1

Large-Capitalization Stocks: Total Return
From 1926 to 2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan-Dec*
1958	0.0445	-0.0141	0.0328	0.0337	0.0212	0.0279	0.0449	0.0176	0.0501	0.0270	0.0284	0.0535	1958	0.4336
1959	0.0053	0.0049	0.0020	0.0402	0.0240	-0.0022	0.0363	-0.0102	-0.0443	0.0128	0.0186	0.0292	1959	0.1196
1960	-0.0700	0.0147	-0.0123	-0.0161	0.0326	0.0211	-0.0234	0.0317	-0.0590	-0.0007	0.0465	0.0479	1960	0.0047
1961	0.0645	0.0319	0.0270	0.0051	0.0239	-0.0275	0.0342	0.0243	-0.0184	0.0298	0.0447	0.0046	1961	0.2689
1962	-0.0366	0.0209	-0.0046	-0.0607	-0.0811	-0.0803	0.0652	0.0208	-0.0465	0.0064	0.1086	0.0153	1962	-0.0873
1963	0.0506	-0.0239	0.0370	0.0500	0.0193	-0.0188	-0.0022	0.0535	-0.0097	0.0339	-0.0046	0.0262	1963	0.2280
1964	0.0283	0.0147	0.0165	0.0075	0.0162	0.0178	0.0195	-0.0118	0.0301	0.0096	0.0005	0.0056	1964	0.1648
1965	0.0345	0.0031	-0.0133	0.0356	-0.0030	-0.0473	0.0147	0.0272	0.0334	0.0289	-0.0031	0.0106	1965	0.1245
1966	0.0062	-0.0131	-0.0205	0.0220	-0.0492	-0.0146	-0.0120	-0.0725	-0.0053	0.0494	0.0095	0.0002	1966	-0.1006
1967	0.0798	0.0072	0.0409	0.0437	-0.0477	0.0190	0.0468	-0.0070	0.0342	-0.0276	0.0065	0.0278	1967	0.2398
1968	-0.0425	-0.0261	0.0110	0.0834	0.0161	0.0105	-0.0172	0.0164	0.0400	0.0087	0.0531	-0.0402	1968	0.1106
1969	-0.0068	-0.0426	0.0359	0.0229	0.0026	-0.0542	-0.0587	0.0454	-0.0236	0.0459	-0.0297	-0.0177	1969	-0.0850
1970	-0.0743	0.0558	0.0044	-0.0875	-0.0578	-0.0466	0.0769	0.0478	0.0362	-0.0083	0.0506	0.0597	1970	0.0386
1971	0.0432	0.0117	0.0394	0.0389	-0.0391	0.0033	-0.0387	0.0388	-0.0044	-0.0392	0.0002	0.0888	1971	0.1430
1972	0.0206	0.0277	0.0083	0.0068	0.0197	-0.0194	0.0048	0.0369	-0.0025	0.0118	0.0481	0.0142	1972	0.1900
1973	-0.0149	-0.0352	0.0008	-0.0383	-0.0163	-0.0040	0.0407	-0.0341	0.0427	0.0017	-0.1109	0.0198	1973	-0.1469
1974	-0.0072	-0.0007	-0.0205	-0.0359	-0.0302	-0.0113	-0.0742	-0.0864	-0.1152	0.1681	-0.0488	-0.0156	1974	-0.2647
1975	0.1272	0.0638	0.0254	0.0510	0.0477	0.0477	-0.0644	-0.0176	-0.0312	0.0653	0.0282	-0.0081	1975	0.3723
1976	0.1217	-0.0084	0.0337	-0.0078	-0.0111	0.0443	-0.0048	-0.0018	0.0258	-0.0186	-0.0041	0.0561	1976	0.2393
1977	-0.0473	-0.0182	-0.0105	0.0042	-0.0196	0.0494	-0.0124	-0.0172	0.0016	-0.0390	0.0316	0.0075	1977	-0.0716
1978	-0.0574	-0.0203	0.0294	0.0902	0.0092	-0.0138	0.0583	0.0301	-0.0032	-0.0872	0.0215	0.0196	1978	0.0657
1979	0.0443	-0.0321	0.0596	0.0063	-0.0217	0.0435	0.0134	0.0577	0.0043	-0.0640	0.0475	0.0214	1979	0.1861
1980	0.0622	-0.0001	-0.0972	0.0462	0.0515	0.0316	0.0696	0.0101	0.0294	0.0202	0.1065	-0.0302	1980	0.3250
1981	-0.0418	0.0174	0.0400	-0.0193	0.0026	-0.0063	0.0021	-0.0577	-0.0493	0.0540	0.0413	-0.0256	1981	-0.0492
1982	-0.0131	-0.0559	-0.0052	0.0452	-0.0341	-0.0150	-0.0178	0.1214	0.0125	0.1151	0.0404	0.0193	1982	0.2155
1983	0.0372	0.0229	0.0369	0.0788	-0.0087	0.0389	-0.0295	0.0150	0.0138	-0.0116	0.0211	-0.0052	1983	0.2256
1984	-0.0056	-0.0352	0.0173	0.0095	-0.0554	0.0217	-0.0124	0.1104	0.0002	0.0039	-0.0112	0.0263	1984	0.0627
1985	0.0779	0.0122	0.0007	-0.0009	0.0578	0.0157	-0.0015	-0.0085	-0.0313	0.0462	0.0686	0.0484	1985	0.3173
1986	0.0056	0.0747	0.0558	-0.0113	0.0532	0.0169	-0.0559	0.0742	-0.0827	0.0577	0.0243	-0.0255	1986	0.1867
1987	0.1347	0.0395	0.0289	-0.0089	0.0087	0.0505	0.0507	0.0373	-0.0219	-0.2154	-0.0824	0.0761	1987	0.0525
1988	0.0421	0.0466	-0.0309	0.0111	0.0086	0.0459	-0.0038	-0.0339	0.0426	0.0278	-0.0143	0.0174	1988	0.1661
1989	0.0732	-0.0249	0.0233	0.0519	0.0405	-0.0057	0.0903	0.0195	-0.0041	-0.0232	0.0204	0.0240	1989	0.3169

Appendix A-1

Large-Capitalization Stocks: Total Return
From 1926 to 2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1990	-0.0671	0.0129	0.0265	-0.0249	0.0975	-0.0067	-0.0032	-0.0904	-0.0487	-0.0043	0.0646	0.0279	1990	-0.0310
1991	0.0436	0.0715	0.0242	0.0024	0.0431	-0.0458	0.0466	0.0237	-0.0167	0.0134	-0.0403	0.1144	1991	0.3047
1992	-0.0186	0.0130	-0.0194	0.0294	0.0049	-0.0149	0.0409	-0.0205	0.0118	0.0035	0.0341	0.0123	1992	0.0762
1993	0.0084	0.0136	0.0211	-0.0242	0.0268	0.0029	-0.0040	0.0379	-0.0077	0.0207	-0.0095	0.0121	1993	0.1008
1994	0.0340	-0.0271	-0.0436	0.0128	0.0164	-0.0245	0.0328	0.0410	-0.0245	0.0225	-0.0364	0.0148	1994	0.0132
1995	0.0259	0.0390	0.0295	0.0294	0.0400	0.0232	0.0332	0.0025	0.0422	-0.0036	0.0439	0.0193	1995	0.3758
1996	0.0340	0.0093	0.0096	0.0147	0.0258	0.0038	-0.0442	0.0211	0.0563	0.0276	0.0756	-0.0198	1996	0.2296
1997	0.0625	0.0078	-0.0411	0.0597	0.0609	0.0448	0.0796	-0.0560	0.0548	-0.0334	0.0463	0.0172	1997	0.3336
1998	0.0111	0.0721	0.0512	0.0101	-0.0172	0.0406	-0.0106	-0.1446	0.0641	0.0813	0.0606	0.0576	1998	0.2858
1999	0.0418	-0.0311	0.0400	0.0387	-0.0236	0.0555	-0.0312	-0.0049	-0.0274	0.0633	0.0203	0.0589	1999	0.2104
2000	-0.0502	-0.0189	0.0978	-0.0301	-0.0205	0.0247	-0.0156	0.0621	-0.0528	-0.0042	-0.0788	0.0049	2000	-0.0910
2001	0.0355	-0.0912	-0.0634	0.0777	0.0067	-0.0243	-0.0098	-0.0626	-0.0808	0.0191	0.0767	0.0088	2001	-0.1189
2002	-0.0146	-0.0193	0.0376	-0.0606	-0.0074	-0.0712	-0.0780	0.0066	-0.1087	0.0880	0.0589	-0.0587	2002	-0.2210
2003	-0.0262	-0.0150	0.0097	0.0824	0.0527	0.0128	0.0176	0.0195	-0.0106	0.0566	0.0088	0.0524	2003	0.2868
2004	0.0184	0.0139	-0.0151	-0.0157	0.0137	0.0194	-0.0331	0.0040	0.0108	0.0153	0.0405	0.0340	2004	0.1088
2005	-0.0244	0.0210	-0.0177	-0.0190	0.0318	0.0014	0.0372	-0.0091	0.0081	-0.0167	0.0378	0.0003	2005	0.0491
2006	0.0265	0.0027	0.0124	0.0134	-0.0288	0.0014	0.0062	0.0238	0.0258	0.0326	0.0190	0.0140	2006	0.1579
2007	0.0151	-0.0196	0.0112	0.0443	0.0349	-0.0166	-0.0310	0.0150	0.0374	0.0159	-0.0418	-0.0069	2007	0.0549
2008	-0.0600	-0.0325	-0.0043	0.0487	0.0130	-0.0843	-0.0084	0.0145	-0.0891	-0.1679	-0.0718	0.0106	2008	-0.3700
2009	-0.0843	-0.1065	0.0876	0.0957	0.0559	0.0020	0.0756	0.0361	0.0373	-0.0186	0.0600	0.0193	2009	0.2646
2010	-0.0360	0.0310	0.0603	0.0158	-0.0799	-0.0523	0.0701	-0.0451	0.0892	0.0380	0.0001	0.0668	2010	0.1506
2011	0.0237	0.0343	0.0004	0.0296	-0.0113	-0.0167	-0.0203	-0.0543	-0.0703	0.1093	-0.0022	0.0102	2011	0.0211
2012	0.0448	0.0432	0.0329	-0.0063	-0.0601	0.0412	0.0139	0.0225	0.0258	-0.0185	0.0058	0.0091	2012	0.1600
2013	0.0518	0.0136	0.0375	0.0193	0.0234	-0.0134	0.0509	-0.0290	0.0314	0.0460	0.0305	0.0253	2013	0.3239
2014	-0.0346	0.0457	0.0084	0.0074	0.0235	0.0207	-0.0138	0.0400	-0.0140	0.0244	0.0269	-0.0025	2014	0.1369
2015	-0.0300	0.0575	-0.0158	0.0096	0.0129	-0.0194	0.0210	-0.0603	-0.0247	0.0844	0.0030	-0.0158	2015	0.0138
2016	-0.0496	-0.0013	0.0678	0.0039	0.0180	0.0026	0.0369	0.0014	0.0002	-0.0182	0.0370	0.0198	2016	0.1196
2017	0.0190	0.0397	0.0012	0.0103	0.0141	0.0062	0.0206	0.0031	0.0206	0.0233	0.0307	0.0111	2017	0.2183
2018	0.0573	-0.0369	-0.0254	0.0038	0.0241	0.0062	0.0372	0.0326	0.0057	-0.0684	0.0204	-0.0903	2018	-0.0438
2019	0.0801	0.0321	0.0194	0.0405	-0.0635	0.0705	0.0144	-0.0158	0.0187	0.0217	0.0363	0.0302	2019	0.3149
2020	-0.0004	-0.0823	-0.1235	0.1282	0.0476	0.0199	0.0564	0.0719	-0.0380	-0.0266	0.1095	0.0384	2020	0.1840
2021	-0.0101	0.0276	0.0438	0.0534	0.0070	0.0233	0.0238	0.0304	-0.0465	0.0701	-0.0069	0.0448	2021	0.2871
2022	-0.0517	-0.0299	0.0371	-0.0872	0.0018	-0.0825	0.0922	-0.0408	-0.0921	0.0810	0.0559	-0.0576	2022	-0.1811

Appendix A-7

Long-term Government Bonds: Income Returns
From 1926 to 2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1926	0.0031	0.0028	0.0032	0.0030	0.0028	0.0033	0.0031	0.0031	0.0030	0.0030	0.0031	0.0030	1926	0.0373
1927	0.0030	0.0027	0.0029	0.0027	0.0028	0.0027	0.0027	0.0029	0.0027	0.0028	0.0027	0.0027	1927	0.0341
1928	0.0027	0.0025	0.0027	0.0026	0.0027	0.0027	0.0027	0.0029	0.0027	0.0030	0.0027	0.0029	1928	0.0322
1929	0.0029	0.0027	0.0028	0.0034	0.0030	0.0029	0.0032	0.0030	0.0032	0.0031	0.0026	0.0031	1929	0.0347
1930	0.0029	0.0026	0.0029	0.0027	0.0027	0.0029	0.0028	0.0026	0.0029	0.0027	0.0026	0.0028	1930	0.0332
1931	0.0028	0.0026	0.0029	0.0027	0.0026	0.0028	0.0027	0.0027	0.0027	0.0029	0.0031	0.0032	1931	0.0333
1932	0.0032	0.0032	0.0031	0.0030	0.0028	0.0028	0.0028	0.0028	0.0026	0.0027	0.0026	0.0027	1932	0.0369
1933	0.0027	0.0023	0.0027	0.0025	0.0028	0.0025	0.0026	0.0026	0.0025	0.0026	0.0025	0.0028	1933	0.0312
1934	0.0029	0.0024	0.0027	0.0025	0.0025	0.0024	0.0024	0.0024	0.0023	0.0027	0.0025	0.0025	1934	0.0318
1935	0.0025	0.0021	0.0022	0.0023	0.0023	0.0022	0.0024	0.0023	0.0023	0.0023	0.0024	0.0024	1935	0.0281
1936	0.0024	0.0023	0.0024	0.0022	0.0022	0.0024	0.0023	0.0023	0.0021	0.0023	0.0022	0.0022	1936	0.0277
1937	0.0021	0.0020	0.0022	0.0023	0.0022	0.0025	0.0024	0.0023	0.0023	0.0023	0.0024	0.0023	1937	0.0266
1938	0.0023	0.0021	0.0023	0.0022	0.0022	0.0021	0.0021	0.0022	0.0021	0.0022	0.0021	0.0022	1938	0.0264
1939	0.0021	0.0019	0.0021	0.0019	0.0020	0.0018	0.0019	0.0018	0.0019	0.0023	0.0020	0.0019	1939	0.0240
1940	0.0020	0.0018	0.0019	0.0018	0.0019	0.0019	0.0020	0.0019	0.0018	0.0018	0.0018	0.0017	1940	0.0223
1941	0.0016	0.0016	0.0018	0.0017	0.0017	0.0016	0.0016	0.0016	0.0016	0.0016	0.0014	0.0016	1941	0.0194
1942	0.0021	0.0019	0.0021	0.0020	0.0019	0.0021	0.0021	0.0021	0.0020	0.0021	0.0020	0.0021	1942	0.0246
1943	0.0020	0.0019	0.0021	0.0020	0.0019	0.0021	0.0021	0.0021	0.0020	0.0020	0.0021	0.0021	1943	0.0244
1944	0.0021	0.0020	0.0021	0.0020	0.0022	0.0020	0.0021	0.0021	0.0020	0.0021	0.0020	0.0020	1944	0.0246
1945	0.0021	0.0018	0.0020	0.0019	0.0019	0.0019	0.0018	0.0019	0.0018	0.0019	0.0018	0.0018	1945	0.0234
1946	0.0017	0.0015	0.0016	0.0017	0.0018	0.0016	0.0019	0.0017	0.0018	0.0019	0.0018	0.0019	1946	0.0204
1947	0.0018	0.0016	0.0018	0.0017	0.0017	0.0019	0.0018	0.0017	0.0018	0.0018	0.0017	0.0021	1947	0.0213
1948	0.0020	0.0019	0.0022	0.0020	0.0018	0.0021	0.0019	0.0021	0.0020	0.0019	0.0021	0.0020	1948	0.0240
1949	0.0020	0.0018	0.0019	0.0018	0.0020	0.0019	0.0017	0.0019	0.0017	0.0018	0.0017	0.0017	1949	0.0225
1950	0.0018	0.0016	0.0018	0.0016	0.0019	0.0017	0.0018	0.0018	0.0017	0.0019	0.0018	0.0018	1950	0.0212
1951	0.0020	0.0017	0.0019	0.0020	0.0021	0.0020	0.0023	0.0021	0.0019	0.0023	0.0021	0.0022	1951	0.0238
1952	0.0023	0.0021	0.0023	0.0022	0.0020	0.0022	0.0022	0.0021	0.0023	0.0023	0.0021	0.0024	1952	0.0266
1953	0.0023	0.0021	0.0025	0.0024	0.0024	0.0027	0.0025	0.0025	0.0025	0.0023	0.0024	0.0024	1953	0.0284
1954	0.0023	0.0022	0.0025	0.0022	0.0020	0.0025	0.0022	0.0023	0.0022	0.0021	0.0023	0.0023	1954	0.0279
1955	0.0022	0.0022	0.0024	0.0022	0.0025	0.0023	0.0023	0.0027	0.0024	0.0025	0.0024	0.0024	1955	0.0275
1956	0.0025	0.0023	0.0023	0.0026	0.0026	0.0023	0.0026	0.0026	0.0025	0.0029	0.0027	0.0028	1956	0.0299
1957	0.0029	0.0025	0.0026	0.0029	0.0029	0.0025	0.0033	0.0030	0.0031	0.0031	0.0029	0.0029	1957	0.0344

Appendix A-7

Long-term Government Bonds: Income Returns
From 1926 to 2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1958	0.0027	0.0025	0.0027	0.0026	0.0024	0.0027	0.0027	0.0027	0.0032	0.0032	0.0028	0.0033	1958	0.0327
1959	0.0031	0.0031	0.0035	0.0033	0.0033	0.0036	0.0035	0.0035	0.0034	0.0035	0.0035	0.0036	1959	0.0401
1960	0.0035	0.0037	0.0036	0.0032	0.0037	0.0034	0.0032	0.0034	0.0032	0.0033	0.0032	0.0033	1960	0.0426
1961	0.0033	0.0030	0.0031	0.0031	0.0034	0.0032	0.0033	0.0033	0.0032	0.0034	0.0032	0.0031	1961	0.0383
1962	0.0037	0.0032	0.0033	0.0033	0.0032	0.0030	0.0034	0.0034	0.0030	0.0035	0.0031	0.0032	1962	0.0400
1963	0.0032	0.0029	0.0031	0.0034	0.0033	0.0030	0.0036	0.0033	0.0034	0.0034	0.0032	0.0036	1963	0.0389
1964	0.0035	0.0032	0.0037	0.0035	0.0032	0.0038	0.0035	0.0035	0.0034	0.0034	0.0035	0.0035	1964	0.0415
1965	0.0033	0.0032	0.0038	0.0033	0.0033	0.0038	0.0034	0.0037	0.0035	0.0034	0.0037	0.0037	1965	0.0419
1966	0.0038	0.0034	0.0040	0.0036	0.0041	0.0039	0.0038	0.0043	0.0041	0.0040	0.0038	0.0039	1966	0.0449
1967	0.0040	0.0034	0.0039	0.0035	0.0043	0.0039	0.0043	0.0042	0.0040	0.0045	0.0045	0.0044	1967	0.0459
1968	0.0050	0.0042	0.0043	0.0049	0.0046	0.0042	0.0048	0.0042	0.0044	0.0045	0.0043	0.0049	1968	0.0550
1969	0.0050	0.0046	0.0047	0.0055	0.0047	0.0055	0.0052	0.0048	0.0055	0.0057	0.0049	0.0060	1969	0.0595
1970	0.0056	0.0052	0.0056	0.0054	0.0055	0.0064	0.0059	0.0057	0.0056	0.0055	0.0058	0.0053	1970	0.0674
1971	0.0051	0.0046	0.0056	0.0048	0.0047	0.0056	0.0052	0.0055	0.0050	0.0047	0.0051	0.0050	1971	0.0632
1972	0.0050	0.0047	0.0049	0.0048	0.0055	0.0049	0.0051	0.0049	0.0047	0.0052	0.0048	0.0045	1972	0.0587
1973	0.0054	0.0051	0.0056	0.0057	0.0058	0.0055	0.0061	0.0062	0.0055	0.0063	0.0056	0.0060	1973	0.0651
1974	0.0061	0.0055	0.0059	0.0068	0.0068	0.0061	0.0072	0.0065	0.0071	0.0070	0.0062	0.0067	1974	0.0727
1975	0.0068	0.0060	0.0066	0.0067	0.0067	0.0070	0.0068	0.0065	0.0073	0.0072	0.0061	0.0075	1975	0.0799
1976	0.0065	0.0061	0.0071	0.0064	0.0059	0.0073	0.0065	0.0069	0.0064	0.0061	0.0066	0.0063	1976	0.0789
1977	0.0059	0.0057	0.0065	0.0061	0.0067	0.0062	0.0059	0.0067	0.0061	0.0063	0.0063	0.0062	1977	0.0714
1978	0.0069	0.0060	0.0069	0.0063	0.0075	0.0069	0.0073	0.0070	0.0065	0.0073	0.0071	0.0068	1978	0.0790
1979	0.0079	0.0065	0.0074	0.0076	0.0077	0.0071	0.0076	0.0073	0.0068	0.0082	0.0083	0.0083	1979	0.0886
1980	0.0083	0.0084	0.0099	0.0100	0.0087	0.0086	0.0084	0.0081	0.0097	0.0097	0.0091	0.0108	1980	0.0997
1981	0.0094	0.0088	0.0111	0.0101	0.0104	0.0109	0.0109	0.0110	0.0114	0.0117	0.0113	0.0100	1981	0.1155
1982	0.0108	0.0103	0.0124	0.0112	0.0101	0.0120	0.0114	0.0112	0.0100	0.0091	0.0095	0.0093	1982	0.1350
1983	0.0087	0.0081	0.0089	0.0085	0.0091	0.0090	0.0088	0.0103	0.0096	0.0095	0.0094	0.0094	1983	0.1038
1984	0.0103	0.0092	0.0098	0.0104	0.0103	0.0106	0.0116	0.0106	0.0094	0.0108	0.0091	0.0098	1984	0.1174
1985	0.0096	0.0082	0.0094	0.0102	0.0097	0.0080	0.0094	0.0085	0.0088	0.0089	0.0081	0.0086	1985	0.1125
1986	0.0079	0.0073	0.0071	0.0063	0.0062	0.0070	0.0066	0.0063	0.0065	0.0069	0.0059	0.0070	1986	0.0898
1987	0.0064	0.0059	0.0066	0.0065	0.0066	0.0075	0.0073	0.0075	0.0075	0.0079	0.0075	0.0078	1987	0.0792
1988	0.0072	0.0071	0.0072	0.0070	0.0078	0.0076	0.0071	0.0083	0.0076	0.0076	0.0070	0.0075	1988	0.0897
1989	0.0080	0.0069	0.0079	0.0070	0.0080	0.0070	0.0068	0.0066	0.0065	0.0072	0.0064	0.0064	1989	0.0881

Appendix A-7

Long-term Government Bonds: Income Returns
From 1926 to 2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec
1990	0.0073	0.0066	0.0071	0.0075	0.0075	0.0068	0.0074	0.0071	0.0069	0.0081	0.0071	0.0072	1990	0.0819
1991	0.0071	0.0064	0.0064	0.0076	0.0068	0.0063	0.0076	0.0068	0.0068	0.0065	0.0060	0.0068	1991	0.0822
1992	0.0061	0.0059	0.0067	0.0065	0.0061	0.0067	0.0063	0.0060	0.0058	0.0057	0.0061	0.0063	1992	0.0726
1993	0.0059	0.0055	0.0063	0.0057	0.0052	0.0062	0.0054	0.0056	0.0050	0.0049	0.0053	0.0055	1993	0.0717
1994	0.0055	0.0049	0.0058	0.0057	0.0063	0.0061	0.0060	0.0066	0.0061	0.0066	0.0064	0.0066	1994	0.0659
1995	0.0070	0.0059	0.0064	0.0058	0.0065	0.0054	0.0056	0.0057	0.0052	0.0057	0.0051	0.0049	1995	0.0760
1996	0.0054	0.0048	0.0052	0.0059	0.0058	0.0054	0.0062	0.0057	0.0060	0.0058	0.0052	0.0056	1996	0.0618
1997	0.0056	0.0051	0.0059	0.0059	0.0058	0.0059	0.0058	0.0049	0.0058	0.0054	0.0047	0.0054	1997	0.0664
1998	0.0048	0.0044	0.0052	0.0049	0.0048	0.0052	0.0049	0.0048	0.0044	0.0042	0.0045	0.0045	1998	0.0583
1999	0.0042	0.0040	0.0053	0.0048	0.0045	0.0055	0.0051	0.0054	0.0052	0.0050	0.0056	0.0055	1999	0.0557
2000	0.0057	0.0051	0.0054	0.0047	0.0056	0.0052	0.0052	0.0050	0.0046	0.0053	0.0048	0.0045	2000	0.0650
2001	0.0049	0.0042	0.0045	0.0047	0.0050	0.0047	0.0052	0.0046	0.0041	0.0048	0.0041	0.0046	2001	0.0553
2002	0.0048	0.0043	0.0043	0.0054	0.0049	0.0044	0.0051	0.0044	0.0042	0.0040	0.0040	0.0045	2002	0.0559
2003	0.0041	0.0038	0.0040	0.0040	0.0039	0.0036	0.0038	0.0042	0.0046	0.0041	0.0039	0.0047	2003	0.0480
2004	0.0042	0.0038	0.0043	0.0039	0.0040	0.0048	0.0043	0.0045	0.0040	0.0038	0.0041	0.0043	2004	0.0502
2005	0.0041	0.0035	0.0041	0.0039	0.0040	0.0036	0.0034	0.0040	0.0035	0.0039	0.0039	0.0039	2005	0.0469
2006	0.0040	0.0036	0.0039	0.0039	0.0048	0.0044	0.0045	0.0043	0.0039	0.0042	0.0039	0.0036	2006	0.0468
2007	0.0043	0.0038	0.0039	0.0042	0.0041	0.0040	0.0046	0.0042	0.0037	0.0043	0.0039	0.0037	2007	0.0486
2008	0.0040	0.0034	0.0037	0.0035	0.0037	0.0040	0.0039	0.0036	0.0039	0.0037	0.0036	0.0033	2008	0.0445
2009	0.0024	0.0030	0.0035	0.0029	0.0033	0.0038	0.0036	0.0036	0.0034	0.0033	0.0035	0.0034	2009	0.0347
2010	0.0036	0.0033	0.0040	0.0038	0.0034	0.0037	0.0031	0.0032	0.0026	0.0027	0.0032	0.0032	2010	0.0425
2011	0.0035	0.0032	0.0036	0.0034	0.0036	0.0032	0.0032	0.0034	0.0026	0.0022	0.0024	0.0022	2011	0.0382
2012	0.0022	0.0020	0.0022	0.0025	0.0023	0.0018	0.0020	0.0018	0.0017	0.0021	0.0019	0.0019	2012	0.0247
2013	0.0022	0.0022	0.0022	0.0026	0.0023	0.0024	0.0030	0.0028	0.0029	0.0029	0.0027	0.0031	2013	0.0290
2014	0.0032	0.0026	0.0029	0.0028	0.0028	0.0025	0.0027	0.0026	0.0023	0.0025	0.0023	0.0022	2014	0.0341
2015	0.0020	0.0015	0.0021	0.0019	0.0020	0.0023	0.0024	0.0022	0.0021	0.0021	0.0022	0.0022	2015	0.0247
2016	0.0021	0.0020	0.0018	0.0017	0.0020	0.0018	0.0014	0.0016	0.0015	0.0016	0.0018	0.0022	2016	0.0230
2017	0.0024	0.0021	0.0023	0.0021	0.0024	0.0021	0.0022	0.0022	0.0019	0.0022	0.0021	0.0020	2017	0.0267
2018	0.0024	0.0022	0.0024	0.0025	0.0025	0.0023	0.0025	0.0025	0.0022	0.0030	0.0028	0.0027	2018	0.0282
2019	0.0025	0.0022	0.0023	0.0023	0.0023	0.0018	0.0021	0.0019	0.0015	0.0016	0.0016	0.0018	2019	0.0255
2020	0.0020	0.0015	0.0013	0.0009	0.0009	0.0009	0.0010	0.0008	0.0010	0.0009	0.0011	0.0011	2020	0.0153
2021	0.0011	0.0012	0.0018	0.0019	0.0018	0.0017	0.0016	0.0015	0.0014	0.0015	0.0017	0.0015	2021	0.0173
2022	0.0017	0.0017	0.0020	0.0021	0.0028	0.0028	0.0027	0.0029	0.0029	0.0035	0.0036	0.0033	2022	0.0261

FRBSF ECONOMIC LETTER

2014-33 | November 10, 2014

Does Slower Growth Imply Lower Interest Rates?

BY SYLVAIN LEDUC AND GLENN D. RUDEBUSCH

Over the past two years, both monetary and fiscal policy projections have been based on the view that declines in the long-run potential growth rate of the economy will in turn push down interest rates. In contrast, examination of private-sector professional forecasts and historical data provides little evidence of such a linkage. This suggests a greater risk that future interest rates may be higher than expected.

The aging of the labor force, weak productivity growth, and possible long-run supply-side damage from the Great Recession have all suggested recently that the potential growth rate of the U.S. economy may be lower in the years ahead. According to standard economic theory, such slower growth would push down the level of the natural rate of interest. This natural rate, also called the neutral or equilibrium real interest rate, is the risk-free short-term interest rate adjusted for inflation that would prevail in normal times with full employment (Williams 2003).

Moreover, a decline in the natural rate of interest would tend to lower every other real and nominal interest rate in the economy. Therefore, understanding the linkage between economic growth and the natural rate is crucial for forecasting *all* types of interest rates. Indeed, this linkage has been at the center of recent fiscal and monetary policy forecasts. The Congressional Budget Office (CBO 2014) noted that its lower projections of U.S. Treasury yields and the federal government's future debt servicing costs partly reflected reductions in its forecast for potential output. In addition, earlier this year, some Federal Open Market Committee (FOMC) participants appeared to reduce their estimates of the natural rate of interest because of an expectation of slower growth ahead for potential output.

This *Economic Letter* examines the linkage between growth and interest rates as embodied in recent projections by FOMC participants, the CBO, and private-sector forecasters. Although forecasts of potential growth or the natural rate are rarely reported, we can construct reasonable proxies from long-run forecasts of GDP growth, the short-term interest rate, and inflation. In essence, the long-run nature of these forecasts strips out cyclical variation and reveals the fundamental secular trends that underlie the concepts of potential growth and the natural rate of interest.

Although in the CBO and FOMC policy projections long-run forecasts of growth and the real interest rate have fallen together, private-sector forecasters do not anticipate a similar dual drop. In particular, the recent downward revisions in private-sector expectations for long-run growth have been associated with no change in their long-run projections of the real short-term interest rate. If the private-sector forecasters are correct, this would raise a concern that the CBO and FOMC may have overestimated the effects of slower potential growth toward reducing interest rates, which may introduce some upside risk to CBO and FOMC interest rate projections.

FOMC and CBO projections of growth and interest rates

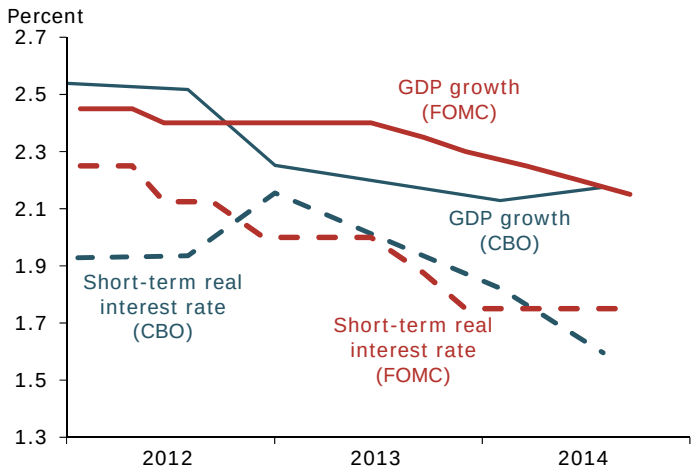
In standard economic theory, the natural interest rate—that is, the short-term real interest rate at which the economy would stay at full employment—is related positively to the growth rate of potential output. Higher potential growth can affect the real interest rate via two key channels. First, it increases the returns on investment and thus leads to higher investment demand. Second, because higher growth boosts future earnings, it leads forward-looking households to consume more and save less. The combination of higher investment and lower savings raises the real interest rate. As a result, higher potential growth would be associated with a higher natural rate (Laubach and Williams 2003). Of course, this simple theory is not definitive, and in the real world, other factors may obscure or overwhelm this relationship, including those highlighted in the recent debate about secular stagnation (Summers 2014). Most importantly perhaps, in an open economy with international financial flows, the real interest rate is determined by the interaction of growth, saving, and investment at a *global* level—rather than by developments in any single country.

Because we do not directly observe the natural rate of interest or potential trend growth, we construct proxies from long-run forecasts of real GDP growth and short-term real interest rates. Since the impact of cyclical shocks diminishes over time, long-run projections should capture forecasters' views of secular influences in the economy, which are the factors that affect potential growth and the natural rate.

We first examine long-run policy projections of real GDP growth and the short-term real interest rate from the FOMC and the CBO. FOMC forecasts are reported four times per year in the FOMC's Summary of Economic Projections (SEP). Long-run real GDP growth forecasts are available since 2009. Long-run forecasts of the equilibrium real interest rate can be constructed since 2012 using long-run forecasts of the nominal federal funds rate and of inflation in the price index for personal consumption expenditures. We use the midpoint of the forecasts' central tendency, which excludes the three highest and three lowest projections. The CBO's long-run forecasts are available since 1996. We use the average of five- to ten-year-ahead forecasts. We calculate the real interest rate forecast using projections of the three-month Treasury bill rate and of inflation in the consumer price index (CPI). Based on historical differences among the data series, we subtract 0.3 percentage point from the CPI inflation forecasts and add 0.2 percentage point to the Treasury bill rate forecasts to make them broadly comparable to the FOMC projections.

Figure 1 depicts the evolution of the FOMC and the CBO long-run forecasts for real GDP growth and the short-term real interest rate. Since the beginning of 2012, FOMC participants have lowered their projections of the short-term rate from 2.3% to 1.7%, and one likely important factor behind this decline was the FOMC participants' more pessimistic outlook for long-run GDP growth, reflected in Figure 1. The June 2014 FOMC minutes described the connection: "Compared with March, some

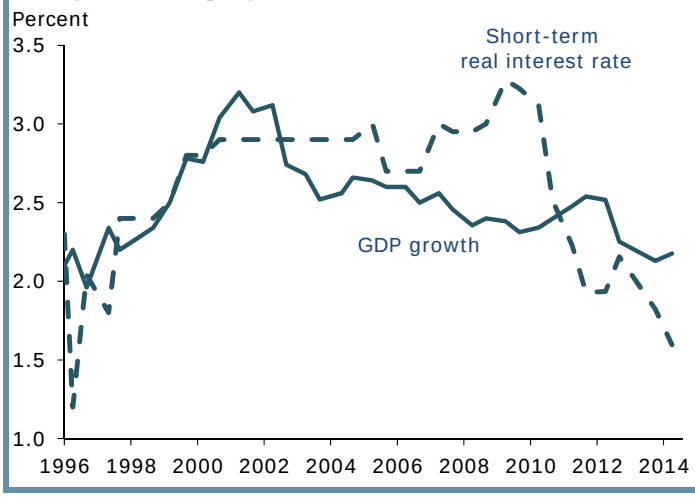
Figure 1
Long-run FOMC and CBO projections



participants revised down their estimates of the longer-run federal funds rate, with a lower assessment of the longer-run level of potential output growth cited as a contributing factor for the majority of those revisions" (Board of Governors 2014).

Figure 1 also shows that the CBO lowered its estimate of the short-term real interest rate by roughly 0.4 percentage point since the beginning of 2012. Echoing the views of FOMC participants, the latest report on the long-term budget outlook from the CBO (2014) emphasized that a key factor behind the declining real rate was the decline in potential growth. This link between potential growth and the natural real interest rate is also evident in the CBO's projections since the mid-1990s, shown in Figure 2. The two series have a fairly close correlation of 0.5.

Figure 2
Long-run CBO projections

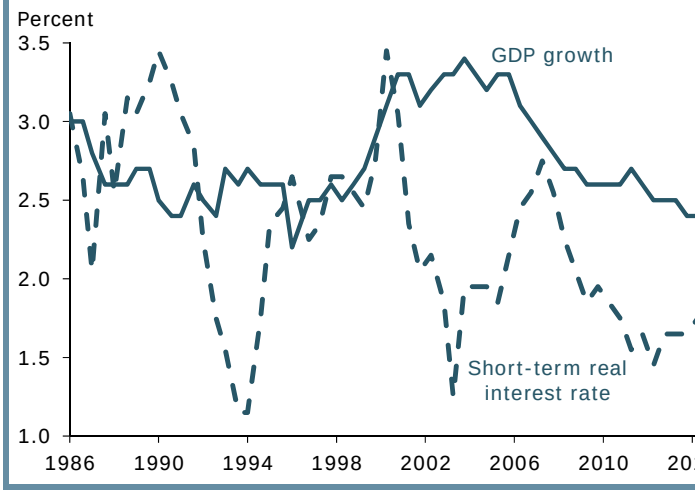


Evidence from private-sector forecasts and historical data

Are the views of FOMC participants and the CBO about the linkage between long-run growth and interest rates shared by private-sector forecasters? Since 1986, the Blue Chip Economic Indicators has reported long-run forecasts from business economists for growth and interest rates. We use the average five- to ten-year-ahead consensus forecasts for real GDP growth and for the short-term real interest rate. We base the latter on projections of the federal funds rate and CPI inflation adjusted by 0.3 percentage point.

Figure 3 shows the movements in the Blue Chip forecasts for real GDP growth and the short-term real interest rate. Like the FOMC and CBO, private forecasters have also lowered their projections of long-run growth since 2012. However, despite this weaker growth outlook, the Blue Chip long-run estimates of the short-term real interest rate have actually edged up during this period. Furthermore, this recent episode is not unusual. Over the past three decades, it appears that private forecasters have incorporated essentially no link between potential growth and the natural rate of interest: The two data series have a zero correlation.

Figure 3
Long-run Blue Chip projections



This evidence is surprising given the predictions of standard economic

theory, but it is in line with some other research findings. For instance, Goldman Sachs (2014) recently examined the effect of real per-capita GDP growth on short-term real interest rates in 20 countries since the early 1800s. The report found no statistically significant relationship between these two variables. Similarly, Carroll and Summers (1991) and Bosworth (2014) found at best a weak positive relationship between growth and short-term real interest rates using data for a number of countries.

A strong positive link between higher growth and higher real interest rates depends in part on a decline in the saving rate, arising from household assumptions about longer-term income. However, much research has instead found that higher growth is associated with a higher saving rate (for example, International Monetary Fund 2014). In this case, although higher growth would raise investment demand and put upward pressure on real interest rates, this effect would be mitigated by a rise in the saving rate.

The Blue Chip results could be interpreted in three ways. First, it's possible that the private forecasters are naively ignoring an important growth and interest rate connection that is obvious in policy projections. Alternatively, it is possible that the Blue Chip forecasters have a more subtle understanding of the many factors other than growth that influence investment and saving in a way that masks a positive connection between potential growth and the equilibrium real interest rate. Finally, the Blue Chip forecasters may correctly recognize that there is no significant relationship between potential growth and the equilibrium real funds rate. If either the second or third of these interpretations were true, it would imply that many FOMC participants and the CBO may have overemphasized the effect that weaker potential growth has on damping future interest rates.

Conclusions and policy implications

In this *Letter*, we document a range of views about the link between potential growth and the natural interest rate. In particular, while the CBO and many FOMC participants expect weaker long-run growth to translate into lower interest rates, private-sector forecasts do not seem to share this view. Thus, future downward pressure on interest rates may be more muted than indicated by current monetary and fiscal policy projections, which would translate into an upside risk to these longer-term interest rate forecasts.

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Trading Services

	2/19/25
Current Quarter	0.59
EPS Last Quarter	0.95
Last EPS Surprise	-4.04%
ABR	2.50

Earnings ESP	0.00%
Current Year	3.02
Next Year	3.30
EPS (TTM)	2.97
P/E (F1)	28.25

% EPS Growth Estimates	AWR	IND	S&P
Current Qtr (12/2024)	7.27	-24.48	20.57
Next Qtr (03/2025)	17.74	-32.99	13.17
Current Year (12/2024)	5.96	8.40	12.40
Next Year (12/2025)	9.27	8.00	18.75
Past 5 Years	8.90	11.10	8.10
Next 5 Years	6.30	8.50	NA
PE	28.25	22.90	25.13
PEG Ratio	4.48	2.69	NA

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Research for AWR

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	126.00M	142.00M	577.00M	621.00M
# of Estimates	1	1	1	1
High Estimate	126.00M	142.00M	577.00M	621.00M
Low Estimate	126.00M	142.00M	577.00M	621.00M
Year ago Sales	125.18M	135.25M	595.70M	577.00M
Year over Year Growth Est.	0.66%	4.99%	-3.14%	7.63%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.59	0.73	3.02	3.30
# of Estimates	1	1	2	2
Most Recent Consensus	0.59	0.73	3.01	3.29
High Estimate	0.59	0.73	3.03	3.31
Low Estimate	0.59	0.73	3.01	3.29
Year ago EPS	0.55	0.62	2.85	3.02
Year over Year Growth Est.	7.27%	17.74%	5.96%	9.27%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	1	0	0
Up Last 60 Days	1	1	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	1	1
Down Last 60 Days	0	0	1	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.59	0.73	3.02	3.30
7 Days Ago	0.59	0.73	3.02	3.30
30 Days Ago	0.56	0.63	3.03	3.35
60 Days Ago	0.56	0.63	3.03	3.35
90 Days Ago	0.56	0.63	3.03	3.35

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.59	0.73	3.01	3.29
Zacks Consensus Estimate	0.59	0.73	3.02	3.30
Earnings ESP	0.00%	0.00%	-0.33%	-0.30%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.95	0.85	0.62	0.55	NA
Estimate	0.99	0.84	0.59	0.53	NA
Difference	-0.04	0.01	0.03	0.02	0.01
Surprise	-4.04%	1.19%	5.08%	3.77%	1.50%

Quarterly Estimates By Analyst

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	2/12/25
Current Quarter	1.13
EPS Last Quarter	1.80
Last EPS Surprise	-2.17%
ABR	2.67

Earnings ESP	0.00%
Current Year	5.28
Next Year	5.69
EPS (TTM)	5.05
P/E (F1)	25.94

% EPS Growth Estimates	AWK	IND	S&P
Current Qtr (12/2024)	28.41	-24.48	20.57
Next Qtr (03/2025)	11.58	-32.99	13.17
Current Year (12/2024)	7.76	8.40	12.40
Next Year (12/2025)	7.77	8.00	18.75
Past 5 Years	8.10	11.10	8.10
Next 5 Years	8.10	8.50	NA
PE	25.94	22.90	25.13
PEG Ratio	3.19	2.69	NA

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Research for AWK

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.08B	1.03B	4.55B	4.70B
# of Estimates	4	3	4	4
High Estimate	1.11B	1.06B	4.59B	4.83B
Low Estimate	1.06B	999.43M	4.50B	4.52B
Year ago Sales	1.03B	1.01B	4.23B	4.55B
Year over Year Growth Est.	4.98%	1.46%	7.37%	3.38%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.13	1.06	5.28	5.69
# of Estimates	3	3	7	7
Most Recent Consensus	1.10	1.04	5.27	5.67
High Estimate	1.17	1.08	5.34	5.73
Low Estimate	1.10	1.04	5.25	5.65
Year ago EPS	0.88	0.95	4.90	5.28
Year over Year Growth Est.	28.41%	11.58%	7.76%	7.79%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	3	1	2	2
Up Last 60 Days	3	2	2	2
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	1	1	2
Down Last 60 Days	0	1	0	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	1.13	1.06	5.28	5.69
7 Days Ago	1.13	1.06	5.28	5.69
30 Days Ago	1.09	1.06	5.27	5.69
60 Days Ago	1.08	1.06	5.27	5.69
90 Days Ago	1.08	1.06	5.26	5.69

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.13	1.06	5.30	5.70
Zacks Consensus Estimate	1.13	1.06	5.28	5.69
Earnings ESP	0.00%	0.31%	0.34%	0.22%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.80	1.42	0.95	0.88	NA
Estimate	1.84	1.47	0.99	0.84	NA
Difference	-0.04	-0.05	-0.04	0.04	-0.02
Surprise	-2.17%	-3.40%	-4.04%	4.76%	-1.21%

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	3/6/25
Current Quarter	0.37
EPS Last Quarter	1.03
Last EPS Surprise	-5.50%
ABR	2.20

Earnings ESP	-1.37%
Current Year	3.29
Next Year	2.35
EPS (TTM)	3.46
P/E (F1)	15.56

% EPS Growth Estimates	CWT	IND	S&P
Current Qtr (12/2024)	-28.85	-24.48	20.57
Next Qtr (03/2025)	-85.95	-32.99	13.17
Current Year (12/2024)	261.54	8.40	12.40
Next Year (12/2025)	-28.57	8.00	18.75
Past 5 Years	-7.70	11.10	8.10
Next 5 Years	NA	8.50	NA
PE	15.56	22.90	25.13
PEG Ratio	NA	2.69	NA

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Research for CWT

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	231.11M	179.52M	1.05B	934.90M
# of Estimates	2	2	2	2
High Estimate	235.00M	182.00M	1.05B	959.00M
Low Estimate	227.21M	177.03M	1.04B	910.80M
Year ago Sales	214.51M	270.75M	794.63M	1.05B
Year over Year Growth Est.	7.74%	-33.70%	31.62%	-10.61%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.37	0.17	3.29	2.35
# of Estimates	2	2	3	3
Most Recent Consensus	0.36	NA	3.31	2.36
High Estimate	0.37	0.17	3.31	2.40
Low Estimate	0.36	0.16	3.26	2.30
Year ago EPS	0.52	1.21	0.91	3.29
Year over Year Growth Est.	-28.85%	-85.95%	261.54%	-28.47%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	0	2	2
Down Last 60 Days	1	0	2	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.37	0.17	3.29	2.35
7 Days Ago	0.37	0.17	3.29	2.35
30 Days Ago	0.37	0.17	3.33	2.38
60 Days Ago	0.37	0.17	3.33	2.38
90 Days Ago	0.37	0.17	3.33	2.37

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.36	0.17	3.31	2.33
Zacks Consensus Estimate	0.37	0.17	3.29	2.35
Earnings ESP	-1.37%	0.00%	0.46%	-0.99%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.03	0.70	1.21	0.52	NA
Estimate	1.09	0.39	0.21	1.50	NA
Difference	-0.06	0.31	1.00	-0.98	0.07
Surprise	-5.50%	79.49%	476.19%	-65.33%	121.21%

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	2/27/25
Current Quarter	0.65
EPS Last Quarter	0.25
Last EPS Surprise	8.70%
ABR	1.45

Earnings ESP	17.53%
Current Year	2.01
Next Year	2.12
EPS (TTM)	1.76
P/E (F1)	19.97

% EPS Growth Estimates	WTRG	IND	S&P
Current Qtr (12/2024)	30.00	-24.48	20.57
Next Qtr (03/2025)	9.59	-32.99	13.17
Current Year (12/2024)	8.06	8.40	12.40
Next Year (12/2025)	5.47	8.00	18.75
Past 5 Years	5.60	11.10	8.10
Next 5 Years	6.30	8.50	NA
PE	19.97	22.90	25.13
PEG Ratio	3.17	2.69	NA

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Research for WTRG

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	533.96M	699.82M	2.05B	2.26B
# of Estimates	2	2	3	3
High Estimate	535.91M	709.64M	2.13B	2.37B
Low Estimate	532.00M	690.00M	2.01B	2.19B
Year ago Sales	479.42M	612.07M	2.05B	2.05B
Year over Year Growth Est.	11.38%	14.34%	-0.03%	9.88%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.65	0.80	2.01	2.12
# of Estimates	3	2	4	6
Most Recent Consensus	NA	NA	1.96	2.10
High Estimate	0.76	0.80	2.14	2.20
Low Estimate	0.50	0.79	1.91	2.08
Year ago EPS	0.50	0.73	1.86	2.01
Year over Year Growth Est.	30.00%	9.59%	8.06%	5.81%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	2	1
Up Last 60 Days	1	0	1	0
Down Last 7 Days	0	0	0	1
Down Last 30 Days	0	0	0	3
Down Last 60 Days	0	0	0	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.65	0.80	2.01	2.12
7 Days Ago	0.65	0.80	2.01	2.12
30 Days Ago	0.59	0.80	1.99	2.12
60 Days Ago	0.58	0.80	1.95	2.11
90 Days Ago	0.58	0.80	1.94	2.11

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.76	0.80	2.08	2.13
Zacks Consensus Estimate	0.65	0.80	2.01	2.12
Earnings ESP	17.53%	0.00%	3.49%	0.39%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.25	0.28	0.73	0.50	NA
Estimate	0.23	0.30	0.76	0.49	NA
Difference	0.02	-0.02	-0.03	0.01	-0.01
Surprise	8.70%	-6.67%	-3.95%	2.04%	0.03%

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	3/5/25
Current Quarter	0.06
EPS Last Quarter	0.12
Last EPS Surprise	9.09%
ABR	1.00

Earnings ESP	0.00%
Current Year	0.28
Next Year	0.30
EPS (TTM)	0.29
P/E (F1)	47.86

% EPS Growth Estimates	GWRS	IND	S&P
Current Qtr (12/2024)	-14.29	-24.48	20.57
Next Qtr (03/2025)	66.67	-32.99	13.17
Current Year (12/2024)	7.69	8.40	12.40
Next Year (12/2025)	7.14	8.00	18.75
Past 5 Years	15.90	11.10	8.10
Next 5 Years	15.00	8.50	NA
PE	47.86	22.90	25.13
PEG Ratio	3.19	2.69	NA

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Research for GWRS

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	12.70M	12.00M	52.40M	55.00M
# of Estimates	2	1	2	2
High Estimate	13.00M	12.00M	53.00M	56.00M
Low Estimate	12.40M	12.00M	51.80M	54.00M
Year ago Sales	12.37M	11.61M	53.03M	52.40M
Year over Year Growth Est.	2.67%	3.36%	-1.18%	4.96%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.06	0.05	0.28	0.30
# of Estimates	2	1	2	2
Most Recent Consensus	NA	NA	0.28	0.30
High Estimate	0.08	0.05	0.30	0.36
Low Estimate	0.04	0.05	0.26	0.23
Year ago EPS	0.07	0.03	0.26	0.28
Year over Year Growth Est.	-14.29%	66.67%	7.69%	5.36%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	1	1
Up Last 60 Days	0	0	1	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	1	1
Down Last 60 Days	0	0	1	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.06	0.05	0.28	0.30
7 Days Ago	0.06	0.05	0.28	0.30
30 Days Ago	0.06	0.05	0.27	0.31
60 Days Ago	0.06	0.05	0.27	0.31
90 Days Ago	0.06	0.05	0.27	0.31

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.06	0.05	0.28	0.30
Zacks Consensus Estimate	0.06	0.05	0.28	0.30
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.12	0.07	0.03	0.07	NA
Estimate	0.11	0.08	0.03	0.05	NA
Difference	0.01	-0.01	0.00	0.02	0.01
Surprise	9.09%	-12.50%	0.00%	40.00%	9.15%

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	3/6/25
Current Quarter	0.36
EPS Last Quarter	0.80
Last EPS Surprise	19.40%
ABR	2.00

Earnings ESP	0.00%
Current Year	2.34
Next Year	2.39
EPS (TTM)	2.30
P/E (F1)	27.96

% EPS Growth Estimates	MSEX	IND	S&P
Current Qtr (12/2024)	12.50	-24.48	20.57
Next Qtr (03/2025)	-18.64	-32.99	13.17
Current Year (12/2024)	32.95	8.40	12.40
Next Year (12/2025)	2.14	8.00	18.75
Past 5 Years	-0.30	11.10	8.10
Next 5 Years	NA	8.50	NA
PE	27.96	22.90	25.13
PEG Ratio	NA	2.69	NA

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Research for MSEX

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	41.00M	42.00M	186.00M	192.00M
# of Estimates	1	1	1	1
High Estimate	41.00M	42.00M	186.00M	192.00M
Low Estimate	41.00M	42.00M	186.00M	192.00M
Year ago Sales	38.60M	40.52M	166.27M	186.00M
Year over Year Growth Est.	6.22%	3.65%	11.86%	3.23%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.36	0.48	2.34	2.39
# of Estimates	1	1	1	1
Most Recent Consensus	NA	0.48	2.34	2.39
High Estimate	0.36	0.48	2.34	2.39
Low Estimate	0.36	0.48	2.34	2.39
Year ago EPS	0.32	0.59	1.76	2.34
Year over Year Growth Est.	12.50%	-18.64%	32.95%	2.14%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	1	1	1
Up Last 60 Days	0	1	1	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	0	0	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.36	0.48	2.34	2.39
7 Days Ago	0.36	0.48	2.34	2.39
30 Days Ago	0.36	0.45	2.21	2.36
60 Days Ago	0.36	0.45	2.21	2.36
90 Days Ago	0.36	0.45	2.21	2.36

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.36	0.48	2.34	2.39
Zacks Consensus Estimate	0.36	0.48	2.34	2.39
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.80	0.59	0.59	0.32	NA
Estimate	0.67	0.64	0.45	0.46	NA
Difference	0.13	-0.05	0.14	-0.14	0.02
Surprise	19.40%	-7.81%	31.11%	-30.43%	3.07%

Quarterly Estimates By Analyst

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	2/19/25
Current Quarter	0.55
EPS Last Quarter	1.18
Last EPS Surprise	0.00%
ABR	2.33

Earnings ESP	2.44%
Current Year	2.75
Next Year	2.98
EPS (TTM)	2.79
P/E (F1)	20.30

% EPS Growth Estimates	SJW	IND	S&P
Current Qtr (12/2024)	-6.78	-24.48	20.57
Next Qtr (03/2025)	22.22	-32.99	13.17
Current Year (12/2024)	2.61	8.40	12.40
Next Year (12/2025)	8.36	8.00	18.75
Past 5 Years	4.20	11.10	8.10
Next 5 Years	6.10	8.50	NA
PE	20.30	22.90	25.13
PEG Ratio	3.35	2.69	NA

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Research for SJW

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	175.92M	156.57M	715.23M	755.03M
# of Estimates	2	2	2	2
High Estimate	176.00M	157.00M	726.45M	758.00M
Low Estimate	175.83M	156.13M	704.00M	752.05M
Year ago Sales	171.34M	149.38M	670.36M	715.23M
Year over Year Growth Est.	2.67%	4.81%	6.69%	5.56%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.55	0.44	2.75	2.98
# of Estimates	3	2	4	4
Most Recent Consensus	0.57	0.40	2.74	2.96
High Estimate	0.57	0.47	2.77	3.08
Low Estimate	0.51	0.40	2.71	2.92
Year ago EPS	0.59	0.36	2.68	2.75
Year over Year Growth Est.	-6.78%	22.22%	2.61%	8.64%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	1	0	1
Up Last 60 Days	2	2	0	2
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	0	0	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.55	0.44	2.75	2.98
7 Days Ago	0.55	0.44	2.75	2.98
30 Days Ago	0.54	0.42	2.75	2.98
60 Days Ago	0.54	0.41	2.75	2.97
90 Days Ago	0.56	0.41	2.76	2.98

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.56	0.47	2.75	2.97
Zacks Consensus Estimate	0.55	0.44	2.75	2.98
Earnings ESP	2.44%	8.05%	0.00%	-0.42%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.18	0.66	0.36	0.59	NA
Estimate	1.18	0.57	0.35	0.60	NA
Difference	0.00	0.09	0.01	-0.01	0.02
Surprise	0.00%	15.79%	2.86%	-1.67%	4.25%

Annual Estimates By Analyst

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	2/6/25
Current Quarter	2.36
EPS Last Quarter	1.64
Last EPS Surprise	10.07%
ABR	1.95

Earnings ESP	0.07%
Current Year	7.43
Next Year	8.40
EPS (TTM)	6.75
P/E (F1)	31.95

% EPS Growth Estimates	AAPL	IND	S&P
Current Qtr (12/2024)	8.26	6.89	20.57
Next Qtr (03/2025)	9.80	9.57	13.17
Current Year (09/2025)	10.07	13.90	12.40
Next Year (09/2026)	13.06	18.80	18.75
Past 5 Years	16.80	8.50	8.10
Next 5 Years	13.70	13.20	NA
PE	31.95	18.00	25.13
PEG Ratio	2.33	1.36	NA

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Research for AAPL

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	124.10B	96.24B	412.80B	451.23B
# of Estimates	9	8	9	8
High Estimate	124.90B	100.79B	431.18B	476.04B
Low Estimate	123.06B	91.80B	401.69B	436.71B
Year ago Sales	119.58B	90.75B	391.04B	412.80B
Year over Year Growth Est.	3.78%	6.04%	5.57%	9.31%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	2.36	1.68	7.43	8.40
# of Estimates	11	8	12	9
Most Recent Consensus	2.23	1.65	7.24	8.36
High Estimate	2.50	1.78	7.85	9.35
Low Estimate	2.23	1.57	7.05	8.12
Year ago EPS	2.18	1.53	6.75	7.43
Year over Year Growth Est.	8.26%	9.80%	10.07%	13.04%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	2	1	3	3
Up Last 60 Days	2	1	3	3
Down Last 7 Days	0	1	1	1
Down Last 30 Days	5	5	7	1
Down Last 60 Days	5	5	7	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Current	2.36	1.68	7.43	8.40
7 Days Ago	2.36	1.69	7.43	8.40
30 Days Ago	2.36	1.70	7.48	8.52
60 Days Ago	2.38	1.73	7.55	8.60
90 Days Ago	2.39	1.73	7.55	8.60

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Most Accurate Estimate	2.36	1.70	7.48	8.28
Zacks Consensus Estimate	2.36	1.68	7.43	8.40
Earnings ESP	0.07%	1.14%	0.70%	-1.42%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.64	1.40	1.53	2.18	NA
Estimate	1.49	1.34	1.51	2.09	NA
Difference	0.15	0.06	0.02	0.09	0.08
Surprise	10.07%	4.48%	1.32%	4.31%	5.05%

Quarterly Estimates By Analyst

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	1/22/25
Current Quarter	1.34
EPS Last Quarter	1.21
Last EPS Surprise	0.83%
ABR	1.58

Earnings ESP	0.00%
Current Year	4.67
Next Year	5.14
EPS (TTM)	4.52
P/E (F1)	25.43

% EPS Growth Estimates	ABT	IND	S&P
Current Qtr (12/2024)	12.61	57.17	20.57
Next Qtr (03/2025)	14.29	268.75	13.17
Current Year (12/2024)	5.18	11.10	12.40
Next Year (12/2025)	10.06	21.80	18.75
Past 5 Years	9.00	4.30	8.10
Next 5 Years	9.10	14.70	NA
PE	25.43	-0.80	25.13
PEG Ratio	2.79	-0.05	NA

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Research for ABT

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	11.03B	10.62B	42.01B	44.91B
# of Estimates	8	6	8	8
High Estimate	11.10B	10.71B	42.08B	45.04B
Low Estimate	10.90B	10.50B	41.87B	44.72B
Year ago Sales	10.24B	9.96B	40.11B	42.01B
Year over Year Growth Est.	7.71%	6.55%	4.73%	6.90%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.34	1.12	4.67	5.14
# of Estimates	9	5	10	10
Most Recent Consensus	1.34	1.10	4.67	5.16
High Estimate	1.34	1.20	4.68	5.16
Low Estimate	1.33	1.09	4.66	5.10
Year ago EPS	1.19	0.98	4.44	4.67
Year over Year Growth Est.	12.61%	14.29%	5.18%	10.02%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	2	2	7	6
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	3	1	3	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	1.34	1.12	4.67	5.14
7 Days Ago	1.34	1.12	4.67	5.14
30 Days Ago	1.34	1.12	4.67	5.14
60 Days Ago	1.34	1.12	4.66	5.13
90 Days Ago	1.34	1.12	4.66	5.13

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.34	1.12	4.67	5.14
Zacks Consensus Estimate	1.34	1.12	4.67	5.14
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.21	1.14	0.98	1.19	NA
Estimate	1.20	1.10	0.96	1.19	NA
Difference	0.01	0.04	0.02	0.00	0.02
Surprise	0.83%	3.64%	2.08%	0.00%	1.64%

Quarterly Estimates By Analyst

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	2/4/25
Current Quarter	3.54
EPS Last Quarter	3.00
Last EPS Surprise	20.00%
ABR	2.00

Earnings ESP	0.00%
Current Year	15.41
Next Year	17.96
EPS (TTM)	16.44
P/E (F1)	14.74

% EPS Growth Estimates	AIZ	IND	S&P
Current Qtr (12/2024)	-22.71	17.55	20.57
Next Qtr (03/2025)	-2.93	-57.05	13.17
Current Year (12/2024)	-0.52	11.90	12.40
Next Year (12/2025)	16.55	14.80	18.75
Past 5 Years	20.20	9.00	8.10
Next 5 Years	NA	12.90	NA
PE	14.74	-15.60	25.13
PEG Ratio	NA	-1.21	NA

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Research for AIZ

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	3.05B	2.98B	11.87B	12.27B
# of Estimates	4	3	4	4
High Estimate	3.16B	3.04B	11.97B	12.68B
Low Estimate	2.94B	2.95B	11.76B	11.88B
Year ago Sales	3.00B	2.89B	11.20B	11.87B
Year over Year Growth Est.	1.74%	3.24%	5.98%	3.35%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	3.54	4.64	15.41	17.96
# of Estimates	4	4	4	4
Most Recent Consensus	3.66	4.59	15.52	17.70
High Estimate	3.73	4.75	15.60	18.80
Low Estimate	3.14	4.48	15.00	17.45
Year ago EPS	4.58	4.78	15.49	15.41
Year over Year Growth Est.	-22.71%	-2.93%	-0.52%	16.60%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	3	3	3	4
Up Last 60 Days	0	2	0	4
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	1	0
Down Last 60 Days	4	2	4	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	3.54	4.64	15.41	17.96
7 Days Ago	3.54	4.64	15.41	17.96
30 Days Ago	3.14	4.59	14.58	17.48
60 Days Ago	4.40	4.60	16.54	17.56
90 Days Ago	4.40	4.60	16.54	17.56

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	3.54	4.64	15.41	17.96
Zacks Consensus Estimate	3.54	4.64	15.41	17.96
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	3.00	4.08	4.78	4.58	NA
Estimate	2.50	3.58	3.87	3.70	NA
Difference	0.50	0.50	0.91	0.88	0.70
Surprise	20.00%	13.97%	23.51%	23.78%	20.32%

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	2/11/25
Current Quarter	1.55
EPS Last Quarter	1.59
Last EPS Surprise	0.00%
ABR	1.68

Earnings ESP	-0.61%
Current Year	6.36
Next Year	6.72
EPS (TTM)	6.50
P/E (F1)	14.79

% EPS Growth Estimates	AKAM	IND	S&P
Current Qtr (12/2024)	-8.28	31.44	20.57
Next Qtr (03/2025)	1.22	12.72	13.17
Current Year (12/2024)	2.58	10.30	12.40
Next Year (12/2025)	5.66	14.80	18.75
Past 5 Years	9.90	10.40	8.10
Next 5 Years	6.10	23.90	NA
PE	14.79	25.60	25.13
PEG Ratio	2.43	1.07	NA

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Research for AKAM

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.01B	1.04B	3.98B	4.26B
# of Estimates	6	7	7	7
High Estimate	1.02B	1.05B	3.99B	4.32B
Low Estimate	1.01B	1.03B	3.98B	4.21B
Year ago Sales	995.02M	986.97M	3.81B	3.98B
Year over Year Growth Est.	1.62%	5.37%	4.51%	6.82%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.55	1.66	6.36	6.72
# of Estimates	8	7	9	9
Most Recent Consensus	1.53	1.68	6.35	6.67
High Estimate	1.59	1.71	6.42	6.89
Low Estimate	1.50	1.61	6.26	6.53
Year ago EPS	1.69	1.64	6.20	6.36
Year over Year Growth Est.	-8.28%	1.22%	2.58%	5.66%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	1
Up Last 60 Days	0	0	0	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	5	4	7	6
Down Last 60 Days	5	4	7	6

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	1.55	1.66	6.36	6.72
7 Days Ago	1.55	1.66	6.36	6.72
30 Days Ago	1.61	1.69	6.43	6.88
60 Days Ago	1.61	1.69	6.43	6.88
90 Days Ago	1.61	1.69	6.43	6.88

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.54	1.65	6.35	6.69
Zacks Consensus Estimate	1.55	1.66	6.36	6.72
Earnings ESP	-0.61%	-0.45%	-0.13%	-0.36%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.59	1.58	1.64	1.69	NA
Estimate	1.59	1.54	1.61	1.59	NA
Difference	0.00	0.04	0.03	0.10	0.04
Surprise	0.00%	2.60%	1.86%	6.29%	2.69%

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	2/4/25
Current Quarter	0.90
EPS Last Quarter	0.82
Last EPS Surprise	0.00%
ABR	2.82

Earnings ESP	-1.48%
Current Year	3.78
Next Year	4.04
EPS (TTM)	3.85
P/E (F1)	19.73

% EPS Growth Estimates	AOS	IND	S&P
Current Qtr (12/2024)	-7.22	58.54	20.57
Next Qtr (03/2025)	-2.00	2.38	13.17
Current Year (12/2024)	-0.79	18.20	12.40
Next Year (12/2025)	6.88	17.40	18.75
Past 5 Years	10.20	7.50	8.10
Next 5 Years	10.00	12.20	NA
PE	19.73	20.70	25.13
PEG Ratio	1.97	1.70	NA

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Research for AOS

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	949.39M	991.81M	3.86B	3.96B
# of Estimates	5	3	5	5
High Estimate	969.80M	1.01B	3.88B	4.05B
Low Estimate	937.10M	976.80M	3.84B	3.90B
Year ago Sales	988.10M	978.80M	3.85B	3.86B
Year over Year Growth Est.	-3.92%	1.33%	0.07%	2.67%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.90	0.98	3.78	4.04
# of Estimates	6	4	6	6
Most Recent Consensus	0.87	0.96	3.75	3.96
High Estimate	0.92	1.00	3.80	4.15
Low Estimate	0.87	0.96	3.75	3.96
Year ago EPS	0.97	1.00	3.81	3.78
Year over Year Growth Est.	-7.22%	-2.00%	-0.79%	6.88%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	1
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	2	2	2	1
Down Last 60 Days	5	2	6	6

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.90	0.98	3.78	4.04
7 Days Ago	0.90	0.98	3.78	4.04
30 Days Ago	0.93	1.01	3.83	4.10
60 Days Ago	1.07	1.07	4.07	4.37
90 Days Ago	1.07	1.07	4.07	4.37

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.89	0.97	3.77	3.97
Zacks Consensus Estimate	0.90	0.98	3.78	4.04
Earnings ESP	-1.48%	-1.27%	-0.27%	-1.61%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.82	1.06	1.00	0.97	NA
Estimate	0.82	1.07	0.99	0.96	NA
Difference	0.00	-0.01	0.01	0.01	0.00
Surprise	0.00%	-0.93%	1.01%	1.04%	0.28%

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	2/3/25
Current Quarter	2.84
EPS Last Quarter	3.56
Last EPS Surprise	3.49%
ABR	1.86

Earnings ESP	0.00%
Current Year	13.07
Next Year	14.16
EPS (TTM)	12.43
P/E (F1)	25.58

% EPS Growth Estimates	APD	IND	S&P
Current Qtr (12/2024)	0.71	600.78	20.57
Next Qtr (03/2025)	5.96	-39.16	13.17
Current Year (09/2025)	5.15	3.70	12.40
Next Year (09/2026)	8.34	23.90	18.75
Past 5 Years	9.10	-1.20	8.10
Next 5 Years	7.80	15.50	NA
PE	25.58	21.80	25.13
PEG Ratio	3.28	1.41	NA

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Research for APD

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	2.99B	3.02B	12.42B	13.27B
# of Estimates	3	3	5	5
High Estimate	3.02B	3.03B	12.80B	13.77B
Low Estimate	2.95B	2.99B	12.21B	12.66B
Year ago Sales	3.00B	2.93B	12.10B	12.42B
Year over Year Growth Est.	-0.11%	2.95%	2.61%	6.89%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	2.84	3.02	13.07	14.16
# of Estimates	5	4	7	6
Most Recent Consensus	2.83	3.12	12.85	14.20
High Estimate	2.95	3.16	14.27	14.61
Low Estimate	2.79	2.80	12.70	13.80
Year ago EPS	2.82	2.85	12.43	13.07
Year over Year Growth Est.	0.71%	5.96%	5.15%	8.36%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	1	1
Up Last 60 Days	0	0	1	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	2	2	4	3
Down Last 60 Days	2	2	5	4

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Current	2.84	3.02	13.07	14.16
7 Days Ago	2.84	3.02	13.07	14.16
30 Days Ago	3.26	3.36	13.44	14.58
60 Days Ago	3.23	3.33	13.36	14.37
90 Days Ago	3.23	3.30	13.37	14.41

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Most Accurate Estimate	2.84	3.02	12.81	14.19
Zacks Consensus Estimate	2.84	3.02	13.07	14.16
Earnings ESP	0.00%	0.00%	-1.97%	0.23%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	3.56	3.20	2.85	2.82	NA
Estimate	3.44	3.04	2.72	2.99	NA
Difference	0.12	0.16	0.13	-0.17	0.06
Surprise	3.49%	5.26%	4.78%	-5.69%	1.96%

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Trading Services

	*BMO 12/10/24
Current Quarter	33.60
EPS Last Quarter	48.11
Last EPS Surprise	-9.75%
ABR	1.50

Earnings ESP	0.00%
Current Year	158.09
Next Year	177.30
EPS (TTM)	146.24
P/E (F1)	20.05

*BMO = Before Market Open *AMC = After Market Close

% EPS Growth Estimates	AZO	IND	S&P
Current Qtr (11/2024)	3.23	-10.82	20.57
Next Qtr (02/2025)	4.64	6.64	13.17
Current Year (08/2025)	8.18	0.00	12.40
Next Year (08/2026)	12.15	20.00	18.75
Past 5 Years	18.50	0.00	8.10
Next 5 Years	12.50	13.80	NA
PE	20.05	11.00	25.13
PEG Ratio	1.60	0.80	NA

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Research for AZO

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Zacks Consensus Estimate	4.30B	3.99B	18.80B	19.82B
# of Estimates	9	9	10	10
High Estimate	4.33B	4.08B	19.07B	20.18B
Low Estimate	4.26B	3.95B	18.42B	19.29B
Year ago Sales	4.19B	3.86B	18.49B	18.80B
Year over Year Growth Est.	2.61%	3.46%	1.69%	5.40%

Earnings Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Zacks Consensus Estimate	33.60	30.23	158.09	177.30
# of Estimates	13	10	13	11
Most Recent Consensus	32.64	30.90	159.26	181.69
High Estimate	34.78	31.65	182.46	184.74
Low Estimate	32.04	28.68	151.34	167.18
Year ago EPS	32.55	28.89	146.14	158.09
Year over Year Growth Est.	3.23%	4.64%	8.18%	12.15%

Agreement - Estimate Revisions

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	1	1	1	1

Magnitude - Consensus Estimate Trend

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Current	33.60	30.23	158.09	177.30
7 Days Ago	33.60	30.23	158.09	177.30
30 Days Ago	33.60	30.23	158.09	177.30
60 Days Ago	33.86	30.22	158.25	177.40
90 Days Ago	36.22	31.45	163.56	183.40

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Most Accurate Estimate	33.60	30.23	158.09	177.30
Zacks Consensus Estimate	33.60	30.23	158.09	177.30
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (8/2024)	Quarter Ending (5/2024)	Quarter Ending (2/2024)	Quarter Ending (11/2023)	Average Surprise
Reported	48.11	36.69	28.89	32.55	NA
Estimate	53.31	35.67	26.08	31.01	NA
Difference	-5.20	1.02	2.81	1.54	0.04
Surprise	-9.75%	2.86%	10.77%	4.97%	2.21%

Quarterly Estimates By Analyst

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	1/24/25
Current Quarter	1.47
EPS Last Quarter	1.81
Last EPS Surprise	22.30%
ABR	2.40

Earnings ESP	1.39%
Current Year	6.20
Next Year	6.90
EPS (TTM)	5.93
P/E (F1)	23.89

% EPS Growth Estimates	BAH	IND	S&P
Current Qtr (12/2024)	4.26	25.57	20.57
Next Qtr (03/2025)	18.80	24.85	13.17
Current Year (03/2025)	12.73	4.10	12.40
Next Year (03/2026)	11.29	10.90	18.75
Past 5 Years	15.60	14.00	8.10
Next 5 Years	13.30	15.20	NA
PE	23.89	30.70	25.13
PEG Ratio	1.80	2.02	NA

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Research for BAH

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Zacks Consensus Estimate	2.84B	3.08B	12.01B	12.82B
# of Estimates	6	6	5	6
High Estimate	2.86B	3.13B	12.06B	12.99B
Low Estimate	2.81B	3.03B	11.94B	12.63B
Year ago Sales	2.57B	2.77B	10.66B	12.01B
Year over Year Growth Est.	10.41%	11.21%	12.61%	6.74%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Zacks Consensus Estimate	1.47	1.58	6.20	6.90
# of Estimates	7	6	7	7
Most Recent Consensus	1.47	1.71	6.21	6.75
High Estimate	1.57	1.71	6.36	7.15
Low Estimate	1.43	1.53	5.85	6.71
Year ago EPS	1.41	1.33	5.50	6.20
Year over Year Growth Est.	4.26%	18.80%	12.73%	11.24%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	2	1	4	4
Up Last 60 Days	2	1	6	6
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	1	0	0
Down Last 60 Days	1	3	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Current	1.47	1.58	6.20	6.90
7 Days Ago	1.47	1.58	6.20	6.90
30 Days Ago	1.46	1.60	6.01	6.71
60 Days Ago	1.46	1.64	5.95	6.68
90 Days Ago	1.47	1.61	5.94	6.68

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Most Accurate Estimate	1.49	1.55	6.25	6.99
Zacks Consensus Estimate	1.47	1.58	6.20	6.90
Earnings ESP	1.39%	-2.10%	0.80%	1.27%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.81	1.38	1.33	1.41	NA
Estimate	1.48	1.52	1.22	1.13	NA
Difference	0.33	-0.14	0.11	0.28	0.15
Surprise	22.30%	-9.21%	9.02%	24.78%	11.72%

Quarterly Estimates By Analyst

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	2/13/25
Current Quarter	0.52
EPS Last Quarter	0.80
Last EPS Surprise	2.56%
ABR	2.75

Earnings ESP	0.00%
Current Year	1.98
Next Year	2.59
EPS (TTM)	3.01
P/E (F1)	17.00

% EPS Growth Estimates	BAX	IND	S&P
Current Qtr (12/2024)	-40.91	57.17	20.57
Next Qtr (03/2025)	-23.08	268.75	13.17
Current Year (12/2024)	-23.85	11.10	12.40
Next Year (12/2025)	30.81	21.80	18.75
Past 5 Years	-2.50	4.30	8.10
Next 5 Years	1.30	14.70	NA
PE	17.00	-0.80	25.13
PEG Ratio	13.39	-0.05	NA

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Research for BAX

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.67B	2.62B	10.55B	11.27B
# of Estimates	5	2	5	5
High Estimate	2.69B	2.64B	10.57B	11.37B
Low Estimate	2.63B	2.60B	10.51B	11.02B
Year ago Sales	3.89B	3.59B	14.95B	10.55B
Year over Year Growth Est.	-31.34%	-27.00%	-29.42%	6.79%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.52	0.50	1.98	2.59
# of Estimates	6	2	7	7
Most Recent Consensus	0.51	0.50	1.82	2.49
High Estimate	0.52	0.50	2.93	3.15
Low Estimate	0.51	0.50	1.82	2.46
Year ago EPS	0.88	0.65	2.60	1.98
Year over Year Growth Est.	-40.91%	-23.08%	-23.85%	30.79%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	5	2	6	5
Down Last 60 Days	5	2	6	5

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.52	0.50	1.98	2.59
7 Days Ago	0.52	0.50	1.98	2.59
30 Days Ago	0.87	0.67	2.96	3.11
60 Days Ago	0.87	0.67	2.96	3.11
90 Days Ago	0.87	0.67	2.96	3.11

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.52	0.50	1.83	2.50
Zacks Consensus Estimate	0.52	0.50	1.98	2.59
Earnings ESP	0.00%	0.00%	-7.96%	-3.74%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.80	0.68	0.65	0.88	NA
Estimate	0.78	0.66	0.61	0.86	NA
Difference	0.02	0.02	0.04	0.02	0.03
Surprise	2.56%	3.03%	6.56%	2.33%	3.62%

Quarterly Estimates By Analyst

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	2/21/25
Current Quarter	1.11
EPS Last Quarter	1.03
Last EPS Surprise	0.00%
ABR	1.00

Earnings ESP	-0.45%
Current Year	4.19
Next Year	4.65
EPS (TTM)	3.72
P/E (F1)	43.13

% EPS Growth Estimates	BCPC	IND	S&P
Current Qtr (12/2024)	35.37	338.96	20.57
Next Qtr (03/2025)	26.97	31.09	13.17
Current Year (12/2024)	25.07	10.80	12.40
Next Year (12/2025)	10.98	9.10	18.75
Past 5 Years	2.90	4.70	8.10
Next 5 Years	8.00	12.80	NA
PE	43.13	17.70	25.13
PEG Ratio	5.39	1.38	NA

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Research for BCPC

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	242.90M	249.45M	956.60M	1.03B
# of Estimates	2	2	2	2
High Estimate	249.70M	254.00M	963.40M	1.07B
Low Estimate	236.10M	244.90M	949.80M	998.80M
Year ago Sales	228.70M	239.66M	922.44M	956.60M
Year over Year Growth Est.	6.21%	4.08%	3.70%	7.92%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.11	1.13	4.19	4.65
# of Estimates	2	2	2	2
Most Recent Consensus	1.10	1.06	4.01	4.47
High Estimate	1.11	1.19	4.36	4.82
Low Estimate	1.10	1.06	4.01	4.47
Year ago EPS	0.82	0.89	3.35	4.19
Year over Year Growth Est.	35.37%	26.97%	25.07%	10.98%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	1	1	1
Up Last 60 Days	1	2	2	2
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	1	0	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	1.11	1.13	4.19	4.65
7 Days Ago	1.11	1.13	4.19	4.65
30 Days Ago	1.05	1.12	4.09	4.61
60 Days Ago	1.06	1.11	3.96	4.61
90 Days Ago	1.06	1.11	3.96	4.61

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.10	1.06	4.01	4.47
Zacks Consensus Estimate	1.11	1.13	4.19	4.65
Earnings ESP	-0.45%	-5.78%	-4.18%	-3.77%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.03	0.98	0.89	0.82	NA
Estimate	1.03	0.95	0.94	0.87	NA
Difference	0.00	0.03	-0.05	-0.05	-0.02
Surprise	0.00%	3.16%	-5.32%	-5.75%	-1.98%

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	2/6/25
Current Quarter	2.98
EPS Last Quarter	3.81
Last EPS Surprise	1.06%
ABR	1.29

Earnings ESP	0.00%
Current Year	14.43
Next Year	15.68
EPS (TTM)	13.16
P/E (F1)	15.38

% EPS Growth Estimates	BDX	IND	S&P
Current Qtr (12/2024)	11.19	119.51	20.57
Next Qtr (03/2025)	8.83	64.71	13.17
Current Year (09/2025)	9.82	7.10	12.40
Next Year (09/2026)	8.66	10.70	18.75
Past 5 Years	3.70	13.40	8.10
Next 5 Years	9.30	9.70	NA
PE	15.38	34.10	25.13
PEG Ratio	1.65	3.52	NA

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Research for BDX

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	5.10B	5.44B	22.00B	23.01B
# of Estimates	8	8	7	8
High Estimate	5.15B	5.49B	22.09B	23.33B
Low Estimate	5.00B	5.31B	21.95B	22.40B
Year ago Sales	4.71B	5.05B	20.18B	22.00B
Year over Year Growth Est.	8.39%	7.73%	9.04%	4.58%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	2.98	3.45	14.43	15.68
# of Estimates	9	8	11	8
Most Recent Consensus	2.99	3.45	14.40	15.70
High Estimate	3.00	3.52	14.52	15.93
Low Estimate	2.93	3.40	14.35	15.51
Year ago EPS	2.68	3.17	13.14	14.43
Year over Year Growth Est.	11.19%	8.83%	9.82%	8.65%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Up Last 7 Days	1	1	1	1
Up Last 30 Days	2	1	10	5
Up Last 60 Days	2	2	10	5
Down Last 7 Days	0	0	0	0
Down Last 30 Days	4	5	1	1
Down Last 60 Days	4	4	1	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Current	2.98	3.45	14.43	15.68
7 Days Ago	2.97	3.45	14.40	15.65
30 Days Ago	3.03	3.48	14.30	15.58
60 Days Ago	3.03	3.47	14.29	15.54
90 Days Ago	3.00	3.46	14.26	15.48

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Most Accurate Estimate	2.98	3.45	14.43	15.68
Zacks Consensus Estimate	2.98	3.45	14.43	15.68
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	3.81	3.50	3.17	2.68	NA
Estimate	3.77	3.31	2.96	2.39	NA
Difference	0.04	0.19	0.21	0.29	0.18
Surprise	1.06%	5.74%	7.09%	12.13%	6.51%

Quarterly Estimates By Analyst

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Exp Earnings Date	2/27/25
Current Quarter	NA
EPS Last Quarter	1.12
Last EPS Surprise	1.82%
ABR	1.00

Earnings ESP	NA
Current Year	NA
Next Year	NA
EPS (TTM)	4.33
P/E (F1)	16.46

% EPS Growth Estimates	BRC	IND	S&P
Current Qtr (01/2025)	NA	-34.71	20.57
Next Qtr (04/2025)	NA	-38.43	13.17
Current Year (07/2025)	7.80	12.00	12.40
Next Year (07/2026)	NA	16.10	18.80
Past 5 Years	13.80	18.10	8.10
Next 5 Years	NA	14.90	NA
PE	16.46	24.70	25.10
PEG Ratio	NA	1.66	NA

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Research for BRC

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (1/2025)	Next Qtr (4/2025)	Current Year (7/2025)	Next Year (7/2026)
Zacks Consensus Estimate	NA	NA	NA	NA
# of Estimates	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago Sales	322.62M	343.38M	1.34B	NA
Year over Year Growth Est.	NA	NA	NA	NA

Earnings Estimates

	Current Qtr (1/2025)	Next Qtr (4/2025)	Current Year (7/2025)	Next Year (7/2026)
Zacks Consensus Estimate	NA	NA	4.55	NA
# of Estimates	0	0	1	0
Most Recent Consensus	NA	NA	NA	NA
High Estimate	NA	NA	4.70	NA
Low Estimate	NA	NA	4.40	NA
Year ago EPS	0.93	1.09	4.22	4.55
Year over Year Growth Est.	NA	NA	7.82%	NA

Agreement - Estimate Revisions

	Current Qtr (1/2025)	Next Qtr (4/2025)	Current Year (7/2025)	Next Year (7/2026)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (1/2025)	Next Qtr (4/2025)	Current Year (7/2025)	Next Year (7/2026)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	4.55	4.70
60 Days Ago	NA	NA	4.55	4.70
90 Days Ago	NA	NA	4.35	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (1/2025)	Next Qtr (4/2025)	Current Year (7/2025)	Next Year (7/2026)
Most Accurate Estimate	NA	NA	4.55	NA
Zacks Consensus Estimate	NA	NA	4.55	NA
Earnings ESP	NA	NA	0.00%	NA

Surprise - Reported Earnings History

	Quarter Ending (10/2024)	Quarter Ending (7/2024)	Quarter Ending (4/2024)	Quarter Ending (1/2024)	Average Surprise
Reported	1.12	1.19	1.09	0.93	NA
Estimate	1.10	1.11	1.02	0.92	NA
Difference	0.02	0.08	0.07	0.01	0.05
Surprise	1.82%	7.21%	6.86%	1.09%	4.25%

Annual Estimates By Analyst

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	2/25/25
Current Quarter	0.82
EPS Last Quarter	0.83
Last EPS Surprise	7.79%
ABR	1.75

Earnings ESP	1.12%
Current Year	3.23
Next Year	3.42
EPS (TTM)	3.42
P/E (F1)	40.49

% EPS Growth Estimates	BWXT	IND	S&P
Current Qtr (12/2024)	-18.81	-59.22	20.57
Next Qtr (03/2025)	-6.58	21.80	13.17
Current Year (12/2024)	6.95	2.70	12.40
Next Year (12/2025)	5.88	15.70	18.75
Past 5 Years	5.10	4.70	8.10
Next 5 Years	9.20	16.70	NA
PE	40.49	18.80	25.13
PEG Ratio	4.38	1.13	NA

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Research for BWXT

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	739.32M	633.17M	2.70B	2.86B
# of Estimates	3	1	3	3
High Estimate	746.00M	633.17M	2.70B	2.89B
Low Estimate	726.08M	633.17M	2.68B	2.84B
Year ago Sales	725.52M	603.97M	2.50B	2.70B
Year over Year Growth Est.	1.90%	4.84%	8.02%	6.05%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.82	0.71	3.23	3.42
# of Estimates	4	2	4	4
Most Recent Consensus	NA	NA	3.20	3.43
High Estimate	0.89	0.71	3.30	3.45
Low Estimate	0.79	0.70	3.20	3.39
Year ago EPS	1.01	0.76	3.02	3.23
Year over Year Growth Est.	-18.81%	-6.58%	6.95%	5.76%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	1	4	4
Up Last 60 Days	0	1	4	4
Down Last 7 Days	0	0	0	0
Down Last 30 Days	2	1	0	0
Down Last 60 Days	2	1	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.82	0.71	3.23	3.42
7 Days Ago	0.82	0.71	3.23	3.42
30 Days Ago	0.85	0.73	3.20	3.37
60 Days Ago	0.84	0.73	3.20	3.37
90 Days Ago	0.84	0.73	3.20	3.37

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.83	0.71	3.23	3.42
Zacks Consensus Estimate	0.82	0.71	3.23	3.42
Earnings ESP	1.12%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.83	0.82	0.76	1.01	NA
Estimate	0.77	0.76	0.67	0.94	NA
Difference	0.06	0.06	0.09	0.07	0.07
Surprise	7.79%	7.89%	13.43%	7.45%	9.14%

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	1/22/25
Current Quarter	5.22
EPS Last Quarter	5.93
Last EPS Surprise	16.73%
ABR	1.55

Earnings ESP	0.94%
Current Year	23.33
Next Year	26.56
EPS (TTM)	22.64
P/E (F1)	19.71

% EPS Growth Estimates	CACI	IND	S&P
Current Qtr (12/2024)	19.72	-1.58	20.57
Next Qtr (03/2025)	1.22	-5.11	13.17
Current Year (06/2025)	10.83	4.30	12.40
Next Year (06/2026)	13.84	22.30	18.75
Past 5 Years	15.20	11.60	8.10
Next 5 Years	13.80	14.90	NA
PE	19.71	26.70	25.13
PEG Ratio	1.43	1.79	NA

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Style Scores	

B Value | B Growth | A Momentum | A VGM

Earnings ESP 0.94%

Research Reports for CACI Analyst | Snapshot

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Research for CACI

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Zacks Consensus Estimate	1.94B	2.13B	8.35B	8.79B
# of Estimates	4	4	3	4
High Estimate	1.98B	2.17B	8.47B	8.96B
Low Estimate	1.91B	2.06B	8.20B	8.40B
Year ago Sales	1.83B	1.94B	7.66B	8.35B
Year over Year Growth Est.	5.64%	9.75%	9.00%	5.26%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Zacks Consensus Estimate	5.22	5.81	23.33	26.56
# of Estimates	5	4	6	5
Most Recent Consensus	5.15	5.80	23.03	25.83
High Estimate	5.37	5.94	23.90	27.50
Low Estimate	5.02	5.64	22.70	25.83

Year ago EPS	4.36	5.74	21.05	23.33
Year over Year Growth Est.	19.72%	1.22%	10.83%	13.87%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	0	4	4
Up Last 60 Days	2	0	5	5
Down Last 7 Days	0	0	0	0
Down Last 30 Days	3	3	1	0
Down Last 60 Days	2	4	1	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Current	5.22	5.81	23.33	26.56
7 Days Ago	5.22	5.81	23.33	26.56
30 Days Ago	5.24	5.99	23.13	25.70
60 Days Ago	5.35	6.07	23.01	25.20
90 Days Ago	5.37	6.11	23.04	25.33

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Most Accurate Estimate	5.27	5.77	23.45	26.61
Zacks Consensus Estimate	5.22	5.81	23.33	26.56
Earnings ESP	0.94%	-0.73%	0.54%	0.15%

Surprise - Reported Earnings History

	Quarter Ending	Quarter Ending	Quarter Ending	Quarter Ending	Average Surprise

	(9/2024)	(6/2024)	(3/2024)	(12/2023)	
Reported	5.93	6.61	5.74	4.36	NA
Estimate	5.08	5.90	5.52	4.50	NA
Difference	0.85	0.71	0.22	-0.14	0.41
Surprise	16.73%	12.03%	3.99%	-3.11%	7.41%

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	AMC 12/9/24
Current Quarter	4.24
EPS Last Quarter	4.83
Last EPS Surprise	6.39%
ABR	2.00

Earnings ESP	1.50%
Current Year	14.22
Next Year	15.55
EPS (TTM)	13.74
P/E (F1)	29.60

*BMO = Before Market Open *AMC = After Market Close

% EPS Growth Estimates	CASY	IND	S&P
Current Qtr (10/2024)	0.00	-1.01	20.57
Next Qtr (01/2025)	9.44	8.98	13.17
Current Year (04/2025)	5.88	-0.80	12.40
Next Year (04/2026)	9.35	10.40	18.75
Past 5 Years	19.40	28.50	8.10
Next 5 Years	NA	NA	NA
PE	29.60	26.40	25.13
PEG Ratio	NA	NA	NA

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Research for CASY

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (10/2024)	Next Qtr (1/2025)	Current Year (4/2025)	Next Year (4/2026)
Zacks Consensus Estimate	4.01B	3.98B	16.02B	17.38B
# of Estimates	5	3	3	3
High Estimate	4.21B	4.10B	16.09B	17.55B
Low Estimate	3.94B	3.88B	15.90B	17.09B
Year ago Sales	4.06B	3.33B	14.86B	16.02B
Year over Year Growth Est.	-1.43%	19.67%	7.81%	8.45%

Earnings Estimates

	Current Qtr (10/2024)	Next Qtr (1/2025)	Current Year (4/2025)	Next Year (4/2026)
Zacks Consensus Estimate	4.24	2.55	14.22	15.55
# of Estimates	5	3	3	3
Most Recent Consensus	4.17	NA	NA	NA
High Estimate	4.50	2.71	14.38	16.17
Low Estimate	4.10	2.34	13.98	15.20
Year ago EPS	4.24	2.33	13.43	14.22
Year over Year Growth Est.	0.00%	9.44%	5.88%	9.35%

Agreement - Estimate Revisions

	Current Qtr (10/2024)	Next Qtr (1/2025)	Current Year (4/2025)	Next Year (4/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	2	1	2
Up Last 60 Days	1	2	1	2
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	0	1	0
Down Last 60 Days	1	0	1	0

Magnitude - Consensus Estimate Trend

	Current Qtr (10/2024)	Next Qtr (1/2025)	Current Year (4/2025)	Next Year (4/2026)
Current	4.24	2.55	14.22	15.55
7 Days Ago	4.24	2.55	14.22	15.55
30 Days Ago	4.23	2.45	14.01	15.49
60 Days Ago	4.23	2.45	14.01	15.49
90 Days Ago	4.41	2.41	13.65	15.60

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (10/2024)	Next Qtr (1/2025)	Current Year (4/2025)	Next Year (4/2026)
Most Accurate Estimate	4.30	2.53	14.14	15.68
Zacks Consensus Estimate	4.24	2.55	14.22	15.55
Earnings ESP	1.50%	-0.98%	-0.56%	0.87%

Surprise - Reported Earnings History

	Quarter Ending (7/2024)	Quarter Ending (4/2024)	Quarter Ending (1/2024)	Quarter Ending (10/2023)	Average Surprise
Reported	4.83	2.34	2.33	4.24	NA
Estimate	4.54	1.70	2.20	3.74	NA
Difference	0.29	0.64	0.13	0.50	0.39
Surprise	6.39%	37.65%	5.91%	13.37%	15.83%

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	2/4/25
Current Quarter	2.66
EPS Last Quarter	2.25
Last EPS Surprise	0.00%
ABR	2.39

Earnings ESP	-0.09%
Current Year	9.10
Next Year	9.92
EPS (TTM)	9.03
P/E (F1)	20.00

% EPS Growth Estimates	CHKP	IND	S&P
Current Qtr (12/2024)	3.50	11.68	20.57
Next Qtr (03/2025)	9.31	36.16	13.17
Current Year (12/2024)	8.08	15.40	12.40
Next Year (12/2025)	9.01	20.90	18.75
Past 5 Years	7.10	7.70	8.10
Next 5 Years	7.50	16.40	NA
PE	20.00	219.80	25.13
PEG Ratio	2.68	13.40	NA

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Research for CHKP

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	698.49M	632.79M	2.56B	2.71B
# of Estimates	12	11	12	12
High Estimate	709.00M	636.50M	2.57B	2.75B
Low Estimate	695.00M	623.70M	2.55B	2.66B
Year ago Sales	663.50M	598.80M	2.41B	2.56B
Year over Year Growth Est.	5.27%	5.68%	6.00%	5.75%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.66	2.23	9.10	9.92
# of Estimates	12	10	12	12
Most Recent Consensus	2.65	2.21	9.10	9.92
High Estimate	2.69	2.31	9.13	10.26
Low Estimate	2.64	2.11	9.09	9.57
Year ago EPS	2.57	2.04	8.42	9.10
Year over Year Growth Est.	3.50%	9.31%	8.08%	8.98%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	7	1	8	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	1	1
Down Last 60 Days	4	8	4	10

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	2.66	2.23	9.10	9.92
7 Days Ago	2.66	2.23	9.11	9.92
30 Days Ago	2.66	2.23	9.11	9.93
60 Days Ago	2.62	2.27	9.07	10.02
90 Days Ago	2.62	2.27	9.07	10.02

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	2.65	2.14	9.10	9.89
Zacks Consensus Estimate	2.66	2.23	9.10	9.92
Earnings ESP	-0.09%	-3.99%	-0.02%	-0.29%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	2.25	2.17	2.04	2.57	NA
Estimate	2.25	2.16	2.01	2.46	NA
Difference	0.00	0.01	0.03	0.11	0.04
Surprise	0.00%	0.46%	1.49%	4.47%	1.61%

Annual Estimates By Analyst

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	1/29/25
Current Quarter	3.50
EPS Last Quarter	3.34
Last EPS Surprise	4.05%
ABR	1.67

Earnings ESP	0.00%
Current Year	14.93
Next Year	16.36
EPS (TTM)	13.76
P/E (F1)	16.85

% EPS Growth Estimates	COR	IND	S&P
Current Qtr (12/2024)	6.71	179.14	20.57
Next Qtr (03/2025)	9.74	91.92	13.17
Current Year (09/2025)	8.50	5.10	12.40
Next Year (09/2026)	9.58	13.50	18.75
Past 5 Years	13.80	9.90	8.10
Next 5 Years	10.10	11.80	NA
PE	16.85	-0.60	25.13
PEG Ratio	1.67	-0.05	NA

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Research for COR

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

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Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	77.79B	74.02B	315.90B	337.69B
# of Estimates	6	6	6	6
High Estimate	78.65B	75.01B	318.93B	347.25B
Low Estimate	75.91B	72.63B	307.75B	327.43B
Year ago Sales	72.25B	68.41B	293.96B	315.90B
Year over Year Growth Est.	7.66%	8.20%	7.46%	6.90%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	3.50	4.17	14.93	16.36
# of Estimates	7	6	7	7
Most Recent Consensus	3.45	4.12	14.99	17.08
High Estimate	3.56	4.25	14.99	17.08
Low Estimate	3.42	4.11	14.82	16.07
Year ago EPS	3.28	3.80	13.76	14.93
Year over Year Growth Est.	6.71%	9.74%	8.50%	9.58%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Up Last 7 Days	1	1	1	2
Up Last 30 Days	4	5	6	6
Up Last 60 Days	4	5	6	6
Down Last 7 Days	0	0	1	0
Down Last 30 Days	1	0	1	0
Down Last 60 Days	1	0	1	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Current	3.50	4.17	14.93	16.36
7 Days Ago	3.48	4.15	14.90	16.31
30 Days Ago	3.46	4.11	14.75	16.09
60 Days Ago	3.47	4.04	14.76	16.07
90 Days Ago	3.49	4.04	14.87	16.11

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Most Accurate Estimate	3.50	4.17	14.93	16.36
Zacks Consensus Estimate	3.50	4.17	14.93	16.36
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	3.34	3.34	3.80	3.28	NA
Estimate	3.21	3.18	3.65	2.86	NA
Difference	0.13	0.16	0.15	0.42	0.22
Surprise	4.05%	5.03%	4.11%	14.69%	6.97%

Quarterly Estimates By Analyst

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	2/5/25
Current Quarter	1.22
EPS Last Quarter	1.06
Last EPS Surprise	-1.85%
ABR	1.33

Earnings ESP	0.00%
Current Year	4.31
Next Year	4.58
EPS (TTM)	4.01
P/E (F1)	12.71

% EPS Growth Estimates	CSGS	IND	S&P
Current Qtr (12/2024)	32.61	-1.58	20.57
Next Qtr (03/2025)	1.98	-5.11	13.17
Current Year (12/2024)	16.80	4.30	12.40
Next Year (12/2025)	6.26	22.30	18.75
Past 5 Years	3.10	11.60	8.10
Next 5 Years	10.00	14.90	NA
PE	12.71	26.70	25.13
PEG Ratio	1.27	1.79	NA

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Research for CSGS

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	296.52M	282.60M	1.12B	1.14B
# of Estimates	5	4	5	5
High Estimate	319.60M	311.10M	1.20B	1.23B
Low Estimate	283.10M	266.60M	1.09B	1.11B
Year ago Sales	273.36M	270.07M	1.10B	1.12B
Year over Year Growth Est.	8.47%	4.64%	1.41%	2.18%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.22	1.03	4.31	4.58
# of Estimates	5	4	6	5
Most Recent Consensus	1.17	0.98	4.31	4.42
High Estimate	1.29	1.10	4.38	4.78
Low Estimate	1.17	0.96	4.25	4.42
Year ago EPS	0.92	1.01	3.69	4.31
Year over Year Growth Est.	32.61%	1.98%	16.80%	6.13%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	5	2	5	4
Up Last 60 Days	5	2	5	4
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	2	1	1
Down Last 60 Days	0	2	1	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	1.22	1.03	4.31	4.58
7 Days Ago	1.22	1.03	4.31	4.58
30 Days Ago	1.16	1.03	4.26	4.51
60 Days Ago	1.16	1.03	4.26	4.51
90 Days Ago	1.16	1.03	4.26	4.51

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.22	1.03	4.31	4.58
Zacks Consensus Estimate	1.22	1.03	4.31	4.58
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.06	1.02	1.01	0.92	NA
Estimate	1.08	0.91	0.93	0.87	NA
Difference	-0.02	0.11	0.08	0.05	0.06
Surprise	-1.85%	12.09%	8.60%	5.75%	6.15%

Quarterly Estimates By Analyst

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	2/6/25
Current Quarter	1.29
EPS Last Quarter	2.26
Last EPS Surprise	3.20%
ABR	2.67

Earnings ESP	0.00%
Current Year	8.22
Next Year	9.59
EPS (TTM)	7.84
P/E (F1)	51.39

% EPS Growth Estimates	CSWI	IND	S&P
Current Qtr (12/2024)	20.56	338.96	20.57
Next Qtr (03/2025)	9.31	31.09	13.17
Current Year (03/2025)	17.26	10.80	12.40
Next Year (03/2026)	16.67	9.10	18.75
Past 5 Years	20.70	4.70	8.10
Next 5 Years	NA	12.80	NA
PE	51.39	17.70	25.13
PEG Ratio	NA	1.38	NA

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Research for CSWI

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Zacks Consensus Estimate	188.00M	228.00M	870.00M	930.00M
# of Estimates	1	1	1	1
High Estimate	188.00M	228.00M	870.00M	930.00M
Low Estimate	188.00M	228.00M	870.00M	930.00M
Year ago Sales	174.97M	210.86M	792.84M	870.00M
Year over Year Growth Est.	7.45%	8.13%	9.73%	6.90%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Zacks Consensus Estimate	1.29	2.23	8.22	9.59
# of Estimates	1	1	1	1
Most Recent Consensus	NA	NA	NA	NA
High Estimate	1.29	2.23	8.22	9.59
Low Estimate	1.29	2.23	8.22	9.59
Year ago EPS	1.07	2.04	7.01	8.22
Year over Year Growth Est.	20.56%	9.31%	17.26%	16.67%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	1
Up Last 60 Days	0	0	0	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	1	0
Down Last 60 Days	1	1	1	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Current	1.29	2.23	8.22	9.59
7 Days Ago	1.29	2.23	8.22	9.59
30 Days Ago	1.47	2.31	8.42	9.65
60 Days Ago	1.47	2.31	8.42	9.65
90 Days Ago	1.43	2.31	8.45	9.75

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Most Accurate Estimate	1.29	2.23	8.22	9.59
Zacks Consensus Estimate	1.29	2.23	8.22	9.59
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	2.26	2.47	2.04	1.07	NA
Estimate	2.19	2.19	1.86	1.17	NA
Difference	0.07	0.28	0.18	-0.10	0.11
Surprise	3.20%	12.79%	9.68%	-8.55%	4.28%

Annual Estimates By Analyst

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	2/5/25
Current Quarter	1.11
EPS Last Quarter	1.09
Last EPS Surprise	1.87%
ABR	1.82

Earnings ESP	0.00%
Current Year	5.37
Next Year	6.25
EPS (TTM)	6.35
P/E (F1)	11.14

% EPS Growth Estimates	CVS	IND	S&P
Current Qtr (12/2024)	-47.64	-6.02	20.57
Next Qtr (03/2025)	7.63	145.98	13.17
Current Year (12/2024)	-38.56	-39.10	12.40
Next Year (12/2025)	16.39	8.50	18.75
Past 5 Years	5.50	-3.70	8.10
Next 5 Years	10.90	11.60	NA
PE	11.14	7.40	25.13
PEG Ratio	1.02	0.64	NA

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Research for CVS

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	97.34B	93.97B	372.03B	389.27B
# of Estimates	9	8	9	9
High Estimate	98.87B	95.40B	373.97B	403.57B
Low Estimate	92.92B	91.72B	368.02B	375.74B
Year ago Sales	93.81B	88.44B	357.78B	372.03B
Year over Year Growth Est.	3.76%	6.25%	3.98%	4.63%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.11	1.41	5.37	6.25
# of Estimates	11	8	13	12
Most Recent Consensus	1.24	1.33	5.47	6.28
High Estimate	1.61	1.73	5.85	7.15
Low Estimate	0.45	1.29	4.68	5.43
Year ago EPS	2.12	1.31	8.74	5.37
Year over Year Growth Est.	-47.64%	7.63%	-38.56%	16.35%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	1	1	1
Up Last 60 Days	1	1	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	8	6	12	11
Down Last 60 Days	8	4	13	12

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	1.11	1.41	5.37	6.25
7 Days Ago	1.11	1.41	5.37	6.25
30 Days Ago	1.73	1.51	6.41	7.15
60 Days Ago	1.65	1.53	6.51	7.28
90 Days Ago	1.67	1.58	6.56	7.34

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.11	1.39	5.37	6.25
Zacks Consensus Estimate	1.11	1.41	5.37	6.25
Earnings ESP	0.00%	-1.13%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.09	1.83	1.31	2.12	NA
Estimate	1.07	1.74	1.69	2.01	NA
Difference	0.02	0.09	-0.38	0.11	-0.04
Surprise	1.87%	5.17%	-22.49%	5.47%	-2.50%

Quarterly Estimates By Analyst

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	2/20/25
Current Quarter	0.17
EPS Last Quarter	0.27
Last EPS Surprise	-3.57%
ABR	1.56

Earnings ESP	0.00%
Current Year	0.65
Next Year	1.09
EPS (TTM)	0.61
P/E (F1)	172.93

% EPS Growth Estimates	CWST	IND	S&P
Current Qtr (12/2024)	30.77	25.11	20.57
Next Qtr (03/2025)	400.00	22.98	13.17
Current Year (12/2024)	-30.85	13.70	12.40
Next Year (12/2025)	67.69	16.00	18.75
Past 5 Years	5.80	13.10	8.10
Next 5 Years	25.80	13.80	NA
PE	172.93	30.80	25.13
PEG Ratio	6.71	2.23	NA

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Research for CWST

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	422.05M	405.32M	1.55B	1.76B
# of Estimates	4	3	5	5
High Estimate	425.00M	408.27M	1.56B	1.78B
Low Estimate	420.20M	400.70M	1.54B	1.74B
Year ago Sales	359.57M	341.01M	1.26B	1.55B
Year over Year Growth Est.	17.38%	18.86%	22.58%	13.60%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.17	0.03	0.65	1.09
# of Estimates	5	3	6	6
Most Recent Consensus	0.20	-0.06	0.67	0.93
High Estimate	0.26	0.18	0.74	1.42
Low Estimate	0.10	-0.06	0.57	0.75
Year ago EPS	0.13	-0.01	0.94	0.65
Year over Year Growth Est.	30.77%	400.00%	-30.85%	66.62%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	4	1	5	2
Up Last 60 Days	3	1	4	2
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	2	1	4
Down Last 60 Days	1	1	1	3

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.17	0.03	0.65	1.09
7 Days Ago	0.17	0.03	0.65	1.09
30 Days Ago	0.10	0.03	0.57	1.14
60 Days Ago	0.10	0.04	0.57	1.20
90 Days Ago	0.09	0.02	0.57	1.18

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.17	0.03	0.65	1.09
Zacks Consensus Estimate	0.17	0.03	0.65	1.09
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.27	0.22	-0.01	0.13	NA
Estimate	0.28	0.28	-0.03	0.18	NA
Difference	-0.01	-0.06	0.02	-0.05	-0.03
Surprise	-3.57%	-21.43%	66.67%	-27.78%	3.47%

Quarterly Estimates By Analyst

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	2/6/25
Current Quarter	2.19
EPS Last Quarter	2.30
Last EPS Surprise	1.77%
ABR	2.13

Earnings ESP	-0.18%
Current Year	8.90
Next Year	9.70
EPS (TTM)	8.84
P/E (F1)	18.28

% EPS Growth Estimates	DGX	IND	S&P
Current Qtr (12/2024)	1.86	98.45	20.57
Next Qtr (03/2025)	7.35	-10.46	13.17
Current Year (12/2024)	2.18	16.00	12.40
Next Year (12/2025)	8.99	13.40	18.75
Past 5 Years	7.40	4.20	8.10
Next 5 Years	6.50	12.20	NA
PE	18.28	17.30	25.13
PEG Ratio	2.81	1.42	NA

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Research for DGX

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.57B	2.61B	9.82B	10.66B
# of Estimates	9	8	9	9
High Estimate	2.58B	2.71B	9.83B	10.80B
Low Estimate	2.53B	2.52B	9.80B	10.46B
Year ago Sales	2.29B	2.37B	9.25B	9.82B
Year over Year Growth Est.	12.15%	10.32%	6.17%	8.53%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.19	2.19	8.90	9.70
# of Estimates	10	8	10	10
Most Recent Consensus	2.17	2.23	8.87	9.68
High Estimate	2.20	2.23	8.93	9.72
Low Estimate	2.15	2.16	8.87	9.68
Year ago EPS	2.15	2.04	8.71	8.90
Year over Year Growth Est.	1.86%	7.35%	2.18%	9.04%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	2	2	2
Up Last 60 Days	1	4	4	10
Down Last 7 Days	0	0	0	0
Down Last 30 Days	2	1	1	1
Down Last 60 Days	6	2	3	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	2.19	2.19	8.90	9.70
7 Days Ago	2.19	2.19	8.90	9.70
30 Days Ago	2.19	2.19	8.89	9.69
60 Days Ago	2.22	2.18	8.89	9.58
90 Days Ago	2.21	2.18	8.89	9.58

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	2.18	2.19	8.89	9.69
Zacks Consensus Estimate	2.19	2.19	8.90	9.70
Earnings ESP	-0.18%	-0.05%	-0.12%	-0.09%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	2.30	2.35	2.04	2.15	NA
Estimate	2.26	2.31	1.86	2.14	NA
Difference	0.04	0.04	0.18	0.01	0.07
Surprise	1.77%	1.73%	9.68%	0.47%	3.41%

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	2/4/25
Current Quarter	2.15
EPS Last Quarter	1.71
Last EPS Surprise	9.62%
ABR	1.55

Earnings ESP	-0.50%
Current Year	7.50
Next Year	8.38
EPS (TTM)	7.44
P/E (F1)	31.97

% EPS Growth Estimates	DHR	IND	S&P
Current Qtr (12/2024)	2.87	-27.22	20.57
Next Qtr (03/2025)	7.29	-27.08	13.17
Current Year (12/2024)	-1.06	9.30	12.40
Next Year (12/2025)	11.73	13.20	18.75
Past 5 Years	11.80	14.50	8.10
Next 5 Years	7.30	13.50	NA
PE	31.97	27.10	25.13
PEG Ratio	4.41	2.01	NA

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Research for DHR

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	6.40B	6.07B	23.74B	25.05B
# of Estimates	8	6	8	8
High Estimate	6.44B	6.18B	23.77B	25.29B
Low Estimate	6.38B	5.93B	23.71B	24.74B
Year ago Sales	6.41B	5.80B	27.60B	23.74B
Year over Year Growth Est.	-0.11%	4.76%	-14.01%	5.55%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.15	2.06	7.50	8.38
# of Estimates	9	6	12	12
Most Recent Consensus	2.14	2.05	7.49	8.22
High Estimate	2.18	2.13	7.55	8.58
Low Estimate	2.14	1.99	7.48	8.20
Year ago EPS	2.09	1.92	7.58	7.50
Year over Year Growth Est.	2.87%	7.29%	-1.06%	11.81%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	1	1
Down Last 60 Days	8	6	11	11

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	2.15	2.06	7.50	8.38
7 Days Ago	2.15	2.06	7.50	8.38
30 Days Ago	2.18	2.07	7.51	8.41
60 Days Ago	2.39	2.17	7.59	8.68
90 Days Ago	2.39	2.17	7.59	8.69

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	2.14	2.05	7.49	8.31
Zacks Consensus Estimate	2.15	2.06	7.50	8.38
Earnings ESP	-0.50%	-0.40%	-0.11%	-0.88%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.71	1.72	1.92	2.09	NA
Estimate	1.56	1.57	1.72	1.90	NA
Difference	0.15	0.15	0.20	0.19	0.17
Surprise	9.62%	9.55%	11.63%	10.00%	10.20%

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	2/6/25
Current Quarter	1.05
EPS Last Quarter	0.81
Last EPS Surprise	19.12%
ABR	1.00

Earnings ESP	2.70%
Current Year	3.97
Next Year	4.32
EPS (TTM)	3.80
P/E (F1)	19.73

% EPS Growth Estimates	DLB	IND	S&P
Current Qtr (12/2024)	3.96	-48.98	20.57
Next Qtr (03/2025)	3.94	11.67	13.17
Current Year (09/2025)	4.75	10.70	12.40
Next Year (09/2026)	8.82	5.10	18.75
Past 5 Years	3.40	3.30	8.10
Next 5 Years	NA	9.50	NA
PE	19.73	22.20	25.13
PEG Ratio	NA	2.34	NA

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Research for DLB

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	346.42M	381.22M	1.35B	1.43B
# of Estimates	2	3	2	3
High Estimate	347.55M	398.95M	1.36B	1.44B
Low Estimate	345.29M	363.87M	1.34B	1.40B
Year ago Sales	315.57M	364.52M	1.27B	1.35B
Year over Year Growth Est.	9.78%	4.58%	5.97%	5.60%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	1.05	1.32	3.97	4.32
# of Estimates	3	3	3	3
Most Recent Consensus	1.08	1.40	4.04	4.35
High Estimate	1.11	1.45	4.06	4.35
Low Estimate	0.99	1.16	3.83	4.26
Year ago EPS	1.01	1.27	3.79	3.97
Year over Year Growth Est.	3.96%	3.94%	4.75%	8.73%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	2	2	1
Up Last 60 Days	1	2	2	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	0	0	0
Down Last 60 Days	1	1	1	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Current	1.05	1.32	3.97	4.32
7 Days Ago	1.05	1.32	3.97	4.32
30 Days Ago	1.07	1.16	3.82	4.26
60 Days Ago	1.07	1.17	3.86	4.29
90 Days Ago	1.07	1.17	3.86	4.29

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Most Accurate Estimate	1.08	1.40	4.04	4.35
Zacks Consensus Estimate	1.05	1.32	3.97	4.32
Earnings ESP	2.70%	6.06%	1.76%	0.66%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.81	0.71	1.27	1.01	NA
Estimate	0.68	0.59	1.17	0.89	NA
Difference	0.13	0.12	0.10	0.12	0.12
Surprise	19.12%	20.34%	8.55%	13.48%	15.37%

Quarterly Estimates By Analyst

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	2/3/25
Current Quarter	3.37
EPS Last Quarter	3.67
Last EPS Surprise	6.38%
ABR	3.08

Earnings ESP	-0.52%
Current Year	14.20
Next Year	15.26
EPS (TTM)	13.37
P/E (F1)	17.64

% EPS Growth Estimates	FFIV	IND	S&P
Current Qtr (12/2024)	-1.75	21.28	20.57
Next Qtr (03/2025)	9.62	53.43	13.17
Current Year (09/2025)	6.21	24.60	12.40
Next Year (09/2026)	7.46	21.60	18.75
Past 5 Years	6.50	13.30	8.10
Next 5 Years	6.70	21.90	NA
PE	17.64	32.60	25.13
PEG Ratio	2.62	1.49	NA

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Research for FFIV

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	715.77M	701.92M	2.94B	3.05B
# of Estimates	7	7	7	7
High Estimate	722.10M	708.89M	2.96B	3.10B
Low Estimate	713.83M	695.00M	2.94B	2.99B
Year ago Sales	692.60M	681.35M	2.82B	2.94B
Year over Year Growth Est.	3.34%	3.02%	4.57%	3.68%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	3.37	3.19	14.20	15.26
# of Estimates	8	7	8	8
Most Recent Consensus	3.35	3.17	13.95	14.74
High Estimate	3.43	3.32	14.45	15.80
Low Estimate	3.33	3.11	13.95	14.74
Year ago EPS	3.43	2.91	13.37	14.20
Year over Year Growth Est.	-1.75%	9.62%	6.21%	7.46%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	1	1	1	1
Up Last 60 Days	5	3	7	3
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	2	4	1	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Current	3.37	3.19	14.20	15.26
7 Days Ago	3.37	3.19	14.20	15.26
30 Days Ago	3.36	3.18	14.18	15.23
60 Days Ago	3.35	3.21	14.00	14.99
90 Days Ago	3.35	3.21	14.00	14.99

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Most Accurate Estimate	3.35	3.17	13.95	14.74
Zacks Consensus Estimate	3.37	3.19	14.20	15.26
Earnings ESP	-0.52%	-0.63%	-1.73%	-3.38%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	3.67	3.36	2.91	3.43	NA
Estimate	3.45	2.97	2.88	3.03	NA
Difference	0.22	0.39	0.03	0.40	0.26
Surprise	6.38%	13.13%	1.04%	13.20%	8.44%

Quarterly Estimates By Analyst

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	2/4/25
Current Quarter	2.12
EPS Last Quarter	2.12
Last EPS Surprise	15.85%
ABR	1.34

Earnings ESP	1.00%
Current Year	8.02
Next Year	8.93
EPS (TTM)	7.54
P/E (F1)	21.26

% EPS Growth Estimates	GOOG	IND	S&P
Current Qtr (12/2024)	29.27	31.44	20.57
Next Qtr (03/2025)	7.41	12.72	13.17
Current Year (12/2024)	38.28	10.30	12.40
Next Year (12/2025)	11.35	14.80	18.75
Past 5 Years	21.30	10.40	8.10
Next 5 Years	17.80	23.90	NA
PE	21.26	25.60	25.13
PEG Ratio	1.19	1.07	NA

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Research for GOOG

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	81.42B	75.91B	294.83B	330.57B
# of Estimates	13	13	13	13
High Estimate	83.12B	77.24B	296.62B	333.19B
Low Estimate	80.12B	74.82B	293.08B	326.40B
Year ago Sales	72.32B	67.59B	256.51B	294.83B
Year over Year Growth Est.	12.58%	12.31%	14.94%	12.12%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.12	2.03	8.02	8.93
# of Estimates	17	14	17	18
Most Recent Consensus	1.99	1.96	7.89	8.55
High Estimate	2.44	2.31	8.33	10.07
Low Estimate	1.98	1.88	7.87	8.00
Year ago EPS	1.64	1.89	5.80	8.02
Year over Year Growth Est.	29.27%	7.41%	38.28%	11.32%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	2	2	3	4
Up Last 60 Days	13	5	17	17
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	1	2	0	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	2.12	2.03	8.02	8.93
7 Days Ago	2.12	2.03	8.02	8.93
30 Days Ago	2.12	2.03	7.97	8.89
60 Days Ago	2.02	2.00	7.63	8.64
90 Days Ago	2.02	2.00	7.63	8.64

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	2.14	2.07	8.05	9.05
Zacks Consensus Estimate	2.12	2.03	8.02	8.93
Earnings ESP	1.00%	1.76%	0.33%	1.40%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	2.12	1.89	1.89	1.64	NA
Estimate	1.83	1.85	1.49	1.60	NA
Difference	0.29	0.04	0.40	0.04	0.19
Surprise	15.85%	2.16%	26.85%	2.50%	11.84%

Quarterly Estimates By Analyst

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Huntington Ingalls Industries (HII)
(Real Time Quote from BATS)

$195.06 USD

-2.86 (-1.45%)

Updated Dec 2, 2024 03:02 PM ET

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Zacks Rank:
5-Strong Sell

Style Scores:
B Value | F Growth | F Momentum | D VGM
Ind
Bottom 29% (17
Industry: Aerospa

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Detailed Estimates

EPS Estimates

Exp Earnings Date	2/6/25	Earnings ESP	-6.00%
Current Quarter	3.47	Current Year	14.51

EPS Last Quarter	2.56	Next Year	15.84
Last EPS Surprise	-33.33%	EPS (TTM)	17.71
ABR	3.10	P/E (F1)	13.64

% EPS Growth Estimates	HII	IND	S&P
Current Qtr (12/2024)	-49.71	15.60	20.57
Next Qtr (03/2025)	-11.63	20.41	13.17
Current Year (12/2024)	-15.00	12.00	12.40
Next Year (12/2025)	9.17	17.50	18.75
Past 5 Years	2.50	3.80	8.10
Next 5 Years	7.40	14.70	NA
PE	13.64	9.20	25.13
PEG Ratio	1.85	0.63	NA

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Premium Research for HII

Zacks Rank	▼ Strong Sell 5
Zacks Industry Rank	Bottom 29% (178 out of 250)
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Style Scores	B Value | F Growth | F Momentum | D VGM
Earnings ESP	-6.00%
Research Reports for HII	Analyst | Snapshot

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Research for HII

Price and EPS Surprise Chart

1 Month | 3 Months | 6 Months | YTD | 1 Year

EPS Surprise▲▼

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	3.05B	2.91B	11.58B	12.05B
# of Estimates	10	6	9	10
High Estimate	3.15B	2.93B	11.71B	12.20B
Low Estimate	2.97B	2.88B	11.50B	11.84B
Year ago Sales	3.18B	2.81B	11.45B	11.58B
Year over Year Growth Est.	-4.15%	3.66%	1.14%	4.05%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	3.47	3.42	14.51	15.84
# of Estimates	11	6	11	11
Most Recent Consensus	2.49	3.69	13.30	13.25
High Estimate	4.51	4.33	16.50	18.50
Low Estimate	2.49	2.60	13.30	12.86
Year ago EPS	6.90	3.87	17.07	14.51
Year over Year Growth Est.	-49.71%	-11.63%	-15.00%	9.17%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	1	0	1	1
Down Last 30 Days	8	4	9	9
Down Last 60 Days	8	4	9	9

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	3.47	3.42	14.51	15.84
7 Days Ago	3.70	3.42	14.80	16.32
30 Days Ago	4.57	4.09	16.49	18.88
60 Days Ago	4.62	4.11	16.58	18.89
90 Days Ago	4.66	4.17	16.54	18.97

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year
Most Accurate Estimate	3.26	3.24	14.07	
Zacks Consensus Estimate	3.47	3.42	14.51	
Earnings ESP	-6.00%	-5.29%	-3.04%	

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Avera
Reported	2.56	4.38	3.87	6.90	

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Estimate	3.84	3.55	3.50	4.27	NA
Difference	-1.28	0.83	0.37	2.63	0.64
Surprise	-33.33%	23.38%	10.57%	61.59%	15.55%

Quarterly Estimates By Analyst

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	1/29/25
Current Quarter	-0.04
EPS Last Quarter	-0.12
Last EPS Surprise	-500.00%
ABR	3.67

Earnings ESP	0.00%
Current Year	-0.38
Next Year	0.22
EPS (TTM)	-0.29
P/E (F1)	NA

% EPS Growth Estimates	HTLD	IND	S&P
Current Qtr (12/2024)	-166.67	-2.01	20.57
Next Qtr (03/2025)	78.95	30.54	13.17
Current Year (12/2024)	-300.00	-23.10	12.40
Next Year (12/2025)	157.89	16.90	18.75
Past 5 Years	-24.60	8.90	8.10
Next 5 Years	NA	12.80	NA
PE	NA	43.10	25.13
PEG Ratio	NA	3.37	NA

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Research for HTLD

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	257.06M	228.84M	1.06B	1.12B
# of Estimates	2	1	2	2
High Estimate	262.67M	228.84M	1.07B	1.20B
Low Estimate	251.44M	228.84M	1.06B	1.04B
Year ago Sales	275.35M	270.32M	1.21B	1.06B
Year over Year Growth Est.	-6.64%	-15.34%	-12.05%	5.80%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	-0.04	-0.04	-0.38	0.22
# of Estimates	2	1	2	2
Most Recent Consensus	NA	NA	NA	NA
High Estimate	-0.03	-0.04	-0.36	0.25
Low Estimate	-0.05	-0.04	-0.39	0.19
Year ago EPS	0.06	-0.19	0.19	-0.38
Year over Year Growth Est.	-166.67%	78.95%	-300.00%	156.58%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	0	1	1
Down Last 60 Days	2	1	2	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	-0.04	-0.04	-0.38	0.22
7 Days Ago	-0.04	-0.04	-0.38	0.22
30 Days Ago	-0.01	-0.04	-0.31	0.32
60 Days Ago	0.04	0.04	-0.17	0.48
90 Days Ago	0.04	0.04	-0.17	0.48

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	-0.04	-0.04	-0.38	0.22
Zacks Consensus Estimate	-0.04	-0.04	-0.38	0.22
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	-0.12	-0.04	-0.19	0.06	NA
Estimate	-0.02	-0.04	-0.11	-0.10	NA
Difference	-0.10	0.00	-0.08	0.16	-0.01
Surprise	-500.00%	0.00%	-72.73%	160.00%	-103.18%

Annual Estimates By Analyst

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	2/3/25
Current Quarter	0.62
EPS Last Quarter	1.60
Last EPS Surprise	-14.89%
ABR	1.75

Earnings ESP	0.00%
Current Year	5.49
Next Year	6.26
EPS (TTM)	4.94
P/E (F1)	31.64

% EPS Growth Estimates	JJSF	IND	S&P
Current Qtr (12/2024)	19.23	17.30	20.57
Next Qtr (03/2025)	16.67	-6.22	13.17
Current Year (09/2025)	11.36	4.50	12.40
Next Year (09/2026)	14.03	15.40	18.75
Past 5 Years	7.80	5.00	8.10
Next 5 Years	NA	9.80	NA
PE	31.64	22.50	25.13
PEG Ratio	NA	2.30	NA

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Research for JJSF

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	361.49M	369.67M	1.63B	1.69B
# of Estimates	3	3	3	3
High Estimate	362.10M	371.72M	1.64B	1.70B
Low Estimate	360.37M	366.30M	1.63B	1.69B
Year ago Sales	348.31M	359.73M	1.57B	1.63B
Year over Year Growth Est.	3.78%	2.76%	3.72%	3.69%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Zacks Consensus Estimate	0.62	0.98	5.49	6.26
# of Estimates	3	3	3	3
Most Recent Consensus	0.61	1.16	5.40	6.05
High Estimate	0.63	1.16	5.65	6.40
Low Estimate	0.61	0.82	5.40	6.05
Year ago EPS	0.52	0.84	4.93	5.49
Year over Year Growth Est.	19.23%	16.67%	11.36%	13.97%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	3	1
Down Last 60 Days	1	1	3	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Current	0.62	0.98	5.49	6.26
7 Days Ago	0.62	0.98	5.49	6.26
30 Days Ago	0.83	0.88	6.05	7.10
60 Days Ago	0.83	0.88	6.05	7.10
90 Days Ago	0.83	0.88	6.05	7.10

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (9/2025)	Next Year (9/2026)
Most Accurate Estimate	0.62	0.98	5.49	6.26
Zacks Consensus Estimate	0.62	0.98	5.49	6.26
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.60	1.98	0.84	0.52	NA
Estimate	1.88	2.01	0.63	0.87	NA
Difference	-0.28	-0.03	0.21	-0.35	-0.11
Surprise	-14.89%	-1.49%	33.33%	-40.23%	-5.82%

Annual Estimates By Analyst

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	2/4/25
Current Quarter	1.32
EPS Last Quarter	1.63
Last EPS Surprise	1.24%
ABR	2.53

Earnings ESP	-0.30%
Current Year	5.80
Next Year	6.25
EPS (TTM)	5.42
P/E (F1)	30.40

% EPS Growth Estimates	JKHY	IND	S&P
Current Qtr (12/2024)	8.20	-73.45	20.57
Next Qtr (03/2025)	13.45	-77.16	13.17
Current Year (06/2025)	10.90	32.80	12.40
Next Year (06/2026)	7.76	15.60	18.75
Past 5 Years	7.40	7.40	8.10
Next 5 Years	9.20	9.10	NA
PE	30.40	14.00	25.13
PEG Ratio	3.32	1.54	NA

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Research for JKHY

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Zacks Consensus Estimate	579.49M	584.93M	2.37B	2.54B
# of Estimates	5	5	5	5
High Estimate	585.00M	588.10M	2.38B	2.55B
Low Estimate	577.00M	580.91M	2.37B	2.53B
Year ago Sales	545.70M	538.56M	2.22B	2.37B
Year over Year Growth Est.	6.19%	8.61%	7.13%	7.07%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Zacks Consensus Estimate	1.32	1.35	5.80	6.25
# of Estimates	6	5	7	7
Most Recent Consensus	1.31	1.30	5.73	6.29
High Estimate	1.34	1.39	5.84	6.35
Low Estimate	1.31	1.29	5.67	5.99
Year ago EPS	1.22	1.19	5.23	5.80
Year over Year Growth Est.	8.20%	13.45%	10.90%	7.83%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	1	1	1
Up Last 60 Days	0	1	1	1
Down Last 7 Days	1	1	1	0
Down Last 30 Days	4	2	4	2
Down Last 60 Days	4	2	4	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Current	1.32	1.35	5.80	6.25
7 Days Ago	1.32	1.35	5.80	6.25
30 Days Ago	1.37	1.35	5.88	6.29
60 Days Ago	1.37	1.35	5.88	6.29
90 Days Ago	1.37	1.34	5.78	6.28

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Most Accurate Estimate	1.32	1.33	5.78	6.23
Zacks Consensus Estimate	1.32	1.35	5.80	6.25
Earnings ESP	-0.30%	-1.58%	-0.31%	-0.36%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.63	1.38	1.19	1.22	NA
Estimate	1.61	1.30	1.16	1.14	NA
Difference	0.02	0.08	0.03	0.08	0.05
Surprise	1.24%	6.15%	2.59%	7.02%	4.25%

Quarterly Estimates By Analyst

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	2/4/25
Current Quarter	0.58
EPS Last Quarter	0.48
Last EPS Surprise	9.09%
ABR	2.92

Earnings ESP	0.17%
Current Year	1.65
Next Year	2.02
EPS (TTM)	1.69
P/E (F1)	21.72

% EPS Growth Estimates	JNPR	IND	S&P
Current Qtr (12/2024)	-4.92	30.45	20.57
Next Qtr (03/2025)	37.93	20.63	13.17
Current Year (12/2024)	-26.99	21.00	12.40
Next Year (12/2025)	22.42	12.80	18.75
Past 5 Years	1.80	21.30	8.10
Next 5 Years	3.60	8.00	NA
PE	21.72	-37.30	25.13
PEG Ratio	6.10	-4.66	NA

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Research for JNPR

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.41B	1.24B	5.09B	5.32B
# of Estimates	6	6	5	6
High Estimate	1.48B	1.31B	5.15B	5.45B
Low Estimate	1.38B	1.18B	5.05B	5.14B
Year ago Sales	1.36B	1.15B	5.56B	5.09B
Year over Year Growth Est.	3.51%	7.61%	-8.61%	4.66%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.58	0.40	1.65	2.02
# of Estimates	5	5	5	5
Most Recent Consensus	0.57	0.36	1.64	2.04
High Estimate	0.65	0.48	1.72	2.27
Low Estimate	0.55	0.31	1.62	1.83
Year ago EPS	0.61	0.29	2.26	1.65
Year over Year Growth Est.	-4.92%	37.93%	-26.99%	22.06%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	4	2	4	1
Up Last 60 Days	4	2	4	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	1	1	3
Down Last 60 Days	0	1	1	3

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.58	0.40	1.65	2.02
7 Days Ago	0.58	0.40	1.65	2.02
30 Days Ago	0.57	0.38	1.64	2.03
60 Days Ago	0.57	0.38	1.64	2.03
90 Days Ago	0.57	0.38	1.64	2.03

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.59	0.40	1.65	2.05
Zacks Consensus Estimate	0.58	0.40	1.65	2.02
Earnings ESP	0.17%	0.17%	0.00%	1.46%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.48	0.31	0.29	0.61	NA
Estimate	0.44	0.44	0.39	0.64	NA
Difference	0.04	-0.13	-0.10	-0.03	-0.06
Surprise	9.09%	-29.55%	-25.64%	-4.69%	-12.70%

Annual Estimates By Analyst

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	2/12/25
Current Quarter	0.79
EPS Last Quarter	0.75
Last EPS Surprise	1.35%
ABR	2.53

Earnings ESP	0.00%
Current Year	3.01
Next Year	3.07
EPS (TTM)	3.00
P/E (F1)	10.63

% EPS Growth Estimates	KHC	IND	S&P
Current Qtr (12/2024)	1.28	17.30	20.57
Next Qtr (03/2025)	0.00	-6.22	13.17
Current Year (12/2024)	1.01	4.50	12.40
Next Year (12/2025)	1.99	15.40	18.75
Past 5 Years	-2.10	5.00	8.10
Next 5 Years	2.90	9.80	NA
PE	10.63	22.50	25.13
PEG Ratio	3.65	2.30	NA

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Research for KHC

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	6.69B	6.32B	25.96B	25.99B
# of Estimates	6	5	6	6
High Estimate	6.73B	6.36B	26.00B	26.14B
Low Estimate	6.66B	6.30B	25.93B	25.75B
Year ago Sales	6.86B	6.41B	26.64B	25.96B
Year over Year Growth Est.	-2.43%	-1.35%	-2.54%	0.11%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.79	0.69	3.01	3.07
# of Estimates	8	5	9	9
Most Recent Consensus	0.79	0.70	3.01	3.03
High Estimate	0.79	0.70	3.01	3.15
Low Estimate	0.77	0.67	3.00	3.00
Year ago EPS	0.78	0.69	2.98	3.01
Year over Year Growth Est.	1.28%	0.00%	1.01%	1.98%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	2	0
Up Last 60 Days	0	0	2	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	4	3	2	5
Down Last 60 Days	6	5	5	8

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.79	0.69	3.01	3.07
7 Days Ago	0.79	0.69	3.01	3.07
30 Days Ago	0.79	0.71	3.01	3.11
60 Days Ago	0.81	0.72	3.02	3.14
90 Days Ago	0.81	0.72	3.02	3.15

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.79	0.69	3.01	3.06
Zacks Consensus Estimate	0.79	0.69	3.01	3.07
Earnings ESP	0.00%	0.00%	-0.01%	-0.33%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.75	0.78	0.69	0.78	NA
Estimate	0.74	0.73	0.68	0.77	NA
Difference	0.01	0.05	0.01	0.01	0.02
Surprise	1.35%	6.85%	1.47%	1.30%	2.74%

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	1/22/25
Current Quarter	0.34
EPS Last Quarter	0.34
Last EPS Surprise	3.03%
ABR	2.09

Earnings ESP	-0.83%
Current Year	1.05
Next Year	2.21
EPS (TTM)	0.79
P/E (F1)	56.61

% EPS Growth Estimates	KNX	IND	S&P
Current Qtr (12/2024)	277.78	-2.01	20.57
Next Qtr (03/2025)	166.67	30.54	13.17
Current Year (12/2024)	-38.95	-23.10	12.40
Next Year (12/2025)	110.48	16.90	18.75
Past 5 Years	-3.30	8.90	8.10
Next 5 Years	27.90	12.80	NA
PE	56.61	43.10	25.13
PEG Ratio	2.03	3.37	NA

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Research for KNX

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.90B	1.82B	7.44B	7.98B
# of Estimates	5	4	5	5
High Estimate	1.93B	1.84B	7.48B	8.66B
Low Estimate	1.88B	1.81B	7.43B	7.79B
Year ago Sales	1.93B	1.82B	7.14B	7.44B
Year over Year Growth Est.	-1.70%	0.07%	4.24%	7.24%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.34	0.32	1.05	2.21
# of Estimates	7	4	7	8
Most Recent Consensus	0.34	0.33	1.04	2.03
High Estimate	0.38	0.33	1.10	3.02
Low Estimate	0.32	0.31	1.02	1.98
Year ago EPS	0.09	0.12	1.72	1.05
Year over Year Growth Est.	277.78%	166.67%	-38.95%	110.26%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	1
Up Last 60 Days	0	1	0	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	2	2
Down Last 60 Days	5	3	5	7

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.34	0.32	1.05	2.21
7 Days Ago	0.34	0.32	1.05	2.21
30 Days Ago	0.35	0.34	1.06	2.25
60 Days Ago	0.38	0.39	1.09	2.55
90 Days Ago	0.41	0.41	1.12	2.63

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.34	0.33	1.04	2.02
Zacks Consensus Estimate	0.34	0.32	1.05	2.21
Earnings ESP	-0.83%	4.76%	-1.30%	-8.44%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.34	0.24	0.12	0.09	NA
Estimate	0.33	0.27	0.19	0.47	NA
Difference	0.01	-0.03	-0.07	-0.38	-0.12
Surprise	3.03%	-11.11%	-36.84%	-80.85%	-31.44%

Quarterly Estimates By Analyst

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	1/23/25
Current Quarter	3.47
EPS Last Quarter	3.34
Last EPS Surprise	2.14%
ABR	1.75

Earnings ESP	-0.31%
Current Year	13.10
Next Year	14.37
EPS (TTM)	12.99
P/E (F1)	18.80

% EPS Growth Estimates	LHX	IND	S&P
Current Qtr (12/2024)	3.58	15.60	20.57
Next Qtr (03/2025)	9.15	20.41	13.17
Current Year (12/2024)	5.99	12.00	12.40
Next Year (12/2025)	9.69	17.50	18.75
Past 5 Years	8.30	3.80	8.10
Next 5 Years	9.20	14.70	NA
PE	18.80	9.20	25.13
PEG Ratio	2.05	0.63	NA

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Research for LHX

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	5.49B	5.32B	21.30B	22.00B
# of Estimates	7	4	7	7
High Estimate	5.58B	5.38B	21.38B	22.31B
Low Estimate	5.41B	5.21B	21.22B	21.55B
Year ago Sales	5.34B	5.21B	19.42B	21.30B
Year over Year Growth Est.	2.85%	2.07%	9.67%	3.30%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	3.47	3.34	13.10	14.37
# of Estimates	8	5	8	8
Most Recent Consensus	3.49	3.32	13.14	14.19
High Estimate	3.51	3.54	13.15	14.75
Low Estimate	3.40	3.23	13.05	14.05
Year ago EPS	3.35	3.06	12.36	13.10
Year over Year Growth Est.	3.58%	9.15%	5.99%	9.69%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	1	1
Up Last 60 Days	1	3	5	5
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	6	1	1	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	3.47	3.34	13.10	14.37
7 Days Ago	3.47	3.34	13.09	14.37
30 Days Ago	3.48	3.34	13.09	14.35
60 Days Ago	3.50	3.34	13.06	14.29
90 Days Ago	3.51	3.33	13.06	14.32

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	3.46	3.34	13.05	14.23
Zacks Consensus Estimate	3.47	3.34	13.10	14.37
Earnings ESP	-0.31%	0.00%	-0.39%	-1.02%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	3.34	3.24	3.06	3.35	NA
Estimate	3.27	3.18	2.89	3.31	NA
Difference	0.07	0.06	0.17	0.04	0.09
Surprise	2.14%	1.89%	5.88%	1.21%	2.78%

Annual Estimates By Analyst

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	1/28/25
Current Quarter	6.60
EPS Last Quarter	6.84
Last EPS Surprise	5.72%
ABR	2.00

Earnings ESP	0.00%
Current Year	26.65
Next Year	28.11
EPS (TTM)	28.18
P/E (F1)	19.87

% EPS Growth Estimates	LMT	IND	S&P
Current Qtr (12/2024)	-16.46	15.60	20.57
Next Qtr (03/2025)	4.90	20.41	13.17
Current Year (12/2024)	-4.21	12.00	12.40
Next Year (12/2025)	5.48	17.50	18.75
Past 5 Years	9.40	3.80	8.10
Next 5 Years	4.50	14.70	NA
PE	19.87	9.20	25.13
PEG Ratio	4.37	0.63	NA

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Research for LMT

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	18.85B	17.53B	71.27B	74.05B
# of Estimates	6	5	6	6
High Estimate	18.94B	17.75B	71.36B	75.19B
Low Estimate	18.83B	17.38B	71.25B	73.28B
Year ago Sales	18.87B	17.20B	67.57B	71.27B
Year over Year Growth Est.	-0.12%	1.97%	5.48%	3.90%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	6.60	6.64	26.65	28.11
# of Estimates	8	5	8	9
Most Recent Consensus	6.61	6.76	26.65	29.42
High Estimate	6.75	6.81	26.85	29.42
Low Estimate	6.41	6.53	26.40	26.75
Year ago EPS	7.90	6.33	27.82	26.65
Year over Year Growth Est.	-16.46%	4.90%	-4.21%	5.47%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	2	1	7	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	3	2	1	6

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	6.60	6.64	26.65	28.11
7 Days Ago	6.60	6.64	26.65	28.11
30 Days Ago	6.60	6.64	26.65	28.11
60 Days Ago	6.73	6.73	26.49	28.86
90 Days Ago	6.73	6.73	26.49	28.86

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	6.60	6.64	26.65	28.11
Zacks Consensus Estimate	6.60	6.64	26.65	28.11
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	6.84	7.11	6.33	7.90	NA
Estimate	6.47	6.45	5.80	7.26	NA
Difference	0.37	0.66	0.53	0.64	0.55
Surprise	5.72%	10.23%	9.14%	8.82%	8.48%

Quarterly Estimates By Analyst

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	2/5/25
Current Quarter	8.55
EPS Last Quarter	7.07
Last EPS Surprise	2.61%
ABR	1.41

Earnings ESP	0.00%
Current Year	32.73
Next Year	36.61
EPS (TTM)	28.87
P/E (F1)	19.20

% EPS Growth Estimates	MCK	IND	S&P
Current Qtr (12/2024)	10.47	119.51	20.57
Next Qtr (03/2025)	49.84	64.71	13.17
Current Year (03/2025)	19.28	7.10	12.40
Next Year (03/2026)	11.85	10.70	18.75
Past 5 Years	14.70	13.40	8.10
Next 5 Years	14.10	9.70	NA
PE	19.20	34.10	25.13
PEG Ratio	1.36	3.52	NA

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Research for MCK

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Zacks Consensus Estimate	95.46B	90.48B	357.89B	392.24B
# of Estimates	6	6	6	6
High Estimate	96.96B	91.43B	361.32B	408.94B
Low Estimate	94.04B	89.35B	351.78B	377.76B
Year ago Sales	80.90B	76.36B	308.95B	357.89B
Year over Year Growth Est.	18.00%	18.50%	15.84%	9.60%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Zacks Consensus Estimate	8.55	9.26	32.73	36.61
# of Estimates	7	6	8	8
Most Recent Consensus	8.87	9.11	32.90	37.21
High Estimate	8.92	9.41	33.00	37.50
Low Estimate	8.30	9.11	32.43	35.05
Year ago EPS	7.74	6.18	27.44	32.73
Year over Year Growth Est.	10.47%	49.84%	19.28%	11.86%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Up Last 7 Days	1	1	1	0
Up Last 30 Days	5	6	8	7
Up Last 60 Days	5	6	8	6
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	0	0	0
Down Last 60 Days	1	0	0	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Current	8.55	9.26	32.73	36.61
7 Days Ago	8.54	9.21	32.67	36.61
30 Days Ago	8.36	8.90	31.94	35.22
60 Days Ago	8.33	8.83	32.06	35.31
90 Days Ago	8.24	8.66	32.14	35.32

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Most Accurate Estimate	8.55	9.26	32.73	36.83
Zacks Consensus Estimate	8.55	9.26	32.73	36.61
Earnings ESP	0.00%	0.00%	0.00%	0.61%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	7.07	7.88	6.18	7.74	NA
Estimate	6.89	7.16	6.34	7.05	NA
Difference	0.18	0.72	-0.16	0.69	0.36
Surprise	2.61%	10.06%	-2.52%	9.79%	4.99%

Quarterly Estimates By Analyst

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	1/23/25
Current Quarter	0.78
EPS Last Quarter	0.83
Last EPS Surprise	22.06%
ABR	2.38

Earnings ESP	0.00%
Current Year	2.92
Next Year	3.12
EPS (TTM)	3.00
P/E (F1)	26.89

% EPS Growth Estimates	MKC	IND	S&P
Current Qtr (11/2024)	-8.24	17.30	20.57
Next Qtr (02/2025)	9.52	-6.22	13.17
Current Year (11/2024)	8.15	4.50	12.40
Next Year (11/2025)	6.85	15.40	18.75
Past 5 Years	2.10	5.00	8.10
Next 5 Years	7.50	9.80	NA
PE	26.89	22.50	25.13
PEG Ratio	3.58	2.30	NA

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Research for MKC

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (11/2024)	Next Year (11/2025)
Zacks Consensus Estimate	1.77B	1.63B	6.70B	6.86B
# of Estimates	4	3	4	4
High Estimate	1.78B	1.64B	6.71B	6.92B
Low Estimate	1.77B	1.62B	6.70B	6.81B
Year ago Sales	1.75B	1.60B	6.66B	6.70B
Year over Year Growth Est.	1.16%	1.69%	0.55%	2.44%

Earnings Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (11/2024)	Next Year (11/2025)
Zacks Consensus Estimate	0.78	0.69	2.92	3.12
# of Estimates	6	3	7	7
Most Recent Consensus	NA	NA	2.87	3.15
High Estimate	0.80	0.70	2.95	3.17
Low Estimate	0.75	0.68	2.87	3.07
Year ago EPS	0.85	0.63	2.70	2.92
Year over Year Growth Est.	-8.24%	9.52%	8.15%	6.89%

Agreement - Estimate Revisions

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (11/2024)	Next Year (11/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	1	7	6
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	4	2	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (11/2024)	Next Year (11/2025)
Current	0.78	0.69	2.92	3.12
7 Days Ago	0.78	0.69	2.92	3.12
30 Days Ago	0.78	0.69	2.92	3.12
60 Days Ago	0.87	0.69	2.85	3.06
90 Days Ago	0.87	0.69	2.85	3.04

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (11/2024)	Next Year (11/2025)
Most Accurate Estimate	0.78	0.69	2.92	3.12
Zacks Consensus Estimate	0.78	0.69	2.92	3.12
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (8/2024)	Quarter Ending (5/2024)	Quarter Ending (2/2024)	Quarter Ending (11/2023)	Average Surprise
Reported	0.83	0.69	0.63	0.85	NA
Estimate	0.68	0.59	0.58	0.79	NA
Difference	0.15	0.10	0.05	0.06	0.09
Surprise	22.06%	16.95%	8.62%	7.59%	13.81%

Annual Estimates By Analyst

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	1/14/25
Current Quarter	0.73
EPS Last Quarter	1.03
Last EPS Surprise	-4.63%
ABR	2.78

Earnings ESP	0.00%
Current Year	3.65
Next Year	4.18
EPS (TTM)	4.79
P/E (F1)	23.56

% EPS Growth Estimates	MSM	IND	S&P
Current Qtr (11/2024)	-41.60	106.59	20.57
Next Qtr (02/2025)	-38.98	98.55	13.17
Current Year (08/2025)	-24.12	8.40	12.40
Next Year (08/2026)	14.52	10.90	18.75
Past 5 Years	-0.90	8.10	8.10
Next 5 Years	NA	16.80	NA
PE	23.56	-8.30	25.13
PEG Ratio	NA	-0.49	NA

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Research for MSM

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Zacks Consensus Estimate	905.01M	906.70M	3.77B	3.96B
# of Estimates	9	9	9	9
High Estimate	906.90M	912.00M	3.82B	4.03B
Low Estimate	897.00M	895.00M	3.71B	3.91B
Year ago Sales	953.97M	935.35M	3.82B	3.77B
Year over Year Growth Est.	-5.13%	-3.06%	-1.21%	4.78%

Earnings Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Zacks Consensus Estimate	0.73	0.72	3.65	4.18
# of Estimates	9	9	9	9
Most Recent Consensus	0.73	0.77	3.67	4.07
High Estimate	0.76	0.77	4.15	4.74
Low Estimate	0.70	0.65	3.28	3.80
Year ago EPS	1.25	1.18	4.81	3.65
Year over Year Growth Est.	-41.60%	-38.98%	-24.12%	14.52%

Agreement - Estimate Revisions

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	9	9	9	7

Magnitude - Consensus Estimate Trend

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Current	0.73	0.72	3.65	4.18
7 Days Ago	0.73	0.72	3.65	4.18
30 Days Ago	0.73	0.72	3.65	4.18
60 Days Ago	0.99	1.02	4.79	5.26
90 Days Ago	1.00	1.03	4.81	5.26

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Most Accurate Estimate	0.73	0.72	3.65	4.18
Zacks Consensus Estimate	0.73	0.72	3.65	4.18
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (8/2024)	Quarter Ending (5/2024)	Quarter Ending (2/2024)	Quarter Ending (11/2023)	Average Surprise
Reported	1.03	1.33	1.18	1.25	NA
Estimate	1.08	1.33	1.16	1.30	NA
Difference	-0.05	0.00	0.02	-0.05	-0.02
Surprise	-4.63%	0.00%	1.72%	-3.85%	-1.69%

Quarterly Estimates By Analyst

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Exp Earnings Date	1/29/25
Current Quarter	NA
EPS Last Quarter	NA
Last EPS Surprise	NA
ABR	NA

Earnings ESP	NA
Current Year	NA
Next Year	NA
EPS (TTM)	45.03
P/E (F1)	NA

% EPS Growth Estimates	NEU	IND	S&P
Current Qtr (Not defined)	NA	338.96	20.57
Next Qtr (Not defined)	NA	31.09	13.17
Current Year (Not defined)	NA	10.80	12.40
Next Year (Not defined)	NA	9.10	18.80
Past 5 Years	NA	4.70	8.10
Next 5 Years	NA	12.80	NA
PE	NA	17.70	25.10
PEG Ratio	NA	1.38	NA

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Research for NEU

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (ND)	Next Qtr (ND)	Current Year (ND)	Next Year (ND)
Zacks Consensus Estimate	NA	NA	NA	NA
# of Estimates	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago Sales	NA	NA	2.70B	NA
Year over Year Growth Est.	NA	NA	NA	NA

Earnings Estimates

	This Quarter (ND)	Next Quarter (ND)	This Year (ND)	Next Year (ND)
Zacks Consensus Estimate	NA	NA	NA	NA
# of Estimates	NA	NA	NA	NA
Most Recent Consensus	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago EPS	NA	NA	NA	NA
Year over Year Growth Est.	NA	NA	NA	NA

Agreement - Estimate Revisions

	Current Qtr (NA)	Next Qtr (NA)	Current Year (NA)	Next Year (NA)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	This Quarter (Not defined)	Next Quarter (Not defined)	This Year (Not defined)	Next Year (Not defined)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	This Quarter (Not defined)	Next Quarter (Not defined)	This Year (Not defined)	Next Year (Not defined)
Most Accurate Estimate	NA	NA	NA	NA
Zacks Consensus Estimate	NA	NA	NA	NA
Earnings ESP	NA	NA	NA	NA

Surprise - Reported Earnings History

	Quarter Ending (Not defined)	Quarter Ending (Not defined)	Quarter Ending (Not defined)	Quarter Ending (Not defined)	Average Surprise
Reported	NA	NA	NA	NA	NA
Estimate	NA	NA	NA	NA	NA
Difference	NA	NA	NA	NA	NA
Surprise	NA	NA	NA	NA	NA

Annual Estimates By Analyst

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	1/23/25
Current Quarter	6.27
EPS Last Quarter	7.00
Last EPS Surprise	15.32%
ABR	2.44

Earnings ESP	-2.67%
Current Year	25.82
Next Year	27.81
EPS (TTM)	25.95
P/E (F1)	18.96

% EPS Growth Estimates	NOC	IND	S&P
Current Qtr (12/2024)	0.00	15.60	20.57
Next Qtr (03/2025)	2.53	20.41	13.17
Current Year (12/2024)	10.86	12.00	12.40
Next Year (12/2025)	7.71	17.50	18.75
Past 5 Years	4.60	3.80	8.10
Next 5 Years	19.10	14.70	NA
PE	18.96	9.20	25.13
PEG Ratio	0.99	0.63	NA

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Research for NOC

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	11.00B	10.29B	41.37B	42.91B
# of Estimates	6	4	6	6
High Estimate	11.05B	10.48B	41.40B	43.36B
Low Estimate	10.93B	10.18B	41.32B	42.62B
Year ago Sales	10.64B	10.13B	39.29B	41.37B
Year over Year Growth Est.	3.39%	1.56%	5.28%	3.74%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	6.27	6.48	25.82	27.81
# of Estimates	8	4	8	7
Most Recent Consensus	6.10	6.43	25.78	27.46
High Estimate	6.47	6.60	26.15	28.40
Low Estimate	6.06	6.42	25.07	27.30
Year ago EPS	6.27	6.32	23.29	25.82
Year over Year Growth Est.	0.00%	2.53%	10.86%	7.69%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	1	0
Up Last 60 Days	0	0	7	3
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	0	1
Down Last 60 Days	5	2	0	3

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	6.27	6.48	25.82	27.81
7 Days Ago	6.27	6.48	25.82	27.79
30 Days Ago	6.29	6.51	25.72	27.81
60 Days Ago	6.40	6.55	25.14	27.76
90 Days Ago	6.42	6.55	25.10	27.75

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	6.10	6.43	25.78	27.46
Zacks Consensus Estimate	6.27	6.48	25.82	27.81
Earnings ESP	-2.67%	-0.78%	-0.16%	-1.25%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	7.00	6.36	6.32	6.27	NA
Estimate	6.07	5.95	5.83	5.75	NA
Difference	0.93	0.41	0.49	0.52	0.59
Surprise	15.32%	6.89%	8.40%	9.04%	9.91%

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	12/9/24
Current Quarter	1.48
EPS Last Quarter	1.39
Last EPS Surprise	5.30%
ABR	1.77

Earnings ESP	0.00%
Current Year	6.20
Next Year	7.00
EPS (TTM)	5.77
P/E (F1)	29.82

% EPS Growth Estimates	ORCL	IND	S&P
Current Qtr (11/2024)	10.45	15.28	20.57
Next Qtr (02/2025)	10.64	27.07	13.17
Current Year (05/2025)	11.51	17.10	12.40
Next Year (05/2026)	12.90	20.50	18.75
Past 5 Years	7.90	13.60	8.10
Next 5 Years	10.80	13.10	NA
PE	29.82	32.00	25.13
PEG Ratio	2.75	2.44	NA

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Research for ORCL

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (5/2025)	Next Year (5/2026)
Zacks Consensus Estimate	14.12B	14.62B	58.02B	64.63B
# of Estimates	9	9	9	9
High Estimate	14.32B	14.78B	58.42B	66.32B
Low Estimate	14.05B	14.35B	57.53B	63.04B
Year ago Sales	12.94B	13.28B	52.96B	58.02B
Year over Year Growth Est.	9.14%	10.07%	9.55%	11.39%

Earnings Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (5/2025)	Next Year (5/2026)
Zacks Consensus Estimate	1.48	1.56	6.20	7.00
# of Estimates	12	9	13	13
Most Recent Consensus	1.44	1.54	6.13	6.94
High Estimate	1.49	1.60	6.41	7.69
Low Estimate	1.44	1.52	5.56	6.37
Year ago EPS	1.34	1.41	5.56	6.20
Year over Year Growth Est.	10.45%	10.64%	11.51%	13.00%

Agreement - Estimate Revisions

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (5/2025)	Next Year (5/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	0	0	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (5/2025)	Next Year (5/2026)
Current	1.48	1.56	6.20	7.00
7 Days Ago	1.48	1.56	6.20	7.00
30 Days Ago	1.48	1.56	6.20	7.00
60 Days Ago	1.48	1.56	6.20	7.00
90 Days Ago	1.46	1.56	6.19	6.98

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (5/2025)	Next Year (5/2026)
Most Accurate Estimate	1.48	1.56	6.20	7.00
Zacks Consensus Estimate	1.48	1.56	6.20	7.00
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (8/2024)	Quarter Ending (5/2024)	Quarter Ending (2/2024)	Quarter Ending (11/2023)	Average Surprise
Reported	1.39	1.63	1.41	1.34	NA
Estimate	1.32	1.64	1.37	1.32	NA
Difference	0.07	-0.01	0.04	0.02	0.03
Surprise	5.30%	-0.61%	2.92%	1.52%	2.28%

Quarterly Estimates By Analyst

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	2/5/25
Current Quarter	9.72
EPS Last Quarter	11.41
Last EPS Surprise	-1.04%
ABR	1.68

Earnings ESP	2.48%
Current Year	40.85
Next Year	44.55
EPS (TTM)	40.42
P/E (F1)	30.43

% EPS Growth Estimates	ORLY	IND	S&P
Current Qtr (12/2024)	4.97	-10.82	20.57
Next Qtr (03/2025)	9.78	6.64	13.17
Current Year (12/2024)	6.19	0.00	12.40
Next Year (12/2025)	9.06	20.00	18.75
Past 5 Years	20.00	0.00	8.10
Next 5 Years	12.10	13.80	NA
PE	30.43	11.00	25.13
PEG Ratio	2.52	0.80	NA

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Research for ORLY

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	4.03B	4.19B	16.64B	17.53B
# of Estimates	10	8	10	10
High Estimate	4.08B	4.23B	16.70B	17.71B
Low Estimate	3.97B	4.14B	16.59B	17.31B
Year ago Sales	3.83B	3.98B	15.81B	16.64B
Year over Year Growth Est.	5.12%	5.25%	5.24%	5.34%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	9.72	10.10	40.85	44.55
# of Estimates	13	8	14	14
Most Recent Consensus	9.75	10.17	40.91	44.90
High Estimate	10.17	10.65	41.32	45.78
Low Estimate	9.45	9.66	40.60	42.99
Year ago EPS	9.26	9.20	38.47	40.85
Year over Year Growth Est.	4.97%	9.78%	6.19%	9.06%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	1	0	1
Up Last 60 Days	4	3	1	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	2	1	2	1
Down Last 60 Days	5	4	12	12

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	9.72	10.10	40.85	44.55
7 Days Ago	9.72	10.10	40.85	44.55
30 Days Ago	9.72	10.10	40.87	44.61
60 Days Ago	9.78	10.15	41.10	45.68
90 Days Ago	9.78	10.15	41.13	45.79

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	9.96	10.15	41.12	45.17
Zacks Consensus Estimate	9.72	10.10	40.85	44.55
Earnings ESP	2.48%	0.50%	0.64%	1.39%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	11.41	10.55	9.20	9.26	NA
Estimate	11.53	10.95	9.18	9.07	NA
Difference	-0.12	-0.40	0.02	0.19	-0.08
Surprise	-1.04%	-3.65%	0.22%	2.09%	-0.60%

Quarterly Estimates By Analyst

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Detailed Estimates

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EPS Estimates

Exp Earnings Date	
Current Quarter	

EPS Last Quarter	1.25	Next Year	9.94
Last EPS Surprise	17.92%	EPS (TTM)	8.46
ABR	1.00	P/E (F1)	19.45

% EPS Growth Estimates	OSIS	IND	S&P
Current Qtr (12/2024)	7.69	-59.22	20.57
Next Qtr (03/2025)	14.35	21.80	13.17
Current Year (06/2025)	12.18	2.70	12.40
Next Year (06/2026)	8.99	15.70	18.75
Past 5 Years	14.10	4.70	8.10
Next 5 Years	12.70	16.70	NA
PE	19.45	18.80	25.13
PEG Ratio	1.53	1.13	NA

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Premium Research for OSIS

Zacks Rank	**Buy 2**
Zacks Industry Rank	Top 14% (35 out of 250)
Zacks Sector Rank	Top 13% (2 out of 16)
Style Scores	**B Value | F Growth | F Momentum | D VGM**
Earnings ESP	0.00%
Research Report for OSIS	Snapshot

(▲▼ = Change in last 30 days)

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Research for OSIS

Price and EPS Surprise Chart

1 Month | 3 Months | 6 Months | YTD | 1 Year

Interactive Chart | Fundamental Chart

Sales Estimat

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Zacks Consensus Estimate	402.85M	435.93M	1.68B	1.75B
# of Estimates	3	3	3	3
High Estimate	408.00M	439.00M	1.68B	1.77B
Low Estimate	397.56M	430.80M	1.67B	1.73B
Year ago Sales	373.24M	405.41M	1.54B	1.68B
Year over Year Growth Est.	7.93%	7.53%	9.12%	4.43%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Zacks Consensus Estimate	2.38	2.47	9.12	9.94
# of Estimates	3	3	4	4
Most Recent Consensus	2.32	2.44	9.00	9.71
High Estimate	2.43	2.51	9.20	10.55
Low Estimate	2.32	2.44	9.00	9.50
Year ago EPS	2.21	2.16	8.13	9.12
Year over Year Growth Est.	7.69%	14.35%	12.18%	8.99%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	2	1	3	3
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	0	1	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Current	2.38	2.47	9.12	9.94
7 Days Ago	2.38	2.47	9.12	9.94
30 Days Ago	2.38	2.47	9.12	9.94
60 Days Ago	2.33	2.54	8.98	9.87
90 Days Ago	2.33	2.54	8.93	9.64

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (6/2025)	Next Year (6/2026)
Most Accurate Estimate	2.38	2.47	9.12	9.94
Zacks Consensus Estimate	2.38	2.47	9.12	9.94
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

Reported	

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Estimate	1.06	2.79	2.11	1.74	NA
Difference	0.19	0.05	0.05	0.47	0.19
Surprise	17.92%	1.79%	2.37%	27.01%	12.27%

Quarterly Estimates By Analyst

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	2/13/25
Current Quarter	1.17
EPS Last Quarter	1.09
Last EPS Surprise	0.00%
ABR	1.40

Earnings ESP	-0.69%
Current Year	4.44
Next Year	4.76
EPS (TTM)	4.07
P/E (F1)	19.08

% EPS Growth Estimates	PBH	IND	S&P
Current Qtr (12/2024)	10.38	57.17	20.57
Next Qtr (03/2025)	26.47	268.75	13.17
Current Year (03/2025)	5.46	11.10	12.40
Next Year (03/2026)	7.21	21.80	18.75
Past 5 Years	8.70	4.30	8.10
Next 5 Years	8.00	14.70	NA
PE	19.08	-0.80	25.13
PEG Ratio	2.39	-0.05	NA

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Research for PBH

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Zacks Consensus Estimate	286.67M	295.27M	1.13B	1.16B
# of Estimates	4	4	4	4
High Estimate	288.45M	299.00M	1.14B	1.17B
Low Estimate	286.00M	292.99M	1.13B	1.15B
Year ago Sales	282.74M	276.99M	1.13B	1.13B
Year over Year Growth Est.	1.39%	6.60%	0.62%	2.42%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Zacks Consensus Estimate	1.17	1.29	4.44	4.76
# of Estimates	5	4	5	5
Most Recent Consensus	1.16	1.28	4.46	4.73
High Estimate	1.20	1.32	4.46	4.80
Low Estimate	1.16	1.28	4.42	4.72
Year ago EPS	1.06	1.02	4.21	4.44
Year over Year Growth Est.	10.38%	26.47%	5.46%	7.07%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Up Last 7 Days	0	1	0	1
Up Last 30 Days	0	4	3	3
Up Last 60 Days	0	4	3	3
Down Last 7 Days	0	0	0	0
Down Last 30 Days	3	0	0	0
Down Last 60 Days	3	0	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Current	1.17	1.29	4.44	4.76
7 Days Ago	1.17	1.28	4.44	4.75
30 Days Ago	1.21	1.24	4.43	4.74
60 Days Ago	1.21	1.24	4.43	4.74
90 Days Ago	1.21	1.24	4.42	4.74

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (3/2025)	Next Year (3/2026)
Most Accurate Estimate	1.16	1.29	4.45	4.75
Zacks Consensus Estimate	1.17	1.29	4.44	4.76
Earnings ESP	-0.69%	0.00%	0.25%	-0.06%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.09	0.90	1.02	1.06	NA
Estimate	1.09	0.86	1.14	1.04	NA
Difference	0.00	0.04	-0.12	0.02	-0.02
Surprise	0.00%	4.65%	-10.53%	1.92%	-0.99%

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	2/4/25
Current Quarter	0.49
EPS Last Quarter	1.06
Last EPS Surprise	65.62%
ABR	2.25

Earnings ESP	7.23%
Current Year	2.91
Next Year	2.91
EPS (TTM)	2.58
P/E (F1)	9.00

% EPS Growth Estimates	PFE	IND	S&P
Current Qtr (12/2024)	390.00	252.71	20.57
Next Qtr (03/2025)	-17.07	20.98	13.17
Current Year (12/2024)	58.15	8.90	12.40
Next Year (12/2025)	0.00	9.60	18.75
Past 5 Years	-8.50	2.90	8.10
Next 5 Years	12.50	11.80	NA
PE	9.00	22.00	25.13
PEG Ratio	0.72	1.86	NA

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Research for PFE

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	17.50B	14.84B	63.36B	62.98B
# of Estimates	6	1	6	6
High Estimate	17.97B	14.84B	63.84B	66.13B
Low Estimate	17.10B	14.84B	62.97B	61.36B
Year ago Sales	14.25B	14.88B	58.50B	63.36B
Year over Year Growth Est.	22.80%	-0.24%	8.32%	-0.61%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.49	0.68	2.91	2.91
# of Estimates	7	1	10	9
Most Recent Consensus	0.39	NA	2.87	2.80
High Estimate	0.66	0.68	3.14	3.12
Low Estimate	0.39	0.68	2.60	2.70
Year ago EPS	0.10	0.82	1.84	2.91
Year over Year Growth Est.	390.00%	-17.07%	58.15%	-0.03%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	1	0	1	0
Up Last 30 Days	1	0	2	1
Up Last 60 Days	0	0	10	5
Down Last 7 Days	0	0	0	1
Down Last 30 Days	1	0	0	1
Down Last 60 Days	6	0	0	3

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.49	0.68	2.91	2.91
7 Days Ago	0.49	0.68	2.91	2.92
30 Days Ago	0.52	0.68	2.88	2.92
60 Days Ago	0.66	0.68	2.62	2.84
90 Days Ago	0.66	0.68	2.62	2.85

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.53	0.68	2.94	2.85
Zacks Consensus Estimate	0.49	0.68	2.91	2.91
Earnings ESP	7.23%	0.00%	1.05%	-1.99%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.06	0.60	0.82	0.10	NA
Estimate	0.64	0.45	0.56	-0.19	NA
Difference	0.42	0.15	0.26	0.29	0.28
Surprise	65.62%	33.33%	46.43%	152.63%	74.50%

Quarterly Estimates By Analyst

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	1/22/25
Current Quarter	3.16
EPS Last Quarter	3.58
Last EPS Surprise	5.29%
ABR	1.68

Earnings ESP	3.04%
Current Year	13.20
Next Year	13.81
EPS (TTM)	12.92
P/E (F1)	20.38

% EPS Growth Estimates	PGR	IND	S&P
Current Qtr (12/2024)	6.76	-75.88	20.57
Next Qtr (03/2025)	-4.29	-37.53	13.17
Current Year (12/2024)	116.04	8.80	12.40
Next Year (12/2025)	4.62	15.20	18.75
Past 5 Years	5.90	11.40	8.10
Next 5 Years	27.40	11.20	NA
PE	20.38	15.40	25.13
PEG Ratio	0.74	1.38	NA

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Research for PGR

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	19.84B	20.25B	74.35B	86.16B
# of Estimates	8	7	8	8
High Estimate	20.59B	21.07B	75.09B	89.74B
Low Estimate	18.67B	19.27B	71.92B	81.09B
Year ago Sales	16.59B	17.09B	61.76B	74.35B
Year over Year Growth Est.	19.62%	18.49%	20.40%	15.87%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	3.16	3.57	13.20	13.81
# of Estimates	11	9	11	12
Most Recent Consensus	2.93	3.14	12.90	15.18
High Estimate	3.73	3.93	13.70	18.75
Low Estimate	2.58	3.03	12.55	11.23
Year ago EPS	2.96	3.73	6.11	13.20
Year over Year Growth Est.	6.76%	-4.29%	116.04%	4.66%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	5	3	5	6
Up Last 60 Days	2	4	4	8
Down Last 7 Days	0	0	0	0
Down Last 30 Days	2	3	3	1
Down Last 60 Days	6	3	7	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	3.16	3.57	13.20	13.81
7 Days Ago	3.16	3.57	13.20	13.81
30 Days Ago	3.10	3.54	13.15	13.70
60 Days Ago	3.24	3.51	13.20	13.55
90 Days Ago	3.12	3.37	12.32	12.85

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	3.26	3.65	13.26	14.76
Zacks Consensus Estimate	3.16	3.57	13.20	13.81
Earnings ESP	3.04%	2.27%	0.51%	6.89%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	3.58	2.65	3.73	2.96	NA
Estimate	3.40	1.99	3.20	2.38	NA
Difference	0.18	0.66	0.53	0.58	0.49
Surprise	5.29%	33.17%	16.56%	24.37%	19.85%

Quarterly Estimates By Analyst

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	2/12/25
Current Quarter	0.92
EPS Last Quarter	0.95
Last EPS Surprise	20.25%
ABR	1.30

Earnings ESP	3.36%
Current Year	3.42
Next Year	3.82
EPS (TTM)	3.18
P/E (F1)	28.08

% EPS Growth Estimates	PSN	IND	S&P
Current Qtr (12/2024)	33.33	457.20	20.57
Next Qtr (03/2025)	10.00	42.55	13.17
Current Year (12/2024)	40.74	17.80	12.40
Next Year (12/2025)	11.70	21.30	18.75
Past 5 Years	NA	5.20	8.10
Next 5 Years	18.60	20.90	NA
PE	28.08	2.20	25.13
PEG Ratio	1.51	0.11	NA

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Research for PSN

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.72B	1.68B	6.76B	7.22B
# of Estimates	5	2	4	5
High Estimate	1.80B	1.74B	6.81B	7.54B
Low Estimate	1.65B	1.63B	6.73B	6.80B
Year ago Sales	1.49B	1.54B	5.44B	6.76B
Year over Year Growth Est.	15.42%	9.56%	24.20%	6.82%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.92	0.77	3.42	3.82
# of Estimates	5	2	5	5
Most Recent Consensus	0.95	0.83	3.37	3.84
High Estimate	1.02	0.83	3.50	4.10
Low Estimate	0.80	0.70	3.29	3.65
Year ago EPS	0.69	0.70	2.43	3.42
Year over Year Growth Est.	33.33%	10.00%	40.74%	11.93%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	1	1
Up Last 60 Days	3	2	5	5
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	0	0	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.92	0.77	3.42	3.82
7 Days Ago	0.92	0.77	3.42	3.82
30 Days Ago	0.90	0.77	3.38	3.70
60 Days Ago	0.84	0.72	3.20	3.49
90 Days Ago	0.84	0.74	3.19	3.51

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.96	0.77	3.42	3.82
Zacks Consensus Estimate	0.92	0.77	3.42	3.82
Earnings ESP	3.36%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.95	0.84	0.70	0.69	NA
Estimate	0.79	0.66	0.62	0.63	NA
Difference	0.16	0.18	0.08	0.06	0.12
Surprise	20.25%	27.27%	12.90%	9.52%	17.49%

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	1/22/25
Current Quarter	0.93
EPS Last Quarter	1.31
Last EPS Surprise	33.67%
ABR	2.30

Earnings ESP	1.83%
Current Year	5.85
Next Year	6.28
EPS (TTM)	6.46
P/E (F1)	30.09

% EPS Growth Estimates	RLI	IND	S&P
Current Qtr (12/2024)	-39.61	-75.88	20.57
Next Qtr (03/2025)	-1.06	-37.53	13.17
Current Year (12/2024)	18.42	8.80	12.40
Next Year (12/2025)	7.35	15.20	18.75
Past 5 Years	18.70	11.40	8.10
Next 5 Years	NA	11.20	NA
PE	30.09	15.40	25.13
PEG Ratio	NA	1.38	NA

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Research for RLI

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	436.39M	444.47M	1.67B	1.83B
# of Estimates	5	4	5	5
High Estimate	438.00M	449.00M	1.67B	1.85B
Low Estimate	433.29M	438.39M	1.67B	1.82B
Year ago Sales	378.44M	393.52M	1.41B	1.67B
Year over Year Growth Est.	15.31%	12.95%	17.99%	9.59%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.93	1.87	5.85	6.28
# of Estimates	5	5	5	5
Most Recent Consensus	1.01	1.86	5.93	6.20
High Estimate	1.01	2.03	5.93	6.65
Low Estimate	0.86	1.69	5.77	5.96
Year ago EPS	1.54	1.89	4.94	5.85
Year over Year Growth Est.	-39.61%	-1.06%	18.42%	7.35%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	1	0	1
Up Last 60 Days	0	3	0	3
Down Last 7 Days	0	0	0	0
Down Last 30 Days	2	0	2	0
Down Last 60 Days	4	0	4	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.93	1.87	5.85	6.28
7 Days Ago	0.93	1.87	5.85	6.28
30 Days Ago	1.17	1.87	5.93	6.26
60 Days Ago	1.61	1.90	6.14	6.30
90 Days Ago	1.61	1.90	6.14	6.30

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.95	1.86	5.87	6.20
Zacks Consensus Estimate	0.93	1.87	5.85	6.28
Earnings ESP	1.83%	-0.64%	0.33%	-1.21%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.31	1.72	1.89	1.54	NA
Estimate	0.98	1.35	1.63	1.44	NA
Difference	0.33	0.37	0.26	0.10	0.27
Surprise	33.67%	27.41%	15.95%	6.94%	20.99%

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	2/12/25
Current Quarter	0.23
EPS Last Quarter	0.29
Last EPS Surprise	-3.33%
ABR	2.10

Earnings ESP	0.00%
Current Year	0.99
Next Year	1.09
EPS (TTM)	0.97
P/E (F1)	50.94

% EPS Growth Estimates	ROL	IND	S&P
Current Qtr (12/2024)	9.52	4.60	20.57
Next Qtr (03/2025)	10.00	14.47	13.17
Current Year (12/2024)	10.00	18.20	12.40
Next Year (12/2025)	10.10	11.00	18.75
Past 5 Years	14.80	13.90	8.10
Next 5 Years	NA	12.00	NA
PE	50.94	35.50	25.13
PEG Ratio	NA	2.96	NA

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Research for ROL

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	816.28M	798.97M	3.37B	3.63B
# of Estimates	4	3	5	5
High Estimate	822.00M	810.00M	3.38B	3.67B
Low Estimate	809.33M	782.60M	3.37B	3.59B
Year ago Sales	754.09M	748.35M	3.07B	3.37B
Year over Year Growth Est.	8.25%	6.76%	9.76%	7.62%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.23	0.22	0.99	1.09
# of Estimates	5	3	5	5
Most Recent Consensus	0.23	0.22	0.99	1.10
High Estimate	0.23	0.22	0.99	1.11
Low Estimate	0.22	0.21	0.98	1.07
Year ago EPS	0.21	0.20	0.90	0.99
Year over Year Growth Est.	9.52%	10.00%	10.00%	10.51%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	1	0
Down Last 60 Days	3	0	4	3

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.23	0.22	0.99	1.09
7 Days Ago	0.23	0.22	0.99	1.09
30 Days Ago	0.23	0.22	0.99	1.09
60 Days Ago	0.23	0.22	1.00	1.10
90 Days Ago	0.23	0.22	1.00	1.11

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.23	0.22	0.99	1.09
Zacks Consensus Estimate	0.23	0.22	0.99	1.09
Earnings ESP	0.00%	0.00%	0.20%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.29	0.27	0.20	0.21	NA
Estimate	0.30	0.27	0.20	0.21	NA
Difference	-0.01	0.00	0.00	0.00	0.00
Surprise	-3.33%	0.00%	0.00%	0.00%	-0.83%

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Rush Enterprises (RUSHA)
(Real Time Quote from BATS)

$62.14 USD

+0.19 (0.31%)

Updated Dec 2, 2024 03:00 PM ET

Add to portfolio

Zacks Rank:
2-Buy

Style Scores:
A Value | C Growth | F Momentum | B VGM

Industry Rank:
Bottom 32% (171 out of 250)

Industry: Automotive - Retail and Whole Sales

View All Zacks #1 Ranked Stocks

Detailed Estimates

Enter Symbol

EPS Estimates

Exp Earnings Date	2/11/25	Earnings ESP	0.00%
Current Quarter	0.80	Current Year	3.45

EPS Last Quarter	0.97	Next Year	4.08
Last EPS Surprise	2.11%	EPS (TTM)	3.77
ABR	1.00	P/E (F1)	17.96

% EPS Growth Estimates	RUSHA	IND	S&P
Current Qtr (12/2024)	-15.79	4.00	20.57
Next Qtr (03/2025)	NA	-7.43	13.17
Current Year (12/2024)	-16.87	-19.20	12.40
Next Year (12/2025)	18.26	10.00	18.75
Past 5 Years	22.80	34.20	8.10
Next 5 Years	7.70	12.30	NA
PE	17.96	42.40	25.13
PEG Ratio	2.34	3.45	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for RUSHA

Zacks Rank	Buy 2
Zacks Industry Rank	Bottom 32% (171 out of 250)
Zacks Sector Rank	Bottom 44% (9 out of 16)
Style Scores	A Value | C Growth | F Momentum | B VGM
Earnings ESP	0.00%
Research Report for RUSHA	Snapshot

(▲▼ = Change in last 30 days)

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More Premium Research » »

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Research for RUSHA

Price and EPS Surprise Chart

1 Month | 3 Months | 6 Months | YTD | 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	NA	NA	NA	NA
# of Estimates	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago Sales	2.03B	1.87B	7.93B	NA
Year over Year Growth Est.	NA	NA	NA	NA

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.80	NA	3.45	4.08
# of Estimates	1	NA	2	2
Most Recent Consensus	NA	NA	NA	NA
High Estimate	0.80	NA	3.62	4.45
Low Estimate	0.80	NA	3.28	3.71
Year ago EPS	0.95	0.88	4.15	3.45
Year over Year Growth Est.	-15.79%	NA	-16.87%	18.26%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	NA	0	0
Up Last 30 Days	0	NA	0	0
Up Last 60 Days	0	NA	1	1
Down Last 7 Days	0	NA	0	0
Down Last 30 Days	0	NA	0	0
Down Last 60 Days	0	NA	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.80	NA	3.45	4.08
7 Days Ago	0.80	NA	3.45	4.08
30 Days Ago	0.80	NA	3.45	4.08
60 Days Ago	NA	NA	3.44	4.08
90 Days Ago	NA	NA	3.28	4.01

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.80	NA	3.62	4.45
Zacks Consensus Estimate	0.80	NA	3.45	4.08
Earnings ESP	0.00%	NA	4.93%	9.07%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.97	0.97	0.88	0.95	NA

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Estimate	0.95	0.77	0.80	0.84	NA
Difference	0.02	0.20	0.08	0.11	0.10
Surprise	2.11%	25.97%	10.00%	13.10%	12.80%

Annual Estimates By Analyst

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	2/10/25
Current Quarter	1.05
EPS Last Quarter	0.79
Last EPS Surprise	0.00%
ABR	1.20

Earnings ESP	0.48%
Current Year	3.51
Next Year	3.92
EPS (TTM)	3.40
P/E (F1)	25.22

% EPS Growth Estimates	SCI	IND	S&P
Current Qtr (12/2024)	12.90	7.45	20.57
Next Qtr (03/2025)	6.74	1.49	13.17
Current Year (12/2024)	0.57	2.30	12.40
Next Year (12/2025)	11.68	10.70	18.75
Past 5 Years	14.70	5.90	8.10
Next 5 Years	9.70	12.40	NA
PE	25.22	18.80	25.13
PEG Ratio	2.59	1.52	NA

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Research for SCI

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.08B	1.08B	4.18B	4.32B
# of Estimates	3	3	3	3
High Estimate	1.09B	1.09B	4.19B	4.35B
Low Estimate	1.08B	1.07B	4.17B	4.30B
Year ago Sales	1.06B	1.05B	4.10B	4.18B
Year over Year Growth Est.	2.76%	3.14%	1.92%	3.48%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.05	0.95	3.51	3.92
# of Estimates	4	3	4	4
Most Recent Consensus	1.05	0.96	3.51	3.90
High Estimate	1.05	0.96	3.52	3.94
Low Estimate	1.03	0.93	3.50	3.90
Year ago EPS	0.93	0.89	3.49	3.51
Year over Year Growth Est.	12.90%	6.74%	0.57%	11.61%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	2	2	2
Up Last 60 Days	0	2	2	2
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	0	1	1
Down Last 60 Days	1	0	1	1

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	1.05	0.95	3.51	3.92
7 Days Ago	1.05	0.95	3.51	3.92
30 Days Ago	1.05	0.93	3.52	3.90
60 Days Ago	1.05	0.93	3.52	3.90
90 Days Ago	1.05	0.93	3.52	3.90

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.05	0.95	3.52	3.91
Zacks Consensus Estimate	1.05	0.95	3.51	3.92
Earnings ESP	0.48%	0.00%	0.12%	-0.17%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.79	0.79	0.89	0.93	NA
Estimate	0.79	0.86	0.85	0.89	NA
Difference	0.00	-0.07	0.04	0.04	0.00
Surprise	0.00%	-8.14%	4.71%	4.49%	0.27%

Quarterly Estimates By Analyst

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Trading Services

	1/29/25
Current Quarter	1.95
EPS Last Quarter	1.40
Last EPS Surprise	-17.16%
ABR	2.38

Earnings ESP	1.93%
Current Year	3.59
Next Year	7.77
EPS (TTM)	3.57
P/E (F1)	28.42

% EPS Growth Estimates	SIGI	IND	S&P
Current Qtr (12/2024)	0.52	-75.88	20.57
Next Qtr (03/2025)	48.87	-37.53	13.17
Current Year (12/2024)	-39.05	8.80	12.40
Next Year (12/2025)	116.43	15.20	18.75
Past 5 Years	9.50	11.40	8.10
Next 5 Years	NA	11.20	NA
PE	28.42	15.40	25.13
PEG Ratio	NA	1.38	NA

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Research for SIGI

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.27B	1.30B	4.87B	5.39B
# of Estimates	4	4	4	4
High Estimate	1.28B	1.32B	4.88B	5.46B
Low Estimate	1.27B	1.29B	4.87B	5.31B
Year ago Sales	1.11B	1.17B	4.24B	4.87B
Year over Year Growth Est.	15.30%	11.84%	15.08%	10.48%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.95	1.98	3.59	7.77
# of Estimates	4	4	4	4
Most Recent Consensus	1.95	1.90	3.60	7.75
High Estimate	2.02	2.10	3.67	8.07
Low Estimate	1.80	1.90	3.45	7.50
Year ago EPS	1.94	1.33	5.89	3.59
Year over Year Growth Est.	0.52%	48.87%	-39.05%	116.43%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	2	2	0	1
Up Last 60 Days	3	4	0	2
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	2	1
Down Last 60 Days	1	0	4	2

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	1.95	1.98	3.59	7.77
7 Days Ago	1.95	1.98	3.59	7.77
30 Days Ago	1.94	1.96	3.68	7.86
60 Days Ago	1.88	1.89	3.84	7.90
90 Days Ago	1.88	1.89	3.84	7.90

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.99	1.93	3.63	7.76
Zacks Consensus Estimate	1.95	1.98	3.59	7.77
Earnings ESP	1.93%	-2.66%	0.91%	-0.16%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.40	-1.10	1.33	1.94	NA
Estimate	1.69	1.56	1.88	1.92	NA
Difference	-0.29	-2.66	-0.55	0.02	-0.87
Surprise	-17.16%	-170.51%	-29.26%	1.04%	-53.97%

Quarterly Estimates By Analyst

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Trading Services

	2/6/25
Current Quarter	0.20
EPS Last Quarter	0.18
Last EPS Surprise	-21.74%
ABR	2.41

Earnings ESP	0.00%
Current Year	0.72
Next Year	1.30
EPS (TTM)	0.66
P/E (F1)	47.01

% EPS Growth Estimates	SNDR	IND	S&P
Current Qtr (12/2024)	25.00	-64.22	20.57
Next Qtr (03/2025)	72.73	-77.17	13.17
Current Year (12/2024)	-47.45	3.50	12.40
Next Year (12/2025)	80.56	14.30	18.75
Past 5 Years	2.00	15.50	8.10
Next 5 Years	13.70	11.30	NA
PE	47.01	16.20	25.13
PEG Ratio	3.43	1.43	NA

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Research for SNDR

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.37B	1.38B	5.32B	5.65B
# of Estimates	5	4	5	5
High Estimate	1.39B	1.42B	5.34B	5.73B
Low Estimate	1.33B	1.32B	5.28B	5.63B
Year ago Sales	1.37B	1.32B	5.50B	5.32B
Year over Year Growth Est.	-0.30%	4.39%	-3.27%	6.25%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.20	0.19	0.72	1.30
# of Estimates	7	4	8	8
Most Recent Consensus	0.21	0.21	0.71	1.18
High Estimate	0.22	0.22	0.82	1.81
Low Estimate	0.19	0.12	0.68	1.10
Year ago EPS	0.16	0.11	1.37	0.72
Year over Year Growth Est.	25.00%	72.73%	-47.45%	81.60%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	2
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	5	4	8	8
Down Last 60 Days	5	4	8	8

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.20	0.19	0.72	1.30
7 Days Ago	0.20	0.19	0.72	1.29
30 Days Ago	0.29	0.24	0.84	1.50
60 Days Ago	0.30	0.25	0.85	1.54
90 Days Ago	0.30	0.25	0.85	1.55

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.20	0.19	0.72	1.30
Zacks Consensus Estimate	0.20	0.19	0.72	1.30
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.18	0.21	0.11	0.16	NA
Estimate	0.23	0.18	0.13	0.21	NA
Difference	-0.05	0.03	-0.02	-0.05	-0.02
Surprise	-21.74%	16.67%	-15.38%	-23.81%	-11.07%

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	1/1/25
Current Quarter	2.27
EPS Last Quarter	2.46
Last EPS Surprise	20.00%
ABR	3.33

Earnings ESP	0.00%
Current Year	7.68
Next Year	8.65
EPS (TTM)	8.25
P/E (F1)	26.17

% EPS Growth Estimates	UNF	IND	S&P
Current Qtr (11/2024)	-4.62	7.65	20.57
Next Qtr (02/2025)	4.92	7.06	13.17
Current Year (08/2025)	-6.91	2.40	12.40
Next Year (08/2026)	12.63	11.00	18.75
Past 5 Years	1.40	8.60	8.10
Next 5 Years	NA	12.00	NA
PE	26.17	39.80	25.13
PEG Ratio	NA	3.32	NA

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Research for UNF

Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Zacks Consensus Estimate	604.83M	603.04M	2.43B	2.53B
# of Estimates	2	2	2	2
High Estimate	607.66M	604.07M	2.44B	2.54B
Low Estimate	602.00M	602.00M	2.43B	2.52B
Year ago Sales	593.53M	590.71M	2.43B	2.43B
Year over Year Growth Est.	1.90%	2.09%	0.20%	4.00%

Earnings Estimates

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Zacks Consensus Estimate	2.27	1.28	7.68	8.65
# of Estimates	2	2	2	2
Most Recent Consensus	2.23	1.31	7.57	8.82
High Estimate	2.30	1.31	7.78	8.82
Low Estimate	2.23	1.24	7.57	8.47
Year ago EPS	2.38	1.22	8.25	7.68
Year over Year Growth Est.	-4.62%	4.92%	-6.91%	12.63%

Agreement - Estimate Revisions

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	0	0	0	0
Down Last 60 Days	2	2	2	2

Magnitude - Consensus Estimate Trend

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Current	2.27	1.28	7.68	8.65
7 Days Ago	2.27	1.28	7.68	8.65
30 Days Ago	2.27	1.28	7.68	8.65
60 Days Ago	2.44	1.45	8.30	9.06
90 Days Ago	2.44	1.45	8.30	9.06

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (11/2024)	Next Qtr (2/2025)	Current Year (8/2025)	Next Year (8/2026)
Most Accurate Estimate	2.27	1.28	7.68	8.65
Zacks Consensus Estimate	2.27	1.28	7.68	8.65
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (8/2024)	Quarter Ending (5/2024)	Quarter Ending (2/2024)	Quarter Ending (11/2023)	Average Surprise
Reported	2.46	2.19	1.22	2.38	NA
Estimate	2.05	1.88	1.41	2.33	NA
Difference	0.41	0.31	-0.19	0.05	0.15
Surprise	20.00%	16.49%	-13.48%	2.15%	6.29%

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	1/10/25
Current Quarter	6.74
EPS Last Quarter	7.15
Last EPS Surprise	1.85%
ABR	1.14

Earnings ESP	-0.92%
Current Year	27.61
Next Year	30.02
EPS (TTM)	27.02
P/E (F1)	22.10

% EPS Growth Estimates	UNH	IND	S&P
Current Qtr (12/2024)	9.42	40.55	20.57
Next Qtr (03/2025)	6.51	1,728.87	13.17
Current Year (12/2024)	9.91	-3.30	12.40
Next Year (12/2025)	8.73	10.30	18.75
Past 5 Years	14.50	14.50	8.10
Next 5 Years	12.30	10.90	NA
PE	22.10	24.30	25.13
PEG Ratio	1.79	2.23	NA

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Research for UNH

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	101.71B	106.07B	401.27B	431.67B
# of Estimates	10	9	10	10
High Estimate	104.14B	108.27B	403.61B	444.11B
Low Estimate	99.80B	103.65B	399.96B	422.04B
Year ago Sales	94.43B	99.80B	371.62B	401.27B
Year over Year Growth Est.	7.71%	6.29%	7.98%	7.58%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	6.74	7.36	27.61	30.02
# of Estimates	12	11	15	14
Most Recent Consensus	6.68	6.96	27.54	29.80
High Estimate	6.93	7.89	27.75	31.36
Low Estimate	6.45	6.88	27.31	29.72
Year ago EPS	6.16	6.91	25.12	27.61
Year over Year Growth Est.	9.42%	6.51%	9.91%	8.73%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	1	2	0
Down Last 7 Days	0	0	0	1
Down Last 30 Days	1	1	2	3
Down Last 60 Days	10	8	10	13

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	6.74	7.36	27.61	30.02
7 Days Ago	6.74	7.36	27.61	30.08
30 Days Ago	6.76	7.39	27.63	30.28
60 Days Ago	6.91	7.56	27.69	31.21
90 Days Ago	6.91	7.55	27.69	31.21

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	6.68	6.96	27.60	29.92
Zacks Consensus Estimate	6.74	7.36	27.61	30.02
Earnings ESP	-0.92%	-5.40%	-0.04%	-0.32%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	7.15	6.80	6.91	6.16	NA
Estimate	7.02	6.65	6.63	5.98	NA
Difference	0.13	0.15	0.28	0.18	0.19
Surprise	1.85%	2.26%	4.22%	3.01%	2.84%

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	2/4/25
Current Quarter	2.50
EPS Last Quarter	1.76
Last EPS Surprise	6.67%
ABR	2.01

Earnings ESP	-2.36%
Current Year	7.48
Next Year	8.75
EPS (TTM)	7.45
P/E (F1)	18.14

% EPS Growth Estimates	UPS	IND	S&P
Current Qtr (12/2024)	1.21	28.28	20.57
Next Qtr (03/2025)	21.68	41.12	13.17
Current Year (12/2024)	-14.81	-10.80	12.40
Next Year (12/2025)	16.98	22.40	18.75
Past 5 Years	4.80	5.30	8.10
Next 5 Years	8.10	10.80	NA
PE	18.14	21.50	25.13
PEG Ratio	2.23	1.99	NA

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Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

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Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	25.19B	22.52B	90.96B	94.81B
# of Estimates	7	6	7	7
High Estimate	25.42B	23.41B	91.19B	97.64B
Low Estimate	24.49B	21.96B	90.26B	92.42B
Year ago Sales	24.92B	21.71B	90.96B	90.96B
Year over Year Growth Est.	1.09%	3.74%	0.00%	4.23%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.50	1.74	7.48	8.75
# of Estimates	9	6	11	11
Most Recent Consensus	2.44	1.74	7.42	8.79
High Estimate	2.56	1.93	7.59	9.20
Low Estimate	2.39	1.56	7.35	7.82
Year ago EPS	2.47	1.43	8.78	7.48
Year over Year Growth Est.	1.21%	21.68%	-14.81%	16.98%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	2	1
Up Last 60 Days	2	0	6	2
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	0	1
Down Last 60 Days	5	4	4	8

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	2.50	1.74	7.48	8.75
7 Days Ago	2.50	1.74	7.48	8.75
30 Days Ago	2.51	1.76	7.47	8.79
60 Days Ago	2.55	1.82	7.43	8.87
90 Days Ago	2.55	1.82	7.43	8.87

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	2.44	1.74	7.46	8.79
Zacks Consensus Estimate	2.50	1.74	7.48	8.75
Earnings ESP	-2.36%	0.00%	-0.27%	0.46%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	1.76	1.79	1.43	2.47	NA
Estimate	1.65	1.98	1.33	2.44	NA
Difference	0.11	-0.19	0.10	0.03	0.01
Surprise	6.67%	-9.60%	7.52%	1.23%	1.46%

Quarterly Estimates By Analyst

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Exp Earnings Date	12/5/24
Current Quarter	NA
EPS Last Quarter	NA
Last EPS Surprise	NA
ABR	NA

Earnings ESP	NA
Current Year	NA
Next Year	NA
EPS (TTM)	5.17
P/E (F1)	NA

% EPS Growth Estimates	UVV	IND	S&P
Current Qtr (Not defined)	NA	0.16	20.57
Next Qtr (Not defined)	NA	-14.68	13.17
Current Year (Not defined)	NA	3.40	12.40
Next Year (Not defined)	NA	9.30	18.75
Past 5 Years	NA	5.10	8.10
Next 5 Years	NA	6.10	NA
PE	NA	14.40	25.13
PEG Ratio	NA	2.36	NA

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Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (ND)	Next Qtr (ND)	Current Year (ND)	Next Year (ND)
Zacks Consensus Estimate	NA	NA	NA	NA
# of Estimates	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago Sales	NA	NA	2.75B	NA
Year over Year Growth Est.	NA	NA	NA	NA

Earnings Estimates

	This Quarter (ND)	Next Quarter (ND)	This Year (ND)	Next Year (ND)
Zacks Consensus Estimate	NA	NA	NA	NA
# of Estimates	NA	NA	NA	NA
Most Recent Consensus	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago EPS	NA	NA	NA	NA
Year over Year Growth Est.	NA	NA	NA	NA

Agreement - Estimate Revisions

	Current Qtr (NA)	Next Qtr (NA)	Current Year (NA)	Next Year (NA)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	This Quarter (Not defined)	Next Quarter (Not defined)	This Year (Not defined)	Next Year (Not defined)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	This Quarter (Not defined)	Next Quarter (Not defined)	This Year (Not defined)	Next Year (Not defined)
Most Accurate Estimate	NA	NA	NA	NA
Zacks Consensus Estimate	NA	NA	NA	NA
Earnings ESP	NA	NA	NA	NA

Surprise - Reported Earnings History

	Quarter Ending (Not defined)	Quarter Ending (Not defined)	Quarter Ending (Not defined)	Quarter Ending (Not defined)	Average Surprise
Reported	NA	NA	NA	NA	NA
Estimate	NA	NA	NA	NA	NA
Difference	NA	NA	NA	NA	NA
Surprise	NA	NA	NA	NA	NA

Annual Estimates By Analyst

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	2/3/25
Current Quarter	4.07
EPS Last Quarter	4.38
Last EPS Surprise	6.05%
ABR	1.91

Earnings ESP	0.82%
Current Year	0.50
Next Year	18.55
EPS (TTM)	0.51
P/E (F1)	943.52

% EPS Growth Estimates	VRTX	IND	S&P
Current Qtr (12/2024)	-3.10	30.65	20.57
Next Qtr (03/2025)	-8.61	112.39	13.17
Current Year (12/2024)	-96.72	17.70	12.40
Next Year (12/2025)	3,610.00	10.50	18.75
Past 5 Years	38.20	4.00	8.10
Next 5 Years	12.20	20.20	NA
PE	943.52	-2.90	25.13
PEG Ratio	77.34	-0.14	NA

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Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.77B	2.68B	10.88B	11.78B
# of Estimates	12	4	12	12
High Estimate	2.87B	2.69B	10.98B	13.73B
Low Estimate	2.71B	2.67B	10.84B	11.27B
Year ago Sales	2.52B	2.69B	9.87B	10.88B
Year over Year Growth Est.	10.11%	-0.47%	10.27%	8.22%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	4.07	4.35	0.50	18.55
# of Estimates	13	5	13	13
Most Recent Consensus	3.82	4.26	0.13	17.69
High Estimate	4.96	5.20	1.42	22.00
Low Estimate	3.60	3.81	0.05	16.39
Year ago EPS	4.20	4.76	15.23	0.50
Year over Year Growth Est.	-3.10%	-8.61%	-96.72%	3,609.97%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	3	1	11	7
Up Last 60 Days	4	1	10	9
Down Last 7 Days	0	0	0	0
Down Last 30 Days	6	3	1	6
Down Last 60 Days	5	2	1	3

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	4.07	4.35	0.50	18.55
7 Days Ago	4.07	4.35	0.50	18.55
30 Days Ago	4.19	4.61	0.22	17.17
60 Days Ago	4.10	4.63	0.19	16.66
90 Days Ago	4.10	4.62	0.19	16.65

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	4.11	4.35	0.53	18.55
Zacks Consensus Estimate	4.07	4.35	0.50	18.55
Earnings ESP	0.82%	0.00%	7.49%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	4.38	-12.83	4.76	4.20	NA
Estimate	4.13	-11.50	4.10	4.10	NA
Difference	0.25	-1.33	0.66	0.10	-0.08
Surprise	6.05%	-11.57%	16.10%	2.44%	3.26%

Quarterly Estimates By Analyst

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	2/4/25
Current Quarter	4.02
EPS Last Quarter	2.93
Last EPS Surprise	9.33%
ABR	2.76

Earnings ESP	0.00%
Current Year	11.79
Next Year	12.93
EPS (TTM)	11.39
P/E (F1)	32.63

% EPS Growth Estimates	WAT	IND	S&P
Current Qtr (12/2024)	11.05	19.26	20.57
Next Qtr (03/2025)	12.67	87.70	13.17
Current Year (12/2024)	0.34	15.40	12.40
Next Year (12/2025)	9.67	19.70	18.75
Past 5 Years	7.30	9.90	8.10
Next 5 Years	4.60	12.90	NA
PE	32.63	10.10	25.13
PEG Ratio	7.04	0.78	NA

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Research for WAT

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	857.10M	682.75M	2.94B	3.11B
# of Estimates	5	4	5	5
High Estimate	862.90M	692.50M	2.95B	3.14B
Low Estimate	854.34M	668.68M	2.94B	3.08B
Year ago Sales	819.47M	636.84M	2.96B	2.94B
Year over Year Growth Est.	4.59%	7.21%	-0.46%	5.80%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	4.02	2.49	11.79	12.93
# of Estimates	7	4	7	7
Most Recent Consensus	4.00	2.45	11.77	12.94
High Estimate	4.07	2.82	11.83	13.04
Low Estimate	3.99	2.31	11.76	12.80
Year ago EPS	3.62	2.21	11.75	11.79
Year over Year Growth Est.	11.05%	12.67%	0.34%	9.64%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	3	7	7
Up Last 60 Days	0	2	7	7
Down Last 7 Days	0	0	0	0
Down Last 30 Days	5	1	0	0
Down Last 60 Days	5	2	0	0

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	4.02	2.49	11.79	12.93
7 Days Ago	4.02	2.49	11.79	12.93
30 Days Ago	4.09	2.48	11.60	12.73
60 Days Ago	4.10	2.51	11.60	12.75
90 Days Ago	4.10	2.47	11.62	12.76

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	4.02	2.49	11.79	12.93
Zacks Consensus Estimate	4.02	2.49	11.79	12.93
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	2.93	2.63	2.21	3.62	NA
Estimate	2.68	2.55	2.10	3.56	NA
Difference	0.25	0.08	0.11	0.06	0.13
Surprise	9.33%	3.14%	5.24%	1.69%	4.85%

Quarterly Estimates By Analyst

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	2/4/25
Current Quarter	0.23
EPS Last Quarter	0.15
Last EPS Surprise	-31.82%
ABR	3.37

Earnings ESP	3.70%
Current Year	0.70
Next Year	1.63
EPS (TTM)	0.85
P/E (F1)	58.82

% EPS Growth Estimates	WERN	IND	S&P
Current Qtr (12/2024)	-41.03	-2.01	20.57
Next Qtr (03/2025)	57.14	30.54	13.17
Current Year (12/2024)	-63.73	-23.10	12.40
Next Year (12/2025)	132.86	16.90	18.75
Past 5 Years	-0.80	8.90	8.10
Next 5 Years	1.70	12.80	NA
PE	58.82	43.10	25.13
PEG Ratio	34.60	3.37	NA

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Research for WERN

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	775.54M	788.36M	3.05B	3.29B
# of Estimates	3	2	3	3
High Estimate	786.40M	816.83M	3.06B	3.35B
Low Estimate	756.21M	759.90M	3.03B	3.21B
Year ago Sales	821.95M	769.08M	3.28B	3.05B
Year over Year Growth Est.	-5.65%	2.51%	-7.08%	7.91%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.23	0.22	0.70	1.63
# of Estimates	4	2	6	6
Most Recent Consensus	NA	NA	NA	NA
High Estimate	0.24	0.26	0.78	2.53
Low Estimate	0.20	0.18	0.65	1.25
Year ago EPS	0.39	0.14	1.93	0.70
Year over Year Growth Est.	-41.03%	57.14%	-63.73%	133.33%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	1
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	3	3
Down Last 60 Days	3	2	6	6

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.23	0.22	0.70	1.63
7 Days Ago	0.23	0.22	0.70	1.63
30 Days Ago	0.27	0.25	0.77	1.72
60 Days Ago	0.44	0.28	0.94	1.94
90 Days Ago	0.44	0.28	1.00	2.06

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.23	0.22	0.70	1.63
Zacks Consensus Estimate	0.23	0.22	0.70	1.63
Earnings ESP	3.70%	0.00%	1.30%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.15	0.17	0.14	0.39	NA
Estimate	0.22	0.23	0.28	0.44	NA
Difference	-0.07	-0.06	-0.14	-0.05	-0.08
Surprise	-31.82%	-26.09%	-50.00%	-11.36%	-29.82%

Annual Estimates By Analyst

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	2/11/25
Current Quarter	2.07
EPS Last Quarter	4.22
Last EPS Surprise	-12.81%
ABR	2.64

Earnings ESP	-5.01%
Current Year	13.06
Next Year	14.51
EPS (TTM)	12.94
P/E (F1)	42.25

% EPS Growth Estimates	WSO	IND	S&P
Current Qtr (12/2024)	0.49	7.43	20.57
Next Qtr (03/2025)	1.84	13.30	13.17
Current Year (12/2024)	-4.46	18.30	12.40
Next Year (12/2025)	11.10	17.20	18.75
Past 5 Years	17.10	19.30	8.10
Next 5 Years	NA	15.90	NA
PE	42.25	41.20	25.13
PEG Ratio	NA	2.59	NA

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Research for WSO

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.64B	1.61B	7.52B	7.90B
# of Estimates	5	4	5	5
High Estimate	1.68B	1.63B	7.63B	8.09B
Low Estimate	1.62B	1.59B	7.48B	7.76B
Year ago Sales	1.60B	1.56B	7.28B	7.52B
Year over Year Growth Est.	2.15%	2.71%	3.22%	5.08%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	2.07	2.21	13.06	14.51
# of Estimates	5	4	6	6
Most Recent Consensus	1.97	2.25	12.85	14.48
High Estimate	2.33	2.25	13.50	14.84
Low Estimate	1.86	2.15	12.75	13.90
Year ago EPS	2.06	2.17	13.67	13.06
Year over Year Growth Est.	0.49%	1.84%	-4.46%	11.16%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	0	0
Up Last 60 Days	0	0	0	0
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	1	2	2
Down Last 60 Days	4	1	5	5

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	2.07	2.21	13.06	14.51
7 Days Ago	2.07	2.21	13.06	14.51
30 Days Ago	2.13	2.32	13.28	14.78
60 Days Ago	2.35	2.68	13.83	15.52
90 Days Ago	2.35	2.68	13.83	15.52

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	1.97	2.25	12.96	14.66
Zacks Consensus Estimate	2.07	2.21	13.06	14.51
Earnings ESP	-5.01%	1.93%	-0.73%	1.02%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	4.22	4.49	2.17	2.06	NA
Estimate	4.84	4.75	2.26	2.50	NA
Difference	-0.62	-0.26	-0.09	-0.44	-0.35
Surprise	-12.81%	-5.47%	-3.98%	-17.60%	-9.97%

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	2/4/25
Current Quarter	0.42
EPS Last Quarter	0.46
Last EPS Surprise	4.55%
ABR	3.41

Earnings ESP	0.13%
Current Year	1.77
Next Year	1.83
EPS (TTM)	1.72
P/E (F1)	6.23

% EPS Growth Estimates	WU	IND	S&P
Current Qtr (12/2024)	13.51	39.21	20.57
Next Qtr (03/2025)	0.00	14.92	13.17
Current Year (12/2024)	1.72	22.80	12.40
Next Year (12/2025)	3.39	17.40	18.75
Past 5 Years	-0.90	6.00	8.10
Next 5 Years	4.00	15.00	NA
PE	6.23	7.60	25.13
PEG Ratio	1.54	0.51	NA

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Research for WU

Analyst Snapshot

Price and EPS Surprise Chart

1 Month 3 Months 6 Months YTD 1 Year

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	1.03B	1.06B	4.18B	4.23B
# of Estimates	6	6	6	6
High Estimate	1.04B	1.07B	4.19B	4.27B
Low Estimate	1.01B	1.05B	4.17B	4.18B
Year ago Sales	1.05B	1.05B	4.36B	4.18B
Year over Year Growth Est.	-2.48%	0.69%	-4.11%	1.14%

Earnings Estimates

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Zacks Consensus Estimate	0.42	0.45	1.77	1.83
# of Estimates	7	6	7	7
Most Recent Consensus	0.42	0.47	1.77	1.83
High Estimate	0.46	0.47	1.80	1.89
Low Estimate	0.40	0.45	1.75	1.81
Year ago EPS	0.37	0.45	1.74	1.77
Year over Year Growth Est.	13.51%	0.00%	1.72%	3.59%

Agreement - Estimate Revisions

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Up Last 7 Days	0	0	0	0
Up Last 30 Days	0	0	1	0
Up Last 60 Days	1	2	3	1
Down Last 7 Days	0	0	0	0
Down Last 30 Days	1	0	0	1
Down Last 60 Days	5	2	2	5

Magnitude - Consensus Estimate Trend

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Current	0.42	0.45	1.77	1.83
7 Days Ago	0.42	0.45	1.77	1.83
30 Days Ago	0.42	0.45	1.77	1.83
60 Days Ago	0.44	0.45	1.77	1.85
90 Days Ago	0.44	0.45	1.77	1.85

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (12/2024)	Next Qtr (3/2025)	Current Year (12/2024)	Next Year (12/2025)
Most Accurate Estimate	0.42	0.45	1.77	1.83
Zacks Consensus Estimate	0.42	0.45	1.77	1.83
Earnings ESP	0.13%	0.00%	0.16%	-0.04%

Surprise - Reported Earnings History

	Quarter Ending (9/2024)	Quarter Ending (6/2024)	Quarter Ending (3/2024)	Quarter Ending (12/2023)	Average Surprise
Reported	0.46	0.44	0.45	0.37	NA
Estimate	0.44	0.44	0.40	0.36	NA
Difference	0.02	0.00	0.05	0.01	0.02
Surprise	4.55%	0.00%	12.50%	2.78%	4.96%

Quarterly Estimates By Analyst

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AVANGRID, INC. NYSE-AGR

RECENT PRICE **35.79** | P/E RATIO **13.9** (12.4 NMF) | RELATIVE P/E RATIO **0.76** | DIV'D YLD **4.9%** | **VALUE LINE**

TIMELINESS — [F] Suspended 3/22/24
SAFETY 2 Raised 5/10/24
TECHNICAL — [F] Suspended 3/22/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

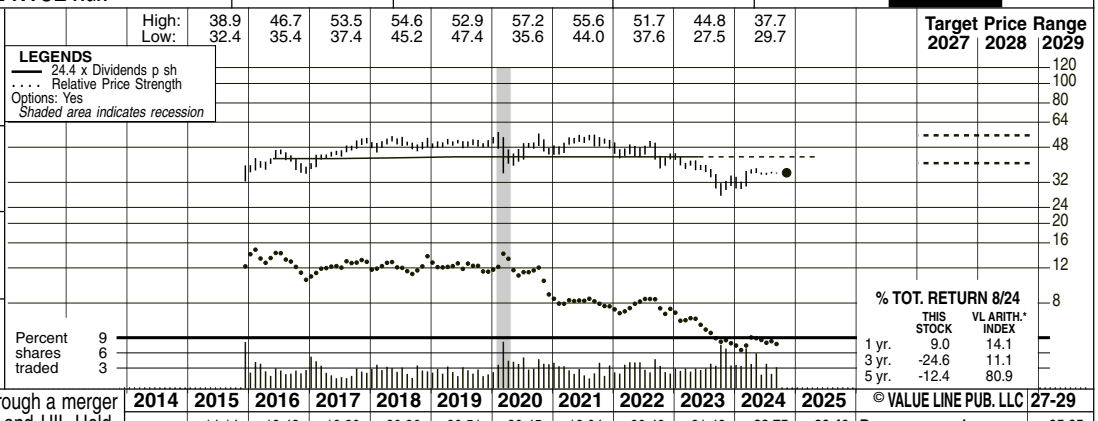
Low-High	Midpoint (% to Mid)
$24-$42	$33 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	55	(+55%)	*10%*
Low	40	(+10%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	142	149	134
to Sell	152	147	140
Hld's(000)	51016	49291	45938



Avangrid, Inc. was formed through a merger between Iberdrola USA, Inc. and UIL Holdings Corporation in December of 2015. Iberdrola S.A., a worldwide leader in the energy industry, owns 81.5% of Avangrid. The predecessor company was founded in 1852 and is headquartered in New Gloucester, Maine. It was incorporated in 1997 in New York under the name NGE Resources, Inc. Avangrid began trading on the NYSE on December 17, 2015.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	--	14.14	19.48	19.30	20.96	20.51	20.45	18.04	20.49	21.48	*22.75*	*23.40*	Revenues per sh	*25.85*
	--	3.44	4.74	4.49	4.89	5.41	5.22	4.64	5.14	5.08	*5.60*	*5.90*	"Cash Flow" per sh	*6.50*
	--	1.05	1.98	1.67	1.92	2.17	2.02	2.18	2.32	2.09	*2.55*	*2.70*	Earnings per sh [A]	*3.00*
	--	--	1.73	1.73	1.74	1.76	1.76	1.76	1.76	1.76	*1.76*	*1.76*	Div'd Decl'd per sh [B] ■	*1.95*
	--	3.50	5.52	7.82	5.78	8.87	9.00	7.70	6.52	7.68	*7.50*	*7.60*	Cap'l Spending per sh	*8.00*
	--	48.74	48.90	48.79	48.88	49.31	49.21	49.35	50.13	50.80	*51.50*	*52.50*	Book Value per sh [C]	*55.50*
	--	308.86	308.99	309.01	309.01	309.01	309.08	386.57	386.63	386.77	*387.00*	*387.00*	Common Shs Outst'g [D]	*387.00*
	--	33.5	20.5	27.3	26.1	23.1	23.6	23.2	19.6	17.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
	--	1.69	1.08	1.37	1.41	1.23	1.21	1.25	1.13	.98			Relative P/E Ratio	*.90*
	--	--	4.3%	3.8%	3.5%	3.5%	3.7%	3.5%	3.9%	4.8%			Avg Ann'l Div'd Yield	*4.1%*
	4594.0	4367.0	6018.0	5963.0	6478.0	6338.0	6320.0	6974.0	7923.0	8309.0	*8800*	*9050*	Revenues ($mill)	*10000*
	424.0	267.0	611.0	516.0	595.0	673.0	625.0	780.0	901.0	808.0	*985*	*1045*	Net Profit ($mill)	*1160*
	39.9%	11.3%	37.4%	32.4%	22.1%	17.0%	7.2%	6.2%	3.2%	7.0%	*7.0%*	*7.0%*	Income Tax Rate	*7.0%*
	6.8%	12.7%	7.5%	12.4%	9.4%	15.0%	17.1%	15.5%	12.9%	17.9%	*18.0%*	*18.0%*	AFUDC % to Net Profit	*16.0%*
	16.8%	23.1%	23.0%	25.6%	26.2%	30.6%	40.8%	29.3%	29.8%	33.7%	*36.0%*	*39.0%*	Long-Term Debt Ratio	*44.0%*
	83.2%	76.9%	77.0%	74.4%	73.8%	69.4%	59.2%	70.7%	70.2%	66.3%	*64.0%*	*61.0%*	Common Equity Ratio	*56.0%*
	14956	19583	19619	20273	20472	21953	25687	26998	27603	29632	*31400*	*33100*	Total Capital ($mill)	*38000*
	17099	20711	21548	22669	23459	25218	26751	28866	30994	32857	*34600*	*36500*	Net Plant ($mill)	*41200*
	3.7%	2.1%	3.8%	3.1%	3.5%	3.7%	3.0%	3.4%	3.8%	3.4%	*3.5%*	*3.5%*	Return on Total Cap'l	*4.0%*
	3.4%	1.8%	4.0%	3.4%	3.9%	4.4%	4.1%	4.1%	4.6%	4.1%	*4.5%*	*5.0%*	Return on Shr. Equity	*5.0%*
	3.4%	1.8%	4.0%	3.4%	3.9%	4.4%	4.1%	4.1%	4.6%	4.1%	*4.5%*	*5.0%*	Return on Com Equity [E]	*5.0%*
	3.4%	1.8%	1.4%	NMF	.4%	.8%	.5%	.9%	1.1%	.6%	*1.0%*	*1.0%*	Retained to Com Eq	*1.5%*
	--	--	66%	104%	90%	81%	87%	79%	76%	84%	*69%*	*65%*	All Div'ds to Net Prof	*65%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $14692 mill. **Due in 5 Yrs** $3579 mill.
LT Debt $10839 mill. **LT Interest** $460 mill.
Incl. $81 mill. finance leases.
(Total Interest coverage: 2.8x)
Leases, Uncapitalized Annual rentals $12 mill.

Pension Assets-12/23 $2159 mill.
Oblig. $2500 mill.
Pfd Stock None

Common Stock 386,911,024 shs.
as of 10/22/24
MARKET CAP: $13.8 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (MWH)	+1.8	+.7	-3.3
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (MW)	NA	NA	NA
Peak Load, Summer (MW)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+.1	+1.2	+.4
Fixed Charge Cov. (%)	300	247	203

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	--	--	*4.0%*
"Cash Flow"	--	1.0%	*4.0%*
Earnings	--	3.5%	*4.0%*
Dividends	--	0.5%	*0.5%*
Book Value	--	0.5%	*2.0%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1966	1477	1598	1933	6974
2022	2133	1794	1838	2158	7923
2023	2466	1587	1974	2282	8309
2024	2417	1923	2083	*2377*	*8800*
2025	*2600*	*1950*	*2100*	*2400*	*9050*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.14	.35	.34	.44	2.18
2022	1.16	.46	.31	.39	2.32
2023	.64	.21	.27	.97	2.09
2024	.88	.49	.55	*.63*	*2.55*
2025	*.90*	*.50*	*.60*	*.70*	*2.70*

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.44	.44	.44	.44	1.76
2021	.44	.44	.44	.44	1.76
2022	.44	.44	.44	.44	1.76
2023	.44	.44	.44	.44	1.76
2024	.44	.44	.44	.44	

BUSINESS: Avangrid, Inc. (formerly Iberdrola USA, Inc.), is a diversified energy and utility company that serves 2.3 million electric customers in New York, Connecticut, and Maine and 1.0 million gas customers in New York, Connecticut, Massachusetts & Maine. Has a nonregulated generating subsidiary focused on wind and solar power generation, with 9.3 GW of capacity and 1.3 GW under construction. Renewables segment accounted for about 22% of net profits for trailing 12 months. Power/fuel costs: 29% of rev. '23 reported depr. rate: 2.5%. Iberdrola owns 81.6% of stock. Employs about 8,000. Board Chair: Ignacio Sanchez Galan. CEO: Pedro Azagra Blazquez. Inc.: New York. Address: 180 Marsh Hill Road, Orange, CT 06477. Tel.: 207-629-1200. Web: www.avangrid.com.

Avangrid's parent company has received minority shareholder approval to purchase the public float for $35.75 a share. Spanish multinational Iberdrola, S.A. already owns 81.6% of Avangrid's common stock. The initial proposal in March was for a buyout of the 18.4% minority interest for $34.25 a share. At the time, Avangrid's board of directors stated that it would review, evaluate, negotiate, and approve or disapprove of the offer based on the recommendations of its advisers. In mid-May, the boards of both companies unanimously approved the purchase agreement at $1.50 per share more than the initial offer. In late September, Avangrid's minority shareholders voted in the affirmative for the buyout.

The deal has cleared some of the necessary regulatory hurdles. The Federal Energy Regulatory Commission has approved the buyout. In addition, Maine regulators cleared the transaction subject to a final written order. According to Avangrid, all that remains for the deal to close is the approval of the New York Public Service Commission. However, the company also distributes natural gas in Massachusetts, as well as gas and electricity in Connecticut. While we have not seen any contention out of Massachusetts regulators that would indicate that they believe they have a say in this matter, Connecticut regulators seem to think that their own approval is a necessary condition for the buyout. Avangrid and Iberdrola have not filed for merger permission with The Public Utilities Regulatory Authority in Connecticut. This disagreement may serve as a potential snag that extends the length of the closing.

The dividend should be paid until the deal's completion. Avangrid indicated it will continue to make the $0.44-per-quarter payout, including a pro-rated disbursement for the final partial interim.

Shareholders may want to sell in the open market. It depends on the preference for receiving further AGR dividends versus the opportunity cost of waiting for the deal to close. We don't see a lot of downside for the stock price should the deal not close, as AGR now looks undervalued relative to industry peers, which have seen their valuations run up of late.

Anthony J. Glennon *November 8, 2024*

(A) Diluted egs. Excl. nonrecur. gain/(loss): '16, 6¢; '17, (44¢); '19, 9¢; '20, (14¢); '21, (21¢); '22, (5¢); '23, (6¢). Qtly. EPS may not sum to full-year due to rounding. Next egs. report due late January. **(B)** Div'ds paid in early Jan., Apr., July and Oct. ■ Div'd reinvestment plan available. **(C)** Incl. intangibles. In '23: $6,214 mill., $16.07/sh. **(D)** In mill. **(E)** Rate allowed on com. eq. in NY in '23: 9.2%; in CT in '23: 8.63% elec.; in CT in '19: 9.3% gas; in ME in '22: 9.25%. Reg. Climate: Below Avg. **(F)** Ranks are suspended due to the buyout offer.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	35
Earnings Predictability	80

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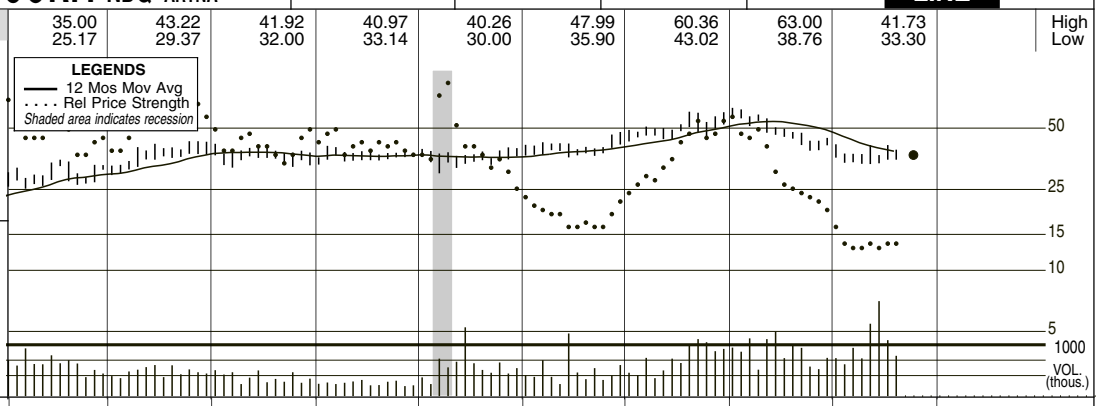
ARTESIAN RES. CORP. NDQ--ARTNA

RECENT PRICE **36.90** | TRAILING P/E RATIO **20.7** | RELATIVE P/E RATIO **1.14** | DIV'D YLD **3.2%** | **VALUE LINE**

RANKS

PERFORMANCE	**4**	*Below Average*
Technical	**5**	*Lowest*
SAFETY	**3**	*Average*
BETA .75	(1.00 = Market)	

Financial Strength	B+
Price Stability	90
Price Growth Persistence	60
Earnings Predictability	95



© VALUE LINE PUBLISHING LLC	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025/2026
SALES PER SH	8.67	8.92	8.69	9.00	9.42	9.65	10.41	9.61	--	
"CASH FLOW" PER SH	2.43	2.55	2.66	2.77	2.99	3.05	3.22	2.92	--	
EARNINGS PER SH	1.41	1.51	1.54	1.60	1.79	1.79	1.90	1.67	***1.92*** [A,B]	***2.09*** [C]***/NA***
DIV'DS DECL'D PER SH	.90	.93	.96	.98	1.01	1.05	1.09	1.14	--	
CAP'L SPENDING PER SH	3.10	4.46	5.30	4.38	3.66	4.34	5.10	6.04	--	
BOOK VALUE PER SH	15.23	15.91	16.57	17.25	18.11	18.91	19.78	22.39	--	
COMMON SHS OUTST'G (MILL)	9.13	9.22	9.25	9.29	9.36	9.41	9.50	10.29	--	
AVG ANN'L P/E RATIO	20.9	24.2	23.9	22.8	20.2	22.3	26.2	29.6	***19.2***	***17.7/NA***
RELATIVE P/E RATIO	1.14	1.21	1.35	1.32	1.18	1.36	1.74	1.84	--	
AVG ANN'L DIV'D YIELD	3.1%	2.5%	2.6%	2.7%	2.8%	2.6%	2.2%	2.3%	--	
SALES ($MILL)	79.1	82.2	80.4	83.6	88.1	90.9	98.9	98.9	--	***Bold figures are consensus earnings estimates and, using the recent prices, P/E ratios.***
OPERATING MARGIN	44.4%	44.6%	46.1%	43.0%	47.8%	48.1%	49.8%	42.6%	--	
DEPRECIATION ($MILL)	9.2	9.6	10.3	10.8	11.1	11.9	12.6	13.3	--	
NET PROFIT ($MILL)	13.0	14.0	14.3	14.9	16.8	16.8	18.0	16.7	--	
INCOME TAX RATE	--	--	--	--	--	--	--	27.5%	--	
NET PROFIT MARGIN	16.4%	17.0%	17.8%	17.9%	19.1%	18.5%	18.2%	16.9%	--	
WORKING CAP'L ($MILL)	d4.7	d9.5	d21.6	d11.4	d26.1	d28.5	d16.3	8.2	--	
LONG-TERM DEBT ($MILL)	102.3	105.6	115.9	144.2	142.3	143.3	175.6	178.3	--	
SHR. EQUITY ($MILL)	139.0	146.6	153.3	160.3	169.4	178.0	187.9	230.4	--	
RETURN ON TOTAL CAP'L	6.7%	6.8%	6.5%	6.1%	6.6%	6.4%	6.1%	5.2%	--	
RETURN ON SHR. EQUITY	9.3%	9.5%	9.3%	9.3%	9.9%	9.5%	9.6%	7.2%	--	
RETAINED TO COM EQ	3.4%	3.7%	3.6%	3.6%	4.4%	3.9%	4.1%	2.4%	--	
ALL DIV'DS TO NET PROF	63%	61%	62%	61%	56%	58%	57%	67%	--	

[A] *No. of analysts changing earn. est. in last 23 days: 0 up, 0 down, consensus 5-year earnings growth not available.* [B] *Based upon one analyst's estimate.* [C] *Based upon one analyst's estimate.*

ANNUAL RATES

of change (per share)	5 Yrs.	1 Yr.
Sales	2.5%	-7.5%
"Cash Flow"	4.0%	-9.5%
Earnings	3.5%	-12.0%
Dividends	3.5%	4.5%
Book Value	5.0%	13.0%

QUARTERLY SALES ($mill.)

Fiscal Year	1Q	2Q	3Q	4Q	Full Year
12/31/22	22.2	25.0	26.6	25.1	98.9
12/31/23	22.5	25.3	26.6	24.5	98.9
12/31/24	24.5	27.4			
12/31/25					

EARNINGS PER SHARE

Fiscal Year	1Q	2Q	3Q	4Q	Full Year
12/31/21	.45	.48	.54	.32	1.79
12/31/22	.48	.53	.65	.24	1.90
12/31/23	.40	.44	.49	.34	1.67
12/31/24	.43	.52	***.61***	***.36***	
12/31/25	***.46***				

QUARTERLY DIVIDENDS PAID

Calendar	1Q	2Q	3Q	4Q	Full Year
2021	.257	.261	.261	.268	1.05
2022	.268	.273	.273	.278	1.09
2023	.278	.284	.284	.29	1.14
2024	.29	.296	.296		

INSTITUTIONAL DECISIONS

	4Q'23	1Q'24	2Q'24
to Buy	49	50	70
to Sell	48	50	64
Hld's(000)	5897	5902	6002

ASSETS ($mill.)	2022	2023	6/30/24
Cash Assets	1.3	2.5	6.3
Receivables	13.5	12.8	11.7
Inventory	4.7	6.0	4.8
Other	8.3	9.3	6.3
Current Assets	27.8	30.6	29.1
Property, Plant & Equip, at cost	845.7	903.1	- -
Accum Depreciation	173.9	185.1	- -
Net Property	671.8	718.0	723.8
Other	20.2	18.2	30.2
Total Assets	719.8	766.8	783.1
LIABILITIES ($mill.)			
Accts Payable	11.0	9.7	7.8
Debt Due	22.2	2.2	2.2
Other	10.9	10.5	12.4
Current Liab	44.1	22.4	22.4

LONG-TERM DEBT AND EQUITY as of 6/30/24

Total Debt $179.7 mill. **Due in 5 Yrs.** NA
LT Debt $177.5 mill.
Including Cap. Leases NA (43% of Cap'l)

Leases, Uncapitalized Annual rentals NA

Pension Liability None in '23 vs. None in '22

Pfd Stock None **Pfd Div'd Paid** None

Common Stock 9,414,108 shares (57% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: Artesian Resources Corp. is the holding company of eight subsidiaries offering water, wastewater, and other services in Delaware, Maryland, and Pennsylvania. The subsidiaries consist of five regulated public utilities: Artesian Water Co., Inc., Artesian Water Pennsylvania, Inc., Artesian Water Maryland, Inc., Artesian Wastewater Management, Inc., and Artesian Wastewater Maryland, Inc.; and three non-regulated subsidiaries: Artesian Utility Development, Inc., Artesian Development Corp., and Artesian Storm Water Services, Inc. Its principal subsidiary, Artesian Water, distributes and sells water to residential, commercial, industrial, governmental, municipal and utility customers. In addition, it offers services to other water utilities, including operations and billing functions, and has contract operation agreements with private, municipal and state water providers. Artesian Water also provides water for public and private fire protection to customers in its service territories. Has 251 employees. Chairman, C.E.O. & President: Dian C. Taylor Address: 664 Churchmans Rd., Newark, DE 19702. Tel.: (302) 453-6900. Internet: www.artesianwater.com. *E.B.*

October 4, 2024

TOTAL SHAREHOLDER RETURN

Dividends plus appreciation as of 8/30/2024

3 Mos.	6 Mos.	1 Yr.	3 Yrs.	5 Yrs.
1.48%	6.36%	-19.39%	-1.30%	12.05%

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ATMOS ENERGY CORP. NYSE-ATO

RECENT PRICE 146.11 | P/E RATIO 20.4 (Trailing: 21.5 Median: 20.0) | RELATIVE P/E RATIO 1.08 | DIV'D YLD 2.4% | VALUE LINE

TIMELINESS 4 Lowered 2/16/24
SAFETY 1 Raised 6/6/14
TECHNICAL 3 Raised 10/25/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$109-$165	$137 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	165	(+15%)	6%
Low	135	(-10%)	1%

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	358	367	342
to Sell	295	292	311
Hld's(000)	137294	137412	144146

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	47.4	58.2	64.8	82.0	93.6	100.8	115.2	121.1	105.3	123.0	125.3	146.9								
Low:	34.9	44.2	50.8	60.0	72.5	76.5	89.2	77.9	84.6	97.7	101.0	110.5								
Revenues per sh [A]	79.52	53.69	53.12	48.15	38.10	42.88	49.22	40.82	32.23	26.01	28.00	24.32	22.41	25.73	29.82	28.79	*26.55*	*27.55*	Revenues per sh [A]	*35.70*
"Cash Flow" per sh	4.19	4.29	4.64	4.72	4.76	5.14	5.42	5.81	6.19	6.62	7.24	7.57	8.03	8.64	9.30	10.04	*11.05*	*11.95*	"Cash Flow" per sh	*13.65*
Earnings per sh [AB]	2.00	1.97	2.16	2.26	2.10	2.50	2.96	3.09	3.38	3.60	4.00	4.35	4.72	5.12	5.60	6.10	6.83	*7.20*	Earnings per sh [AB]	*8.35*
Div'ds Decl'd per sh [C]	1.30	1.32	1.34	1.36	1.38	1.40	1.48	1.56	1.68	1.80	1.94	2.10	2.30	2.50	2.72	2.96	3.22	*3.48*	Div'ds Decl'd per sh [C]	*4.25*
Cap'l Spending per sh	5.20	5.51	6.02	6.90	8.12	9.32	8.32	9.61	10.46	10.72	13.19	14.19	15.38	14.87	17.35	18.90	*18.95*	*23.40*	Cap'l Spending per sh	*21.75*
Book Value per sh	22.60	23.52	24.16	24.98	26.14	28.47	30.74	31.48	33.32	36.74	42.87	48.18	53.95	59.71	66.85	73.20	*80.70*	*82.60*	Book Value per sh	*89.15*
Common Shs Outst'g [D]	90.81	92.55	90.16	90.30	90.24	90.64	100.39	101.48	103.93	106.10	111.27	119.34	125.88	132.42	140.90	148.49	*155.00*	*158.00*	Common Shs Outst'g [D]	*175.00*
Avg Ann'l P/E Ratio	13.6	12.5	13.2	14.4	15.9	15.9	16.1	17.5	20.8	22.0	21.7	23.2	22.3	18.8	19.3	18.7	17.3		Avg Ann'l P/E Ratio	*18.0*
Relative P/E Ratio	.82	.83	.84	.90	1.01	.89	.85	.88	1.09	1.11	1.17	1.24	1.15	1.02	1.12	1.08	.96		Relative P/E Ratio	*1.00*
Avg Ann'l Div'd Yield	4.8%	5.3%	4.7%	4.2%	4.1%	3.5%	3.1%	2.9%	2.4%	2.3%	2.2%	2.1%	2.2%	2.6%	2.5%	2.6%	2.7%		Avg Ann'l Div'd Yield	*2.8%*
Revenues ($mill) [A]							4940.9	4142.1	3349.9	2759.7	3115.5	2901.8	2821.1	3407.5	4201.7	4275.4	*4115*	*4350*	Revenues ($mill) [A]	*6250*
Net Profit ($mill)							289.8	315.1	350.1	382.7	444.3	511.4	580.5	665.6	774.4	885.9	1043.0	*1145*	Net Profit ($mill)	*1475*
Income Tax Rate							39.2%	38.3%	36.4%	36.6%	27.0%	21.4%	19.5%	18.8%	9.1%	11.4%	15.6%	*19.0%*	Income Tax Rate	*25.0%*
Net Profit Margin							5.9%	7.6%	10.5%	13.9%	14.3%	17.6%	20.6%	19.5%	18.4%	20.7%	*25.3%*	*26.3%*	Net Profit Margin	*23.6%*
Long-Term Debt Ratio							44.3%	43.5%	38.7%	44.0%	34.3%	38.0%	40.0%	38.4%	37.9%	37.9%	*39.0%*	*40.0%*	Long-Term Debt Ratio	*40.0%*
Common Equity Ratio							55.7%	56.5%	61.3%	56.0%	65.7%	62.0%	60.0%	61.6%	62.1%	62.1%	*61.0%*	*60.0%*	Common Equity Ratio	*60.0%*
Total Capital ($mill)							5542.2	5650.2	5651.8	6965.7	7263.6	9279.7	11323	12837	15180	17509	*20500*	*21750*	Total Capital ($mill)	*26000*
Net Plant ($mill)							6725.9	7430.6	8280.5	9259.2	10371	11788	13355	15064	17240	19607	*22000*	*23100*	Net Plant ($mill)	*28000*
Return on Total Cap'l							6.4%	6.6%	7.2%	6.4%	6.9%	6.1%	5.5%	5.5%	5.4%	5.5%	*6.5%*	*6.5%*	Return on Total Cap'l	*7.0%*
Return on Shr. Equity							9.4%	9.9%	10.1%	9.8%	9.3%	8.9%	8.5%	8.4%	8.2%	8.1%	*8.5%*	*9.0%*	Return on Shr. Equity	*9.5%*
Return on Com Equity							9.4%	9.9%	10.1%	9.8%	9.3%	8.9%	8.5%	8.4%	8.2%	8.1%	*8.5%*	*9.0%*	Return on Com Equity	*9.5%*
Retained to Com Eq							4.7%	4.9%	5.1%	4.9%	4.8%	4.6%	4.4%	4.3%	4.2%	4.2%	*4.5%*	*4.5%*	Retained to Com Eq	*4.5%*
All Div'ds to Net Prof							50%	51%	50%	50%	48%	48%	49%	49%	49%	49%	*48%*	*48%*	All Div'ds to Net Prof	*50%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $7876.1 mill. **Due in 5 Yrs** $915.0 mill.
LT Debt $7866.5 mill. **LT Interest** $135.0 mill.
(LT interest earned: 8.3x; total interest coverage: 8.3x)
Leases, Uncapitalized Annual rentals $41.3 mill.

Pfd Stock None

Pension Assets-9/23 $502.4 mill.
Oblig. $431.6 mill.
Common Stock 155,232,827 shs.
as of 8/2/24

MARKET CAP: $22.7 billion (Large Cap)

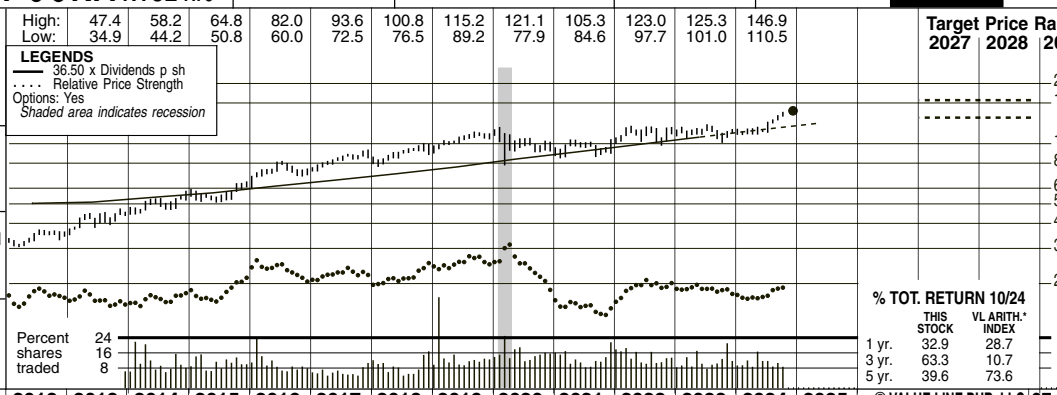
CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	51.6	15.4	674.6
Other	2996.1	870.4	1034.0
Current Assets	3047.7	885.8	1708.6
Accts Payable	496.0	336.1	319.4
Debt Due	2386.4	253.4	9.6
Other	720.2	763.1	655.9
Current Liab.	3602.6	1352.6	984.9
Fix. Chg. Cov.	1238%	1059%	1075%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-4.0%	-.5%	*4.0%*
"Cash Flow"	6.5%	7.0%	*6.5%*
Earnings	9.5%	9.0%	*7.0%*
Dividends	7.0%	8.5%	*7.5%*
Book Value	9.5%	12.0%	*5.0%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	914.5	1319.1	605.6	568.3	3407.5
2022	1012.8	1649.8	816.4	722.7	4201.7
2023	1484.0	1541.0	662.7	587.7	4275.4
2024	1158.5	1647.2	701.5	***607.8***	***4115***
2025	***1250***	***1725***	***750***	***625***	***4350***

Fiscal Year Ends	EARNINGS PER SHARE [A B E] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	1.71	2.30	.78	.37	5.12
2022	1.86	2.37	.92	.51	5.60
2023	1.91	2.48	.94	.80	6.10
2024	2.08	2.85	1.08	.86	6.83
2025	***2.23***	***2.92***	***1.15***	***.90***	***7.20***

Calendar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.575	.575	.575	.625	2.35
2021	.625	.625	.625	.68	2.56
2022	.68	.68	.68	.74	2.78
2023	.74	.74	.74	.805	3.03
2024	.805	.805	.805	.87	



BUSINESS: Atmos Energy Corporation is engaged primarily in the distribution and sale of natural gas to over three million customers through six regulated natural gas utility operations: Louisiana Division, West Texas Division, Mid-Tex Division, Mississippi Division, Colorado-Kansas Division, and Kentucky/Mid-States Division. Gas sales breakdown for fiscal 2023: 66.5%, residential; 28.0%, commercial; 3.8%, industrial; and 1.7% other. The company sold Atmos Energy Marketing, 1/17. Officers and directors own approximately .5% of common stock (12/23 Proxy). President and Chief Executive Officer: Kevin Akers. Incorporated: Texas. Address: Three Lincoln Centre, Suite 1800, 5430 LBJ Freeway, Dallas, Texas 75240. Telephone: 972-934-9227. Internet: www.atmosenergy.com.

Atmos Energy Corporation ought to exhibit bottom-line improvement, once again, in fiscal 2025 (which started on October 1st). We believe that will be brought about partially by the distribution division, supported to a large extent by benefits of higher rates plus an expanded customer base. The pipeline and storage unit stands to have a better performance, too. Even though the company's effective income tax rate may well climb, we look for earnings per share to be in the neighborhood of $7.20. That would show a 5% increase from fiscal 2024's $6.83 tally. Concerning the following fiscal year, profits might advance at a similar percentage rate, to $7.55 a share, as operating margins widen further.

Capital spending for fiscal 2025 is expected to be roughly $3.7 billion. That is some 26% higher than the prior-year level of around $2.9 billion. Similar to fiscal 2024, a considerable portion of the resources are being utilized to enhance the safety and reliability of Atmos Energy's natural gas distribution and transmission systems. Leadership adds that it projects total capital expenditures from fiscal 2025 through fiscal 2029 to be roughly $24 billion. A meaningful amount of the investments will continue to be deployed to where they are presently. Assuming that the balance sheet remains healthy, the company ought to have little trouble achieving those goals.

The quarterly common stock dividend was raised around 8%, to $0.87 per share. What's more, we anticipate additional steady hikes in the distribution out to 2027-2029. The payout ratio over that span should be manageable, in the vicinity of 50%.

These top-quality shares have reached fresh highs since our last full-page report in August. It appears that price movement stems partially from investor optimism regarding the energy firm's near-term prospects. But 3- to 5-year capital appreciation potential is minimal, even after raising our Target Price Range. Too, the dividend yield is not exciting versus *Value Line's* Natural Gas Utility Industry average. Meanwhile, the stock possesses a 4 (Below Average) rank for Timeliness.

Frederick L. Harris, III November 22, 2024

(A) Fiscal year ends Sept. 30th. **(B)** Diluted shrs. Excl. nonrec. gains (loss): '10, 5¢; '11, (1¢); '18, $1.43; '20, 17¢. Excludes discontinued operations: '11, 10¢; '12, 27¢; '13, 14¢; '17, 13¢. Next earnings report due early Feb. **(C)** Dividends historically paid in early March, June, Sept., and Dec. ■ Div. reinvestment plan. Direct stock purchase plan avail. **(D)** In millions. **(E)** Qtrs may not add due to change in shrs outstanding.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	60
Earnings Predictability	100

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AVISTA CORP. NYSE-AVA

RECENT PRICE 37.18 | P/E RATIO 15.2 (Trailing: 15.1 Median: 19.0) | RELATIVE P/E RATIO 0.84 | DIV'D YLD 5.2% | VALUE LINE

TIMELINESS 3 Lowered 7/26/24
SAFETY 3 Lowered 1/19/24
TECHNICAL 2 Raised 10/18/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

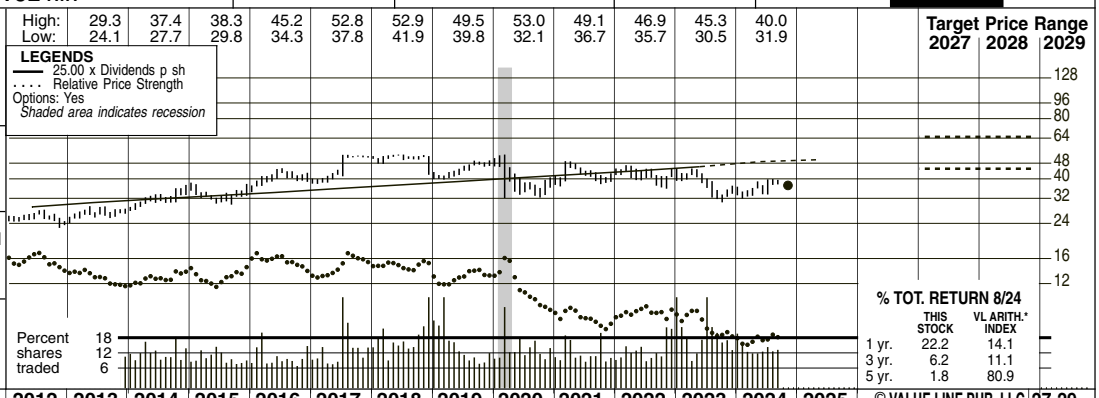
Low-High	Midpoint (% to Mid)
$31-$48	$40 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	65	(+75%)	*19%*
Low	45	(+20%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	146	167	184
to Sell	121	120	102
Hld's(000)	66647	66030	67784



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
30.77	27.58	27.29	27.73	25.86	26.94	23.66	23.83	22.47	22.08	21.27	20.03	19.09	20.13	22.82	22.43	*23.40*	*23.45*	Revenues per sh	*24.75*
3.98	4.45	3.62	3.78	3.70	4.36	4.36	4.92	5.30	4.87	5.01	6.06	5.16	5.34	5.47	5.63	*5.90*	*6.20*	"Cash Flow" per sh	*6.75*
1.36	1.58	1.65	1.72	1.32	1.85	1.84	1.89	2.15	1.95	2.07	2.97	1.90	2.10	2.12	2.24	*2.40*	*2.60*	Earnings per sh [A]	*3.00*
.69	.81	1.00	1.10	1.16	1.22	1.27	1.32	1.37	1.43	1.49	1.55	1.62	1.69	1.76	1.84	*1.95*	*2.00*	Div'd Decl'd per sh [B] ■	*2.20*
4.09	3.86	3.64	4.20	4.61	5.05	5.47	6.46	6.34	6.30	6.46	6.59	5.84	6.15	6.03	6.39	*6.40*	*6.50*	Cap'l Spending per sh	*7.50*
18.30	19.17	19.71	20.30	21.06	21.61	23.84	24.53	25.69	26.41	26.99	28.87	29.31	30.14	31.15	31.83	*32.90*	*35.00*	Book Value per sh [C]	*35.50*
54.49	54.84	57.12	58.42	59.81	60.08	62.24	62.31	64.19	65.49	65.69	67.18	69.24	71.50	74.95	78.08	*79.00*	*81.00*	Common Shs Outst'g [D]	*85.00*
15.0	11.4	12.7	14.1	19.3	14.6	17.3	17.6	18.8	23.4	24.5	15.0	21.2	20.2	20.0	17.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*18.0*
.90	.76	.81	.88	1.23	.82	.91	.89	.99	1.18	1.32	.80	1.09	1.09	1.16	.95			Relative P/E Ratio	*1.00*
3.4%	4.5%	4.8%	4.5%	4.6%	4.5%	4.0%	4.0%	3.4%	3.1%	2.9%	3.5%	4.0%	4.0%	4.2%	4.8%			Avg Ann'l Div'd Yield	*4.0%*
1472.6	1484.8	1442.5	1445.9	1396.9	1345.6	1321.9	1438.9	1710.2	1751.6	*1850*	*1900*	Revenues ($mill)	*2100*
114.2	118.1	137.2	126.1	136.4	197.0	129.5	147.3	155.2	171.2	*190*	*210*	Net Profit ($mill)	*255*
37.6%	36.3%	36.3%	36.5%	16.0%	13.8%	5.2%	7.5%	7.5%	NMF	*15.0%*	*15.0%*	Income Tax Rate	*15.0%*
11.1%	10.1%	8.1%	7.9%	7.7%	5.5%	8.5%	7.5%	2.4%	2.1%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
51.0%	50.0%	51.2%	47.2%	50.5%	49.4%	50.4%	47.5%	50.4%	51.2%	*51.0%*	*49.0%*	Long-Term Debt Ratio	*48.5%*
49.0%	50.0%	48.8%	52.8%	49.5%	50.6%	49.6%	52.5%	49.6%	48.8%	*49.0%*	*51.0%*	Common Equity Ratio	*51.5%*
3027.3	3060.3	3379.0	3273.2	3580.3	3834.6	4089.8	4104.7	4709.7	5091.3	*5300*	*5535*	Total Capital ($mill)	*5875*
3620.0	3898.6	4147.5	4398.8	4648.9	4797.0	4991.6	5225.5	5444.7	5700.1	*5950*	*6260*	Net Plant ($mill)	*7050*
4.9%	5.1%	5.3%	5.0%	4.8%	6.2%	4.2%	4.7%	4.6%	4.8%	*4.5%*	*5.0%*	Return on Total Cap'l	*5.5%*
7.7%	7.7%	8.3%	7.3%	7.7%	10.2%	6.4%	6.8%	6.6%	6.9%	*7.5%*	*7.5%*	Return on Shr. Equity	*8.5%*
7.7%	7.7%	8.3%	7.3%	7.7%	10.2%	6.4%	6.8%	6.6%	6.9%	*7.5%*	*7.5%*	Return on Com Equity [E]	*8.5%*
2.4%	2.3%	3.0%	1.9%	2.2%	4.9%	.9%	1.4%	1.1%	1.2%	*1.5%*	*2.0%*	Retained to Com Eq	*2.5%*
69%	70%	64%	73%	72%	52%	85%	80%	83%	82%	*81%*	*76%*	All Div'ds to Net Prof	*72%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $2704.8 mill. **Due in 5 Yrs** $40.0 mill.
LT Debt $2689.8 mill. **LT Interest** $150.0 mill.
Incl. $51.5 mill. debt to affiliated trusts; $39.9 mill. finance leases.
(LT interest earned: 2.1x)
Leases, Uncapitalized Annual rentals $10.4 mill.
Pension Assets-12/23 $589.3 mill.
Oblig $585.3 mill.
Pfd Stock None

Common Stock 78,703,761 shs.
as of 8/2/24
MARKET CAP: $2.9 billion (Mid Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+4.3	+3.1	-4.4
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	9.98	9.99	10.58
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	1889	1860	1809
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+1.4	-1.0	+1.4
Fixed Charge Cov. (%)	216	175	200

ANNUAL RATES

of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-2.0%	- -	*1.5%*
"Cash Flow"	3.5%	1.5%	*3.0%*
Earnings	3.0%	1.0%	*5.0%*
Dividends	4.5%	4.5%	*4.0%*
Book Value	4.0%	3.5%	*2.0%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	412.9	298.2	296.0	431.8	1438.9
2022	462.7	378.6	359.4	509.5	1710.2
2023	474.6	379.9	379.6	517.5	1751.6
2024	609.4	402.1	*385*	*453.5*	*1850*
2025	*610*	*405*	*400*	*485*	*1900*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.98	.20	.20	.71	2.10
2022	.99	.16	d.08	1.05	2.12
2023	.73	.23	.19	1.08	2.24
2024	.91	.29	*.10*	*1.10*	*2.40*
2025	*.95*	*.15*	*.20*	*1.30*	*2.60*

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.405	.405	.405	.405	1.62
2021	.4225	.4225	.4225	.4225	1.69
2022	.44	.44	.44	.44	1.76
2023	.46	.46	.46	.46	1.84
2024	.475	.475	.475		

BUSINESS: Avista Corporation (formerly The Washington Water Power Company) supplies electricity & gas in eastern Washington & northern Idaho. Supplies electricity to part of Alaska & gas to part of Oregon. Customers: 416,000 electric, 381,000 gas. Acq'd Alaska Electric Light and Power 7/14. Sold Ecova energy-management sub. 6/14. Electric rev. breakdown: residential, 36%; commercial, 29%; industrial, 9%; wholesale, 21%; other, 5%. Generating sources: gas & coal, 41%; hydro, 25%; purch., 42%. Fuel costs: 35% of revs. '23 reported depr. rate (Avista Utilities): 3.5%. Has 1,858 employees. Chairman: Scott L. Morris. Pres. & CEO: Dennis Vermillion. Inc.: WA. Address: 1411 E. Mission Ave., Spokane, WA 99202-2600. Tel.: 509-489-0500. Internet: www.avistacorp.com.

Avista Corporation's near-term share-profit picture seems promising. The utility experienced low precipitation in the first half of 2024, causing unevenness in hydroelectric generation. This resulted in elevated net power supply costs and additional expenses under the Energy Recovery Mechanism (ERM) in Washington. Avista incurred a $4.7 million pre-tax ERM expense in the first half of the year and expects further costs in the second half. Nonetheless, benefits from general rate cases and the addition of a new large electric customer are expected to counterbalance these cost headwinds. Thus, for 2024 and 2025, we estimate share earnings will advance at a mid- to high-single-digit rate, to $2.40 and $2.60, respectively.

Ongoing capital investments will likely make a strong case for future rate negotiations. Utilities often highlight capital projects to justify the need for increased revenues to cover costs. Avista plans to prioritize investments in infrastructure enhancement and expansion, while also advancing clean energy initiatives. The company anticipates approximately 5% annual growth in capital spending through 2026, primarily to strengthen its transmission and distribution systems. These efforts should support future rate increases.

Avista Utilities has pending regulatory matters. The Washington general rate cases for electric and gas are before the commission, with decisions expected in December 2024. Avista plans to file a natural gas rate case in Oregon in the fourth quarter of 2024. Additionally, the company will submit rate case filings for electric and natural gas in Idaho during the first quarter of 2025.

The company will begin next year under a new Chief Executive Officer (CEO). Heather Rosentrater, currently President and Chief Operating Officer, is expected to succeed Dennis Vermillion on January 1, 2025. Rosentrater will also join the board at that time and will be the first female CEO in the company's history.

Shares of Avista have above-average long-term capital appreciation potential, at the recent quotation. The dividend yield of 5.2% is also well above the utility average.

Emma Jalees *October 18, 2024*

(A) Diluted EPS. Excl. nonrec. gain (loss): '14, 9¢; '17, (16¢); gains on discont. ops.: '14, $1.17; '15, 8¢. EPS may not sum due to rounding. Next earnings report due early November. **(B)** Div'ds paid in mid-Mar., June, Sept. & Dec. ■ Div'd reinvest. plan avail. **(C)** Incl. deferred chgs. In '23: $973.8 mill., $12.47/sh. **(D)** In mill. **(E)** Rate base: Net orig. cost. Rate allowed on com. eq. in WA in '21: 9.4%; in ID in '21: 9.4%; in OR in '21: 9.4%; earned on avg. com. eq., '22: 7.1%. Regulatory Climate: WA, Below Avg.; ID, Above Avg.

Company's Financial Strength	A
Stock's Price Stability	70
Price Growth Persistence	30
Earnings Predictability	70

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AMERICAN WATER NYSE-AWK

RECENT PRICE **147.54** | P/E RATIO **27.3** (Trailing: 30.2 Median: 29.0) | RELATIVE P/E RATIO **1.48** | DIV'D YLD **2.1%** | **VALUE LINE**

TIMELINESS 3 Raised 3/15/24
SAFETY 2 Raised 10/4/24
TECHNICAL 2 Raised 10/4/24
BETA 1.00 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$124-$194	$159 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	210	(+40%)	*11%*
Low	155	(+5%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	491	455	458
to Sell	468	487	477
Hld's(000)	175761	172142	172197

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	45.1	56.2	61.2	85.2	92.4	98.2	129.9	172.6	189.6	189.3	162.6	150.7						
Low:	37.0	41.1	48.4	58.9	70.0	76.0	88.0	92.0	131.0	122.8	114.3	113.3						
Revenues per sh	14.61	13.98	15.49	15.18	16.25	16.28	16.78	17.72	18.54	18.81	19.04	19.97	20.83	21.58	20.85	21.74	*22.95*	*24.30*
"Cash Flow" per sh	2.87	2.89	3.56	3.73	4.27	4.36	4.75	5.13	5.26	5.14	6.15	6.65	7.24	10.46	8.08	8.46	*9.15*	*9.70*
Earnings per sh A	1.10	1.25	1.53	1.72	2.11	2.06	2.39	2.64	2.62	2.38	3.15	3.43	3.91	6.95	4.51	4.90	*5.25*	*5.65*
Div'd Decl'd per sh B■	.40	.82	.86	.90	1.21	.84	1.21	1.33	1.47	1.62	1.78	1.96	2.15	2.36	2.57	2.78	*3.00*	*3.22*
Cap'l Spending per sh	6.31	4.50	4.38	5.27	5.25	5.50	5.33	6.51	7.36	8.04	8.78	9.15	10.05	9.71	12.63	13.22	*15.25*	*15.30*
Book Value per sh D	25.64	22.91	23.59	24.11	25.11	26.52	27.39	28.25	29.24	30.13	32.42	33.83	35.58	40.18	42.30	50.31	*53.95*	*55.60*
Common Shs Outst'g C	160.00	174.63	175.00	175.66	176.99	178.25	179.46	178.28	178.10	178.44	180.68	180.81	181.30	181.61	181.86	194.73	*195.50*	*196.00*
Avg Ann'l P/E Ratio	18.9	15.6	14.6	16.8	16.7	19.9	20.0	20.5	27.7	33.8	27.3	32.9	35.3	23.6	33.6	28.6		
Relative P/E Ratio	1.14	1.04	.93	1.05	1.06	1.12	1.05	1.03	1.45	1.70	1.47	1.75	1.81	1.28	1.94	1.60		
Avg Ann'l Div'd Yield	1.9%	4.2%	3.8%	3.1%	3.4%	2.0%	2.5%	2.5%	2.0%	2.0%	2.1%	1.7%	1.6%	1.4%	1.7%	2.0%		
Revenues ($mill)							3011.3	3159.0	3302.0	3357.0	3440.0	3610.0	3777.0	3920.0	3792.0	4234.0	*4490*	*4765*
Net Profit ($mill)							429.8	476.0	468.0	426.0	567.0	621.0	709.0	1263.0	820.0	944.0	*1025*	*1105*
Income Tax Rate							39.4%	39.1%	39.2%	53.3%	28.2%	25.5%	23.3%	23.0%	18.7%	21.1%	*23.5%*	*21.5%*
AFUDC % to Net Profit							--	--	--	--	--	--	--	--	5.1%	2.9%	*3.5%*	*3.5%*
Long-Term Debt Ratio							52.4%	53.7%	52.4%	54.7%	56.3%	58.5%	59.1%	58.6%	58.7%	54.5%	*55.5%*	*57.5%*
Common Equity Ratio							47.4%	46.2%	47.5%	45.3%	43.6%	41.4%	40.9%	41.4%	41.3%	45.5%	*44.5%*	*42.5%*
Total Capital ($mill)							10364	10911	10967	11875	13433	14760	15787	17639	18619	21512	*23650*	*25750*
Net Plant ($mill)							12900	13933	14992	16246	17409	18232	19710	21084	23223	25438	*27450*	*29800*
Return on Total Cap'l							5.5%	5.7%	5.6%	4.9%	5.4%	5.4%	5.7%	8.2%	5.5%	5.4%	*5.5%*	*5.5%*
Return on Shr. Equity							8.7%	9.4%	9.0%	7.9%	9.7%	10.1%	11.0%	17.3%	10.7%	9.6%	*9.5%*	*10.0%*
Return on Com Equity							8.7%	9.4%	9.0%	7.9%	9.7%	10.1%	11.0%	17.3%	10.7%	9.6%	*9.5%*	*10.0%*
Retained to Com Eq							4.3%	4.7%	4.0%	2.5%	4.2%	4.4%	5.0%	11.4%	4.6%	4.2%	*4.0%*	*4.5%*
All Div'ds to Net Prof							50%	50%	56%	68%	56%	57%	55%	34%	57%	56%	*57%*	*57%*

Bold figures are Value Line estimates

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Revenues per sh	*27.50*
"Cash Flow" per sh	*12.00*
Earnings per sh A	*7.00*
Div'd Decl'd per sh B■	*4.10*
Cap'l Spending per sh	*15.25*
Book Value per sh D	*62.75*
Common Shs Outst'g C	*202.00*
Avg Ann'l P/E Ratio	*26.0*
Relative P/E Ratio	*1.45*
Avg Ann'l Div'd Yield	*2.2%*
Revenues ($mill)	*5550*
Net Profit ($mill)	*1415*
Income Tax Rate	*22.0%*
AFUDC % to Net Profit	*4.0%*
Long-Term Debt Ratio	*40.0%*
Common Equity Ratio	*60.0%*
Total Capital ($mill)	*31700*
Net Plant ($mill)	*35800*
Return on Total Cap'l	*6.5%*
Return on Shr. Equity	*11.0%*
Return on Com Equity	*11.0%*
Retained to Com Eq	*4.5%*
All Div'ds to Net Prof	*59%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $13141 mil. **Due in 5 Yrs** $4140 mil.
LT Debt $12566 mil. **LT Interest** $484 mil. (55% of Cap'l)

Leases, Uncapitalized: Annual rentals $10.0 mill.
Pension Assets 12/23 $1622.0 mill
Oblig. $1431.0 mill.
Pfd Stock $3.0 mill. **Pfd Div'd** $.1 mill

Common Stock 194,863,034 shares
as of 7/23/24

MARKET CAP: $28.8 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	117	364	98
Accts Receivable	334	339	393
Other	799	686	674
Current Assets	1250	1389	1165
Accts Payable	254	294	215
Debt Due	1456	179	575
Other	1101	1678	1035
Current Liab.	2811	2151	1825

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	3.0%	2.5%	*4.0%*
"Cash Flow"	8.0%	10.5%	*3.0%*
Earnings	11.0%	15.0%	*4.5%*
Dividends	10.0%	9.5%	*8.5%*
Book Value	6.0%	7.5%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	888	999	1082	951	3920
2022	842	937	1082	931	3792
2023	938	1097	1167	1032	4234
2024	1011	1149	*1220*	*1110*	*4490*
2025	*1070*	*1225*	*1305*	*1165*	*4765*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	.73	1.14	1.53	3.55	6.95
2022	.87	1.20	1.63	.81	4.51
2023	.91	1.45	1.66	.88	4.90
2024	.95	1.42	*1.83*	*1.05*	*5.25*
2025	*1.10*	*1.60*	*1.95*	*1.00*	*5.65*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.50	.55	.55	.55	2.15
2021	.55	.6025	.6025	.6025	2.36
2022	.6025	.655	.655	.655	2.57
2023	.655	.7075	.7075	.7075	2.28
2024	.7075	.765	.765		

BUSINESS: American Water Works Company, Inc. is the largest investor-owned water and wastewater utility in the U.S., providing services to approximately 14 million people in 24 states. Nonregulated business assists municipalities and military bases with the maintenance and upkeep as well. Regulated operations made up 93% of 2023 revenues. New Jersey and Pennsylvania are its largest markets accounting for 24.6% of regulated revenues; Missouri, 10.5%. Has 6,500 employees. Vanguard owns 12.3% of outstanding shares; BlackRock, 9.5%; State St., 5.7%; officers & directors, less than 1.0% (3/24 Proxy). President & Chief Executive Officer: M. Susan Hardwick. . Address: 1 Water Street, Camden, NJ 08102. Telephone: 856-346-8200. Internet: www.amwater.com.

Shares of America Water Works have done well since our July report. Indeed, the value of the stock has increased 14% compared to the broader market's 5% gain. We attribute much of the positive performance to investors' anticipation of the Federal Reserve lowering short-term interest rates. Utilities are capital intensive and depend heavily on debt to fund their capital expenditures. Thus, interest expense will likely fall. In addition, since utility equities are often owned for their dividend yield, these equities become more attractive versus other securities favored by income-oriented investors.

Our earnings estimates are unchanged. In the second quarter, the company's bottom line experienced a year-over-year decline. Similar to other utilities in the Northeast, American Water was negatively impacted by the warm dry weather, particularly in New Jersey. Management has actually narrowed its share earnings guidance for 2024 to $5.25 to $5.30. We expect the figure to be closer to the lower end of the range. Next year, share earnings could climb 8% thanks to the implementation of rate relief and the continued impact of America Water's acquisition strategy (more below).

Growth through acquisition is one of the main drivers behind the company's strong bottom-line performance. American Water has a history of purchasing smaller water districts and merging them into its existing operations. Due to the redundancies in the business, it has been able to lower costs and make these assets much more profitable.

The construction budget is massive. About $3.1 billion and $14-$15 billion are projected to be spent on upgrading and modernizing the company's water infrastructure in 2024 and over the next five-year period, respectively. Debt will be required to fund these expenditures, but the balance sheet can handle it.

Investors can probably find more attractive alternatives elsewhere. The equity is just ranked to mirror the market in the year ahead. Moreover, it has subpar prospects over the next 18-month period. Too, thanks to the recent spike in the stock price, AWK also has below average total return potential out to 2027-2029.

James A. Flood *October 4, 2024*

(A) Diluted earnings. Excludes nonrecur. losses: '08, $4.62; '09, $2.63; '11, $0.07. Disc. oper.: '06, ($0.04); '11, $0.03; '12, ($0.10); '13,($0.01). GAAP used as of 2014. Includes $2.70 sh. gain from sale of HOS sub.in Q4,'21. Next earnings report due early November. **(B)** Dividends paid in March, June, September, and December. ■ Div. reinvestment available. **(C)** In millions. **(D)** Includes intangibles. On 12/31/23: $1.229 billion, $6.31/share.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	85
Earnings Predictability	65

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AMER. STATES WATER NYSE-AWR

RECENT PRICE **84.45** | P/E RATIO **27.4** (Trailing: 29.4 Median: 30.0) | RELATIVE P/E RATIO **1.49** | DIV'D YLD **2.2%** | **VALUE LINE**

TIMELINESS 3 Lowered 12/1/23
SAFETY 1 Raised 4/5/24
TECHNICAL 4 Lowered 10/4/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$73-$116	$95 (10%)

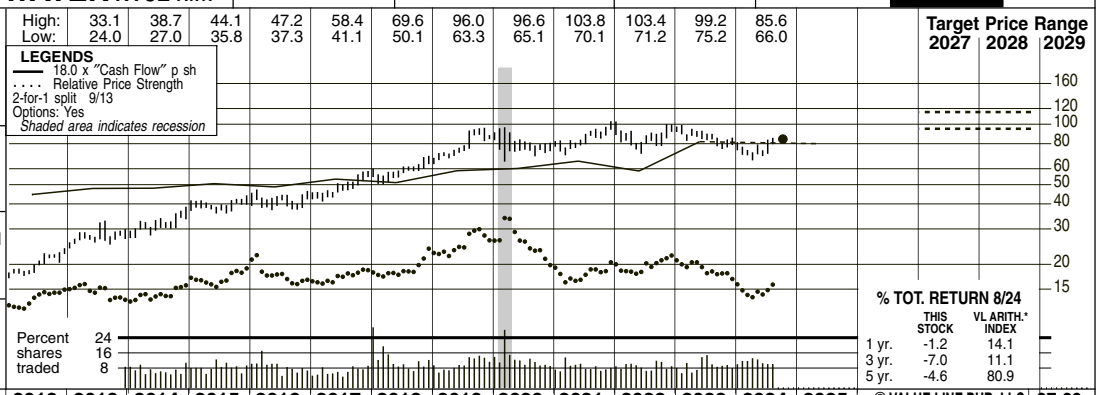
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	115	(+35%)	*10%*
Low	95	(+10%)	*6%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	152	140	167
to Sell	140	169	136
Hld's(000)	28792	28469	28544

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	33.1	38.7	44.1	47.2	58.4	69.6	96.0	96.6	103.8	103.4	99.2	85.6								
Low:	24.0	27.0	35.8	37.3	41.1	50.1	63.3	65.1	70.1	71.2	75.2	66.0								
	9.21	9.74	10.71	11.12	12.12	12.19	12.17	12.56	11.92	12.01	11.88	12.86	13.24	13.51	13.30	16.11	*15.65*	*15.80*	Revenues per sh	*19.35*
	1.69	1.70	2.11	2.13	2.48	2.65	2.67	2.81	2.70	2.96	2.84	3.26	3.34	3.64	3.25	4.55	*4.20*	*4.55*	"Cash Flow" per sh	*5.35*
	.78	.81	1.11	1.12	1.41	1.61	1.57	1.61	1.62	1.88	1.72	2.28	2.33	2.55	2.11	3.37	*3.00*	*3.25*	Earnings per sh [A]	*3.90*
	.50	.51	.52	.55	.64	.76	.83	.87	.91	.99	1.06	1.16	1.28	1.40	1.53	1.66	*1.79*	*1.95*	Div'd Decl'd per sh [B]■	*2.50*
	2.23	2.09	2.12	2.13	1.77	2.52	1.89	2.39	3.55	3.08	3.44	4.12	3.54	3.91	4.50	5.10	*5.75*	*5.60*	Cap'l Spending per sh	*5.75*
	8.97	9.70	10.13	10.84	11.80	12.72	13.24	12.77	13.52	14.45	15.19	16.33	17.39	18.57	19.20	20.99	*23.85*	*25.50*	Book Value per sh [D]	*28.95*
	34.60	37.06	37.26	37.70	38.53	38.72	38.29	36.50	36.57	36.68	36.76	36.85	36.89	36.94	36.96	36.98	*37.75*	*38.00*	Common Shs Outst'g [C]	*38.00*
	22.6	21.2	15.7	15.4	14.3	17.2	20.1	24.6	25.6	25.7	34.0	34.4	34.3	33.2	41.0	25.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*27.0*
	1.36	1.41	1.00	.97	.91	.97	1.06	1.24	1.34	1.29	1.84	1.83	1.76	1.79	2.37	1.44			Relative P/E Ratio	*1.50*
	2.9%	2.9%	3.0%	3.2%	3.1%	2.7%	2.6%	2.2%	2.2%	2.0%	1.8%	1.5%	1.6%	1.7%	1.8%	1.9%			Avg Ann'l Div'd Yield	*2.4%*
							465.8	458.6	436.1	440.6	436.8	473.9	488.2	498.9	491.5	595.7	*590*	*600*	Revenues ($mill)	*735*
							61.1	60.5	59.7	69.4	63.9	84.3	86.4	94.3	78.4	124.9	*113*	*124*	Net Profit ($mill)	*150*
							38.4%	38.4%	36.8%	36.0%	22.0%	22.6%	24.6%	24.4%	23.2%	25.0%	*24.5%*	*25.0%*	Income Tax Rate	*25.0%*
							--	--	--	--	--	--	--	--	2.5%	--	*Nil*	*Nil*	AFUDC % to Net Profit	*Nil*
							39.1%	41.1%	39.4%	38.0%	40.5%	44.4%	47.2%	46.1%	39.9%	42.6%	*42.0%*	*43.0%*	Long-Term Debt Ratio	*45.0%*
							60.9%	58.9%	60.6%	62.0%	59.5%	55.6%	52.8%	53.9%	60.1%	57.4%	*58.0%*	*57.0%*	Common Equity Ratio	*55.0%*
							832.6	791.5	815.3	854.9	938.4	1082.5	1216.2	1272.6	1181.5	1351.7	*1550*	*1700*	Total Capital ($mill)	*2000*
							1003.5	1060.8	1150.9	1205.0	1296.3	1415.7	1512.0	1626.0	1753.8	1892.3	*2150*	*2300*	Net Plant ($mill)	*2600*
							8.6%	9.0%	8.6%	9.3%	7.9%	8.9%	8.0%	8.3%	7.6%	8.8%	*8.5%*	*8.5%*	Return on Total Cap'l	*9.0%*
							12.0%	13.0%	12.1%	13.1%	11.4%	14.0%	13.5%	13.8%	11.0%	16.1%	*12.5%*	*14.0%*	Return on Shr. Equity	*13.5%*
							12.0%	13.0%	12.1%	13.1%	11.4%	14.0%	13.5%	13.8%	11.0%	16.1%	*12.5%*	*14.0%*	Return on Com Equity	*13.5%*
							5.7%	6.0%	5.3%	6.2%	4.5%	6.9%	6.1%	6.2%	3.1%	8.2%	*5.0%*	*5.5%*	Retained to Com Eq	*5.0%*
							53%	54%	56%	52%	61%	51%	55%	55%	72%	49%	*60%*	*60%*	All Div'ds to Net Prof	*64%*



CAPITAL STRUCTURE as of 6/30/24
Total Debt $807.4 mill. **Due in 5 Yrs** $216.7 mill.
LT Debt $640.0 mill. **LT Interest** $40.0 mill. (43% of Cap'l)

Leases, Uncapitalized: Annual rentals $2.2 mill.
Pension Assets-12/23 $203.0 mill. **Oblig.** $205.3 mill.
Pfd Stock None

Common Stock 37,457,199 shs.
as of 8/5/24

MARKET CAP: $3.2 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	6.0	14.1	3.6
Accts Receivable	26.2	34.3	39.1
Other	119.1	157.6	166.8
Current Assets	151.3	206.0	209.5
Accts Payable	84.9	68.7	72.0
Debt Due	255.9	42.4	167.4
Other	55.7	55.5	59.7
Current Liab.	396.5	166.6	299.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	2.0%	3.5%	*4.5%*
"Cash Flow"	4.5%	6.0%	*5.5%*
Earnings	7.0%	9.0%	*6.5%*
Dividends	9.0%	9.0%	*8.5%*
Book Value	5.0%	6.5%	*11.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	117.1	128.4	136.8	116.6	498.9
2022	108.6	122.5	135.0	125.4	491.5
2023	161.4	157.4	151.7	125.2	595.7
2024	135.3	155.3	*165*	*134.4*	*590*
2025	*130*	*150*	*175*	*145*	*600*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	.52	.72	.76	.55	2.55
2022	.38	.54	.69	.50	2.11
2023	.93	1.04	.85	.55	3.37
2024	.62	.85	*.95*	*.58*	*3.00*
2025	*.70*	*.90*	*1.00*	*.65*	*3.25*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.305	.305	.335	.335	1.28
2021	.335	.335	.365	.365	1.40
2022	.365	.365	.3975	.3975	1.53
2023	.3975	.3975	.43	.43	1.66
2024	.43	.43	.4655		

BUSINESS: American States Water Co. operates as a holding company. Through its principal subsidiary, Golden State Water Co., it supplies water to 264,093 customers in 10 California counties. Service areas include the metropolitan areas of Los Angeles and Orange Counties. The company also provides electricity to 24,777 customers in Big Bear Lake and San Bernardino Cnty. Provides water & wastewater services to U.S. military bases through its ASUS subsidiary. Sold Chaparral City Wtr. of AZ. (6/11). Employs 815. BlackRock, Inc. owns 18.2% of out. shares; Vanguard, 12.4%; off. & dir., 0.8% (4/24 Proxy). Chair.: Anne M. Holloway. Pres. & CEO: Robert Sprowls. Inc: CA. Address: 630 East Foothill Blvd., San Dimas, CA 91773. Tel.: 909-394-3600. Int.: www.aswater.com.

American States Water appears to have reached a settlement on an important regulatory matter. The company's Golden State Water subsidiary agreed to terms for rate increases for the 2025 to 2027 period with the state's Public Advocate Office. The deal must still be approved by the California Public Utilities Commission (CPUC), however. Since the Public Advocate is generally the tougher negotiator of the two, we would be surprised if any meaningful changes were made to the agreement. The main terms included that Golden State will invest $573 million in infrastructure improvements over the next three years. It would also be able to increase its revenues by around $23 million in 2025 and about $20 million in both 2026 and 2027. Some outstanding issues remain, but this was an important step in the regulatory process, as California can be a difficult environment for a utility to operate.

Meanwhile, the dividend was raised by a generous amount. On July 30th, the quarterly payout was increased by 8.3%, to $0.4655 a share. The hike marked the 70th consecutive year that the annual distribution has been increased.

The company's second-quarter performance was better than it appears. The prior year's interim was aided by the reversal of an expense that was previously booked. Thus, without that gain, profits would have been down only marginally. Earnings decreased at American States electric utility business, but it only accounts for less than 5% of total income. Assuming the CPUC signs off on the aforementioned deal, we think that share earnings of $3.00 and $3.25 are possible in 2024 and 2025, respectively.

The balance sheet is in good shape. Despite having a large construction program geared towards modernizing its pipelines, the company has managed to keep debt levels at a relatively low level.

Shares of American States are not appealing at the recent price. Since our early July report, the value of the equity has climbed approximately 20%. The stock has just an Average (3) Timeliness rank along with subpar return potential over both the 18-month and three- to five-year time frames.

James A. Flood *October 4, 2024*

(A) Primary earnings. Excludes nonrecurring gains/(losses):; '08, (14¢); '10, (23¢); '11, 10¢. Next earnings report due early November.
(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for split.
(D) Includes intangibles. As of 12/31/23; $1.1 million/$0.03 a share.

Company's Financial Strength	A
Stock's Price Stability	100
Price Growth Persistence	75
Earnings Predictability	80

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BLACK HILLS CORP. NYSE-BKH

RECENT PRICE **59.12** | P/E RATIO **15.2** (Trailing: 14.6 Median: 18.0) | RELATIVE P/E RATIO **0.84** | DIV'D YLD **4.5%** | **VALUE LINE**

TIMELINESS 3 Raised 12/1/23
SAFETY 2 Raised 10/18/24
TECHNICAL 3 Raised 10/11/24
BETA 1.05 (1.00 = Market)

18-Month Target Price Range

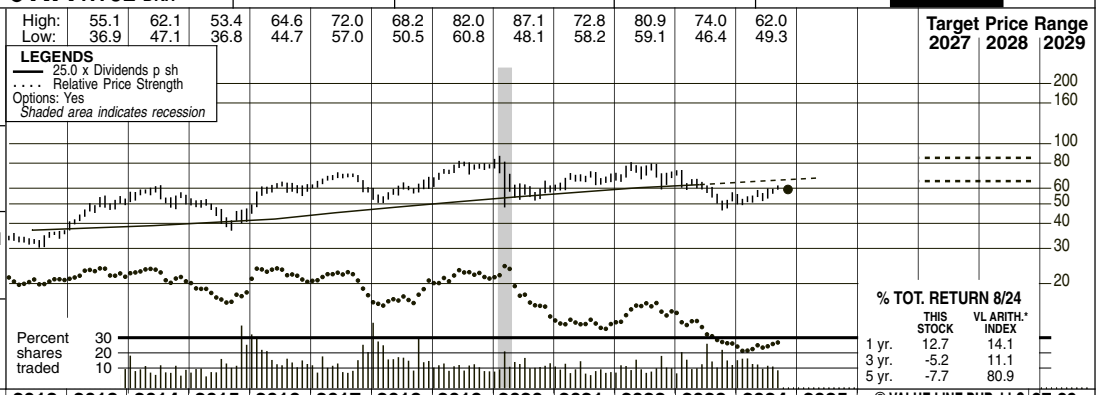
Low-High	Midpoint (% to Mid)
$39-$70	$55 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	85	(+45%)	*13%*
Low	65	(+10%)	*6%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	200	222	196
to Sell	147	144	160
Hld's(000)	59277	59259	59237



% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	12.7	14.1
3 yr.	-5.2	11.1
5 yr.	-7.7	80.9

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
26.03	32.58	33.29	28.96	26.55	28.67	31.20	25.48	29.47	31.38	29.24	28.22	27.02	30.11	38.60	34.18	***33.80***	***34.95***	Revenues per sh	***38.65***
2.95	5.41	4.88	4.01	5.59	5.93	6.25	5.67	6.28	7.15	6.61	7.02	7.41	7.41	7.85	7.76	***8.05***	***8.40***	"Cash Flow" per sh	***9.70***
.18	2.32	1.66	1.01	1.97	2.61	2.89	2.83	2.63	3.38	3.47	3.53	3.73	3.74	3.97	3.91	***3.95***	***4.15***	Earnings per sh [A]	***4.80***
1.40	1.42	1.44	1.46	1.48	1.52	1.56	1.62	1.68	1.81	1.93	2.05	2.17	2.29	2.41	2.50	***2.60***	***2.70***	Div'd Decl'd per sh [B] ■	***3.00***
8.51	8.90	12.04	10.03	7.90	7.97	8.92	8.90	8.89	6.09	7.62	13.31	12.22	10.47	9.14	8.15	***11.00***	***11.00***	Cap'l Spending per sh	***11.25***
27.19	27.84	28.02	27.53	27.88	29.39	30.80	28.63	30.25	31.92	36.36	38.42	40.79	43.05	45.31	47.15	***48.75***	***50.50***	Book Value per sh [C]	***56.00***
38.64	38.97	39.27	43.92	44.21	44.50	44.67	51.19	53.38	53.54	60.00	61.48	62.79	64.74	66.10	68.20	***69.50***	***71.50***	Common Shs Outst'g [D]	***75.00***
NMF	9.9	18.1	31.1	17.1	18.2	19.0	16.1	22.3	19.5	16.8	21.2	17.0	17.7	18.1	15.2	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***15.5***
NMF	.66	1.15	1.95	1.09	1.02	1.00	.81	1.17	.98	.91	1.13	.87	.96	1.05	.85			Relative P/E Ratio	***.85***
4.2%	6.2%	4.8%	4.6%	4.4%	3.2%	2.8%	3.5%	2.9%	2.7%	3.3%	2.7%	3.4%	3.5%	3.4%	4.2%			Avg Ann'l Div'd Yield	***4.0%***
1393.6	1304.6	1573.0	1680.3	1754.3	1734.9	1696.9	1949.1	2551.8	2331.3	***2350***	***2500***	Revenues ($mill)	***2900***
128.8	128.3	140.3	186.5	192.5	214.5	232.9	236.7	258.4	262.2	***275***	***295***	Net Profit ($mill)	***360***
33.7%	35.8%	25.1%	28.7%	19.2%	13.0%	12.2%	2.8%	8.5%	8.5%	***8.5%***	***8.5%***	Income Tax Rate	***8.5%***
2.4%	2.7%	5.3%	2.7%	1.4%	3.3%	2.5%	2.0%	2.4%	2.4%	***2.5%***	***2.5%***	AFUDC % to Net Profit	***2.5%***
47.9%	56.0%	66.5%	64.5%	57.5%	57.1%	57.9%	59.7%	54.6%	54.2%	***55.0%***	***55.0%***	Long-Term Debt Ratio	***56.0%***
52.1%	44.0%	33.5%	35.5%	42.5%	42.9%	42.1%	40.3%	45.4%	45.8%	***45.0%***	***45.0%***	Common Equity Ratio	***44.0%***
2643.6	3332.7	4825.8	4818.4	5132.4	5502.2	6089.5	6914.0	6602.3	7016.5	***7530***	***8030***	Total Capital ($mill)	***9550***
3239.4	3259.1	4469.0	4541.4	4854.9	5503.2	6019.7	6449.2	6797.9	7119.3	***7650***	***8150***	Net Plant ($mill)	***9775***
6.1%	4.9%	4.0%	5.2%	5.0%	4.9%	5.0%	4.5%	5.1%	4.9%	***4.5%***	***4.5%***	Return on Total Cap'l	***5.0%***
9.4%	8.8%	8.7%	10.9%	8.8%	9.1%	9.1%	8.5%	8.6%	8.2%	***8.0%***	***8.0%***	Return on Shr. Equity	***8.5%***
9.4%	8.8%	8.7%	10.9%	8.8%	9.1%	9.1%	8.5%	8.6%	8.2%	***8.0%***	***8.0%***	Return on Com Equity [E]	***8.5%***
4.3%	3.8%	3.3%	5.3%	3.9%	3.8%	3.8%	3.3%	3.4%	2.9%	***2.5%***	***3.0%***	Retained to Com Eq	***3.0%***
54%	57%	62%	52%	55%	58%	58%	61%	61%	64%	***66%***	***65%***	All Div'ds to Net Prof	***63%***

CAPITAL STRUCTURE as of 6/30/24
Total Debt $4847.1 mill. **Due in 5 Yrs** $1660.0 mill.
LT Debt $4247.1 mill. **LT Interest** $180.0 mill.
(Total Interest Coverage: 2.6x)
Leases, Uncapitalized Annual rentals $2.2 mill.

Pension Assets-12/23 $308.6 mill.
Oblig $348.1 mill.

Pfd Stock None

Common Stock 68,748,458 shs.
as of 7/31/24

MARKET CAP: $4.1 billion (Mid Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+1.5	+3.4	+1.5
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Yearend (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	1078	1107	1101
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+1.0	+1.0	+.9
Fixed Charge Cov. (%)	259	281	254

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	2.0%	2.5%	*2.5%*
"Cash Flow"	4.0%	3.0%	*3.5%*
Earnings	7.5%	4.0%	*4.0%*
Dividends	5.0%	6.0%	*4.0%*
Book Value	5.0%	6.5%	*3.5%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	633.4	372.6	380.6	562.5	1949.1
2022	823.6	474.2	462.6	791.4	2551.8
2023	921.2	411.3	407.1	591.7	2331.3
2024	726.4	402.6	***426***	***795***	***2350***
2025	***810***	***440***	***450***	***800***	***2500***

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.54	.40	.70	1.11	3.74
2022	1.82	.52	.54	1.11	3.97
2023	1.73	.35	.67	1.17	3.91
2024	1.87	.33	***.56***	***1.19***	***3.95***
2025	***1.80***	***.44***	***.66***	***1.25***	***4.15***

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.535	.535	.535	.565	2.17
2021	.565	.565	.565	.595	2.29
2022	.595	.595	.595	.625	2.41
2023	.625	.625	.625	.625	2.50
2024	.65	.65	.65		

BUSINESS: Black Hills Corporation is a holding company for Black Hills Energy, which serves 222,340 electric customers in CO, SD, WY and MT, and 1.12 million gas customers in NE, IA, KS, CO, WY, and AR. Has coal mining sub. Acq'd utility ops. from Aquila 7/08; SourceGas 2/16. Discontinued gas marketing in '11; gas & oil E&P in '17. Electric rev. breakdown: residential, 34%; commercial, 39%; industrial, 24%; other, 3%. Generating sources: coal, 35%; gas, 26%; wind, 9%; purchased, 30%. Fuel costs: 38% of revs. '23 deprec. rate: 2.9%-3.5%. Has 2,874 employees. Chairman: Steven R. Mills. President & CEO: Linden R. Evans. Inc.: SD. Address: 7001 Mount Rushmore Rd., P.O. Box 1400, Rapid City, SD 57709-1400. Telephone: 605-721-1700. Internet: www.blackhillscorp.com.

After performing miserably for most of 2023, Black Hills stock is participating reasonably well in the utility industry's rebound during the last year. Over the past 12 months, the equity has matched the 20.5% gain of the *Value Line Utilities Index*. The issue's underperformance last year, which stemmed largely from leadership's reduction in its growth expectations from 5%-7% to 4%-6%, likely ran its course and was perhaps overdone. The industry has been performing well given its defensive characteristics and renewed recession fears. The drop in the benchmark 10-year Treasury yield, from a high of 5.0% last autumn to about 4.0% recently, has also been a plus for this rate-sensitive group.

We're looking for annual earnings to be back on a growth trajectory this year. In late July, management reaffirmed its bottom-line target for 2024 at $3.80-$4.00 a share, which is up against a somewhat difficult comparison, as last year's result benefited by about $0.16 a share from non-operating items that aren't expected to repeat. Still, Black Hills posted decent first-half results, with earnings coming in at $2.20 per share versus $2.08 for the comparable period in 2023.

Higher delivery prices to rectify regulatory lag is a key factor in our projections. In February, the company received a $13.9 million hike in annual gas revenues from Wyoming regulators. The same month, a $20.2 million annual gas hike took place in Colorado. During the first quarter, Arkansas Gas advanced its rate review request of $44.1 million in new annual revenue. In early May, Iowa Gas filed a rate case seeking a $20.7 million annual hike. And in mid-June, the company filed for a 2.25% electric rate hike in Colorado. Management expects a normal cadence of approximately three to four reviews per year to seek recovery of investments made on behalf of customers and to reduce the lag.

Income-oriented investors may be drawn to this issue. BKH's yield is about 80 basis points higher than the peer median, and the annual dividend has increased every year since 1970. Appreciation potential, however, looks subdued following the solid year-long runup.

Anthony J. Glennon *October 18, 2024*

(A) Diluted EPS. Excl. nonrec. gains/(losses): '15, ($3.54); '16, ($1.26); '17, 14¢; '18, $1.31; '19, (25¢); '20, (8¢); discont. ops.: '08, $4.12; '09, 7¢; '11, 23¢; '12, (16¢); '17, (31¢); '18, (12¢). Qtly. EPS may not sum to full year due to rounding. Next egs. report due late Oct. **(B)** Div'ds paid in early March, June, Sept., and Dec. ■ Div'd reinv. plan avail. **(C)** Incl. deferred chgs. and intagibles in '23: $23.64/sh. **(D)** In mill. **(E)** Rate base: Net orig. cost. Rate allowed on com. eq. in SD in '15: none specified; in CO in '17: 9.37%. Regulatory Climate: Average.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	30
Earnings Predictability	100

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CHESAPEAKE UTIL. NYSE-CPK

RECENT PRICE 126.44 | P/E RATIO 24.4 (Trailing: 25.6 Median: 23.0) | RELATIVE P/E RATIO 1.29 | DIV'D YLD 2.1% | VALUE LINE

TIMELINESS 4 Lowered 10/18/24
SAFETY 2 New 6/5/15
TECHNICAL 2 Raised 10/25/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$105-$165	$135 (5%)

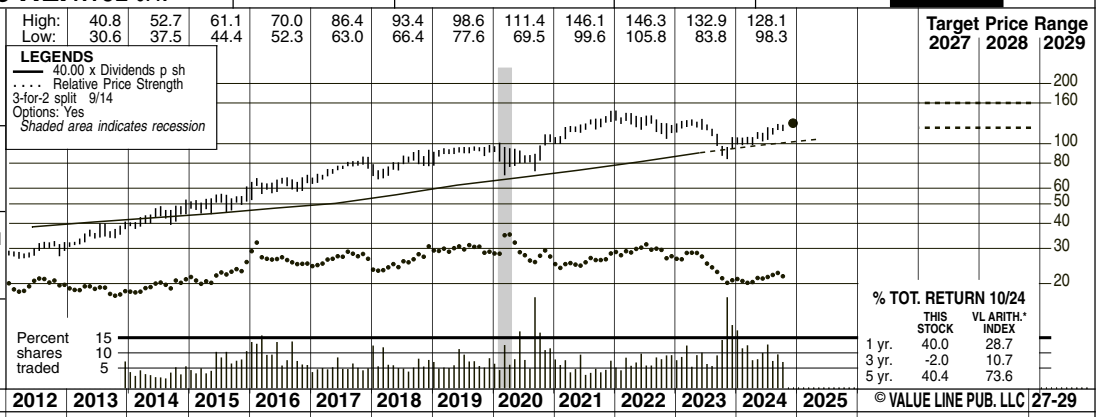
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	160	(+25%)	*8%*
Low	120	(-5%)	*1%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	191	131	121
to Sell	71	124	117
Hld's(000)	18413	18800	18673

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	40.8	52.7	61.1	70.0	86.4	93.4	98.6	111.4	146.1	146.3	132.9	128.1								
Low:	30.6	37.5	44.4	52.3	63.0	66.4	77.6	69.5	99.6	105.8	83.8	98.3								
	28.46	19.07	29.93	29.13	27.26	30.73	34.19	30.07	30.60	37.79	43.81	29.24	27.96	32.28	38.37	30.16	*33.25*	*36.75*	Revenues per sh	*66.00*
	2.50	2.15	3.50	3.69	3.95	4.35	4.73	5.05	5.16	5.42	6.47	6.50	7.37	8.28	8.87	6.87	*8.00*	*8.35*	"Cash Flow" per sh	*10.80*
	1.39	1.43	1.82	1.91	1.99	2.26	2.47	2.68	2.86	2.68	3.45	3.72	4.21	4.73	4.97	4.73	*5.05*	*5.30*	Earnings per sh A	*7.00*
	.81	.83	.87	.91	.96	1.01	1.07	1.12	1.19	1.26	1.39	1.55	1.69	1.84	2.03	2.25	*2.46*	*2.64*	Div'ds Decl'd per sh B■	*3.25*
	3.00	1.89	3.18	3.28	5.00	6.72	6.66	9.47	10.42	10.73	16.47	11.26	9.48	10.59	7.23	8.48	*13.05*	*13.90*	Cap'l Spending per sh	*16.00*
	12.02	14.89	15.84	16.78	17.82	19.28	20.59	23.45	27.36	29.75	31.65	34.23	39.92	43.85	46.94	56.04	*59.90*	*62.20*	Book Value per sh	*70.70*
	10.24	14.09	14.29	14.35	14.40	14.46	14.59	15.27	16.30	16.34	16.38	16.40	17.46	17.66	17.74	22.24	*23.00*	*23.00*	Common Shs Outst'g C	*25.00*
	14.2	14.2	12.2	14.2	14.8	15.6	17.7	19.1	21.8	27.8	22.9	24.7	21.6	25.6	25.8	24.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.0*
	.85	.95	.78	.89	.94	.88	.93	.96	1.14	1.40	1.24	1.32	1.11	1.38	1.49	1.36			Relative P/E Ratio	*1.10*
	4.1%	4.1%	3.9%	3.4%	3.3%	2.9%	2.4%	2.2%	1.9%	1.7%	1.8%	1.7%	1.9%	1.5%	1.6%	2.0%			Avg Ann'l Div'd Yield	*2.3%*
							498.8	459.2	498.9	617.6	717.5	479.6	488.2	570.0	680.7	670.6	*765*	*845*	Revenues ($mill)	*1650*
							36.1	40.2	44.7	43.8	56.6	61.1	70.6	83.5	88.4	87.2	*115*	*120*	Net Profit ($mill)	*175*
							39.9%	39.5%	38.8%	39.5%	27.1%	25.6%	25.0%	25.9%	27.4%	24.4%	*27.0%*	*27.5%*	Income Tax Rate	*29.0%*
							7.2%	8.8%	9.0%	7.1%	7.9%	12.7%	14.5%	14.6%	13.0%	13.0%	*15.0%*	*14.2%*	Net Profit Margin	*10.6%*
							34.5%	29.4%	23.5%	28.9%	37.9%	43.9%	42.2%	41.5%	41.0%	48.8%	*46.5%*	*47.0%*	Long-Term Debt Ratio	*48.0%*
							65.5%	70.6%	76.5%	71.1%	62.1%	56.1%	57.8%	58.5%	59.0%	51.2%	*53.5%*	*53.0%*	Common Equity Ratio	*52.0%*
							458.8	507.5	583.0	683.7	834.5	1001.7	1205.6	1324.0	1411.2	2433.2	*2575*	*2700*	Total Capital ($mill)	*3400*
							689.8	855.0	986.7	1126.0	1384.0	1463.8	1601.2	1744.9	1810.5	2456.4	*2750*	*2975*	Net Plant ($mill)	*3650*
							8.5%	8.9%	8.6%	7.3%	7.8%	7.2%	6.8%	7.1%	7.1%	4.3%	*6.0%*	*6.0%*	Return on Total Cap'l	*6.5%*
							12.0%	11.2%	10.0%	9.0%	10.9%	10.9%	10.1%	10.8%	10.6%	7.0%	*8.5%*	*8.5%*	Return on Shr. Equity	*10.0%*
							12.0%	11.2%	10.0%	9.0%	10.9%	10.9%	10.1%	10.8%	10.6%	7.0%	*8.5%*	*8.5%*	Return on Com Equity	*10.0%*
							7.4%	6.8%	6.1%	4.9%	6.7%	6.5%	6.2%	6.7%	6.4%	3.8%	*4.0%*	*4.0%*	Retained to Com Eq	*5.5%*
							38%	40%	39%	45%	39%	40%	38%	38%	40%	46%	*49%*	*51%*	All Div'ds to Net Prof	*46%*



CAPITAL STRUCTURE as of 9/30/24
Total Debt $1406.3 mill. **Due in 5 Yrs** $625.0 mill.
LT Debt $1173.0 mill. **LT Interest** $60.0 mill.
(LT interest earned: 4.1x; total interest coverage: 4.1x) (47% of Cap'l)
Leases, Uncapitalized Annual rentals $2.8 mill.
Pfd Stock None
Pension Assets-12/23 $49.4 mill.
Oblig. $51.3 mill.
Common Stock 22,780,819 shs.
as of 11/4/24

MARKET CAP: $2.9 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	6.2	4.9	1.6
Other	187.8	180.8	164.9
Current Assets	194.0	185.7	166.5
Accts Payable	61.5	77.5	70.1
Debt Due	223.6	198.4	233.3
Other	83.9	110.5	131.4
Current Liab.	369.0	386.4	434.8
Fix. Chg. Cov.	692%	514%	615%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	1.5%	-2.0%	*12.0%*
"Cash Flow"	7.0%	7.0%	*5.0%*
Earnings	9.0%	10.0%	*6.5%*
Dividends	8.0%	10.0%	*8.0%*
Book Value	10.5%	10.5%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	191.2	111.1	107.3	160.4	570.0
2022	222.9	139.5	131.1	187.2	680.7
2023	218.1	135.6	131.5	185.4	670.6
2024	245.7	166.3	160.1	*192.9*	*765*
2025	*265*	*185*	*180*	*215*	*845*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.96	.78	.71	1.28	4.73
2022	2.08	.88	.54	1.47	4.97
2023	2.04	.90	.53	1.26	4.73
2024	2.07	.82	.78	*1.38*	*5.05*
2025	*2.16*	*.87*	*.83*	*1.44*	*5.30*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.405	.405	.44	.44	1.69
2021	.44	.44	.48	.48	1.84
2022	.48	.48	.535	.535	2.03
2023	.535	.535	.59	.59	2.25
2024	.59	.59	.64	.64	

BUSINESS: Chesapeake Utilities Corporation consists of two main units. The Regulated Energy segment distributes natural gas in Delaware, Maryland, and Florida; distributes electricity in Florida; and transmits natural gas on the Delmarva Peninsula and in Florida. The Unregulated Energy operation wholesales and distributes propane; markets natural gas; and provides other unregulated energy services, including midstream services in Ohio. Revenue breakdown for 2023: Regulated Energy, 70.6%; Unregulated Energy, 33.3%; Other, d3.9%. Officers and directors own 1.7% of common stock; BlackRock, 16.1% (3/24 Proxy). Chairman and CEO: Jeffry Householder. Inc.: DE. Address: 500 Energy Lane, Dover, DE 19901. Tel.: (302) 734-6799. Internet: www.chpk.com.

Chesapeake Utilities Corporation's results in the third quarter of 2024 surprised us in a good way. Specifically, earnings jumped 47.2%, to $0.78 per share, compared to the $0.53 tally that was posted for the same period last year. (That came after a rather uninspiring first-half performance.) The major improvement was traced largely to the November, 2023 acquisition of Florida City Gas (FCG) from NextEra Energy for nearly $923 million. Other contributors included pipeline expansion projects and growth in the natural gas distribution businesses. Leadership adds that operations sustained no significant damage from the recent hurricanes. But results were weighed down, to some degree, by substantially higher interest charges, stemming from debt issued to help finance the aforementioned purchase. Moreover, the number of diluted shares outstanding rose considerably, reflecting the impact of stock issued in connection with the FCG deal. Still, since it seems that the fourth quarter will turn out reasonably well for the company, the bottom line stands to end up in the vicinity of $5.05 a share for the full year. That would mark a nearly 7% recovery from 2023's $4.73 total. Regarding 2025, per-share profits may advance another 5% or so, to $5.30, made possible by such factors as expansion of the customer base and incremental benefits from FCG.

This year's capital spending budget is still expected to lie between $300 million and $360 million. The bulk of the funds are devoted to the Regulated Energy division, with a focus on the natural gas distribution and transmission segments. Furthermore, Chesapeake looks for total capital expenditures to be in the range of $1.5 billion to $1.8 billion for the five-year period between 2024 and 2028. All told, we think those goals are achievable, assuming that finances stay in solid shape.

These untimely shares hold unspectacular total return potential over the 3- to 5-year span. The dividend yield is not impressive, when compared to those of other Natural Gas Utility stocks in the *Value Line* group. Moreover, long-term capital gains possibilities lack appeal, at the recent quotation.

Frederick L. Harris, III November 22, 2024

(A) Diluted shrs. Excludes nonrecurring gains (loss): '08, (7¢); '15, 6¢; '17, 87¢; '22, 8¢. Excludes discontinued operations: '19, 24¢; '20, 5¢. Next earnings report due early Feb.

(B) Dividends historically paid in early January, April, July, and October. ■ Dividend reinvestment plan. Direct stock purchase plan available.

(C) In millions, adjusted for split.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	70
Earnings Predictability	100

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CALIFORNIA WATER NYSE-CWT

RECENT PRICE **53.85** | P/E RATIO **18.6** (Trailing: 17.5 Median: 29.0) | RELATIVE P/E RATIO **1.01** | DIV'D YLD **2.1%** | **VALUE LINE**

TIMELINESS 3 Raised 8/16/24
SAFETY 2 Raised 4/5/24
TECHNICAL 2 Raised 10/4/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

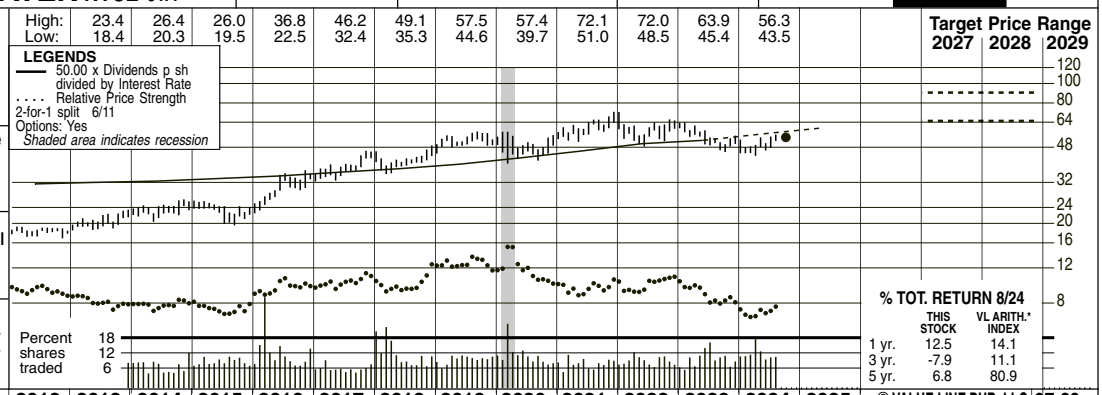
Low-High	Midpoint (% to Mid)
$46-$84	$65 (20%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	90	(+65%)	*15%*
Low	65	(+20%)	*7%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	128	126	144
to Sell	131	135	131
Hld's(000)	49232	49451	48438



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
9.90	10.82	11.05	12.00	13.34	12.23	12.50	12.29	12.70	13.89	14.53	14.72	15.78	14.72	15.22	13.77	*18.00*	*19.25*	Revenues per sh	*25.00*
1.86	1.93	1.93	2.07	2.32	2.21	2.47	2.22	2.34	3.00	3.11	3.14	3.88	3.91	3.79	3.03	*5.00*	*4.45*	"Cash Flow" per sh	*4.85*
.95	.98	.91	.86	1.02	1.02	1.19	.94	1.01	1.40	1.36	1.31	1.97	1.96	1.77	.91	*3.60*	*3.00*	Earnings per sh A	*3.25*
.59	.59	.60	.62	.63	.64	.65	.67	.69	.72	.75	.79	.85	.92	1.00	1.04	*1.12*	*1.20*	Div'd Decl'd per sh B ■	*1.40*
2.41	2.66	2.97	2.83	3.04	2.58	2.76	3.69	4.77	5.40	5.65	5.64	5.93	5.46	5.90	6.65	*6.15*	*6.25*	Cap'l Spending per sh	*6.45*
9.72	10.13	10.45	10.76	11.28	12.54	13.11	13.41	13.75	14.44	15.19	16.07	18.30	21.92	23.70	24.72	*27.65*	*29.10*	Book Value per sh C	*34.50*
41.45	41.53	41.67	41.82	41.98	47.74	47.81	47.88	47.97	48.01	48.07	48.53	50.33	53.72	55.60	57.72	*57.00*	*55.00*	Common Shs Outst'g D	*50.00*
19.8	19.7	20.3	21.3	17.9	20.1	19.7	24.8	29.6	26.9	30.3	39.3	24.9	30.5	33.0	NMF	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*24.0*
1.19	1.31	1.29	1.34	1.14	1.13	1.04	1.25	1.55	1.35	1.64	2.09	1.28	1.65	1.91	NMF			Relative P/E Ratio	*1.30*
3.1%	3.1%	3.2%	3.4%	3.5%	3.1%	2.8%	2.9%	2.3%	1.9%	1.8%	1.5%	1.7%	1.5%	1.7%	1.9%			Avg Ann'l Div'd Yield	*1.8%*
						597.5	588.4	609.4	666.9	698.2	714.6	794.3	790.9	846.4	794.6	*1025*	*1060*	Revenues ($mill) E	*1250*
						56.7	45.0	48.7	67.2	65.6	63.1	96.8	101.1	96.0	51.9	*205*	*165*	Net Profit ($mill)	*163*
						33.0%	36.0%	35.5%	30.1%	24.5%	19.1%	11.1%	20.1%	3.3%	3.3%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
						2.7%	4.3%	6.1%	3.5%	3.1%	5.8%	3.3%	1.7%	1.7%	1.7%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
						40.1%	44.4%	44.6%	42.7%	49.3%	50.2%	45.9%	47.3%	44.4%	42.5%	*39.0%*	*37.5%*	Long-Term Debt Ratio	*34.5%*
						59.9%	55.6%	55.4%	57.3%	50.7%	49.8%	54.1%	52.7%	55.6%	57.5%	*61.0%*	*62.5%*	Common Equity Ratio	*65.5%*
						1045.9	1154.4	1191.2	1209.3	1440.2	1566.7	1702.4	2233.4	2370.1	2479.5	*2575*	*2550*	Total Capital ($mill)	*2625*
						1590.4	1701.8	1859.3	2048.0	2232.7	2406.4	2650.6	2846.9	3058.9	3773.3	*3825*	*3900*	Net Plant ($mill)	*4000*
						6.3%	5.2%	5.5%	7.1%	5.9%	5.5%	7.0%	5.5%	5.0%	3.1%	*8.5%*	*7.0%*	Return on Total Cap'l	*6.5%*
						9.1%	7.0%	7.4%	9.7%	9.0%	8.1%	10.5%	8.6%	7.3%	3.6%	*13.0%*	*10.5%*	Return on Shr. Equity	*9.5%*
						9.1%	7.0%	7.4%	9.7%	9.0%	8.1%	10.5%	8.6%	7.3%	3.6%	*13.0%*	*10.5%*	Return on Com Equity	*9.5%*
						4.1%	2.0%	2.4%	4.7%	4.0%	3.2%	6.0%	4.6%	3.2%	NMF	*9.0%*	*6.0%*	Retained to Com Eq	*5.5%*
						55%	71%	68%	51%	55%	60%	43%	47%	56%	114%	*31%*	*40%*	All Div'ds to Net Prof	*43%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $1296.8 mill. **Due in 5 Yrs** $357.0 mill.
LT Debt $1051.8 mill. **LT Interest** $40.0 mill.
(Total interest coverage: 2.8x) (42% of Cap'l)

Pension Assets-12/23 $716.3 mill.
Oblig. $710.8 mill.

Pfd Stock None

Common Stock 58,825,000 shs.

MARKET CAP: $3.2 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	62.1	39.6	37.3
Other	233.4	256.7	229.5
Current Assets	295.5	296.3	266.8
Accts Payable	141.0	157.3	143.5
Debt Due	73.3	180.7	245.0
Other	80.4	92.3	124.0
Current Liab.	294.7	430.3	512.5

BUSINESS: California Water Service Group provides regulated and nonregulated water service to 497,700 customers in 100 communities in the state of California. Accounts for about 90% of total customers. Also operates in Washington, New Mexico, and Hawaii. Main service areas: San Francisco Bay area, Sacramento Valley, Salinas Valley, San Joaquin Valley & parts of Los Angeles. Acquired Rio Grande Corp; West Hawaii Utilities (9/08). Revenue breakdown, '23: residential, 67%; business, 20%; industrial, 3%; public authorities, 5%; other 5%. Off. and dir. own 1% of common stock (4/24 proxy). Has 1,184 employees. Pres. and CEO: Martin A. Kropelnicki. Inc.: DE. Addr.: 1720 North First St., San Jose, CA 95112-4598. Tel.: 408-367-8200. Internet: www.calwatergroup.com.

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	1.5%	1.0%	*9.5%*
"Cash Flow"	5.0%	5.0%	*5.0%*
Earnings	5.0%	4.0%	*13.0%*
Dividends	4.5%	6.5%	*6.0%*
Book Value	7.5%	10.0%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) E Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	147.7	213.1	256.7	173.4	790.9
2022	173.0	206.2	266.3	200.9	846.4
2023	131.1	194.0	255.0	214.5	794.6
2024	270.7	244.3	*280*	*230*	*1025*
2025	*245*	*265*	*300*	*250*	*1060*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	d.06	.75	1.20	.07	1.96
2022	.02	.36	1.03	.35	1.77
2023	d.40	.17	.60	.52	.91
2024	1.21	.70	*1.15*	*.54*	*3.60*
2025	*.50*	*.65*	*1.20*	*.65*	*3.00*

Calendar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.2125	.2125	.2125	.2125	.85
2021	.230	.230	.230	.230	.92
2022	.250	.250	.250	.250	1.00
2023	.260	.260	.260	.260	1.04
2024	.280	.280	.280		

California Water Service Group reported solid second-quarter financial results. The regulated water utility posted revenues of $244 million and earnings of $0.70 per share in the June period, with both figures topping consensus estimates and logging impressive year-over-year improvements. Indeed, the recently approved 2021 general rate case from California regulators provided a significant boost to the top line, adding more than $30 million in revenues over the past six months. The bottom line has also been a beneficiary, even amidst rising water production costs and wholesale rates.

We are lifting our 2024 and 2025 revenue estimates at this juncture. For the current year, we now look for revenues of $1.025 billion, up from our previous call of $985 million. Likewise, we are adding $120 million onto next year's forecast, to $1.060 billion. A combination of higher rates from the above-mentioned rate approval and increasing water consumption underpins our sanguine intermediate-term stance.

Management is moving full steam ahead on plans for long-term infrastructure-related upgrades. The company has already filed its 2024 general rate case, along with an improvement plan for the 2025-2027 time frame. Over the next three years, California Water is set to invest approximately $1.6 billion to support water treatment facility enhancements and delivery system upgrades. Much of these costs are likely to be recouped further down the road via increased customer rates, assuming the most recent rate case filings are eventually approved. Note that the regulatory review process takes roughly 18 months for a decision. A high-single-digit customer rate increase is also on tap for 2028.

Our 3- to 5-year Target Price Range has been lifted owing to a more-positive profit outlook over the pull to late decade. At the recent quotation, total return potential out to 2027-2029 is worthwhile. The stock is now ranked 3 (Average) for Timeliness, and offers decent price upside over the 18-month horizon. Overall, California Water shares are best suited for conservative subscribers with a holding period beyond one year.

Nicholas Patrikis *October 4, 2024*

(A) Basic EPS. Excl. nonrecurring gain (loss): '11, 4¢. Next earnings report due late Nov.
(B) Dividends historically paid in late Feb., May, Aug., and Nov. ■ Div'd reinvestment plan available.
(C) Incl. intangible assets. In '23 : $37.0 mill., $0.64/sh.
(D) In millions, adjusted for split.
(E) Excludes non-regulated revenues.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	75
Earnings Predictability	50

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DOMINION ENERGY NYSE-D

RECENT PRICE **60.12** | P/E RATIO **19.1** (26.8 / 21.0) | RELATIVE P/E RATIO **1.05** | DIV'D YLD **4.4%** | **VALUE LINE**

TIMELINESS 3 Raised 3/29/24
SAFETY 2 Raised 11/8/24
TECHNICAL 3 Lowered 11/8/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$36-$70	$53 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	75	(+25%)	*11%*
Low	55	(-10%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	467	580	569
to Sell	681	575	573
Hld's(000)	611917	630872	629952

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	68.0	80.9	79.9	79.0	85.3	81.7	83.9	90.9	81.1	88.8	63.9	61.3								
Low:	51.9	63.1	64.5	66.3	70.9	61.5	67.4	57.8	67.9	57.2	39.2	43.5								
	27.94	25.26	26.16	25.23	22.73	22.58	21.26	19.60	18.69	19.51	19.63	19.78	17.58	17.24	20.57	17.18	*18.15*	*19.40*	Revenues per sh	*21.40*
	5.07	4.82	5.10	5.04	5.24	5.47	5.71	5.99	6.32	6.89	7.24	7.65	7.17	7.27	7.81	5.58	*6.50*	*7.25*	"Cash Flow" per sh	*8.05*
	3.04	2.64	2.89	2.76	2.75	3.09	3.05	3.20	3.44	3.53	4.05	4.24	3.54	3.86	4.11	1.99	*2.75*	*3.40*	Earnings per sh [A]	*4.05*
	1.58	1.75	1.83	1.97	2.11	2.25	2.40	2.59	2.80	3.04	3.34	3.67	3.45	2.52	2.67	2.67	*2.67*	*2.67*	Div'd Decl'd per sh [B] ■	*2.67*
	6.10	6.41	5.89	6.41	7.20	7.06	9.14	9.35	9.69	8.53	6.25	5.94	7.47	7.36	9.09	12.19	*12.70*	*12.45*	Cap'l Spending per sh	*9.50*
	17.28	18.67	20.65	20.08	18.35	20.04	19.75	21.25	23.26	26.58	29.53	35.33	29.44	31.51	31.26	30.72	*31.00*	*31.95*	Book Value per sh [C]	*36.50*
	583.00	599.00	581.00	570.00	576.00	581.00	585.00	596.00	628.00	645.00	681.00	838.00	806.00	810.00	835.00	838.00	*842.00*	*850.00*	Common Shs Outst'g [D]	*880.00*
	13.8	12.7	14.3	17.3	18.9	19.2	23.0	22.1	21.3	22.2	17.5	18.2	22.6	19.5	18.7	26.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.5*
	.83	.85	.91	1.09	1.20	1.08	1.21	1.11	1.12	1.12	.95	.97	1.16	1.05	1.08	1.46			Relative P/E Ratio	*.90*
	3.8%	5.2%	4.4%	4.1%	4.1%	3.8%	3.4%	3.7%	3.8%	3.9%	4.7%	4.8%	4.3%	3.3%	3.5%	5.1%			Avg Ann'l Div'd Yield	*4.0%*
							12436	11683	11737	12586	13366	16572	14172	13964	17174	14393	*15300*	*16500*	Revenues ($mill)	*18850*
							1793.0	1899.0	2123.0	2244.0	2651.0	3447.0	3006.0	3191.0	3505.0	1743.0	*2415*	*2940*	Net Profit ($mill)	*3660*
							28.1%	32.0%	22.8%	27.2%	17.3%	20.3%	12.2%	13.7%	16.3%	18.9%	*17.0%*	*17.0%*	Income Tax Rate	*17.0%*
							4.5%	5.3%	7.5%	10.5%	5.1%	2.6%	3.4%	3.7%	3.2%	9.1%	*6.5%*	*6.0%*	AFUDC % to Net Profit	*5.0%*
							65.4%	65.1%	67.4%	64.4%	60.8%	51.4%	56.5%	56.4%	58.3%	54.7%	*53.0%*	*54.0%*	Long-Term Debt Ratio	*55.0%*
							34.6%	34.9%	32.6%	35.6%	39.2%	45.0%	39.5%	38.5%	39.1%	42.4%	*44.0%*	*45.0%*	Common Equity Ratio	*43.0%*
							33360	36280	44836	48090	51251	65818	60074	66344	66795	60777	*59400*	*63800*	Total Capital ($mill)	*77150*
							36270	41554	49964	53758	54560	69082	57848	59774	63460	58780	*61700*	*67550*	Net Plant ($mill)	*80500*
							6.6%	6.5%	6.0%	5.9%	6.5%	6.4%	6.2%	5.9%	6.0%	4.2%	*5.0%*	*5.5%*	Return on Total Cap'l	*6.0%*
							15.5%	15.0%	14.5%	13.1%	13.2%	10.8%	11.5%	11.0%	12.6%	6.3%	*9.0%*	*10.0%*	Return on Shr. Equity	*10.5%*
							15.4%	15.0%	14.5%	13.1%	13.2%	11.6%	12.4%	12.2%	13.1%	6.5%	*9.0%*	*10.5%*	Return on Com Equity [E]	*11.0%*
							3.3%	2.9%	2.7%	1.8%	2.3%	1.5%	.3%	4.3%	4.6%	NMF	*.5%*	*2.0%*	Retained to Com Eq	*3.5%*
							79%	81%	81%	86%	82%	87%	98%	66%	66%	NMF	*97%*	*79%*	All Div'ds to Net Prof	*66%*

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	21.4	14.1
3 yr.	-17.1	11.1
5 yr.	-9.7	80.9

CAPITAL STRUCTURE as of 6/30/24
Total Debt $41579 mill. **Due in 5 Yrs** $13361 mill.
LT Debt $36617 mill. **LT Interest** $1940 mill.
(Total Interest coverage: 2.5x)
Leases, Uncapitalized Annual rentals $36 mill.

Pension Assets-12/23 $9087 mill.
Oblig. $8431 mill.
Pfd Stock $1783 mill. **Pfd Divd** $81 mill.

Common Stock 838,938,399 shs.
as of 7/26/24

MARKET CAP: $50.4 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (MWH)	+2.1	+5.0	-1.1
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+1.4	+1.1	+1.2
Fixed Charge Cov. (%)	227	272	201

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-2.5%	-1.0%	*2.5%*
"Cash Flow"	2.5%	- -	*2.5%*
Earnings	1.5%	-2.0%	*3.0%*
Dividends	2.0%	-3.0%	*.5%*
Book Value	5.0%	3.5%	*1.5%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	3870	3038	3176	3880	13964
2022	4279	3596	4386	4913	17174
2023	3883	3166	3810	3534	14393
2024	3632	3486	*4180*	*4002*	*15300*
2025	*4230*	*3770*	*4350*	*4150*	*16500*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.09	.76	1.11	.90	3.86
2022	1.18	.77	1.11	1.06	4.11
2023	.59	.35	.75	.29	1.99
2024	.55	.65	*.90*	*.65*	*2.75*
2025	*.80*	*.80*	*1.00*	*.80*	*3.40*

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.94	.94	.94	.63	3.45
2021	.63	.63	.63	.63	2.52
2022	.6675	.6675	.6675	.6675	2.67
2023	.6675	.6675	.6675	.6675	2.67
2024	.6675	.6675	.6675		

BUSINESS: Dominion Energy, Inc. (formerly Dominion Resources) is a holding company for Virginia Power, North Carolina Electric, and South Carolina Electric & Gas. The company provides regulated electricity service to 3.6 million homes and businesses in VA, NC, & SC, and regulated natural gas service to 400,000 customers in SC. Acquired Questar 9/16; SCANA 1/19. Electric rev. breakdown: resid'l, 44%; commercial, 39%; ind'l, 7%; oth., 10%. Generating sources: gas, 36%; nuclear, 29%; coal, 5%; renewable, 5%; purchased, 25%. Power/fuel costs: 31% of rev. Deprec. rates: 2.3%-4.2%. Employs 17,700. Chair, Pres. & CEO: Robert M. Blue. Inc.: VA. Address: 120 Tredegar St., P.O. Box 26532, Richmond, VA 23261-6532. Tel.: 804-819-2000. Int.: dominionenergy.com.

Dominion Energy's restructuring initiatives have been completed. Several nonstrategic assets on the natural gas side of the business have been divested. During the utility holding company's lengthy business review, completed earlier this year, it announced that all of the transactions targeted represented about $21 billion of debt reduction. With the closures of the Cove Point liquefied natural gas operation, East Ohio Gas Company, Questar Gas Company, Public Service Company of North Carolina, and the Wexpro exploration and production company, along with the securitization of some other assets, Dominion achieved 87% of its debt target. (Note that with the exception of the Cove Point LNG operation sale to Berkshire Hathaway, the rest of the aforementioned divestitures were all sold to Enbridge Inc.) The company's transformation was recently completed with the sale of a 50% noncontrolling equity position in the Coastal Virginia Offshore Wind commercial project to Stonepeak for $2.6 billion. The infrastructure investment company will share equally in future development costs as long as they remain on budget.

Leadership believes it has put the company on course for sustainable 5%-7% annual earning growth. That's going forward from next year's in-house profit target of $3.25-$3.54 per share. (Investors should note that 2024 is a transition year as the company's adjusted earnings are hampered by discontinued operations and not having all of the funds from divestitures on hand until the beginning of the fourth quarter.) Following the natural gas divestitures, Dominion will mainly be a regulated utility with 3.6 million electric customers in Virginia and the Carolinas and 400,000 gas customers in South Carolina. The combination of rate-base growth from investments in modernization, transmission and distribution, power generation capacity, along with growth in demand from trends in electrification and data center needs ought to translate to mid- to high-single-digit annual profit gains.

The main draw here remains the above-average dividend yield. It compares favorably to the 3.6% median level of industry peers. But upside potential for D stock looks slim since the recovery.

Anthony J. Glennon *November 8, 2024*

(A) Dil. egs. Excl. nonrec. gain/(loss): '08, 12¢; '09, (47¢); '10, $2.13; '11, (31¢); '12, ($2.18); '14, (81¢); '17, $1.19; '18, (31¢); '19, ($2.62); '20, ($1.72); '21, (67¢); '22, ($3.03); '23, 49¢; gain/(losses) from disc. ops.: '10, (26¢); '12, (4¢); '13, (16¢); '20, ($2.39); '21, 79¢; '22, 1¢; '23, (19¢). Next egs. report due early Feb. **(B)** Div'ds paid mid-Mar., June, Sept., & Dec. ■ Div'd reinv. plan avail. **(C)** Incl. intang. In '23: $16.04/sh. **(D)** In mill. **(E)** Rate base: Net orig. cost, adj. Rate all'd on com. eq. in VA in '22: 9.35%; in SC in '21: 9.5%. Regult'y. Clim.: Avg.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	25
Earnings Predictability	100

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DUKE ENERGY NYSE-DUK

RECENT PRICE 117.06 | P/E RATIO 19.1 (19.7 / 18.0) | RELATIVE P/E RATIO 1.05 | DIV'D YLD 3.6% | VALUE LINE

TIMELINESS 4 Lowered 10/4/24
SAFETY 2 New 6/1/07
TECHNICAL 2 Raised 10/25/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$88-$133	$111 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	150	(+30%)	*11%*
Low	110	(-5%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	838	893	923
to Sell	864	830	811
Hld's(000)	505574	503341	507258

	2027	2028	2029
High:	75.5	87.3	90.0
Low:	64.2	67.1	65.5

	87.8	91.8	91.4	97.4	103.8	108.4	116.3	106.4	121.3
	70.2	76.1	72.0	82.5	62.1	85.6	83.8	83.1	90.1

LEGENDS
25.60 x Dividends p sh
Relative Price Strength
1-for-3 Rev split 7/12
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

200 160 100 80 60 50 40 30 20

Percent shares traded 15 10 5

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	33.8	14.1
3 yr.	22.9	11.1
5 yr.	49.3	80.9

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
31.15	29.18	32.22	32.63	27.88	34.84	33.84	34.10	32.49	33.66	33.73	34.21	31.04	32.64	37.36	37.69	*39.00*	*40.35*	Revenues per sh	*43.25*
7.34	7.58	8.49	8.68	6.80	8.56	9.11	9.40	9.20	10.01	11.05	12.12	12.04	12.60	12.91	13.22	*13.55*	*13.90*	"Cash Flow" per sh	*15.05*
3.03	3.39	4.02	4.14	3.71	3.98	4.13	4.10	3.71	4.22	4.72	5.06	5.12	5.24	5.27	5.43	*6.00*	*6.35*	Earnings per sh [A]	*7.60*
2.70	2.82	2.91	2.97	3.03	3.09	3.15	3.24	3.36	3.49	3.64	3.75	3.82	3.90	3.98	4.06	*4.14*	*4.22*	Div'd Decl'd per sh [B] ■	*4.30*
10.35	9.85	10.84	9.80	7.81	7.83	7.62	9.83	11.29	11.50	12.91	15.17	12.88	12.63	14.76	16.35	*17.60*	*17.75*	Cap'l Spending per sh	*16.75*
49.51	49.85	50.84	51.14	58.04	58.54	57.81	57.74	58.62	59.63	60.27	61.20	59.82	61.55	61.51	63.70	*66.25*	*68.65*	Book Value per sh [C]	*70.00*
423.96	436.29	442.96	445.29	704.00	706.00	707.00	688.00	700.00	700.00	727.00	733.00	769.00	769.00	770.00	771.00	*772.00*	*773.00*	Common Shs Outst'g [D]	*775.00*
17.3	13.3	12.7	13.8	17.5	17.4	17.9	18.2	21.3	19.9	17.0	17.7	17.1	18.9	19.6	16.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.0*
1.04	.89	.81	.87	1.11	.98	.94	.92	1.12	1.00	.92	.94	.88	1.02	1.14	.94			Relative P/E Ratio	*.95*
5.2%	6.2%	5.7%	5.2%	4.7%	4.4%	4.3%	4.3%	4.3%	4.2%	4.5%	4.2%	4.4%	3.9%	3.9%	4.3%			Avg Ann'l Div'd Yield	*3.9%*
23925	23459	22743	23565	24521	25079	23868	25097	28768	29060	*30100*	*31200*	Revenues ($mill)	*33500*
2934.0	2854.0	2560.0	2963.0	3339.0	3748.0	1377.0	3908.0	2550.0	2841.0	*3350*	*3825*	Net Profit ($mill)	*4775*
30.6%	32.2%	31.0%	30.4%	14.1%	12.7%	.3%	5.1%	7.4%	9.2%	*9.0%*	*9.0%*	Income Tax Rate	*9.0%*
7.2%	9.2%	11.7%	12.3%	11.4%	8.0%	6.9%	5.9%	8.1%	7.1%	*7.0%*	*7.0%*	AFUDC % to Net Profit	*7.0%*
47.7%	48.6%	52.6%	54.0%	53.8%	54.0%	53.7%	55.1%	56.1%	59.6%	*58.5%*	*58.5%*	Long-Term Debt Ratio	*61.0%*
52.3%	51.4%	47.4%	46.0%	46.2%	44.1%	44.4%	43.1%	42.5%	40.4%	*41.0%*	*40.5%*	Common Equity Ratio	*37.5%*
78088	77222	86609	90774	94940	101807	103589	109744	115235	121564	*124525*	*125500*	Total Capital ($mill)	*144100*
70046	75709	82520	86391	91694	102127	106782	111408	111748	115315	*124375*	*132500*	Net Plant ($mill)	*141100*
4.8%	4.8%	4.0%	4.3%	4.6%	4.7%	4.8%	4.8%	2.0%	2.3%	*4.5%*	*4.5%*	Return on Total Cap'l	*4.5%*
7.2%	7.2%	6.2%	7.1%	7.6%	8.0%	8.1%	8.4%	5.2%	5.8%	*9.0%*	*9.0%*	Return on Shr. Equity	*9.0%*
7.2%	7.2%	6.2%	7.1%	7.6%	8.3%	8.2%	8.5%	5.2%	5.8%	*9.0%*	*9.0%*	Return on Com Equity [E]	*9.0%*
1.7%	1.5%	.6%	1.2%	2.0%	2.4%	2.3%	1.9%	1.5%	1.8%	*2.5%*	*2.5%*	Retained to Com Eq	*3.0%*
76%	79%	91%	83%	74%	71%	73%	78%	76%	73%	*73%*	*73%*	All Div'ds to Net Prof	*68%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $78779 mill. **Due in 5 Yrs** $19536 mill.
LT Debt $76439 mill. **LT Interest** $2206 mill.
Incl. $915 mill. finance leases.
(LT interest earned: 2.7x)
Leases, Uncapitalized Annual rentals $225 mill.
Pension Assets-12/23 $6993 mill.
Oblig $8207 mill.
Pfd Stock $1962 mill. **Pfd Div'd** $107 mill.
40 mill. shs. 5.75%, cum., $25 liq. value, redeemable at $25.50 prior to 6/15/24; 1 mill. shs. 4.875%, cum., $1000 liq. value.
Common Stock 772,201,706 shs. **as of 7/31/24**
MARKET CAP: $90.4 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+2.0	NA	NA
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (avg.)	NA	NA	NA
Fixed Charge Cov. (%)	209	285	NA

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	.5%	-.5%	*2.5%*
"Cash Flow"	4.0%	5.0%	*5.0%*
Earnings	3.0%	4.5%	*5.0%*
Dividends	3.0%	3.5%	*2.0%*
Book Value	2.0%	1.0%	*2.5%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	6150	5758	6951	6238	25097
2022	7132	6685	7968	6983	28768
2023	7276	6578	7994	7212	29060
2024	7671	7172	*8090*	*7167*	*30100*
2025	*7700*	*7300*	*8300*	*7900*	*31200*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.26	1.15	1.88	.94	5.24
2022	1.30	1.14	1.78	1.11	5.27
2023	1.20	.91	1.81	1.51	5.43
2024	1.44	1.18	*1.83*	*1.55*	*6.00*
2025	*1.40*	*1.35*	*2.10*	*1.50*	*6.35*

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.945	.945	.965	.965	3.82
2021	.965	.965	.985	.985	3.90
2022	.985	.985	1.005	1.005	3.98
2023	1.005	1.005	1.025	1.025	4.06
2024	1.025	1.025	1.045		

BUSINESS: Duke Energy Corporation is a holding company for utilities with 7.6 mill. elec. customers in NC, FL, IN, SC, OH, and KY, and 1.6 mill. gas customers in OH, KY, NC, SC, and TN. Owns independent power plants & has 25% stake in National Methanol in Saudi Arabia. Acq'd Progress Energy 7/12; Piedmont Natural Gas 10/16; discontinued most int'l ops. in '16. Elec. rev. breakdown: residential, 45%; commercial, 28%; industrial, 13%; other, 14%. Generating sources: gas, 32%; nuclear, 30%; coal, 18%; other, 1%; purchased, 19%. Fuel costs: 28% of revs. '22 reported deprec. rate: 3.6%. Has 27,600 employees. Chairman, President & CEO: Lynn J. Good. Inc.: DE. Address: 550 South Tryon St., Charlotte, NC 28202-1803. Tel.: 704-382-3853. Internet: www.duke-energy.com.

Duke Energy is making progress in a number of pending rate cases. In Florida, the Florida Public Service Commission approved a settlement which will increase Duke Energy Florida's base electric rates and assist the building of solar-energy facilities. The settlement will increase rates by $203 million in 2025, $59 million in 2026, and add 12 new solar energy projects estimated at $141 million from 2025-2027. Too, the agreement includes Duke using approximately $50 million in federal tax credits to offset the need for a base-rate increase in 2027. Meanwhile, the utility's final order in its South Carolina rate case was recently implemented, and Duke also reached a constructive settlement in North Carolina. In South Carolina, the new rates are based on a retail base of $7.4 billion, with a return on equity of 9.9%. The rate case also includes $215 million in new investments in highly efficient natural gas, solar, nuclear, and coal ash compliance costs over a seven-year period.

We continue to look for nice profit growth over the next few years. We think the utility will likely continue to take advantage of strong electric volume growth and constructive regulatory outcomes over that stretch. Since the start of 2023, Duke has received approximately $75 billion of rate base investments approved or settled across seven rate cases. And, we do not see the utility's impressive recoupments slowing down anytime soon. Too, management reaffirmed its long-term annual earnings growth rate of 5%-7% through 2028, and its 2024 per-share profit range of $5.85-$6.10, the midpoint of which sits right at our call. Indeed, we look for 2024 and 2025 bottom-line totals of $6.00 and $6.35 per share.

These shares have risen more than 10% in value since our August review. Along with strong financial and regulatory showings of late, a recent rally in utility stocks due to investor demand for stable income amidst falling interest rates has benefited performance. The stock is now up more than 30% over the past year.

This issue is best suited for income-oriented accounts. What's more, Duke is one of the better-managed and best-performing utilities in the industry.

Zachary J. Hodgkinson *November 8, 2024*

(A) Dil. EPS. Excl. net nonrec. losses: '12, 64¢; '13, 22¢; '14, 59¢; '15, 5¢; '16, 60¢; '18, 96; '20, $3.40; '21, 30¢; net nonrec gain: '17, 14¢. 2021 EPS may not sum to annual due to rounding. Next egs. due early Feb. **(B)** Div'ds paid mid-Mar., June, Sept., & Dec. ■ Div'd reinv. plan avail. **(C)** Incl. intang. In '22: $41.34/sh. **(D)** In mill., **(E)** Rate base: Net orig. cost. Rate all'd on com. eq. in '21 in NC: 9.6%; 9.5%; in '20 in FL: 9.5%-11.5%; in '20 in IN: 9.7%. in '19 in SC:9.5%; Reg. Clim.: NC, SC Avg.; OH, IN Above Avg.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	45
Earnings Predictability	100

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CON. EDISON NYSE-ED

RECENT PRICE 104.81 | P/E RATIO 19.9 (19.6 / 18.0) | RELATIVE P/E RATIO 1.09 | DIV'D YLD 3.2% | VALUE LINE

TIMELINESS 3 Lowered 6/7/24
SAFETY 1 New 7/27/90
TECHNICAL 3 Raised 10/18/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$91-$128	$110 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	120	(+15%)	*8%*
Low	100	(-5%)	*2%*

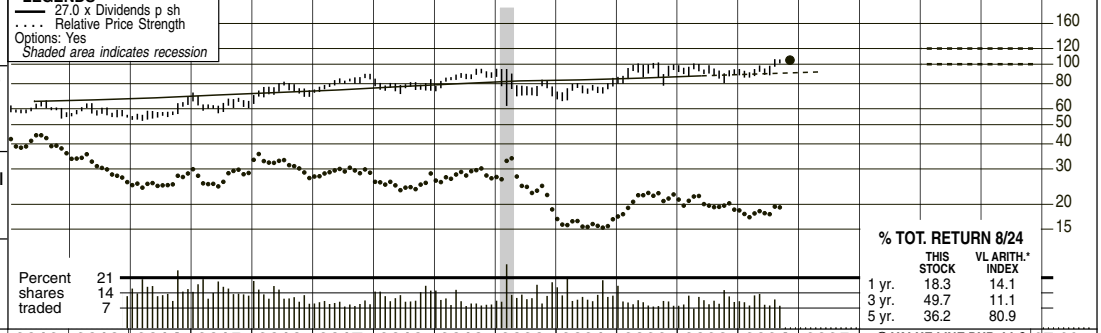
Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	515	482	490
to Sell	450	480	464
Hld's(000)	230144	229319	235686

	64.0	68.9	72.3	81.9	89.7	84.9	95.0	95.1	85.6	102.2	100.9	107.8
High:	54.2	52.2	56.9	63.5	72.1	71.1	73.3	62.0	65.6	78.1	80.5	85.9
Low:												

LEGENDS
27.0 x Dividends p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029



% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	18.3	14.1
3 yr.	49.7	11.1
5 yr.	36.2	80.9

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
49.62	46.36	45.69	44.17	41.62	42.27	44.11	42.85	39.59	38.82	38.44	37.80	35.78	38.63	44.15	42.45	*43.85*	*46.70*	Revenues per sh	*52.10*
5.99	5.86	6.24	6.61	7.15	7.45	7.30	7.93	7.89	8.41	8.92	9.39	9.70	10.06	10.36	10.98	*12.10*	*12.70*	"Cash Flow" per sh	*14.65*
3.36	3.14	3.47	3.57	3.86	3.93	3.62	4.05	3.94	4.10	4.55	4.37	4.17	4.38	4.55	5.04	*5.30*	*5.60*	Earnings per sh A	*6.65*
2.34	2.36	2.38	2.40	2.42	2.46	2.52	2.60	2.68	2.76	2.86	2.96	3.06	3.10	3.16	3.24	*3.32*	*3.40*	Div'd Decl'd per sh B ■	*4.02*
8.50	7.80	6.96	6.72	7.06	8.67	8.26	10.42	12.07	11.11	10.90	10.48	11.42	11.17	11.74	13.01	*14.40*	*14.50*	Cap'l Spending per sh	*15.50*
35.43	36.46	37.93	39.05	40.53	41.81	42.94	44.55	46.88	49.74	52.11	54.18	55.06	56.60	58.28	61.25	*63.50*	*65.75*	Book Value per sh C	*74.50*
273.72	281.12	291.62	292.89	292.87	292.87	292.88	293.00	305.00	310.00	320.96	332.63	342.30	353.98	354.96	345.42	*346.50*	*347.00*	Common Shs Outst'g D	*355.00*
12.3	12.5	13.3	15.1	15.4	14.7	15.9	15.6	18.8	19.8	17.1	19.7	19.0	17.2	20.3	18.4	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.5*
.74	.83	.85	.95	.98	.83	.84	.79	.99	1.00	.92	1.05	.98	.93	1.17	1.03			Relative P/E Ratio	*.90*
5.7%	6.0%	5.2%	4.5%	4.1%	4.3%	4.4%	4.1%	3.6%	3.4%	3.7%	3.4%	3.9%	4.1%	3.4%	3.5%			Avg Ann'l Div'd Yield	*3.7%*
12919	12554	12075	12033	12337	12574	12246	13676	15670	14663	*15200*	*16200*	Revenues ($mill)	*18500*
1066.0	1193.0	1189.0	1266.0	1424.0	1438.0	1399.0	1528.0	1620.0	1762.0	*1835*	*1950*	Net Profit ($mill)	*2375*
34.0%	33.6%	35.3%	36.6%	20.1%	17.5%	12.9%	16.2%	15.4%	17.8%	*18.0%*	*18.0%*	Income Tax Rate	*18.0%*
.3%	.7%	1.3%	1.5%	1.5%	1.9%	2.2%	2.1%	3.4%	4.4%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
48.0%	47.9%	50.8%	48.9%	51.1%	50.7%	52.0%	53.0%	49.3%	50.9%	*51.0%*	*51.0%*	Long-Term Debt Ratio	*51.5%*
52.0%	52.1%	49.2%	51.1%	48.9%	49.3%	48.0%	47.0%	50.7%	49.1%	*49.0%*	*49.0%*	Common Equity Ratio	*48.5%*
24207	25058	29033	30149	34221	36549	39229	42641	40834	43085	*44200*	*46750*	Total Capital ($mill)	*55000*
29827	32209	35216	37600	41749	43889	46555	48596	46766	49608	*52300*	*54800*	Net Plant ($mill)	*63200*
5.6%	6.0%	5.3%	5.4%	5.3%	5.1%	4.7%	4.7%	5.2%	5.2%	*5.0%*	*5.0%*	Return on Total Cap'l	*5.5%*
8.5%	9.1%	8.3%	8.2%	8.5%	8.0%	7.4%	7.6%	7.8%	8.3%	*8.5%*	*8.5%*	Return on Shr. Equity	*9.0%*
8.5%	9.1%	8.3%	8.2%	8.5%	8.0%	7.4%	7.6%	7.8%	8.3%	*8.5%*	*8.5%*	Return on Com Equity E	*9.0%*
2.6%	3.5%	3.0%	3.0%	3.5%	2.9%	2.2%	2.5%	2.6%	3.1%	*3.0%*	*3.5%*	Retained to Com Eq	*3.5%*
69%	61%	64%	63%	59%	64%	70%	67%	67%	62%	*63%*	*61%*	All Div'ds to Net Prof	*61%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $26013 mill. **Due in 5 Yrs** $1730 mill.
LT Debt $23311 mill. **LT Interest** $1070 mill.
(Total Interest Coverage: 3.0x)

Leases, Uncapitalized Annual rentals $70 mill.

Pension Assets-12/23 $15404 mill.
Oblig. $12712 mill.

Pfd Stock None

Common Stock 346,147,200 shs.
as of 7/31/24
MARKET CAP: $36.3 billion (Large Cap)

CECONY ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Electric Sales (GWH)	-.5	+3.3	-1.4
Annual Residential Use (GWH)	11344	11875	11574
Annual Comm./Ind. Use (GWH)	9250	10522	10895
Annual Retail Choice (GWH)	21549	21116	20315
Annual Govt. & Other Use (GWH)	9185	9507	9472
% Change Customers (yr-end)	NA	NA	NA
Peak Load, Summer (MW)	13517	12424	11565
ConEd Fixed Charge Cov. (%)	352	240	217

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	- -	1.5%	*4.0%*
"Cash Flow"	4.0%	4.5%	*5.5%*
Earnings	2.0%	2.0%	*6.0%*
Dividends	2.5%	2.5%	*4.0%*
Book Value	4.0%	3.5%	*4.5%*

QUARTERLY REVENUES ($ mill.) A

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	3677	2971	3613	3415	13676
2022	4060	3415	4165	4031	15670
2023	4403	2944	3872	3444	14663
2024	4280	3220	*4070*	*3630*	*15200*
2025	*4475*	*3400*	*4400*	*3925*	*16200*

EARNINGS PER SHARE A

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.44	.53	1.41	1.00	4.38
2022	1.47	.64	1.63	.81	4.55
2023	1.82	.61	1.61	1.00	5.04
2024	2.14	.59	*1.62*	*.95*	*5.30*
2025	*2.05*	*.65*	*1.85*	*1.05*	*5.60*

QUARTERLY DIVIDENDS PAID B ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.765	.765	.765	.765	3.06
2021	.775	.775	.775	.775	3.10
2022	.79	.79	.79	.79	3.16
2023	.81	.81	.81	.81	3.24
2024	.83	.83	.83		

BUSINESS: Consolidated Edison, Inc. (ConEd) is a holding company for Consolidated Edison Company of New York (CECONY), which sells electricity, gas, and steam in most of NY city and Westchester County. ConEd also owns Orange and Rockland utilities (O&R), which operates in southeastern NY and northern NJ. ConEd has 4.0 mill. electric and 1.3 mill. gas customers. Sold its portfolio of renewable power generation for $6.8 billion (3/23). Entered into midstream gas joint venture 6/16; sold it 7/21. Purchases most of its power. Fuel costs: 24% of revenues. '23 depreciation rate for CECONY: 3.6%. Employs about 14,600. Chairman, Pres., and CEO: Timothy Cawley. Inc.: NY. Addr.: 4 Irving Place, NY, NY 10003. Tel.: 212-460-4600. Internet.: www.conedison.com.

Consolidated Edison looks on pace to deliver a decent profit gain in 2024. Over the first half of this year the utility holding company posted adjusted earnings of $2.73 a share versus $2.43 for the comparable year-ago period. ConEd is benefiting from a constructive regulatory outcome as a result of New York State's decision to "go green." The company has billions of dollars of ongoing modernization work that's necessary to prepare the grid to receive renewable energy interfaces. It receives a 9.25% regulated return on equity (ROE) for infrastructure investments. When the company reports third-quarter financial results, just after this review went to press, we expect leadership will reaffirm this year's target range for earnings per share of $5.20 to $5.40. That represents 5% growth at the midpoint.

In 2025, the company should be able to deliver a similar earnings advance. Under the terms of the latest general rate case decision, ConEd is due to receive annualized revenue increases of $518 million and $173 million, respectively, for electricity and natural gas deliveries beginning from midway through the third quarter of this year. Next August, the final delivery rate hike under the existing regulatory agreement is to take place, resulting in additional revenue of $382 million for electricity and $122 million for gas.

The next general rate case (GRC) filing is not far off. ConEd is expected to make an initial GRC filing for 2026-2028 by early next year. Similar to the previous process, there will likely be a lengthy negotiation and regulatory hearings prior to a decision being delivered around late 2025 to early 2026. It will be interesting as to how politicized the upcoming hearings will be. Last time, the governor had to get involved to move the process along. Historically, New York has not been a particularly good regulatory environment. But the rate decision covering 2023-2025 turned out fairly well for ConEd, with the company receiving a 45 basis point boost to its regulated ROE and the green light on modernization work.

These shares aren't timely. Moreover, total return prospects look limited from the recent valuation. The dividend yield is 40 basis points below the peer median.

Anthony J. Glennon *November 8, 2024*

(A) Diluted EPS. Excl. nonrec. gains/(losses): '13, (32¢); '14, 9¢; '16, 18¢; '17, 84¢; '18, (13¢); '19, (29¢); '20, (89¢); '21, (53¢); '22, 11¢; '23, $2.17. Excl. gain on disc. ops.: '08, $1.01. Next egs. report due early Feb. Qtly. figures may not sum to full year due to rounding. **(B)** Div'ds paid in mid-Mar., June, Sept., and Dec. ■ Div'd reinvestment plan available. **(C)** Incl. intang. In '23: $14.52/sh. **(D)** In mill. **(E)** Rate base: net orig. cost. Rate allowed on com. eq. for CECONY in '23: 9.25%; O&R in '22: 9.2%. Regulatory Climate: Below Average.

Company's Financial Strength	A+
Stock's Price Stability	90
Price Growth Persistence	50
Earnings Predictability	100

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EDISON INTERNAT'L NYSE-EIX

RECENT PRICE **84.66** | P/E RATIO **16.5** (Trailing: 16.9 Median: 14.0) | RELATIVE P/E RATIO **0.91** | DIV'D YLD **3.8%** | **VALUE LINE**

TIMELINESS 4 Lowered 10/18/24
SAFETY 2 Raised 10/18/24
TECHNICAL 3 Raised 10/4/24
BETA 1.00 (1.00 = Market)

18-Month Target Price Range

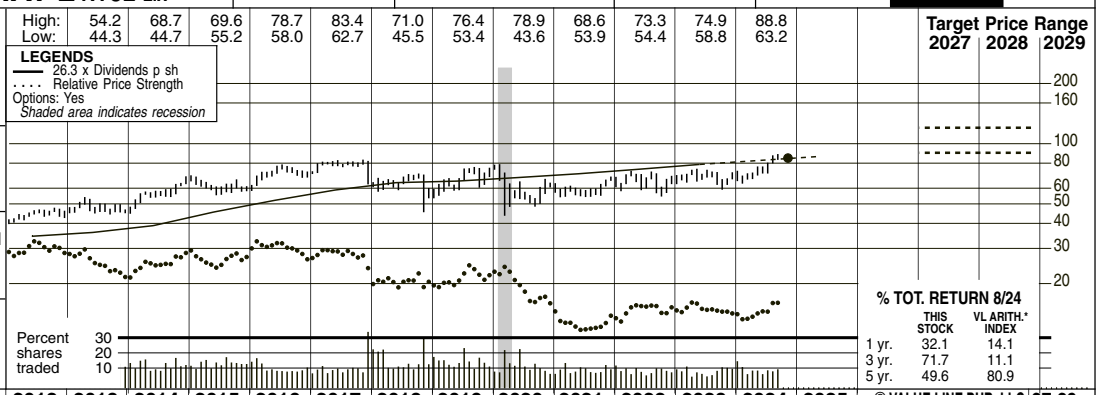
Low-High	Midpoint (% to Mid)
$63-$97	$80 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	120	(+40%)	*12%*
Low	90	(+5%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	356	368	403
to Sell	362	329	300
Hld's(000)	342030	344659	343961



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
43.31	37.98	38.09	39.16	36.41	38.61	41.17	35.37	36.43	37.81	38.85	34.11	35.83	39.18	45.05	42.56	***44.55***	***46.65***	Revenues per sh	***52.55***
8.08	7.96	8.41	9.03	9.63	8.80	9.95	10.35	10.43	11.03	4.69	9.39	9.80	10.59	11.51	11.80	***12.85***	***13.60***	"Cash Flow" per sh	***15.20***
3.68	3.24	3.35	3.23	4.55	3.78	4.33	4.15	3.94	4.51	d1.26	4.70	4.52	4.59	4.63	4.76	***4.95***	***5.50***	Earnings per sh [A]	***6.75***
1.23	1.25	1.27	1.29	1.31	1.37	1.48	1.73	1.98	2.23	2.43	2.48	2.58	2.69	2.84	2.99	***3.14***	***3.29***	Div'd Decl'd per sh [B] ■	***4.00***
8.67	10.07	13.94	14.76	12.73	11.05	11.99	12.97	11.46	11.75	13.84	13.47	14.47	14.47	15.12	14.19	***15.75***	***16.25***	Cap'l Spending per sh	***17.00***
29.21	30.20	32.44	30.86	28.95	30.50	33.64	34.89	36.82	35.82	32.10	36.75	37.08	36.57	35.70	36.02	***38.00***	***40.40***	Book Value per sh [C]	***48.50***
325.81	325.81	325.81	325.81	325.81	325.81	325.81	325.81	325.81	325.81	325.81	361.99	378.91	380.38	382.21	383.93	***386.20***	***388.00***	Common Shs Outst'g [D]	***390.00***
12.4	9.7	10.3	11.8	9.7	12.7	13.0	14.8	17.9	17.2	- -	14.1	13.3	12.9	14.0	14.4	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***15.5***
.75	.65	.66	.74	.62	.71	.68	.75	.94	.87	- -	.75	.68	.70	.81	.80			Relative P/E Ratio	***.85***
2.7%	4.0%	3.7%	3.4%	3.0%	2.8%	2.6%	2.8%	2.8%	2.9%	3.8%	3.7%	4.3%	4.5%	4.4%	4.4%			Avg Ann'l Div'd Yield	***3.8%***
						13413	11524	11869	12320	12657	12347	13578	14905	17220	16338	***17200***	***18100***	Revenues ($mill)	***20500***
						1539.0	1480.0	1422.0	1603.0	d290.0	1716.0	1818.0	1907.0	1977.0	2035.0	***2120***	***2345***	Net Profit ($mill)	***2850***
						22.4%	6.6%	11.1%	5.0%	- -	1.2%	5.0%	18.0%	12.5%	14.9%	***13.0%***	***13.0%***	Income Tax Rate	***13.0%***
						5.8%	8.0%	6.8%	7.2%	- -	9.6%	9.6%	8.8%	9.6%	11.4%	***11.0%***	***10.5%***	AFUDC % to Net Profit	***10.0%***
						44.1%	45.0%	41.8%	45.6%	53.6%	53.5%	55.2%	57.6%	60.7%	62.8%	***64.0%***	***64.0%***	Long-Term Debt Ratio	***64.0%***
						47.2%	46.7%	49.2%	45.8%	38.3%	39.9%	39.5%	33.2%	30.6%	28.7%	***28.0%***	***28.5%***	Common Equity Ratio	***28.5%***
						23216	24352	24362	25506	27284	33360	35581	41959	44547	48260	***52150***	***55350***	Total Capital ($mill)	***65750***
						32981	35085	37000	39050	41348	44285	47839	50700	53486	56084	***59100***	***62250***	Net Plant ($mill)	***72300***
						7.7%	7.1%	6.9%	7.3%	.1%	6.4%	6.3%	5.6%	5.7%	5.8%	***5.0%***	***5.5%***	Return on Total Cap'l	***6.0%***
						11.9%	11.1%	10.0%	11.6%	NMF	11.1%	11.4%	10.7%	11.3%	11.3%	***11.5%***	***12.0%***	Return on Shr. Equity	***12.0%***
						13.0%	12.0%	10.8%	12.7%	NMF	12.0%	12.0%	12.5%	12.9%	13.1%	***13.0%***	***13.5%***	Return on Com Equity [E]	***13.5%***
						8.8%	7.2%	5.6%	6.6%	NMF	5.9%	5.4%	5.4%	5.2%	5.0%	***5.0%***	***5.5%***	Retained to Com Eq	***5.5%***
						37%	44%	53%	52%	NMF	54%	58%	61%	64%	66%	***67%***	***63%***	All Div'ds to Net Prof	***62%***

CAPITAL STRUCTURE as of 6/30/24
Total Debt $36302 mill. **Due in 5 Yrs** $10489 mill.
LT Debt $33099 mill. **LT Interest** $1715 mill.
(Total Interest Coverage: 2.6x)
Leases, Uncapitalized Annual rentals $166 mill.

Pension Assets-12/23 $3609 mill.
Oblig $3647 mill.

Pfd Stock $4116 mill. **Pfd Div'd** $225 mill.

Common Stock 386,176,746 shs.
as of 7/18/24
MARKET CAP: $32.7 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	-3.9	+.9	-6.3
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	21190	24345	21254
Annual Load Factor (%)	52.7	45.8	49.7
% Change Customers (yr-end)	+.3	+.8	+.7
Fixed Charge Cov. (%)	113	135	166

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	1.0%	2.5%	*3.5%*
"Cash Flow"	2.0%	5.5%	*5.5%*
Earnings	2.0%	14.0%	*6.5%*
Dividends	8.0%	5.0%	*6.0%*
Book Value	2.0%	.5%	*5.0%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2960	3315	5299	3331	14905
2022	3968	4008	5228	4016	17220
2023	3966	3964	4702	3706	16338
2024	4078	4336	***4920***	***3866***	***17200***
2025	***4360***	***4500***	***5200***	***4040***	***18100***

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.79	.94	1.69	1.16	4.59
2022	1.07	.94	1.48	1.15	4.63
2023	1.09	1.01	1.38	1.28	4.76
2024	1.13	1.23	***1.44***	***1.15***	***4.95***
2025	***1.30***	***1.25***	***1.65***	***1.30***	***5.50***

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.6375	.6375	.6375	.6375	2.55
2021	.6625	.6625	.6625	.6625	2.65
2022	.70	.70	.70	.70	2.80
2023	.7375	.7375	.7375	.7375	2.95
2024	.78	.78	.78		

BUSINESS: Edison International is a holding company for Southern California Edison Company (SoCal Edison), which supplies electricity to 5.28 mill. customers in a 50,000-sq.-mi. area in central, coastal, & southern CA (excl. Los Angeles & San Diego). Edison Energy is an energy svcs. co. Disc. Edison Mission Energy (independent power producer) in '12. Elec. rev. breakdown: residential, 40%; commercial, 43%; industrial, 3%; other, 14%. Generating sources: nuclear, 9%; gas, 5%; hydroelectric, 6%; purchased, 80%. Power costs: 34% of revs. '23 reported depr. rate: 4.1%. Employs 14,316. Board Chair: Peter J. Taylor. President & CEO: Pedro J. Pizzaro. Inc.: CA. Address: 2244 Walnut Grove Ave., P.O. Box 976, Rosemead, CA 91770. Tel.: 626-302-2222. Internet: www.edison.com.

Edison International stock has had a terrific run, of late. The shares are up more than 18% since our last report three months ago, bettering the *Value Line Utility Index* by three percentage points. The industry has benefited from renewed interest in more-defensive equities on recession fears, as well as from the drop in bond yields. It hasn't hurt that EIX is off to a solid start this year with share earnings on pace for a 4% annual gain. Load growth in California, approaching 3% due to trends in electrification for vehicles and heavy equipment, is above the national average. This leads to transmission and distribution work that pays off rapidly in terms of return on investment for regulated utilities in the state. Fire mitigation also keeps the rate base growing. Edison's current authorized return on equity (ROE) is 10.3%, but may see an improvement come next year when a general rate case decision is due. State peer PG&E received an authorized ROE of 10.7% from regulators earlier this year. Odds are EIX will receive an increase, too. If so, it should be able to grow earnings per share by at least 6% in 2025.

For once, there may be good news regarding the company's legacy California wildfires. EIX has paid out billions of dollars for the role its power lines played in the December 2017 Thomas Fire, Koenigstein Fire and Montecito Mudslides (together known as the TKM Events), along with the November 2018 Woolsey Fire. The company has settled 98% of the TKM Events' claims and 92% of those related to Woolsey. In August 2023, EIX filed with the California Public Utilities Commission (CPUC) for cost recovery on $2.7 billion of its TKM payouts it believed were "prudently incurred." EIX came to a settlement agreement with the state's public advocates office for about 60% of that figure or $1.65 billion. The terms still need to be approved by CPUC. EIX is expected to file for cost recovery on the Woolsey Fire this year, as well.

These shares are ranked to underperform the year-ahead broader market averages. After the recent 18% run up in value, EIX stock's total return prospects out to 2027-2029 don't look particularly impressive.

Anthony J. Glennon *October 18, 2024*

(A) Adjusted (non-GAAP) EPS from 2019 on. Excl. gains/(losses): nonrecur's ; '10, 54¢; '11, ($3.33); '13, ($1.12); '15, ($1.18); '17, ($1.37); '18, (14¢); '19, (92¢); '20, ($2.54); '21, ($2.59); '22, ($3.02); '23, ($1.34); disc. ops.: '13, 11¢; '14, 57¢; '15, 11¢; '18, 10¢. Qtly. EPS may not sum to full yr. due to rounding. Next egs. report due late Oct. **(B)** Div'ds paid late Jan., Apr., July, & Oct. ■ Div'd reinv. plan avail. **(C)** Incl. def'd chgs. In '23: $4.36/sh. **(D)** In mill. **(E)** Rate base: net orig. cost. Rate all'd on com. eq. in '20: 10.3%; Regulatory Climate: Avg.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	25
Earnings Predictability	15

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EVERSOURCE ENERGY NYSE-ES

RECENT PRICE **66.49** | P/E RATIO **14.0** (15.3 / 19.0) | RELATIVE P/E RATIO **0.77** | DIV'D YLD **4.5%** | **VALUE LINE**

TIMELINESS 4 Raised 5/24/24
SAFETY 2 Lowered 5/12/23
TECHNICAL 3 Lowered 11/8/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$54-$88	$71 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	110	(+65%)	*16%*
Low	80	(+20%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	366	371	363
to Sell	417	386	388
Hld's(000)	282086	285815	292086

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	45.7	56.7	56.8	60.4	66.1	70.5	86.6	99.4	92.7	94.6	86.8	69.0						
Low:	38.6	41.3	44.6	50.0	54.1	52.8	63.1	60.7	76.6	70.5	52.0	52.1						

LEGENDS
26.3 x Dividends p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	10.7	14.1
3 yr.	-17.2	11.1
5 yr.	-0.9	80.9

37.22	30.97	27.76	25.21	19.98	23.16	24.42	25.08	24.11	24.46	26.66	25.85	25.96	28.64	35.27	34.08	***33.70***	***35.80***
6.16	4.96	5.68	4.88	4.03	5.22	4.56	4.94	5.46	5.84	6.64	6.65	6.99	7.74	8.79	6.68	***7.60***	***7.85***
1.86	1.91	2.10	2.22	1.89	2.49	2.58	2.76	2.96	3.11	3.25	3.45	3.64	3.86	4.09	4.34	***4.55***	***4.80***
.83	.95	1.03	1.10	1.32	1.47	1.57	1.67	1.78	1.90	2.02	2.14	2.27	2.41	2.55	2.70	***2.86***	***3.03***
8.06	5.17	5.41	6.08	4.69	4.62	5.06	5.44	6.24	7.41	7.96	8.83	8.58	9.22	9.88	12.41	***12.15***	***12.10***
19.38	20.37	21.60	22.65	29.41	30.49	31.47	32.64	33.80	34.99	36.25	38.29	41.01	42.39	44.41	40.55	***42.65***	***44.55***
155.83	175.62	176.45	177.16	314.05	315.27	316.98	317.19	316.89	316.89	316.89	329.88	342.95	344.40	348.44	349.54	***357.50***	***359.00***
13.7	12.0	13.4	15.4	19.9	16.9	17.9	18.1	18.7	19.5	18.7	22.1	23.7	22.2	20.9	16.0		
.82	.80	.85	.97	1.27	.95	.94	.91	.98	.98	1.01	1.18	1.22	1.20	1.21	.89		
3.2%	4.2%	3.6%	3.2%	3.5%	3.5%	3.4%	3.3%	3.2%	3.1%	3.3%	2.8%	2.6%	2.8%	3.0%	3.9%		

Bold figures are Value Line estimates

© VALUE LINE PUB. LLC 27-29

Revenues per sh	*41.10*
"Cash Flow" per sh	*10.00*
Earnings per sh A	*5.75*
Div'd Decl'd per sh B ■	*3.60*
Cap'l Spending per sh	*12.50*
Book Value per sh C	*51.25*
Common Shs Outst'g D	*365.00*
Avg Ann'l P/E Ratio	*16.5*
Relative P/E Ratio	*.90*
Avg Ann'l Div'd Yield	*3.8%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $27627 mill. **Due in 5 Yrs** $9258.1 mill.
LT Debt $26182 mill. **LT Interest** $895.0 mill.
(Total Interest coverage: 3.1x)

Leases, Uncapitalized Annual rentals $80.6 mill.

Pension Assets-12/23 $5775.0 mill.
Oblig. $5238.4 mill.
Pfd Stock $155.6 mill. **Pfd Div'd** $7.52 mill.

Common Stock 357,384,733 shs.
as of 7/31/24
MARKET CAP: $23.8 billion (Large Cap)

7741.9	7954.8	7639.1	7752.0	8448.2	8526.5	8904.4	9863.1	12289	11911	***12050***	***12850***
827.1	886.0	949.8	995.5	1040.5	1121.0	1244.8	1337.7	1427.4	1525.2	***1615***	***1730***
36.2%	37.9%	36.9%	36.8%	21.7%	19.7%	22.2%	21.9%	24.3%	19.8%	***24.0%***	***24.0%***
2.4%	2.9%	3.9%	4.7%	6.1%	6.3%	5.3%	4.2%	4.8%	8.0%	***8.0%***	***8.0%***
45.9%	45.6%	44.8%	51.2%	52.4%	52.8%	52.4%	54.2%	56.3%	62.6%	***62.0%***	***62.5%***
53.2%	53.6%	54.4%	48.2%	46.9%	46.6%	47.1%	45.3%	43.3%	37.0%	***37.5%***	***37.5%***
18738	19313	19697	23018	24474	27097	29842	32233	35763	38285	***40400***	***42900***
18647	19892	21351	23617	25610	27585	30883	33378	36113	39499	***42250***	***45250***
5.3%	5.5%	5.8%	5.2%	5.2%	5.1%	5.1%	5.1%	5.0%	5.0%	***5.0%***	***5.5%***
8.2%	8.4%	8.7%	8.9%	8.9%	8.8%	8.8%	9.1%	9.1%	10.6%	***10.5%***	***10.5%***
8.2%	8.5%	8.8%	8.9%	9.0%	8.8%	8.8%	9.1%	9.2%	10.7%	***10.5%***	***11.0%***
3.5%	3.4%	3.5%	3.5%	3.4%	3.6%	3.5%	3.6%	3.6%	4.2%	***4.0%***	***4.0%***
58%	61%	60%	61%	62%	60%	60%	61%	61%	61%	***63%***	***63%***

Revenues ($mill)	*15000*
Net Profit ($mill)	*2110*
Income Tax Rate	*24.0%*
AFUDC % to Net Profit	*8.0%*
Long-Term Debt Ratio	*61.5%*
Common Equity Ratio	*38.0%*
Total Capital ($mill)	*49200*
Net Plant ($mill)	*53100*
Return on Total Cap'l	*5.5%*
Return on Shr. Equity	*11.0%*
Return on Com Equity E	*11.0%*
Retained to Com Eq	*4.0%*
All Div'ds to Net Prof	*63%*

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (GWH)	+1.6	+.5	-3.3
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Winter (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+.6	+.7	+.7
Fixed Charge Cov. (%)	347	310	263

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	3.5%	5.5%	*4.0%*
"Cash Flow"	5.0%	5.5%	*4.5%*
Earnings	6.5%	5.5%	*6.0%*
Dividends	7.0%	6.0%	*6.0%*
Book Value	4.5%	4.0%	*3.0%*

QUARTERLY REVENUES ($ mill.) A

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2826	2123	2433	2482	9863
2022	3471	2573	3216	3030	12289
2023	3796	2629	2792	2694	11911
2024	3333	2534	***3070***	***3113***	***12050***
2025	***3600***	***2775***	***3250***	***3225***	***12850***

EARNINGS PER SHARE A

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.15	.79	1.02	.91	3.86
2022	1.30	.86	1.01	.92	4.09
2023	1.41	1.00	.97	.95	4.34
2024	1.49	.95	***1.07***	***1.04***	***4.55***
2025	***1.59***	***1.04***	***1.10***	***1.07***	***4.80***

QUARTERLY DIVIDENDS PAID B ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.5675	.5675	.5675	.5675	2.27
2021	.6025	.6025	.6025	.6025	2.41
2022	.6375	.6375	.6375	.6375	2.55
2023	.675	.675	.675	.675	2.70
2024	.715	.715	.715		

BUSINESS: Eversource Energy (formerly Northeast Utilities) is the parent of 12 regulated utilities with 4.45 million electric, natural gas, and water customers. Supplies power to most of Connecticut and gas to part of CT; supplies power to 3/4 of New Hampshire's population; supplies power to western Massachusetts and parts of eastern MA & gas to central & eastern MA; supplies water to CT, MA, & NH. Acq'd NSTAR 4/12; Aquarion 12/17; Columbia Gas 10/20. Electric rev. breakdown: residential, 56%; commercial/indus'l/other, 43.4%. Fuel costs: 41% of revs. '23 reported depr. rate: 3.1%. Employs about 10,200. Chairman, President & CEO: Joseph R. Nolan, Jr. Inc.: MA. Addr.: 300 Cadwell Drive, Springfield, MA 01104. Telephone: 413-785-5871. Internet: www.eversource.com.

Eversource Energy's offshore-wind investment troubles should just about be in the rearview mirror at this point. Rapidly rising development and borrowing costs resulted in cost overruns and uncertainties regarding future capital expenditures and investment returns. Unfortunately the decision to exit the business came a few quarters too late. The utility had to take a nearly $2 billion impairment charge last year as it had to sell these assets for less than the overall investment. Management has pre-warned that a final $520 million writedown, which we'll treat as a nonrecurring item, associated with the divestiture will be included in its third-quarter financial results (expected to be released just after this report goes to press). The company was able to recoup about $855 million from its former joint-venture partner, Orsted. However, the agreement to sell its 50% stake in the South Fork Wind and Revolution Wind projects to Global Infrastructure Partners for $1.12 billion ultimately fetched less at closing than previously expected. Various financial conditions associated with the deal weren't met.

Eversource is shopping its water utility subsidiary to improve finances. Aquarion Water was purchased for $1.67 billion in 2017. It has been deemed a non-strategic asset by management. The business distributes water to 72 towns and cities in Connecticut, Massachusetts, and New Hampshire. It is not as profitable as the electric utilities, but may retrieve a decent price from the right buyer

Patient utility investors should consider allocating funds here. The valuation gap between this company, which still has above-average long-term growth prospects relative to its peer group, is simply too wide. After increasing the dividend 5.9% this year, the yield stands at 4.5%, which is 90 basis points above the median for electric utilities under our coverage. This issue is trading at a price-to-earnings ratio that's four multiples of earnings below that of the peer-group average. The valuation gap should diminish over time as headline risk tied to the company's offshore-wind troubles dries up and management shows that the company's earnings growth consistency remains intact.

Anthony J. Glennon *November 8, 2024*

(A) Diluted EPS excl. nonrecur. gain/(losses): '08, (19¢); '10, 9¢; '19, (64¢); '20, (9¢); '21, (32¢); '22, (4¢); '23, ($3.45). Next egs. report due early February. Quarterly figures may not sum to full year due to rounding. **(B)** Div'ds paid late Mar., June, Sept., & Dec. ■ Div'd reinvestment plan avail. **(C)** Incl. intangibles. In '23: $26.45/sh. **(D)** In mill. **(E)** Rate allowed on com. eq. in MA: (elec.) '22, 9.8%; (gas) '20, 9.7%-9.9%; in CT: (elec.) '18, 9.25%; (gas) '18, 9.3%; in NH: '21, 9.3%; Regulatory Climate: CT, Below Avg.; NH, Avg.; MA, Above Avg.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	65
Earnings Predictability	100

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EXELON CORP. NDQ-EXC

RECENT PRICE 40.23 | P/E RATIO 15.8 (16.6 / 14.0) | RELATIVE P/E RATIO 0.87 | DIV'D YLD 3.8% | VALUE LINE

TIMELINESS — Suspended 2/4/22
SAFETY 2 Raised 8/13/21
TECHNICAL — Suspended 2/4/22
BETA NMF (1.00 = Market)

18-Month Target Price Range

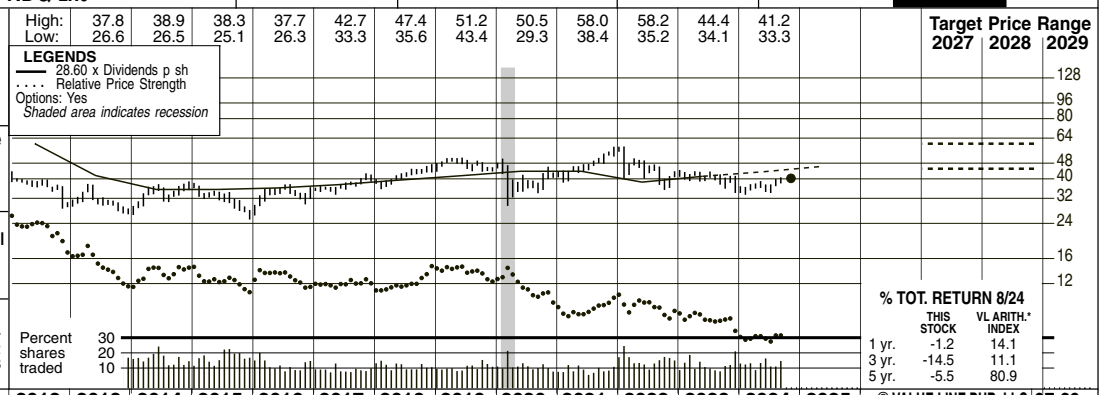
Low-High	Midpoint (% to Mid)
$29-$46	$38 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	60	(+50%)	*16%*
Low	45	(+10%)	*9%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	458	445	442
to Sell	475	474	438
Hld's(000)	820814	836116	842112



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
28.65	26.25	28.17	28.53	27.48	29.03	31.90	32.01	33.94	34.81	37.17	35.39	33.85	37.13	19.19	21.75	*22.20*	*22.90*	Revenues per sh	*24.90*
7.64	8.25	8.32	7.23	6.61	6.72	6.61	6.80	7.88	8.37	9.29	9.17	9.65	10.56	6.07	6.12	*6.25*	*6.60*	"Cash Flow" per sh	*7.60*
4.10	4.29	3.87	3.75	1.92	2.31	2.10	2.54	2.68	2.78	3.12	3.22	3.22	2.82	2.26	2.38	*2.45*	*2.65*	Earnings per sh A	*3.10*
2.05	2.10	2.10	2.10	2.10	1.46	1.24	1.24	1.26	1.31	1.38	1.45	1.53	1.53	1.35	1.44	*1.52*	*1.62*	Div'd Decl'd per sh B ■	*1.95*
4.74	4.96	5.03	6.09	6.77	6.29	7.07	8.29	9.26	7.87	7.84	7.45	8.25	8.15	7.19	7.42	*7.80*	*7.80*	Cap'l Spending per sh	*8.00*
16.78	19.16	20.49	21.68	25.07	26.52	26.29	28.04	27.96	30.99	31.77	33.12	33.39	35.13	24.89	25.78	*26.35*	*27.25*	Book Value per sh C	*29.75*
658.15	659.76	661.85	663.37	854.78	857.29	859.83	919.92	924.04	963.34	968.19	973.00	976.00	979.00	994.00	999.00	*1000.0*	*1000.0*	Common Shs Outst'g D	*1005.0*
18.0	11.5	11.0	11.3	19.1	13.4	16.0	12.6	12.5	13.4	13.3	14.7	12.4	16.6	19.9	17.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.5*
1.08	.77	.70	.71	1.22	.75	.84	.63	.66	.67	.72	.78	.64	.90	1.15	.95			Relative P/E Ratio	*.95*
2.8%	4.3%	4.9%	5.0%	5.7%	4.7%	3.7%	3.9%	3.7%	3.5%	3.3%	3.1%	3.8%	3.3%	3.2%	4.3%			Avg Ann'l Div'd Yield	*3.5%*
						27429	29447	31360	33531	35985	34438	33039	36347	19078	21727	*22200*	*22900*	Revenues ($mill)	*25000*
						1826.0	2282.0	2488.0	2636.0	3026.0	3139.0	3149.0	2764.0	2170.0	2328.0	*2450*	*2650*	Net Profit ($mill)	*3115*
						27.2%	32.2%	38.5%	34.2%	11.1%	19.4%	17.4%	16.1%	14.5%	13.8%	*15.0%*	*15.0%*	Income Tax Rate	*15.0%*
						5.5%	5.4%	8.3%	6.5%	4.6%	5.0%	5.5%	7.4%	7.0%	7.4%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
						46.7%	48.3%	55.5%	52.2%	52.8%	49.6%	52.1%	50.9%	59.9%	60.3%	*61.0%*	*61.0%*	Long-Term Debt Ratio	*64.5%*
						52.8%	51.3%	44.5%	47.8%	47.2%	50.4%	47.9%	49.1%	40.2%	39.1%	*39.0%*	*39.0%*	Common Equity Ratio	*35.5%*
						42811	50272	58053	62422	65229	63943	68068	70107	58836	65837	*65250*	*70300*	Total Capital ($mill)	*81000*
						52087	57439	71555	74202	76707	80233	82584	84219	69076	73593	*69750*	*70100*	Net Plant ($mill)	*77600*
						5.3%	5.5%	5.5%	5.3%	5.7%	6.0%	5.7%	5.0%	5.0%	3.6%	*5.0%*	*5.0%*	Return on Total Cap'l	*5.0%*
						8.0%	8.8%	9.6%	8.8%	9.8%	9.7%	9.7%	8.0%	9.5%	9.0%	*10.0%*	*10.0%*	Return on Shr. Equity	*10.0%*
						8.0%	8.8%	9.6%	8.8%	9.8%	9.7%	9.7%	8.0%	9.5%	9.0%	*10.0%*	*10.0%*	Return on Com Equity E	*10.0%*
						3.3%	4.5%	5.1%	4.7%	5.5%	5.4%	5.1%	3.7%	4.0%	3.5%	*4.0%*	*4.0%*	Retained to Com Eq	*4.0%*
						59%	49%	47%	47%	44%	45%	47%	54%	60%	60%	*60%*	*60%*	All Div'ds to Net Prof	*60%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $44493 mill. **Due in 5 Yrs** $12334 mill.
LT Debt $43039 mill. **LT Interest** $1450 mill.
Includes $390 mill. nonrecourse transition bonds.
(Interest coverage: 2.7x)
Leases, Uncapitalized Annual rentals $156 mill.

Pension Assets-12/23 $20827 mill.
Oblig $23846 mill.

Pfd Stock None

Common Stock 1,000,498,207 shs.
as of 6/30/24
MARKET CAP: $40.3 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	NA	NA	NA
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load (Mw)	NA	NA	NA
Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+.6	NA	NA
Fixed Charge Cov. (%)	237	325	NA

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	2.5%	1.0%	*NMF*
"Cash Flow"	3.0%	5.5%	*NMF*
Earnings	-.5%	2.5%	*NMF*
Dividends	-3.0%	4.0%	*NMF*
Book Value	4.5%	3.5%	*NMF*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	9890	7915	8910	9632	36347
2022	5327	4239	4845	4667	19078
2023	5562	4818	5980	5367	21727
2024	6043	5361	*5850*	*4946*	*22200*
2025	*6200*	*5450*	*6250*	*5000*	*22900*

EARNINGS PER SHARE A

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	d.06	.89	1.09	.90	2.82
2022	.64	.44	.75	.43	2.26
2023	.70	.41	.67	.60	2.38
2024	.68	.47	*.70*	*.60*	*2.45*
2025	*.75*	*.50*	*.80*	*.60*	*2.65*

QUARTERLY DIVIDENDS PAID B ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.3825	.3825	.3825	.3825	1.53
2021	.3825	.3825	.3825	.3825	1.53
2022	.3375	.3375	.3375	.3375	1.35
2023	.360	.360	.360	.360	1.44
2024	.380	.380	.380		

BUSINESS: Exelon Corporation is a holding company for Commonwealth Edison (ComEd), PECO Energy, Baltimore Gas and Electric (BGE), Pepco, Delmarva Power (DPL), & Atlantic City Electric (ACE). Has 9.1 mill. elec., 1.3 mill. gas customers. Spun off Constellation Energy (nonregulated generating & energy-marketing ops.) 2/22. Acq'd Constellation Energy 3/12; Pepco Holdings 3/16. Elec. rev. breakdown: residntl., 54%; small commercl. & indstrl., 16%; large commercl. & indstrl., 17%; other, 13%. Fuel costs: 48% of revs. '23 deprec. rates: 2.8%-8.7% elec., 2.1% gas. Has 18,700 empls. Chrmn.: John F. Young. CEO: Calvin Butler. Inc.: PA. Address: 10 S.Dearborn St., P.O. Box 805379, Chicago, IL 60680-5379. Telephone: 312-394-7398. Internet: www.exeloncorp.com.

Exelon looks poised for a decent finish to 2024. (The company was set to report third-quarter results shortly after this Issue went to press.) Our 2024 bottom-line estimate is staying put at the midpoint of Exelon's updated target range of $2.40-$2.50 a share. As an entirely regulated utility, the businesses should continue to perform fairly consistently. And, an improved operating environment, as well as volume growth, rate relief, and power demand will likely boost profits moving forward. Management also reaffirmed its long-term target of annual earnings growth of 5%-7%, which includes investing $34.5 billion over 2024-2027 to grow the rate base at 7.5%.

We look for sharper growth next year. Indeed, we have raised our 2025 top- and bottom-line estimates by $50 million and $0.05 a share, respectively. Exelon is increasingly well positioned for the long term as an entirely regulated utility, and will likely continue to benefit from much of the same catalysts, including rate relief and a boost in power demand. The utility has a number of pending rate cases, and should continue to take advantage of additional revenues from regulatory mechanisms and higher distribution rates. We still expect profits to reach $3.10 a share by 2027-2029. And, the stock should trade around $45-$60 over that interim.

These shares are up more than 10% in value since our early August report. Exelon and many of its peers have rallied nicely of late due to investor enthusiasm for stable income-paying assets as interest rates go lower. Plus, we do not look for investor demand to soften anytime soon. The stock is now up about 13% since the start of 2024.

This issue may interest conservative, income-oriented accounts. Exelon holds a very strong dividend yield of 3.8%, and is ranked 2 (Above Average) for Safety. The stock is generally seen as a solid addition to a well-rounded portfolio. Meanwhile, after the recent increase in stock price, total return potential over the 18-month and 3- to 5-year time frames is nothing to write home about. Prospective investors should be aware that these shares remain unranked for Timeliness due to the company's 2022 spinoff of Constellation Energy.

Zachary J. Hodgkinson November 8, 2024

(A) Dil. egs. Excl. nonrec. gain (loss): '09, (20¢); '12, (50¢); '13, (31¢); '14, (22¢); '16, ($1.46); '17, $1.19; '18, ($1.05); '19, (21¢); '20, ($1.21); '21, ($1.08); Next egs. report due Feb. **(B)** Div'ds paid in early Mar., June, Sept., & Dec. ■ Div'd reinvest. plan avail. **(C)** Incl. deferred charges. In '22: $15.20/sh. **(D)** In mill. **(E)** Rate allowed on common equity in IL in '15: 9.25%; in MD in '16: 9.75% elec., 9.65% gas; Regulatory Climate: PA, NJ: Average; IL, MD: Below Avg. **(F)** Timeliness rank suspended due to Constellation Energy spinoff.

Company's Financial Strength	B++
Stock's Price Stability	NMF
Price Growth Persistence	NMF
Earnings Predictability	NMF

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FIRSTENERGY NYSE-FE

RECENT PRICE **43.68** | P/E RATIO **16.0** (16.7 / 14.0) | RELATIVE P/E RATIO **0.88** | DIV'D YLD **4.1%** | **VALUE LINE**

TIMELINESS 4 Lowered 10/18/24
SAFETY 3 Lowered 7/31/20
TECHNICAL 3 Lowered 11/8/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$33-$50	$42 (-5%)

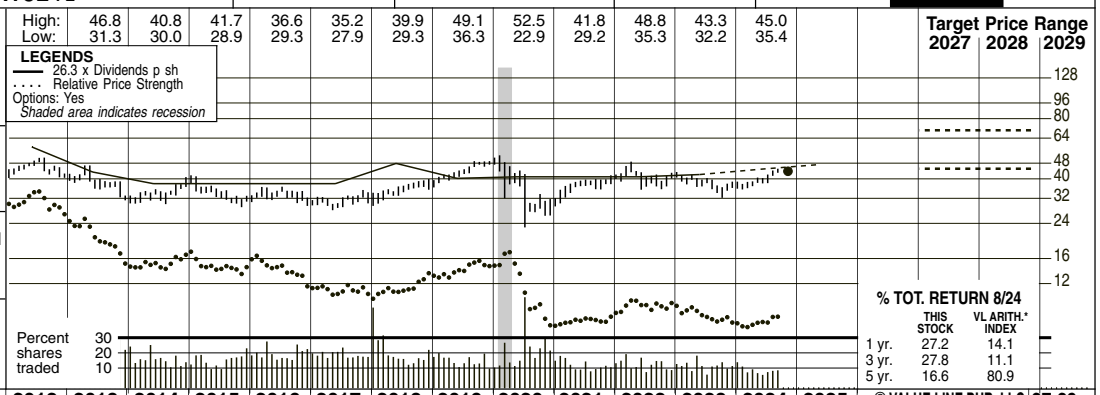
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	70	(+60%)	*15%*
Low	45	(+5%)	*6%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	306	326	357
to Sell	311	297	275
Hld's(000)	477876	484464	483657

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	46.8	40.8	41.7	36.6	35.2	39.9	49.1	52.5	41.8	48.8	43.3	45.0								
Low:	31.3	30.0	28.9	29.3	27.9	29.3	36.3	22.9	29.2	35.3	32.2	35.4								
	44.70	41.70	43.76	38.87	36.57	35.60	35.74	35.48	32.92	31.49	22.00	20.41	19.87	19.52	21.78	22.41	***23.85***	***25.85***	Revenues per sh	***28.55***
	9.04	8.80	8.50	5.75	6.05	6.30	6.26	7.04	7.04	6.54	5.19	4.80	4.59	5.41	4.71	4.78	***4.90***	***5.20***	"Cash Flow" per sh	***6.30***
	4.38	3.32	3.25	1.88	2.13	2.97	2.56	2.71	2.63	2.73	2.59	2.56	2.39	2.60	2.41	2.56	***2.65***	***2.85***	Earnings per sh [A]	***3.50***
	2.20	2.20	2.20	2.20	2.20	1.65	1.44	1.44	1.44	1.44	1.82	1.53	1.56	1.56	1.56	1.60	***1.70***	***1.80***	Div'd Decl'd per sh [B] ■	***2.17***
	9.47	7.23	6.44	5.45	7.09	6.90	8.42	6.83	6.93	6.38	5.23	4.93	4.89	4.29	4.82	5.84	***6.05***	***6.20***	Cap'l Spending per sh	***6.50***
	27.17	28.08	28.03	31.75	31.29	30.32	29.49	29.33	14.11	8.81	13.17	12.90	13.33	15.21	17.77	18.17	***18.95***	***19.90***	Book Value per sh [C]	***24.00***
	304.84	304.84	304.84	418.22	418.22	418.63	421.10	423.56	442.34	445.33	511.92	540.65	543.12	570.26	572.13	574.34	***577.00***	***580.00***	Common Shs Outst'g [D]	***595.00***
	15.6	13.0	11.7	22.4	21.1	13.1	13.2	12.6	12.7	11.4	13.6	17.1	15.7	14.1	17.0	14.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***16.5***
	.94	.87	.74	1.41	1.34	.74	.69	.63	.67	.57	.73	.91	.81	.76	.98	.83			Relative P/E Ratio	***.90***
	3.2%	5.1%	5.8%	5.2%	4.9%	4.3%	4.3%	4.2%	4.3%	4.6%	5.2%	3.5%	4.2%	4.3%	3.8%	4.2%			Avg Ann'l Div'd Yield	***3.8%***
							15049	15029	14562	14022	11261	11035	10790	11132	12459	12870	***13750***	***15000***	Revenues ($mill)	***17000***
							1074.0	1144.0	1118.0	1213.0	1346.0	1380.0	1296.0	1419.0	1377.0	1468.0	***1530***	***1655***	Net Profit ($mill)	***2095***
							28.4%	35.8%	37.4%	37.2%	28.5%	19.8%	13.6%	20.6%	48.1%	16.2%	***21.0%***	***21.0%***	Income Tax Rate	***21.0%***
							11.0%	10.2%	9.2%	6.5%	4.8%	5.1%	5.9%	5.3%	6.1%	6.6%	***7.0%***	***7.0%***	AFUDC % to Net Profit	***7.0%***
							60.7%	60.7%	74.5%	84.3%	72.3%	73.8%	75.4%	71.9%	67.6%	68.7%	***65.5%***	***65.5%***	Long-Term Debt Ratio	***63.0%***
							39.3%	39.3%	25.5%	15.7%	27.4%	26.2%	24.6%	28.1%	32.4%	31.3%	***34.5%***	***34.5%***	Common Equity Ratio	***37.0%***
							31596	31613	24433	25040	24565	26593	29368	30923	31369	33322	***31950***	***34000***	Total Capital ($mill)	***38500***
							35783	37214	29387	28879	29911	31650	33294	34744	36285	38412	***39300***	***41500***	Net Plant ($mill)	***48300***
							5.0%	5.3%	6.6%	7.0%	7.4%	6.8%	6.0%	6.2%	5.9%	5.8%	***6.5%***	***6.5%***	Return on Total Cap'l	***6.5%***
							8.6%	9.2%	17.9%	30.9%	19.8%	19.8%	17.9%	16.4%	13.5%	14.1%	***14.5%***	***14.5%***	Return on Shr. Equity [E]	***14.5%***
							8.6%	9.2%	17.9%	30.9%	18.9%	19.7%	17.9%	16.4%	13.5%	14.1%	***14.5%***	***14.5%***	Return on Com Equity [E]	***14.5%***
							3.8%	4.3%	8.1%	14.6%	8.4%	8.1%	6.2%	6.6%	4.8%	5.4%	***5.5%***	***5.5%***	Retained to Com Eq	***5.5%***
							56%	53%	55%	53%	58%	59%	65%	60%	65%	62%	***63%***	***63%***	All Div'ds to Net Prof	***62%***



CAPITAL STRUCTURE as of 9/30/24
Total Debt $23705 mill. **Due in 5 Yrs** $10605 mill.
LT Debt $21603 mill. **LT Interest** $1050 mill.
Incl. $14 mill. finance leases.
(Total Interest coverage: 2.7x)
Leases, Uncapitalized Annual rentals $56 mill.

Pension Assets-12/23 $6879 mill.
Oblig. $8363 mill.

Pfd Stock None

Common Stock 576,317,004 shs.

MARKET CAP: $25.2 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (MWH)	+2.4	+1.5	-3.3
Residential Use (MWH)	55624	55995	52216
Commercial Use (MWH)	35599	36317	34891
Industrial Use (MWH)	54027	55169	55541
Tot. Electric Deliv'd (MWH)	145250	147481	142648
Peak Load Summer (Mw)	NA	NA	NA
% Change Customers (yr-end)	+.4	+.4	+.5
Fixed Charge Cov. (%)	171	290	225

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-5.5%	-6.0%	*4.5%*
"Cash Flow"	-2.0%	-4.5%	*5.5%*
Earnings	1.0%	-1.0%	*6.0%*
Dividends	-2.5%	- -	*6.0%*
Book Value	-6.0%	7.0%	*6.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2726	2622	3124	2660	11132
2022	2989	2818	3475	3177	12459
2023	3231	3006	3487	3146	12870
2024	3287	3280	3729	***3454***	***13750***
2025	***3575***	***3600***	***4050***	***3775***	***15000***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.69	.59	.82	.51	2.60
2022	.60	.53	.79	.50	2.41
2023	.60	.47	.88	.62	2.56
2024	.55	.56	.85	***.69***	***2.65***
2025	***.61***	***.58***	***.94***	***.72***	***2.85***

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.39	.39	.39	.39	1.56
2021	.39	.39	.39	.39	1.56
2022	.39	.39	.39	.39	1.56
2023	.39	.39	.39	.41	1.58
2024	.41	.425	.425		

BUSINESS: FirstEnergy Corp. is a holding company for Ohio Edison, Pennsylvania Power, Cleveland Electric, Toledo Edison, Metropolitan Edison, Penelec, Jersey Central Power & Light, West Penn Power, Potomac Edison, & Mon Power. Provides electric service to 6.24 million customers in OH, PA, NJ, WV, MD, & NY. Acq'd Allegheny Energy 2/11. Electric revenue breakdown: residential, 59.6%; commercial, industrial & other, 40.4%. Purchases most of its power. Power costs: 36.1% of revenues. 2023 reported depreciation rate: 2.8%. Employs about 12,000. Chair: John W. Somerhalder II. President and CEO: Brian X. Tierney. Incorporated: Ohio. Address: 76 South Main Street, Akron, Ohio 44308-1890. Telephone: 800-736-3402. Internet: www.firstenergycorp.com.

FirstEnergy appears on target for decent earnings growth in 2024 and 2025. The utility posted core operating earnings of $1.96 per share for the first nine months of this year versus $1.94 in the comparable year-ago period. Better results reflect continued growth from the company's regulated investment strategy and favorable distribution sales. These factors offset a rise in operating expenses and finance costs. For the fourth quarter, the company expects to earn $0.65-$0.75 a share, and its full-year 2024 earnings-per-share expectation is $2.61-$2.71. Beyond this year, 5% to 7% profit growth seems achievable, as FirstEnergy continues to leverage the flexibility of its vast Mid-Atlantic to Midwest network by prioritizing transmission and distribution projects. This type of investment provides a relatively quick regulated return on capital employed. Rate relief should add to the bottom line, too. In October of 2023, a favorable rate case was concluded in Maryland, and constructive settlements in West Virginia and New Jersey took place this year. Cases were filed a few months ago in Pennsylvania and Ohio.

Finances are improving. In 2021, FirstEnergy settled most of its bribery charges with Ohio regulators and federal prosecutors. New leadership recently finalized all settlements and the deferred prosecution agreement concluded. To further recap, equity injections of $1 billion were received in late 2021, followed by the mid-2022 sale of a minority interest in the company's transmission assets for $2.4 billion. Fitch restored the utility's credit rating to investment grade in 2022. The closing on the sale of a second minority interest for $3.5 billion this year prompted upgrades from the other two major credit rating agencies. Our own Financial Strength rating was lifted one notch to a B++ this year.

This equity trades at a valuation discount to its industry median. The dividend yield is 50 basis points higher than the peer average while the price-to-earnings ratio is nearly three multiples of earnings lower than that of the average electric. Over time, as the company moves further beyond the bribery scandal, these valuation discounts may diminish.

Anthony J. Glennon *November 8, 2024*

(A) Diluted egs. excl. nonrc. loss: '13, $2.07; '14, $2.05; '15, $1.34; '16, $17.12; '17, $6.61; '18, $1.26; '19, 89¢; '20, 54¢; '21, 33¢; '22, $1.70; '23, 60¢; gain/loss from disc. ops.: '18, 66¢; '20, 14¢; '21, 8¢; '23, d4¢. Qtly. EPS don't sum due to rnd'g. Next egs. report late Jan. **(B)** Div. pd. Mar., June, Sept., & Dec. 3 div. in '13, 5 in '18. ■ Div'd reinv. avail. **(C)** Incl. intang. in '23: $10.42/sh. **(D)** In mill. **(E)** High ROE from large writeoffs. Rate base: Depr. orig. cost. Rates all'd on com. eq.: 9.6-11.7%; Reg.: OH Above Avg.; PA/NJ Avg.; MD/WV Below Avg.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	35
Earnings Predictability	100

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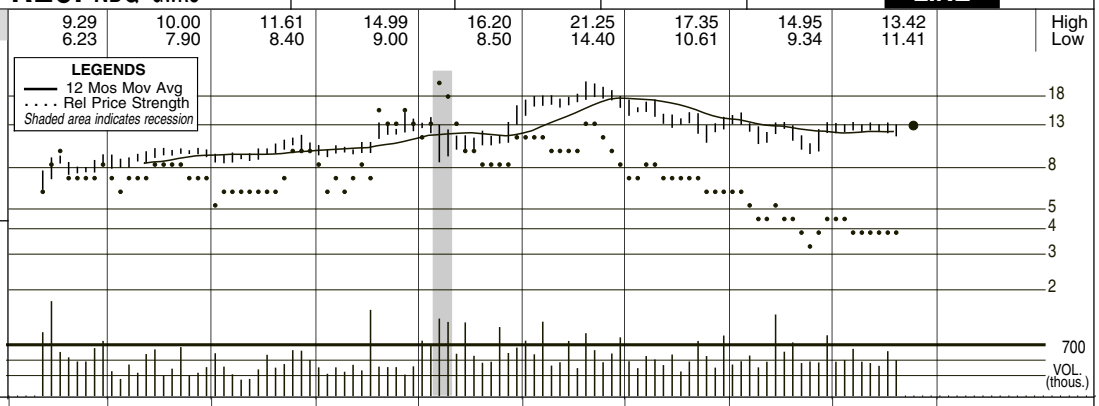
GLOBAL WATER RES. NDQ--GWRS

RECENT PRICE	TRAILING P/E RATIO	RELATIVE P/E RATIO	DIV'D YLD	VALUE LINE
12.88	49.5	2.71	2.3%	

RANKS

PERFORMANCE	2	Above Average
Technical	3	Average
SAFETY	3	Average
BETA .90	(1.00 = Market)	

Financial Strength	B+
Price Stability	80
Price Growth Persistence	55
Earnings Predictability	40



© VALUE LINE PUBLISHING LLC	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025/2026
REVENUES PER SH	1.52	1.59	1.65	1.65	1.71	1.85	1.87	2.17	--	
"CASH FLOW" PER SH	.18	.58	.49	.49	.45	.58	.65	.79	--	
EARNINGS PER SH	d.15	.23	.15	.10	.05	.16	.24	.33	***.27*** [A,B]	***.31*** [C]***/NA***
DIV'DS DECL'D PER SH	.17	.28	.28	.29	.29	.29	.30	.30	--	
CAP'L SPENDING PER SH	.44	1.06	.22	.52	.40	.81	1.42	.91	--	
BOOK VALUE PER SH	.78	.76	1.30	1.15	1.43	1.33	1.86	1.99	--	
COMMON SHS OUTST'G (MILL)	19.58	19.63	21.47	21.54	22.59	22.65	23.87	24.49	--	
AVG ANN'L P/E RATIO	--	40.1	63.9	NMF	NMF	NMF	58.9	36.7	***47.7***	***41.5/NA***
RELATIVE P/E RATIO	--	2.01	3.61	NMF	NMF	NMF	3.90	2.28	--	
AVG ANN'L DIV'D YIELD	2.2%	3.0%	3.0%	2.6%	2.5%	1.7%	2.1%	2.5%	--	
REVENUES ($MILL)	29.8	31.2	35.5	35.5	38.6	41.9	44.7	53.0	--	***Bold figures are consensus earnings estimates and, using the recent prices, P/E ratios.***
OPERATING MARGIN	38.8%	45.7%	47.1%	43.2%	42.4%	39.3%	40.0%	44.7%	--	
DEPRECIATION ($MILL)	6.3	6.9	7.5	8.4	9.0	9.5	10.1	11.4	--	
NET PROFIT ($MILL)	d2.9	4.6	3.1	2.2	1.1	3.6	5.5	8.0	--	
INCOME TAX RATE	--	--	36.5%	34.3%	41.1%	24.2%	14.5%	26.5%	--	
NET PROFIT MARGIN	NMF	14.6%	8.7%	6.3%	2.9%	8.6%	12.3%	15.1%	--	
WORKING CAP'L ($MILL)	13.8	.7	7.7	2.2	11.1	2.1	d2.1	d2.5	--	
LONG-TERM DEBT ($MILL)	114.3	114.4	114.5	114.7	112.7	108.9	104.9	103.7	--	
SHR. EQUITY ($MILL)	15.2	14.9	27.9	24.7	32.2	30.0	44.4	48.6	--	
RETURN ON TOTAL CAP'L	2.4%	5.5%	4.0%	3.5%	2.6%	4.5%	5.0%	6.8%	--	
RETURN ON SHR. EQUITY	NMF	30.6%	11.1%	9.0%	3.4%	12.0%	12.4%	16.4%	--	
RETAINED TO COM EQ	NMF	NMF	11.1%	NMF	NMF	12.0%	12.4%	1.6%	--	
ALL DIV'DS TO NET PROF	NMF	119%	--	NMF	NMF	--	--	90%	--	

[A] *No. of analysts changing earn. est. in last 23 days: 0 up, 0 down, consensus 5-year earnings growth 15.0% per year.* [B] *Based upon 2 analysts' estimates.* [C] *Based upon 2 analysts' estimates.*

ANNUAL RATES

of change (per share)	5 Yrs.	1 Yr.
Sales	4.5%	15.5%
"Cash Flow"	10.0%	21.5%
Earnings	26.0%	37.5%
Dividends	4.0%	1.5%
Book Value	13.0%	6.5%

Fiscal Year	QUARTERLY SALES ($mill.) 1Q	2Q	3Q	4Q	Full Year
12/31/22	10.0	11.7	11.9	11.1	44.7
12/31/23	13.1	13.0	14.5	12.4	53.0
12/31/24	11.6	13.5			
12/31/25					

Fiscal Year	EARNINGS PER SHARE 1Q	2Q	3Q	4Q	Full Year
12/31/21	d.01	.08	.07	.02	.16
12/31/22	.04	.09	.07	.04	.24
12/31/23	.10	.07	.11	.05	.33
12/31/24	.03	.07	***.11***	***.06***	
12/31/25	***.05***				

Cal-endar	QUARTERLY DIVIDENDS PAID 1Q	2Q	3Q	4Q	Full Year
2021	.073	.073	.073	.073	.29
2022	.074	.074	.074	.074	.30
2023	.074	.074	.074	.074	.30
2024	.075	.075	.075		

INSTITUTIONAL DECISIONS

	4Q'23	1Q'24	2Q'24
to Buy	32	28	30
to Sell	28	28	28
Hld's(000)	6755	6624	6643

ASSETS ($mill.)	2022	2023	6/30/24
Cash Assets	6.6	3.1	18.1
Receivables	2.1	2.8	2.8
Inventory	.0	.0	.0
Other	5.5	5.8	6.0
Current Assets	14.2	11.7	26.9
Property, Plant & Equip, at cost	412.3	465.7	- -
Accum Depreciation	124.6	142.4	- -
Net Property	287.7	323.3	331.9
Other	21.2	26.1	25.7
Total Assets	323.1	361.1	384.5
LIABILITIES ($mill.)			
Accts Payable	2.2	1.0	1.1
Debt Due	3.8	3.9	3.9
Other	10.2	9.3	9.4
Current Liab	16.2	14.2	14.4

LONG-TERM DEBT AND EQUITY as of 6/30/24

Total Debt $123.0 mill. **Due in 5 Yrs.** NA
LT Debt $119.1 mill.
Including Cap. Leases NA (71% of Cap'l)

Leases, Uncapitalized Annual rentals NA

Pension Liability None in '23 vs. None in '22

Pfd Stock None **Pfd Div'd Paid** None

Common Stock 24,217,000 shares (29% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: Global Water Resources, Inc. is a water resource management company that owns and operates 32 water, wastewater, and recycled water systems in strategically located communities, principally in metropolitan Phoenix and Tucson, Arizona. It seeks to deploy an integrated approach, referred to as "Total Water Management." Total Water Management is a comprehensive approach to water utility management that reduces demand on scarce non-renewable water sources and costly renewable water supplies, in a manner that ensures sustainability and greatly benefits communities both environmentally and economically. The company treats water to potable standards and also treats, cleans, and recycles wastewater for a variety of non-potable uses. Recycled water is created by taking wastewater and applying advanced tertiary treatment to create a high quality, non-potable water source. Global Water recycles over 1 billion gallons of water annually with a total of 17 billion gallons recycled since 2004. Has 106 employees. Chairman, C.E.O. & President: Ron L. Fleming Address: 21410 N. 19th Avenue #220, Phoenix, AZ 85027. Tel.: (480) 360-7775. Internet: www.gwresources.com. *E.B.*

October 4, 2024

TOTAL SHAREHOLDER RETURN

Dividends plus appreciation as of 8/30/2024

3 Mos.	6 Mos.	1 Yr.	3 Yrs.	5 Yrs.
-1.18%	-0.74%	16.67%	-32.39%	18.18%

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HAWAIIAN ELECTRIC NYSE-HE

RECENT PRICE 9.72 | P/E RATIO NMF (Trailing: 6.0 Median: 19.0) | RELATIVE P/E RATIO NMF | DIV'D YLD Nil | VALUE LINE

TIMELINESS — Suspended 8/25/23
SAFETY 5 Lowered 9/15/23
TECHNICAL — Suspended 8/25/23
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$5-$21	$13 (35%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	22	(+125%)	*23%*
Low	12	(+25%)	*6%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	151	139	145
to Sell	142	144	132
Hld's(000)	66270	64657	71463

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	28.3	35.0	34.9	35.0	38.7	39.3	47.6	55.2	46.0	44.7	43.7	18.2								
Low:	23.8	22.7	27.0	27.3	31.7	31.7	35.1	31.8	33.0	33.2	9.1	7.6								
Revenues per sh	35.56	24.96	28.14	33.76	34.46	31.98	31.59	24.22	21.92	23.49	26.28	26.38	23.63	26.08	34.18	33.43	*21.05*	*21.50*	Revenues per sh	*23.10*
"Cash Flow" per sh	2.72	2.59	2.88	3.18	3.28	3.22	3.41	3.31	4.17	3.68	4.20	4.55	4.48	4.80	4.90	4.63	*d6.95*	*2.85*	"Cash Flow" per sh	*3.20*
Earnings per sh A	1.07	.91	1.21	1.44	1.67	1.62	1.64	1.50	2.29	1.64	1.85	1.99	1.81	2.25	2.20	1.81	*d10.70*	*1.00*	Earnings per sh A	*1.30*
Div'd Decl'd per sh B	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.28	1.32	1.36	1.40	1.08	*Nil*	*Nil*	Div'd Decl'd per sh B	*Nil*
Cap'l Spending per sh	3.12	3.29	1.92	2.45	3.32	3.49	3.31	3.39	3.04	4.55	4.94	4.20	3.52	2.88	3.14	4.07	*2.65*	*2.65*	Cap'l Spending per sh	*2.70*
Book Value per sh C	15.35	15.58	15.67	15.95	16.28	17.06	17.47	17.94	19.03	19.28	19.86	20.93	21.41	21.87	20.12	21.29	*8.20*	*9.20*	Book Value per sh C	*12.80*
Common Shs Outst'g D	90.52	92.52	94.69	96.04	97.93	101.26	102.57	107.46	108.58	108.79	108.88	108.97	109.18	109.31	109.47	110.15	*171.00*	*172.00*	Common Shs Outst'g D	*173.00*
Avg Ann'l P/E Ratio	23.2	19.8	18.6	17.1	15.8	16.2	15.9	20.4	13.6	20.7	18.9	21.3	21.5	18.2	18.5	15.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*13.0*
Relative P/E Ratio	1.40	1.32	1.18	1.07	1.01	.91	.84	1.03	.71	1.04	1.02	1.13	1.10	.98	1.07	.89			Relative P/E Ratio	*.70*
Avg Ann'l Div'd Yield	5.0%	6.9%	5.5%	5.0%	4.7%	4.7%	4.8%	4.1%	4.0%	3.7%	3.5%	3.0%	3.4%	3.3%	3.4%	3.7%			Avg Ann'l Div'd Yield	*Nil*
Revenues ($mill)							3239.5	2603.0	2380.7	2555.6	2860.8	2874.6	2579.8	2850.4	3742.0	3682.2	*3600*	*3700*	Revenues ($mill)	*4000*
Net Profit ($mill)							170.2	161.8	250.1	180.6	203.7	219.8	199.7	248.1	243.0	201.1	*d1505*	*175*	Net Profit ($mill)	*225*
Income Tax Rate							35.0%	36.5%	33.1%	34.7%	20.0%	19.0%	17.0%	20.2%	20.1%	18.1%	*18.0%*	*19.0%*	Income Tax Rate	*20.0%*
AFUDC % to Net Profit							5.5%	5.8%	4.6%	9.6%	7.7%	7.5%	5.9%	5.2%	5.8%	10.1%	*NMF*	*11.5%*	AFUDC % to Net Profit	*11.0%*
Long-Term Debt Ratio							45.2%	43.5%	41.6%	43.4%	47.5%	44.6%	46.5%	46.4%	50.3%	62.2%	*73.0%*	*70.5%*	Long-Term Debt Ratio	*64.0%*
Common Equity Ratio							53.8%	55.5%	57.5%	55.7%	51.7%	54.6%	52.7%	52.8%	49.0%	37.3%	*26.5%*	*29.0%*	Common Equity Ratio	*35.5%*
Total Capital ($mill)							3332.3	3473.5	3595.1	3765.5	4182.3	4176.9	4435.9	4524.1	4498.5	6292.6	*5350*	*5550*	Total Capital ($mill)	*6300*
Net Plant ($mill)							4148.8	4377.7	4603.5	5025.9	4830.1	5109.6	5265.7	5392.1	5687.0	6150.1	*6275*	*6400*	Net Plant ($mill)	*6800*
Return on Total Cap'l							6.2%	5.7%	7.9%	5.8%	5.9%	6.3%	5.5%	6.4%	6.4%	4.1%	*NMF*	*4.5%*	Return on Total Cap'l	*4.5%*
Return on Shr. Equity							9.3%	8.2%	11.9%	8.5%	9.3%	9.5%	8.4%	10.2%	10.9%	8.5%	*NMF*	*11.0%*	Return on Shr. Equity	*9.5%*
Return on Com Equity E							9.4%	8.3%	12.0%	8.5%	9.3%	9.6%	8.5%	10.3%	10.9%	8.5%	*NMF*	*11.0%*	Return on Com Equity E	*9.5%*
Retained to Com Eq							2.3%	1.5%	6.3%	2.1%	3.1%	3.4%	2.3%	4.1%	4.0%	3.7%	*NMF*	*11.0%*	Retained to Com Eq	*9.5%*
All Div'ds to Net Prof F							75%	83%	48%	76%	67%	64%	73%	61%	64%	57%	*NMF*	*1%*	All Div'ds to Net Prof F	*1%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $3801.6 mill. **Due in 5 Yrs** $1023 mill.
LT Debt $3281.6 mill. **LT Interest** $120.0 mill.
Incl. $443.4 mill. finance leases.
(Total Interest Coverage: 3.0x)
Leases, Uncapitalized Annual rentals $27.3 mill.

Pension Assets-12/23 $1973.5 mill.
Oblig. $2033.0 mill.
Pfd Stock $34.3 mill. **Pfd Div'd** $1.9 mill.

Common Stock 110,303,446 shs.
as of 7/31/24
MARKET CAP: $1.1 billion (Small Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (MWH)	+1.7	+1.1	-1.5
Avg. Indust. Use (MWH)	3174	3296	3273
Avg. Indust. Revs. per KWH (¢)	26.88	36.75	35.34
Capacity at Yearend (Mw)	2278	2100	2101
Peak Load/Demand (Mw)	1471	1467	1447
Annual Load Factor (%)	67.2	68.2	68.0
% Change Customers (yr-end)	+.5	-.2	+.4
Fixed Charge Cov. (%)	393	356	273

ANNUAL RATES

of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-.5%	5.5%	*NMF*
"Cash Flow"	4.0%	3.5%	*NMF*
Earnings	3.0%	1.5%	*NMF*
Dividends	.5%	.5%	*NMF*
Book Value	2.5%	1.5%	*NMF*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	642.9	680.3	756.9	770.3	2850.4
2022	785.1	895.6	1042.2	1019.1	3742.0
2023	928.2	895.7	896.9	961.4	3682.2
2024	897.2	897.4	*900*	*905.4*	*3600*
2025	*910*	*920*	*930*	*940*	*3700*

EARNINGS PER SHARE A

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.59	.58	.58	.50	2.25
2022	.63	.48	.57	.52	2.20
2023	.50	.50	.37	.44	1.81
2024	.38	d11.74	*.35*	*.31*	*d10.70*
2025	*.25*	*.25*	*.25*	*.25*	*1.00*

QUARTERLY DIVIDENDS PAID B

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.33	.33	.33	.33	1.32
2021	.34	.34	.34	.34	1.36
2022	.35	.35	.35	.35	1.40
2023	.36	.36	.36	--	1.08
2024	--	--	--		

BUSINESS: Hawaiian Electric Industries (HEI) is the parent company of Hawaiian Electric Company, Inc. (HECO), American Savings Bank (ASB), and Pacific Current. HECO & its subs., Maui Electric Co. (MECO) & Hawaii Electric Light Co. (HELCO), supply electricity to 416,177 customers on Oahu, Maui, Molokai, Lanai, & Hawaii. Operating companies' systems are not interconnected. Elec. rev. breakdown: residential, 32%; commercial, 36%; industrial, 32%; other, less than 1%. Generating sources: oil, 52%; purchased, 48%. Fuel costs: 50%+ of revs. '23 reported deprec. rate: 3.2%. Has about 3,600 employees. Chairman: Tom Fargo. Pres. & CEO: Scott Seu. Inc.: HI. Address: 1001 Bishop St., Suite 2900, Honolulu, HI 96808-0730. Telephone: 808-543-5662. Internet: www.hei.com.

Hawaiian Electric Industries has agreed to a tentative $2 billion settlement for its role in last year's Maui wildfires. To briefly recap, on August 8, 2023, winds from Hurricane Dora knocked down power lines that started a morning fire near the town of Lahaina. Though that blaze at the time was thought to have been exstinguished it could not be ruled out that the company's equipment played a part in the fires that began near that area hours later, resulting in over 100 deaths and billions of dollars in property damage. HEI was named as a defendant in at least 400 tort claims for local damages, a class action suit on behalf of shareholders, and subrogation claims on the part of about 160 different insurers. HEI would probably have faced Chapter 11 bankruptcy if it had attempted to fight all of those lawsuits. Instead, the company agreed to terms brokered by the state government where HEI will pay about half of a collective $4.037 billion settlement over four years with six other defendants. The agreement is currently hung up in court as a result of a dispute with insurance companies.

This may have been the best outcome available to HEI, but it's a bitter pill to swallow. The speed with which the company has to make restitution is problematic. As a result, HEI has taken on huge equity dilution in a secondary offering of 54 million shares priced at $9.25 each, last month. An additional eight million shares may be purchased at the option of the brokerages involved in the offering. We've modeled the share count rising by more than 55% to raise nearly $600 million. In addition, HEI is reportedly shopping its savings bank subsidiary. Based on its solid profitability (core earnings have been $75 million in recent years), the bank may be able to fetch around $750 million. The rest of the settlement would come from cash flow and debt. In all, HEI's earnings power will be substantially diminished. Still, there is value here at a price below $10 per share. Earnings may be half of what they once were, but the stock price is a quarter of where it had been in 2023. HEI can make a slow grind back to respectability. Most utility investors will want to look elsewhere, however.

Anthony J. Glennon *October 18, 2024*

(A) Diluted EPS. Excl. nonrec. losses: '12, 25¢; '17, 12¢. Qtrly. EPS may not sum to full year due to rounding. Next earnings report due early November. **(B)** Quarterly div'ds not declared prior to 8/21/23 have been suspended. **(C)** Incl. deferred charges. In '23: $294.8 mill., $2.68/sh. **(D)** In mill. **(E)** Rate base: Orig. cost. Rate allowed on com. eq. in '18: HECO, 9.5%; in '18: HELCO, 9.5%; in '18: MECO, 9.5%; Regulatory Climate: Below Average. **(F)** Includes preferred dividends. **(G)** Ranks are suspended until HE starts trading on fundamentals.

Company's Financial Strength	C+
Stock's Price Stability	5
Price Growth Persistence	40
Earnings Predictability	90

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IDACORP, INC. NYSE-IDA

RECENT PRICE **101.02** | P/E RATIO **18.2** (Trailing: 18.9 Median: 20.0) | RELATIVE P/E RATIO **1.00** | DIV'D YLD **3.3%** | **VALUE LINE**

TIMELINESS 4 Raised 8/16/24
SAFETY 1 Raised 4/19/24
TECHNICAL 2 Raised 10/18/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

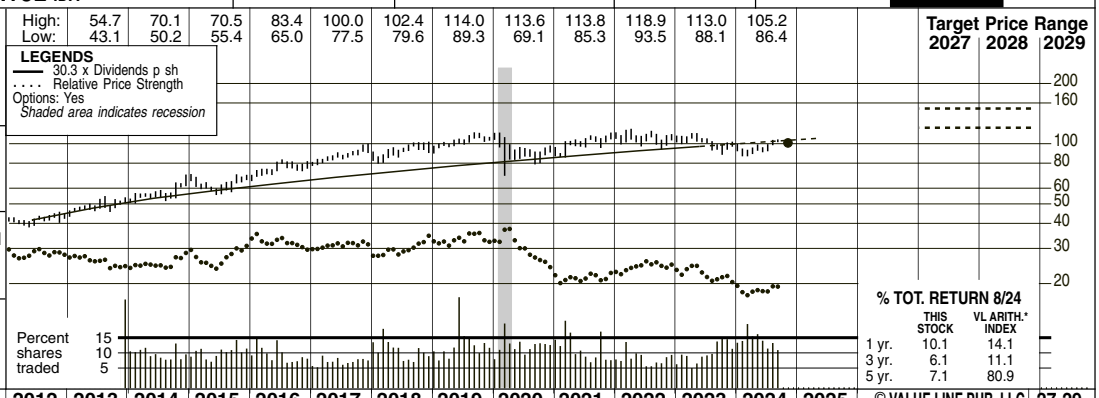
Low-High	Midpoint (% to Mid)
$89-$128	$109 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	150	(+50%)	*13%*
Low	120	(+20%)	*8%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	192	165	191
to Sell	168	200	170
Hld's(000)	45178	46315	46039



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
20.47	21.92	20.97	20.55	21.55	24.81	25.51	25.23	25.04	26.76	27.19	26.70	26.77	28.86	32.51	34.90	*35.05*	*36.75*	Revenues per sh	*39.90*
4.27	5.07	5.35	5.84	5.93	6.29	6.58	6.70	6.86	7.50	7.85	8.07	8.19	8.41	8.55	9.11	*9.50*	*10.20*	"Cash Flow" per sh	*12.25*
2.18	2.64	2.95	3.36	3.37	3.64	3.85	3.87	3.94	4.21	4.49	4.61	4.69	4.85	5.11	5.14	*5.45*	*5.80*	Earnings per sh [A]	*7.10*
1.20	1.20	1.20	1.20	1.37	1.57	1.76	1.92	2.08	2.24	2.40	2.56	2.72	2.88	3.04	3.20	*3.36*	*3.52*	Div'd Decl'd per sh [B] ■ †	*4.20*
5.19	5.26	6.85	6.76	4.78	4.68	5.45	5.84	5.89	5.66	5.51	5.53	6.16	5.94	8.56	12.07	*17.75*	*16.60*	Cap'l Spending per sh	*13.40*
27.76	29.17	31.01	33.19	35.07	36.84	38.85	40.88	42.74	44.65	47.01	48.88	50.73	52.82	55.52	57.44	*63.55*	*66.60*	Book Value per sh [C]	*71.50*
46.92	47.90	49.41	49.95	50.16	50.23	50.27	50.34	50.40	50.42	50.42	50.42	50.46	50.52	50.56	50.62	*53.50*	*54.00*	Common Shs Outst'g [D]	*56.00*
13.9	10.2	11.8	11.5	12.4	13.4	14.7	16.2	19.1	20.6	20.5	22.3	19.9	20.8	21.0	19.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*19.0*
.84	.68	.75	.72	.79	.75	.77	.82	1.00	1.04	1.11	1.19	1.02	1.12	1.21	1.11			Relative P/E Ratio	*1.05*
4.0%	4.5%	3.4%	3.1%	3.3%	3.2%	3.1%	3.1%	2.8%	2.6%	2.6%	2.5%	2.9%	2.9%	2.8%	3.1%			Avg Ann'l Div'd Yield	*3.1%*
1282.5	1270.3	1262.0	1349.5	1370.8	1346.4	1350.7	1458.1	1644.0	1766.4	*1875*	*1985*	Revenues ($mill)	*2235*
193.5	194.7	198.3	212.4	226.8	232.9	237.4	245.6	259.0	261.2	*290*	*315*	Net Profit ($mill)	*400*
8.0%	19.0%	15.5%	18.6%	7.1%	9.5%	10.8%	13.1%	12.7%	9.4%	*13.0%*	*13.0%*	Income Tax Rate	*13.0%*
13.6%	16.3%	16.3%	13.9%	15.2%	16.2%	17.3%	17.7%	19.8%	8.8%	*15.0%*	*15.0%*	AFUDC % to Net Profit	*16.0%*
45.3%	45.6%	44.8%	43.7%	43.6%	41.3%	43.9%	42.8%	43.9%	48.8%	*48.5%*	*49.0%*	Long-Term Debt Ratio	*49.5%*
54.7%	54.4%	55.2%	56.3%	56.4%	58.7%	56.1%	57.2%	56.1%	51.2%	*51.5%*	*51.0%*	Common Equity Ratio	*50.5%*
3567.6	3783.3	3898.5	3997.5	4205.1	4201.3	4560.4	4669.1	5001.4	5683.4	*6200*	*6625*	Total Capital ($mill)	*7500*
3833.5	3992.4	4172.0	4283.9	4395.7	4531.5	4709.5	4901.8	5173.0	5745.2	*6350*	*6775*	Net Plant ($mill)	*7600*
6.6%	6.2%	6.1%	6.3%	6.4%	6.5%	6.1%	6.2%	6.1%	5.4%	*5.5%*	*6.0%*	Return on Total Cap'l	*6.0%*
9.9%	9.5%	9.2%	9.4%	9.6%	9.4%	9.3%	9.2%	9.2%	9.0%	*9.0%*	*9.0%*	Return on Shr. Equity	*9.0%*
9.9%	9.5%	9.2%	9.4%	9.6%	9.4%	9.3%	9.2%	9.2%	9.0%	*9.0%*	*9.0%*	Return on Com Equity [E]	*9.0%*
5.4%	4.8%	4.3%	4.4%	4.4%	4.2%	3.9%	3.7%	3.7%	3.4%	*3.5%*	*3.5%*	Retained to Com Eq	*3.5%*
46%	50%	53%	53%	54%	56%	58%	60%	60%	63%	*62%*	*61%*	All Div'ds to Net Prof	*59%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $2825.9 mill. **Due in 5 Yrs** $200.0 mill.
LT Debt $2776.1 mill. **LT Interest** $100.0 mill.
(Total Interest Coverage: 2.5x)

Pension Assets-12/23 $917.5 mill.
Oblig $1028.0 mill.

Pfd Stock None

Common Stock 53,253,924 shs.
as of 7/26/24

MARKET CAP: $5.4 billion (Mid Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+3.9	+9.6	+7.3
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	3751	3568	3615
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+2.8	+2.4	+2.4
Fixed Charge Cov. (%)	390	395	315

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	3.5%	4.0%	*3.5%*
"Cash Flow"	3.5%	3.5%	*6.0%*
Earnings	4.0%	3.5%	*6.0%*
Dividends	8.0%	6.5%	*5.5%*
Book Value	4.5%	4.5%	*4.5%*

QUARTERLY REVENUES($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	316.1	360.1	446.9	335.0	1458.1
2022	344.3	358.7	518.0	422.9	1644.0
2023	429.7	413.8	510.9	412.0	1766.4
2024	448.1	451.0	*625*	*350.9*	*1875*
2025	*475*	*475*	*650*	*385*	*1985*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.89	1.38	1.93	.65	4.85
2022	.91	1.27	2.10	.83	5.11
2023	1.11	1.35	2.07	.61	5.14
2024	.95	1.71	*2.20*	*.59*	*5.45*
2025	*1.05*	*1.80*	*2.30*	*.65*	*5.80*

QUARTERLY DIVIDENDS PAID [B] ■ †

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.67	.67	.67	.71	2.72
2021	.71	.71	.71	.75	2.88
2022	.75	.75	.75	.79	3.04
2023	.79	.79	.79	.83	3.20
2024	.83	.83	.83		

BUSINESS: IDACORP, Inc. is a holding company for Idaho Power Company, a regulated electric utility that serves 633,000 customers throughout a 24,000-square-mile area in southern Idaho and eastern Oregon (population: 1.4 million). Most of the company's revenues are derived from the Idaho portion of its service area. Revenue breakdown: residential, 39%; commercial, 21%; industrial, 14%; irrigation, 10%; other, 16%. Generating sources: hydro, 35%; coal, 13%; gas, 15%; purchased, 37%. Fuel costs: 40% of revenues. '23 reported depreciation rate: 3.1%. Has 2,112 employees. Chairman: Dennis L. Johnson. President & CEO: Lisa Grow. Incorporated: Idaho. Address: 1221 W. Idaho St., Boise, Idaho 83702. Telephone: 208-388-2200. Internet: www.idacorpinc.com.

IDACORP's earnings are apt to grow by 6% in 2024. Customer usage has been on an upward swing, as has the amount of customers within its service range. On top of this, favorable rate changes have kicked in, so profitability metrics have been enhanced a bit. Leadership has lifted the lower end of its expected share-earnings bracket, which now runs from $5.30 to $5.45. These figures assume the expectation that Idaho Power will use between $35 million and $50 million of additional tax credits under the earnings support regulatory mechanism for 2024. Normal weather conditions and normalized expense rates for the supply of power are used in these calculations. One more caveat, these figures are being constrained some by higher depreciation from ongoing system investments that are needed to meet customer/load growth. Looking ahead to next year, the favorable backdrop should stretch out for several linked quarters with earnings pegged at $5.80 a share (another 6% gain) in 2025.

Management has laid out a capital expenditure plan that stretches through 2028. This year, $925 million-$975 million in layouts are budgeted. Significant upgrades in areas like generation, transmission, and storage are in the works, with a priority on battery storage. For 2025, the expected cost lines up at $850 million-$950 million. Finally, 2026-2028 should come at a price tag of $2.0 billion-$2.5 billion for the three-year window. Transmission lines are in the works. One from Boardman, Oregon to the Hemingway substation in Boise, Idaho has experienced some delays, but construction should start by the end of this year, and the hope is that it will come on line in 2027.

We think better investment options exist at this time in the electric utility space. IDA shares have risen more than 10% in value over the last three months. With that, they continue to carry an untimely designation (4: Below Average) in our Timeliness Ranking System. Too, long-term capital appreciation is subpar when placed up against the *Value Line* median. Add to this, the dividend yield might look sexy compared to all the stocks in our coverage universe, but in the utility world it does not stand out.

Erik M. Manning *October 18, 2024*

(A) Diluted EPS. Earnings may not sum due to rounding. Next earnings report due early November. **(B)** Dividends historically paid in late February, May, August, and November. ■ Dividend reinvestment plan available. † Shareholder investment plan available. **(C)** Incl. intangibles. In '23: $882.7 mill., $17.44/sh. **(D)** In millions. **(E)** Rate base: Net original cost. Rate allowed on common equity in '12: 10% (imputed); Regulatory Climate: Above Average.

Company's Financial Strength	A
Stock's Price Stability	100
Price Growth Persistence	60
Earnings Predictability	100

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MIDDLESEX WATER NDQ-MSEX

RECENT PRICE 65.75 | P/E RATIO 26.7 (Trailing: 31.9 Median: 28.0) | RELATIVE P/E RATIO 1.45 | DIV'D YLD 2.0% | VALUE LINE

TIMELINESS 3 Raised 6/7/24
SAFETY 2 New 10/21/11
TECHNICAL 4 Lowered 10/4/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

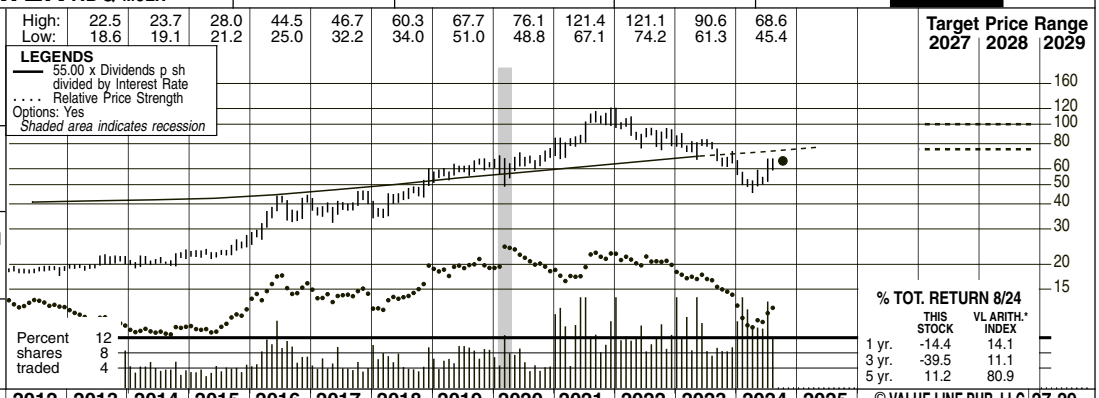
Low-High	Midpoint (% to Mid)
$52-$96	$74 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	100	(+50%)	*13%*
Low	75	(+15%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	96	111	94
to Sell	76	69	86
Hld's(000)	13700	13370	12771



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
6.79	6.75	6.60	6.50	6.98	7.19	7.26	7.77	8.16	8.00	8.42	7.72	8.10	8.17	9.21	9.33	*10.35*	*10.85*	Revenues per sh	*11.95*
1.53	1.40	1.55	1.46	1.56	1.72	1.84	1.97	2.17	2.24	2.89	2.90	3.25	3.28	3.70	3.41	*3.50*	*3.75*	"Cash Flow" per sh	*4.25*
.89	.72	.96	.84	.90	1.03	1.13	1.22	1.38	1.38	1.96	2.01	2.18	2.07	2.39	1.76	*2.45*	*2.65*	Earnings per sh A	*3.15*
.70	.71	.72	.73	.74	.75	.76	.78	.81	.86	.91	.98	1.04	1.11	1.18	1.26	*1.32*	*1.40*	Div'd Decl'd per sh B■	*1.60*
2.12	1.49	1.90	1.50	1.36	1.26	1.40	1.59	2.91	3.08	4.40	5.11	6.04	4.53	5.18	5.06	*5.45*	*5.65*	Cap'l Spending per sh	*6.00*
10.03	10.33	11.13	11.27	11.48	11.82	12.24	12.74	13.40	14.02	15.17	18.57	19.81	20.99	22.65	23.74	*23.60*	*23.70*	Book Value per sh	*23.70*
13.40	13.52	15.57	15.70	15.82	15.96	16.12	16.23	16.30	16.35	16.40	17.43	17.47	17.52	17.64	17.82	*17.90*	*17.95*	Common Shs Outst'g C	*18.00*
19.8	21.0	17.8	21.7	20.8	19.7	18.5	19.1	25.6	28.4	22.2	29.7	30.1	44.3	38.6	42.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*28.0*
1.19	1.40	1.13	1.36	1.32	1.11	.97	.96	1.34	1.43	1.20	1.58	1.55	2.39	2.23	2.39			Relative P/E Ratio	*1.30*
4.0%	4.7%	4.2%	4.0%	4.0%	3.7%	3.7%	3.3%	2.3%	2.2%	2.1%	1.6%	1.6%	1.2%	1.3%	1.7%			Avg Ann'l Div'd Yield	*1.8%*
						117.1	126.0	132.9	130.8	138.1	134.6	141.6	143.1	162.4	166.3	*185*	*195*	Revenues ($mill)	*215*
						18.4	20.0	22.7	22.8	32.5	33.9	38.4	36.5	42.4	31.5	*44.0*	*48.0*	Net Profit ($mill)	*57.0*
						35.0%	34.5%	34.0%	32.7%	2.8%	--	--	--	7.1%	3.2%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
						1.7%	1.9%	2.7%	3.1%	1.4%	3.4%	3.9%	--	3.9%	3.9%	*2.5%*	*2.5%*	AFUDC % to Net Profit	*2.5%*
						40.5%	39.4%	37.9%	37.5%	37.8%	41.5%	44.0%	45.3%	41.9%	45.7%	*42.5%*	*41.0%*	Long-Term Debt Ratio	*40.5%*
						58.8%	59.8%	61.5%	61.8%	61.6%	58.2%	55.7%	54.4%	57.7%	54.0%	*57.0%*	*58.5%*	Common Equity Ratio	*59.5%*
						335.8	345.4	355.4	370.7	404.1	556.7	621.5	676.3	692.7	783.2	*740*	*725*	Total Capital ($mill)	*720*
						465.4	481.9	517.8	557.2	618.5	705.7	796.6	865.4	920.6	998.3	*1035*	*1050*	Net Plant ($mill)	*1100*
						6.3%	6.6%	7.1%	6.9%	8.9%	6.7%	6.8%	6.0%	6.8%	4.8%	*6.5%*	*7.0%*	Return on Total Cap'l	*8.0%*
						9.2%	9.6%	10.3%	9.8%	12.9%	10.4%	11.0%	9.9%	10.5%	7.4%	*10.5%*	*11.0%*	Return on Shr. Equity	*13.0%*
						9.3%	9.6%	10.3%	9.9%	13.0%	10.4%	11.1%	9.9%	10.6%	7.4%	*10.5%*	*11.0%*	Return on Com Equity	*13.5%*
						3.1%	3.5%	4.3%	3.8%	7.0%	5.4%	5.8%	4.6%	5.4%	2.1%	*5.0%*	*5.5%*	Retained to Com Eq	*6.5%*
						67%	63%	58%	62%	46%	48%	48%	53%	49%	72%	*54%*	*53%*	All Div'ds to Net Prof	*51%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $364.0 mill. **Due in 5 Yrs** $43.7 mill.
LT Debt $356.0 mill. **LT Interest** $7.5 mill.
(Total interest coverage: 9.3x)
(46% of Cap'l)

Pension Assets-12/23 $84.8 mill.
Oblig. $87.8 mill.
Pfd Stock $2.4 mill. **Pfd Div'd:** $.1 mill.

Common Stock 17,829,000 shs.

MARKET CAP: $1.2 billion (Small Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	3.8	2.4	8.0
Other	33.5	106.1	113.0
Current Assets	37.3	108.5	121.0
Accts Payable	24.8	27.6	25.2
Debt Due	17.5	7.7	8.0
Other	75.6	68.5	101.8
Current Liab.	117.9	103.8	135.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	2.5%	1.5%	*5.0%*
"Cash Flow"	8.0%	7.5%	*3.5%*
Earnings	8.5%	5.5%	*7.0%*
Dividends	5.0%	6.5%	*5.0%*
Book Value	7.0%	9.5%	*1.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	32.5	36.7	39.9	34.0	143.1
2022	36.2	39.7	47.7	38.8	162.4
2023	38.2	42.8	46.7	38.6	166.3
2024	40.5	49.1	*52.0*	*43.4*	*185*
2025	*45.0*	*51.0*	*54.0*	*45.0*	*195*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	.39	.62	.65	.41	2.07
2022	.68	.50	.80	.40	2.39
2023	.33	.55	.56	.32	1.76
2024	.59	.59	*.66*	*.61*	*2.45*
2025	*.60*	*.67*	*.75*	*.63*	*2.65*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.2562	.2562	.2562	.2725	1.04
2021	.2725	.2725	.2725	.29	1.11
2022	.29	.29	.29	.3125	1.18
2023	.3125	.3125	.3125	.325	1.26
2024	.325	.325	.325		

BUSINESS: Middlesex Water Company engages in the ownership and operation of regulated water utility systems in New Jersey, Delaware, and Pennsylvania. It also operates water and wastewater systems under contract on behalf of municipal and private clients in NJ and DE. Its Middlesex System provides water services to 61,000 retail customers, primarily in Middlesex County, New Jersey. In 2023, the Middlesex System accounted for 66% of operating revenues. At 12/31/23, the company had 355 employees. Incorporated: NJ. President, CEO, and Chairman: Dennis W. Doll. Officers & directors own 1.8% of the com. stock; BlackRock Inst. Trust Co., 14.6% (4/24 proxy). Add.: 485 C Route 1 South, Suite 400, Iselin, NJ 08830. Tele.: 732-634-1500. Int.: www.middlesexwater.com.

Middlesex Water reported solid year-over-year revenue growth in the June period. The regulated water utility posted second-quarter revenues of $49 million, representing a 15% annual advance. The improvement was driven largely by a recent approval from New Jersey regulators to increase customer base rate. Higher commercial and industrial billings, along with stronger water demand and customer growth in the Delaware system, also contributed to the performance. Meanwhile, earnings of $0.59 per share, while flat period-to-period, rose modestly versus the like-2023 figure and was on par with our expectations.

We are maintaining our outlook for respectable revenue and profit expansion this year. The top line ought to be supported by the above-mentioned rate hike, as well as encouraging operating trends. On the bottom line, management is doing a good job of keeping a lid on maintenance and water supply costs. On balance, we now expect revenues of $185 million, up from our previous call of $178 million, while our earnings call holds steady, at $2.45 per share.

The stock price has rebounded sharply of late. Subsequent to finding a bottom earlier this year, shares of Middlesex have regained some ground. In fact, over the past three months, the equity is up nearly 25% in value, as the investment community appears to be applauding the company's recently improved financial results. It is worth noting, however, that the stock remains considerably depressed compared to 2022 all-time highs.

Looking out to the 2027-2029 horizon, aggressive capital investment plans suggest that additional rate increases are probably on tap. Spending will likely be focused on upgrades to drinking water infrastructure and treatment plant enhancements.

The stock offers limited appeal at this juncture. The equity is neutrally ranked (3) for relative year-ahead price performance. What's more, even after recently boosting our 3- to 5-year Target Price Range via a more upbeat earnings outlook, total return potential over that time frame is unenticing. Thus, we recommend investors turn the page, for now.

Nicholas Patrikis *October 4, 2024*

(A) Diluted earnings. Quarterly figures may not sum due to rounding. Next earnings report due early November.

(B) Dividends historically paid in mid-Feb., May, Aug., and November.■ Div'd reinvestment plan available.

(C) In millions.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	90
Earnings Predictability	85

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NEXTERA ENERGY NYSE-NEE

RECENT PRICE **82.87** | P/E RATIO **23.5** (24.2 / 24.0) | RELATIVE P/E RATIO **1.29** | DIV'D YLD **2.7%** | **VALUE LINE**

TIMELINESS 3 Lowered 5/24/24
SAFETY 2 Raised 11/8/24
TECHNICAL 2 Raised 10/25/24
BETA 1.00 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$49-$102	$76 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	110	(+35%)	*12%*
Low	80	(-5%)	*2%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	1164	1287	1315
to Sell	1119	970	1015
Hld's(000)	1622643	1593082	1666683

	2022	2023	2024
High:	22.4	27.7	28.2
Low:	17.5	21.0	23.4

	2025			
High:	33.0	39.8	46.1	61.3
Low:	25.5	29.3	36.3	42.2

	2026			
High:	83.3	93.7	93.6	86.5
Low:	43.7	68.3	67.2	47.2

	2027
High:	86.1
Low:	53.9

LEGENDS
33.3 x Dividends p sh
Relative Price Strength
4-for-1 split 10/20
Options: Yes
Shaded area indicates recession

4-for-1

Percent shares traded 15 10 5

Target Price Range 2027 2028 2029: 128 96 80 64 48 40 32 24 16 12

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	24.2	14.1
3 yr.	3.3	11.1
5 yr.	65.1	80.9

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
10.03	9.45	9.10	9.22	8.41	8.70	9.61	9.48	8.63	9.13	8.75	9.82	9.18	8.70	10.55	13.70	*12.95*	*14.65*	Revenues per sh	*17.25*
2.01	2.19	2.41	2.32	2.17	2.63	3.03	3.23	3.24	3.03	3.84	4.22	4.52	4.70	5.30	6.14	*6.50*	*6.75*	"Cash Flow" per sh	*7.90*
1.02	.99	1.19	1.21	1.14	1.21	1.40	1.52	1.45	1.63	1.67	1.94	2.31	2.55	2.90	3.17	*3.45*	*3.70*	Earnings per sh [A]	*4.70*
.45	.47	.50	.55	.60	.66	.73	.77	.87	.98	1.11	1.25	1.40	1.54	1.70	1.87	*2.06*	*2.25*	Div'd Decl'd per sh [B] ■ †	*2.86*
3.20	3.63	3.47	3.98	5.58	3.84	3.96	4.54	5.15	5.70	6.80	6.29	7.45	8.19	9.70	12.24	*11.00*	*11.00*	Cap'l Spending per sh	*12.00*
7.14	7.84	8.59	8.98	9.47	10.37	11.24	12.24	13.00	14.97	17.86	18.92	18.63	18.95	19.74	23.13	*24.65*	*26.25*	Book Value per sh [C]	*35.00*
1635.7	1654.5	1683.4	1664.0	1696.0	1740.0	1772.0	1844.0	1872.0	1884.0	1912.0	1956.0	1960.0	1963.0	1987.0	2052.0	*2057.0*	*2065.0*	Common Shs Outst'g [D]	*2150.0*
14.5	13.4	10.8	11.5	14.4	16.6	17.3	16.9	20.7	21.6	24.8	26.8	28.9	31.3	27.8	22.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.0*
.87	.89	.69	.72	.92	.93	.91	.85	1.09	1.09	1.34	1.43	1.48	1.69	1.61	1.23			Relative P/E Ratio	*1.10*
3.0%	3.5%	3.9%	4.0%	3.6%	3.3%	3.0%	3.0%	2.9%	2.8%	2.7%	2.4%	2.1%	1.9%	2.1%	2.7%			Avg Ann'l Div'd Yield	*3.0%*
17021	17486	16155	17195	16727	19204	17997	17069	20956	28114	*26600*	*30300*	Revenues ($mill)	*37000*
2465.0	2752.0	2693.0	3074.0	3200.0	3769.0	4552.0	5021.0	5742.0	6441.0	*7100*	*7630*	Net Profit ($mill)	*10100*
32.3%	30.8%	29.3%	24.4%	28.6%	11.7%	13.0%	15.0%	18.2%	12.5%	*18.0%*	*18.0%*	Income Tax Rate	*18.0%*
6.7%	6.9%	8.2%	6.7%	6.6%	4.1%	4.6%	6.3%	4.3%	5.4%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
55.0%	54.2%	53.3%	52.7%	44.0%	50.4%	53.5%	57.8%	58.5%	56.4%	*57.5%*	*59.0%*	Long-Term Debt Ratio	*57.5%*
45.0%	45.8%	46.7%	47.3%	56.0%	49.6%	46.5%	42.2%	41.5%	43.6%	*42.5%*	*41.0%*	Common Equity Ratio	*42.5%*
44283	49255	52159	59671	60926	74548	78457	88162	94485	108873	*121300*	*133900*	Total Capital ($mill)	*176200*
55705	61386	66912	72416	70334	82010	91803	99348	111059	125776	*139600*	*153200*	Net Plant ($mill)	*196400*
7.0%	6.8%	6.3%	6.3%	6.3%	6.0%	6.8%	6.6%	6.9%	7.2%	*7.0%*	*7.0%*	Return on Total Cap'l	*7.0%*
12.4%	12.2%	11.1%	10.9%	9.4%	10.2%	12.5%	13.5%	14.6%	13.6%	*14.0%*	*14.0%*	Return on Shr. Equity	*14.0%*
12.4%	12.2%	11.1%	10.9%	9.4%	10.2%	12.5%	13.5%	14.6%	13.6%	*14.0%*	*14.0%*	Return on Com Equity [E]	*14.0%*
6.0%	6.1%	4.4%	4.4%	3.2%	3.7%	5.0%	5.4%	6.1%	5.6%	*5.5%*	*5.5%*	Retained to Com Eq	*5.0%*
51%	50%	60%	60%	66%	64%	60%	60%	58%	59%	*60%*	*61%*	All Div'ds to Net Prof	*61%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $82767 mill. **Due in 5 Yrs** $32228 mill.
LT Debt $66100 mill. **LT Interest** $2880 mill.

(Total Interest coverage: 3.0x)

Pension Assets-12/23 $4897 mill.
Oblig. $2785 mill.

Pfd Stock None

Common Stock 2,056,404,540 shs.

MARKET CAP: $170 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	-1.0%	+3.0	+.6
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+.5	+1.5	+1.2
Fixed Charge Cov. (%)	284	370	341

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	2.5%	4.5%	*8.0%*
"Cash Flow"	8.5%	10.0%	*7.0%*
Earnings	9.5%	12.5%	*8.5%*
Dividends	11.0%	11.5%	*9.0%*
Book Value	8.0%	6.0%	*9.0%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	3726	3927	4370	5046	17069
2022	2890	5183	6719	6164	20956
2023	6716	7349	7172	6877	28114
2024	5731	6069	7567	*7233*	*26600*
2025	*6800*	*7350*	*8250*	*7900*	*30300*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.67	.71	.75	.41	2.55
2022	.74	.81	.85	.51	2.90
2023	.84	.88	.94	.52	3.17
2024	.91	.96	1.03	*.55*	*3.45*
2025	*.95*	*1.00*	*1.10*	*.65*	*3.70*

QUARTERLY DIVIDENDS PAID [B] ■ †

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.35	.35	.35	.35	1.40
2021	.385	.385	.385	.385	1.54
2022	.425	.425	.425	.425	1.70
2023	.4675	.4675	.4675	.4675	1.87
2024	.515	.515	.515		

BUSINESS: NextEra Energy, Inc. is a holding company for Florida Power & Light Co. (FP&L), which provides electricity to roughly 5.9 million customers in eastern, southern, & northwestern Florida. NextEra Energy Resources is a nonregulated power generator with nuclear, gas, & renewables. Has 51.4% stake in NextEra Energy Partners. Acquired Gulf Power 1/19; Florida City Gas 7/18. Revenue: residential, about 55%; commercial/industrial/other, 45%. Generating sources: gas, 73%; nuclear, 20%; solar, 6%; other, 1%. Fuel costs: 19.4% of revenues. '23 depreciation rate: 3.4%. Employs about 16,800. Chairman, President and CEO: John W. Ketchum. Inc.: Florida. Address: 700 Universe Blvd., Juno Beach, FL 33408. Tel.: 561-694-4000. Internet: www.nexteraenergy.com.

NextEra Energy looks on pace for a 9% earnings gain this year. The company has averaged a $0.06 per share upside earnings surprise over the past three quarters. The strong year-to-date operating performance makes it likely that NextEra will reach the high end of its full-year bottom-line target of $3.23-$3.43 per share. Its utility subsidiary, Florida Power & Light (FPL), continues to experience healthy growth driven by investment in the business. Regulatory capital employed has grown by nearly 10% year over year as of the end of the third quarter. FPL is benefiting from a nice surge in its customer base, with the count up by about 100,000 in 2024. In addition to load growth from migration, FPL also benefits from the ongoing need to invest in system resiliency in storm-challenged Florida. NextEra's renewable energy subsidiary is having an excellent year. The September period marked the second consecutive quarter in which the company added three gigawatts to its backlog of projects. The running four-quarter total stands at roughly 11 gigawatts.

The stock has recovered nicely following a tumultuous 2023. Last year, utilities underperformed the market as interest rates rose sharply. Because Treasury securities are an alternative investment vehicle to utility stocks, there is a strong inverse correlation between interest rates and this group of equities. NEE stock did worse than the peer group as it entered 2023 with one of the highest utility valuations due to a track record of above-average growth. Higher borrowing costs for a utility that regularly visits the capital markets brought into question how sustainable NEE's above-industry-level growth is. The company's strong operating performance over the past four quarters is making leadership's 6%-8% earnings growth target to late decade look conservative. NEE's 48% total return over the past 12 months is the second-best among electric utilities.

This equity is ranked to mirror the year-ahead market. However, following the strong run-up in valuation in recent months, the company's solid prospects look largely priced in. Total return potential appears limited from the recent quotation.

Anthony J. Glennon *November 8, 2024*

(A) Diluted EPS. Excl. nonrecurring gains/(losses): '11, (6¢); '13, (20¢); '16, 12¢; '17, $1.22¢; '18, $1.80; '20, (83¢); '21, (74¢); '22, (80¢); '23, 43¢; Q1-Q3 '24, (11¢); disc. ops.: '13, 11¢. EPS may not some to full yr. due to rounding. Next egs. report due late Jan. **(B)** Div'ds paid in mid-Mar., mid-June, mid-Sept., & mid-Dec. ■ Div'd reinvestment plan avail. † Shareholder investment plan avail. **(C)** Includes intangibles. In '23: $5.85/sh. **(D)** In mill., adj. for stock split. **(E)** Rate allowed on common eq. in '22 (FPL): 9.8%-11.8%; Regult'y Climate: Avg.

Company's Financial Strength	A+
Stock's Price Stability	45
Price Growth Persistence	85
Earnings Predictability	95

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NISOURCE INC. NYSE-NI

RECENT PRICE **36.22** | P/E RATIO **20.1** (Trailing: 20.2 Median: 21.0) | RELATIVE P/E RATIO **1.07** | DIV'D YLD **3.1%** | **VALUE LINE**

TIMELINESS 4 Lowered 9/6/24
SAFETY 2 Raised 2/23/24
TECHNICAL 2 Raised 11/22/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

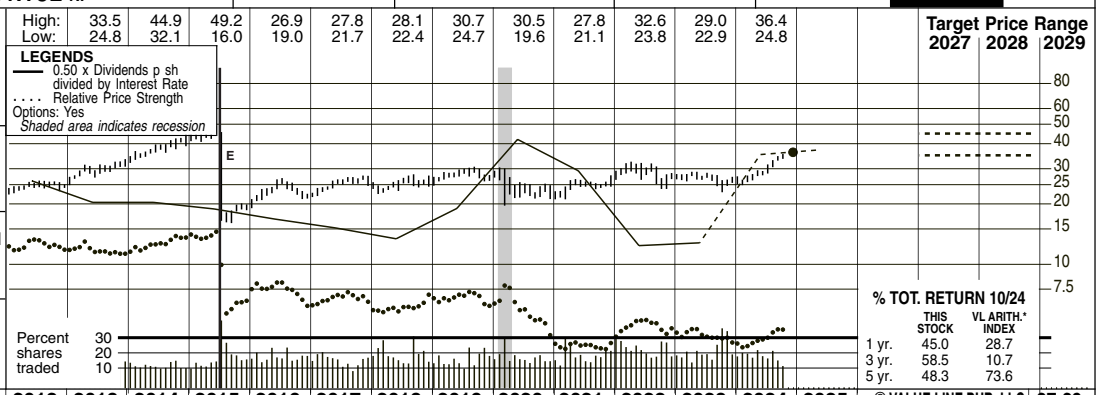
Low-High	Midpoint (% to Mid)
$25-$42	$34 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	45	(+25%)	*9%*
Low	35	(-5%)	*3%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	313	331	328
to Sell	253	236	249
Hld's(000)	413866	425705	439719



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
32.36	24.02	22.99	21.33	16.31	18.04	20.47	14.58	13.90	14.46	13.74	13.63	11.95	12.09	14.23	12.33	*12.60*	*13.55*	Revenues per sh	*15.15*
3.32	2.96	3.19	2.98	3.13	3.41	3.60	2.27	2.71	2.07	2.86	3.17	3.15	3.26	3.47	3.64	*3.95*	*4.05*	"Cash Flow" per sh	*4.45*
1.34	.84	1.06	1.05	1.37	1.57	1.67	.63	1.00	.39	1.30	1.31	1.32	1.37	1.47	1.60	*1.75*	*1.80*	Earnings per sh [A]	*2.15*
.92	.92	.92	.92	.94	.98	1.02	.83	.64	.70	.78	.80	.84	.88	.94	1.00	*1.06*	*1.12*	Div'ds Decl'd per sh [B] ■	*1.20*
3.54	2.81	2.88	3.99	4.83	5.99	6.42	4.26	4.57	5.03	4.88	4.72	4.49	4.53	6.32	5.93	*5.30*	*6.50*	Cap'l Spending per sh	*7.00*
17.24	17.54	17.63	17.71	17.90	18.77	19.54	12.04	12.60	12.82	13.08	13.36	12.44	13.33	13.14	22.71	*22.55*	*23.25*	Book Value per sh [C]	*26.05*
274.26	276.79	279.30	282.18	310.28	313.68	316.04	319.11	323.16	337.02	372.36	382.14	391.76	404.30	411.10	446.38	*465.00*	*465.00*	Common Shs Outst'g [D]	*475.00*
12.1	14.3	15.3	19.4	17.9	18.9	22.7	37.3	23.2	NMF	19.3	21.3	18.7	18.0	19.6	16.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*19.0*
.73	.95	.97	1.22	1.14	1.06	1.19	1.88	1.22	NMF	1.04	1.13	.96	.99	11.8	.97			Relative P/E Ratio	*1.05*
5.7%	7.6%	5.7%	4.5%	3.8%	3.3%	2.7%	3.5%	2.8%	2.8%	3.1%	2.9%	3.4%	3.6%	3.3%	3.7%			Avg Ann'l Div'd Yield	*3.0%*
6470.6	4651.8	4492.5	4874.6	5114.5	5208.9	4681.7	4899.6	5850.6	5505.4	*5850*	*6300*	Revenues ($mill)	*7200*
530.7	198.6	328.1	128.6	478.3	549.8	562.6	626.3	648.2	716.3	*815*	*835*	Net Profit ($mill)	*1020*
36.9%	41.6%	35.7%	71.0%	19.7%	17.0%	18.3%	15.7%	17.2%	17.8%	*19.0%*	*19.0%*	Income Tax Rate	*19.0%*
--	--	--	--	--	--	--	2.0%	2.3%	3.5%	*3.0%*	*2.5%*	AFUDC % to Net Profit	*2.5%*
56.9%	60.7%	59.8%	63.5%	55.3%	56.8%	61.6%	56.9%	55.7%	52.2%	*54.0%*	*55.0%*	Long-Term Debt Ratio	*55.0%*
43.1%	39.3%	40.2%	36.5%	37.9%	36.9%	32.5%	33.5%	31.6%	45.5%	*46.0%*	*45.0%*	Common Equity Ratio	*45.0%*
14331	9792.0	10129	11832	12856	13843	14972	16131	17099	21192	*22800*	*24000*	Total Capital ($mill)	*27500*
16017	12112	13068	14360	15543	16912	16620	17882	19843	22275	*25250*	*26000*	Net Plant ($mill)	*28000*
5.3%	4.0%	5.0%	2.6%	5.1%	5.3%	5.0%	4.9%	3.8%	3.4%	*3.5%*	*3.5%*	Return on Total Cap'l	*3.5%*
8.6%	5.2%	8.1%	3.0%	8.3%	9.2%	9.8%	9.0%	9.3%	7.1%	*8.0%*	*8.0%*	Return on Shr. Equity	*8.5%*
8.6%	5.2%	8.1%	3.0%	9.6%	9.7%	10.4%	10.6%	12.0%	7.4%	*8.0%*	*8.0%*	Return on Com Equity	*8.5%*
3.4%	NMF	3.0%	NMF	4.0%	3.8%	3.8%	4.2%	4.0%	2.8%	*3.0%*	*3.0%*	Retained to Com Eq	*3.5%*
61%	NMF	63%	NMF	60%	64%	67%	64%	64%	63%	*61%*	*62%*	All Div'ds to Net Prof	*56%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $13614.5 mill. **Due in 5 Yrs** $4536 mill.
LT Debt $12086.3 mill. **LT Interest** $505 mill.
(Interest cov. earned: 5.5x) (54% of Cap'l)

Leases, Uncapitalized Annual rentals $9.6 mill.
Pension Assets-12/23 $1.4 bill. **Oblig.** $1.4 bill.

Common Stock 466,778,943 shs.
as of 10/22/24

MARKET CAP: $16.9 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	40.8	2245.4	126.2
Other	2543.5	2254.0	1489.8
Current Assets	2584.3	4499.4	1616.0
Accts Payable	899.5	749.4	614.6
Debt Due	1791.9	3072.4	1528.2
Other	1969.1	1443.3	1342.7
Current Liab.	4660.5	5265.1	3485.5
Fix. Chg. Cov.	255%	225%	445%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-5.0%	-3.5%	*5.5%*
"Cash Flow"	.5%	6.5%	*5.5%*
Earnings	1.5%	15.0%	*9.5%*
Dividends	-.5%	3.5%	*4.5%*
Book Value	-3.0%	.5%	*5.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1545.6	986.0	959.4	1408.6	4899.6
2022	1873.3	1183.2	1089.5	1704.6	5850.6
2023	1966.0	1090.0	1027.4	1422.0	5505.4
2024	1706.3	1084.7	1076.3	*1982.7*	*5850*
2025	*1840*	*1175*	*1160*	*2125*	*6300*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.77	.13	.11	.39	1.37
2022	.75	.12	.10	.50	1.47
2023	.77	.11	.19	.53	1.60
2024	.85	.21	.20	*.49*	*1.75*
2025	*.85*	*.20*	*.20*	*.55*	*1.80*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.21	.21	.21	.21	.84
2021	.22	.22	.22	.22	.88
2022	.235	.235	.235	.235	.94
2023	.25	.25	.25	.25	1.00
2024	.265	.265	.265	.265	

BUSINESS: NiSource Inc. is a holding company for Northern Indiana Public Service Company (NIPSCO), which supplies electricity and gas to the northern third of Indiana. Customers: 488,833 electric in Indiana, 3,200,000 gas in Indiana, Ohio, Pennsylvania, Kentucky, Virginia, Maryland, through its Columbia subsidiaries. Revenue breakdown, 2023: electrical, 32%; gas, 67%; other, less than 1%. Generating capacity, coal, 69.4%; purchased & other, 30.6%. 2023 reported depreciation rates: 3.5% electric, 2.4% gas. Has 7,364 employees. Chairman: Richard L. Thompson. President & Chief Executive Officer: Lloyd Yates. Incorporated: Indiana. Address: 801 East 86th Avenue, Merrillville, Indiana 46410. Telephone: 877-647-5990. Internet: www.nisource.com.

NiSource posted a better third-quarter profit than we expected. The earnings figure was steady versus both the year before and the prior quarter. We had thought the bottom line would dip to $0.13 per share during the gas utility's low season. Instead, higher rate base investments brought in an additional $61 million in revenues, and financing benefits added $26 million to the bottom line. Taking a closer look, the company's performance has been bolstered by lower energy costs, providing a significant boost to margins. However, depreciation expense is also rising rapidly, as the company is currently investing heavily in new capital projects aimed at infrastructure hardening and expanding upon clean-energy programs. Interest expense is up, too, as a result. On balance, the bottom-line has expanded nicely over the first nine months.

The good recent operating performance may come up against headwinds in the near term. As noted, the company has benefited from energy prices, due to a cost-pass-through mechanism that typically lags twelve months. Otherwise, the company has had to contend with some cost inflation. We think its probable that the lower energy costs will soon subside, leaving higher operating costs that will pressure earnings growth. To wit, management appears to agree, as our full-year 2024 bottom-line target of $1.75 is at the top of their guidance range. We've cut our full-year 2025 target by $0.05 as well, to $1.80, reflecting the recent share-count expansion of roughly 4%, per the end of the most recent quarter.

NiSource's current capital investment cycle is a key driver for future performance. Leadership updated its five-year capital plan to $19.3 billion, an increase of $2.9 billion from prior expectations. This focuses further on investments in power generation, gas compliance, infrastructure hardening, and modernization of technology systems. The plan aims to drive an 8% to 10% rate base growth.

The shares have gained over 45% in price these past twelve months, and currently trade within the bounds of our 3- to 5-year projections. Other investment opportunities show greater upside potential at this juncture.

Earl B. Humes *November 22, 2024*

(A) Dil. EPS. Excl. gains (losses) on disc. ops.: '08, ($1.14); '15, (30¢); '18, ($1.48). Next egs. report due late February. Qtl'y egs. may not sum to total due to rounding.
(B) Div'ds historically paid in mid-Feb., May, Aug., Nov. ■ Div'd reinv. avail.
(C) Incl. intang in '23: $1485.9 million, $3.33/sh.
(D) In mill.
(E) Spun off Columbia Pipeline Group (7/15)

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	25
Earnings Predictability	70

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NEW JERSEY RES. NYSE-NJR

RECENT PRICE **47.56** | P/E RATIO **15.9** (Trailing: 20.2 Median: 17.0) | RELATIVE P/E RATIO **0.84** | DIV'D YLD **3.8%** | **VALUE LINE**

TIMELINESS 4 Raised 3/29/24
SAFETY 2 Lowered 4/17/20
TECHNICAL 2 Raised 10/25/24
BETA 1.00 (1.00 = Market)

18-Month Target Price Range

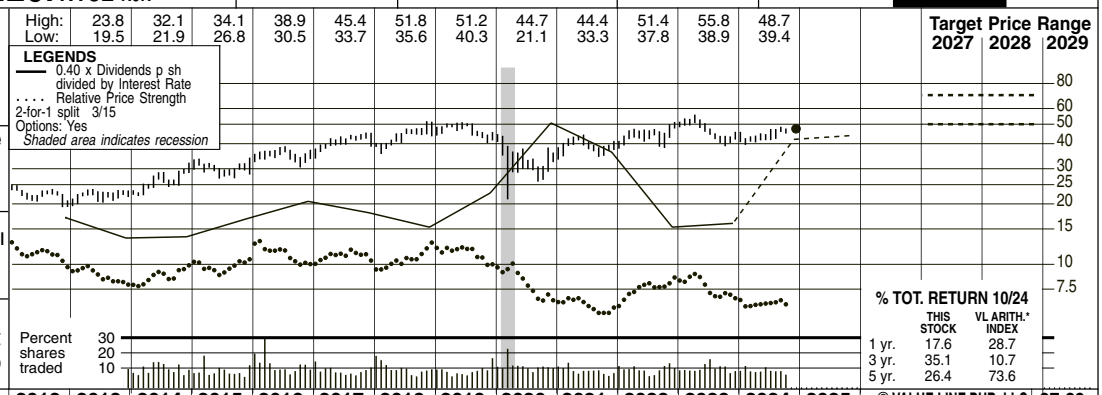
Low-High	Midpoint (% to Mid)
$40-$60	$50 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	70	(+45%)	*13%*
Low	50	(+5%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	161	167	167
to Sell	143	140	139
Hld's(000)	70304	70181	71950



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
45.37	31.17	32.05	36.30	27.08	38.38	44.40	32.09	21.90	26.28	33.24	29.01	20.39	22.71	30.38	20.12	*19.00*	*21.00*	Revenues per sh [A]	*25.00*
1.81	1.58	1.63	1.70	1.86	1.93	2.73	2.52	2.46	2.68	3.72	2.99	3.30	3.36	3.86	4.22	*4.50*	*4.50*	"Cash Flow" per sh	*5.25*
1.35	1.20	1.23	1.29	1.36	1.37	2.08	1.78	1.61	1.73	2.72	1.96	2.07	2.16	2.50	2.70	*2.90*	*2.90*	Earnings per sh [B]	*3.50*
.56	.62	.68	.72	.77	.81	.86	.93	.98	1.04	1.11	1.19	1.27	1.36	1.45	1.56	*1.71*	*1.76*	Div'ds Decl'd per sh [C] ■	*1.95*
.86	.90	1.05	1.13	1.26	1.33	1.52	3.76	4.15	3.80	4.39	5.83	4.65	5.42	6.50	5.13	*5.00*	*5.50*	Cap'l Spending per sh	*6.25*
8.64	8.29	8.81	9.36	9.80	10.65	11.48	12.99	13.58	14.33	16.18	17.37	19.26	17.18	19.00	20.40	*22.30*	*23.65*	Book Value per sh [D]	*28.35*
84.12	83.17	82.35	82.89	83.05	83.32	84.20	85.19	85.88	86.32	87.69	89.34	95.80	94.95	95.64	97.57	*100.00*	*100.00*	Common Shs Outst'g [E]	*100.00*
12.3	14.9	15.0	16.8	16.8	16.0	11.7	16.6	21.3	22.4	15.6	24.3	17.7	17.5	17.0	17.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.0*
.74	.99	.95	1.05	1.07	.90	.62	.84	1.12	1.13	.84	1.29	.91	.94	.98	1.02			Relative P/E Ratio	*.95*
3.3%	3.5%	3.7%	3.3%	3.4%	3.7%	3.5%	3.1%	2.9%	2.7%	2.6%	2.5%	3.5%	3.6%	3.4%	3.3%			Avg Ann'l Div'd Yield	*4.0%*
						3738.1	2734.0	1880.9	2268.6	2915.1	2592.0	1953.7	2156.6	2906.0	1963.0	*1900*	*2100*	Revenues ($mill) [A]	*2500*
						176.9	153.7	138.1	149.4	240.5	175.0	196.2	207.7	240.3	261.8	*290*	*290*	Net Profit ($mill)	*350*
						30.2%	26.3%	15.5%	17.2%	- -	- -	NMF	10.3%	21.4%	15.8%	*21.5%*	*22.0%*	Income Tax Rate	*22.0%*
						4.7%	5.6%	7.3%	6.6%	8.2%	6.7%	10.0%	9.6%	8.3%	13.3%	*15.3%*	*13.8%*	Net Profit Margin	*14.0%*
						38.2%	43.2%	47.7%	44.6%	45.4%	49.8%	55.1%	57.0%	57.8%	58.2%	*57.5%*	*57.0%*	Long-Term Debt Ratio	*55.0%*
						61.8%	56.8%	52.3%	55.4%	54.6%	50.2%	44.9%	43.0%	42.2%	41.8%	*42.5%*	*43.0%*	Common Equity Ratio	*45.0%*
						1564.4	1950.6	2230.1	2233.7	2599.6	3088.9	4104.2	3793.0	4302.6	4758.8	*5250*	*5500*	Total Capital ($mill)	*6300*
						1884.1	2128.3	2407.7	2609.7	2651.0	3041.2	3983.0	4213.5	4649.9	5022.1	*5400*	*5750*	Net Plant ($mill)	*6500*
						12.1%	8.6%	6.9%	7.7%	10.1%	6.4%	5.6%	6.5%	5.6%	5.5%	*5.5%*	*5.5%*	Return on Total Cap'l	*5.5%*
						18.3%	13.9%	11.8%	12.1%	16.9%	11.3%	10.6%	12.7%	13.2%	13.2%	*13.0%*	*12.5%*	Return on Shr. Equity	*12.5%*
						18.3%	13.9%	11.8%	12.1%	16.9%	11.3%	10.6%	12.7%	13.2%	13.2%	*13.0%*	*12.5%*	Return on Com Equity	*12.5%*
						11.0%	7.0%	4.8%	5.0%	10.2%	4.6%	4.3%	5.6%	6.2%	5.6%	*5.5%*	*5.0%*	Retained to Com Eq	*5.5%*
						40%	50%	60%	59%	40%	59%	60%	56%	53%	58%	*58%*	*61%*	All Div'ds to Net Prof	*56%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $3246.0 mill. **Due in 5 Yrs** $580 mill.
LT Debt $2793.7 mill. **LT Interest** $125 mill.
Incl. $9.3 mill. capitalized leases.
(Interest coverage: 4.85x)
Pension Assets-9/23 $405.0 mill.
Oblig. $493.7 mill.
Pfd Stock None

Common Stock 99,167,564 shs.
as of 8/2/24

MARKET CAP: $4.7 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	1.1	1.0	22.4
Other	755.0	531.1	512.0
Current Assets	756.1	532.1	534.4
Accts Payable	156.6	151.8	144.6
Debt Due	499.1	368.3	452.3
Other	448.5	286.5	297.4
Current Liab.	1104.2	806.6	894.3
Fix. Chg. Cov.	545%	520%	310%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-3.0%	-6.0%	*2.5%*
"Cash Flow"	7.0%	4.5%	*5.0%*
Earnings	5.0%	2.5%	*5.0%*
Dividends	6.5%	6.5%	*5.0%*
Book Value	7.5%	7.0%	*4.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	454.3	802.2	367.6	532.5	2156.6
2022	675.8	912.3	552.3	765.5	2906.0
2023	723.6	644.0	264.1	331.3	1963.0
2024	467.2	657.9	275.6	*499.3*	*1900*
2025	*715*	*625*	*305*	*455*	*2100*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	.46	1.77	d.15	.07	2.16
2022	.69	1.36	d.04	.50	2.50
2023	1.14	1.16	.10	.30	2.70
2024	.74	1.41	d.09	*.84*	*2.90*
2025	*.75*	*1.40*	*.Nil*	*.75*	*2.90*

Calendar	QUARTERLY DIVIDENDS PAID [C] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.3125	.3125	.3125	.3325	1.27
2021	.3325	.3325	.3325	.3625	1.36
2022	.3625	.3625	.3625	.3625	1.45
2023	.39	.39	.39	.39	1.56
2024	.42	.42	.42	.45	

BUSINESS: New Jersey Resources Corp. is a holding company providing retail/wholesale energy svcs. to customers in NJ, and in states from the Gulf Coast to New England, and Canada. New Jersey Natural Gas had 576,000 cust. at 9/30/23. Fiscal 2023 volume: 128 bill. cu. ft. (23% interruptible, 50% residential, commercial & firm transportation, 27% other). N.J. Natural Energy subsidiary provides unregulated retail/wholesale natural gas and related energy svcs. 2023 dep. rate: 2.8%. Has 1,350 empls. Off./dir. own less than 1% of common; BlackRock, 15.9%; Vanguard, 11.4% (12/23 Proxy). CEO, President & Director: Steven D. Westhoven. Incorporated: New Jersey. Address: 1415 Wyckoff Road, Wall, NJ 07719. Telephone: 732-938-1480. Web: www.njresources.com.

New Jersey Resources likely ended fiscal 2024 on a good note. (Fiscal year ended September 30th.) The company reported earnings per share of $2.06 over the first nine months, down from $2.40 in the year before. The broader energy markets have been volatile over the past two-plus years, but New Jersey Resources' diverse business mix has helped to smooth out some turbulence. Still, the negative overall comparison factors in multiple benefits unique to 2023, including a winter storm event and a tax valuation allowance. As such, operating results have generally expanded at a steady pace. Similarly, we expect a good operating result was reached in the fiscal-fourth quarter. However, our target of $0.84 per share is bolstered by the likely recognition of significant revenue from asset management agreements within the Energy Services segment. This should bring the year-end tally to $2.90 per share.

Looking ahead, earnings growth may stall somewhat in the absence of similar beneficial items. The bottom-line comparison may be more challenging next year without specific financial items to bolster results. However, core operations are likely to maintain the pace. The ongoing base rate case for NJ Natural Gas is proceeding, and could be resolved before the start of 2025, which would surely help results. Unfortunately, the company has planned significant investment of up to $1.5 billion over the next two years, targeting the utility infrastructure as well as renewable energy projects. The latter of these planned investments could face headwinds with the potential for shifts in renewable energy policies and incentives, adding a degree of uncertainty and risk. The potential for tariffs may also elevate maintenance and other operating costs.

The stock doesn't offer strong price appreciation potential over the long run, at the recent quotation. To its credit, the company did recently raise its dividend by 7%, to $0.45 per share. Investors may also appreciate the stock's Safety rank of 2 (Above Average). However, other stocks within the industry appear to offer better price appreciation potential for those looking to gain exposure to regulated gas utilities.

Earl B. Humes *November 22, 2024*

(A) Fiscal year ends Sept. 30th.
(B) Diluted earnings. Qtly. revenues and egs. may not sum to total due to rounding and change in shares outstanding. Next earnings report due November 25th.
(C) Dividends historically paid in early Jan., April, July, and October. ■ Dividend reinvestment plan available.
(D) Includes regulatory assets in 2023: $585 million, $6.00/share.
(E) In millions, adjusted for 3/15 split.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	40
Earnings Predictability	65

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NORTHWESTERN NDQ-NWE

RECENT PRICE **54.63** | P/E RATIO **15.2** (Trailing: 16.1 Median: 17.0) | RELATIVE P/E RATIO **0.84** | DIV'D YLD **4.8%** | **VALUE LINE**

TIMELINESS 3 Lowered 5/24/24
SAFETY 2 Raised 10/18/24
TECHNICAL 3 Raised 10/18/24
BETA 1.00 (1.00 = Market)

18-Month Target Price Range

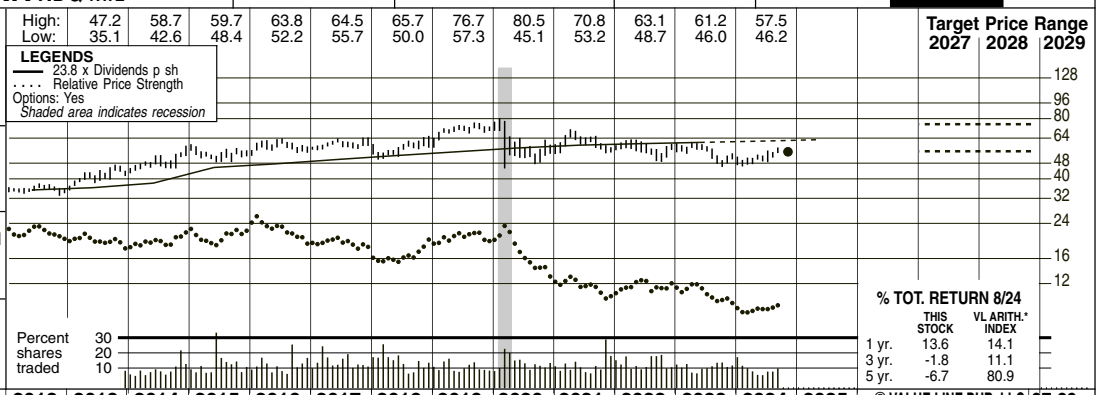
Low-High	Midpoint (% to Mid)
$41-$63	$52 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	75	(+35%)	*12%*
Low	55	(Nil)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	144	168	158
to Sell	130	128	134
Hld's(000)	59945	58166	58903



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
35.09	31.72	30.66	30.80	28.76	29.80	25.68	25.21	26.01	26.45	23.81	24.93	23.70	25.38	24.74	23.22	*25.20*	*26.30*	Revenues per sh	*28.90*
4.40	4.62	4.76	5.42	5.18	5.45	5.39	5.92	6.74	6.76	6.96	7.07	6.86	6.92	6.46	6.69	*7.10*	*7.45*	"Cash Flow" per sh	*8.55*
1.77	2.02	2.14	2.53	2.26	2.46	2.99	2.90	3.39	3.34	3.40	3.53	3.21	3.50	3.29	3.22	*3.50*	*3.70*	Earnings per sh A	*4.25*
1.32	1.34	1.36	1.44	1.48	1.52	1.60	1.92	2.00	2.10	2.20	2.30	2.40	2.48	2.52	2.56	*2.60*	*2.64*	Div'd Decl'd per sh B ■ †	*2.76*
3.47	5.26	6.30	5.20	5.89	5.95	5.76	5.89	5.96	5.60	5.64	6.26	8.02	8.03	8.62	9.26	*8.15*	*8.15*	Cap'l Spending per sh	*8.25*
21.25	21.86	22.64	23.68	25.09	26.60	31.50	33.22	34.68	36.44	38.60	40.42	41.10	43.28	44.61	45.48	*46.40*	*47.50*	Book Value per sh C	*51.85*
35.93	36.00	36.23	36.28	37.22	38.75	46.91	48.17	48.33	49.37	50.32	50.45	50.59	54.06	59.74	61.25	*61.50*	*62.00*	Common Shs Outst'g D	*64.00*
13.9	11.5	12.9	12.6	15.7	16.9	16.2	18.4	17.2	17.8	16.8	19.9	18.6	17.4	17.3	17.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.5*
.84	.77	.82	.79	1.00	.95	.85	.93	.90	.90	.91	1.06	.96	.94	1.00	.95			Relative P/E Ratio	*.85*
5.4%	5.7%	4.9%	4.5%	4.2%	3.7%	3.3%	3.6%	3.4%	3.5%	3.9%	3.3%	4.0%	4.1%	4.4%	4.7%			Avg Ann'l Div'd Yield	*4.2%*
						1204.9	1214.3	1257.2	1305.7	1198.1	1257.9	1198.7	1372.3	1477.8	1422.1	*1550*	*1630*	Revenues ($mill)	*1850*
						120.7	138.4	164.2	162.7	171.1	179.3	162.6	181.6	185.5	194.1	*215*	*230*	Net Profit ($mill)	*270*
						- -	13.7%	- -	7.6%	- -	1.6%	- -	.9%	.9%	3.7%	*6.0%*	*9.0%*	Income Tax Rate	*12.0%*
						8.9%	9.8%	4.3%	5.2%	3.4%	4.6%	6.0%	14.9%	18.5%	21.6%	*20.0%*	*20.0%*	AFUDC % to Net Profit	*20.0%*
						53.4%	53.1%	52.0%	50.2%	52.2%	52.5%	52.8%	52.2%	48.2%	49.1%	*50.0%*	*51.0%*	Long-Term Debt Ratio	*50.5%*
						46.6%	46.9%	48.0%	49.8%	47.8%	47.5%	47.2%	47.8%	51.8%	50.9%	*50.0%*	*49.0%*	Common Equity Ratio	*49.5%*
						3168.0	3408.6	3493.9	3614.5	4064.6	4289.8	4409.1	4893.1	5148.3	5475.4	*5725*	*5975*	Total Capital ($mill)	*6700*
						3758.0	4059.5	4214.9	4358.3	4521.3	4700.9	4952.9	5247.2	5657.5	6039.8	*6300*	*6600*	Net Plant ($mill)	*7300*
						4.8%	5.2%	5.9%	5.6%	5.2%	5.2%	4.6%	4.6%	4.5%	4.5%	*4.5%*	*5.0%*	Return on Total Cap'l	*5.0%*
						8.2%	8.6%	9.8%	9.0%	8.8%	8.8%	7.8%	7.8%	7.0%	7.0%	*7.5%*	*8.0%*	Return on Shr. Equity	*8.0%*
						8.2%	8.6%	9.8%	9.0%	8.8%	8.8%	7.8%	7.8%	7.0%	7.0%	*7.5%*	*8.0%*	Return on Com Equity E	*8.0%*
						3.8%	3.0%	4.1%	3.4%	3.2%	3.1%	2.0%	2.3%	1.7%	1.4%	*2.0%*	*2.5%*	Retained to Com Eq	*3.0%*
						54%	65%	58%	62%	64%	64%	74%	71%	76%	79%	*74%*	*71%*	All Div'ds to Net Prof	*65%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $2901.7 mill. **Due in 5 Yrs** $1011.5 mill.
LT Debt $2573.3 mill. **LT Interest** $120.0 mill.
Incl. $5.5 mill. finance leases.
(Total Interest Coverage: 2.5x)

Pension Assets-12/23 $402.7 mill.
Oblig $477.0 mill.

Pfd Stock None

Common Stock 61,300,497 shs.
as of 7/26/24

MARKET CAP: $3.4 billion (Mid Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+.7	+3.7	-.3
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Winter (Mw)	2000	2073	1992
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+1.6	+1.5	+1.6
Fixed Charge Cov. (%)	245	219	216

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-2.0%	-1.0%	*2.5%*
"Cash Flow"	2.5%	-.5%	*3.5%*
Earnings	3.5%	- -	*4.0%*
Dividends	5.5%	3.5%	*2.0%*
Book Value	6.0%	4.0%	*3.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	400.8	298.2	326.0	347.3	1372.3
2022	394.5	323.0	335.1	425.2	1477.8
2023	454.5	290.5	321.1	356.0	1422.1
2024	475.3	319.9	*355*	*399.8*	*1550*
2025	*495*	*335*	*380*	*420*	*1630*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.24	.59	.70	.97	3.50
2022	1.08	.58	.47	1.16	3.29
2023	1.10	.32	.48	1.32	3.22
2024	1.08	.52	*.70*	*1.20*	*3.50*
2025	*1.18*	*.54*	*.73*	*1.25*	*3.70*

Calendar	QUARTERLY DIVIDENDS PAID B ■ † Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.60	.60	.60	.60	2.40
2021	.62	.62	.62	.62	2.48
2022	.63	.63	.63	.63	2.52
2023	.64	.64	.64	.64	2.56
2024	.65	.65	.65		

BUSINESS: NorthWestern Energy Group, Inc. supplies electricity & gas in the Upper Midwest and Northwest, serving 467,700 electric customers in Montana and South Dakota and 307,600 gas customers in Montana, South Dakota, and Nebraska. Electric revenue breakdown for 2023: residential, 44%; commercial, 50%; industrial, 4%; and other, 2%. Generating sources: coal, 18%; hydro, 37%; wind, 4%; natural gas, 12%; purchased power, 29%. Fuel costs: 30% of revenues. 2023 reported depreciation rate: 2.8%. Had 1,573 employees as of 12/31/23. Chair of the board of directors: Dana J. Dykhouse. President and CEO: Brian B. Bird. Incorporated: DE. Address: 3010 West 69th Street, Sioux Falls, SD 57108. Telephone: 605-978-2900. Internet: www.northwesternenergy.com.

NorthWestern Energy's bottom line will likely be up this year and next. Rate relief from the October 2023 regulatory decision in Montana remains a major plus. Higher delivery prices that went into effect then increased annual electric revenue by $67.4 million and natural gas revenue by $14.1 million. NorthWestern also received pricing mechanisms that allow for the expedient pass through of changes in fuel and purchased power costs, as well as property taxes. In the company's smaller South Dakota service area, the utility came to terms with state regulators earlier this year that lift electric revenues by an additional $21.5 million annually. And in June, NorthWestern filed for gas rate reviews in South Dakota and Nebraska. The following month, it filed for electric and gas rate reviews in Montana. Decisions likely won't be reached until next year, but the company may receive increased interim base rates starting as soon as this quarter.

Growth prospects are about average for this industry. The company's five-year investment plan calls for expenditures of roughly $500 million per year from 2024 through 2028. The $2.5 billion total investment should expand the company's rate base (the dollar value of assets for which a utility is allowed to earn a regulated return on) by about 4%-6% per annum. That, in turn, should translate to perhaps 4%-5% annual earnings growth.

The company announced pending acquisitions. It's purchasing the Energy West natural gas utility distribution system for $39.0 million in cash. The operations serve 33,000 Montana households and businesses, most of whom are already NorthWestern electric customers. The deal is expected to close by March of 2025. The company also announced it is receiving Puget Sound Energy's 25% interest in the Colstrip, Montana generating station for free, similar to the terms previously announced for Avista's 15% stake. With a 55% total position in the plant starting December 31, 2025, NorthWestern will likely need to invest in various clean-coal technologies and other enhancements.

Income-oriented investors may find these shares of interest. However, we don't foresee much appreciation potential.

Anthony J. Glennon *October 18, 2024*

(A) Diluted egs. Excl. nonrec. gains/(losses): '12, 40¢; '15, 27¢; '18, 52¢; '19, 45¢; '20, (15¢); '21, 10¢; '22, (4¢). Qtly EPS may not sum to full yr. due to rounding. Next egs. report due early Nov. **(B)** Div'ds paid late Mar., June, Sept. & Dec. ■ Div'd reinvest. plan avail. † Shrhldr. invest. plan avail. **(C)** Incl. def'd charges and intag. '23: $17.90/sh. **(D)** In mill. **(E)** Rate base: Net orig. cost. Rate allowed on com. eq. in MT in '22 (elec.): 9.65%; in '22 (gas): 9.55%; in SD in '24: 6.81%; in NE in '07: 10.4%. Reg. Climate: Below Avg.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	20
Earnings Predictability	95

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N.W. NATURAL NYSE-NWN

RECENT PRICE **41.44** | P/E RATIO **14.6** (Trailing: 19.0 Median: 24.0) | RELATIVE P/E RATIO **0.77** | DIV'D YLD **4.7%** | **VALUE LINE**

TIMELINESS 3 Raised 8/16/24
SAFETY 2 Raised 2/23/24
TECHNICAL 4 Lowered 7/26/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$28-$49	$39 (-5%)

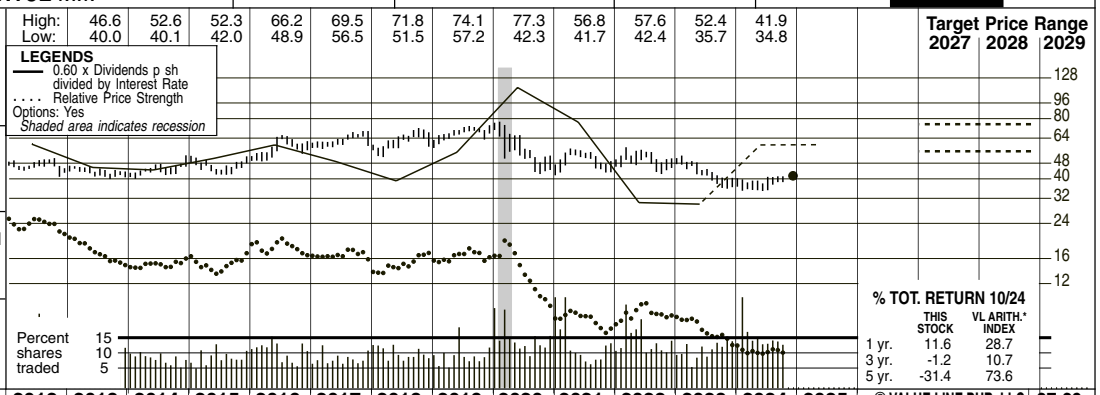
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	75	(+80%)	*19%*
Low	55	(+35%)	*11%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	123	131	132
to Sell	90	105	104
Hld's(000)	28414	28777	29331

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	46.6	52.6	52.3	66.2	69.5	71.8	74.1	77.3	56.8	57.6	52.4	41.9								
Low:	40.0	40.1	42.0	48.9	56.5	51.5	57.2	42.3	41.7	42.4	35.7	34.8								
	39.16	38.17	30.56	31.72	27.14	28.02	27.64	26.39	23.61	26.52	24.45	24.49	25.29	27.64	29.20	31.82	*28.75*	*28.55*	Revenues per sh	*31.10*
	5.31	5.20	5.18	5.00	4.94	5.04	5.05	4.91	4.93	1.04	5.28	5.15	5.69	6.17	5.71	5.83	*5.55*	*6.55*	"Cash Flow" per sh	*7.15*
	2.57	2.83	2.73	2.39	2.22	2.24	2.16	1.96	2.12	d1.94	2.33	2.19	2.30	2.56	2.54	2.59	*2.30*	*3.00*	Earnings per sh [A]	*3.15*
	1.52	1.60	1.68	1.75	1.79	1.83	1.85	1.86	1.87	1.88	1.89	1.90	1.91	1.92	1.93	1.94	*1.95*	*1.96*	Div'ds Decl'd per sh [B]■	*1.98*
	3.92	5.09	9.35	3.76	4.91	5.13	4.40	4.37	4.87	7.43	7.43	7.95	9.18	9.49	9.53	8.70	*10.00*	*9.50*	Cap'l Spending per sh	*10.00*
	23.71	24.88	26.08	26.70	27.23	27.77	28.12	28.47	29.71	25.85	26.41	28.42	29.05	30.04	33.08	34.12	*37.40*	*36.95*	Book Value per sh [D]	*39.00*
	26.50	26.53	26.58	26.76	26.92	27.08	27.28	27.43	28.63	28.74	28.88	30.47	30.59	31.13	35.53	37.63	*40.00*	*42.00*	Common Shs Outst'g [C]	*45.00*
	18.1	15.2	17.0	19.0	21.1	19.4	20.7	23.7	26.9	- -	26.6	30.9	25.0	19.5	19.6	16.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.0*
	1.09	1.01	1.08	1.19	1.34	1.09	1.09	1.19	1.41	- -	1.44	1.65	1.28	1.06	1.13	.96			Relative P/E Ratio	*1.10*
	3.3%	3.7%	3.6%	3.9%	3.8%	4.2%	4.1%	4.0%	3.3%	3.0%	3.0%	2.8%	3.3%	3.8%	3.9%	4.5%			Avg Ann'l Div'd Yield	*3.3%*
							754.0	723.8	676.0	762.2	706.1	746.4	773.7	860.4	1037.4	1197.5	*1150*	*1200*	Revenues ($mill)	*1400*
							58.7	53.7	58.9	d55.6	67.3	65.3	70.3	78.7	86.3	93.9	*92.5*	*125*	Net Profit ($mill)	*140*
							41.5%	40.0%	40.9%	- -	26.4%	16.2%	23.1%	25.8%	25.2%	25.7%	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
							7.8%	7.4%	8.7%	NMF	9.5%	8.8%	9.1%	9.1%	8.3%	7.8%	*8.0%*	*10.5%*	Net Profit Margin	*10.1%*
							44.8%	42.5%	44.4%	47.9%	48.1%	48.2%	49.2%	52.8%	51.5%	52.6%	*52.5%*	*55.0%*	Long-Term Debt Ratio	*55.0%*
							55.2%	57.5%	55.6%	52.1%	51.9%	51.8%	50.8%	47.2%	48.5%	47.4%	*47.5%*	*45.0%*	Common Equity Ratio	*45.0%*
							1389.0	1357.7	1529.8	1426.0	1468.9	1672.0	1748.8	1979.7	2421.6	2709.2	*3150*	*3450*	Total Capital ($mill)	*3900*
							2121.6	2182.7	2260.9	2255.0	2421.4	2438.9	2654.8	2871.4	3114.4	3358.0	*3750*	*3900*	Net Plant ($mill)	*4200*
							5.8%	5.5%	5.1%	NMF	5.8%	5.2%	5.2%	5.1%	3.6%	3.5%	*3.0%*	*3.5%*	Return on Total Cap'l	*3.5%*
							7.6%	6.9%	6.9%	NMF	8.8%	7.5%	7.9%	8.4%	7.3%	7.3%	*6.0%*	*8.0%*	Return on Shr. Equity	*8.0%*
							7.6%	6.9%	6.9%	NMF	8.8%	7.5%	7.9%	8.4%	7.3%	7.3%	*6.0%*	*8.0%*	Return on Com Equity	*8.0%*
							1.1%	.6%	.9%	NMF	2.1%	1.4%	1.7%	2.4%	2.1%	1.7%	*1.0%*	*2.5%*	Retained to Com Eq	*2.5%*
							85%	92%	87%	NMF	76%	82%	79%	71%	79%	75%	*85%*	*65%*	All Div'ds to Net Prof	*63%*



CAPITAL STRUCTURE as of 6/30/24
Total Debt $1654.7 mill. **Due in 5 Yrs** $1415 mill.
LT Debt $1574.8 mill. **LT Interest** $80 mill.

(Total interest coverage: 5.0x)

Pension Assets-12/23 $283.0 mill.
Oblig. $425.5 mill.

Pfd Stock None

Common Stock 38,670,272 shares
as of 7/26/24

MARKET CAP $1.6 billion (Small Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	29.3	32.9	65.2
Other	714.9	568.5	357.9
Current Assets	744.2	601.4	423.1
Accts Payable	180.7	145.4	93.6
Debt Due	348.9	240.7	79.9
Other	369.1	310.8	262.0
Current Liab.	898.7	696.9	435.5
Fix. Chg. Cov.	320%	240%	315%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-2.5%	- -	*4.5%*
"Cash Flow"	1.0%	2.5%	*5.0%*
Earnings	-1.0%	2.5%	*6.5%*
Dividends	1.5%	.5%	*.5%*
Book Value	1.0%	.5%	*4.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	315.9	148.9	101.5	294.1	860.4
2022	350.3	195.0	116.8	375.3	1037.4
2023	462.4	237.9	141.5	355.7	1197.5
2024	433.5	211.7	136.9	*367.9*	*1150*
2025	*450*	*220*	*135*	*395*	*1200*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.94	d.02	d.67	1.31	2.56
2022	1.80	.05	d.56	1.36	2.54
2023	2.01	.03	d.65	1.21	2.59
2024	1.69	d.07	d.71	*1.39*	*2.30*
2025	*2.10*	*.05*	*d.60*	*1.45*	*3.00*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.4775	.4775	.4775	.48	1.91
2021	.48	.48	.48	.483	1.92
2022	.483	.483	.483	.485	1.93
2023	.485	.485	.485	.488	1.94
2024	.488	.488	.488	.49	

BUSINESS: Northwest Natural Holding Co. distributes natural gas to 1,000 communities, 795,000 customers, in Oregon (88% of customers) and in southwest Washington state. Principal cities served: Portland and Eugene, OR; Vancouver, WA. Service area population: 3.7 mill. (77% in OR). Company buys gas supply from Canadian and U.S. producers; has transportation rights on Northwest Pipeline system. Owns local underground storage. Rev. breakdown: residential, 38%; commercial, 23%; industrial, gas transportation, 39%. Employs 1,380. BlackRock Inc. owns 17.6% of shares; Vanguard, 12.4%; Off./Dir., .84% (4/24 proxy). CEO: David H. Anderson. Inc.: Oregon. Address: 220 NW 2nd Ave., Portland, OR 97209. Tel.: 503-226-4211. Internet: www.nwnatural.com.

Northwest Natural's stock is up 12% in price since our late August review. The shares reached a twelve-month high on Tuesday, November 12th, after the company posted earnings results. The gas utility notched a loss of $0.71 per share, in line with our forecast, for the business' low season quarter. Management's commentary helped to improve investors' sentiment as it provided an update on the Oregon gas utility rate case and detailed various strategic objectives.

The third quarter was mostly in line with expectations. The earnings per share declined year over year, primarily as a result of regulatory lag on capital investments, as well as inflationary pressures. Operating expenses rose, including a $1.3 million rise in labor and material costs, and a $3.6 million increase in depreciation and general taxes. Other income also decreased $4.6 million from lower interest income and higher pension expense. Consolidated, net losses were $3.5 million worse this year, or $0.05 per share.

We expected earnings per share to bottom out this year, and begin to improve markedly by the end of 2025. The completion of the Oregon rate case is expected to improve earnings and resolve the regulatory lag. Capital expenditures are likely to be stable or lower next year as the company focuses primarily on safety and reliability projects. The acquisition of Putman Infrastructure and through Infrastructure Capital Holdings (ICH) by the water services subsidiary should help to expand that niche. Too, the completion of two landfill natural gas facilities should contribute to good results expected ahead.

Our long-term earnings-growth forecast is slightly above management's own target range. We expect strong economic fundamentals, including a steady regional economy, a good customer expansion rate, and a recent rise in single-family housing permits, will drive core utility performance, though, as we've seen this year, the regulatory environment remains a risk. We've targeted 6.5% earnings per share growth, compared to Northwest's guidance of 4% to 6%.

These shares could be of interest to long-term investors seeking a good-value position with a utility company.

Earl B. Humes *November 22, 2024*

(A) Diluted earnings per share. Excludes nonrecurring items: '08, ($0.03); '09, $0.06; May not sum due to rounding. Next earnings report due in late Febraury.
(B) Dividends historically paid in mid-February, May, August, and November.
■ Dividend reinvestment plan available.
(C) In millions.
(D) Includes intangibles. In 2023: $163 million, $4.33/share.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	20
Earnings Predictability	20

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ONE GAS, INC. NYSE-OGS

RECENT PRICE 75.02 | P/E RATIO 18.8 (Trailing: 19.5 Median: 21.0) | RELATIVE P/E RATIO 0.99 | DIV'D YLD 3.6% | VALUE LINE

TIMELINESS 4 Lowered 11/22/24
SAFETY 2 New 6/2/17
TECHNICAL 2 Raised 11/8/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

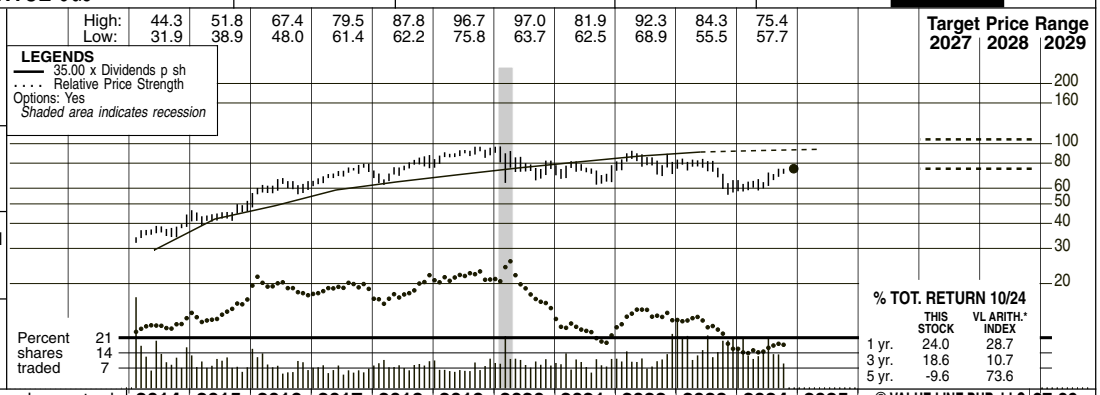
Low-High	Midpoint (% to Mid)
$47-$87	$67 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	105	(+40%)	*12%*
Low	75	(Nil)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	159	170	143
to Sell	160	147	160
Hld's(000)	52932	51905	53086



The shares of ONE Gas, Inc. began trading "regular-way" on the New York Stock Exchange on February 3, 2014. That happened as a result of the separation of ONEOK's natural gas distribution operation. Regarding the details of the spinoff, on January 31, 2014, ONEOK distributed one share of OGS common stock for every four shares of ONEOK common stock held by ONEOK shareholders of record as of the close of business on January 21. It should be mentioned that ONEOK did not retain any ownership interest in the new company.

CAPITAL STRUCTURE as of 9/30/24
Total Debt $3365.3 mill. **Due in 5 Yrs** $890.0 mill.
LT Debt $2384.9 mill. **LT Interest** $120.0 mill.
(LT interest earned: 3.4x; total interest coverage: 3.4x)
Leases, Uncapitalized Annual rentals $6.7 mill.
Pfd Stock None
Pension Assets-12/23 $977.0 mill. **Oblig.** $962.1 mill.
Common Stock 56,655,256 shs.
as of 10/28/24
MARKET CAP: $4.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	9.7	18.8	18.8
Other	1207.9	746.4	671.7
Current Assets	1217.6	765.2	690.5
Accts Payable	360.5	278.1	146.8
Debt Due	572.7	888.9	980.4
Other	256.2	310.2	260.4
Current Liab.	1189.4	1477.2	1387.6
Fix. Chg. Cov.	540%	390%	405%

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	- -	7.0%	*9.5%*
"Cash Flow"	- -	7.0%	*9.0%*
Earnings	- -	6.0%	*3.5%*
Dividends	- -	8.5%	*2.5%*
Book Value	- -	4.5%	*4.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	625.3	315.6	273.9	593.8	1808.6
2022	971.5	428.9	359.4	818.2	2578.0
2023	1032.1	398.1	335.8	606.0	2372.0
2024	758.3	354.1	340.4	***617.2***	***2070***
2025	***800***	***375***	***350***	***675***	***2200***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.79	.56	.38	1.12	3.85
2022	1.83	.59	.44	1.23	4.08
2023	1.84	.58	.45	1.27	4.14
2024	1.75	.48	.34	***1.28***	***3.85***
2025	***1.84***	***.53***	***.38***	***1.30***	***4.05***

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.54	.54	.54	.54	2.16
2021	.58	.58	.58	.58	2.32
2022	.62	.62	.62	.62	2.48
2023	.65	.65	.65	.65	2.60
2024	.66	.66	.66	.66	

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	34.92	29.62	27.30	29.43	31.08	31.32	28.78	33.72	46.58	41.95	***36.65***	***38.95***	Revenues per sh	***70.15***
	4.52	4.82	5.43	5.96	6.32	6.96	7.36	7.71	8.13	9.04	***9.10***	***9.45***	"Cash Flow" per sh	***13.95***
	2.07	2.24	2.65	3.02	3.25	3.51	3.68	3.85	4.08	4.14	***3.85***	***4.05***	Earnings per sh [A]	***5.00***
	.84	1.20	1.40	1.68	1.84	2.00	2.16	2.32	2.48	2.60	***2.64***	***2.68***	Div'ds Decl'd per sh [B]■	***2.85***
	5.70	5.63	5.91	6.81	7.50	7.91	8.87	9.23	11.01	11.79	***12.10***	***12.30***	Cap'l Spending per sh	***12.60***
	34.45	35.24	36.12	37.47	38.86	40.35	42.01	43.81	46.69	48.91	***51.75***	***55.95***	Book Value per sh	***60.20***
	52.08	52.26	52.28	52.31	52.57	52.77	53.17	53.63	55.35	56.55	***56.50***	***56.50***	Common Shs Outst'g [C]	***57.00***
	17.8	19.8	22.7	23.5	23.1	25.3	21.7	18.9	19.9	18.0	*Bold figures are*		Avg Ann'l P/E Ratio	***18.0***
	.94	1.00	1.19	1.18	1.25	1.35	1.11	1.02	1.16	1.01	*Value Line*		Relative P/E Ratio	***1.00***
	2.3%	2.7%	2.3%	2.4%	2.5%	2.3%	2.7%	3.2%	3.1%	3.5%	*estimates*		Avg Ann'l Div'd Yield	***3.2%***
	1818.9	1547.7	1427.2	1539.6	1633.7	1652.7	1530.3	1808.6	2578.0	2372.0	***2070***	***2200***	Revenues ($mill)	***4000***
	109.8	119.0	140.1	159.9	172.2	186.7	196.4	206.4	221.7	231.2	***220***	***230***	Net Profit ($mill)	***285***
	38.4%	38.0%	37.8%	36.4%	23.7%	18.7%	17.5%	16.3%	17.3%	14.9%	***16.5%***	***16.5%***	Income Tax Rate	***20.0%***
	6.0%	7.7%	9.8%	10.4%	10.5%	11.3%	12.8%	11.4%	8.6%	9.7%	***10.6%***	***10.5%***	Net Profit Margin	***7.1%***
	40.1%	39.5%	38.7%	37.8%	38.6%	37.7%	41.5%	61.1%	50.7%	43.8%	***46.0%***	***45.0%***	Long-Term Debt Ratio	***51.0%***
	59.9%	60.5%	61.3%	62.2%	61.4%	62.3%	58.5%	38.9%	49.3%	56.2%	***54.0%***	***55.0%***	Common Equity Ratio	***49.0%***
	2995.3	3042.9	3080.7	3153.5	3328.1	3415.5	3815.7	6032.9	5246.2	4926.3	***5415***	***5750***	Total Capital ($mill)	***7000***
	3293.7	3511.9	3731.6	4007.6	4283.7	4565.2	4867.1	5190.8	5628.8	6135.2	***6650***	***7025***	Net Plant ($mill)	***8200***
	4.4%	4.7%	5.2%	5.8%	5.9%	6.4%	6.0%	3.9%	5.0%	5.9%	***5.5%***	***5.5%***	Return on Total Cap'l	***5.5%***
	6.1%	6.5%	7.4%	8.2%	8.4%	8.8%	8.8%	8.8%	8.6%	8.4%	***7.5%***	***7.5%***	Return on Shr. Equity	***8.5%***
	6.1%	6.5%	7.4%	8.2%	8.4%	8.8%	8.8%	8.8%	8.6%	8.4%	***7.5%***	***7.5%***	Return on Com Equity	***8.5%***
	3.7%	3.1%	3.5%	3.7%	3.7%	3.8%	3.7%	3.5%	3.4%	3.2%	***2.5%***	***2.5%***	Retained to Com Eq	***3.5%***
	40%	53%	52%	55%	56%	56%	58%	60%	60%	62%	***68%***	***66%***	All Div'ds to Net Prof	***57%***

BUSINESS: ONE Gas, Inc. provides natural gas distribution services to more than two million customers. There are three divisions: Oklahoma Natural Gas, Kansas Gas Service, and Texas Gas Service. The company purchased 160 Bcf of natural gas supply in 2023, compared to 165 Bcf in 2022. Total volumes delivered by customer (fiscal 2023): transportation, 59.3%; residential, 29.7%; commercial & industrial, 10.6%; other, .4%. ONE Gas has around 3,900 employees. BlackRock owns 14.5% of common stock; The Vanguard Group, 11.6%; American Century Investment, 7.5%; officers and directors, 1.5% (4/24 Proxy). CEO: Robert S. McAnnally. Incorporated: Oklahoma. Address: 15 East Fifth Street, Tulsa, Oklahoma 74103. Tel.: 918-947-7000. Internet: www.onegas.com.

ONE Gas appears to be headed for a down year. Indeed, through the first nine months, profits of $2.57 per share were 10.5% below the $2.87 figure that was generated for the same period in 2023. That partly reflected higher employee-related costs, stemming from planned investments in the company's workforce and ongoing in-sourcing efforts. Depreciation & amortization expense increased, too, given additional capital investments. Moreover, sales volumes declined and interest charges climbed. But new rates aided results to a certain degree during the period. Although we do not anticipate any big problems for ONE Gas in the fourth quarter, the bottom line stands to end up around $3.85 a share for the whole year. That would indicate a 7% decrease from 2023's $4.14 tally. But concerning 2025, a 5% or so recovery, to $4.05 per share, seems plausible, assuming that the operating environment is generally favorable.

Business prospects out to 2027-2029 look promising. The company is the leading natural gas distributor, as measured by number of customers, in both Oklahoma and Kansas, and holds the number-three position in Texas. Furthermore, we believe these markets have decent growth potential and are located in one of the most active drilling areas in the United States. Also, supported by the sound finances, ONE Gas ought to continue to satisfy its obligations (including capital expenditures and working capital requirements) with little trouble.

There are risk factors to consider, though. The company's lack of geographic diversification leaves it somewhat more vulnerable to regional economic downturns and regulations. Moreover, there's competition from other energy suppliers, such as propane dealers and electric companies. Finally, pipeline ruptures, leaks, and other unfortunate events can take a major toll on earnings if not adequately covered by insurance.

What about the stock? The dividend yield looks respectable when stacked against other equities in *Value Line's* Natural Gas Utility Industry. However, capital gains possibilities over the 3- to 5-year span are unspectacular, at the recent quotation. These shares are untimely, too.

Frederick L. Harris, III November 22, 2024

(A) Diluted EPS. Excludes nonrecurring gain: 2017, $0.06. Next earnings report due early Feb. Quarterly EPS figures for 2022 don't equal total due to rounding.
(B) Dividends historically paid in early March, June, Sept., and Dec. ■ Dividend reinvestment plan. Direct stock purchase plan.
(C) In millions.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	40
Earnings Predictability	100

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P.S. ENTERPRISE GP. NYSE-PEG

RECENT PRICE **90.42** | P/E RATIO **23.1** (27.2 / 16.0) | RELATIVE P/E RATIO **1.27** | DIV'D YLD **2.8%** | **VALUE LINE**

TIMELINESS 4 Lowered 2/9/24
SAFETY 1 Raised 11/23/12
TECHNICAL 3 Raised 10/25/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

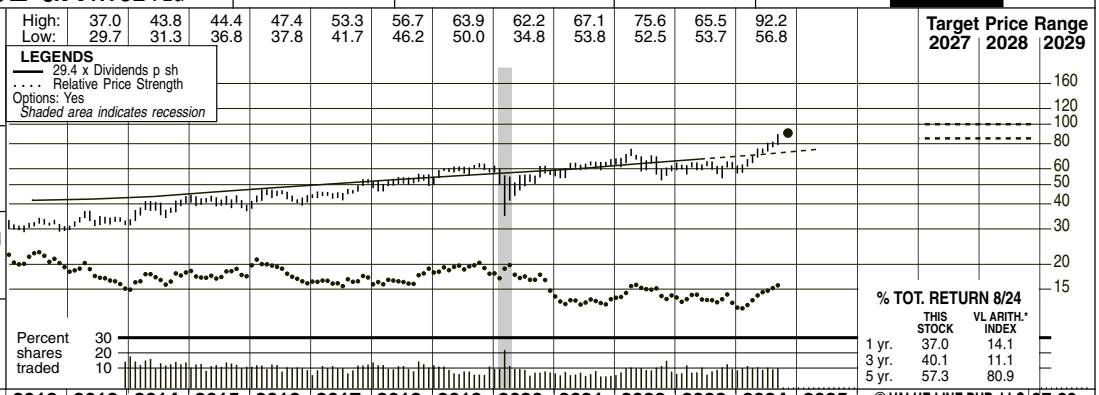
Low-High	Midpoint (% to Mid)
$62-$102	$82 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	100	(+10%)	*4%*
Low	85	(-5%)	*Nil*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	493	461	548
to Sell	385	444	409
Hld's(000)	370095	368330	373869



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
27.94	24.57	23.31	22.42	19.33	19.71	21.52	20.61	18.22	18.14	19.24	19.99	19.05	19.29	19.72	22.56	***20.95***	***23.00***	Revenues per sh	***26.75***
4.68	4.98	5.27	5.36	4.87	5.17	5.82	5.75	5.07	5.30	5.81	6.14	6.37	6.46	6.08	6.16	***6.55***	***7.15***	"Cash Flow" per sh	***8.60***
2.90	3.08	3.07	3.11	2.44	2.45	2.99	2.91	2.83	2.82	3.12	3.28	3.43	3.65	3.47	3.48	***3.65***	***4.15***	Earnings per sh [A]	***5.10***
1.29	1.33	1.37	1.37	1.42	1.44	1.48	1.56	1.64	1.72	1.80	1.88	1.96	2.04	2.16	2.28	***2.40***	***2.56***	Div'd Decl'd per sh [B] ■	***3.08***
3.50	3.55	4.27	4.12	5.09	5.56	5.58	7.65	8.32	8.30	7.76	6.28	5.80	5.39	5.81	6.68	***7.20***	***7.50***	Cap'l Spending per sh	***9.00***
15.36	17.37	19.04	20.30	21.31	22.95	24.09	25.86	26.01	27.42	28.53	29.94	31.71	28.65	27.62	31.08	***32.45***	***34.15***	Book Value per sh [C]	***40.50***
506.02	505.99	505.97	505.95	505.89	505.86	505.84	505.28	504.87	505.00	504.00	504.00	504.00	504.00	497.00	498.00	***499.00***	***500.00***	Common Shs Outst'g [D]	***505.00***
13.6	10.0	10.4	10.4	12.8	13.5	12.6	14.1	15.3	16.3	16.6	18.0	15.7	16.8	18.5	17.7	***Bold figures are Value Line estimates***		Avg Ann'l P/E Ratio	***18.0***
.82	.67	.66	.65	.81	.76	.66	.71	.80	.82	.90	.96	.81	.91	1.07	.99			Relative P/E Ratio	***1.00***
3.3%	4.3%	4.3%	4.2%	4.6%	4.4%	3.9%	3.8%	3.8%	3.7%	3.5%	3.2%	3.6%	3.3%	3.4%	3.7%			Avg Ann'l Div'd Yield	***3.4%***
10886	10415	9198.0	9161.0	9696.0	10076	9603.0	9722.0	9800.0	11237	***10450***	***11500***	Revenues ($mill)	***13500***
1518.0	1476.0	1436.0	1431.0	1582.0	1666.0	1741.0	1853.0	1739.0	1742.0	***1835***	***2085***	Net Profit ($mill)	***2590***
38.2%	37.4%	31.7%	37.3%	23.7%	32.2%	14.3%	19.5%	13.7%	10.1%	***20.0%***	***20.0%***	Income Tax Rate	***20.0%***
4.5%	6.2%	8.4%	10.6%	8.7%	6.5%	7.0%	5.5%	5.1%	5.3%	***5.0%***	***5.0%***	AFUDC % to Net Profit	***5.0%***
40.4%	40.3%	45.3%	46.6%	47.8%	47.7%	47.6%	51.3%	54.6%	53.5%	***54.5%***	***54.5%***	Long-Term Debt Ratio	***56.0%***
59.6%	59.7%	54.7%	53.4%	52.2%	52.3%	52.4%	48.7%	45.4%	46.5%	***45.5%***	***45.5%***	Common Equity Ratio	***44.0%***
20446	21900	24025	25915	27545	28832	30480	29657	30224	33261	***35425***	***37500***	Total Capital ($mill)	***46300***
23589	26539	29286	31797	34363	35844	37585	34366	35942	38031	***40250***	***42400***	Net Plant ($mill)	***51400***
8.4%	7.6%	6.8%	6.4%	6.7%	6.7%	6.6%	7.1%	6.7%	6.4%	***6.0%***	***6.5%***	Return on Total Cap'l	***6.5%***
12.5%	11.3%	10.9%	10.3%	11.0%	11.0%	10.9%	12.8%	12.7%	11.3%	***11.5%***	***12.0%***	Return on Shr. Equity	***12.5%***
12.5%	11.3%	10.9%	10.3%	11.0%	11.0%	10.9%	12.8%	12.7%	11.3%	***11.5%***	***12.0%***	Return on Com Equity [E]	***12.5%***
6.3%	5.3%	4.6%	4.1%	4.7%	4.7%	4.7%	5.7%	4.8%	3.9%	***4.0%***	***4.5%***	Retained to Com Eq	***5.0%***
49%	53%	58%	61%	58%	57%	57%	56%	62%	65%	***65%***	***62%***	All Div'ds to Net Prof	***61%***

CAPITAL STRUCTURE as of 6/30/24
Total Debt $21398 mill. **Due in 5 Yrs** $6950 mill.
LT Debt $18419 mill. **LT Interest** $765 mill.
(Total Interest coverage: 3.0x)

Leases, Uncapitalized Annual rentals $35 mill.

Pension Assets-12/23 $4140 mill.
Oblig. $4758 mill.

Pfd Stock None

Common Stock 498,161,668 shs.
as of 7/16/24
MARKET CAP: $45.0 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+1.3	+1.6	-4.2
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH(¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (avg.)	+.9	+.9	+.9
Fixed Charge Cov. (%)	403	297	285

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	- -	2.0%	*4.5%*
"Cash Flow"	2.0%	3.0%	*5.5%*
Earnings	3.0%	4.0%	*6.5%*
Dividends	4.5%	4.5%	*6.0%*
Book Value	3.0%	1.5%	*5.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2889	1874	1903	3056	9722
2022	2313	2076	2272	3139	9800
2023	3755	2421	2456	2605	11237
2024	2760	2423	***2590***	***2677***	***10450***
2025	***3075***	***2575***	***2825***	***3025***	***11500***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.28	.70	.98	.69	3.65
2022	1.33	.64	.86	.64	3.47
2023	1.39	.70	.85	.54	3.48
2024	1.31	.63	***.91***	***.80***	***3.65***
2025	***1.40***	***.80***	***1.07***	***.88***	***4.15***

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.49	.49	.49	.49	1.96
2021	.51	.51	.51	.51	2.04
2022	.54	.54	.54	.54	2.16
2023	.57	.57	.57	.57	2.28
2024	.60	.60	.60		

BUSINESS: Public Service Enterprise Group Inc. (PSEG) is a holding company for Public Service Electric and Gas Company (PSE&G), which serves 2.4 million electric and 1.9 million gas customers in NJ, and PSEG Power LLC, a nonregulated power generator with 5 nuclear plants in the Northeast (sold fossil-fuel generation, 2/22). Divested offshore wind assets (5/23). Percentage of electric sales: Commercial (58%); Residential (33%); Industrial (9%). Fuel costs: 41% of revenues. '23 reported depreciation rates (utility): 1.84%-2.54%. Employs approximately 12,500. Chair of the Board, President and CEO: Ralph A. LaRossa. Inc.: New Jersey. Address: 80 Park Plaza, P.O. Box 1171, Newark, New Jersey 07101-1171. Tel.: 973-430-7000. Internet: www.pseg.com.

Public Service Enterprise Group is the top-performing electric utility stock after becoming something of a play on artificial intelligence (AI). The equity has delivered 51% in total return this year, well over double its utility industry median. Solid financials, little debt coming due in the next few years, and no near-term need to float more equity are positives here. The lower risk of an almost pure-play utility is also a plus. PSEG's only significant business held outside of the regulatory pricing umbrella is its nuclear fleet, and herein lies the play on AI and higher power pricing. PSEG operates three plants in New Jersey and has a 50% stake in two Pennsylvania reactors. Nuclear generation is increasingly being viewed as a key noncarbon-emitting contributor to future domestic energy needs. Big Tech firms seeking reliable nonemitting power for their energy-hungry data centers are lining up long-term deals with electric utilities that have nuclear generating capacity. Meantime, the supply side of the clean-energy equation hasn't been keeping up with demand, so power prices are rising.

The utility's intermediate-term profitability has likely taken a significant step up recently due to a sharp rise in auctioned peak-power contracts. There are numerous moving parts in the supply-demand equation for reliably generated power across the Mid-Atlantic and contiguous states that can be delivered on the hottest and coldest days of the year. On the demand side, trends in rising electrification, such as in the transport system, and higher data center demand are factors. On the supply side, aged natural gas and coal generating capacity has not been sufficiently invested in to remain as reliable as it once was. As a result, electric power from sources deemed reliable and available at peak-demand periods is up nearly fivefold in price starting in 2025-2026. It's a good time to have spare nuclear capacity available or to be renegotiating long-term power supply contracts. We've lifted our 2025 share-earnings call by a quarter as a result.

At the recent quote, the solid prospects we foresee for PSEG appear to be largely priced into the equity.

Anthony J. Glennon *November 8, 2024*

(A) Diluted EPS. Excl. nonrec. gains/(losses): '08, (96¢); '09, 6¢; '11, (34¢); '12, 7¢; '15, 39¢; '16, ($1.08); '17, 28¢ (net); '18, (29¢); '19, 5¢; '20, 33¢; '21, ($4.94); '22, ($1.41); '23, $1.65; disc. ops.: '08, 40¢; '10, 1¢; '11, 19¢. Next earnings report due in early February.
(B) Div'ds historically paid in late Mar., June, Sept., & Dec. ■ Div'd reinvestment plan avail.
(C) Incl. intangibles. In '23: $13.36/sh.
(D) In mill., adj. for '08 split. **(E)** Rate base: Net original cost. Rate allowed on common equity in '21: 9.9%-10.4%; Regulatory Climate: Avg.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	60
Earnings Predictability	100

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PORTLAND GENERAL NYSE-POR

RECENT PRICE **46.27** | P/E RATIO **15.5** (Trailing: 15.3 Median: 18.0) | RELATIVE P/E RATIO **0.85** | DIV'D YLD **4.5%** | **VALUE LINE**

TIMELINESS 4 Raised 5/10/24
SAFETY 2 Raised 7/19/24
TECHNICAL 2 Raised 10/18/24
BETA .95 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$39-$60 $50 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	75	(+60%)	*16%*
Low	55	(+20%)	*9%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	213	186	240
to Sell	164	188	144
Hld's(000)	103294	102071	106708

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	33.3	40.3	41.0	45.2	50.1	50.4	58.4	63.1	53.1	57.0	51.6	49.4								
Low:	27.4	29.0	33.0	35.3	42.4	39.0	44.0	32.0	40.8	41.6	38.0	39.1								
	27.89	23.99	23.67	24.06	23.89	23.18	24.29	21.38	21.62	22.54	22.30	23.75	23.96	26.80	29.65	28.90	*31.25*	*31.60*	Revenues per sh	*34.55*
	4.71	4.07	4.82	4.96	5.15	4.93	6.08	5.37	5.78	6.16	6.65	6.97	7.83	7.25	7.41	6.83	*7.90*	*8.30*	"Cash Flow" per sh	*10.00*
	1.39	1.31	1.66	1.95	1.87	1.77	2.18	2.04	2.16	2.29	2.37	2.39	2.75	2.72	2.74	2.38	*3.10*	*3.25*	Earnings per sh A	*3.85*
	.97	1.01	1.04	1.06	1.08	1.10	1.12	1.18	1.26	1.34	1.43	1.52	1.59	1.70	1.79	1.88	*1.98*	*2.08*	Div'd Decl'd per sh B ■ †	*2.46*
	6.12	9.25	5.97	3.98	4.01	8.40	12.87	6.73	6.57	5.77	6.67	6.78	8.76	7.11	8.58	13.42	*12.60*	*11.30*	Cap'l Spending per sh	*12.25*
	21.64	20.50	21.14	22.07	22.87	23.30	24.43	25.43	26.35	27.11	28.07	28.99	29.18	30.28	31.13	32.81	*34.20*	*35.50*	Book Value per sh C	*39.95*
	62.58	75.21	75.32	75.36	75.56	78.09	78.23	88.79	88.95	89.11	89.27	89.39	89.54	89.41	89.28	101.16	*104.00*	*106.00*	Common Shs Outst'g D	*110.00*
	16.3	14.4	12.0	12.4	14.0	16.9	15.3	17.7	19.1	20.0	18.4	22.3	16.6	17.7	18.2	19.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.5*
	.98	.96	.76	.78	.89	.95	.81	.89	1.00	1.01	.99	1.19	.85	.96	1.05	1.08			Relative P/E Ratio	*.90*
	4.3%	5.4%	5.2%	4.4%	4.1%	3.7%	3.3%	3.3%	3.1%	2.9%	3.3%	2.8%	3.5%	3.5%	3.6%	4.1%			Avg Ann'l Div'd Yield	*3.9%*
							1900.0	1898.0	1923.0	2009.0	1991.0	2123.0	2145.0	2396.0	2647.0	2923.0	*3250*	*3350*	Revenues ($mill)	*3800*
							175.0	172.0	193.0	204.0	212.0	214.0	247.0	244.0	245.0	233.0	*320*	*340*	Net Profit ($mill)	*425*
							26.0%	20.7%	20.6%	25.3%	7.4%	11.2%	12.4%	8.6%	15.2%	16.8%	*17.5%*	*17.5%*	Income Tax Rate	*17.5%*
							33.7%	19.8%	16.6%	8.8%	8.0%	7.0%	9.7%	10.2%	8.6%	13.7%	*11.0%*	*11.0%*	AFUDC % to Net Profit	*11.0%*
							52.7%	47.8%	48.4%	50.1%	46.5%	51.3%	53.6%	56.8%	57.0%	55.8%	*57.5%*	*58.0%*	Long-Term Debt Ratio	*59.0%*
							47.3%	52.2%	51.6%	49.9%	53.5%	48.7%	46.4%	43.2%	43.0%	44.2%	*42.5%*	*42.0%*	Common Equity Ratio	*41.0%*
							4037.0	4329.0	4544.0	4842.0	4684.0	5323.0	5628.0	6265.0	6459.0	7513.0	*8325*	*9000*	Total Capital ($mill)	*10900*
							5679.0	6012.0	6434.0	6741.0	6887.0	7161.0	7539.0	8005.0	8465.0	9546.0	*10350*	*11000*	Net Plant ($mill)	*12900*
							5.8%	5.4%	5.6%	5.5%	5.8%	5.1%	5.6%	4.9%	4.9%	4.2%	*5.0%*	*5.0%*	Return on Total Cap'l	*5.0%*
							9.2%	7.6%	8.2%	8.4%	8.5%	8.3%	9.5%	9.0%	8.8%	7.0%	*9.0%*	*9.0%*	Return on Shr. Equity	*9.5%*
							9.2%	7.6%	8.2%	8.4%	8.5%	8.3%	9.5%	9.0%	8.8%	7.0%	*9.0%*	*9.0%*	Return on Com Equity E	*9.5%*
							4.6%	3.3%	3.5%	3.6%	3.5%	3.1%	4.1%	3.5%	3.1%	1.6%	*3.0%*	*3.5%*	Retained to Com Eq	*3.5%*
							50%	56%	57%	58%	59%	63%	57%	61%	64%	77%	*64%*	*64%*	All Div'ds to Net Prof	*64%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $4740 mill. **Due in 5 Yrs** $570 mill.
LT Debt $4636 mill. **LT Interest** $190 mill.
Incl. $283 mill. finance leases.
(Total Interest Coverage: 2.7x)
Leases, Uncapitalized Annual rentals $3 mill.
Pension Assets-12/23 $530 mill.
Oblig $690 mill.
Pfd Stock None

Common Stock 103,066,683 shs.
as of 7/19/24

MARKET CAP: $4.8 billion (Mid Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+5.1	+3.4	+.9
Avg. Indust. Use (MWH)	20002	22097	23052
Avg. Indust. Revs. per KWH (¢)	5.22	5.23	5.85
Capacity at Peak (MW)	NA	NA	NA
Peak Load, Summer (MW)	4453	4255	4498
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+.6	+1.1	+.7
Fixed Charge Cov. (%)	261	254	217

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	2.0%	5.0%	*3.5%*
"Cash Flow"	3.5%	3.0%	*6.0%*
Earnings	3.5%	3.0%	*6.0%*
Dividends	5.0%	6.0%	*5.5%*
Book Value	3.5%	3.0%	*4.0%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	609	537	642	608	2396
2022	626	591	743	687	2647
2023	748	648	802	725	2923
2024	929	758	*838*	*725*	*3250*
2025	*875*	*785*	*880*	*810*	*3350*

EARNINGS PER SHARE A

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.07	.36	.56	.73	2.72
2022	.67	.72	.65	.70	2.74
2023	.80	.44	.46	.67	2.38
2024	1.21	.69	*.60*	*.60*	*3.10*
2025	*1.10*	*.70*	*.75*	*.70*	*3.25*

QUARTERLY DIVIDENDS PAID B ■ †

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.385	.385	.385	.4075	1.56
2021	.4075	.4075	.43	.43	1.68
2022	.43	.43	.4525	.4525	1.77
2023	.4525	.4525	.475	.475	1.86
2024	.475	.475	.50	.50	

BUSINESS: Portland General Electric Company provides electricity to 934,000 customers in 51 cities in a 4,000-square-mile area of Oregon, including Portland and Salem (population: 1.9 million). The company is in the process of decommissioning the Trojan nuclear plant, which was closed in 1993. Electric revenue breakdown: residential, 52%; commercial, 33%; industrial, 15%; other, less than 1%. Generating sources: gas, 40%; wind, 7%; coal, 8%; hydro, 4%; purchased, 41%. Fuel costs: 40% of revenues. '23 reported depreciation rate: 3.4%. Has 2,842 full-time employees. Chair: James P. Torgerson. President and CEO: Maria M. Pope. Incorporated: Oregon. Address: 121 S.W. Salmon Street, Portland, OR 97204. Tel.: 503-464-8000. Internet: www.portlandgeneral.com.

Portland General Electric posted stout first-half profits and looks on target for a sizable earnings gain this year. Granted, 2023 comparisons were relatively easy to surpass, as volumes suffered from mild weather. At the same time, purchased-power costs were exceptionally high. This year, the weather situation has improved, and volumes are on the rise from strong demand growth from the semiconductor industry and data centers, too. It has also been a plus that Portland General is becoming less reliant on volatile at-the-market purchased power. The company brought its Clearwater Wind development project on line in January. Portland General has been following a formula where new renewable capacity additions are half company owned with the remainder of the generation coming from a strategic partner under stable long-term purchased-power agreements.

Higher electric delivery rates should lift earnings further in 2025. In late February, the utility filed a general rate case with Oregon regulators. Portland General is seeking an 8.6% hike in rates for recoupment of investments made, plus timely recovery mechanisms via customer billing pass-throughs. We're expecting a constructive outcome. A regulatory decision is due by the end of this year, with new prices effective starting from January 1st of 2025.

Longer-term prospects look good. On the demand side, Portland General should benefit from 2%-3% annual load growth, supported by a healthy high-tech industrial segment in its service area. Profitability ought to be on the rise, as the company continues to reduce its reliance on open-market power purchases, which are vulnerable to price spikes during periods of high demand or constrained supply. The company has the green light from regulators to add more nonemitting annual power generation, plus significant battery storage capacity. Out to late decade, 5%-7% annual earnings growth looks doable.

Patient utility investors may find this equity of interest. Portland General's yield is 80 basis points above the peer-group median. Meanwhile, annual total return prospects appear worthwhile over the three- to five-year horizon.

Anthony J. Glennon *October 18, 2024*

(A) Diluted earnings. Excl. nonrecurring gains/(losses): '13, (42¢); '17, (19¢); '20, ($1.03); '22, (14¢); '23, (5¢); Q1-Q2 '24, (13¢). Quarterly EPS many not sum to full year due to rounding. Next earnings report due late Oct. **(B)** Dividends paid mid-Jan., Apr., July, and Oct. ■ Dividend reinvestment plan available. † Shareholder investment plan available. **(C)** Incl. deferred charges. In '23: $492 mill., $4.86/sh. **(D)** In mill. **(E)** Rate base: Net original cost. Rate allowed on common equity in '22: 9.5%. Regulatory Climate: Average.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	45
Earnings Predictability	90

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PPL CORPORATION NYSE-PPL

RECENT PRICE **32.71** | P/E RATIO **19.5** (18.7 / 15.0) | RELATIVE P/E RATIO **1.07** | DIV'D YLD **3.1%** | **VALUE LINE**

TIMELINESS 4 Lowered 5/17/24
SAFETY 2 Raised 8/9/24
TECHNICAL 3 Lowered 11/1/24
BETA 1.10 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$24-$37 $31 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	45	(+40%)	*13%*
Low	35	(+5%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	314	325	327
to Sell	396	382	359
Hld's(000)	569058	547034	567935

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	33.6	38.1	36.7	39.9	40.2	32.5	36.3	36.8	30.7	31.0	31.7	33.4								
Low:	28.4	29.4	29.2	32.1	30.7	25.3	27.8	18.1	26.2	23.5	22.2	25.3								
	21.47	20.03	17.63	22.02	21.11	18.82	17.27	11.38	11.06	10.74	10.81	10.13	9.89	7.87	10.73	11.28	***11.10***	***11.40***	Revenues per sh	***12.35***
	4.71	3.47	3.66	4.59	4.84	4.64	4.58	3.78	4.28	3.68	4.16	3.94	3.81	2.07	3.09	3.44	***3.55***	***3.70***	"Cash Flow" per sh	***4.10***
	2.45	1.19	2.29	2.61	2.61	2.38	2.38	2.37	2.79	2.11	2.58	2.37	2.04	.53	1.41	1.60	***1.70***	***1.85***	Earnings per sh [A]	***2.25***
	1.34	1.38	1.40	1.40	1.44	1.47	1.49	1.50	1.52	1.58	1.64	1.65	1.66	1.66	.88	.95	***1.03***	***1.10***	Div'd Decl'd per sh [B] ■	***1.40***
	3.79	3.25	3.30	4.30	5.34	6.68	6.14	5.24	4.30	4.52	4.50	4.02	4.23	2.68	2.93	3.24	***3.65***	***3.70***	Cap'l Spending per sh	***4.00***
	13.55	14.57	16.98	18.72	18.01	19.78	20.47	14.72	14.56	15.52	16.18	16.93	17.39	18.67	18.89	18.90	***19.85***	***20.55***	Book Value per sh [C]	***23.45***
	374.58	377.18	483.39	578.41	581.94	630.32	665.85	673.86	679.73	693.40	720.32	767.23	768.91	735.11	736.49	737.13	***737.20***	***737.40***	Common Shs Outst'g [D]	***738.00***
	17.6	25.7	11.9	10.5	10.9	12.8	14.1	13.9	12.8	17.6	11.3	13.3	13.9	54.1	20.0	16.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***17.0***
	1.06	1.71	.76	.66	.69	.72	.74	.70	.67	.89	.61	.71	.71	2.92	1.16	.93			Relative P/E Ratio	***.95***
	3.1%	4.5%	5.1%	5.1%	5.1%	4.8%	4.4%	4.5%	4.2%	4.2%	5.6%	5.2%	5.8%	5.8%	3.1%	3.5%			Avg Ann'l Div'd Yield	***3.4%***
							11499	7669.0	7517.0	7447.0	7785.0	7769.0	7607.0	5783.0	7902.0	8312.0	***8200***	***8400***	Revenues ($mill)	***9100***
							1583.0	1603.0	1902.0	1449.0	1827.0	1746.0	1571.0	401.0	756.0	740.0	***1255***	***1365***	Net Profit ($mill)	***1660***
							33.0%	22.5%	25.4%	24.2%	20.0%	19.0%	20.3%	23.0%	22.0%	19.9%	***21.0%***	***21.0%***	Income Tax Rate	***21.0%***
							2.8%	1.6%	1.6%	1.9%	2.0%	1.9%	1.8%	6.0%	.7%	1.6%	***2.0%***	***2.0%***	AFUDC % to Net Profit	***2.0%***
							58.0%	65.2%	64.3%	64.8%	63.3%	61.5%	61.7%	43.7%	48.1%	51.1%	***51.0%***	***51.0%***	Long-Term Debt Ratio	***49.5%***
							42.0%	34.8%	35.7%	35.2%	36.7%	38.5%	38.3%	56.3%	51.9%	48.8%	***49.0%***	***49.0%***	Common Equity Ratio	***50.5%***
							32484	28482	27707	30608	31726	33712	34926	24389	26804	28544	***29875***	***30925***	Total Capital ($mill)	***34280***
							34597	30382	30074	33092	34458	36482	38892	25470	30238	31418	***31900***	***32700***	Net Plant ($mill)	***34900***
							6.5%	7.1%	8.4%	6.2%	7.2%	6.6%	5.9%	2.6%	2.8%	2.6%	***5.5%***	***5.5%***	Return on Total Cap'l	***6.5%***
							11.6%	16.2%	19.2%	13.5%	15.7%	13.4%	11.7%	2.9%	5.4%	5.3%	***8.5%***	***8.5%***	Return on Shr. Equity	***9.5%***
							11.6%	16.2%	19.2%	13.5%	15.7%	13.4%	11.7%	2.9%	5.4%	5.3%	***8.5%***	***8.5%***	Return on Com Equity [E]	***9.5%***
							4.5%	6.0%	8.8%	3.5%	6.0%	4.3%	2.2%	NMF	1.8%	1.6%	***3.5%***	***3.5%***	Retained to Com Eq	***3.5%***
							61%	63%	54%	74%	62%	68%	81%	NMF	76%	67%	***61%***	***61%***	All Div'ds to Net Prof	***60%***

CAPITAL STRUCTURE as of 6/30/24
Total Debt $16145 mill. **Due in 5 Yrs** $3613 mill.
LT Debt $15756 mill. **LT Interest** $427 mill.
Incl. 23 mill. units 7.75%, $25 liq. value; 82,000 units 8.23%, $1000 face value.
(LT interest earned: 3.5x)

Leases, Uncapitalized Annual rentals $24 mill.
Pension Assets-12/23 $3175 mill.
Oblig $3333 mill.
Pfd Stock None
Common Stock 737,773,304 shs.
as of 7/30/24
MARKET CAP: $24.1 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+3.0	+1.5	NA
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Winter (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	NA	NA	NA
Fixed Charge Cov. (%)	154	348	NA

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-7.5%	-3.0%	*5.0%*
"Cash Flow"	-6.0%	-8.5%	*3.0%*
Earnings	-9.0%	-17.0%	*7.5%*
Dividends	-1.0%	-4.5%	*-.5%*
Book Value	- -	4.0%	*3.0%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1498	1288	1512	1485	5783
2022	1782	1696	2134	2290	7902
2023	2415	1823	2043	2031	8312
2024	2304	1881	***1850***	***2165***	***8200***
2025	***2250***	***1700***	***2000***	***2450***	***8400***

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.26	d.20	.27	.19	.53
2022	.41	.30	.41	.28	1.41
2023	.48	.29	.43	.40	1.60
2024	.54	.38	***.40***	***.38***	***1.70***
2025	***.50***	***.40***	***.50***	***.45***	***1.85***

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.4125	.415	.415	.415	1.66
2021	.415	.415	.415	.415	1.66
2022	.415	.20	.225	.225	1.07
2023	.225	.24	.24	.24	.95
2024	.24	.258	.258		

BUSINESS: PPL Corporation (formerly PP&L Resources, Inc.) is a holding company for PPL Electric Utilities, which distributes electricity to 1.4 mill. customers in eastern & central Pennsylvania. Acquired Kentucky Utilities and Louisville Gas and Electric (1.3 mill. customers) 11/10. Acq'd Narragansett Electric (770,000 customers, renamed Rhode Island Energy) 5/22. Spun off power-generating sub. in '15. Sold electric distribution sub. in U.K. in '21. Electric rev. breakdown: res'l, 48%; comm'l, 22%; ind'l, 10%; other, 20%. Fuel costs: 29% of revs. '23 reported deprec. rate: 3.2%. Has 6,527 employees. Chairman: William H. Spence. President & CEO: Vincent Sorgi. Inc.: PA. Address: Two North Ninth St., Allentown, PA 18101-1179. Tel.: 800-345-3085. Internet: www.pplweb.com.

We look for PPL Corp. to end 2024 on a solid note. (The company was set to release third-quarter results after this issue went to press.) The utility should post profits of around $0.40 a share on revenues of $1.85 billion. Management reaffirmed its full-year profit range of $1.63-$1.75 per share with the August release of mid-2024 results. Our full-year profit estimate remains right near the midpoint of that range, within PPL's annual 6%-8% earnings growth target. The utility is benefiting from rate relief in Pennsylvania, Kentucky, and Rhode Island, along with increased demand and higher sales volumes. Plus, PPL is well on track to complete approximately $3.1 billion in infrastructure improvements this year to support cleaner energy.

We have raised our 2025 bottom-line estimate by $0.05 a share. We look for a sharper 8% advance next year, at the high end of PPL's annual growth target, as the utility is increasingly well-positioned to meet the growing demand for electricity. Investments with a focus on grid modernization and the clean energy transition, along with additional returns on capital investments, should also improve over that interim. Too, a full year of rate relief and lower operating and maintenance expenses will likely benefit prospects nicely next year. The utility plans to achieve over $150 million in cost savings through the end of 2025, largely due to infrastructure improvements.

These shares are up more than 10% in value since our early August report. Utility stocks have rallied nicely of late due to investor demand for stable income-paying assets as interest rates go lower. The stock is now up about 35% over the past year.

This issue is best suited for conservative investors seeking utility exposure. The stock's best feature remains its solid dividend yield of 3.1%. But, shares of PPL are ranked 4 (Below Average) for Timeliness, and are already trading within or near both our 18-month and 3- to 5-year Target Price Ranges, indicating pedestrian long-term total capital appreciation potential. Plus, for income-oriented accounts, many other electric utility stocks pay higher dividends.

Zachary J. Hodgkinson November 8, 2024

Company's Financial Strength	A+
Stock's Price Stability	75
Price Growth Persistence	15
Earnings Predictability	45

(A) Dil. EPS. Excl. nonrec. gain (losses): '10, (8¢); '11, 8¢; '13, (62¢); '20, (13¢); '21, (50¢); gains (losses) on disc. ops.: '08, 3¢; '09, (10¢); '10, (4¢); '12, (1¢); '14, 23¢; '15, ($1.36); '21, ($1.94). '20 & '21 EPS don't sum due to rounding. Next egs. rept. due early Feb. **(B)** Div'ds paid in early Jan., April, July, & Oct. ■ Div'd reinv. plan avail. **(C)** Incl. intang. In '23: $3.10/sh. **(D)** In mill. **(E)** Rate base: Fair val. Rate all'd on com. eq. in PA in '16: none spec.; in KY in '19: 9.725%; earned on avg. com. eq., '21: 2.8%. Reg. Clim.: Avg.

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SJW GROUP NYSE-SJW

RECENT PRICE 58.79 | P/E RATIO 19.0 (Trailing: 21.6 Median: 26.0) | RELATIVE P/E RATIO 1.03 | DIV'D YLD 2.7% | VALUE LINE

TIMELINESS 4 Raised 5/10/24
SAFETY 2 Raised 10/4/24
TECHNICAL 4 Raised 8/16/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

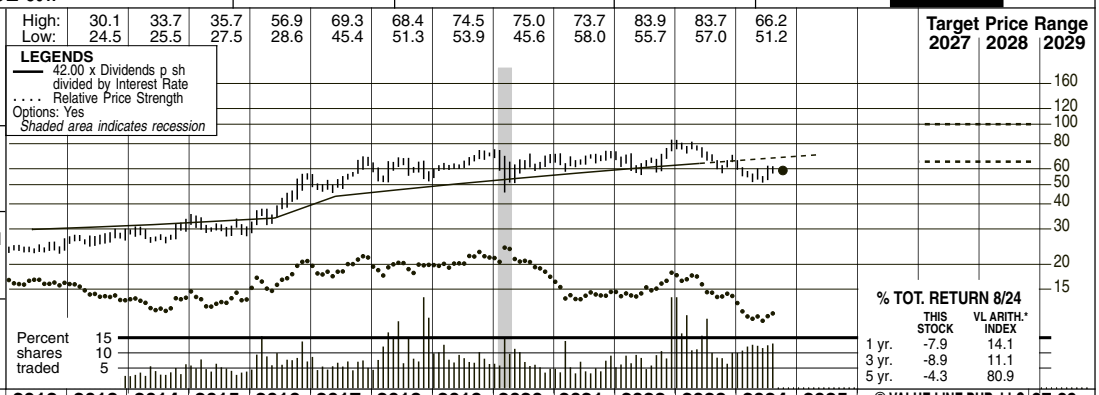
Low-High	Midpoint (% to Mid)
$50-$87	$69 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	95	(+60%)	*15%*
Low	70	(+20%)	*7%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	113	115	126
to Sell	106	114	104
Hld's(000)	24551	24459	24970



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
12.12	11.68	11.62	12.85	14.01	13.73	15.76	14.97	16.61	18.97	14.00	14.78	19.77	19.01	20.15	20.93	*22.35*	*24.05*	Revenues per sh	*26.15*
2.44	2.21	2.38	2.80	2.97	2.90	4.42	3.86	4.76	5.24	3.29	3.13	5.28	5.13	5.79	6.03	*4.50*	*4.85*	"Cash Flow" per sh	*5.20*
1.08	.81	.84	1.11	1.18	1.12	2.54	1.85	2.57	2.86	1.82	.82	2.14	2.03	2.43	2.68	*2.95*	*3.25*	Earnings per sh A	*3.55*
.65	.66	.68	.69	.71	.73	.75	.78	.81	1.04	1.12	1.20	1.28	1.36	1.44	1.52	*1.60*	*1.68*	Div'd Decl'd per sh BD■	*1.85*
3.79	3.17	5.65	3.75	5.67	4.68	5.02	5.24	6.95	7.26	5.08	6.25	7.44	8.32	7.85	9.01	*8.25*	*8.50*	Cap'l Spending per sh	*8.75*
13.99	13.66	13.75	14.20	14.71	15.92	17.75	18.83	20.61	22.57	31.31	31.27	32.12	34.28	36.06	38.52	*39.85*	*41.95*	Book Value per sh	*44.15*
18.18	18.50	18.55	18.59	18.67	20.17	20.29	20.38	20.46	20.52	28.40	28.46	28.56	30.18	30.80	32.02	*32.00*	*31.00*	Common Shs Outst'g C	*30.00*
26.2	28.7	29.1	21.2	20.4	24.3	11.2	16.6	15.7	18.8	32.7	78.8	30.0	32.9	27.3	26.4	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*23.0*
1.58	1.91	1.85	1.33	1.30	1.37	.59	.84	.82	.95	1.77	4.20	1.54	1.78	1.58	1.47			Relative P/E Ratio	*1.30*
2.3%	2.8%	2.8%	2.9%	3.0%	2.7%	2.6%	2.5%	2.0%	1.9%	1.9%	1.9%	2.0%	2.0%	2.2%	2.1%			Avg Ann'l Div'd Yield	*2.2%*
						319.7	305.1	339.7	389.2	397.7	420.5	564.5	573.7	620.7	670.4	*715*	*745*	Revenues ($mill)	*785*
						51.8	37.9	52.8	59.2	38.8	23.4	61.5	60.5	73.8	85.0	*95.0*	*100*	Net Profit ($mill)	*107*
						32.5%	38.1%	38.8%	36.7%	20.6%	26.4%	12.0%	12.2%	10.3%	6.5%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
						--	--	--	--	--	--	--	--	6.4%	6.4%	*1.5%*	*1.5%*	AFUDC % to Net Profit	*1.5%*
						51.6%	49.8%	50.7%	48.2%	32.7%	59.1%	58.4%	59.1%	57.3%	55.3%	*52.5%*	*50.0%*	Long-Term Debt Ratio	*43.0%*
						48.4%	50.2%	49.3%	51.8%	67.3%	40.9%	41.6%	40.9%	42.7%	44.7%	*47.5%*	*50.0%*	Common Equity Ratio	*57.0%*
						744.5	764.6	855.0	894.3	1320.7	2173.6	2204.7	2527.5	2602.8	2760.1	*2675*	*26/00*	Total Capital ($mill)	*2325*
						963.0	1036.8	1146.4	1239.3	1328.8	2206.5	2334.9	2497.5	2630.3	3155.6	*3200*	*3275*	Net Plant ($mill)	*2925*
						8.3%	6.3%	7.4%	7.9%	3.9%	1.8%	4.0%	3.5%	4.0%	4.3%	*4.0%*	*4.5%*	Return on Total Cap'l	*5.0%*
						14.4%	9.9%	12.5%	12.8%	4.4%	2.6%	6.7%	5.8%	6.6%	6.9%	*7.5%*	*7.5%*	Return on Shr. Equity	*8.0%*
						14.4%	9.9%	12.5%	12.8%	4.4%	2.6%	6.7%	5.8%	6.6%	6.9%	*7.5%*	*7.5%*	Return on Com Equity	*8.0%*
						10.2%	5.7%	8.6%	8.2%	1.8%	NMF	2.7%	2.0%	2.7%	3.0%	*3.5%*	*3.5%*	Retained to Com Eq	*4.0%*
						29%	42%	31%	36%	60%	NMF	59%	66%	59%	56%	*54%*	*52%*	All Div'ds to Net Prof	*52%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $1558.6 mill. **Due in 5 Yrs** $44.3 mill.
LT Debt $1549.6 mill. **LT Interest** $50.0 mill.
(LT Interest Coverage: 4.2x)
(55% of Cap'l)

Pension Assets-12/23 $285.5 mill.
Oblig. $297.8 mill.
Pfd Stock None.
Common Stock 32,669,000 shs.

MARKET CAP: $1.9 billion (Small Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	12.3	9.7	22.8
Accts Receivable	58.2	67.9	70.2
Other	84.2	120.8	80.2
Current Assets	154.7	198.4	173.2
Accts Payable	29.6	46.1	37.9
Debt Due	4.4	49.0	9.0
Other	230.7	247.9	303.2
Current Liab.	264.7	343.0	350.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	4.0%	4.0%	*4.0%*
"Cash Flow"	7.0%	5.0%	*-1.5%*
Earnings	7.5%	-.5%	*6.5%*
Dividends	7.5%	8.0%	*4.5%*
Book Value	9.5%	8.0%	*3.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	114.8	152.2	166.9	139.8	573.7
2022	124.3	149.0	176.0	171.4	620.7
2023	137.3	156.9	204.8	171.4	670.4
2024	149.4	176.2	*215*	*174.4*	*715*
2025	*155*	*185*	*225*	*180*	*745*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	.09	.69	.64	.60	2.03
2022	.12	.38	.82	1.09	2.43
2023	.37	.58	1.13	.59	2.68
2024	.36	.64	*1.20*	*.75*	*2.95*
2025	*.50*	*.70*	*1.25*	*.80*	*3.25*

Calendar	QUARTERLY DIVIDENDS PAID BD■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.32	.32	.32	.32	1.28
2021	.34	.34	.34	.34	1.36
2022	.36	.36	.36	.36	1.44
2023	.38	.38	.38	.38	1.52
2024	.40	.40	.40		

BUSINESS: SJW Group engages in the production, purchase, storage, purification, distribution, and retail sale of water. It provides water service to approximately 231,000 connections with a total population of roughly one million people in the San Jose area and 16,000 connections that reach about 49,000 residents in the region between San Antonio and Austin, Texas. The company merged with Connecticut Water (10/19) which provides service to approx. 138,000 connections with a total population of 450,000 people. Has 808 employees. Officers and directors own less than 1.0% of outstanding shares (3/24 proxy). Chairman & CEO: Eric Thornburg. Incorporated: California. Address: 110 West Taylor Street, San Jose, CA 95110. Telephone: (408) 279-7800. Internet: www.sjwater.com.

SJW Group's second-quarter financial results came in slightly ahead of consensus expectations. The company reported revenues of $176 million, driven largely by a combination of rate increases, customer growth, and higher water usage across several operating regions. Meanwhile, earnings came in four cents better than our call, at $0.64 per share, supported by strong revenues and lower administrative expenses. Both figures logged low-double-digit improvements versus the previous-year period. On balance, we are tacking $10 million and $0.05 on to our current-year top- and bottom-line estimates, to $715 million and $2.95 per share, respectively.

Some updates on the rate case front are worth highlighting. First, in California, recent discrepancies with the originally filed rate case for 2025-2027 have been resolved, and an updated case was submitted in August. This application, which is slated for a decision in the fourth quarter, proposes increased revenues of 11% in 2025, 4% in 2026, and 5% in 2027, along with a 3-year $540 million capital investment plan in San Jose. Elsewhere, regulators in Connecticut approved the rate case filed in late 2023, which would increase revenues by nearly 6%, with new customers rates effective as of July of this year.

Aggressive capital spending ought to remain a core strategy over the long haul. Year to date, management has utilized nearly half the $330 million capital expenditure budget on infrastructure and water supply upgrades. Over the next five years, the company plans to invest more than $1.6 billion on water delivery and wastewater treatment improvements. Moreover, the company's $100 million advanced metering infrastructure project is in full swing, with installations set to wrap up by 2026.

SJW Group's investment characteristics do not particularly jump off the page at the moment. The stock is ranked 4 (Below Average) for Timeliness. What's more, at the recent quotation, total return potential over both the 18-month and 3- to 5-year windows is roughly on par with the *Value Line* median. Thus, subscribers should probably take a pass, for now.

Nicholas Patrikis *October 4, 2024*

(A) Diluted earnings. Excludes nonrecurring losses: '08, $1.22; '10, $0.46. GAAP accounting as of 2013. Next earnings report due early November. Quarterly egs. may not add due to rounding.
(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions.
(D) Paid special dividend of $0.17 per share on 11/17.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	75
Earnings Predictability	50

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SOUTHERN COMPANY NYSE-SO

RECENT PRICE **91.79** | P/E RATIO **23.1** (19.1 / 17.0) | RELATIVE P/E RATIO **1.27** | DIV'D YLD **3.1%** | **VALUE LINE**

TIMELINESS 3 Raised 11/8/24
SAFETY 2 Lowered 2/21/14
TECHNICAL 3 Lowered 11/1/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

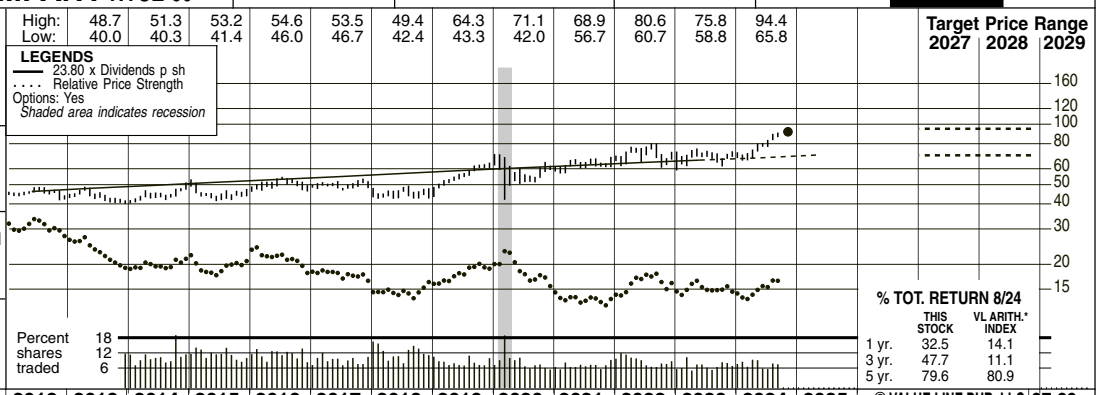
Low-High	Midpoint (% to Mid)
$67-$104	$86 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	95	(+5%)	*7%*
Low	70	(-25%)	*Nil*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	841	822	895
to Sell	776	786	732
Hld's(000)	708610	707349	735543



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
22.04	19.21	20.70	20.41	19.06	19.26	20.34	19.18	20.09	22.86	22.73	20.34	19.29	21.80	26.89	23.15	*24.10*	*25.10*	Revenues per sh	*28.50*
4.43	4.43	4.51	4.91	5.18	5.27	5.28	5.47	5.69	6.64	6.41	6.33	6.98	7.20	7.34	7.79	*8.10*	*8.40*	"Cash Flow" per sh	*9.30*
2.25	2.32	2.36	2.55	2.67	2.70	2.77	2.84	2.83	3.21	3.00	3.17	3.25	3.42	3.61	3.64	*4.00*	*4.30*	Earnings per sh [A]	*5.10*
1.66	1.73	1.80	1.87	1.94	2.01	2.08	2.15	2.22	2.30	2.38	2.46	2.54	2.62	2.70	2.78	*2.86*	*2.96*	Div'd Decl'd per sh [B] ■	*3.10*
5.10	5.70	4.85	5.23	5.54	6.16	6.58	6.22	7.38	7.37	7.74	7.17	7.04	6.83	7.87	8.88	*8.85*	*8.75*	Cap'l Spending per sh	*8.50*
17.08	18.15	19.21	20.32	21.09	21.43	21.98	22.59	25.00	23.98	23.92	26.11	26.48	26.30	27.93	28.82	*29.90*	*31.75*	Book Value per sh [C]	*32.25*
777.19	819.65	843.34	865.13	867.77	887.09	907.78	911.72	990.39	1007.6	1033.8	1053.3	1056.5	1060.0	1089.0	1091.0	*1095.0*	*1095.0*	Common Shs Outst'g [D]	*1095.0*
16.1	13.5	14.9	15.8	17.0	16.2	16.0	15.8	17.8	15.5	15.1	17.6	17.9	18.4	19.6	19.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.5*
.97	.90	.95	.99	1.08	.91	.84	.80	.93	.78	.82	.94	.92	1.00	1.14	1.06			Relative P/E Ratio	*.90*
4.6%	5.5%	5.1%	4.6%	4.3%	4.6%	4.7%	4.8%	4.4%	4.6%	5.3%	4.4%	4.4%	4.2%	4.1%	4.1%			Avg Ann'l Div'd Yield	*3.6%*
18467	17489	19896	23031	23495	21419	20375	23113	29279	25253	*26400*	*27500*	Revenues ($mill)	*31200*
2567.0	2647.0	2757.0	3269.0	3096.0	3354.0	3481.0	3670.0	3931.3	3976.0	*4380*	*4700*	Net Profit ($mill)	*5585*
33.8%	33.4%	28.5%	25.2%	21.3%	15.9%	14.3%	16.3%	18.9%	11.4%	*15.0%*	*15.0%*	Income Tax Rate	*15.0%*
13.9%	13.2%	11.9%	7.6%	6.8%	6.0%	6.6%	7.7%	8.0%	7.9%	*8.0%*	*8.0%*	AFUDC % to Net Profit	*6.0%*
49.5%	52.8%	61.5%	64.5%	62.0%	60.1%	61.5%	64.0%	63.0%	65.6%	*64.0%*	*64.0%*	Long-Term Debt Ratio	*63.0%*
47.3%	44.0%	35.7%	35.0%	37.6%	39.5%	38.1%	35.6%	36.5%	37.6%	*36.0%*	*36.0%*	Common Equity Ratio	*37.0%*
42142	46788	69359	68953	65750	69594	73336	78285	80558	83654	*85000*	*87500*	Total Capital ($mill)	*93500*
54868	61114	78446	79872	80797	83080	87634	91108	94570	99844	*100000*	*100500*	Net Plant ($mill)	*110000*
7.1%	6.6%	4.9%	5.9%	5.9%	6.0%	5.9%	5.8%	5.5%	4.6%	*5.5%*	*5.5%*	Return on Total Cap'l	*6.5%*
12.1%	12.0%	10.3%	13.3%	12.4%	12.1%	12.3%	13.0%	12.5%	12.6%	*13.0%*	*13.0%*	Return on Shr. Equity	*14.5%*
12.5%	12.6%	11.0%	13.4%	12.5%	12.1%	12.4%	13.1%	12.5%	12.6%	*13.0%*	*13.0%*	Return on Com Equity [E]	*14.5%*
3.2%	3.1%	2.5%	3.9%	2.6%	2.8%	2.8%	3.1%	3.0%	3.2%	*3.5%*	*3.5%*	Retained to Com Eq	*5.0%*
75%	76%	78%	72%	79%	77%	78%	76%	78%	77%	*77%*	*77%*	All Div'ds to Net Prof	*67%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $59883 mill. **Due in 5 Yrs** $15427 mill.
LT Debt $57083 mill. **LT Interest** $1754 mill.
Incl. $215 mill. finance leases.
(LT interest earned: 3.3x)
Leases, Uncapitalized Annual rentals $307 mill.
Pension Assets-12/23 $14218 mill.
Oblig $16382 mill.
Pfd Stock $242 mill. **Pfd Div'd** $15 mill.
Incl. 10 mill. shs. 5.83% cum. pfd. ($25 stated value); 475,115 shs. 4.2%-5.44% cum. pfd. ($100 par).
Common Stock 1,094,565,737 shs.
MARKET CAP: $100.5 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	-5.3	+2.0	NA
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Yearend (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	+1.3	+1.5	NA
Fixed Charge Cov. (%)	270	275	NA

ANNUAL RATES

of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	- -	.5%	*6.0%*
"Cash Flow"	4.0%	4.5%	*5.0%*
Earnings	3.0%	3.0%	*6.5%*
Dividends	3.5%	3.5%	*3.5%*
Book Value	3.0%	2.5%	*3.5%*

QUARTERLY REVENUES (mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	5910	5198	6238	5767	23113
2022	6648	7206	8378	7047	29279
2023	6480	5748	6980	6045	25253
2024	6646	6463	*7200*	*6091*	*26400*
2025	*7000*	*6400*	*7200*	*6900*	*27500*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.09	.67	1.22	.44	3.42
2022	.97	1.07	1.31	.26	3.61
2023	.79	.79	1.42	.64	3.64
2024	1.03	1.10	*1.32*	*.55*	*4.00*
2025	*1.00*	*1.10*	*1.50*	*.70*	*4.30*

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.62	.64	.64	.64	2.54
2021	.64	.66	.66	.66	2.62
2022	.66	.68	.68	.68	2.70
2023	.68	.70	.70	.70	2.78
2024	.70	.72			

BUSINESS: The Southern Company, through its subsidiaries, supplies electricity to 4.4 mill. customers in GA, AL, and MS. Also has a competitive generation business. Acq'd AGL Resources (renamed Southern Company Gas, 4.4 mill. customers in GA, NJ, IL, VA, & TN) 7/16. Sold Gulf Power 1/19. Electric revenue breakdown: residential, 43%; commercial, 35%; industrial, 21%; other, 1%. Generating sources: gas, 51%; coal, 19%; nuclear, 10%; other, 11%; purchased, 9%. Fuel costs: 26% of revenues. '23 reported deprec. rates (utility): 2.7%-3.4%. Has 27,300 employees. President and CEO: Chris Womack. Incorporated.: Delaware. Address: 30 Ivan Allen Jr. Blvd., N.W., Atlanta, Georgia 30308. Telephone: 404-506-0747. Internet: www.southerncompany.com.

Southern Company shares continue to rise. The stock is up about 10% in value since our early August review, and has now risen more than 35% this past year, reaching an all-time high. Investors seem to be excited with the company's better-than-expected second-quarter financial results and the recent completion of the Vogtle Nuclear Construction Project. (Third-period results were expected to be released shortly after this issue went to press.)

The company probably posted solid September-period financial results. We think Southern likely inked earnings around $1.32 per share on revenues of about $7.2 billion. Increased power demand, along with investments in state-regulated utilities, should remain the main drivers of third-quarter performance. Plus, we think the top- and bottom-line will get a nice boost as units 3 and 4 pick-up through the end of this year and beyond. And, our full-year 2024 profit estimate is staying put at the midpoint of management's updated target range of $3.95-$4.05 per share.

Our full-year 2025 earnings estimate remains unchanged. Our call for profits of $4.30 per share represents 7% growth from our 2024 projection, which is in line with Southern's long-term 5%-7% target. The utility is increasingly well-positioned to take advantage of the clean energy transition and elevated power demand due to technological advancements, artificial intelligence, and data centers over the next few years. And, the Vogtle Nuclear Construction site, which is the largest generator of clean energy in the U.S., is set to be the primary driver of top- and bottom-line growth in that interim.

This issue is best suited for conservative, income-oriented investors. Southern holds a nice paying dividend, which remains its most notable feature. But, many of its peers pay even higher dividends. Plus, the stock does not stand out for intermediate- or long-term prospects at this juncture. These shares are ranked Average (3) for Timeliness. What's more, the stock trades on the high-end of both our 18-month and 3- to 5-year Target Price Ranges, indicating limited capital appreciation potential.

Zachary Hodgkinson *November 8, 2024*

(A) Diluted EPS. Excl. nonrec. gain (losses): '09, (25¢); '13, (83¢); '14, (59¢); '15, (25¢); '16, (28¢); '17, ($2.37); '18, (78¢); '19, $1.30; '20, (17¢); '21, (54¢). Next earnings report due in Feb. **(B)** Div'ds paid in early Mar., June, Sept., and Dec. ■ Div'd reinvestment plan avail. **(C)** Incl. def'd charges. In '23: $17.35/sh. **(D)** In mill. **(E)** Rate base: AL, MS, fair value; FL, GA, orig. cost. Allowed return on common eq. (blended): 12.5%; earned on avg. com. eq., '21: 12.8%. Regulatory Climate: GA, AL Above Average; MS, FL Average.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	55
Earnings Predictability	95

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SPIRE INC. NYSE-SR

RECENT PRICE **66.08** | P/E RATIO **15.5** (Trailing: 15.9 Median: 19.0) | RELATIVE P/E RATIO **0.82** | DIV'D YLD **4.8%** | **VALUE LINE**

TIMELINESS 3 Raised 2/16/24
SAFETY 2 Raised 6/20/03
TECHNICAL 2 Raised 11/15/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

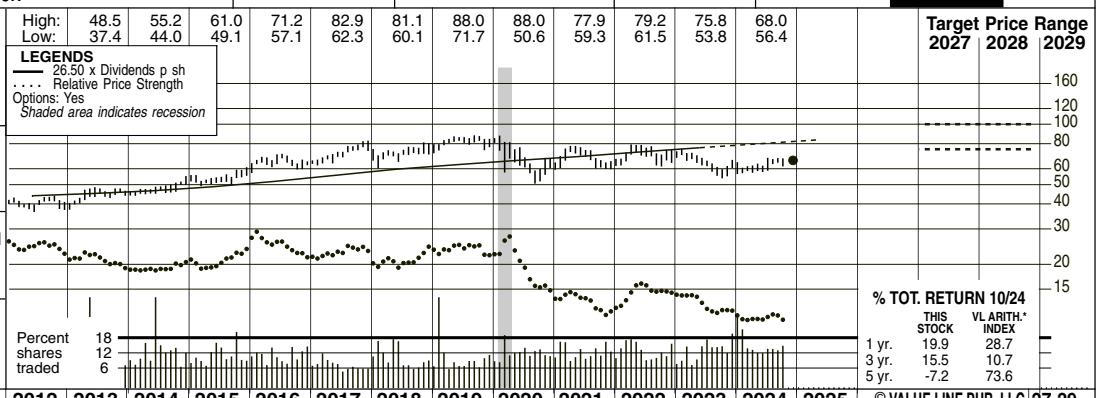
Low-High	Midpoint (% to Mid)
$47-$76	$62 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	100	(+50%)	*15%*
Low	75	(+15%)	*8%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	140	135	160
to Sell	123	134	108
Hld's(000)	48459	48507	49797



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
100.44	85.49	77.83	71.48	49.90	31.10	37.68	45.59	33.68	36.07	38.78	38.30	35.96	43.24	41.88	50.12	*45.15*	*45.25*	Revenues per sh A	*57.25*
4.22	4.56	4.11	4.62	4.58	3.12	3.87	6.15	6.16	6.54	7.55	7.12	5.25	9.09	8.44	8.60	*8.90*	*9.25*	"Cash Flow" per sh	*11.00*
2.64	2.92	2.43	2.86	2.79	2.02	2.35	3.16	3.24	3.43	4.33	3.52	1.44	4.96	3.95	3.85	*4.30*	*4.55*	Earnings per sh A B	*5.50*
1.49	1.53	1.57	1.61	1.66	1.70	1.76	1.84	1.96	2.10	2.25	2.37	2.49	2.60	2.74	2.88	3.02	*3.16*	Div'ds Decl'd per sh C■	*3.60*
2.57	2.36	2.56	3.02	4.83	4.00	3.96	6.68	6.42	9.08	9.86	16.15	12.37	12.09	10.52	12.45	*14.30*	*11.25*	Cap'l Spending per sh	*14.50*
22.12	23.32	24.02	25.56	26.67	32.00	34.93	36.30	38.73	41.26	44.51	45.14	44.19	46.74	49.08	50.29	*52.75*	*55.50*	Book Value per sh D	*66.05*
21.99	22.17	22.29	22.43	22.55	32.70	43.18	43.36	45.65	48.26	50.67	50.97	51.60	51.70	52.50	53.20	*58.00*	*60.00*	Common Shs Outst'g E	*62.00*
14.3	13.4	13.7	13.0	14.5	21.3	19.8	16.5	19.6	19.8	16.7	22.8	51.1	13.6	17.5	17.3	*14.2*		Avg Ann'l P/E Ratio	*16.0*
.86	.89	.87	.82	.92	1.20	1.04	.83	1.03	1.00	.90	1.21	2.62	.73	1.01	1.00	*.79*		Relative P/E Ratio	*.90*
3.9%	3.9%	4.7%	4.3%	4.1%	4.0%	3.8%	3.5%	3.1%	3.1%	3.1%	3.0%	3.4%	3.8%	4.0%	4.3%	4.9%		Avg Ann'l Div'd Yield	*4.1%*
1627.2	1976.4	1537.3	1740.7	1965.0	1952.4	1855.4	2235.5	2198.5	2666.3	*2620*	*2715*	Revenues ($mill) A	*3550*
84.6	136.9	144.2	161.6	214.2	184.6	88.6	271.7	220.8	217.5	*240*	*260*	Net Profit ($mill)	*340*
27.6%	31.2%	32.5%	32.4%	- -	15.7%	12.3%	20.1%	21.1%	15.1%	*19.5%*	*19.5%*	Income Tax Rate	*24.0%*
5.2%	6.9%	9.4%	9.3%	10.9%	9.5%	4.8%	12.2%	10.0%	8.2%	*9.2%*	*9.6%*	Net Profit Margin	*9.6%*
55.1%	53.0%	50.9%	50.0%	45.7%	45.0%	49.0%	52.5%	51.2%	54.9%	*51.0%*	*51.0%*	Long-Term Debt Ratio	*51.0%*
44.9%	47.0%	49.1%	50.0%	54.3%	49.7%	46.1%	43.2%	44.6%	41.3%	*45.0%*	*45.0%*	Common Equity Ratio	*45.0%*
3359.4	3345.1	3601.9	3986.3	4155.5	4625.6	4946.0	5597.3	5777.0	6471.3	*6800*	*7400*	Total Capital ($mill)	*9100*
2759.7	2941.2	3300.9	3665.2	3970.5	4352.0	4680.1	5055.7	5370.4	5778.9	*6150*	*6530*	Net Plant ($mill)	*7675*
3.1%	5.1%	4.9%	5.0%	6.3%	5.1%	2.9%	5.8%	4.9%	4.8%	*5.0%*	*5.0%*	Return on Total Cap'l	*5.5%*
5.6%	8.7%	8.2%	8.1%	9.5%	7.3%	3.5%	10.2%	7.8%	7.5%	*8.0%*	*8.0%*	Return on Shr. Equity	*8.5%*
5.6%	8.7%	8.2%	8.1%	9.5%	7.9%	3.2%	10.6%	8.0%	7.6%	*8.0%*	*8.0%*	Return on Com Equity	*8.5%*
1.5%	3.7%	3.3%	3.3%	4.7%	2.7%	NMF	5.1%	2.5%	1.9%	*2.0%*	*1.5%*	Retained to Com Eq	*2.5%*
73%	58%	59%	60%	51%	66%	NMF	54%	71%	76%	*77%*	*79%*	All Div'ds to Net Prof	*70%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $4500.3 mill. **Due in 5 Yrs**$2310.0 mill.
LT Debt $3422.3 mill. **LT Interest** $140.0 mill.
(Total interest coverage: 2.4x)

Leases, Uncapitalized Annual rentals $9.8 mill.
Pension Assets-9/23 $630.3 mill.
Oblig. $832.5 mill.
Pfd Stock $242.0 mill. **Pfd Div'd** $14.8 mill.
Common Stock 57,750,474 shs.
as of 7/28/24

MARKET CAP: $3.8 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	6.5	5.6	7.4
Other	1585.5	1071.3	818.4
Current Assets	1592.0	1076.9	825.8
Accts Payable	617.4	253.1	205.2
Debt Due	1318.7	1112.1	1078.0
Other	417.5	390.2	426.6
Current Liab.	2353.6	1755.4	1709.8
Fix. Chg. Cov.	393%	294%	310%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-1.0%	4.5%	*4.0%*
"Cash Flow"	8.0%	5.0%	*4.0%*
Earnings	5.0%	3.0%	*4.5%*
Dividends	5.0%	5.5%	*4.5%*
Book Value	5.5%	3.5%	*5.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.)A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	512.6	1104.9	327.8	290.2	2235.5
2022	555.4	880.9	448.0	314.2	2198.5
2023	814.0	1123.4	418.5	310.4	2666.3
2024	756.6	1128.5	414.1	*320.8*	*2620*
2025	*795*	*1140*	*445*	*335*	*2715*

Fiscal Year Ends	EARNINGS PER SHARE A B F Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	1.65	3.55	.03	d.26	4.96
2022	1.01	3.27	d.10	d.20	3.95
2023	1.66	3.33	d.48	d.66	3.85
2024	1.52	3.58	d.28	*d.52*	*4.30*
2025	*1.50*	*3.45*	*d.16*	*d.24*	*4.55*

Calendar	QUARTERLY DIVIDENDS PAID C■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.6225	.6225	.6225	.6225	2.49
2021	.65	.65	.65	.65	2.60
2022	.685	.685	.685	.685	2.74
2023	.72	.72	.72	.72	2.88
2024	.755	.755	.755	.755	

BUSINESS: Spire Inc., formerly known as the Laclede Group, Inc., is a holding company for natural gas utilities, which distributes natural gas across Missouri, including the cities of St. Louis and Kansas City, Alabama, and Mississippi. Has roughly 1.7 million customers. Acquired Missouri Gas 9/13, Alabama Gas Co 9/14. Utility therms sold and transported in fiscal 2023: 3.2 bill. Revenue mix for regulated operations: residential, 67%; commercial and industrial, 25%; transportation, 5%; other, 3%. Officers and directors own 2.9% of common shares; American Century Companies, 15.4% (12/23 proxy). Chairman: Edward Glotzbach; CEO: Steve Lindsey. Inc.: Missouri. Address: 700 Market Street, St. Louis, Missouri 63101. Tel.: 314-342-0500. Internet: www.spireenergy.com.

It appears that Spire managed to post healthy bottom-line results in fiscal 2024, which concluded September 30th. (Please be aware that fourth-quarter figures were not disclosed to the public when this report went to press.) Recall that during the first nine months, earnings per share increased 7%, to $4.82, compared to the previous-year tally of $4.51. That was brought about partly by the Gas Utility division, which benefited from new rates. The Midstream unit and Gas Marketing segment had improved performances for that period, as well. If there were no big setbacks in the fourth quarter, we think full-year profits rebounded about 12%, to $4.30 a share, relative to fiscal 2023's $3.85 total.

Concerning fiscal 2025, earnings per share stand to grow in the mid-single-digit percentage range, to $4.55. This is based, to a certain extent, on our assumption that the business climate is generally favorable. Improvements in operating efficiencies ought to provide further assistance.

Corporate finances are sufficient. When the third quarter concluded, cash and equivalents were $7.4 million. Too, there was $1.3 billion available through a revolving credit facility maturing in July, 2027. Also, long-term debt resided at a manageable 50% of total capital, and short-term borrowings were not a major problem.

Prospects out to the end of the decade look decent. The gas utilities currently serve about 1.7 million customers in Mississippi, Alabama, and Missouri. Moreover, the other operations, particularly pipelines, hold promise. Additional expansionary projects and technological enhancements in customer service and elsewhere should be beneficial to Spire, as well. Finally, future acquisitions are probable, supported, of course, by the sound balance sheet.

The good-quality stock might be of interest to income-focused investors. Indeed, the dividend yield stacks up nicely relative to those of other equities in *Value Line's* Natural Gas Utility Industry. What's more, we anticipate further steady increases in the payout over the 2027-2029 span.

Frederick L. Harris, III November 22, 2024

(A) Fiscal year ends Sept. 30th. **(B)** Based on diluted shares outstanding. Excludes gain from discontinued operations: '08, 94¢. Next earnings report due late Jan. **(C)** Dividends paid in early January, April, July, and October. ■ Dividend reinvestment plan available. **(D)** Incl. deferred charges. In '23: $1,171.6 mill., $22.02/sh. **(E)** In millions. **(F)** Qtly. egs. may not sum due to rounding or change in shares outstanding.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	25
Earnings Predictability	50

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SOUTHWEST GAS NYSE-SWX

RECENT PRICE 77.10 | P/E RATIO 20.7 (Trailing: 31.0 Median: 21.0) | RELATIVE P/E RATIO 1.10 | DIV'D YLD 3.2% | VALUE LINE

TIMELINESS E- Suspended 11/17/23
SAFETY 2 Raised 2/23/24
TECHNICAL E- Suspended 11/17/23
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$51-$91	$71 (-10%)

2027-29 PROJECTIONS

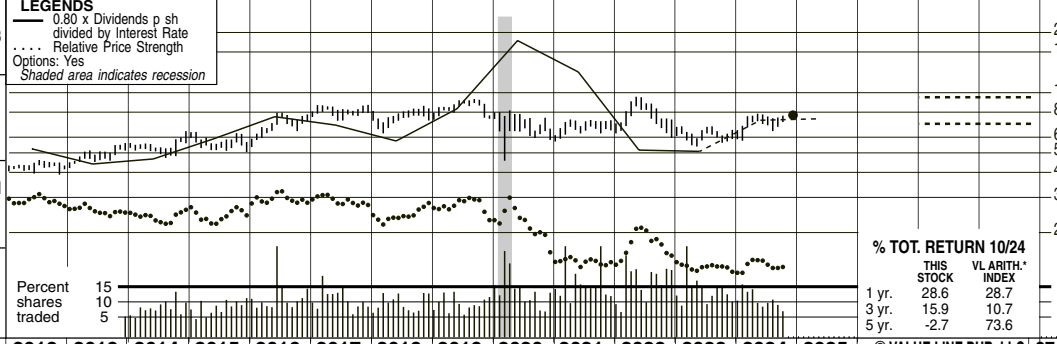
	Price	Gain	Ann'l Total Return
High	95	(+25%)	*8%*
Low	70	(-10%)	*1%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	130	122	141
to Sell	144	149	131
Hld's(000)	66489	65977	66812

High:	56.0	64.2	63.7	79.6	86.9	86.0	92.9	81.6	73.5	95.6	68.0	79.0
Low:	42.0	47.2	50.5	53.5	72.3	62.5	73.3	45.7	57.0	59.5	53.8	57.6

LEGENDS
0.80 x Dividends p sh divided by Interest Rate
Relative Price Strength
Options: Yes
Shaded area indicates recession



% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	28.6	28.7
3 yr.	15.9	10.7
5 yr.	-2.7	73.6

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
48.53	42.00	40.18	41.07	41.77	42.08	45.61	52.00	51.82	53.00	54.31	56.72	57.68	60.91	73.90	76.22	*71.55*	*73.95*	Revenues per sh	*76.65*
5.76	6.16	6.46	6.81	7.73	8.24	8.47	8.62	9.29	8.83	8.14	9.40	9.87	9.46	3.91	8.29	*8.75*	*9.85*	"Cash Flow" per sh	*10.90*
1.39	1.94	2.27	2.43	2.86	3.11	3.01	2.92	3.18	3.62	3.68	3.94	4.14	3.39	d3.10	2.13	*2.80*	*3.60*	Earnings per sh A	*4.50*
.90	.95	1.00	1.06	1.18	1.32	1.46	1.62	1.80	1.98	2.08	2.18	2.28	2.38	2.48	2.48	*2.48*	*2.52*	Div'ds Decl'd per sh B■†	*2.60*
6.79	4.81	4.73	8.29	8.57	7.86	8.53	10.30	11.15	12.97	14.44	17.06	14.43	11.84	12.80	12.19	*13.15*	*12.50*	Cap'l Spending per sh	*14.00*
23.49	24.44	25.62	26.66	28.35	30.47	31.95	33.61	35.03	37.74	42.47	45.56	46.77	48.89	47.95	47.72	*51.70*	*54.25*	Book Value per sh	*56.35*
44.19	45.09	45.56	45.96	46.15	46.36	46.52	47.38	47.48	48.09	53.03	55.01	57.19	60.42	67.12	71.56	*72.00*	*73.00*	Common Shs Outst'g C	*75.00*
20.3	12.2	14.0	15.7	15.0	15.8	17.9	19.4	21.6	22.2	20.6	21.3	16.8	19.9	- -	29.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*18.0*
1.22	.81	.89	.98	.95	.89	.94	.98	1.13	1.12	1.11	1.13	.86	1.08	- -	1.68			Relative P/E Ratio	*.90*
3.2%	4.0%	3.2%	2.8%	2.8%	2.7%	2.7%	2.9%	2.6%	2.5%	2.7%	2.6%	3.3%	3.5%	3.2%	4.0%			Avg Ann'l Div'd Yield	*3.4%*
2121.7	2463.6	2460.5	2548.8	2880.0	3119.9	3298.9	3680.5	4960.0	5454.0	*5150*	*5400*	Revenues ($mill)	*5750*
141.1	138.3	152.0	173.8	182.3	213.9	232.3	200.8	d203.3	150.9	*200*	*265*	Net Profit ($mill)	*335*
35.7%	36.4%	33.9%	32.8%	25.3%	20.5%	21.6%	16.1%	NMF	21.2%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
6.7%	5.6%	6.2%	6.8%	6.3%	6.9%	7.0%	5.5%	NMF	2.8%	*3.9%*	*4.9%*	Net Profit Margin	*5.9%*
52.4%	49.3%	48.2%	49.8%	48.3%	47.9%	50.5%	58.2%	57.8%	57.4%	*55.0%*	*55.0%*	Long-Term Debt Ratio	*56.0%*
47.6%	50.7%	51.8%	50.2%	51.7%	52.1%	49.5%	41.8%	42.2%	42.6%	*45.0%*	*45.0%*	Common Equity Ratio	*44.0%*
3123.9	3143.5	3213.5	3613.3	4359.3	4806.4	5407.2	7069.5	7621.4	8024.5	*8200*	*8800*	Total Capital ($mill)	*9600*
3658.4	3891.1	4132.0	4523.7	5093.2	5685.2	6176.1	7594.0	7024.5	7518.2	*8000*	*8500*	Net Plant ($mill)	*9250*
5.7%	5.5%	5.8%	5.8%	5.2%	5.4%	5.3%	3.5%	NMF	1.9%	*2.5%*	*3.0%*	Return on Total Cap'l	*3.5%*
9.5%	8.7%	9.1%	9.6%	8.1%	8.5%	8.7%	6.8%	NMF	4.4%	*5.5%*	*6.5%*	Return on Shr. Equity	*8.0%*
9.5%	8.7%	9.1%	9.6%	8.1%	8.5%	8.7%	6.8%	NMF	4.4%	*5.5%*	*6.5%*	Return on Com Equity	*8.0%*
5.0%	4.0%	4.1%	4.5%	3.6%	3.9%	4.0%	2.1%	NMF	NMF	*.5%*	*2.0%*	Retained to Com Eq	*3.5%*
47%	54%	55%	53%	55%	54%	54%	69%	NMF	116%	*89%*	*70%*	All Div'ds to Net Prof	*58%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $5045.1 mill. **Due in 5 Yrs** $1008 mill.
LT Debt $4382.1 mill. **LT Interest** $300 mill.
(Total interest coverage: 2.6x) (55% of Cap'l)

Leases, Uncapitalized Annual rentals $24.9 mill.
Pension Assets-12/23 $1202.0 mill.
Oblig. $1352.2 mill.

Pfd Stock None

Common Stock 71,743,666 shs.
as of 10/25/24

MARKET CAP: $5.5 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	123.1	106.5	456.6
Other	3584.6	1774.6	998.8
Current Assets	3707.7	1881.1	1455.4
Accts Payable	662.1	346.9	227.0
Debt Due	1587.4	671.1	663.0
Other	1173.5	666.8	812.7
Current Liab.	1173.5	1684.8	1702.7
Fix. Chg. Cov.	265%	145%	225%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	3.5%	3.0%	*6.0%*
"Cash Flow"	4.0%	1.5%	*8.5%*
Earnings	5.5%	4.5%	*10.0%*
Dividends	8.5%	7.0%	*5.5%*
Book Value	6.5%	7.0%	*7.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	885.9	821.4	888.7	1084.5	3680.5
2022	1267.4	1146.1	1125.6	1420.9	4960.0
2023	1603.3	1293.6	1169.5	1387.6	5454.0
2024	1581.0	1182.2	1079.2	*1307.6*	*5150*
2025	*1660*	*1240*	*1225*	*1275*	*5400*

Calendar	EARNINGS PER SHARE A D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2.03	.43	d.19	1.15	3.39
2022	1.58	d.10	d.18	d4.18	d3.10
2023	.67	.40	.04	1.02	2.13
2024	1.22	.25	Nil	*1.33*	*2.80*
2025	*1.75*	*.65*	*.15*	*1.05*	*3.60*

Calendar	QUARTERLY DIVIDENDS PAID B■† Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.545	.570	.570	.570	2.26
2021	.570	.595	.595	.595	2.36
2022	.595	.62	.62	.62	2.46
2023	.62	.62	.62	.62	2.48
2024	.62	.62	.62		

BUSINESS: Southwest Gas Holdings, Inc. is the parent holding company of Southwest Gas. Centuri Group spun-off 4/22/24. Southwest Gas is a regulated gas distributor serving 2.2 million customers in Arizona, Nevada, and California. 2023 margin mix: residential 68%; small commercial, 20%; large commercial and industrial, 8%; transportation, 4%. Total throughput: 2.2 billion therms. Southwest has 2,371 employees; Centuri 12,572. Off. & dir. own .4% of common stock; Carl C. Icahn, 15.4%; BlackRock, 13.0%; The Vanguard Group, 10.1%; (3/24 Proxy). Chairman: Michael J. Melarkey. Pres. & CEO: Karen S. Haller. Inc.: DE. Addr.: 8360 S. Durango Drive, P.O. Box 98510 Las Vegas, Nevada 89193. Telephone: 702-876-7237. Internet: www.swgas.com.

Southwest Gas Holdings delivered another weaker-than-expected quarterly performance in the September period. Following the 2024 spin-off of the Centuri Group, the business has posted two quarters of year-over-year earnings declines. To be fair, the September and June periods both reflect the low season for gas usage, so Southwest's breakeven performance is not necessarily indicative of the utility's performance. In fact, Southwest Gas Corporation, the regulated utility business, achieved a significant expansion of operating profit compared to the previous year, as a result of rate relief from earlier investments made in Nevada and California, along with good customer growth trends. The poor comparison was actually a result of challenges at the Centuri Group, of which Southwest Holdings maintains an approximately 80% ownership interest. As such, Southwest's financial statements still present consolidated results. Centuri, the infrastructure services subsidiary, faced reduced work volumes and operational issues that led to higher costs and lower margins. Higher interest expense is also impacting earnings.

We've cut our near-term earnings forecasts to reflect recent headwinds. The utility should continue to perform well, but losses at Centuri are likely to subtract from results. We've lowered our profit target from $240 million (which is what the utility business is likely to earn independently) to $200 million. The recently refreshed rate structures and other key rate cases on the horizon exemplify the impetus for simplifying the company's operations away from auxiliary businesses. However, the separation of Centuri remains uncertain, contingent on market conditions that will influence the timing and structure of a sale. Until then, challenges at the Centuri group could create headwinds for Southwest's bottom line. We've cut our earnings-per-share targets from $3.25 in 2024 and $3.90 in 2025 to $2.80 and $3.60, respectively.

The stock has risen 9% in price since our August review. Despite the struggle at Centuri, investors are likely impressed with the gas utility's operating strength. We think conservative accounts may enjoy the dividend and lower risk here.

Earl B. Humes *November 22, 2024*

(A) Diluted earnings. Excl. nonrec. gains (losses): '22, 10¢. Next egs. report due late February. **(B)** Dividends historically paid early March, June, September, and December. ■† Div'd reinvestment and stock purchase plan avail. **(C)** In millions. **(D)** Totals may not sum due to rounding. **(E)** Rank suspended 11/17/2023 for spin-off of the Centuri Group.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	25
Earnings Predictability	5

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UGI CORP. NYSE-UGI

RECENT PRICE **23.94** | P/E RATIO **8.8** (Trailing: 7.4 Median: 16.0) | RELATIVE P/E RATIO **0.47** | DIV'D YLD **6.4%** | **VALUE LINE**

TIMELINESS 3 Lowered 6/14/24
SAFETY 3 Lowered 5/26/23
TECHNICAL 4 Lowered 11/1/24
BETA 1.15 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$15-$29	$22 (-10%)

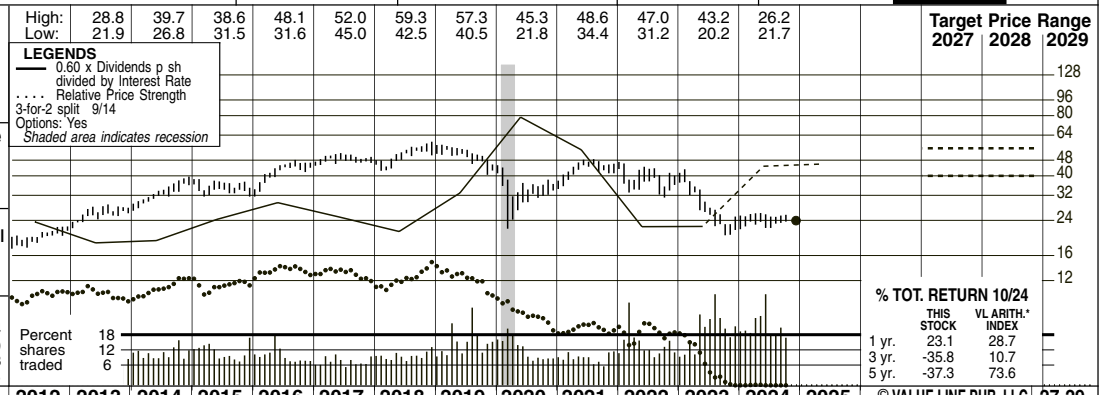
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	55	(+130%)	*26%*
Low	40	(+65%)	*18%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	206	232	250
to Sell	226	193	183
Hld's(000)	172312	171028	183465

	2027	2028	2029
Target Price Range			



% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	23.1	28.7
3 yr.	-35.8	10.7
5 yr.	-37.3	73.6

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
41.27	35.25	34.01	36.31	38.56	42.10	47.92	38.65	32.84	35.18	43.94	35.03	31.31	35.49	48.00	42.33	*35.20*	*37.20*	Revenues per sh [A]	*42.50*
2.48	2.82	2.87	2.75	3.05	3.75	4.05	4.20	4.39	4.73	5.40	4.12	4.99	5.26	5.43	5.43	*5.50*	*5.75*	"Cash Flow" per sh	*5.90*
1.33	1.57	1.59	1.37	1.17	1.59	1.92	2.01	2.05	2.29	2.74	2.28	2.67	2.96	2.90	2.84	*2.90*	*3.00*	Earnings per sh [AB]	*3.15*
.50	.52	.60	.68	.71	.74	.79	.89	.93	.96	1.02	1.15	1.31	1.35	1.41	1.47	*1.52*	*1.56*	Div'ds Decl'd per sh [C] ■	*1.68*
1.44	1.85	2.11	2.15	2.01	2.84	2.64	2.83	3.26	3.67	3.30	3.37	3.13	3.29	3.82	4.62	*3.00*	*3.70*	Cap'l Spending per sh	*4.45*
8.80	9.78	11.10	11.79	13.21	14.59	15.39	15.55	16.46	18.18	21.14	18.27	19.70	25.27	27.76	20.00	*22.70*	*25.05*	Book Value per sh [D]	*25.05*
161.09	162.78	164.38	167.75	169.06	170.88	172.73	173.12	173.15	173.99	174.14	209.01	209.51	209.84	210.56	210.91	*216.00*	*215.00*	Common Shs Outst'g [E]	*220.00*
13.3	10.3	10.9	15.0	16.4	15.4	15.8	17.7	19.3	20.8	17.8	23.4	13.8	13.9	14.1	11.4	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.0*
.80	.69	.69	.94	1.04	.87	.83	.89	1.01	1.05	.96	1.25	.71	.75	.81	.66			Relative P/E Ratio	*.85*
2.9%	3.2%	3.5%	3.3%	3.7%	3.0%	2.6%	2.5%	2.3%	2.0%	2.1%	2.2%	3.6%	3.3%	3.5%	4.5%			Avg Ann'l Div'd Yield	*3.5%*
						8277.3	6691.1	5685.7	6120.7	7651.2	7320.4	6559.0	7447.0	10106	8928	*7600*	*8000*	Revenues ($mill) [A]	*9350*
						337.2	353.8	360.0	406.5	485.6	412.9	561.0	629.0	626.0	613.0	*635*	*670*	Net Profit ($mill)	*695*
						30.6%	30.0%	31.4%	26.5%	- -	16.6%	19.4%	45.4%	24.9%	NMF	*21.0%*	*22.0%*	Income Tax Rate	*22.0%*
						4.1%	5.3%	6.3%	6.6%	6.3%	5.6%	8.6%	8.4%	6.2%	6.9%	*8.4%*	*8.4%*	Net Profit Margin	*7.4%*
						56.4%	56.1%	56.9%	55.8%	53.0%	60.2%	59.2%	53.4%	51.7%	59.9%	*56.0%*	*56.0%*	Long-Term Debt Ratio	*55.0%*
						43.6%	43.9%	43.1%	44.2%	47.0%	39.8%	40.8%	44.7%	46.6%	38.6%	*44.0%*	*44.0%*	Common Equity Ratio	*45.0%*
						6092.7	6133.8	6616.9	7157.9	7827.9	9597.4	10109	11861	12549	10937	*11150*	*11750*	Total Capital ($mill)	*12250*
						4543.7	4994.1	5238.0	5537.0	5808.2	6687.8	6960.0	7558.0	8040.0	8547.0	*8600*	*8750*	Net Plant ($mill)	*9450*
						7.5%	7.7%	7.2%	7.2%	7.7%	5.6%	7.1%	6.6%	6.3%	5.6%	*5.5%*	*5.5%*	Return on Total Cap'l	*5.5%*
						12.7%	13.1%	12.6%	12.9%	13.2%	10.8%	13.6%	11.4%	10.3%	14.0%	*13.0%*	*13.0%*	Return on Shr. Equity	*12.5%*
						12.7%	13.1%	12.6%	12.9%	13.2%	10.8%	13.6%	11.4%	10.7%	14.5%	*13.0%*	*13.0%*	Return on Com Equity	*12.5%*
						7.6%	7.4%	7.0%	7.5%	8.4%	5.6%	7.0%	6.0%	5.6%	6.8%	*6.0%*	*6.0%*	Retained to Com Eq	*6.0%*
						40%	43%	45%	42%	36%	48%	49%	45%	47%	52%	*52%*	*52%*	All Div'ds to Net Prof	*53%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $6921 mill. **Due in 5 Yrs** $4176 mill.
LT Debt $6288 mill. **LT Interest** $400 mill.
(Total interest coverage: 4.75x) (57% of Cap'l)

Leases, Uncapitalized Annual rentals $104 mill.
Pension Assets-9/23 $556 mill. **Oblig.** $623 mill.

Common Stock 214,688,629 shares
as of 7/31/24

MARKET CAP: $5.1 bill. (Mid-Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	405	340	183
Other	3397	1705	1533
Current Assets	3802	2045	1716
Accts Payable	891	613	462
Debt Due	517	706	633
Other	1036	955	791
Current Liab.	2444	2274	1886
Fix. Chg. Cov.	450%	465%	345%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-1.0%	-1.0%	*6.0%*
"Cash Flow"	5.0%	1.5%	*5.0%*
Earnings	8.0%	4.5%	*6.5%*
Dividends	6.5%	7.0%	*3.5%*
Book Value	6.5%	6.5%	*9.0%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	1932	2581	1496	1438	7447
2022	2673	3466	2033	1934	10106
2023	2759	3106	1659	1404	8928
2024	2121	2467	1380	*1632*	*7600*
2025	*2225*	*2600*	*1450*	*1725*	*8000*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	1.18	1.99	.13	d.33	2.96
2022	.93	1.91	.06	- -	2.90
2023	1.14	1.68	- -	.02	2.84
2024	1.20	1.97	.06	*d.33*	*2.90*
2025	*1.25*	*1.75*	*.05*	*d.05*	*3.00*

Cal-endar	QUARTERLY DIVIDENDS PAID [C] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.325	.325	.33	.33	1.31
2021	.33	.33	.345	.345	1.35
2022	.345	.345	.36	.36	1.41
2023	.36	.36	.375	.375	1.47
2024	.375	.375	.375	.375	

BUSINESS: UGI Corp. operates six business segments: AmeriGas Propane (accounted for 11.6% of net income in 2023), UGI International (28.1%), Gas Utility (35.7%), Midstream & Marketing (31.5%), and Corp. & Other (NMF). UGI Utilities distributes natural gas and electricity to over 672,000 customers mainly in Pennsylvania; wholly-owned AmeriGas Ptrs. is the largest U.S. propane marketer, serving about 1.5 million users in 50 states. Acquired remaining 80% interest in Antargaz (3/04); Energy Transfer Partners (1/12). Vanguard Group owns 12.5% of stock; BlackRock, 12.8%; Officers/directors, 1.2% (12/23 proxy). Has 10,000 empls. President & CEO: Robert Flexon. Inc.: PA. Address: 460 N. Gulph Rd., King of Prussia, PA 19406. Tel.: 610-337-1000. Internet: www.ugicorp.com.

We are still waiting to see how UGI Corp. fared in fiscal 2024. (Year ended September 30th.) The company has showcased a strong earnings record over the first nine months of the fiscal year, generating per-share profit of $3.23, versus $2.82 in fiscal 2023, a $0.41 improvement overall. We have limited hopes for the fiscal fourth quarter, projecting likely losses of $0.33 per share for the company's historically weakest quarter.

This presents the opportunity for UGI to surprise us with strong results. Its recent business restructuring and cost-optimization strategies have borne some fruit through this year. As it stands now, it wouldn't be a stretch for fiscal 2024 to set a high-water mark for profits. Likewise, a breakeven quarter, if possible, could probably catalyze a significant stock recovery. However, it's likely that what investors want most is to see progress on the top line of various key segments. Particularly, an improvement at AmeriGas has been long awaited, and would go a long way in shoring up investors' confidence. Similarly, the international business could spark enthusiasm through the signaling of a market recovery in those key regions. Ultimately, we remain cautious about these possibilities, and are targeting somewhat conservative top- and bottom-line figures.

The recent appointment of a new CEO may help tap into growth potential. Robert Flexon is the new President and CEO of UGI. Mr.Flexon was formerly Chair on the board of PG&E. Prior to that, he was the CFO of UGI in 2011.

We expect the company's new direction is indicative of a likely recovery ahead. In addition to the change in leadership, UGI has been working toward repositioning itself within the market over the past few years. It has already divested a considerable portion of its auxiliary businesses and should be well positioned to focus on quality growth for the long run.

We have UGI pegged as a top choice for long-term investors in the utilities and energy sector. The stock's low valuation and high dividend yield are standout features. Business and financial risk is on the high side for its peer group, but so is 3- to 5-year recovery potential.

Earl B. Humes *November 22, 2024*

(A) Fiscal year ends Sept. 30. Quarterly sales and earnings may not sum to total due to rounding and/or change in share count. **(B)** Diluted earnings. Excludes nonrecur. gains/(losses): '15, (41¢); '16, 3¢; '17, 17¢; '18, $1.32; '21, $3.96. Next egs. report due late January. **(C)** Dividends historically paid in early Jan., April, July, and Oct. ■ Div. reinvest. plan available. **(D)** Incl. intang. At 9/23: $3,470 mill., $16.45/sh. **(E)** In mill., adjusted for stock split.

Company's Financial Strength	B++
Stock's Price Stability	70
Price Growth Persistence	15
Earnings Predictability	90

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ESSENTIAL UTIL. NYSE-WTRG

RECENT PRICE **38.29** | P/E RATIO **20.6** (Trailing: 21.2 Median: 26.0) | RELATIVE P/E RATIO **1.12** | DIV'D YLD **3.4%** | **VALUE LINE**

TIMELINESS 4 Lowered 9/6/24
SAFETY 2 Raised 4/5/24
TECHNICAL 1 Raised 10/4/24
BETA 1.00 (1.00 = Market)

18-Month Target Price Range

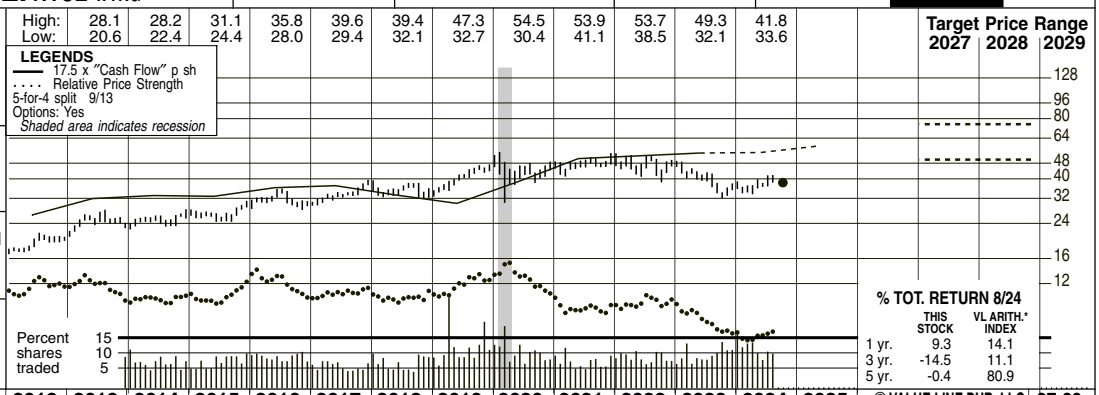
Low-High	Midpoint (% to Mid)
$32-$51	$42 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	75	(+95%)	*21%*
Low	50	(+30%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	322	270	273
to Sell	236	261	263
Hld's(000)	207792	216108	215186



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
3.71	3.93	4.21	4.10	4.32	4.32	4.37	4.61	4.62	4.56	4.71	4.03	5.96	7.43	8.68	7.52	*7.75*	*8.40*	Revenues per sh	*10.75*
1.14	1.29	1.42	1.45	1.51	1.82	1.89	1.87	2.07	2.12	1.90	1.73	2.21	2.89	2.98	3.08	*3.35*	*3.60*	"Cash Flow" per sh	*4.30*
.58	.62	.72	.83	.87	1.16	1.20	1.14	1.32	1.35	1.08	1.04	1.12	1.67	1.77	1.86	*2.05*	*2.15*	Earnings per sh	*2.65*
.41	.44	.47	.50	.54	.58	.63	.69	.74	.79	.85	.91	.97	1.04	1.11	1.19	*1.27*	*1.35*	Div'd Decl'd per sh [B]	*1.75*
1.58	1.66	1.89	1.90	1.98	1.73	1.84	2.07	2.16	2.69	2.78	2.49	3.41	4.04	4.03	4.39	*5.10*	*5.10*	Cap'l Spending per sh	*5.00*
6.26	6.50	6.81	7.21	7.90	8.63	9.27	9.78	10.43	11.02	11.28	17.58	19.09	20.50	20.39	21.57	*22.90*	*23.55*	Book Value per sh [D]	*27.25*
169.21	170.61	172.46	173.60	175.43	177.93	178.59	176.54	177.39	177.71	178.09	220.76	245.39	252.87	263.74	273.30	*276.00*	*279.00*	Common Shs Outst'g [C]	*288.00*
24.9	23.1	21.1	21.3	21.9	21.2	20.8	23.5	23.9	24.7	32.6	39.1	39.6	28.3	26.6	21.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*24.0*
1.50	1.54	1.34	1.34	1.39	1.19	1.09	1.18	1.25	1.24	1.76	2.08	2.03	1.53	1.54	1.21			Relative P/E Ratio	*1.35*
2.8%	3.1%	3.1%	2.8%	2.8%	2.4%	2.5%	2.6%	2.3%	2.4%	2.4%	2.2%	2.2%	2.2%	2.4%	3.0%			Avg Ann'l Div'd Yield	*2.8%*
779.9	814.2	819.9	809.5	838.1	889.7	1462.7	1878.1	2288.0	2053.8	*2140*	*2350*	Revenues ($mill)	*3100*
213.9	201.8	234.2	239.7	192.0	224.5	284.8	431.6	465.2	498.2	*550*	*600*	Net Profit ($mill)	*765*
10.5%	6.9%	8.2%	6.6%	--	--	--	--	--	--	*5.0%*	*10.0%*	Income Tax Rate	*20.0%*
2.4%	3.1%	3.8%	6.3%	6.8%	7.2%	4.5%	4.8%	1.3%	2.2%	*2.0%*	*2.0%*	AFUDC % to Net Profit	*2.0%*
48.5%	50.3%	48.4%	50.6%	54.4%	43.1%	54.0%	52.7%	54.2%	53.7%	*54.0%*	*54.5%*	Long-Term Debt Ratio	*55.0%*
51.5%	49.7%	51.6%	49.4%	45.6%	56.9%	46.0%	47.3%	45.8%	46.3%	*46.0%*	*45.5%*	Common Equity Ratio	*45.0%*
3216.0	3469.5	3587.7	3965.4	4407.8	6824.2	10192	10964	11748	12722	*13725*	*14475*	Total Capital ($mill)	*17350*
4402.0	4688.9	5001.6	5399.9	5930.3	6345.8	9512.9	10252	11131	12097	*13000*	*14025*	Net Plant ($mill)	*17100*
7.8%	6.9%	7.6%	7.1%	5.5%	4.2%	3.7%	4.8%	5.0%	5.0%	*5.0%*	*6.0%*	Return on Total Cap'l	*6.0%*
12.9%	11.7%	12.7%	12.2%	9.6%	5.8%	6.1%	8.3%	8.7%	8.5%	*8.5%*	*9.0%*	Return on Shr. Equity	*9.5%*
12.9%	11.7%	12.7%	12.2%	9.6%	5.8%	6.1%	8.3%	8.7%	8.5%	*8.5%*	*9.0%*	Return on Com Equity	*9.5%*
6.1%	4.7%	5.6%	5.1%	2.1%	.9%	1.1%	3.3%	3.3%	3.1%	*3.0%*	*3.5%*	Retained to Com Eq	*3.5%*
52%	60%	56%	59%	79%	84%	82%	60%	62%	64%	*64%*	*63%*	All Div'ds to Net Prof	*66%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $7176.0 mill. **Due in 5 Yrs** $1201 mill.
LT Debt $7010.9 mill. **LT Interest** $280.0 mill. (53% of Cap'l)

Pension Assets-12/23 $312.3 mill. **Oblig.** $313.7 mill.

Pfd Stock None
Common Stock 273,672,080 shares
as of 7/26/24

MARKET CAP: $10.5 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	11.4	4.6	18.8
Receivables	206.3	144.3	139.8
Inventory (AvgCst)	46.6	47.5	50.1
Other	393.9	295.6	154.0
Current Assets	658.2	492.0	362.7
Accts Payable	238.8	221.2	204.8
Debt Due	427.9	227.5	165.1
Other	355.2	349.0	259.3
Current Liab.	1021.9	797.7	629.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	6.5%	11.0%	*5.5%*
"Cash Flow"	6.5%	8.0%	*6.5%*
Earnings	6.5%	7.0%	*7.0%*
Dividends	7.5%	7.0%	*8.0%*
Book Value	10.0%	14.0%	*4.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	583.5	397.0	361.9	535.7	1878.1
2022	699.3	448.7	434.6	705.4	2288.0
2023	726.5	436.7	411.1	479.5	2053.8
2024	612.1	434.4	*413.5*	*680*	*2140*
2025	*680*	*475*	*480*	*715*	*2350*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.72	.32	.19	.44	1.67
2022	.76	.31	.26	.44	1.77
2023	.72	.34	.30	.50	1.86
2024	.97	.28	*.25*	*.55*	*2.05*
2025	*.78*	*.40*	*.37*	*.60*	*2.15*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.2343	.2343	.2507	.2507	.97
2021	.2507	.2507	.2682	.2682	1.04
2022	.2682	.2682	.287	.287	1.11
2023	.287	.287	.3071	.3071	1.19
2024	.3071	.3071	.3255		

BUSINESS: Essential Utilities, Inc. became the new name for Aqua America on Feb. 3, 2020, to reflect the acquisition of Peoples, a natural gas utility, which occurred in 3/20. In 2023, Aqua Amer. provided water and wastewater services in the states of PA, OH, TX, IL, NC, NJ, IN, VA, NS, WS. Acquired AquaSource, 7/13; N. Maine Util., 7/15; and others. Water respn. for 56% of revenues in 2023; residential, 31%; commercial, 9%; industrial, wastewater & other, 16%. Gas 42%; other, 2%. Employs 3,258. Off. & dir. own less than 1% of the common stock; BlackRock, 11.3%; Vanguard, 10.2%; Can. Pen. Plan 7.9% (3/24 proxy). Pres. & CEO: Christopher Franklin. Inc.: PA Addr.: 762 W Lancaster Ave., Bryn Mawr, PA 19010. Tel.: 610-525-1400. Int.: www.essential.co.

Essential Utilities increased its dividend payout. The water and gas utility recently hiked its quarterly share distribution by 6%, to $0.3255.

Second-quarter profits were restrained by the gas segment. Share earnings declined 18% in the June interim due to unusual weather in its service areas. Leadership attributed the revenue shortfall to temperatures being significantly warmer than the similar year-ago period. As a result, demand for natural gas for heating homes was soft. The water business fared better even though it faced a difficult comparison.

The bottom line's rise in 2024 will not be due to an improved operating performance. The company had an unusual gain of $0.24 a share in the first quarter (now included in our presentation), which should enable its earnings per share to rise 10%, to $2.05. Without this one-time item, share earnings would likely decrease to just over $1.80.

Rate relief ought to provide a boost to earnings in 2025. With quite a few pending rate cases (more below), and normal weather, we think that share earnings could rise a solid 5% next year, to $2.15.

There's a lot happening on the regulatory front. Aqua America, Essential's water operations, filed a petition in May seeking to recover $953 million in projected investment being made through 2025 to replace aging pipelines and other water infrastructure. Moreover, the company's Peoples Gas subsidiary had requested a $156 million rate increase to help offset higher operating expenses, but state authorities voted to grant a raise of just $93 million. Also, the company continues to fight a ruling that denied its proposed acquisition of the Delcora wastewater facility.

These shares are ranked to lag the market in the year ahead. The stock's prospects are not attractive over the next 18-month period, either. However, through 2027-2029, WTRG's total-return potential is above average. Investors should be aware that the main risk of being involved in the utility sector is that state regulators may be reluctant to allow the full recovery of operating costs related to inflation, as this is not popular with the voting public.

James A. Flood *October 4, 2024*

(A) Diluted earnings. Includes unusual gain: '24, Q1, 24¢; Excludes nonrecurring gain: '12, 18¢. Excludes gain from discontinued operations: '12, 7¢; '13, 9¢; '14, 11¢. Next earnings report early November.
(B) Dividends historically paid in early March, June, Sept., & Dec. ■ Div'd. reinvestment plan available (5% discount).
(C) In millions, adjusted for stock split.
(D) Includes intangibles: 12/31/23, $2.341 bill./$8.89 a share.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	65
Earnings Predictability	70

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XCEL ENERGY NDQ-XEL

RECENT PRICE 63.01 | P/E RATIO 17.6 (Trailing: 18.1 Median: 20.0) | RELATIVE P/E RATIO 0.97 | DIV'D YLD 3.6% | VALUE LINE

TIMELINESS 4 Lowered 10/11/24
SAFETY 2 Lowered 1/19/24
TECHNICAL 4 Raised 10/18/24
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$54-$84 $69 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	90	(+45%)	*12%*
Low	65	(+5%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	514	433	467
to Sell	387	502	414
Hld's(000)	438235	437447	437414

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	31.8	37.6	38.3	45.4	52.2	54.1	66.1	76.4	72.9	77.7	73.0	65.6						
Low:	26.8	27.3	31.8	35.2	40.0	41.5	47.7	46.6	57.2	56.9	53.7	46.8						
Revenues per sh	24.69	21.08	21.38	21.90	20.76	21.92	23.11	21.72	21.90	22.46	22.44	21.98	21.45	24.69	27.86	25.60	*25.65*	*27.80*
"Cash Flow" per sh	3.50	3.48	3.51	3.79	4.00	4.10	4.28	4.56	5.04	5.47	5.92	6.25	6.61	7.08	7.81	7.96	*8.60*	*9.25*
Earnings per sh A	1.46	1.49	1.56	1.72	1.85	1.91	2.03	2.10	2.21	2.30	2.47	2.64	2.79	2.96	3.17	3.35	*3.55*	*3.80*
Div'd Decl'd per sh B ■ †	.94	.97	1.00	1.03	1.07	1.11	1.20	1.28	1.36	1.44	1.52	1.62	1.72	1.83	1.95	2.08	*2.19*	*2.30*
Cap'l Spending per sh	4.66	3.91	4.60	4.53	5.27	6.82	6.33	7.26	6.42	6.54	7.70	8.05	9.99	7.80	8.44	10.55	*13.25*	*15.50*
Book Value per sh C	15.35	15.92	16.76	17.44	18.19	19.21	20.20	20.89	21.73	22.56	23.78	25.24	27.12	28.70	30.34	31.74	*33.30*	*35.00*
Common Shs Outst'g D	453.79	457.51	482.33	486.49	487.96	497.97	505.73	507.54	507.22	507.76	514.04	524.54	537.44	544.03	549.58	554.94	*560.00*	*565.00*
Avg Ann'l P/E Ratio	13.7	12.7	14.1	14.2	14.8	15.0	15.4	16.5	18.5	20.2	18.9	22.3	23.9	22.5	22.2	19.0	*Bold figures are Value Line estimates*	
Relative P/E Ratio	.82	.85	.90	.89	.94	.84	.81	.83	.97	1.02	1.02	1.19	1.23	1.22	1.28	1.06		
Avg Ann'l Div'd Yield	4.7%	5.1%	4.5%	4.2%	3.9%	3.9%	3.8%	3.7%	3.3%	3.1%	3.3%	2.7%	2.6%	2.8%	2.8%	3.3%		
Revenues ($mill)							11686	11024	11107	11404	11537	11529	11526	13431	15310	14206	*14350*	*15700*
Net Profit ($mill)							1021.3	1063.6	1123.4	1171.0	1261.0	1372.0	1473.0	1597.0	1736.0	1851.0	*1985*	*2140*
Income Tax Rate							33.9%	35.8%	34.1%	30.7%	12.6%	8.5%	- -	- -	- -	- -	*NMF*	*NMF*
AFUDC % to Net Profit							12.5%	7.7%	7.8%	9.4%	12.4%	8.3%	10.7%	6.2%	5.9%	7.7%	*10.0%*	*9.0%*
Long-Term Debt Ratio							53.0%	54.1%	56.3%	55.9%	56.4%	56.8%	57.4%	58.2%	57.8%	58.6%	*60.5%*	*62.5%*
Common Equity Ratio							47.0%	45.9%	43.7%	44.1%	43.6%	43.2%	42.6%	41.8%	42.2%	41.4%	*39.5%*	*37.5%*
Total Capital ($mill)							21714	23092	25216	25975	28025	30646	34220	37391	39488	42529	*46975*	*53000*
Net Plant ($mill)							28757	31206	32842	34329	36944	39483	42950	45457	48253	51642	*56225*	*62450*
Return on Total Cap'l							6.0%	5.8%	5.7%	5.8%	5.7%	5.6%	5.4%	5.3%	5.5%	5.4%	*5.5%*	*5.0%*
Return on Shr. Equity							10.0%	10.0%	10.2%	10.2%	10.3%	10.4%	10.1%	10.2%	10.4%	10.5%	*10.5%*	*11.0%*
Return on Com Equity E							10.0%	10.0%	10.2%	10.2%	10.3%	10.4%	10.1%	10.2%	10.4%	10.5%	*10.5%*	*11.0%*
Retained to Com Eq							4.5%	4.3%	4.0%	3.9%	4.3%	4.4%	4.2%	4.2%	4.3%	4.3%	*4.0%*	*4.5%*
All Div'ds to Net Prof							55%	57%	61%	62%	58%	58%	58%	59%	58%	59%	*61%*	*60%*

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	11.3	14.1
3 yr.	-2.0	11.1
5 yr.	10.6	80.9

Target Price Range 2027 2028 2029

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CAPITAL STRUCTURE as of 6/30/24
Total Debt $29372 mill. **Due in 5 Yrs** $3790 mill.
LT Debt $27716 mill. **LT Interest** $1175 mill.
Incl. $218 mill. finance leases.
(Total Interest Coverage: 2.6x)

Leases, Uncapitalized Annual rentals $277 mill.
Pension Assets-12/23 $2690 mill.
Oblig. $2943 mill.
Pfd Stock None

Common Stock 557,500,681 shs.
as of 7/30/24
MARKET CAP: $35.1 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2021	2022	2023
% Change Retail Sales (KWH)	+1.4	+1.2	-1.6
Resid'l Revs. per KWH (¢)	12.94	13.41	13.80
C & I Revs. per KWH (¢)	8.73	9.02	8.82
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	19849	20346	20512
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	NA	NA	NA
Fixed Charge Cov. (%)	262	255	245

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	2.0%	3.0%	*3.5%*
"Cash Flow"	7.0%	7.0%	*6.0%*
Earnings	5.5%	6.5%	*6.0%*
Dividends	6.0%	6.5%	*6.0%*
Book Value	5.0%	6.0%	*5.0%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	3541	3068	3467	3355	13431
2022	3751	3424	4082	4053	15310
2023	4080	3022	3662	3442	14206
2024	3649	3028	*3933*	*3740*	*14350*
2025	*4100*	*3400*	*4150*	*4050*	*15700*

EARNINGS PER SHARE A

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.67	.58	1.13	.58	2.96
2022	.70	.60	1.18	.69	3.17
2023	.76	.52	1.23	.83	3.35
2024	.88	.54	*1.30*	*.83*	*3.55*
2025	*.90*	*.65*	*1.40*	*.85*	*3.80*

QUARTERLY DIVIDENDS PAID B ■ †

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.405	.43	.43	.43	1.70
2021	.43	.4575	.4575	.4575	1.80
2022	.4575	.4875	.4875	.4875	1.92
2023	.4875	.52	.52	.52	2.05
2024	.52	.5475	.5475	.5475	

BUSINESS: Xcel Energy Inc. is the parent of Northern States Power Company (NSP), which supplies electricity to MN, WI, ND, SD & MI & gas to MN, WI, ND & MI; Public Service Company of Colorado (PSCo), which supplies electricity & gas to CO; & Southwestern Public Service Company (SPS), which supplies electricity to TX and NM. Customers: 3.8 mill. electric, 2.2 mill. gas. Electric revenues: resid'l, 31%; comm'l & ind'l, 50%; other, 19%. Purchases 34% of power, owns 66%. Total electric mix: wind, 29%; gas, 23%; coal, 13%, nuclear, 24%, solar/other, 11%. Fuel cost: 40% of revenues. '23 deprec. rate: 3.6%. Employs 11,311. Chrmn., President, and CEO: Robert Frenzel. Inc.: MN. Addr.: 414 Nicollet Mall, Minneapolis, MN 55401. Tel.: 612-330-5500. Int.: www.xcelenergy.com.

Over the past three months, Xcel Energy has been among the top performers within the electric utility industry. The shares are up 21% in value, five percentage points better than the 16% gain in the *Value Line Utility Index* during that time. The industry, for the time being at least, is back in vogue after a terrible performance for much of 2023, and lots of backing and filling for a good portion of 2024. In fact, almost all of this year's rise has taken place since mid-April for a few of the large-capitalization electrics, and not until early July for other industry participants playing catch up to the rotation of funds into this group. Xcel has been among the latter, although in the past it would likely have been a "go-to" name for institutional investors looking to get involved in utilities. The drop into the second-tier names likely comes as a result of the material tort and insurance subrogation claims for fire damage that's alleged to have started as a result of Xcel's equipment in two service areas. (One major blaze dates to December of 2021 in Colorado and the other fire occurred this February in the Texas panhandle.)

Meanwhile, the company looks on pace to achieve another solid year of core earnings growth. First-half results were good, as Xcel posted profits $0.14 per share higher than the year-ago level. Recovery of increased infrastructure investment under the regulatory-umbrella format of setting electric rates was the main factor driving earnings higher. In early August, leadership affirmed its core earnings-per-share target of $3.50-$3.60 for full-year 2024, which represents 6% growth at the midpoint of the range. With some rate relief due next year, the company may be able to do a tad better in 2025. **These shares are an untimely choice for year-ahead relative price performance.** Regarding wildfire claims, Xcel faces many in Texas, but they appear to tally to less than the company's $500 million of insurance protection. That's assuming it doesn't have to pay exorbitant fines for negligence. Regarding the Marshall Fire in Colorado, a September 2025 court date has been set. The dollar amount at risk for the incident shouldn't be above $1.5 billion, in our estimation.

Anthony J. Glennon *October 18, 2024*

(A) Diluted EPS. Excl. nonrec. gain/(losses): '10, 5¢; '15, (16¢); '17, (5¢); '23, (14¢); gain/(loss) on discontinued ops.: '09, (1¢); '10, 1¢. Qtly. EPS may not sum to full yr. due to rounding. Next egs. report due late October.
(B) Div'ds typically paid mid-Jan., Apr., July, and Oct. ■ Div'd reinvestment plan available. † Shareholder investment plan available.
(C) Incl. intangibles. In '23: $2798 mill., $5.04/sh. **(D)** In mill. **(E)** Rate base: Varies. Rate allowed on common equity (blended): 9.6%. Regulatory Climate: Average.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	85
Earnings Predictability	100

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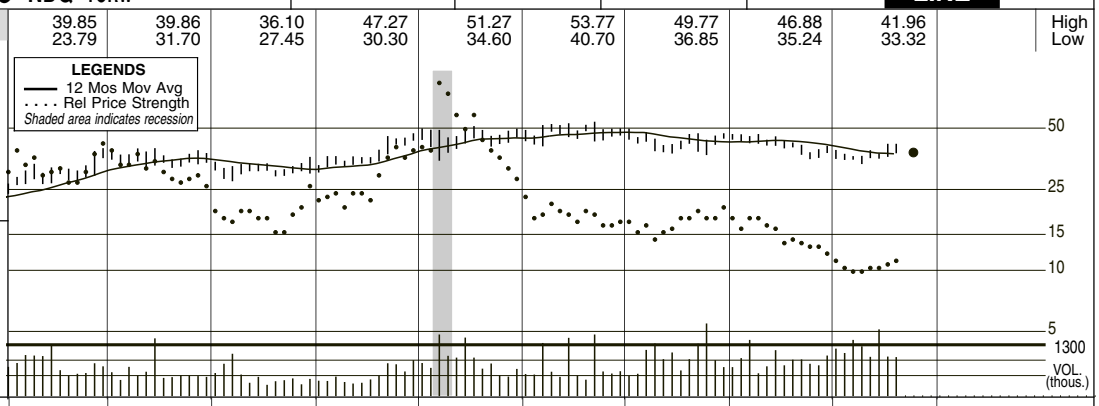
YORK WATER CO NDQ--YORW

RECENT PRICE **37.92** | TRAILING P/E RATIO **23.7** | RELATIVE P/E RATIO **1.30** | DIV'D YLD **2.2%** | **VALUE LINE**

RANKS

PERFORMANCE	**4**	*Below Average*
Technical	**4**	*Below Average*
SAFETY	**3**	*Average*
BETA .85	(1.00 = Market)	

Financial Strength	B+
Price Stability	90
Price Growth Persistence	70
Earnings Predictability	100



© VALUE LINE PUBLISHING LLC	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025/2026
REVENUES PER SH	3.70	3.77	3.74	3.96	4.12	4.20	4.20	4.96	--	
"CASH FLOW" PER SH	1.42	1.53	1.58	1.70	1.90	1.97	2.08	2.48	--	
EARNINGS PER SH	.92	1.01	1.04	1.11	1.27	1.30	1.40	1.66	***1.43*** [A,B]	***1.53*** [C]***/NA***
DIV'D DECL'D PER SH	.63	.65	.67	.70	.73	.76	.79	.82	--	
CAP'L SPENDING PER SH	1.03	1.95	--	.16	.09	.91	.24	4.55	--	
BOOK VALUE PER SH	8.88	9.28	9.75	10.31	10.97	11.64	14.50	15.43	--	
COMMON SHS OUTST'G (MILL)	12.85	12.87	12.94	13.02	13.06	13.11	14.29	14.33	--	
AVG ANN'L P/E RATIO	32.8	34.6	30.3	33.8	35.7	36.7	30.7	25.1	***26.5***	***24.8/NA***
RELATIVE P/E RATIO	1.79	1.73	1.71	1.96	2.09	2.24	2.03	1.56	--	
AVG ANN'L DIV'D YIELD	2.1%	1.9%	2.1%	1.9%	1.6%	1.6%	1.8%	2.0%	--	
REVENUES ($MILL)	47.6	48.6	48.4	51.6	53.9	55.1	60.1	71.0	--	***Bold figures are consensus earnings estimates and, using the recent prices, P/E ratios.***
NET PROFIT ($MILL)	11.8	13.0	13.4	14.4	16.6	17.0	19.6	23.8	--	
INCOME TAX RATE	31.3%	25.9%	15.7%	13.5%	10.8%	6.2%	.1%	5.1%	--	
AFUDC % TO NET PROFIT	1.9%	6.7%	1.7%	2.5%	3.2%	7.2%	--	--	--	
LONG-TERM DEBT RATIO	42.6%	43.0%	42.5%	41.3%	46.3%	47.6%	40.2%	44.9%	--	
COMMON EQUITY RATIO	57.4%	57.0%	57.5%	58.7%	53.7%	52.4%	59.8%	55.1%	--	
TOTAL CAPITAL ($MILL)	198.7	209.5	219.5	228.7	266.8	291.5	346.6	401.2	--	
NET PLANT ($MILL)	270.9	288.8	299.2	313.2	343.6	382.9	431.2	493.7	--	
RETURN ON TOTAL CAP'L	7.2%	7.5%	7.3%	7.4%	7.1%	6.7%	6.4%	6.8%	--	
RETURN ON SHR. EQUITY	10.4%	10.9%	10.6%	10.7%	11.6%	11.1%	9.5%	10.7%	--	
RETURN ON COM EQUITY	10.4%	10.9%	10.6%	10.7%	11.6%	11.1%	9.5%	10.7%	--	
RETAINED TO COM EQ	3.4%	4.0%	3.8%	4.0%	5.0%	4.7%	4.3%	5.5%	--	
ALL DIV'DS TO NET PROF	67%	63%	64%	62%	57%	58%	55%	49%	--	

[A] *No. of analysts changing earn. est. in last 23 days: 0 up, 0 down, consensus 5-year earnings growth not available.* [B] *Based upon one analyst's estimate.* [C] *Based upon one analyst's estimate.*

ANNUAL RATES

of change (per share)	5 Yrs.	1 Yr.
Revenues	3.5%	18.0%
"Cash Flow"	7.5%	19.0%
Earnings	8.0%	18.5%
Dividends	4.0%	4.0%
Book Value	8.5%	6.5%

QUARTERLY SALES ($mill.)

Fiscal Year	1Q	2Q	3Q	4Q	Full Year
12/31/22	14.3	14.9	15.8	15.1	60.1
12/31/23	15.4	18.7	18.8	18.1	71.0
12/31/24	17.6	18.8			
12/31/25					

EARNINGS PER SHARE

Fiscal Year	1Q	2Q	3Q	4Q	Full Year
12/31/21	.28	.35	.36	.31	1.30
12/31/22	.29	.36	.40	.35	1.40
12/31/23	.26	.45	.53	.42	1.66
12/31/24	.30	.35	***.41***	***.37***	
12/31/25	***.34***				

QUARTERLY DIVIDENDS PAID

Cal-endar	1Q	2Q	3Q	4Q	Full Year
2021	.187	.187	.187	.195	.76
2022	.195	.195	.195	.195	.78
2023	.203	.203	.203	.203	.81
2024	.211	.211	.211		

INSTITUTIONAL DECISIONS

	4Q'23	1Q'24	2Q'24
to Buy	60	63	71
to Sell	68	68	59
Hld's(000)	7029	7075	7175

ASSETS ($mill.)	2022	2023	6/30/24
Cash Assets	.0	.0	.0
Receivables	6.7	7.2	7.6
Inventory	2.3	3.1	3.6
Other	5.2	5.3	5.3
Current Assets	14.2	15.6	16.5
Property, Plant & Equip, at cost	540.0	610.8	- -
Accum Depreciation	108.8	117.1	- -
Net Property	431.2	493.7	513.6
Other	65.2	78.9	80.3
Total Assets	510.6	588.2	610.4
LIABILITIES ($mill.)			
Accts Payable	10.8	10.9	13.0
Debt Due	.0	.0	.0
Other	6.2	7.2	8.2
Current Liab	17.0	18.1	21.2

LONG-TERM DEBT AND EQUITY as of 6/30/24

Total Debt $191.1 mill. **Due in 5 Yrs.** NA
LT Debt $191.1 mill.
Including Cap. Leases NA (46% of Cap'l)

Leases, Uncapitalized Annual rentals NA

Pension Liability None in '23 vs. None in '22

Pfd Stock None **Pfd Div'd Paid** None

Common Stock 14,361,225 shares (54% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: The York Water Company is an investor-owned water utility. The company's primary business is to impound, purify to meet or exceed safe drinking water standards and distribute water. It also owns and operates three wastewater collection systems and ten wastewater collection and treatment systems. York Water operates within its franchised water and wastewater territory, which covers portions of 56 municipalities within four counties in south-central Pennsylvania. Water service is supplied through the company's own distribution system. It obtains the bulk of its water supply for its primary system for York and Adams Counties from both the South Branch and East Branch of the Codorus Creek, which together have an average daily flow of approximately 73 million gallons from a combined watershed area of about 117 square miles. At June 30, 2024, the company's average daily availability was 41.0 million gallons, and average daily consumption was about 21.7 million gallons Has 130 employees. C.E.O. & President: Joseph T. Hand Address: 130 East Market Street, York, PA 17401. Tel.: (717) 845-3601. Internet: www.yorkwater.com. *E.B.*

October 4, 2024

TOTAL SHAREHOLDER RETURN

Dividends plus appreciation as of 8/30/2024

3 Mos.	6 Mos.	1 Yr.	3 Yrs.	5 Yrs.
5.84%	10.74%	-2.15%	-19.83%	14.39%

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APPLE INC. NDQ-AAPL

RECENT PRICE **220.91** | P/E RATIO **31.8** (Trailing: 33.6 Median: 17.0) | RELATIVE P/E RATIO **1.80** | DIV'D YLD **0.5%** | **VALUE LINE**

TIMELINESS 2 Raised 6/7/24
SAFETY 1 Raised 4/17/20
TECHNICAL 3 Lowered 8/30/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$187-$313	$250 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	290	(+30%)	*8%*
Low	240	(+10%)	*3%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	2067	2080	2409
to Sell	2462	2566	2372
Hld's(000)	938557	491866	479286688

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	20.5	29.9	33.6	29.7	44.3	58.4	73.5	138.8	182.1	182.9	199.6	237.2								
Low:	13.8	17.6	23.0	22.4	28.7	36.6	35.5	53.2	116.2	125.9	124.2	164.1								
Sales per sh A	1.31	1.45	2.54	4.16	5.95	6.79	7.79	10.47	10.10	11.18	13.96	14.64	16.17	21.55	24.73	24.65	*25.75*	*28.45*	Sales per sh A	*40.45*
"Cash Flow" per sh	.21	.25	.59	1.07	1.71	1.74	2.02	2.90	2.63	2.85	3.70	3.82	4.03	6.24	6.96	6.97	*7.55*	*8.00*	"Cash Flow" per sh	*11.50*
Earnings per sh B	.19	.22	.54	.99	1.58	1.42	1.61	2.31	2.08	2.30	2.98	2.97	3.28	5.61	6.11	6.13	*6.65*	*7.10*	Earnings per sh B	*9.80*
Div'ds Decl'd per sh E	- -	- -	- -	- -	.09	.41	.45	.50	.55	.60	.68	.75	.80	.85	.90	.95	*.99*	*1.10*	Div'ds Decl'd per sh E	*1.46*
Cap'l Spending per sh	.04	.05	.08	.16	.32	.32	.41	.50	.60	.61	.70	.59	.43	.65	.67	.70	*.65*	*.80*	Cap'l Spending per sh	*1.05*
Book Value per sh	.85	1.10	1.86	2.94	4.50	4.91	4.75	5.35	6.01	6.54	5.63	5.09	3.85	3.72	3.18	4.00	*4.50*	*4.80*	Book Value per sh	*6.50*
Common Shs Outst'g C	24873	25195	25647	26020	26298	25178	23465	22315	21345	20505	19020	17773	16977	16977	15943	15500	*15150*	*14750*	Common Shs Outst'g C	*12000*
Avg Ann'l P/E Ratio	30.4	19.2	15.2	12.4	12.0	12.3	13.0	12.8	12.6	14.9	15.3	16.1	24.7	23.4	25.9	26.4	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*27.0*
Relative P/E Ratio	1.83	1.28	.97	.78	.76	.69	.68	.64	.66	.75	.83	.86	1.27	1.26	1.50	1.53			Relative P/E Ratio	*1.50*
Avg Ann'l Div'd Yield	- -	- -	- -	- -	.5%	2.3%	2.2%	1.7%	2.1%	1.8%	1.5%	1.6%	1.0%	.6%	.6%	.6%			Avg Ann'l Div'd Yield	*.6%*
Sales ($mill) A	182795	233715	215639	229234	265595	260174	274515	365817	394328	383285	*390350*	*420000*							Sales ($mill) A	*485400*
Operating Margin	33.1%	35.3%	32.7%	31.2%	30.8%	29.4%	28.2%	32.9%	33.1%	33.5%	*33.5%*	*33.5%*							Operating Margin	*34.0%*
Depreciation ($mill) D	7946.0	11257	10505	10157	10903	12547	11056	11284	11104	11519	*11400*	*11500*							Depreciation ($mill) D	*12100*
Net Profit ($mill)	39510	53394	45687	48351	59531	55256	57411	94680	99803	96854	*103095*	*106865*							Net Profit ($mill)	*125865*
Income Tax Rate	26.1%	26.4%	25.6%	24.6%	18.3%	15.9%	14.4%	13.3%	16.2%	14.7%	*16.5%*	*16.0%*							Income Tax Rate	*16.0%*
Net Profit Margin	21.6%	22.8%	21.2%	21.1%	22.4%	21.2%	20.9%	25.9%	25.3%	25.3%	*26.4%*	*25.4%*							Net Profit Margin	*25.9%*
Working Cap'l ($mill)	5083.0	8768.0	27863	27831	14473	57101	38321	9355.0	d28559	d1742	*d4925*	*1525*							Working Cap'l ($mill)	*15725*
Long-Term Debt ($mill)	28987	53463	75427	97207	93735	91807	98667	109106	98959	95280	*85000*	*81800*							Long-Term Debt ($mill)	*71500*
Shr. Equity ($mill)	111547	119355	128249	134047	107147	90488	65339	63090	50672	62146	*68075*	*71050*							Shr. Equity ($mill)	*79450*
Return on Total Cap'l	28.4%	31.3%	23.2%	21.8%	30.8%	31.5%	36.5%	55.8%	67.7%	63.0%	*69.0%*	*71.0%*							Return on Total Cap'l	*85.0%*
Return on Shr. Equity	35.4%	44.7%	35.6%	36.1%	55.6%	61.1%	87.9%	150.1%	197.0%	155.9%	*151%*	*150%*							Return on Shr. Equity	*158%*
Retained to Com Eq	25.4%	35.0%	26.2%	26.5%	42.8%	45.5%	66.3%	127.1%	167.7%	131.7%	*129%*	*127%*							Retained to Com Eq	*135%*
All Div'ds to Net Prof	28%	22%	27%	26%	23%	26%	25%	15%	15%	16%	*15%*	*15%*							All Div'ds to Net Prof	*15%*

CAPITAL STRUCTURE as of 6/29/24
Total Debt $98.3 bill. **Due in 5 Yrs** $50.0 bill.
LT Debt $86.2 bill. **LT Interest** $3.9 bill. (56% of Cap'l)

Leases, Uncapitalized Annual rentals $2.0 bill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 15,222 mill. shs.

MARKET CAP: $3.4 trillion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/29/24
Cash Assets	62639	48304	61801
Receivables	26278	28184	22795
Inventory (FIFO)	6580	4946	6165
Other	39339	53971	34674
Current Assets	134836	135405	125435
Accts Payable	54763	64115	47574
Debt Due	15613	21110	12114
Other	55105	68757	71936
Current Liab.	125481	153982	131624

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	15.0%	14.5%	*9.0%*
"Cash Flow"	16.0%	16.5%	*8.5%*
Earnings	16.0%	19.0%	*8.0%*
Dividends	18.0%	7.5%	*8.5%*
Book Value	-2.0%	-10.5%	*10.5%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) A Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2021	111439	89584	81434	83360	365817
2022	123945	97278	82959	90146	394328
2023	117154	94836	81797	89498	383285
2024	119575	90753	85777	*94245*	*390350*
2025	*125000*	*100000*	*96000*	*99000*	*420000*

Fiscal Year Ends	EARNINGS PER SHARE A B Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2021	1.67	1.40	1.30	1.24	5.61
2022	2.10	1.52	1.20	1.29	6.11
2023	1.88	1.52	1.26	1.46	6.13
2024	2.18	1.53	1.40	*1.54*	*6.65*
2025	*2.30*	*1.70*	*1.45*	*1.65*	*7.10*

Calendar	QUARTERLY DIVIDENDS PAID E Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.193	.205	.205	.205	.81
2021	.205	.22	.22	.22	.87
2022	.22	.23	.23	.23	.91
2023	.23	.24	.24	.24	.95
2024	.24	.25	.25		

BUSINESS: Apple Inc., established in 1977, is one of the world's largest makers of PCs and peripheral and consumer products, such as the *iPhone* smartphone, the *Apple Watch*, the *iPad* tablet, and its *Mac* line of personal computers, for sale primarily to the business, creative, education, government, and consumer markets. It also sells operating systems, services like *iCloud* storage and *Apple Pay*, and a host of digital content from the popular *iTunes* store and other portals. Research and development: 7.8% of '23 sales. Has approximately 161,000 employees. Off./dir. own less than 1.0% of common stock; Vanguard, 8.3%; BlackRock, 6.7% (1/24 Proxy). CEO: Tim Cook. Inc.: CA. Addr.: One Apple Park Way, Cupertino, CA 95014. Tel.: 408-996-1010. Internet: www.apple.com.

Apple's financial comparisons improved in the June quarter. Revenues increased 5%, to $85.8 billion, setting a new June-period record (year ends September 28th). Notably, the Services category (the second largest) increased 14%, to $24.2 billion, also an all-time high. Sales of *iPad*s were also strong, jumping 24%, to $7.2 billion, thanks, in part, to the launches of the new *iPad Pro* and *iPad Air*. Although sales of the flagship *iPhone* dipped 1%, they grew on a constant currency basis. Meanwhile, per-share profits advanced 11% versus the year-ago period, to $1.40, topping our and the Street's estimate by a nickel.

The company is on course to close out the fiscal year on a positive note, and carry that momentum into 2025. Apple's installed base of active devices are at record levels in all geographic regions. And we expect this to keep growing thanks to recent platform updates, such as Apple Intelligence, which incorporates OpenAI's ChatGPT across its operating systems. Elsewhere, Apple continues to add immersive content to *Vision Pro*, such as concerts, films, and series. For the year, we look for earnings to advance around 8%, to about $6.65 a share, with a similarly sized gain likely in fiscal 2025.

The services division remains a key part of the company's long-term growth strategy. Apple saw a double-digit increase in paid subscriptions in the June quarter, to over one billion accounts, or more than double the figure from just four years ago. A good part of this can be attributed to management's ongoing efforts to broaden the range of offerings with new content for *Apple TV+* and *Apple Arcade*, as well as adding new features for *iCloud*, and *Apple Pay*, among others. As such, we look for this higher-margin business to continue expanding at a double-digit pace in the quarters ahead.

These timely high-quality shares are best suited to risk-averse accounts. With the stock up about 35% from the 2024 low, upside potential out to 2027-2029 is now below average. On a risk-adjusted basis, price appreciation prospects are decent, but even conservative accounts may want to hold off for a better entry point.

Mario Ferro *September 20, 2024*

(A) Fiscal year ends last Saturday in September. **(B)** Diluted earnings. Quarters may not add to total due to rounding/changes in the share count. Next earnings report due late October. **(C)** In millions, adjusted for splits. **(D)** Depreciation on accelerated basis. **(E)** New dividend policy adopted 3/12. Payments typically made in February, May, August, and November.

Company's Financial Strength	A+
Stock's Price Stability	85
Price Growth Persistence	100
Earnings Predictability	85

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ABBOTT LABS. NYSE-ABT

RECENT PRICE 114.07 | P/E RATIO 22.9 (25.2 / 22.0) | RELATIVE P/E RATIO 1.26 | DIV'D YLD 1.9% | VALUE LINE

TIMELINESS 3 Raised 10/27/23
SAFETY 1 New 4/12/13
TECHNICAL 3 Raised 10/4/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

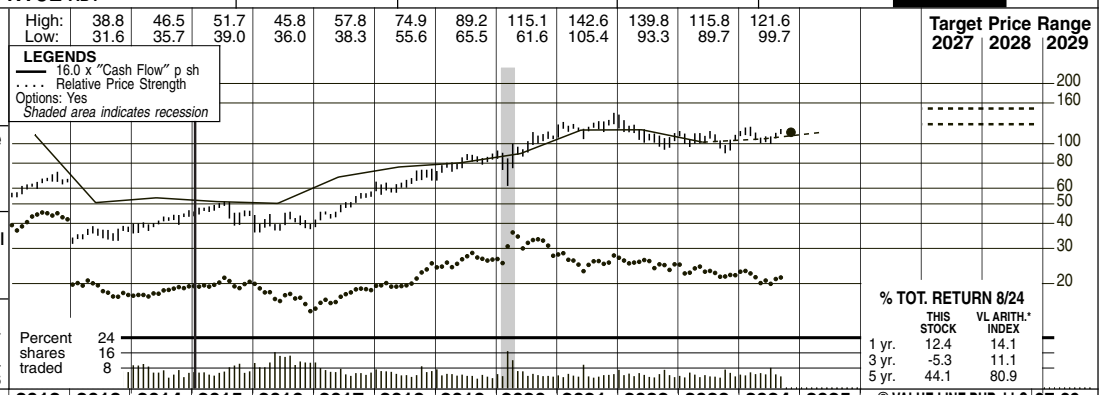
Low-High	Midpoint (% to Mid)
$99-$147	$123 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	150	(+30%)	*11%*
Low	125	(+10%)	*7%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	1227	1294	1251
to Sell	1276	1241	1324
Hld's(000)	1311449	1295328	1323186



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
19.40	19.82	22.73	24.74	25.29	14.11	14.80	13.86	14.16	15.71	17.42	18.10	19.54	24.42	25.12	23.13	*24.15*	*25.80*	Sales per sh	*29.45*
4.32	5.09	5.90	6.61	6.91	3.17	3.35	3.21	3.15	4.26	4.79	5.01	5.58	7.32	7.33	6.37	*6.60*	*7.15*	"Cash Flow" per sh	*8.55*
3.03	3.72	4.17	4.66	4.99	2.01	2.28	2.15	2.20	2.50	2.88	3.24	3.65	5.21	5.34	4.44	*4.65*	*5.15*	Earnings per sh A	*6.30*
1.44	1.60	1.76	1.88	2.01	.56	.88	.96	1.04	1.06	1.12	1.28	1.44	1.80	1.88	2.04	*2.20*	*2.28*	Div'ds Decl'd per sh B■	*2.52*
.85	.70	.66	.95	1.14	.74	.71	.75	.76	.65	.79	.93	1.23	1.07	1.02	1.27	*1.20*	*1.20*	Cap'l Spending per sh	*1.20*
11.48	14.73	14.47	15.56	16.95	16.26	14.27	14.40	13.94	17.72	17.39	17.64	18.51	20.30	21.11	22.26	*23.00*	*23.90*	Book Value per sh C	*26.55*
1522.4	1551.9	1547.0	1570.4	1576.7	1548.1	1508.0	1472.7	1472.9	1743.6	1755.6	1762.5	1771.2	1764.1	1737.8	1734.1	*1738.0*	*1736.0*	Common Shs Outst'g D	*1731.0*
18.3	13.0	12.2	11.0	12.6	17.8	18.0	21.5	18.4	19.4	22.3	24.9	26.3	23.3	21.0	23.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.0*
1.10	.87	.78	.69	.80	1.00	.95	1.08	.97	.98	1.20	1.33	1.35	1.26	1.21	1.32			Relative P/E Ratio	*1.20*
2.6%	3.3%	3.5%	3.7%	3.2%	1.6%	2.1%	2.1%	2.6%	2.2%	1.7%	1.6%	1.5%	1.5%	1.7%	2.0%			Avg Ann'l Div'd Yield	*1.8%*
22324	20405	20853	27390	30578	31904	34608	43075	43653	40109	*42000*	*44800*	Sales ($mill)	*51000*
26.4%	17.0%	17.9%	13.5%	19.1%	20.3%	21.6%	24.3%	23.8%	21.1%	*21.0%*	*21.5%*	Operating Margin	*24.0%*
1548.0	1472.0	1353.0	3021.0	3278.0	3014.0	3327.0	3538.0	3267.0	3243.0	*3400*	*3500*	Depreciation ($mill)	*3900*
3503.0	3258.0	3281.0	4400.0	5131.0	5810.0	6552.0	9367.0	9466.0	7802.0	*8080*	*8940*	Net Profit ($mill)	*10900*
17.9%	15.0%	9.6%	29.9%	14.1%	14.0%	15.0%	15.5%	15.7%	14.0%	*15.0%*	*15.0%*	Income Tax Rate	*15.0%*
15.7%	16.0%	15.7%	16.1%	16.8%	18.2%	18.9%	21.7%	21.7%	19.5%	*19.2%*	*20.0%*	Net Profit Margin	*21.4%*
4729.0	4969.0	20116	11235	5620.0	4804.0	8534.0	11134	9735.0	8829.0	*9000*	*9300*	Working Cap'l ($mill)	*10500*
3408.0	5871.0	20681	27210	19359	16661	18527	17296	14522	13599	*12500*	*12500*	Long-Term Debt ($mill)	*13500*
21526	21211	20538	30897	30524	31088	32784	35802	36686	38603	*40000*	*41500*	Shr. Equity ($mill)	*46000*
14.2%	12.1%	8.4%	8.2%	11.0%	12.8%	13.3%	18.1%	19.0%	15.6%	*16.0%*	*17.0%*	Return on Total Cap'l	*19.0%*
16.3%	15.4%	16.0%	14.2%	16.8%	18.7%	20.0%	26.2%	25.8%	20.2%	*20.0%*	*21.5%*	Return on Shr. Equity	*23.5%*
10.0%	8.6%	8.5%	8.3%	10.3%	11.4%	12.2%	17.2%	16.8%	11.0%	*10.5%*	*12.0%*	Retained to Com Eq	*14.0%*
38%	44%	47%	42%	38%	39%	39%	34%	35%	46%	*47%*	*44%*	All Div'ds to Net Prof	*40%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $14.7 bill. **Due in 5 Yrs** $6.9 bill.
LT Debt $13.1 bill. **LT Interest** $.6 bill.
(25% of Capital)

Leases, Uncapitalized Annual rentals $278 mill.

Pension Assets-12/23 $13.1 bill. **Oblig.** $10.0 bill.

Preferred Stock None

Common Stock 1,739,897,004 shares

MARKET CAP: $198 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	9882	6896	6987
Receivables	6218	6565	6854
Inventory (FIFO)	6173	6570	6814
Other	2951	2639	2464
Current Assets	25224	22670	23119
Accts Payable	4607	4295	4125
Debt Due	2251	1080	1615
Other	8631	8466	8020
Current Liab.	15489	13841	13760

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	1.5%	9.0%	*4.0%*
"Cash Flow"	2.5%	11.5%	*3.5%*
Earnings	2.5%	14.5%	*4.0%*
Dividends	2.5%	12.0%	*5.0%*
Book Value	2.5%	5.5%	*4.0%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	10456	10223	10928	11468	43075
2022	11895	11257	10410	10091	43653
2023	9747	9978	10143	10241	40109
2024	9964	10377	10635	*11024*	*42000*
2025	*10700*	*11100*	*11300*	*11700*	*44800*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.32	1.17	1.40	1.32	5.21
2022	1.73	1.43	1.15	1.03	5.34
2023	1.03	1.08	1.14	1.19	4.44
2024	.98	1.14	1.21	*1.32*	*4.65*
2025	*1.18*	*1.27*	*1.33*	*1.37*	*5.15*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.36	.36	.36	.36	1.44
2021	.45	.45	.45	.45	1.80
2022	.47	.47	.47	.47	1.88
2023	.51	.51	.51	.51	2.04
2024	.55	.55	.55	.55	

BUSINESS: Abbott Laboratories discovers, develops, manufactures, and sells health care products worldwide. The company has four reportable segments: Medical Devices (42% of 2023 sales); Diagnostic Products (25%); Nutritional Products (20%); and Established Pharmaceutical Products (13%). Completed separation of branded pharmaceuticals business AbbVie (1/13). Completed sale of Abbott Medical Optics (2/17). Acquired St. Jude (1/17) and Alere (10/17). Has about 114,000 employees. Officers and directors own less than 1% of common stock; Vanguard Group, 9.0%; BlackRock, 7.7% (3/24 proxy). Chairman, President & Chief Executive Officer: Robert B. Ford. Inc.: IL. Addr.: 100 Abbott Park Road, Abbott Park, IL 60064. Tel.: 847-937-6100. Internet: www.abbott.com.

Abbott Laboratories performed well in the third quarter. The healthcare giant reported adjusted earnings of $1.21 a share on total sales of $10.64 billion, marking solid improvement versus $1.14 and $10.14 billion in the comparable year-ago period. The results were highlighted by continued momentum in the core Medical Device business (45% of the top line), where sales increased 12% on the back of double-digit gains in the Diabetes Care, Structural Heart, Electrophysiology, and Heart Failure product segments. The Established Pharmaceuticals division provided additional support to comparisons (sales +3%), helping to offset lingering weakness in Diagnostics (-2%) and some softness in Nutrition (flat). The former continued to be pressured by reduced COVID-19 testing demand, while the latter was weighed down by poor execution in the international pediatric business.

We are maintaining our 2024 earnings call of $4.65 a share. Third-quarter earnings were directly in line with our estimate and leadership did not provide much change to its full-year outlook. The company now expects 2024 adjusted earnings in the range of $4.64-$4.70 a share (previously $4.61-$4.71), implying annual growth of 5% at the midpoint. We expect sales to come in around $42 billion.

Our model suggests an acceleration to $5.15 a share in 2025. Abbott's 2023 results were hit hard by significant erosion in COVID-19 testing-related sales. This remained a drag on performance in 2024, but has eased over the course of the year and should continue to do so in the coming quarters. With Diagnostics potentially returning to growth, and the Medical Device business firing on all cylinders, Abbott appears well positioned to deliver stronger bottom-line improvement in 2025.

The stock holds an Average (3) rank for Timeliness. With strong defensive characteristics and its Dividend Aristocrat status, Abbott represents a solid core holding in the healthcare space. The equity has shown nice momentum of late, but is still trading below the $120-a-share highs we saw earlier this year. At these levels, the stock offers decent, but not overly compelling, risk-adjusted total return potential over the next 18 months.

Michael Ratty *November 8, 2024*

Company's Financial Strength	A+
Stock's Price Stability	95
Price Growth Persistence	75
Earnings Predictability	75

(A) Diluted earnings. Excludes nonrecurring gain/(losses): '08, 19¢; '10, ($1.21); '11, ($1.65); '12, ($1.27); '13, (39¢); '14, (79¢); '15, 77¢; '16, ($1.26); '17, ($2.23); '18, ($1.55); '19, ($1.18); '20, ($1.15); '21, ($1.27); '22, ($1.43); '23, ($1.18). Next egs. report due late January. **(B)** Dividends historically paid in February, May, August, and November. ■ Dividend reinvestment plan available. **(C)** Includes intangibles. In '23: $32.5 billion, $18.74 a share. **(D)** In millions. **(E)** Data post-2012 reflect the spinoff of the pharma. operation (AbbVie).

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ASSURANT, INC. NYSE-AIZ

RECENT PRICE 194.37 | P/E RATIO 12.8 (Trailing: 12.9 Median: 16.0) | RELATIVE P/E RATIO 0.69 | DIV'D YLD 1.5% | VALUE LINE

TIMELINESS 3 Lowered 11/1/24
SAFETY 2 Raised 5/16/14
TECHNICAL 2 Raised 10/18/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$167-$279	$223 (15%)

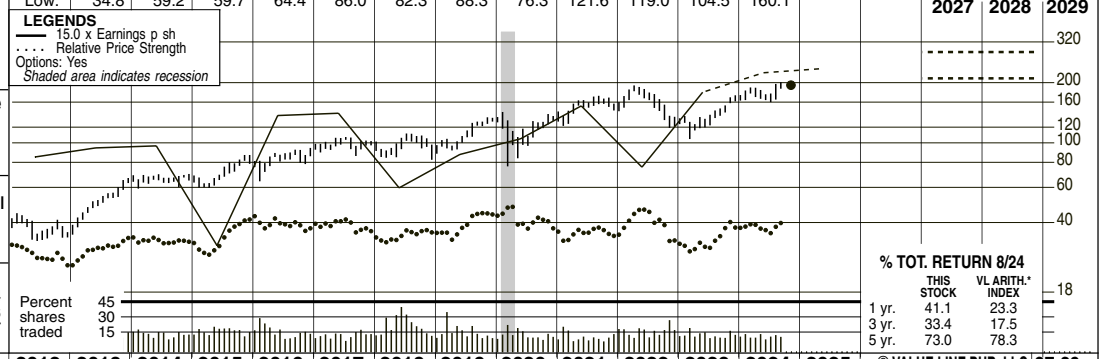
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	285	(+45%)	*11%*
Low	210	(+10%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	272	237	256
to Sell	188	232	237
Hld's(000)	48373	48242	49418

	2027	2028	2029
Target Price Range			



% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	41.1	23.3
3 yr.	33.4	17.5
5 yr.	73.0	78.3

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
67.53	64.73	72.58	80.49	92.00	108.03	124.56	126.82	89.51	84.02	99.45	133.79	143.92	153.75	165.92	180.69	*192.15*	*213.25*	Premium Inc per sh	*248.90*
6.60	5.99	6.89	7.79	9.07	9.05	9.47	9.51	9.22	9.42	9.67	11.26	9.92	5.64	6.89	9.41	*10.30*	*11.75*	Investment Inc per sh	*15.55*
3.77	4.09	2.50	5.58	5.67	6.30	6.44	2.05	9.13	9.39	3.98	5.84	6.99	10.20	5.05	11.95	*14.95*	*15.70*	Earnings per sh [A]	*16.40*
.54	.59	.63	.70	.81	.96	1.06	1.37	2.03	2.15	2.28	2.43	2.55	2.66	2.74	2.82	*2.88*	*2.96*	Div'ds Decl'd per sh [B]	*3.20*
31.61	41.61	46.87	56.79	65.92	67.29	74.77	68.70	73.26	81.47	82.53	94.25	102.62	98.46	80.04	92.57	*106.40*	*123.50*	Book Value per sh [C]	*174.05*
117.37	116.65	102.00	88.52	78.66	71.83	69.30	65.85	55.94	52.42	61.91	59.95	57.97	55.75	52.83	51.96	*51.00*	*49.00*	Common Shs Outst'g [D]	*45.00*
172%	64%	76%	66%	57%	76%	88%	104%	114%	121%	118%	118%	115%	155%	201%	148%			Price to Book Value	*165%*
14.4	6.5	14.3	6.7	6.6	8.2	10.3	34.8	9.2	10.5	24.4	19.0	16.9	15.0	31.8	11.4	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.0*
.87	.43	.91	.42	.42	.46	.54	1.75	.48	.53	1.32	1.01	.87	.81	1.84	.64			Relative P/E Ratio	*.85*
1.0%	2.2%	1.8%	1.9%	2.2%	1.9%	1.6%	1.9%	2.4%	2.2%	2.3%	2.2%	2.2%	1.7%	1.7%	2.1%			Avg Ann'l Div'd Yield	*1.4%*
8632.1	8351.0	5007.4	4404.1	6156.9	8020.0	8342.7	8572.1	8765.3	9388.0	*9800*	*10450*	Premium Inc ($mill)	*11200*
656.4	626.2	515.7	493.8	598.4	675.0	574.9	314.4	364.1	489.1	*525*	*575*	Investment Inc ($mill)	*700*
1032.3	1318.6	1846.2	31.0	- -	- -	- -	- -	1239.5	1323.2	*1400*	*1475*	Other Income ($mill)	*1650*
10321	10296	7369.3	4928.9	6755.3	8695.0	8917.6	8886.5	10369	11200	*11725*	*12150*	Total Income ($mill)	*13550*
4405.3	4742.5	1808.5	1870.6	2342.6	2654.7	2549.3	2195.7	2359.8	2521.8	*2600*	*2700*	Benefits & Reserves ($m)	*3100*
36.7%	29.6%	33.4%	NMF	24.3%	30.2%	14.1%	21.6%	20.9%	20.4%	*21.0%*	*23.0%*	Income Tax Rate	*23.0%*
470.9	141.6	565.4	519.6	251.0	382.6	441.8	613.5	276.6	642.5	*765*	*770*	Net Profit ($mill)	*740*
69.7	- -	4.3	3.6	5.3	- -	- -	- -	5.3	5.3	*10.0*	*15.0*	Insur in Force ($bill)	*25.0*
31562	30043	29709	31843	41089	44291	44650	33912	33124	33635	*34500*	*38000*	Total Assets ($mill)	*52000*
5181.3	4524.0	4098.1	4270.6	5112.0	5652.8	5951.4	5489.7	4228.7	4809.5	*5425*	*6050*	Shr. Equity ($mill) [C]	*7830*
9.1%	3.1%	13.8%	12.2%	4.9%	6.8%	7.4%	11.2%	6.5%	13.4%	*14.0%*	*12.5%*	Return on Shr. Equity	*9.5%*
7.6%	1.0%	10.7%	9.4%	2.0%	3.8%	4.5%	8.2%	3.0%	10.2%	*11.5%*	*10.5%*	Retained to Com Eq	*7.5%*
16%	67%	22%	23%	59%	44%	39%	26%	54%	24%	*19%*	*19%*	All Div'ds to Net Prof	*20%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $2082 mill. **Due in 5 Yrs** $475.0 mill.
LT Debt $2082 mill. **LT Interest** $108 mill.
(LT Interest Earned: 8.5x)
(29% of Cap'l)
Leases, Uncapitalized: Annual rentals: $15.8 mill.

Pension Assets-12/23 $636.7 mill.
Oblig. $599.8 mill.
Pfd Stock None
Common Stock 51,793,255 shs
as of 8/2/24

MARKET CAP: $10.1 billion (Mid Cap)

FINANCIAL POSITION ($MILL.)	2022	2023	6/30/24
Investments	7525	8221	8525
Cash & equiv.	1692	1627	1713
Premiums Due	2406	2266	1815
Other	21501	21521	21680
Total Assets	33124	33635	33733
Notes Payable	- -	- -	- -
Debt	2130	2081	2082
Other	26765	26745	26687
Total Liab.	28895	28826	28769

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Premium Inc	- -	8.0%	*NMF*
Earnings	- -	1.0%	*9.5%*
Dividends	- -	16.5%	*2.5%*
Book Value	- -	11.0%	*8.0%*

Calendar	QUARTERLY PREMIUM INC. ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2106	2151	2140	2178	8572.1
2022	2136	2169	2197	2263	8765.3
2023	2266	2343	2357	2422	9388.0
2024	2003	2445	*2450*	*2902*	*9800*
2025	*2300*	*2450*	*2500*	*3200*	*10450*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2.41	3.01	2.58	2.20	10.20
2022	2.59	.95	.14	1.27	5.05
2023	2.12	2.90	3.54	3.42	11.95
2024	4.47	3.58	*3.15*	*3.75*	*14.95*
2025	*4.70*	*3.80*	*3.30*	*3.90*	*15.70*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.63	.63	.63	.66	2.55
2021	.66	.66	.66	.68	2.66
2022	.68	.68	.68	.70	2.74
2023	.70	.70	.70	.72	2.82
2024	.72	.72	.72		

BUSINESS: Assurant, Inc. provides specialized insurance products and related services primarily in North America, South America, and Europe. The company operates in three segments: Global Housing (homeowners insurance); Global Lifestlye (offers domestic and international extended service contracts); Corp. & Other. Exited the health insurance market (2016), sold its Employee Benefits segment (3/16) and Global Preneed business (8/21). Acq'd The Warranty Group (5/18). 13,600 emplys. 12/31/23. President and CEO: Keith W. Demmings. Offs./dirs. own less than 1% of com. stk.; The Vanguard Group, 13.1%; BlackRock, 10.4%; T.Rowe Price, 9.8% (4/24 proxy). Inc.: DE. Addrs.: 260 Interstate North Circle SE, Atlanta, GA 30339. Tel.: 770-763-1000. Internet:www.assurant.com.

Assurant's stock price has been flirting with new all-time highs. The equity is up more than 10% since our August review, reaching an all-time high price of over $200 in late September, thanks to a couple of healthy earnings reports. Granted, the stock's valuation took a breather in recent weeks, subsequent to Hurricane Helene's landfall in late September. This caused AIZ's stock price to retrace some of those gains, as large catastrophe losses typically take a toll on profitability. Persistent share repurchases remain on tap for the year ahead, as there is close to $600 million left on the current authorization and management expects to be on the high end of the $200 million to $300 million share repurchase range for 2024. Stock buybacks usually are put in place to mitigate the effects from higher catastrophes that typically occur in the third quarter, due to the hurricane season. **The Global Housing segment will probably be a growth driver in the near term.** Second-quarter share earnings of $3.58 came in above our call of $3.10, due in large part to strong EBITDA growth across the Global Housing unit from last year's repositioning efforts. For the most part, the homeowners arm is demonstrating double-digit gains, thanks to new client wins and benefits from lender-placed premium rate increases. Although the Global Housing segment comprises about a quarter of Assurant's premium income, increasing demand for its offerings and its recent recovery augur well. Through its enhanced digital platforms and service capabilities, the company signed new clients that are expected to roll out in the coming months. Meantime, new program investments should begin to support the Global Lifestyle unit. That segment has been dealing with mediocre automotive results due to elevated claim costs and reduced mobile trade-in volumes through the first half of 2024, as consumers hold on to their phones longer. Furthermore, the high interest-rate environment should continue to ease.

This good-quality stock is now ranked 3 (Average) for Timeliness. At the elevated price, both thedividend yield and 3- to 5-year appreciation potential are below average.

Oriatal J. Haiby *November 1, 2024*

(A) Diluted earnings. Next earnings report due early February. Earnings may not sum due to changes in shares outstanding.
(B) Dividends historically paid in mid-March, June, September, and December.
(C) Includes intangibles. In 2023, $3175.9 million, $61.13 per share.
(D) In millions.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	100
Earnings Predictability	45

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AKAMAI TECH., INC. NDQ-AKAM

RECENT PRICE 100.72 | P/E RATIO 23.8 (Trailing: 24.9 Median: 31.0) | RELATIVE P/E RATIO 1.29 | DIV'D YLD Nil | VALUE LINE

TIMELINESS 3 Lowered 6/28/24
SAFETY 2 Raised 4/5/24
TECHNICAL 4 Raised 9/20/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$85-$164	$125 (25%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	200	(+100%)	*19%*
Low	145	(+45%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	361	355	289
to Sell	320	370	424
Hld's(000)	144027	139043	143004

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	53.6	65.4	78.4	71.0	71.6	83.1	93.1	120.0	124.9	123.3	120.6	129.2
Low:	32.6	45.6	50.6	39.4	44.7	58.3	57.2	75.2	92.6	76.3	70.7	87.6

LEGENDS
20.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-3.1	14.1
3 yr.	-10.1	11.1
5 yr.	14.3	80.9

Akamai Technologies, Inc. was founded in April 1999, and on October 29, 1999, sold nine million shares to the public at $26.00. The underwriting syndicate was led by Morgan Stanley Dean Witter. In 10/05, the company sold twelve million shares to the public at $17.00. Deutsche Bank Securities Inc. was the prime underwriter.

CAPITAL STRUCTURE as of 6/30/24

Total Debt $3542.0 mill. **Due in 5 Yrs** $1147.8
LT Debt $2394.2 mill. **LT Interest** $55.4 mill. (34% of Cap'l)

Leases,Uncapitalized: Annual rentals $224.2 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 151,913,000 shs.

MARKET CAP: $15.3 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	1105.3	864.4	1637.2
Receivables	679.2	724.3	699.3
Other	185.1	216.2	234.0
Current Assets	1969.6	1804.9	2570.5
Accts Payable	145.4	146.9	124.5
Debt Due	- -	- -	1147.8
Deferred Revenue	105.1	- -	139.9
Other	568.4	689.1	533.7
Current Liab.	818.9	836.0	1945.9

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	11.5%	9.0%	*4.5%*
"Cash Flow"	12.0%	13.5%	*4.5%*
Earnings	11.0%	17.5%	*6.0%*
Dividends	- -	- -	*Nil*
Book Value	8.0%	8.5%	*3.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	842.7	852.8	860.3	905.4	3461.2
2022	904.0	903.3	881.9	927.5	3616.7
2023	915.7	935.7	965.5	995.0	3811.9
2024	987.0	979.6	*1005*	*1013.4*	*3985*
2025	*995*	*1020*	*1045*	*1065*	*4125*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	.94	.94	1.08	.97	3.93
2022	.82	.85	.78	.82	3.26
2023	.62	.84	1.04	1.03	3.52
2024	1.11	.86	*1.14*	*1.19*	*4.30*
2025	*1.05*	*1.10*	*1.25*	*1.25*	*4.65*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	11.01	12.40	13.51	14.73	16.66	17.86	19.66	21.56	23.11	25.21	*26.55*	*27.50*	Sales per sh	*30.00*
	3.26	3.50	3.75	3.48	4.50	5.67	6.36	7.49	7.13	7.40	*8.30*	*8.95*	"Cash Flow" per sh	*9.55*
	1.84	1.78	1.79	1.26	1.76	2.90	3.37	3.93	3.26	3.52	*4.30*	*4.65*	Earnings per sh A	*5.05*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
	1.16	1.76	1.04	1.50	1.34	2.22	3.16	2.05	1.54	3.03	*2.85*	*2.80*	Cap'l Spending per sh	*2.75*
	16.52	17.61	18.61	19.49	19.59	22.58	26.13	28.22	27.86	30.40	*32.50*	*33.65*	Book Value per sh B	*35.90*
	178.30	177.21	173.26	169.89	162.91	162.00	162.71	160.51	156.50	151.23	*150.00*	*150.00*	Common Shs Outst'g C	*150.00*
	31.4	38.4	30.8	44.2	40.4	27.6	30.4	28.0	30.3	26.9	*Bold figures are*		Avg Ann'l P/E Ratio	*34.0*
	1.65	1.93	1.62	2.22	2.18	1.47	1.56	1.51	1.75	1.50	*Value Line*		Relative P/E Ratio	*1.90*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*estimates*		Avg Ann'l Div'd Yield	*Nil*
	1963.9	2197.4	2340.0	2503.0	2714.5	2893.6	3198.1	3461.2	3616.7	3811.9	*3985*	*4125*	Sales ($mill)	*4500*
	37.5%	34.8%	35.5%	30.9%	31.6%	36.1%	38.0%	40.2%	35.5%	33.2%	*35.5%*	*36.5%*	Operating Margin	*36.5%*
	247.4	299.6	334.3	372.3	434.5	440.7	478.4	550.6	592.8	570.8	*600*	*645*	Depreciation ($mill)	*675*
	333.9	321.4	316.1	218.3	298.4	478.0	557.1	651.6	523.7	547.6	*645*	*695*	Net Profit ($mill)	*760*
	30.4%	29.6%	31.2%	30.9%	13.0%	10.0%	7.5%	8.6%	19.3%	16.3%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
	17.0%	14.6%	13.5%	8.7%	11.0%	16.5%	17.4%	18.8%	14.5%	14.4%	*16.2%*	*16.9%*	Net Profit Margin	*16.8%*
	928.6	920.8	935.3	845.0	1324.7	1538.3	1171.3	1130.1	1150.7	968.9	*1265*	*1300*	Working Cap'l ($mill)	*1375*
	604.9	624.3	640.1	662.9	874.1	1839.8	1906.7	1976.2	2285.3	3538.2	*2400*	*2000*	Long-Term Debt ($mill)	*1850*
	2945.3	3120.9	3224.4	3310.7	3191.9	3658.0	4251.3	4530.0	4360.2	4597.2	*4875*	*5050*	Shr. Equity ($mill) B	*5385*
	9.6%	8.8%	8.4%	5.7%	7.9%	9.1%	9.6%	10.6%	7.9%	6.8%	*9.0%*	*10.0%*	Return on Total Cap'l	*10.5%*
	11.3%	10.3%	9.8%	6.6%	9.3%	13.1%	13.1%	14.4%	12.0%	11.9%	*13.0%*	*14.0%*	Return on Shr. Equity	*14.0%*
	11.3%	10.3%	9.8%	6.6%	9.3%	13.1%	13.1%	14.4%	12.0%	11.9%	*13.0%*	*14.0%*	Retained to Com Eq	*14.0%*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

BUSINESS: Akamai Technologies, Inc. provides services for the delivery of content (video streaming) and business processes over the Internet. The company operates the world's largest and most widely used on-demand distributed computing platform, with more than 350,000 servers and approximately 1,200 networks around the world (as of 12/23). Acquired Cotendo, Inc., 3/12. Foreign customers accounted for about 48% of '23 revenues. Has approximately 9,800 employees. Officers and directors own 2.0% of the common stock (4/24 proxy). Chief Executive Officer: Tom Leighton. Chairman of the Board: Frederic V. Salerno. Incorporated: Delaware. Address: 145 Broadway, Cambridge, Massachusetts 02142. Telephone: 617-444-3000. Internet: www.akamai.com.

Shares of Akamai Technologies have regained some lost ground of late. Subsequent to a rough first half of 2024, the stock has rebounded more than 10% in price since our early July review. Much of the early year sell-off was attributed to isolated noise surrounding a large-scale customer, as well as management's relatively conservative financial outlook. To that end, second-quarter results held up well, despite modest profit growth. Moreover, we think the investment community viewed the recent dip as an attractive entry point into a well-positioned cyber security operator.

Our current-year top-line estimate falls at the midpoint of management's most recent forecast. June-period sales of $980 million improved 5% year over year, led by strong performances from the Security and Compute divisions. And from a geographical standpoint, growth was spearheaded by the U.S. (+6%), with modest expansion on the international front (+3%). On balance, sales are on pace to advance 5% this year, to $3.985 billion, followed by low-single-digit growth in 2025.

The balance sheet is in good shape. At the end of the second quarter, long-term debt obligations accounted for only 34% of total capital, while cash assets jumped above $1.6 billion. In our view, acquisitions are likely to remain par for the course. Strategic collaborations, such as the most recent partnership with Datadog, will probably be front and center, too.

Rapidly increasing cyber security threats, on a global scale, suggest that product demand will remain robust over the long haul. Indeed, there has been a noteworthy rise in cyber attacks, given escalating and lingering geopolitical tensions. These threats span numerous industries, such as financial institutions, governments, education, and healthcare, and thus ought to drive secular customer demand for cyber security solutions.

We continue to like the stock for investors with a holding period of 18 months or longer. Even after the recent price recovery, capital appreciation potential is attractive beyond one year. That said, Akamai shares are merely an Average selection (3) for relative year-ahead price performance.

Nicholas Patrikis *October 4, 2024*

(A) Diluted earnings. Quarterly earnings may not sum due to rounding or changes in share count. Next earnings report due early Nov.

(B) Includes intangibles: In 2023, $3386.6 mill., $22.39/sh.

(C) In millions.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	65
Earnings Predictability	65

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SMITH (A.O.) NYSE-AOS

RECENT PRICE **83.98** | P/E RATIO **20.9** (Trailing: 21.4 Median: 22.0) | RELATIVE P/E RATIO **1.14** | DIV'D YLD **1.5%** | **VALUE LINE**

TIMELINESS 3 Lowered 4/12/24
SAFETY 2 Raised 1/8/21
TECHNICAL 3 Lowered 10/4/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$71-$125	$98 (15%)

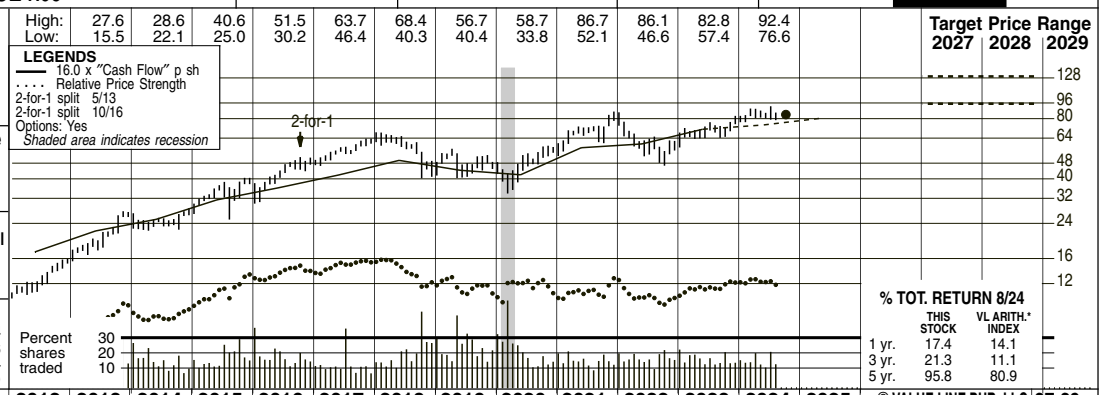
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	130	(+55%)	*13%*
Low	95	(+15%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	305	298	296
to Sell	279	310	304
Hld's(000)	113660	114035	111509

	2027	2028	2029
Target Price Range			



High:	27.6	28.6	40.6	51.5	63.7	68.4	56.7	58.7	86.7	86.1	82.8	92.4
Low:	15.5	22.1	25.0	30.2	46.4	40.3	40.4	33.8	52.1	46.6	57.4	76.6

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	17.4	14.1
3 yr.	21.3	11.1
5 yr.	95.8	80.9

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
11.80	10.24	8.14	9.27	10.49	11.80	13.18	14.42	15.49	17.46	18.96	18.43	17.90	22.45	24.83	26.12	*27.65*	*29.55*	Sales per sh	*37.10*
.79	.77	.65	.86	1.08	1.38	1.57	1.97	2.26	2.61	3.10	2.76	2.63	3.58	3.74	4.43	*4.60*	*5.05*	"Cash Flow" per sh	*6.45*
.49	.57	.43	.60	.78	1.03	1.22	1.58	1.85	2.17	2.61	2.22	2.12	3.02	3.14	3.81	*3.95*	*4.35*	Earnings per sh [A]	*5.55*
.12	.13	.14	.15	.18	.23	.30	.38	.48	.56	.76	.90	.98	1.06	1.14	1.22	*1.30*	*1.38*	Div'ds Decl'd per sh [B■]	*1.78*
.34	.29	.29	.29	.38	.54	.48	.41	.47	.55	.51	.40	.35	.48	.47	.49	*.75*	*.55*	Cap'l Spending per sh	*.60*
3.28	4.06	4.82	5.89	6.46	7.28	7.73	8.20	8.74	9.60	10.21	10.27	11.43	11.62	11.56	12.50	*13.50*	*14.80*	Book Value per sh [C]	*19.45*
195.30	194.44	182.97	184.48	184.88	182.48	178.80	175.90	173.44	171.66	168.16	162.37	161.77	157.65	151.18	147.53	*144.00*	*140.65*	Common Shs Outst'g [D]	*130.95*
11.9	10.1	20.3	16.6	16.4	20.2	20.3	21.6	23.0	25.4	22.2	21.8	22.6	22.8	19.7	18.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.0*
.72	.67	1.29	1.04	1.04	1.13	1.07	1.09	1.21	1.28	1.20	1.16	1.16	1.23	1.14	1.02			Relative P/E Ratio	*1.10*
2.1%	2.2%	1.6%	1.5%	1.4%	1.1%	1.2%	1.1%	1.1%	1.0%	1.3%	1.9%	2.0%	1.5%	1.8%	1.8%			Avg Ann'l Div'd Yield	*1.7%*
2356.0	2536.5	2685.9	2996.7	3187.9	2992.7	2895.3	3538.9	3753.9	3852.8	*3980*	*4155*	Sales ($mill)	*4860*
15.6%	18.2%	19.6%	19.7%	19.6%	18.2%	18.0%	19.4%	19.6%	21.7%	*21.5%*	*22.0%*	Operating Margin	*22.0%*
59.8	63.0	65.1	70.1	71.9	78.3	80.0	77.9	76.9	78.3	*80.0*	*82.0*	Depreciation ($mill)	*87.0*
221.0	282.9	326.5	378.3	449.2	370.0	344.9	487.1	488.7	574.8	*585*	*630*	Net Profit ($mill)	*755*
28.3%	29.7%	29.4%	27.4%	20.4%	21.6%	22.3%	22.1%	24.3%	23.5%	*24.0%*	*24.0%*	Income Tax Rate	*24.0%*
9.4%	11.2%	12.2%	12.6%	14.1%	12.4%	11.9%	13.8%	13.0%	14.9%	*14.7%*	*15.2%*	Net Profit Margin	*15.5%*
713.8	802.1	796.4	978.3	853.2	733.9	731.7	633.8	699.5	555.0	*575*	*580*	Working Cap'l ($mill)	*660*
210.1	236.1	316.4	402.9	221.4	277.2	106.4	189.9	334.5	117.3	*105*	*95.0*	Long-Term Debt ($mill)	*Nil*
1381.3	1442.3	1515.3	1648.8	1717.0	1666.8	1848.3	1832.2	1747.7	1844.4	*1945*	*2080*	Shr. Equity ($mill) [C]	*2550*
14.0%	17.1%	18.0%	18.7%	23.4%	19.3%	17.8%	24.2%	23.7%	29.6%	*29.0%*	*29.0%*	Return on Total Cap'l	*29.5%*
16.0%	19.6%	21.5%	22.9%	26.2%	22.2%	18.7%	26.6%	28.0%	31.2%	*30.5%*	*30.5%*	Return on Shr. Equity	*29.5%*
12.1%	14.9%	16.0%	17.1%	18.6%	13.2%	10.1%	17.3%	17.8%	21.2%	*20.5%*	*20.5%*	Retained to Com Eq	*20.0%*
25%	24%	26%	26%	29%	40%	46%	35%	36%	32%	*33%*	*32%*	All Div'ds to Net Prof	*32%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $140.4 mill. **Due in 5 Yrs** $90.2 mill.
LT Debt $130.4 mill. **LT Interest** $6.0 mill. (6% of Cap'l)
Leases, Uncapitalized Annual rentals $13.0 mill.
Pension Assets-12/23 $20.3 mill. **Oblig.** $26.7 mill.
Common Stock 145,845,344 shares.
Includes 25,886,364 Class A shares.
Class A shares have (10 times) super voting power for matters beyond director elections.
as of 7/22/24

MARKET CAP: $12.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	481.8	363.4	233.3
Receivables	581.2	596.0	649.9
Inventory (LIFO)	516.4	497.4	544.7
Other	54.3	43.5	53.4
Current Assets	1633.7	1500.3	1481.3
Accts Payable	625.8	600.4	574.6
Debt Due	10.0	10.0	10.0
Other	298.4	334.9	287.8
Current Liab.	934.2	945.3	872.4

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	9.0%	7.0%	*7.0%*
"Cash Flow"	13.5%	8.0%	*8.5%*
Earnings	15.5%	8.5%	*9.0%*
Dividends	20.0%	13.5%	*7.5%*
Book Value	6.0%	4.5%	*8.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	769.0	859.8	914.6	995.5	3538.9
2022	977.7	965.9	874.2	936.1	3753.9
2023	966.4	960.8	937.5	988.1	3852.8
2024	978.8	1024.3	*950*	*1026.9*	*3980*
2025	*1020*	*1045*	*1015*	*1075*	*4155*

Calendar	EARNINGS PER SHARE[A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.60	.73	.82	.87	3.02
2022	.77	.82	.69	.86	3.14
2023	.94	1.01	.90	.97	3.81
2024	1.00	1.06	*.90*	*.99*	*3.95*
2025	*1.07*	*1.14*	*1.01*	*1.13*	*4.35*

Calendar	QUARTERLY DIVIDENDS PAID [B■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.24	.24	.24	.26	.98
2021	.26	.26	.26	.28	1.06
2022	.28	.28	.28	.30	1.14
2023	.30	.30	.30	.32	1.22
2024	.32	.32	.32		

BUSINESS: A.O. Smith Corp. is a leading manufacturer of residential and commercial water heaters, boilers. and water treatment products. Has two reportable segments: North America (75% of '23 sales); and Rest of World (25%), which primarily serves China, Europe, and India. Brands include A.O. Smith, GSW, Lochinvar, Reliance, and Takagi. As of 12/23, had approximately 12,000 employees and 27 wholly-owned and leased manufacturing facilities. Smith Family Voting Trust owns 96.9% of Class A shares; Officers & directors, 1.8% of regular common; Vanguard Group, 11.6% (2/24 proxy). Chairman & CEO: Kevin J. Wheeler. Incorporated: Delaware. Address: 11270 West Park Place, Milwaukee, WI 53224. Telephone: 414-359-4130. Internet: www.aosmith.com.

We have lowered our 2024 share-earnings estimate for A.O. Smith by a dime. At $3.95, our new call represents a 4% increase over the $3.81 that the maker of water heaters and purifiers tallied in 2023. Key assumptions include revenues of $3.98 billion (up 3%, year over year) and modest profit-margin compression.

Our slightly less positive near-term stance reflects word that the September quarter got off to a disappointing start, both in North America and China. According to management, order flow in the U.S. slowed during the month of July. Our concern is that the deceleration is emblematic of underlying market weakness and not just the effect of so-called pre-buying ahead of announced price increases (that boosted the company's results in the March and June quarters, likely at the expense of the September interim).

A.O. Smith is increasing its bet on overseas markets outside of China. To wit, it recently agreed to acquire Pureit from Unilever for approximately $120 million in cash. Launched in Chennai, India in 2004, Pureit is now a leading marketer of residential water purification products, serving not only the South Asian country where it was founded but also the likes of Vietnam and Mexico. It will add about $60 million to A.O. Smith's annual sales and should be nicely accretive to earnings over the long term. That said, as per *Value Line* convention, our projections won't reflect any contribution from Pureit until the deal is completed (likely by the end of 2024).

We look for earnings to reach $5.55 a share by 2027–2029. Underpinning our generally positive outlook is an expectation that America's large housing deficit ultimately declines, as construction activity improves with lower interest rates and an increase in home affordability. Too, amid growing concern about water-supply contamination (from lead service lines and forever chemicals), sales of A.O. Smith's water-treatment products should remain strong.

These shares are ranked 3 (Average) for relative year-ahead price performance. At the recent quotation, we think that buy-and-hold investors will also find more attractive options elsewhere.

Nils C. Van Liew *October 4, 2024*

(A) Excludes nonrecurring gain/(losses): '08, ($0.21); '10, ($0.47); '12, $0.38; '14, ($0.15); '18, ($0.03); '22, (1.60). Also excludes disc. operations: '10, $1.18; '11, $4.18; '12, ($0.08). Next earnings report due late October.
(B) Dividends historically paid in mid-February, May, August & November. ■ Dividend reinvestment plan available.
(C) Includes intangible assets: In 2023: $970.1 mill., $6.58/sh. **(D)** In millions, adjusted for stock splits.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	80
Earnings Predictability	85

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AIR PRODUCTS NYSE-APD

RECENT PRICE 320.34 | P/E RATIO 23.5 (Trailing: 27.5 Median: 23.0) | RELATIVE P/E RATIO 1.26 | DIV'D YLD 2.2% | VALUE LINE

TIMELINESS 1 Raised 9/27/24
SAFETY 1 Raised 5/9/14
TECHNICAL 4 Lowered 10/11/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$258-$463	$361 (15%)

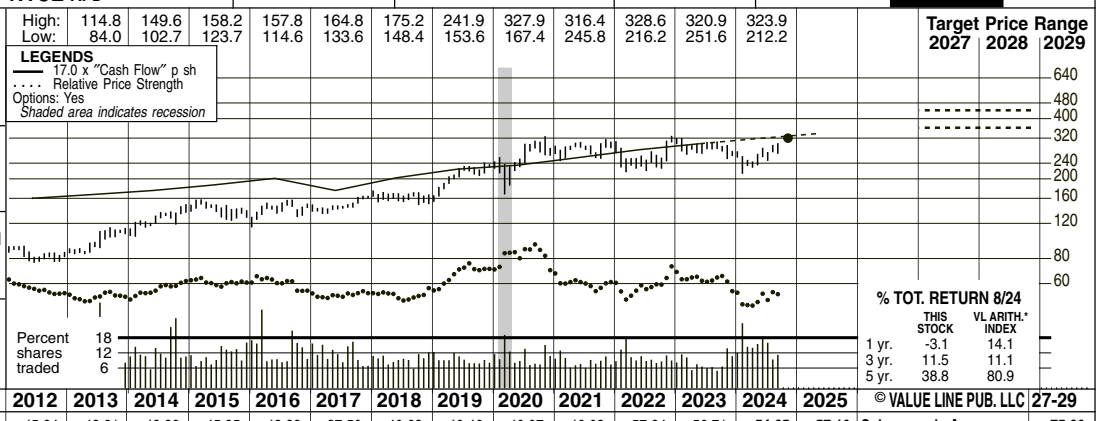
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	440	(+35%)	*10%*
Low	360	(+10%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	800	812	790
to Sell	742	775	726
Hld's(000)	187510	181663	195143

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	114.8	149.6	158.2	157.8	164.8	175.2	241.9	327.9	316.4	328.6	320.9	323.9								
Low:	84.0	102.7	123.7	114.6	133.6	148.4	153.6	167.4	245.8	216.2	251.6	212.2								
	49.75	39.08	42.22	47.97	45.24	48.21	48.89	45.95	43.82	37.50	40.68	40.46	40.07	46.63	57.24	56.71	***54.65***	***57.10***	Sales per sh [A]	***75.80***
	9.36	8.08	9.09	10.09	9.41	9.82	10.30	10.98	11.84	10.31	11.91	13.17	13.79	15.03	16.47	17.65	***18.75***	***19.80***	"Cash Flow" per sh	***25.80***
	4.97	4.06	5.02	5.73	5.40	5.50	5.78	6.57	7.55	6.31	7.45	8.21	8.38	9.05	10.41	11.51	***12.35***	***13.35***	Earnings per sh [B]	***17.00***
	1.70	1.79	1.92	2.23	2.50	2.77	3.02	3.20	3.39	3.71	4.25	4.64	5.18	6.00	6.36	6.87	***7.00***	***7.30***	Div'ds Decl'd per sh [C■]	***8.40***
	5.18	5.58	4.82	6.43	7.16	7.22	7.89	7.50	4.86	4.76	7.14	9.03	11.35	11.13	13.19	20.82	***21.50***	***23.45***	Cap'l Spending per sh	***17.60***
	24.03	22.68	25.94	27.57	30.48	33.35	34.49	33.66	32.57	46.19	49.46	50.15	54.66	61.16	59.25	64.41	***73.40***	***79.20***	Book Value per sh [D]	***92.65***
	209.33	211.26	213.80	210.19	212.48	211.18	213.54	215.36	217.35	218.35	219.52	220.42	221.02	221.40	221.84	222.20	***222.50***	***223.00***	Common Shs Outst'g [E]	***227.50***
	19.0	14.9	15.1	15.4	15.6	16.5	20.6	21.7	18.6	22.6	21.8	23.2	28.9	31.1	25.0	25.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***23.5***
	1.14	.99	.96	.97	.99	.93	1.08	1.09	.98	1.14	1.18	1.24	1.48	1.68	1.44	1.45			Relative P/E Ratio	***1.30***
	1.8%	3.0%	2.5%	2.5%	3.0%	3.1%	2.5%	2.2%	2.4%	2.6%	2.6%	2.4%	2.1%	2.1%	2.4%	2.4%			Avg Ann'l Div'd Yield	***2.1%***
							10439	9894.9	9524.4	8187.6	8930.2	8918.9	8856.3	10323	12699	12600	***12160***	***12735***	Sales ($mill) [A]	***17250***
							24.5%	28.4%	32.2%	30.9%	32.3%	35.9%	37.5%	34.3%	29.1%	32.2%	***32.0%***	***32.5%***	Operating Margin	***36.0%***
							956.9	936.4	925.9	865.8	970.7	1082.8	1185.0	1321.3	1338.2	1358.3	***1425***	***1445***	Depreciation ($mill)	***2000***
							1243.1	1427.7	1647.8	1385.9	1644.7	1819.4	1861.9	2006.7	2315.6	2562.9	***2745***	***2965***	Net Profit ($mill)	***3870***
							27.0%	24.0%	25.9%	23.4%	18.6%	19.4%	19.1%	18.6%	18.2%	18.9%	***20.0%***	***20.0%***	Income Tax Rate	***20.0%***
							11.9%	14.4%	17.3%	16.9%	18.4%	20.4%	21.0%	19.4%	18.2%	20.3%	***22.6%***	***23.3%***	Net Profit Margin	***22.4%***
							331.8	d737.3	1034.0	3387.7	2743.9	2797.4	6268.2	5577.2	2817.1	2530.3	***1200***	***1370***	Working Cap'l ($mill)	***925***
							4824.5	3949.1	4918.1	3402.4	2967.4	3227.4	7430.1	7150.3	7085.8	9431.3	***13935***	***14100***	Long-Term Debt ($mill)	***13900***
							7365.8	7249.0	7079.6	10086	10858	11054	12080	13540	13144	14313	***16335***	***17665***	Shr. Equity ($mill)	***21075***
							10.7%	13.2%	14.2%	10.7%	12.4%	13.2%	9.8%	10.0%	11.9%	11.4%	***9.0%***	***9.5%***	Return on Total Cap'l	***11.5%***
							16.9%	19.7%	23.3%	13.7%	15.1%	16.5%	15.4%	14.8%	17.6%	17.9%	***17.0%***	***17.0%***	Return on Shr. Equity	***18.5%***
							8.4%	10.3%	13.1%	5.9%	6.9%	7.5%	6.3%	5.5%	7.1%	7.5%	***7.0%***	***7.5%***	Retained to Com Eq	***9.5%***
							50%	47%	44%	57%	55%	55%	59%	63%	60%	58%	***59%***	***55%***	All Div'ds to Net Prof	***49%***



% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-3.1	14.1
3 yr.	11.5	11.1
5 yr.	38.8	80.9

CAPITAL STRUCTURE as of 6/30/24

Total Debt $13936.4 mill. **Due in 5 Yrs** $3731 mill.
LT Debt $12786.4 mill. **LT Interest** $293.5 mill.
(Total interest coverage: 17.5x) (44% of Cap'l)

Leases, Uncapitalized Annual rentals $111.0 mill.

Pension Assets-9/23 $5.26 bill **Oblig.** $3.43 bill.

Pfd Stock None
Common Stock 222,314,502 shs.

MARKET CAP: $71.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	3301.7	2234.4	2437.5
Receivables	1794.4	1725.4	1712.2
Inventory	514.2	709.3	755.6
Other	670.3	960.4	372.1
Current Assets	8376.3	5649.5	5277.4
Accts Payable	736.8	2717.9	3168.6
Debt Due	486.9	234.4	1150.0
Other	1575.4	166.9	115.9
Current Liab.	2799.1	3119.2	4474.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	1.5%	5.5%	*9.0%*
"Cash Flow"	5.5%	7.5%	*9.5%*
Earnings	6.5%	8.0%	*10.5%*
Dividends	10.0%	11.0%	*6.0%*
Book Value	7.5%	7.5%	*8.0%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) [AF] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	2374	2502	2606	2841	10323
2022	2994	2945	3189	3570	12698
2023	3174	3200	3033	3191	12600
2024	2977	2930	2986	***3267***	***12160***
2025	***3120***	***3055***	***3250***	***3310***	***12735***

Fiscal Year Ends	EARNINGS PER SHARE [ABF] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	2.12	2.08	2.31	2.51	9.05
2022	2.52	2.38	2.62	2.89	10.41
2023	2.64	2.74	2.98	3.15	11.51
2024	2.73	2.57	3.20	***3.85***	***12.35***
2025	***3.25***	***3.35***	***3.35***	***3.40***	***13.35***

Cal-endar	QUARTERLY DIVIDENDS PAID [C■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	1.16	1.34	1.34	1.34	5.18
2021	1.50	1.50	1.50	1.50	6.00
2022	1.50	1.62	1.62	1.62	6.36
2023	1.62	1.75	1.75	1.75	6.87
2024	1.75	1.77	1.77	1.77	

BUSINESS: Air Products and Chemicals, Inc. supplies a variety of atmospheric (oxygen, nitrogen) and process (hydrogen, helium) gases to energy, industrial, technology, and healthcare customers worldwide. The company is the world's largest supplier of hydrogen, with leading positions serving the refinery hydrogen, semiconductor materials, and natural gas liquefaction markets. FY2023: R&D: .9% of sales; foreign business: 59% of sales. Has about 23000 employees. Vanguard Group owns 9.3% of shares out.; BlackRock, 6.5%; State Farm Mutual, 6.4%; officers & directors, less than 1% (12/23 Proxy). Chairman, Pres. & CEO: Seifi Ghasemi. Inc.: DE. Addr.: 7201 Hamilton Blvd, Allentown, PA 18195. Telephone: 610-481-4911. Internet: www.airproducts.com.

Air Products has come under pressure from two major investors in the company's shares. Reports arose in early October that the investment firm Mantle Ridge purchased a $1 billion position in the company and now seeks a succession plan for CEO Seifi Ghasemi, as well as changes in strategy and capital allocation. Subsequently, an investment fund within D.E. Shaw (DESCO) announced it was seeking greater clarity on succession planning, as well, additionally objecting to the sizable $15 billion investment program it has announced in large decarbonization projects, a majority of which presently lack uptake agreements with future customers. DESCO investors perceive significant risk in creating such a large amount of uncommitted production capacity. Notable ventures include the NOEM green hydrogen project in Saudi Arabia, which has a considerable uptake agreement with France's TotalEnergies. It also points to APD's $7 billion blue hydrogen undertaking in Louisiana and notes that both are behind schedule and above budget.

Investors see risks with the new commitment to clean hydrogen, while management emphasizes its promise. We recall that the company is building hydrogen refueling networks to power vehicles on heavily trafficked routes in both Europe and California.

Air Products is planning for hydrogen powered cars and trucks in various regions—hence, the need for different kinds of hydrogen, Production facilities to produce green hydrogen use hydrolysis to split water molecules into oxygen and hydrogen, while blue hydrogen is derived from natural gas to produce oxygen, hydrogen, and carbon dioxide. The oxygen is used in the production of gasoline, while hydrogen is sold commercially and carbon dioxide is sequestered underground. In short, the company is preparing for a transition from petroleum powered transportation to hydrogen powered alternatives. Management announced a trial of the Mercedes Benz Gen H2 truck, a hydrogen-powered 18-wheeler to which it plans to transition its fleet.

Air Products shares are ranked 1 (Highest) for Timeliness and have appeal as a 18-month holding, as well.

Glenn Pierr Johnson *October 25, 2024*

(A) Fiscal year ends Sept. 30th. **(B)** Excl. nonrecurring gains/(losses): '10, (28¢); '11, (14¢); '12, (74¢); '13, (77¢); '14, ($1.19); '15, (69¢); '16, (61¢); '17, ($1.15); '18, (86¢); '19, (27¢); '20, (17¢); '21, 10¢; '22, 19¢; '23, (21¢). Excl. disc. ops.: '08, (82¢); '09, (4¢); '11, 4¢; '12, 78¢; '13, (5¢); '14, 2¢; '16, ($4.05); '17, $8.49; '18, 19¢; '20, 6¢; '21, 32¢; '22, 6¢; '23, 3¢. Next egs. due late January. **(C)** Divs. paid mid-Feb., May, Aug., and Nov. ■ Div. reinv. plan avail. **(D)** Incl. intang. In '23: $1.2 bill., $5.38/sh. **(E)** In mill. **(F)** Qtrs. may not sum.

Company's Financial Strength	A++
Stock's Price Stability	85
Price Growth Persistence	70
Earnings Predictability	100

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AUTOZONE, INC. NYSE-AZO

RECENT PRICE 3053.45 | P/E RATIO 20.5 (Trailing: 20.4 Median: 16.0) | RELATIVE P/E RATIO 1.13 | DIV'D YLD Nil | VALUE LINE

TIMELINESS 2 Lowered 10/11/24
SAFETY 3 New 2/19/93
TECHNICAL 2 Lowered 10/11/24
BETA .90 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$2624-$4322 $3473 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	5130	(+70%)	*14%*
Low	3420	(+10%)	*3%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	466	499	509
to Sell	471	486	465
Hld's(000)	16088	15738	15981

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	484.2	627.3	803.3	819.5	802.2	896.0	1274	1267	2110	2610	2750	3256						
Low:	342.0	472.5	569.5	681.0	491.1	590.8	798.4	684.9	1111	1703	2277	2510						
Sales per sh [A]	109.43	134.19	163.23	201.28	232.36	266.75	293.32	332.28	365.26	391.21	435.91	493.54	540.38	692.10	849.75	977.45	1092.16	*1184.40*
"Cash Flow" per sh	13.61	16.49	20.63	26.06	30.85	36.27	40.89	46.65	52.83	57.63	68.04	82.67	91.14	121.96	150.15	169.43	189.73	*208.95*
Earnings per sh [B]	10.04	11.73	14.97	19.47	23.48	27.79	31.57	36.03	40.70	44.07	51.28	63.43	71.93	95.19	117.19	132.36	149.55	*163.65*
Div'ds Decl'd per sh	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*
Book Value per sh [C]	3.85	d8.52	d16.38	d31.27	d41.81	d49.20	d50.21	d55.49	d61.39	d51.32	d59.06	d71.30	d37.56	d85.04	d185.03	d243.56	d280.57	*d304.70*
Common Shs Outst'g [D]	59.61	50.80	45.11	40.11	37.03	34.29	32.30	30.66	29.12	27.83	25.74	24.04	23.38	21.14	19.13	17.86	16.93	*16.00*
Avg Ann'l P/E Ratio	12.0	12.0	11.4	13.7	15.1	14.1	15.7	17.4	18.8	15.6	13.0	14.8	15.3	14.0	16.8	18.5	18.8	
Relative P/E Ratio	.72	.80	.73	.86	.96	.79	.83	.88	.99	.78	.70	.79	.79	.76	.97	1.07	1.05	
Avg Ann'l Div'd Yield	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	
Sales ($mill) [A]	9475.3	10187	10636	10889	11221	11864	12632	14630	16252	17457	18490	*18950*						
Gross Margin	54.7%	54.9%	55.5%	55.7%	56.3%	56.8%	56.7%	55.5%	54.9%	54.8%	56.1%	*56.5%*						
Operating Margin	22.0%	21.8%	22.2%	22.1%	22.1%	21.8%	22.3%	22.9%	22.8%	22.8%	23.5%	*23.0%*						
Number of Stores	5391	5609	5814	6029	6202	6411	6549	6767	6943	7140	7353	*7525*						
Net Profit ($mill)	1069.7	1160.2	1241.0	1280.9	1406.3	1617.2	1733.0	2170.3	2429.6	2528.4	2662.4	*2775*						
Income Tax Rate	35.7%	35.6%	35.1%	33.5%	28.2%	20.4%	21.8%	21.1%	21.1%	20.2%	*21.0%*	*21.0%*						
Net Profit Margin	11.3%	11.4%	11.7%	11.8%	12.5%	13.6%	13.7%	14.8%	14.9%	14.5%	14.4%	*14.6%*						
Working Cap'l ($mill)	d960.5	d742.6	d450.7	d155.0	d392.8	d483.4	528.8	d954.5	d1960	d1732	d1407	*d1350*						
Long-Term Debt ($mill) [E]	4162.9	4624.9	4924.1	5081.2	5005.9	5206.3	5513.4	5269.8	6122.1	7668.5	9024.4	*9250*						
Shr. Equity ($mill)	d1622	d1701	d1788	d1428	d1520	d1714	d878.0	d1798	d3539	d4350	d4750	*d4875*						
Return on Total Cap'l	45.2%	42.3%	42.0%	37.2%	43.0%	49.1%	39.6%	65.4%	97.9%	80.8%	*67.6%*	*67.0%*						
Return on Shr. Equity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*NMF*						
Retained to Com Eq	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*NMF*						
All Div'ds to Net Prof	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*						

Target Price Range 2027 | 2028 | 2029
5000 4000 3000 2500 1250 800 600 500 400

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	25.7	14.1
3 yr.	105.4	11.1
5 yr.	188.8	80.9

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CAPITAL STRUCTURE as of 5/4/24
Total Debt $8996.3 mill. **Due in 5 Yrs** $2900 mill.[E]
LT Debt $8496.3 mill.[E] **LT Interest** $306.4 mill.
(Total interest coverage: 13.3x)

Leases, Uncapitalized Annual rentals $287.6 mill.
No Defined Benefit Pension Plan
(On 12/19/17, the board of directors approved a resolution to terminate the company's pension plans, effective 3/15/18)

Preferred Stock None
Common Stock 16,926,000 shares
as of 8/31/24
MARKET CAP: $51.7 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	5/4/24
Cash Assets	264.4	277.1	275.4
Receivables	504.9	520.4	586.8
Inventory	5638.0	5764.1	6155.3
Other	220.7	217.8	272.0
Current Assets	6628.0	6779.4	7289.5
Accts Payable	7301.3	7201.3	7369.7
Debt Due[E]	92.9	86.9	500.0
Other	1194.2	1223.7	1322.9
Current Liab.	8588.4	8511.9	9192.6

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	13.5%	16.0%	*11.0%*
"Cash Flow"	17.0%	20.0%	*11.0%*
Earnings	17.0%	20.5%	*12.5%*
Dividends	- -	- -	*Nil*
Book Value	- -	- -	*NMF*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) [A] Nov.Per	Feb.Per	May Per	Aug.Per	Full Fiscal Year
2021	3154.3	2910.8	3651.0	4913.5	14629.6
2022	3668.9	3369.8	3865.2	5348.3	16252.2
2023	3985.0	3691.0	4090.6	5690.6	17457.2
2024	4190.3	3859.1	4235.5	6205.4	18490.3
2025	*4300*	*4000*	*4350*	*6300*	*18950*

Fiscal Year Ends	EARNINGS PER SHARE [AB] Nov.Per	Feb.Per	May Per	Aug.Per	Full Fiscal Year
2021	18.61	14.93	26.48	35.72	95.19
2022	25.69	22.30	29.03	40.51	117.19
2023	27.45	24.64	34.12	46.15	132.36
2024	32.55	28.89	36.69	48.11	149.55
2025	*33.95*	*30.00*	*44.65*	*55.05*	*163.65*

Cal-endar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

BUSINESS: AutoZone, Inc. is the leading retailer and distributor of automotive replacement parts and accessories in the Americas. As of 8/31/24, the company operated 6,432 stores in the U.S., including Puerto Rico and Saint Thomas; 794 stores in Mexico; and 127 stores in Brazil. Also, the company had a commercial sales program in 5,823 of its domestic stores and in all of its stores in Mexico and Brazil. It conducts sales through various websites, including www.alldata.com and www.alldatadiy.com. Employs over 119,000. Off. & dir. own 2.5% of common stock; Vanguard Group, 10.2%; BlackRock, 7.8% (10/23 Proxy). Chrmn.: William Rhodes; Pres. & CEO: Phil Daniele. Inc.: NV. Addr.: 123 South First St., Memphis, TN 38103. Telephone: 901-495-6500. Internet: www.autozone.com.

AutoZone exhibited strong performance in fiscal 2024. The company achieved higher top- and bottom-line results compared to the prior year in each respective quarter. Sales were boosted by the addition of 213 stores across the United States, Mexico, and Brazil, as well as increased demand for its products and services. Moreover, the gross margin benefited from LIFO (Last-in First-out) favorability, which helped elevate the operating margin despite a rise in payroll expenses. Although the net income margin fell by 10 basis points year-over-year, to 14.4%, the bottom line still achieved favorable comparisons. Earnings per share were positively impacted by the buyback of 1.1 million shares, reaching $149.55.

We anticipate another record year in fiscal 2025. Sales will likely continue to be driven by high demand and the expansion of new stores. Favorable pricing actions should help offset the rising costs of goods, potentially advancing the gross margin by approximately 40 basis points, to 56.5%. However, higher payroll expenses are expected to erode the operating margin by half a percentage point. Nonetheless, we expect weaker interest expenses compared to fiscal 2024, which could raise the net profit margin by 20 basis points, to 14.6%. The anticipated buyback of approximately 1 million additional shares would accelerate earnings-per-share growth.

Shareholders will likely continue benefiting from stock buybacks. In fact, the company had $2.2 billion remaining under its current share repurchase authorization at the end of the fiscal year. It is also worth noting that the board of directors has a history of increasing the limits of this program.

These shares hold an Above-Average rank (2) for Timeliness, indicating solid potential to outperform the broader market in the year ahead. Conservative investors may want to note the high scores for Price Stability and Earnings Predictability. However, the potential for gains in the intermediate- and long-term horizons are nothing to write home about. The absence of a dividend may also deter income-oriented accounts from opening a position here.

Collin Cicconi *October 18, 2024*

(A) Fiscal years end last Saturday in August. Fourth quarter is sixteen weeks. **(B)** Diluted earnings. May not sum to total due to changes in share count resulting from repurchasing activity. Excludes nonrecurring gains/(losses): FY '18, ($2.51). Next earnings report due mid December. **(C)** Includes intangible assets. In FY '24: $302.6 million, or $17.87 a share. **(D)** In millions. **(E)** Excludes finance lease liabilities (included in accrued expenses): FY'23, $86.9 million.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	80
Earnings Predictability	100

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BOOZ ALLEN NYSE-BAH

RECENT PRICE 182.62 | P/E RATIO 28.2 (Trailing: 30.8 Median: 19.0) | RELATIVE P/E RATIO 1.57 | DIV'D YLD 1.1% | VALUE LINE 378

TIMELINESS 2 Raised 11/8/24
SAFETY 2 Raised 11/18/22
TECHNICAL 4 Lowered 11/1/24
BETA .85 (1.00 = Market)

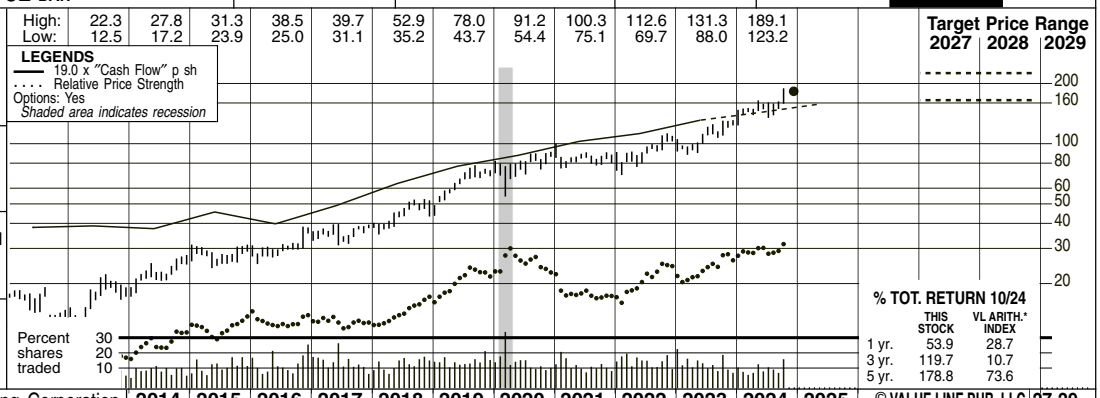
18-Month Target Price Range
Low-High Midpoint (% to Mid)
$155-$278 $217 (20%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	225	(+25%)	7%
Low	165	(-10%)	-1%

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	272	337	364
to Sell	342	304	320
Hld's(000)	120100	115288	117601



Booz Allen Hamilton Holding Corporation completed its initial public offering on November 16, 2010. At that time, 16.1 million shares were sold to the public at an average price of $17.00 per share. The underwriting syndicate was led by Bank of America Merrill Lynch, Barclays, and Credit Suisse.

CAPITAL STRUCTURE as of 9/30/24
Total Debt $3393.3 mill. **Debt Due 5 Yrs** $2.3 bill.
LT Debt $3310.8 mill. **LT Interest** $172.0 mill.

(Total interest coverage: 6.7x) (73% of Cap'l)

Leases, Uncapitalized: Annual Rentals $54.3 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 127,772,744 shs.
as of 10/21/24
MARKET CAP: $23.3 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	404.9	554.3	558.7
Receivables	1774.8	2047.3	2225.4
Inventory	- -	- -	- -
Other	108.4	137.3	132.9
Current Assets	2288.1	2738.9	2917.0
Accts Payable	597.8	653.1	677.4
Debt Due	41.3	61.9	82.5
Other	1258.0	977.2	1115.0
Current Liab.	1897.1	1692.2	1874.9

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	6.0%	10.5%	*9.0%*
"Cash Flow"	11.0%	18.0%	*9.0%*
Earnings	12.0%	17.0%	*10.0%*
Dividends	20.0%	19.5%	*6.0%*
Book Value	7.5%	13.5%	*20.5%*

Fiscal Year Begins	QUARTERLY REVENUES ($ mill.) A Jun.30	Sep.30	Dec.31	Mar.31	Full Fiscal Year
2021	1989.1	2106.2	2030.5	2237.9	8363.7
2022	2249.6	2299.0	2277.1	2433.3	9258.9
2023	2654.5	2666.3	2569.8	2771.3	10661.9
2024	2941.8	3146.4	***2850***	***3011.8***	***11950***
2025	***3175***	***3250***	***3100***	***3275***	***12800***

Fiscal Year Begins	EARNINGS PER SHARE AB Jun.30	Sep.30	Dec.31	Mar.31	Full Fiscal Year
2021	1.07	1.26	1.02	.86	4.21
2022	1.13	1.34	1.07	1.02	4.56
2023	1.47	1.29	1.41	1.33	5.50
2024	1.38	1.81	***1.50***	***1.51***	***6.20***
2025	***1.65***	***1.90***	***1.70***	***1.65***	***6.90***

Cal-endar	QUARTERLY DIVIDENDS PAID D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.31	.31	.31	.31	1.24
2021	.37	.37	.37	.37	1.48
2022	.43	.43	.43	.43	1.72
2023	.47	.47	.47	.47	1.88
2024	.51	.51	.51		

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
35.38	36.53	38.98	43.03	47.88	53.81	57.68	63.08	70.34	82.24	***93.75***	***101.60***	Revenues per sh A	***119.90***
1.98	2.40	2.10	2.58	3.33	4.06	4.61	5.40	5.91	6.89	***7.55***	***8.35***	"Cash Flow" per sh	***10.10***
1.52	1.94	1.67	2.05	2.76	3.41	3.90	4.21	4.56	5.50	***6.20***	***6.90***	Earnings per sh AB	***8.50***
.46	.54	.62	.70	.80	1.04	1.30	1.54	1.76	1.92	***2.06***	***2.14***	Div'ds Decl'd per sh D	***2.50***
.24	.45	.36	.55	.68	.92	.64	.60	.58	.51	***.80***	***.80***	Cap'l Spending per sh	***.90***
1.25	2.76	3.85	3.87	4.82	6.17	7.86	7.89	7.54	8.07	***9.30***	***11.85***	Book Value per sh C	***23.95***
149.09	147.99	148.89	143.45	140.03	138.72	136.25	132.58	131.64	129.64	***127.50***	***126.00***	Common Shs Outst'g E	***123.00***
16.4	14.3	19.2	17.9	17.3	20.3	20.9	20.0	20.8	21.8	*Bold figures are*		Avg Ann'l P/E Ratio	***23.0***
.86	.72	1.01	.90	.93	1.08	1.07	1.08	1.20	1.22	*Value Line*		Relative P/E Ratio	***1.25***
1.8%	1.9%	1.9%	1.9%	1.7%	1.5%	1.6%	1.8%	1.9%	1.6%	*estimates*		Avg Ann'l Div'd Yield	***1.3%***
5274.8	5405.7	5804.3	6171.9	6704.0	7463.8	7858.9	8363.7	9258.9	10661.9	***11950***	***12800***	Revenues ($mill)	***14750***
9.9%	9.4%	9.4%	9.5%	10.0%	10.1%	10.7%	11.2%	9.9%	12.2%	***11.3%***	***11.4%***	Operating Margin	***11.5%***
62.7	61.5	59.5	64.8	68.6	81.1	84.3	145.7	169.8	169.1	***165***	***170***	Depreciation ($mill)	***190***
232.6	294.1	252.5	305.1	397.1	482.6	543.8	570.6	607.8	724.7	***800***	***885***	Net Profit ($mill)	***1050***
39.7%	22.5%	38.7%	30.3%	23.0%	16.7%	17.9%	19.4%	9.3%	25.5%	***23.6%***	***23.5%***	Income Tax Rate	***23.5%***
4.4%	5.4%	4.4%	4.9%	5.9%	6.5%	6.9%	6.8%	6.6%	6.8%	***6.7%***	***6.9%***	Net Profit Margin	***7.1%***
314.2	249.9	193.1	452.5	520.1	1000.5	1345.1	911.7	391.0	1046.7	***1000***	***1175***	Working Cap'l ($mill)	***1700***
1569.3	1484.4	1470.2	1755.5	1701.8	2008.0	2278.7	2731.7	2770.9	3349.9	***3300***	***3250***	Long-Term Debt ($mill)	***3400***
186.5	408.5	573.6	554.6	675.4	856.4	1071.2	1046.1	992.0	1046.6	***1185***	***1495***	Shr. Equity ($mill)	***2950***
15.2%	17.3%	13.6%	14.8%	18.3%	18.3%	17.4%	16.3%	17.7%	18.5%	***20.0%***	***20.5%***	Return on Total Cap'l	***18.0%***
124.7%	72.0%	44.0%	55.0%	58.8%	56.4%	50.8%	54.5%	61.3%	69.2%	***67.5%***	***59.0%***	Return on Shr. Equity	***35.5%***
88.2%	52.4%	27.4%	36.2%	41.9%	39.2%	33.9%	34.6%	37.5%	45.0%	***45.0%***	***41.0%***	Retained to Com Eq	***25.0%***
29%	27%	38%	34%	29%	30%	33%	37%	39%	35%	***33%***	***31%***	All Div'ds to Net Prof	***29%***

BUSINESS: Booz Allen Hamilton Corp. provides management, technology consulting, and engineering services to the U.S. government, major corporations, institutions, and not-for-profit organizations. In fiscal 2023, 98% of revenues were derived from contracts where the end client was an agency or department of the U.S. government, with the Department of Veterans Affairs accounting for 13% of the top line. Has had contracts with the U.S. Army and Navy for more than 70 years. At 6/30/24, total backlog was $36.2 bill. Has about 34,200 employees. CEO & Pres.: Horacio Rozanski. Off./dir. own 1.6% of common stock; The Vanguard Group 10.2% (6/24 Proxy). Inc.: DE. Address: 8283 Greensboro Dr., McLean, VA 22102. Telephone: (703) 902-5000. Internet: www.boozallen.com.

Booz Allen Hamilton delivered strong fiscal second-quarter results. (Fiscal 2024 ends March 31, 2025.) The technology and consulting company posted adjusted earnings per share of $1.81, which, unlike the June-period comparison, far exceeded our estimate of $1.55 and the year-earlier tally of $1.29. The primary catalyst was a revenue advance of 18%, to $3.1 billion. The top-line performance was driven by organic revenue growth of 17%. Management cited gains in the federal defense and civil markets as the main reasons for the acceleration in revenue growth.

The solid performance should continue in the back half of fiscal 2024. Several of the September-period operating metrics suggest that demand for Booz Allen's services will remain strong. The company's backlog of projects expanded 17.1%, to $41.3 billion, which is a positive sign for near-term revenue and earnings visibility. Likewise, Booz Allen's quarterly book-to-bill ratio was 2.61 times. That means the amount of orders (contracts) the company booked far outpaced the number of completed projects. This augurs well for the top line. It also is worth noting that BAH's year-over-year client staff headcount increased 8.1% in the September period, and the company recently opened two new flagship facilities that will enhance its ability to meet evolving mission-critical tasks in the military complex. These developments reflect management's confidence in Booz Allen's near-term operating prospects. Given these factors, we are raising our fiscal 2024 and 2025 earnings-per-share estimates by $0.30 and $0.20, to $6.20 and $6.90, respectively.

Booz Allen Hamilton shares, which are up more than 25% since our mid-August report, are ranked to outperform the broader market in the year-ahead period. We think this ascension (to record heights this fall) was driven by the aforementioned September-quarter results and the technology sector's overall move higher. That said, a commitment here remains quite expensive, given the good-quality stock's elevated price-to-earnings multiple. The high quotation also discounts a good portion of the earnings growth we envision over the pull to 2027-2029.

William G. Ferguson *November 15, 2024*

(A) Fiscal years end March 31st of the following calendar year. **(B)** Diluted egs. Excludes nonrecurring gain/(loss): '18, 15¢; '20 47¢; '21, (77¢); '22, ($2.53); '23, (91¢); '24 Q1-Q2, $1.08. Next egs. report due January 24th. **(C)** Incl. Intang. In fiscal 2023: $2944.8 mill., $22.71/sh. **(D)** Payments in February, June, August, and November. Paid special dividend of $1.50 per share on 6/29/12, $6.50 per share on 8/31/12, $1.00 per share on 11/29/13, $1.00 per share on 2/28/14, and $1.00 per share on 8/29/14. **(E)** In millions.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	90
Earnings Predictability	100

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BAXTER INT'L NYSE-BAX

RECENT PRICE **36.01** | P/E RATIO **11.7** (12.0 / 23.0) | RELATIVE P/E RATIO **0.64** | DIV'D YLD **3.2%** | **VALUE LINE**

TIMELINESS 4 Lowered 10/18/24
SAFETY 2 Lowered 2/3/23
TECHNICAL 3 Raised 11/1/24
BETA .70 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$29-$49	$39 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	80	(+120%)	*24%*
Low	60	(+65%)	*16%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	375	415	371
to Sell	477	394	456
Hld's(000)	460186	449500	457010

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	74.6	77.3	74.0	50.2	66.2	78.4	89.9	95.2	88.3	89.7	53.1	44.0						
Low:	62.8	66.3	32.2	34.1	44.1	61.1	64.1	69.1	73.1	49.0	31.0	32.5						

LEGENDS
10.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-3.6	14.1
3 yr.	-46.2	11.1
5 yr.	-52.4	80.9

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	20.05	20.90	22.48	24.42	25.98	28.10	30.74	18.20	18.83	19.50	21.69	22.45	23.12	25.49	29.96	29.18	*29.90*	*30.80*	Sales per sh	*34.30*
	4.52	4.94	5.25	5.54	5.91	6.24	6.80	2.76	3.48	3.95	4.78	4.95	4.79	5.43	6.29	5.41	*5.45*	*5.80*	"Cash Flow" per sh	*6.95*
	3.38	3.80	3.98	4.31	4.53	4.67	4.90	1.38	1.96	2.48	3.05	3.31	3.09	3.61	3.50	2.92	*2.95*	*3.25*	Earnings per sh [A]	*4.00*
	.91	1.07	1.18	1.27	1.46	1.88	2.02	1.68	.49	.58	.70	.82	.93	1.05	1.14	1.16	*1.16*	*1.20*	Div'ds Decl'd per sh [B] ■	*1.32*
	1.55	1.69	1.66	1.69	2.13	2.81	3.50	1.66	1.33	1.17	1.33	1.38	1.40	1.48	1.35	1.36	*1.30*	*1.30*	Cap'l Spending per sh	*1.35*
	10.11	11.97	11.31	11.57	12.70	15.58	14.97	16.15	15.36	16.85	15.19	15.57	17.21	18.10	11.56	16.55	*16.45*	*16.85*	Book Value per sh [C]	*18.45*
	615.99	600.97	580.73	569.00	546.21	543.04	542.38	547.66	539.60	541.48	513.00	506.16	504.92	501.62	504.43	507.63	*510.00*	*510.00*	Common Shs Outst'g [D]	*510.00*
	18.2	14.2	12.6	12.6	12.8	14.9	14.7	40.5	22.4	23.3	22.9	24.1	27.3	22.4	19.3	14.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.0*
	1.10	.95	.80	.79	.81	.84	.77	2.04	1.18	1.17	1.24	1.28	1.40	1.21	1.12	.78			Relative P/E Ratio	*.95*
	1.5%	2.0%	2.4%	2.3%	2.5%	2.7%	2.8%	3.0%	1.1%	1.0%	1.0%	1.0%	1.1%	1.3%	1.7%	2.8%			Avg Ann'l Div'd Yield	*1.9%*
							16671	9968.0	10163	10561	11127	11362	11673	12784	15113	14813	*15250*	*15700*	Sales ($mill)	*17500*
							27.0%	12.1%	15.0%	19.1%	20.6%	25.6%	25.0%	26.1%	26.4%	22.8%	*23.0%*	*23.5%*	Operating Margin	*24.0%*
							1005.0	759.0	800.0	761.0	785.0	789.0	823.0	890.0	1403.0	1263.0	*1280*	*1320*	Depreciation ($mill)	*1500*
							2683.0	755.0	1078.0	1376.0	1666.0	1717.0	1597.0	1836.0	1772.0	1481.0	*1505*	*1650*	Net Profit ($mill)	*2040*
							21.7%	18.6%	21.9%	18.0%	16.9%	16.7%	16.7%	16.8%	19.9%	20.6%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
							16.1%	7.6%	10.6%	13.0%	15.0%	15.1%	13.7%	14.4%	11.7%	10.0%	*9.9%*	*10.5%*	Net Profit Margin	*11.7%*
							4309.0	6046.0	3830.0	4442.0	3083.0	4273.0	5078.0	4636.0	3266.0	3097.0	*2900*	*2800*	Working Cap'l ($mill)	*3300*
							7606.0	3935.0	2779.0	3509.0	3473.0	4809.0	5786.0	17149	15232	11130	*10000*	*10000*	Long-Term Debt ($mill)	*10000*
							8120.0	8846.0	8290.0	9124.0	7794.0	7882.0	8689.0	9077.0	5833.0	8402.0	*8400*	*8600*	Shr. Equity ($mill)	*9400*
							17.5%	6.4%	10.0%	11.1%	15.0%	13.8%	11.5%	7.4%	9.3%	8.7%	*9.5%*	*10.0%*	Return on Total Cap'l	*11.5%*
							33.0%	8.5%	13.0%	15.1%	21.4%	21.8%	18.4%	20.2%	30.4%	17.6%	*18.0%*	*19.0%*	Return on Shr. Equity	*21.5%*
							19.6%	NMF	9.8%	11.6%	16.6%	16.4%	12.9%	14.4%	20.6%	10.7%	*11.0%*	*12.0%*	Retained to Com Eq	*14.5%*
							41%	121%	25%	23%	23%	25%	30%	29%	32%	40%	*40%*	*37%*	All Div'ds to Net Prof	*33%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $12904 mill. **Due in 5 Yrs** $8544 mill.
LT Debt $10436 mill. **LT Interest** $442 mill. (58% of Cap'l)

Leases, Uncapitalized Annual rentals $143 mill.

Pension Assets-12/23 $2.7 billion
Obligation $3.4 billion

Common Stock 510,177,606 shares
as of 7/31/24

MARKET CAP: $18.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	1718	3194	2095
Receivables	2659	2690	2639
Inventory	2718	2824	2985
Other	916	892	874
Current Assets	8011	9600	8593
Accts Payable	1139	1241	1251
Debt Due	1404	2668	2468
Other	2202	2594	2412
Current Liab.	4745	6503	6131

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	1.0%	7.0%	*3.5%*
"Cash Flow"	-.5%	7.0%	*3.5%*
Earnings	-3.0%	6.0%	*3.0%*
Dividends	-3.0%	13.5%	*3.0%*
Book Value	1.5%	-.5%	*3.0%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2946	3098	3226	3514	12784
2022	3707	3746	3773	3887	15113
2023	3513	3707	3708	3885	14813
2024	3592	3812	***3850***	***3996***	***15250***
2025	***3800***	***3900***	***3900***	***4100***	***15700***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.76	.80	1.02	1.04	3.61
2022	.93	.87	.82	.88	3.50
2023	.59	.66	.82	.85	2.92
2024	.65	.68	***.78***	***.84***	***2.95***
2025	***.70***	***.76***	***.84***	***.95***	***3.25***

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.22	.22	.245	.245	.93
2021	.245	.245	.28	.28	1.05
2022	.28	.28	.29	.29	1.14
2023	.29	.29	.29	.29	1.16
2024	.29	.29	.29	.29	

BUSINESS: Baxter International, through its subsidiaries, provides a broad portfolio of healthcare products, including acute and chronic dialysis therapies; sterile IV solutions; infusion systems and devices; parenteral nutrition therapies; inhaled anesthetics; generic injectable pharmaceuticals; surgical hemostat and sealant products; smart bed systems; patient monitoring and diagnostic technologies; and respiratory health devices. Completed Baxalta spinoff (7/15). Acq. Claris (7/17); Hillrom (12/21). Has 60,000 employees. Officers and directors own less than 1% of common stock; Vanguard, 11.9%; BlackRock, 11.8%; Dodge & Cox, 5.4% (3/24 proxy). Chairman and CEO: Jose E. Almeida. Inc.: DE. Addr.: 1 Baxter Pkwy., Deerfield, IL. 60015. Tel.: 224-948-2000. Internet: www.baxter.com.

Baxter was scheduled to release its third-quarter results just as this Issue was going to press. The official announcement was set to take place when the market opens on Friday November 8th. We are estimating adjusted earnings of $0.78 a share on sales of $3.85 billion, which is relatively in line with the consensus. Internal expectations call for adjusted earnings in a range of $0.77-$0.79 a share on reported sales growth of 3%-4%.

We are targeting modest earnings improvement to $2.95 a share this year. Macroeconomic headwinds and the divestiture of the BioPharma Solutions unit made for difficult comparisons in 2023. On a positive note, we have seen some stabilization across several of Baxter's core product categories this year, which in turn, helped fuel improved results during the first half of 2024. The Pharmaceuticals business in particular has been a standout (first-half sales +10%), owing to new product launches and heightened demand for drug compounding services. For full-year 2024, leadership expects adjusted earnings of $2.93-$3.01 a share, implying annual growth of 2% at the midpoint.

However, we are still awaiting clarity on the potential fallout caused by Hurricane Helene. The storm caused extensive flooding to Western North Carolina, which is where one of Baxter's largest manufacturing facilities is located. Production was subsequently shut down in late September, and at the time of this writing, there was no clear time table on when it would be fully restored. It is difficult to predict the impact on earnings, but some erosion can certainly be expected. We ought to get increased visibility on the company's upcoming conference call.

Baxter agreed to sell its Kidney Care business to Carlyle Group. We had speculated that this was a potential outcome in our last report. The transaction is valued at $3.8 billion and is expected to close later this year or in early 2025.

The stock is ranked to underperform the broader market averages in the year ahead (Timeliness: 4). That said, we see opportunity here for investors with a longer-term mindset. At these levels, capital gains potential out to 2027-2029 is well above the current *Value Line* median.

Michael Ratty *November 8, 2024*

(A) Diluted egs. Excl. nonrecur. gains/(losses): '08, ($0.22); '09, ($0.21); '10, ($1.59); '11, ($0.43); '12, ($0.35); '13, ($1.01); '14, ($0.34); '15, $0.38; '16, $7.05; '17, ($1.19); '18, ($0.08); '19, ($1.38); '20, ($0.96); '21, ($1.08); '22, ($8.33); '23, $2.33. May not sum due to rounding. Next egs. report due early February.
(B) Div'd paid in Jan., Apr., July, and Oct. ■Div'd reinvestment plan available. **(C)** Incl. intang. In 2023: $12.6 billion, $24.81/sh. **(D)** In millions.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	45
Earnings Predictability	85

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RECENT PRICE 181.23 | P/E RATIO 45.5 (Trailing: 48.7 Median: 38.0) | RELATIVE P/E RATIO 2.41 | DIV'D YLD 0.5% | VALUE LINE

TIMELINESS 3 Lowered 10/25/24
SAFETY 2 Raised 2/25/22
TECHNICAL 3 Lowered 11/22/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$150-$246	$198 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	235	(+30%)	*7%*
Low	175	(-5%)	*Nil*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	138	149	162
to Sell	139	134	141
Hld's(000)	29240	28558	29160

	60.0	69.9	70.9	88.8	89.5	117.8	106.6	115.7	174.3	169.0	150.8	186.0
High:	35.7	48.9	50.8	53.1	71.9	70.2	76.2	78.3	106.3	110.1	110.7	135.8
Low:												

LEGENDS
26.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

320 200 160 120 100 80 60 40 18

Percent shares traded 18 12 6

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	45.3	28.7
3 yr.	11.4	10.7
5 yr.	70.3	73.6

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
8.48	7.81	8.87	10.01	10.54	11.16	17.55	17.52	17.42	18.58	19.95	19.99	21.74	24.75	29.31	28.73	*29.55*	*30.75*	Sales per sh	*38.20*
.98	1.24	1.46	1.65	1.69	1.83	2.70	3.16	3.22	4.20	3.82	3.90	4.20	4.49	4.89	5.09	*5.45*	*5.85*	"Cash Flow" per sh	*7.45*
.67	.93	1.12	1.28	1.32	1.45	1.69	1.89	1.75	2.79	2.42	2.45	2.60	2.94	3.25	3.35	*3.75*	*4.10*	Earnings per sh A	*5.15*
.07	.11	.15	.18	.22	.26	.30	.34	.38	.42	.47	.52	.58	.64	.71	.79	*.84*	*.90*	Div'ds Decl'd per sh B	*1.20*
.20	.12	.26	.23	.47	.27	.43	1.31	.73	.86	.59	.88	1.05	1.16	1.56	1.19	*1.00*	*1.20*	Cap'l Spending per sh	*1.50*
4.18	5.24	6.52	7.95	9.27	10.96	12.71	14.71	16.41	19.27	21.44	23.09	25.58	27.16	29.18	32.83	*36.45*	*39.70*	Book Value per sh C	*54.55*
27.37	28.10	28.75	29.17	29.45	30.23	30.85	31.53	31.76	32.02	32.26	32.20	32.37	32.29	32.15	32.11	*32.50*	*32.50*	Common Shs Outst'g D	*33.00*
24.0	18.4	23.4	30.3	25.6	32.9	33.7	31.4	37.9	29.0	37.8	38.8	38.6	46.5	40.9	38.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*40.0*
1.44	1.23	1.49	1.90	1.63	1.85	1.77	1.58	1.99	1.46	2.04	2.07	1.98	2.51	2.36	2.17			Relative P/E Ratio	*2.20*
.5%	.6%	.6%	.5%	.7%	.5%	.5%	.6%	.6%	.5%	.5%	.5%	.6%	.5%	.5%	.6%			Avg Ann'l Div'd Yield	*.6%*
541.4	552.5	553.2	594.8	643.7	643.7	703.6	799.0	942.4	922.4	*960*	*1000*	Sales ($mill)	*1260*
20.8%	24.2%	24.8%	23.8%	23.7%	23.1%	23.1%	22.1%	20.9%	23.4%	*24.0%*	*24.2%*	Operating Margin	*24.0%*
30.5	40.0	46.2	44.4	44.7	45.9	51.3	48.9	51.8	54.9	*55.0*	*60.0*	Depreciation ($mill)	*75.0*
52.8	59.7	56.0	90.1	78.6	79.7	84.6	96.1	105.4	108.5	*125*	*130*	Net Profit ($mill)	*170*
31.4%	31.4%	32.5%	--	20.7%	17.4%	20.5%	23.3%	21.2%	20.9%	*21.8%*	*21.0%*	Income Tax Rate	*21.0%*
9.8%	10.8%	10.1%	15.1%	12.2%	12.4%	12.0%	12.0%	11.2%	11.8%	*12.5%*	*12.9%*	Net Profit Margin	*13.5%*
85.8	117.7	87.4	90.9	144.2	162.7	172.5	178.4	195.8	165.8	*220*	*245*	Working Cap'l ($mill)	*275*
297.5	262.5	245.5	184.0	156.0	248.6	163.6	110.9	442.8	311.5	*225*	*200*	Long-Term Debt ($mill)	*150*
391.9	463.7	521.0	616.9	691.6	743.7	828.2	877.0	938.3	1054.0	*1185*	*1290*	Shr. Equity ($mill)	*1800*
8.0%	8.7%	7.8%	11.7%	9.7%	8.3%	8.8%	9.8%	7.6%	8.0%	*9.0%*	*8.5%*	Return on Total Cap'l	*8.5%*
13.5%	12.9%	10.7%	14.6%	11.4%	10.7%	10.2%	11.0%	11.2%	10.3%	*10.5%*	*10.0%*	Return on Shr. Equity	*9.5%*
11.5%	10.9%	8.7%	12.6%	9.4%	8.7%	8.2%	8.8%	9.0%	7.9%	*8.0%*	*8.0%*	Retained to Com Eq	*7.0%*
15%	15%	19%	13%	17%	19%	20%	19%	20%	24%	*22%*	*23%*	All Div'ds to Net Prof	*23%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $227.0 mill. **Due in 5 Yrs** $227.0 mill.
LT Debt $227.0 mill. **LT Interest** $12.0 mill.
(16% of Tot. Cap'l)

Leases, Uncapitalized Annual rentals $4.0 million
No Defined Benefit Pension Plan

Common Stock 32,507,716 shs.
as of 10/18/24

MARKET CAP: $5.9 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	66.6	64.4	73.7
Receivables	131.6	125.3	120.5
Inventory (FIFO)	119.7	109.5	118.5
Other	18.0	15.0	13.3
Current Assets	335.8	314.2	326.0
Accts Payable	57.3	55.5	46.5
Debt Due	.2	.3	--
Other	82.5	92.7	62.9
Current Liab.	140.0	148.5	109.4

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	10.0%	7.5%	*5.5%*
"Cash Flow"	10.5%	4.5%	*7.5%*
Earnings	8.5%	6.0%	*8.5%*
Dividends	12.0%	10.0%	*9.0%*
Book Value	11.5%	8.0%	*10.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	185.7	202.4	197.9	213.1	799.0
2022	228.9	236.7	244.3	232.5	942.4
2023	232.5	231.3	229.9	228.7	922.4
2024	239.7	234.1	239.9	***246.3***	***960***
2025	***250***	***245***	***245***	***260***	***1000***

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.72	.70	.77	.76	2.94
2022	.89	.92	.78	.66	3.25
2023	.70	.93	.90	.82	3.35
2024	.89	.98	1.03	***.85***	***3.75***
2025	***1.00***	***1.10***	***1.10***	***.90***	***4.10***

Calendar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.52	--	--	--	.52
2021	.58	--	--	--	.58
2022	.64	--	--	--	.64
2023	.71	--	--	--	.71
2024	.79	--	--		

BUSINESS: Balchem Corp. develops, manufactures, markets, and distributes specialty performance ingredients and products for the nutritional, food, pharmaceutical, animal health, medical device sterilization, plant nutrition, and industrial markets. Its operating segments are: Human Nutrition & Heath (58% of 2023 sales), Animal Nutrition & Health (26%), and Specialty Products (14%), Other (2%). International sales comprised 25% of 2023 sales. Has 1,302 employees. Off./dir. own 1.3% of stock; BlackRock, 15.4%; Vanguard, 11.7%; APG Asset Management, 9.0%; Wasatch Advisors, 5.9% (4/24 proxy). Inc.: MD. Chairman/President/CEO: Theodore L. Harris. Addr.: 52 Sunrise Park Road, New Hampton, NY 10958. Tel.: 845-326-5600. Internet: www.balchem.com.

Balchem Corp. will likely register impressive results for 2024. During the first nine months of the year, strength in the company's Human Health & Nutrition and Specialty Chemicals segments helped boost totals, more than offsetting sluggishness from its Animal Health & Nutrition operations. What's more, a better portfolio mix and sales growth, alongside lower input costs aided margins over the last few quarters. All told, we look for earnings per share to increase 12% for the full year, on a 4% sales gain.

The company should continue to gain ground next year. Management's strategic business growth efforts, combined with operating efficiencies and other margin improvements, and better demand for its offerings ought to brighten Balchem's near- and long-term prospects. Consequently, the top and bottom lines will probably advance 3%-5% and 5%-10%, respectively, in 2025.

Balchem has been expanding its footprint. Management will probably focus on product innovation, launching new offerings, and broadening the portfolio to capture more market share. The recent rollout of Human Health & Nutrition products *Optifolin+, K2Vital Delta Fermented,* and *VitaCholine Pro-Flo*, as well as *the AminoShure-XL* offering from its Animal Health & Nutrition segment should augur well. The company has grown with the help of acquisitions, and may focus on strengthening its nutrition and health arm moving forward. Recent additions have widened Balchem's geographic reach, as well as helping it move into adjacent product categories. Likewise, it has built on technological and operating synergies to better scale the business.

These good-quality shares appear to be well valued at this juncture. The issue is ranked to perform in tandem with the broader market averages in the year ahead. Plus, it is already trading within our 18-month Target Price Range, thereby erasing much of its capital appreciation potential over that span. The lofty Price-to-Earnings ratio also suggests that BCPC may be somewhat pricey. Still, its above average scores for Safety (2) and Financial Strength (B++), give this stock some conservative appeal.

Orly Seidman *November 22, 2024*

(A) Based on diluted shares. Next earnings report due late January. Quarterly EPS may not sum due to rounding.
(B) Annual dividend, historically paid early Jan.
(C) Includes intangibles. In 2023: $970.1 mill., $30.10/sh.
(D) In millions.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	95
Earnings Predictability	85

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BECTON, D'SON. NYSE-BDX

RECENT PRICE 238.91 | P/E RATIO 16.4 (18.7 / 20.0) | RELATIVE P/E RATIO 0.90 | DIV'D YLD 1.7% | VALUE LINE

TIMELINESS 3 Raised 5/31/24
SAFETY 1 Raised 3/4/05
TECHNICAL 5 Lowered 11/1/24
BETA .75 (1.00 = Market)

18-Month Target Price Range
Low-High Midpoint (% to Mid)
$210-$342 $276 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	355	(+50%)	*11%*
Low	290	(+20%)	*6%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	645	713	723
to Sell	763	712	681
Hld's(000)	252527	245332	257447

	2008	2009	2010	2011	2012	2013
High:	110.9	142.6	157.5	181.8	229.7	265.9
Low:	78.7	105.2	128.9	129.5	161.5	208.6

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	275.5	286.7	267.4	280.6	287.3	249.9								
Low:	210.7	197.8	235.1	215.9	228.6	218.8								
29.44	30.20	32.08	36.44	39.15	41.52	43.99	48.80	58.53	53.05	59.59	63.94	59.02	71.18	66.59	66.71	*69.65*	*76.90*	Sales per sh [A]	*87.95*
6.60	7.13	7.34	8.27	8.30	8.78	9.37	11.25	13.99	13.56	17.48	19.58	16.97	21.42	18.85	20.20	*21.15*	*23.25*	"Cash Flow" per sh	*27.30*
4.46	4.95	4.94	5.62	5.36	5.81	6.25	7.16	8.59	9.48	11.01	11.68	10.20	13.08	11.35	12.21	*13.15*	*15.00*	Earnings per sh [AB]	*18.00*
1.14	1.32	1.48	1.64	1.80	1.98	2.18	2.40	2.64	2.92	3.00	3.08	3.16	3.32	3.48	3.64	3.80	*3.96*	Div'ds Decl'd per sh [C■]	*4.56*
2.68	2.96	2.75	2.82	2.81	3.03	3.40	2.83	3.25	3.19	3.34	3.54	2.79	4.33	3.43	3.01	*3.30*	*3.30*	Cap'l Spending per sh	*4.15*
20.30	21.69	23.65	22.48	21.00	26.00	26.32	34.00	35.79	56.80	78.26	77.95	81.94	83.22	89.22	88.83	*89.65*	*98.25*	Book Value per sh [D]	*120.70*
243.08	237.08	229.82	214.82	196.91	194.00	191.98	210.70	213.29	227.94	268.22	270.43	290.02	284.48	283.36	290.39	*290.00*	*290.00*	Common Shs Outst'g [E]	*290.00*
19.0	13.7	14.9	14.5	14.1	15.6	18.1	19.5	18.4	19.4	20.8	20.8	24.7	18.9	22.3	20.6	*18.2*		Avg Ann'l P/E Ratio	*18.0*
1.14	.91	.95	.91	.90	.88	.95	.98	.97	.98	1.12	1.11	1.27	1.02	1.29	1.19	*1.00*		Relative P/E Ratio	*1.10*
1.3%	1.9%	2.0%	2.0%	2.4%	2.2%	1.9%	1.7%	1.7%	1.6%	1.3%	1.3%	1.3%	1.3%	1.4%	1.4%	1.6%		Avg Ann'l Div'd Yield	*1.4%*
8446.0	10282	12483	12093	15983	17290	17117	20248	18870	19372	*20200*	*22300*	Sales ($mill) [A]	*25500*
26.6%	32.8%	30.5%	32.9%	37.0%	39.2%	35.3%	35.3%	33.5%	35.4%	*36.0%*	*36.0%*	Operating Margin	*36.0%*
562.0	891.0	1114.0	1088.0	1978.0	2253.0	2154.0	2273.0	2229.0	2288.0	*2325*	*2400*	Depreciation ($mill)	*2700*
1236.0	1480.0	1869.1	2072.0	2862.8	3195.0	2875.6	3911.0	3203.0	3577.0	*3815*	*4350*	Net Profit ($mill)	*5220*
22.8%	31.2%	20.0%	15.2%	17.3%	18.8%	15.3%	11.4%	13.8%	12.9%	*14.0%*	*15.0%*	Income Tax Rate	*15.0%*
14.6%	14.4%	15.0%	17.1%	17.9%	18.5%	16.8%	19.3%	17.0%	18.5%	*19.0%*	*19.5%*	Net Profit Margin	*20.5%*
3896.0	1659.0	1967.0	15291	195.0	1009.0	3133.0	2212.0	330.0	2035.0	*2815*	*3050*	Working Cap'l ($mill)	*3100*
3768.0	11370	10550	18667	18894	18081	17224	17110	13886	14738	*18000*	*16000*	Long-Term Debt ($mill)	*12000*
5053.0	7164.0	7633.0	12948	20994	21081	23765	23677	25282	25796	*26000*	*28500*	Shr. Equity ($mill) [D]	*35000*
14.8%	9.0%	11.3%	7.4%	7.8%	8.9%	7.6%	10.1%	8.6%	9.3%	*9.0%*	*10.5%*	Return on Total Cap'l	*11.5%*
24.5%	20.7%	24.5%	16.0%	13.6%	15.2%	12.1%	16.5%	12.7%	13.9%	*14.5%*	*15.5%*	Return on Shr. Equity	*15.0%*
16.1%	13.9%	17.1%	10.8%	9.2%	10.5%	7.8%	11.7%	8.4%	9.5%	*10.5%*	*11.0%*	Retained to Com Eq	*11.0%*
34%	33%	30%	33%	32%	31%	36%	29%	34%	31%	*29%*	*26%*	All Div'ds to Net Prof	*25%*

Target Price Range 2027 2028 2029: 640, 480, 400, 320, 240, 200, 160, 120, 80, 60

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-11.9	14.1
3 yr.	0.6	11.1
5 yr.	2.0	80.9

CAPITAL STRUCTURE as of 6/30/24
Total Debt $19323 mill. **Due in 5 Yrs** $9474 mill.
LT Debt $18131 mill. **LT Interest** $515 mill.
(Total interest coverage: 4.4x) (41% of Capital)

Leases, Uncapitalized Annual rentals $132 mill.
Pension Assets-9/23 $2129 mill.
Oblig. $2617 mill.

Pfd Stock None
Common Stock 289,042,418 shares
as of 6/30/24
MARKET CAP: $69.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	1014	1424	5310
Receivables	2191	2534	2596
Inventory (FIFO)	3224	3273	3255
Other	1712	1445	1046
Current Assets	8141	8676	12207
Accts Payable	1699	1641	*1600*
Debt Due	2179	1141	1192
Other	3933	3859	3813
Current Liab.	7811	6641	6605

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	5.5%	3.5%	*4.5%*
"Cash Flow"	9.0%	6.0%	*5.0%*
Earnings	8.0%	4.5%	*6.5%*
Dividends	7.0%	4.0%	*4.5%*
Book Value	14.0%	9.0%	*5.5%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	5316	4907	4890	5135	20248
2022	4707	4761	4641	4761	18870
2023	4586	4821	4878	5087	19372
2024	4706	5045	4990	*5459*	*20200*
2025	*5300*	*5600*	*5600*	*5800*	*22300*

Fiscal Year Ends	EARNINGS PER SHARE [AB] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	4.55	3.19	2.74	2.60	13.08
2022	3.17	2.78	2.66	2.75	11.35
2023	2.98	2.86	2.96	3.42	12.21
2024	2.68	3.17	3.50	*3.80*	*13.15*
2025	*3.30*	*3.70*	*3.80*	*4.20*	*15.00*

Calendar	QUARTERLY DIVIDENDS PAID [C■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.79	.79	.79	.83	3.20
2021	.83	.83	.83	.87	3.36
2022	.87	.87	.87	.91	3.52
2023	.91	.91	.91	.95	3.68
2024	.95	.95	.95		

BUSINESS: Becton, Dickinson & Co. operates in three segments: Medical (49% of FY'23 sales) manufactures medical devices which include Medication Delivery and Pharmaceutical Systems; Life Sciences (26%) includes Integrated Diagnostic Solutions and Biosciences; Interventional (25%) includes Surgery, Peripheral Intervention and Urology and Critical Care. '23 R&D: $1237 mill, 6.6% of sales. Acquired C.R Bard 12/17. Divested Diabetes Care business 3/22. Employs about 73,000. Officers & directors own less than 1.0% of comm. stock; The Vanguard Group, 9.0%; BlackRock, 8.0%. (12/23 proxy). CEO and President: Thomas E. Pohlen. Inc.: New Jersey. Address: One Becton Drive, Franklin Lakes, NJ 07417. Telephone: 201-847-6800. Internet: www.bd.com.

Becton, Dickinson (BD) likely posted solid results in fiscal 2024. (Year ended September 30th.) We are forecasting sales to rise 4%, to $20.2 billion. The BD Medical unit likely rose in the mid-single digit vicinity, thanks in part to strength in medication management solutions. In BD Life Sciences, integrated diagnostic solutions has been performing well. The company's smallest unit, BD Interventional, has been spurred by urology and critical care. Meanwhile, our earnings estimate suggests an advance of 8%, to $13.15 per share. Margins should be slightly better than fiscal 2023.

BD completed the acquisition of Edwards Lifesciences' critical care business for $4.2 billion. The purchase was funded with $1 billion in cash and $3.2 billion of debt. The unit, which will now be called BD Advanced Patient Monitoring, should bolster the company's smart connected care solutions and be immediately accretive to BD's earnings.

We have adjusted our fiscal 2025 earnings. Our top-line target now stands at $22.3 billion, which would be a 10% jump from 2024. Organic growth is likely to be in the mid-single digits with the remaining increase coming from the new Advanced Patient Monitoring segment. We are also calling for an earnings increase of 14%, to $15.00 per share. The company is expected to update its outlook for the full fiscal year and the impact of the aforesaid acquisition when it holds its fiscal 2024 fourth-quarter earnings call, scheduled for shortly after our press time.

New product development is ongoing. BD just launched a robotics-compatible reagent kit designed to study single cells. The company's R&D budget should allow it to continue to introduce innovative solutions, which are needed to stay competitive in the medical device space.

These shares are a solid choice for conservative accounts. The stock has traded in a tight range since our August review and is a middling selection for year-ahead relative price performance. Capital appreciation potential out to 2027-2029 does not stand out, either. Still, it is more appealing when considering the low risks involving this stock. The income component adds to total return potential.

Kevin P. O'Sullivan *November 8, 2024*

(A) Fiscal years end September 30th.
(B) Dil. EPS. Qtly EPS may not sum. Excl nonrecurring gains/(losses): '12, $0.23; '13, $0.68; '14, ($0.26); '15 ($3.81); '16 ($4.10); '17, ($4.88); '18, ($10.41); '19, ($7.79); '20, ($7.49); '21, ($6.23); '22, ($5.97); '23, ($7.11); '24 Q1-3, ($4.86). Excl. discontinued ops: '22, $0.50, '23, ($0.16). Next egs report due early Feb.
(C) Dividends paid in late Dec., late March, late June, and late Sep. ■ DRIP available.
(D) Includes intangibles. In FY'23: $35.5 billion, $122.15 a share. **(E)** In millions.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	70
Earnings Predictability	95

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BRADY CORP. 'A' NYSE-BRC

RECENT PRICE **75.40** | P/E RATIO **17.3** (Trailing: 18.5 Median: 19.0) | RELATIVE P/E RATIO **0.94** | DIV'D YLD **1.3%** | **VALUE LINE**

TIMELINESS 1 Raised 9/20/24
SAFETY 2 Raised 7/7/23
TECHNICAL 3 Lowered 7/26/24
BETA .95 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$50-$88 $69 (-10%)

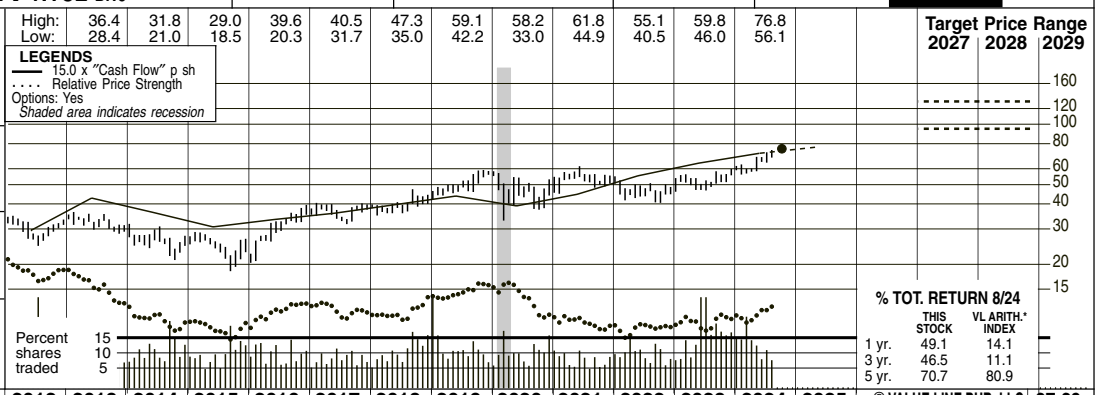
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	130	(+70%)	*16%*
Low	95	(+25%)	*8%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	108	115	120
to Sell	126	123	124
Hld's(000)	36991	35387	35097

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	36.4	31.8	29.0	39.6	40.5	47.3	59.1	58.2	61.8	55.1	59.8	76.8								
Low:	28.4	21.0	18.5	20.3	31.7	35.0	42.2	33.0	44.9	40.5	46.0	56.1								
Sales per sh A	28.33	23.01	23.93	25.21	25.69	22.11	23.90	22.86	22.19	21.68	22.57	21.90	20.80	21.99	26.08	27.55	28.19	*29.80*	Sales per sh A	*35.55*
"Cash Flow" per sh	3.59	2.76	2.78	3.09	1.96	2.85	2.42	2.05	2.23	2.39	2.65	2.93	2.61	2.98	3.69	4.29	4.77	*5.15*	"Cash Flow" per sh	*6.80*
Earnings per sh ABC	2.41	1.71	1.76	2.17	1.07	1.93	1.53	1.27	1.56	1.84	2.12	2.46	2.11	2.47	2.89	3.51	4.07	*4.40*	Earnings per sh ABC	*6.00*
Div'ds Decl'd per sh BD■	.60	.68	.70	.72	.74	.76	.78	.80	.81	.82	.83	.85	.87	.88	.90	.92	.94	*.98*	Div'ds Decl'd per sh BD■	*1.30*
Cap'l Spending per sh	.49	.46	.50	.39	.47	.69	.85	.52	.34	.30	.42	.62	.52	.52	.86	.40	1.68	*1.05*	Cap'l Spending per sh	*1.50*
Book Value per sh E	19.01	18.11	19.10	21.76	19.58	15.95	14.30	11.47	11.95	13.63	14.46	16.05	16.60	18.50	18.26	20.50	22.42	*24.85*	Book Value per sh E	*33.70*
Common Shs Outst'g F	53.75	52.53	52.62	53.13	51.55	52.10	51.25	51.25	50.51	51.35	52.00	53.00	52.00	52.07	49.92	48.34	47.58	*47.00*	Common Shs Outst'g F	*45.00*
Avg Ann'l P/E Ratio	14.5	14.7	16.8	14.9	27.8	16.6	19.0	20.2	16.2	19.6	17.7	18.3	24.0	20.4	17.1	13.9	14.6		Avg Ann'l P/E Ratio	*19.0*
Relative P/E Ratio	.87	.98	1.07	.93	1.77	.93	1.00	1.02	.85	.99	.96	.97	1.23	1.10	.99	.88	.81		Relative P/E Ratio	*1.05*
Avg Ann'l Div'd Yield	1.7%	2.7%	2.4%	2.2%	2.5%	2.4%	2.7%	3.1%	3.2%	2.3%	2.2%	1.9%	1.7%	1.7%	1.8%	1.9%	1.6%		Avg Ann'l Div'd Yield	*1.1%*
Sales ($mill) A							1225.0	1171.7	1120.6	1113.3	1173.9	1160.6	1081.3	1144.7	1302.1	1331.9	1341.4	*1400*	Sales ($mill) A	*1600*
Operating Margin							13.6%	11.6%	13.4%	14.2%	15.2%	16.0%	14.9%	16.8%	17.4%	19.3%	20.4%	*22.0%*	Operating Margin	*24.5%*
Depreciation ($mill)							44.6	39.5	32.4	27.3	25.4	23.8	23.4	25.5	34.2	32.4	29.9	*30.0*	Depreciation ($mill)	*35.0*
Net Profit ($mill)							79.5	65.5	80.1	95.6	112.2	131.3	112.4	129.7	150.0	174.9	197.2	*210*	Net Profit ($mill)	*270*
Income Tax Rate							28.0%	23.5%	26.7%	24.5%	26.2%	20.3%	20.1%	20.8%	21.9%	22.5%	20.4%	*24.0%*	Income Tax Rate	*24.0%*
Net Profit Margin							6.5%	5.6%	7.1%	8.6%	9.6%	11.3%	10.4%	11.3%	11.5%	13.1%	14.7%	*15.1%*	Net Profit Margin	*16.9%*
Working Cap'l ($mill)							171.8	199.3	240.7	220.6	280.4	331.3	323.6	207.5	242.9	266.8	335.0	*365*	Working Cap'l ($mill)	*420*
Long-Term Debt ($mill)							159.3	200.8	212.0	104.5	52.6	--	--	38.0	95.0	49.7	90.9	*80.0*	Long-Term Debt ($mill)	*100*
Shr. Equity ($mill) E							733.1	587.7	603.6	700.1	752.1	850.8	863.1	963.0	911.3	990.9	1066.7	*1165*	Shr. Equity ($mill) E	*1515*
Return on Total Cap'l							9.7%	9.0%	10.3%	12.2%	14.1%	15.6%	13.1%	13.0%	15.0%	17.4%	*19.0%*	*18.0%*	Return on Total Cap'l	*18.0%*
Return on Shr. Equity							10.8%	11.1%	13.3%	13.7%	14.9%	15.4%	13.0%	13.5%	16.5%	17.6%	18.5%	*18.0%*	Return on Shr. Equity	*18.0%*
Retained to Com Eq							5.3%	4.2%	6.5%	7.7%	9.2%	10.2%	7.7%	8.7%	11.4%	13.1%	14.3%	*14.0%*	Retained to Com Eq	*14.0%*
All Div'ds to Net Prof							51%	63%	51%	44%	38%	34%	41%	35%	31%	26%	23%	*22%*	All Div'ds to Net Prof	*22%*



CAPITAL STRUCTURE as of 7/31/24
Total Debt $90.9 mill. **Due in 5 Yrs** $90.9 mill.
LT Debt $90.9 mill. **LT Interest** $3.1 mill. (8% of Cap'l)
Leases, Uncapitalized Annual rentals $15.5 mill.
No Defined Pension Benefit Plan
Preferred Stock None
Common Stock 44,045,649 Class A shares and 3,538,628 Class B shares. The Class B shares are the only voting shares, and are held entirely by trusts controlled by the Brady family.
as of 9/4/24

MARKET CAP: $3.6 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	7/31/24
Cash Assets	114.1	151.5	250.1
Receivables	183.2	184.4	185.5
Inventory (LIFO)	190.0	177.1	152.7
Other	10.8	11.8	11.4
Current Assets	498.1	524.8	599.7
Accts Payable	81.1	79.9	84.7
Debt Due	- -	- -	- -
Other	174.1	178.1	180.1
Current Liab.	255.2	258.0	264.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	.5%	2.5%	*7.0%*
"Cash Flow"	3.5%	8.5%	*13.5%*
Earnings	5.5%	10.0%	*15.0%*
Dividends	2.0%	2.0%	*7.5%*
Book Value	- -	7.5%	*12.0%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) A Oct.31	Jan.31	Apr.30	Jul.31	Full Fiscal Year
2021	277.2	265.9	295.5	306.1	1144.7
2022	321.5	318.0	338.6	324.0	1302.1
2023	322.6	326.2	337.1	346.0	1331.9
2024	332.0	322.6	343.4	343.4	1341.4
2025	*340*	*335*	*360*	*365*	*1400*

Fiscal Year Ends	EARNINGS PER SHARE ABC Oct.31	Jan.31	Apr.30	Jul.31	Full Fiscal Year
2021	.64	.59	.71	.53	2.47
2022	.65	.66	.78	.81	2.89
2023	.78	.77	.96	1.00	3.51
2024	.97	.90	1.05	1.15	4.07
2025	*1.10*	*1.00*	*1.10*	*1.20*	*4.40*

Cal-endar	QUARTERLY DIVIDENDS PAID BD■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.218	.218	.218	.22	.87
2021	.22	.22	.22	.225	.89
2022	.225	.225	.23	.23	.91
2023	.23	.23	.23	.235	.93
2024	.235	.235	.235	.24	

BUSINESS: Brady Corporation engages in the manufacture and marketing of identification solutions and specialty materials worldwide. Its products help customers increase safety, security, performance, and productivity and include high-performance labels and signs, safety devices, printing systems and software, and precision die-cut materials. Brady serves customers in electronics, telecommunications, manufacturing, electrical, construction, education, and a variety of other industries. Employs about 5,700. Officers & directors own 3.6% of Class A nonvoting common (9/24 Form 10-K). President & CEO: Russell Shaller. Incorporated: WI. Address: 6555 West Good Hope Road, Milwaukee, WI 53223. Telephone: 414-358-6600. Internet: www.bradyid.com.

Brady Corporation posted record results in fiscal 2024 (year ended July 31st). This supplier of safety identification products and machinery has been in a solid growth phase of late, with earnings gains in each of the past four years that have averaged nearly 18% annually over that time frame. Fourth-fiscal-quarter results of $1.15 per share reached an all-time high, rising 15% from the prior year, and surpassing our expectation of $1.08 a share. For the full year, profits rose 16%, to $4.07 per share.

We expect the solid momentum to continue in coming years. Brady focuses on providing its customers with a broad range of proprietary and customized offerings that are used in a variety of industries and regions. Its signs, floor marking tape, and spill control products are an important component of the safety measures used by its industrial customers, while its wrist bands, RFID scanners, and labels are integral for tracking and monitoring people and products in the healthcare and other industries. Brady's emphasis on strong customer service and expanding its digital capabilities is also helping it to capture market share.

Strong cash flows are allowing the company to return cash to shareholders. In the current fiscal period, management raised the quarterly dividend for the 39th consecutive year. Although the yield on the stock is modest, shareholders can rely on a rising payout over time. Brady also announced a $100-million increase in its share repurchase authorization, which will allow it to accelerate its buyback activity in the year ahead.

These shares have been accorded our highest rank for Timeliness (1). We expect them to outperform the market over the coming six to 12 month period, as solid earnings gains should continue to propel the stock forward. Over the longer term, we think this equity is a good choice for investors seeking rewarding total returns at an attractive valuation. Despite the company's solid record of growth over the past decade, the shares trade at a modest discount to the market average. We think an expansion in this issue's relative valuation will produce above-average total returns out to 2027-2029.

Stuart J. Benway, CFA *October 4, 2024*

(A) Fiscal years end July 31st. **(B)** Egs. and dividends per Class A nonvoting common shares only. **(C)** GAAP earnings. Excludes nonrecurring charges: '08, 27¢; '09, 38¢; '10, 21¢; '11, 13¢; '12, 25¢; '13, $4.68; '14, $2.42; '15, $1.21; '18, 40¢. Next earnings report due late November. **(D)** Dividends historically paid in January, April, July, and October. ■ Dividend reinvestment plan available. **(E)** Includes intangibles. In '24: $641.4 million, $13.48/share. **(F)** In millions. Includes Class B Voting shares.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	75
Earnings Predictability	90

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BWX TECHNOLOGIES NYSE-BWXT

RECENT PRICE 103.00 | P/E RATIO 32.2 (Trailing: 35.4 Median: NMF) | RELATIVE P/E RATIO 1.76 | DIV'D YLD 0.9% | VALUE LINE 1220

TIMELINESS 3 Raised 3/8/24
SAFETY 3 Lowered 3/15/24
TECHNICAL 2 Raised 8/16/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

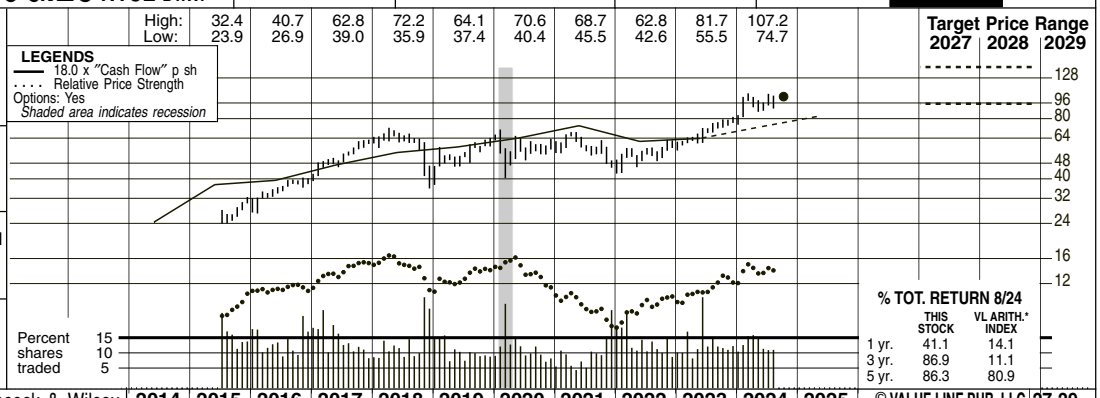
Low-High	Midpoint (% to Mid)
$69-$123	$96 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	145	(+40%)	*10%*
Low	95	(-10%)	*-1%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	158	208	226
to Sell	187	197	221
Hld's(000)	88837	86705	84325



On June 30, 2015, The Babcock & Wilcox Company completed the spinoff of its power generation business. These operations formed a new publicly traded entity, Babcock & Wilcox Enterprises (BWE). The remaining company and stock changed its name to BWX Technologies (BWXT).

CAPITAL STRUCTURE as of 6/30/24
Total Debt $1212.6 mill. **Due in 5 Yrs** $546.3 mill.
LT Debt $1203.2 mill. **LT Interest** $87.8 mill.
(55% of Cap'l)

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 91,208,109 shs.
as of 8/2/24

MARKET CAP: $8.2 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	41.9	78.7	51.2
Receivables	87.2	86.8	72.0
Inventory	- -	- -	- -
Other	642.5	652.3	786.6
Current Assets	771.6	817.8	909.8
Accts Payable	127.1	126.7	164.3
Debt Due	6.3	133.4	9.4
Other	234.5	114.9	234.9
Current Liab.	367.9	375.0	408.6

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	- -	8.5%	*4.5%*
"Cash Flow"	- -	7.0%	*8.5%*
Earnings	- -	7.0%	*9.0%*
Dividends	- -	13.0%	*4.0%*
Book Value	- -	30.5%	*10.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	528.3	505.1	498.7	592.0	2124.1
2022	530.7	554.2	523.7	624.2	2232.8
2023	568.4	612.4	590.0	725.5	2496.3
2024	604.0	681.5	*630*	*694.5*	*2610*
2025	*630*	*650*	*670*	*710*	*2660*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.73	.62	.63	1.26	3.24
2022	.64	.82	.67	.47	2.60
2023	.67	.64	.66	.71	2.68
2024	.75	.79	*.71*	*.90*	*3.15*
2025	*.80*	*.80*	*.90*	*1.00*	*3.50*

Calendar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.19	.19	.19	.19	.76
2021	.21	.21	.21	.21	.84
2022	.22	.22	.22	.22	.88
2023	.23	.23	.23	.23	.92
2024	.24	.24	.24		

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
13.60	13.44	14.51	16.98	18.90	19.88	22.28	23.24	24.47	27.27	*28.70*	*29.55*	Revenues per sh	*32.40*
1.35	2.08	2.19	2.61	3.01	3.21	3.56	4.10	3.42	3.54	*4.05*	*4.60*	"Cash Flow" per sh	*5.95*
.36	1.31	1.76	2.01	2.27	2.55	2.91	3.24	2.60	2.68	*3.15*	*3.50*	Earnings per sh A	*4.80*
- -	.12	.36	.42	.64	.68	.76	.84	.88	.92	*.96*	*1.00*	Div'ds Decl'd per sh B	*1.12*
.71	.65	.49	.97	1.15	1.91	2.68	3.40	2.17	1.65	*2.50*	*2.50*	Cap'l Spending per sh	*3.60*
9.36	2.52	1.40	2.87	2.47	4.24	6.48	6.97	8.20	10.20	*12.15*	*13.55*	Book Value per sh	*14.90*
106.69	105.30	106.87	99.42	95.25	95.31	95.31	91.40	91.25	91.53	*91.00*	*90.00*	Common Shs Outst'g C	*90.00*
- -	21.0	20.1	25.5	26.6	21.0	19.7	18.0	20.4	25.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*25.0*
- -	1.06	1.06	1.28	1.44	1.12	1.01	.97	1.18	1.44			Relative P/E Ratio	*1.40*
- -	.4%	1.0%	.8%	1.1%	1.3%	1.3%	1.4%	1.7%	1.3%			Avg Ann'l Div'd Yield	*.9%*
1450.6	1415.5	1550.6	1687.7	1799.9	1894.9	2123.5	2124.1	2232.8	2496.3	*2610*	*2660*	Revenues ($mill)	*2915*
15.7%	17.5%	19.2%	17.5%	18.6%	19.1%	18.4%	17.8%	17.1%	16.5%	*17.0%*	*18.5%*	Operating Margin	*19.5%*
105.8	78.6	50.6	56.6	60.1	61.7	60.7	69.1	73.8	78.6	*85.0*	*97.0*	Depreciation ($mill)	*105*
38.4	140.7	183.1	202.8	227.0	244.1	278.7	305.9	238.2	245.8	*285*	*315*	Net Profit ($mill)	*430*
5.3%	36.4%	28.8%	31.4%	18.9%	22.0%	22.9%	22.6%	24.1%	23.4%	*24.0%*	*24.0%*	Income Tax Rate	*23.0%*
2.6%	9.9%	11.8%	12.0%	12.6%	12.9%	13.1%	14.4%	10.7%	9.8%	*10.9%*	*11.8%*	Net Profit Margin	*14.8%*
654.2	293.5	253.7	345.0	165.1	225.1	243.9	314.1	403.7	442.7	*480*	*480*	Working Cap'l ($mill)	*490*
285.0	285.0	497.7	481.1	753.6	809.4	862.7	1189.3	1282.6	1203.4	*1200*	*1200*	Long-Term Debt ($mill)	*1340*
998.7	265.7	150.0	285.4	235.7	404.1	617.8	637.2	748.3	933.4	*1105*	*1220*	Shr. Equity ($mill)	*1445*
3.3%	26.5%	28.9%	27.4%	24.3%	21.6%	19.9%	17.7%	13.1%	13.2%	*13.0%*	*13.0%*	Return on Total Cap'l	*16.5%*
3.8%	52.9%	122.0%	71.1%	96.3%	60.4%	45.1%	48.0%	31.8%	26.3%	*26.0%*	*26.0%*	Return on Shr. Equity	*30.0%*
3.8%	40.0%	97.1%	56.6%	69.1%	42.6%	33.3%	35.5%	21.3%	17.2%	*18.0%*	*18.5%*	Retained to Com Eq	*24.5%*
- -	25%	20%	20%	28%	29%	26%	26%	33%	35%	*30%*	*29%*	All Div'ds to Net Prof	*23%*

BUSINESS: BWX Technologies has two reporting segments: Government (propulsion, materials, fuel, components, services, TRISO technology); Commercial (medicine, environmental, disposal, laboratory, research, advanced technologies). BWX derives a significant portion of its revenues and earnings from the U.S. Government (81% of 2023 sales & 83% of operating income). Off & Dir own less than 1% of common stock; Vanguard, 9.5%; William Blair Investment Management, 5.1%; Wellington Management, 5.3%; BlackRock, 10.3%; (3/24 Proxy). Has about 6,250 employees. President & CEO: Rex D. Geveden. Executive Chairman: John A. Fees. Inc.: DE. Address: 800 Main Street, 4th Fl., Lynchburg, VA 24504. Tel.: (434) 522-3800. Internet: www.bwxt.com.

If you believe that nuclear energy will comprise a growing part of the globe's energy needs, then you should consider investing in BWX Technologies. That's because the company gives investors undiluted exposure to the nuclear energy industry, No other publicly-traded company does this. Other nuclear focused participants are either too small, illiquid, and/or have nuclear as only a small portion of their overall business.

We look for BWXT to post 2024 share net of $3.15 on sales of $2.6 billion. Second-quarter results came in comfortably above consensus as well as our estimates as advance payments on worldwide orders for small modular nuclear reactors came in. This commercial business grew faster than the company's core business, which mostly comprises naval work for the U.S. and Canadian governments (73% of sales). Provided there are no significant postponements or cancellations in the latter operation, we see no reason why our estimates won't come to fruition. This is particularly so now that costs related to bringing on board personell related to the RDRE project (more below) have been sunk.

BWX is working on building a nuclear engine with Lockheed Martin (LMT) for a Mars spaceship. This motor, called the rotating detonation rocket engine (RDRE) detonates nuclear fuel in a series of explosions. This produces faster propulsion than the conventional continuous explosion method, which has been traditionally used in space propulsion. This motor would enable humans to reach Mars in five months, and the first rocket is expected to be ready for blast off in 2025.

The stock looks a little pricey. It's trading above its usual P/E multiple of 25. As a result, we advise interested readers to hold off on buying the shares until they fall to a more reasonable level. The dividend is a little more than token, and won't be a much greater part of shareholder returns due to what we anticipate will be greater capital spending. This is to retain high barriers to entry. We speculate that some of this capex will go towards increasing the company's share of the higher-margin medical isotope business, a relatively new priority.

Jeremy J. Butler *September 13, 2024*

(A) Diluted earnings. Next earnings report due late October.
(B) Quarterly dividends expected to be paid in early March, June, September, and December.
(C) In millions.

Company's Financial Strength	B+
Stock's Price Stability	85
Price Growth Persistence	55
Earnings Predictability	80

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CACI INT'L INC. NYSE-CACI

RECENT PRICE **553.27** | P/E RATIO **26.0** (Trailing: 27.4 Median: 18.0) | RELATIVE P/E RATIO **1.44** | DIV'D YLD **Nil** | VALUE LINE **380**

TIMELINESS 2 Lowered 8/23/24
SAFETY 3 New 5/31/02
TECHNICAL 4 Raised 11/15/24
BETA .90 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$399-$620 $510 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	615	(+10%)	*3%*
Low	410	(-25%)	*-7%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	202	219	263
to Sell	213	235	221
Hld's(000)	19688	19403	19612

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	74.3	91.8	104.1	133.7	147.3	200.9	252.7	288.6	290.7	319.3	359.3	570.3								
Low:	50.0	67.0	72.2	78.1	112.1	133.0	139.2	156.2	215.2	238.3	275.8	314.1								
Revenues per sh [A]	80.11	91.09	104.11	118.49	153.20	158.56	151.68	137.01	153.93	178.02	180.86	200.42	227.95	256.61	264.90	294.01	343.46	*386.05*	Revenues per sh [A]	*500.00*
"Cash Flow" per sh	4.33	4.74	5.27	6.63	9.07	8.86	8.53	7.95	8.53	9.62	10.93	14.13	17.22	24.74	21.42	23.09	25.20	*29.30*	"Cash Flow" per sh	*38.00*
Earnings per sh [AB]	2.72	3.14	3.47	4.61	5.96	6.35	5.38	5.17	5.76	6.53	7.84	10.46	12.61	18.30	15.49	16.43	18.60	*21.25*	Earnings per sh [AB]	*27.00*
Div'ds Decl'd per sh	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*Nil*	Div'ds Decl'd per sh	*Nil*
Cap'l Spending per sh	.45	.41	.74	.48	.74	.66	.65	.72	.86	1.77	1.68	1.93	2.88	3.10	3.18	2.80	2.86	*5.10*	Cap'l Spending per sh	*7.00*
Book Value per sh [C]	30.38	33.14	38.78	43.37	47.16	51.89	57.74	61.20	66.08	73.32	85.28	95.31	106.05	113.15	130.40	141.43	157.75	*191.65*	Book Value per sh [C]	*260.00*
Common Shs Outst'g [D]	30.22	29.97	30.25	30.20	24.64	23.22	23.50	24.18	24.32	24.46	24.70	24.88	25.09	23.55	23.42	22.80	22.30	*21.50*	Common Shs Outst'g [D]	*20.00*
Avg Ann'l P/E Ratio	17.4	13.6	13.6	11.5	9.3	8.7	13.2	15.8	15.9	17.5	18.2	17.2	18.5	12.9	17.6	17.9	19.1		Avg Ann'l P/E Ratio	*19.0*
Relative P/E Ratio	1.05	.91	.87	.72	.59	.49	.69	.80	.83	.88	.98	.92	.95	.70	1.02	1.00	1.07		Relative P/E Ratio	*1.05*
Avg Ann'l Div'd Yield	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		Avg Ann'l Div'd Yield	*Nil*
Revenues ($mill) [A]							3564.6	3313.5	3744.1	4354.6	4467.9	4986.3	5720.0	6044.1	6202.9	6702.5	7659.8	*8300*	Revenues ($mill) [A]	*10000*
Operating Margin							9.0%	9.1%	8.8%	8.5%	9.2%	9.3%	9.9%	11.0%	10.2%	10.6%	10.3%	*10.5%*	Operating Margin	*10.0%*
Depreciation ($mill)							65.2	66.1	64.8	71.8	72.2	85.9	110.7	125.4	112.9	141.6	142.1	*170*	Depreciation ($mill)	*220*
Net Profit ($mill)							135.3	126.2	142.8	163.7	197.9	265.6	321.5	457.4	366.8	384.7	419.9	*455*	Net Profit ($mill)	*540*
Income Tax Rate							38.0%	37.4%	36.1%	34.2%	33.7%	19.0%	20.0%	8.4%	19.3%	20.5%	22.9%	*22.5%*	Income Tax Rate	*22.5%*
Net Profit Margin							3.8%	3.8%	3.8%	3.8%	4.4%	5.3%	5.6%	7.6%	5.9%	5.7%	5.5%	*5.5%*	Net Profit Margin	*5.4%*
Working Cap'l ($mill)							313.3	276.8	356.6	353.2	392.2	339.8	316.7	446.4	182.2	216.0	296.2	*860*	Working Cap'l ($mill)	*1500*
Long-Term Debt ($mill)							1238.7	1029.3	1402.1	1177.6	1015.4	1618.1	1357.5	1688.9	1702.1	1650.4	1481.4	*1700*	Long-Term Debt ($mill)	*1600*
Shr. Equity ($mill)							1356.9	1480.1	1607.2	1793.6	2106.8	2371.3	2661.2	2665.1	3053.4	3224.2	3518.1	*4120*	Shr. Equity ($mill)	*5200*
Return on Total Cap'l							5.9%	5.7%	5.4%	6.3%	7.0%	7.3%	8.7%	11.0%	8.2%	8.8%	9.5%	*8.5%*	Return on Total Cap'l	*8.5%*
Return on Shr. Equity							10.0%	8.5%	8.9%	9.1%	9.4%	11.2%	12.1%	17.2%	12.0%	11.9%	11.9%	*11.0%*	Return on Shr. Equity	*10.5%*
Retained to Com Eq							10.0%	8.5%	8.9%	9.1%	9.4%	11.2%	12.1%	17.2%	12.0%	11.9%	11.9%	*11.0%*	Retained to Com Eq	*10.5%*
All Div'ds to Net Prof							--	--	--	--	--	--	--	--	--	--	--	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $1822.9 mill. **Due in 5 Yrs** $1630 mill.
LT Debt $1761.6 mill. **LT Interest** $72.0 mill. (33% of Cap'l)

Leases, Uncapitalized Annual rentals $58.2 mill.

No Defined Benefit Pension Plan

Common Stock 22,408,154 shs. **as of 10/13/24**

MARKET CAP: $12.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	114.8	115.8	440.7
Receivables	926.1	894.9	1069.6
Other	99.4	199.3	236.8
Current Assets	1140.3	1210.0	1747.1
Accts Payable	303.4	181.2	263.5
Debt Due	30.6	45.9	61.3
Other	693.4	766.9	676.3
Current Liab.	1027.4	994.0	1001.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '22-'24 to '27-'29
Revenues	7.0%	10.0%	*10.5%*
"Cash Flow"	10.0%	15.0%	*6.0%*
Earnings	11.0%	15.5%	*4.5%*
Dividends	--	--	*Nil*
Book Value	10.5%	11.0%	*12.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Sep.30	Dec.31	Mar.31	Jun.30	Full Fiscal Year
2021	1459	1468	1551	1564	6044.1
2022	1490	1485	1584	1642	6202.9
2023	1605	1649	1744	1703	6702.5
2024	1850	1834	1938	2038	7659.8
2025	2057	*1960*	*2080*	*2203*	*8300*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Sep.30	Dec.31	Mar.31	Jun.30	Full Fiscal Year
2021	3.67	4.18	4.78	5.74	18.30
2022	3.70	3.83	4.04	3.93	15.49
2023	3.76	3.68	4.33	4.68	16.43
2024	3.76	3.74	5.13	5.98	18.60
2025	5.33	*5.00*	*5.40*	*5.52*	*21.25*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					
2025					

LEGENDS
14.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029: 640, 480, 400, 320, 240, 200, 160, 120, 80, 60

Percent shares traded: 45, 30, 15

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	70.1	28.7
3 yr.	92.1	10.7
5 yr.	146.9	73.6

BUSINESS: CACI International Inc is a provider of expertise and technology to government enterprise and mission customers, supporting national security missions and government modernization/transformation in the intelligence, defense, and federal civilian sectors. Fiscal 2024 revenue by customer type: Department of Defense (74%), Federal Civilian Agencies (21%) and Commercial and other (5%). Has about 24,000 employees. The Vanguard Group, Inc. owns 10.0% of common stock; BlackRock, Inc., 9.4%; Morgan Stanley, 6.5%; FMR LLC, 5.9%; officers and directors, 1.4% (9/24 proxy). President & CEO: John S. Mengucci. Incorporated: Delaware. Address: 12021 Sunset Hills Road, Reston, VA 20190. Tel.: 703-841-7800. Internet: www.caci.com.

CACI International has been winning a lot of new business. In the first quarter of the fiscal year (began July 1st), management won $3.3 billion of contracts. About 75% of that total represent new business and the remainder is extensions of existing business. The book of contract wins to the revenue that was billed in the quarter was a very solid 1.6 times. That means that for every dollar of revenue recorded in the quarter, the company was awarded $1.60 of business in the future. Some sample wins include a five-year task order to provide engineering services to the U.S. Navy worth $805 million. Another contract with the U.S. Navy was in the area of undersea warfare to help train sailors to develop, provide logistics, and analysis of fleet exercises to combat cyberwarfare. This deal also has a five-year term and was valued at $305 million. The total backlog reached $32.4 billion and was up 21% compared to the same time last year when it was $26.7 billion. Management has done a good job identifying areas of growth within the defense sector and has proactively developed the employee base to have the required skill set, and security clearances, necessary to win contracts.

Acquisitions should enhance capabilities going forward. In October, the company closed Applied Insight, to add some cloud migration and artificial intelligence expertise. Also, Azure Summit should be completed soon to add electromagnet engineering capabilities.

It was a strong start to fiscal 2025. Revenues grew 11% year to year. Pricing was solid and expenses were well controlled. This enabled margins to expand and earnings per share to reach $5.23, above our $5.00 target. We have raised our estimate for 2025 to $21.25, which would represent almost 15% growth for the year.

CACI shares are ranked to outperform the market in the year ahead. Not only should the solid earnings momentum continue, but we also like the non-economically sensitive nature of the business. Longer term, investors noticed the recent earnings strength. The shares today sell near a record Relative Price-to-Earnings Ratio, thus limiting 3- to 5-year capital appreciation potential.

Tom Mulle, CFA *November 15, 2024*

(A) Fiscal year ends June 30th.
(B) Diluted earnings. Includes stock option expense. Excludes a nonrecurring gain of $4.09 in '18. May not sum to total due to rounding.
Next quarterly earnings report due late Jan.
(C) Includes intangibles. In fiscal 2024: $4.6 billion, or $207.58/share.
(D) In millions.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	90
Earnings Predictability	85

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CASEY'S GEN'L STRS. NDQ-CASY

RECENT PRICE 372.42 | P/E RATIO 26.1 (Trailing: 27.1 Median: 21.0) | RELATIVE P/E RATIO 1.43 | DIV'D YLD 0.5% | VALUE LINE

TIMELINESS 3 Lowered 10/11/24
SAFETY 2 Raised 7/14/23
TECHNICAL 3 Lowered 10/11/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$309-$538	$424 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	530	(+40%)	*10%*
Low	395	(+5%)	*2%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	266	291	339
to Sell	232	283	263
Hld's(000)	31957	31806	32838

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	77.6	91.4	129.5	136.2	125.4	137.1	179.2	196.6	229.2	249.9	286.6	401.1						
Low:	51.4	64.1	80.9	98.8	99.8	90.4	122.9	114.0	175.0	170.8	202.1	268.1						

LEGENDS
12.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	49.1	14.1
3 yr.	80.6	11.1
5 yr.	123.0	80.9

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	92.20	91.06	148.43	183.21	189.06	203.60	199.74	182.36	193.64	227.56	255.09	249.29	235.65	349.01	405.08	401.59	*432.45*	*459.45*	Sales per sh [A]	*520.55*
	3.17	3.74	4.66	5.59	5.80	6.90	8.72	10.16	9.68	9.87	12.23	13.99	15.65	17.40	20.44	23.02	*23.85*	*25.75*	"Cash Flow" per sh	*33.35*
	1.82	2.31	2.22	3.07	2.86	3.46	4.68	5.73	4.48	3.73	5.51	7.10	8.38	9.10	11.91	13.43	*14.25*	*16.00*	Earnings per sh [A B]	*21.00*
	.29	.32	.46	.60	.66	.71	.80	.86	.96	1.04	1.16	1.28	1.32	1.39	1.52	1.67	*1.96*	*2.20*	Div'ds Decl'd per sh [C]	*2.80*
	14.18	16.19	10.64	13.27	15.70	18.69	22.51	27.74	30.71	34.47	38.42	44.65	52.31	60.38	71.40	81.48	*93.25*	*105.40*	Book Value per sh	*130.15*
	50.84	50.93	37.97	38.14	38.35	38.51	38.89	39.06	38.77	36.87	36.67	36.81	36.95	37.11	37.26	37.01	*37.00*	*37.00*	Common Shs Outst'g [D]	*36.50*
	13.8	12.9	17.8	15.6	19.4	19.6	17.0	18.6	26.8	29.8	21.9	22.3	21.6	21.8	18.0	20.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.0*
	.83	.86	1.13	.98	1.23	1.10	.89	.94	1.41	1.50	1.18	1.19	1.11	1.18	1.04	1.13			Relative P/E Ratio	*1.20*
	1.2%	1.1%	1.2%	1.2%	1.2%	1.0%	1.0%	.8%	.8%	.9%	1.0%	.8%	.7%	.7%	.7%	.6%			Avg Ann'l Div'd Yield	*.6%*
							7767.2	7122.1	7506.6	8391.1	9352.9	9175.3	8707.2	12953	15094	14863	*16000*	*17000*	Sales ($mill) [A]	*19000*
							18.5%	22.7%	22.4%	21.1%	20.9%	23.4%	27.1%	21.3%	20.4%	22.5%	*22.0%*	*22.0%*	Gross Margin	*24.0%*
							6.2%	7.9%	6.8%	5.8%	6.0%	7.0%	8.3%	6.2%	6.3%	7.1%	*7.0%*	*7.0%*	Operating Margin	*7.5%*
							1878	1931	1978	2073	2146	2207	2243	2452	2521	2658	*2750*	*2850*	Number of Stores [E]	*3100*
							183.0	226.0	177.5	143.0	203.9	263.8	312.9	339.8	446.7	502.0	*525*	*590*	Net Profit ($mill)	*765*
							35.66%	35.19%	34.18%	33.31%	22.60%	22.86%	23.19%	22.90%	23.97%	23.50%	*24.0%*	*24.0%*	Income Tax Rate	*24.0%*
							2.4%	3.2%	2.4%	1.7%	2.2%	2.9%	3.6%	2.6%	3.0%	3.4%	*3.3%*	*3.5%*	Net Profit Margin	*4.0%*
							d59.6	d61.7	d95.9	d111.1	d180.3	d676.1	110.8	d179.7	d6.2	d123.6	*d50.0*	*d50*	Working Cap'l ($mill)	*250*
							838.2	822.9	907.4	1291.7	1283.3	714.5	1361.4	1663.4	1620.5	1582.8	*1400*	*1450*	Long-Term Debt ($mill)	*1500*
							875.2	1083.5	1190.6	1271.1	1408.8	1643.2	1932.7	2240.8	2660.7	3015.4	*3450*	*3900*	Shr. Equity ($mill)	*4750*
							11.9%	12.9%	9.4%	6.6%	8.6%	12.3%	10.2%	9.4%	10.5%	10.9%	*11.0%*	*11.0%*	Return on Total Cap'l	*12.5%*
							20.9%	20.9%	14.9%	11.2%	14.5%	16.1%	16.2%	15.2%	16.8%	16.6%	*15.5%*	*15.0%*	Return on Shr. Equity	*16.0%*
							17.5%	17.8%	11.8%	8.2%	11.5%	13.3%	13.7%	12.9%	14.7%	14.4%	*13.0%*	*13.0%*	Retained to Com Eq	*14.0%*
							16%	15%	21%	27%	20%	17%	15%	15%	12%	12%	*14%*	*14%*	All Div'ds to Net Prof	*13%*

CAPITAL STRUCTURE as of 7/31/24
Total Debt $1606.9 mill. **Due in 5 Yrs** $1016 mill.
LT Debt $1398.7 mill. **LT Interest** $30.0 mill.
(Incl. $101.8 mill. capitalized leases; total interest coverage: 11.5x)
(31% of Cap'l)

Leases, Uncapitalized Annual rentals $9.3 mill.
No Defined Benefit Pension Plan

Pfd Stock None
Common Stock 37,115,982 shs.
as of 8/29/2024

MARKET CAP: $13.8 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	7/31/24
Cash Assets	378.9	206.5	305.0
Receivables	120.5	151.8	164.9
Inventory (LIFO)	376.1	428.7	452.0
Other	45.4	42.9	33.1
Current Assets	920.9	829.9	955.0
Accts Payable	560.5	569.5	597.1
Debt Due	52.9	53.2	208.2
Other	313.7	330.8	326.8
Current Liab.	927.1	953.5	1132.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	7.0%	11.0%	*5.5%*
"Cash Flow"	12.0%	12.5%	*8.0%*
Earnings	13.0%	18.0%	*11.0%*
Dividends	8.5%	6.5%	*8.5%*
Book Value	15.5%	14.0%	*12.0%*

Fiscal Year Begins	QUARTERLY SALES ($ mill.) [A] Jul.31	Oct.31	Jan.31	Apr.30	Full Fiscal Year
2021	3182	3263	3049	3459	12952.6
2022	4454	3979	3333	3329	15094.6
2023	3869	4064	3329	3600	14862.9
2024	4098	*4100*	*3800*	*4002*	*16000*
2025	*4400*	*4450*	*4000*	*4150*	*17000*

Fiscal Year Begins	EARNINGS PER SHARE [A B] Jul.31	Oct.31	Jan.31	Apr.30	Full Fiscal Year
2021	3.19	2.59	1.71	1.60	9.10
2022	4.08	3.67	2.67	1.49	11.91
2023	4.52	4.24	2.33	2.34	13.43
2024	4.83	*4.40*	*2.50*	*2.52*	*14.25*
2025	*5.25*	*4.80*	*3.00*	*2.95*	*16.00*

Cal-endar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.32	.32	.32	.32	1.28
2021	.34	.34	.34	.35	1.37
2022	.35	.35	.38	.38	1.46
2023	.38	.38	.43	.43	1.62
2024	.43	.43	.50		

BUSINESS: Casey's General Stores operates convenience stores in sixteen Midwestern states, primarily in Iowa, Missouri, and Illinois. Stores sell gasoline and food (including pizza, doughnuts, hamburgers, etc.), beer and other beverages, and non-food items. In fiscal 2023, Casey's had 2,658 company-owned locations (vs 2,521 in 2022); gasoline accounted for 63% of net sales (vs 67% in 2022); nonfuel retail sales generated 35% of revenue, 66% of gross profit over past three years. Has 20,935 full-time employees, 24,424 part time. Off. & Dir. own less than 1% of common stock out. (7/24 Proxy). Chair.: H. Lynn Horak. Pres. & CEO: Darren M. Rebelez. Incorporated: IA. Address: One Convenience Blvd., Ankeny, IA 50021. Tel.: 515-965-6100. Internet: www.caseys.com.

Casey's delivered strong results in its first fiscal quarter of 2024. (Years end April 30th.) The company's performance benefited from same-store sales growth in prepared food and grocery categories, alongside a positive margin expansion. Inside-store sales rose by 7.6%, driven by prepared food and dispensed beverages, which saw a 4.4% increase in same-store sales. Fuel performance was stable, with same-store gallons sold rising by 70 basis points, while maintaining a fuel margin of $0.41 per gallon. Market conditions created some challenges in higher costs for certain items and inflationary presure on operating expenses, but these were well mitigated by ongoing efficiency measures. The top line advanced 6% overall, resulting in a 7% increase in earnings per share.

Corporate expansion is likely to fuel further growth. Casey's leadership expects to close the acquisition of Fikes before 2025, adding 198 CEFCO convenience stores and increasing its store growth target for the fiscal year. The acquisition is anticipated to generate $400 million in each inside and fuel sales, while contributing $90 million in operating profit. Note that this is not accounted for in our forecast, as the deal has not yet been completed. Similar tuck-in acquisitions are likely to bolster Casey's strategic growth objectives over the foreseeable future.

Operations are set to remain steady over the near term. A conservative pricing strategy, aimed at preserving customer value propositions, should help in maintaining healthy top-line growth through higher sales volumes. A focus on improving food offerings will also help to drive demand to Casey's. Profit margins are likely sustainable at current levels, with potential for ongoing improvement through labor-efficiency implementations, investments in new technologies, and increasing economies of scale. Overall, Casey's is well positioned to continue its growth trajectory.

The stock's astronomical rise gives us pause at the current juncture. Although operating metrics are set to improve substantially in the years ahead, these shares' high valuation leads us to believe that investors should wait for a better opportunity to buy in.

Earl B. Humes *October 18, 2024*

(A) Fiscal year ends April 30th of the following calendar year. Sales figures exclude royalty income and the revenues from franchised stores.
(B) Diluted egs. Excludes nonrecurring gain/(loss): '17, $4.61. Next earnings report due early December.
(C) Dividends historically paid early February, May, August, and November.
(D) In millions.
(E) Includes only company-owned stores.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	90
Earnings Predictability	85

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CHECK POINT SOFT. NDQ-CHKP

RECENT PRICE 192.81 | P/E RATIO 20.9 (Trailing: 21.8 Median: 18.0) | RELATIVE P/E RATIO 1.12 | DIV'D YLD Nil | VALUE LINE

TIMELINESS 1 Raised 7/26/24
SAFETY 1 Raised 1/12/18
TECHNICAL 3 Raised 8/23/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$165-$240	$203 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	350	(+80%)	*16%*
Low	285	(+50%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	299	284	301
to Sell	270	305	290
Hld's(000)	76851	74046	73888

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	64.9	80.8	88.5	90.0	119.2	120.8	132.8	139.3	137.5	149.6	154.1	196.6								
Low:	44.4	60.5	65.1	71.6	84.0	93.8	100.6	80.1	107.9	107.5	117.2	145.8								
	3.85	4.42	5.27	6.06	6.75	7.25	8.14	9.32	10.49	11.66	12.33	13.71	15.05	16.78	19.29	21.39	*22.85*	*23.95*	Revenues per sh	*27.80*
	1.57	1.75	2.21	2.68	3.15	3.44	3.64	3.98	4.43	5.66	5.97	6.53	7.15	7.47	9.07	9.24	*9.25*	*10.25*	"Cash Flow" per sh	*12.65*
	1.50	1.68	2.13	2.54	2.96	3.27	3.43	3.74	4.20	5.33	5.71	6.13	6.78	7.05	7.40	8.42	*9.00*	*10.00*	Earnings per sh [A]	*12.20*
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
	.04	.02	.02	.04	.04	.05	.07	.10	.15	.18	.11	.18	.14	.12	.18	.16	*.20*	*.25*	Cap'l Spending per sh	*.35*
	9.60	11.09	13.05	14.93	16.81	18.74	19.79	20.19	21.03	22.64	24.28	24.53	25.26	25.23	24.25	24.99	*24.10*	*23.40*	Book Value per sh [B]	*21.30*
	210.04	209.10	208.41	205.89	199.03	192.26	183.79	174.90	165.98	159.04	155.38	145.50	137.20	129.10	120.80	112.90	*112.00*	*111.00*	Common Shs Outst'g [C]	*108.00*
	14.8	15.5	16.8	21.0	17.5	16.4	20.0	21.9	19.3	19.9	18.6	18.7	16.9	16.9	17.0	15.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*26.0*
	.89	1.03	1.07	1.32	1.11	.92	1.05	1.10	1.01	1.00	1.00	1.00	.87	.91	.98	.87			Relative P/E Ratio	*1.45*
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			Avg Ann'l Div'd Yield	*Nil*
							1495.8	1629.8	1741.3	1854.7	1916.5	1994.8	2064.9	2166.8	2329.9	2414.7	*2560*	*2660*	Revenues ($mill)	*3000*
							54.2%	52.2%	49.6%	55.9%	53.8%	51.1%	51.0%	49.4%	51.5%	44.7%	*45.0%*	*46.0%*	Operating Margin	*49.0%*
							9.2	10.4	10.9	12.9	16.4	16.7	18.9	20.6	22.7	23.1	*25.0*	*30.0*	Depreciation ($mill)	*45.0*
							659.6	685.9	724.8	888.0	911.0	933.0	962.7	943.9	1072.6	1020.4	*1010*	*1110*	Net Profit ($mill)	*1320*
							20.5%	21.5%	19.2%	17.1%	15.6%	13.9%	12.6%	13.5%	12.1%	11.7%	*12.0%*	*13.0%*	Income Tax Rate	*16.0%*
							44.1%	42.1%	41.6%	47.9%	47.5%	46.8%	46.6%	43.6%	46.0%	42.3%	*39.5%*	*41.5%*	Net Profit Margin	*44.0%*
							815.0	678.9	726.6	757.5	990.0	737.5	734.8	625.8	492.6	341.6	*400*	*500*	Working Cap'l ($mill)	*800*
							--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	Long-Term Debt ($mill)	*Nil*
							3637.6	3531.9	3491.1	3600.1	3772.4	3568.8	3466.2	3257.1	2929.3	2821.0	*2700*	*2600*	Shr. Equity ($mill) [B]	*2300*
							18.1%	19.4%	20.8%	24.7%	24.2%	26.1%	27.8%	29.0%	36.6%	36.2%	*37.5%*	*42.5%*	Return on Total Cap'l	*57.5%*
							18.1%	19.4%	20.8%	24.7%	24.2%	26.1%	27.8%	29.0%	36.6%	36.2%	*37.5%*	*42.5%*	Return on Shr. Equity	*57.5%*
							18.1%	19.4%	20.8%	24.7%	24.2%	26.1%	27.8%	29.0%	36.6%	36.2%	*37.5%*	*42.5%*	Retained to Com Eq	*57.5%*
							--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

% TOT. RETURN 9/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	44.9	23.3
3 yr.	70.8	17.5
5 yr.	76.4	78.3

CAPITAL STRUCTURE as of 6/30/24

Total Debt None

Leases, Uncapitalized: Annual rentals $6.3 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 112,906,427 shs.

MARKET CAP: $21.8 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	1637.6	1530.0	1660.1
Receivables	644.2	657.7	456.7
Other	50.0	70.0	75.5
Current Assets	2331.8	2257.7	2192.3
Accts Payable	475.8	502.3	445.0
Debt Due	--	--	--
Other	1363.4	1413.8	1341.9
Current Liab.	1839.2	1916.1	1786.9

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	10.5%	9.5%	*7.0%*
"Cash Flow"	10.5%	9.0%	*7.0%*
Earnings	9.5%	7.5%	*8.0%*
Dividends	--	--	*Nil*
Book Value	4.0%	2.0%	*NMF*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	507.6	526.1	534.0	599.1	2166.8
2022	542.7	571.1	577.6	638.5	2329.9
2023	566.2	588.7	596.3	663.5	2414.7
2024	598.8	627.4	*635*	*698.8*	*2560*
2025	*625*	*650*	*660*	*725*	*2660*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	1.54	1.61	1.65	2.25	7.05
2022	1.57	1.64	1.77	2.45	7.40
2023	1.80	2.00	2.07	2.57	8.42
2024	2.04	2.17	*2.25*	*2.54*	*9.00*
2025	*2.25*	*2.40*	*2.55*	*2.80*	*10.00*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	NO CASH DIVIDENDS BEING PAID				
2021					
2022					
2023					
2024					

BUSINESS: Check Point Software Tech. develops, markets, and supports Internet security solutions, incl. firewall and virtual private networking solutions. The NGX platform delivers unified security architecture for perimeter, internal, Web, and endpoint security solutions that protect business comm., offers resources for corporate networks and applications, remote employees, branch offices, and partner extranets. Employs 6,450. Officers and directors own 25.1% of common stock; Massachusetts Financial Services, 6.3% (6/24 proxy). CEO: Gil Shwed. Inc: DE. Address: 5 Shlomo Kaplan St., Tel Aviv, Israel, 6789159. Telephone: 972-3-753-4555. U.S. address: 959 Skyway Rd., Suite 300, San Carlos, CA 94070 Telephone: 650-628-2000. Internet: www.checkpoint.com.

Check Point Software has signed a definitive agreement to acquire Cyberint Technologies Ltd., a pioneering provider of External Risk Management solutions. Management believes this will significantly enhance Check Point's Security Operations Center (SOC) capabilities and expand its managed threat intelligence offerings. Cyberint's advanced capabilities will be integrated into the Check Point *Infinity* platform for collaborative threat prevention. Closing of the transaction is expected to occur by the end of 2024.

Check Point has posted impressive top-line results. Revenues are up, thanks to growing demand for the *Infinity* platform. The success of *Infinity* is underscored by its double-digit growth and significant deals with Fortune Global 500 organizations. We estimate the top line will step up 6%, to $2.56 billion, in 2024, assuming demand remains strong. A smaller 4% gain, to $2.66 billion, appears attainable in 2025. (Please note that Nadav Zafrir will assume the CEO role in December 2024. Current CEO Gil Shwed will become Executive Chairman of the Board.)

We think share earnings will expand in spite of challenges. Research & development expenses are up as a result of higher facilities and capital equipment costs. Sales & marketing expenditures have increased because of elevated advertising outlays. However, we expect that gross margin improvement will outweigh the rise in operating costs as a percentage of revenue. Share earnings ought to step up 7%, to $9.00, this year. The bottom line should expand by a larger 11%, to $10.00 a share, in 2025.

Since our July report, this stock's Timeliness rank has ascended one notch, to 1 (Highest). Check Point's long-term prospects are good. Companies and governments will probably increase their cyber security spending, as new threats crop up. Also, the Federal Reserve's recent decision to slash interest rates by 50 basis points should help to support economic growth. Long-term price appreciation potential is above average. This high-quality issue (Safety:1) may be suitable for conservative investors seeking a stability component to their portfolios.

Keith R. Foldesi *October 11, 2024*

(A) Diluted earnings. Next earnings report due late October. Earnings may not sum to total due to rounding.

(B) Includes intangibles. In 2023: $1748.5 mill., roughly $14.47 a share.

(C) In millions.

Company's Financial Strength	A+
Stock's Price Stability	95
Price Growth Persistence	80
Earnings Predictability	100

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CENCORA NYSE-COR

RECENT PRICE 233.57 | P/E RATIO 16.1 (17.6 / 14.0) | RELATIVE P/E RATIO 0.88 | DIV'D YLD 0.9% | VALUE LINE

TIMELINESS 1 Raised 7/12/24
SAFETY 2 Raised 6/26/20
TECHNICAL 3 Lowered 11/1/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

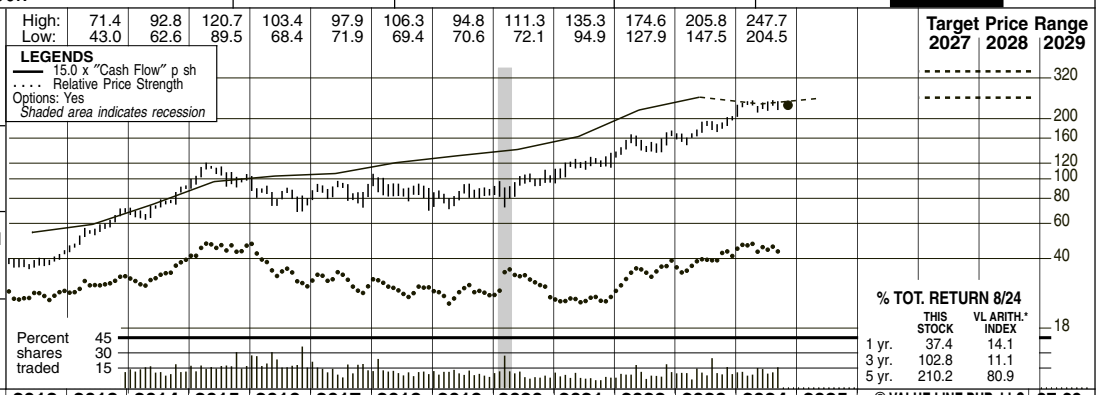
Low-High	Midpoint (% to Mid)
$204-$323	$264 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	345	(+50%)	*14%*
Low	255	(+10%)	*6%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	509	549	542
to Sell	473	499	508
Hld's(000)	168819	196717	198143



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
216.10	243.16	282.09	310.51	337.57	382.38	546.75	657.16	667.34	702.51	787.64	868.58	929.82	1028.4	1157.0	1306.23	*1470.35*	*1562.80*	Sales per sh [A]	*1859.30*
1.81	2.05	2.62	3.15	3.61	3.96	5.00	6.46	6.90	7.09	8.04	8.69	9.36	10.85	13.20	14.10	*15.80*	*16.90*	"Cash Flow" per sh	*22.25*
1.44	1.72	2.22	2.54	2.72	3.14	3.97	4.96	5.62	5.88	6.49	7.09	7.90	9.26	11.03	11.99	*13.65*	*14.75*	Earnings per sh [A B]	*20.00*
.15	.24	.34	.46	.60	.83	.94	1.16	1.36	1.46	1.52	1.60	1.66	1.76	1.84	1.94	2.04	*2.14*	Div'ds Decl'd per sh [C]	*2.40*
.44	.51	.67	.65	.70	.88	1.21	1.12	2.11	2.14	1.58	1.50	1.81	2.11	2.41	2.28	*2.15*	*2.15*	Cap'l Spending per sh	*2.10*
8.67	9.43	10.69	11.10	10.43	10.08	8.95	3.06	9.68	9.47	13.76	13.92	d4.99	1.07	d1.03	2.60	*12.70*	*24.35*	Book Value per sh	*60.30*
312.44	288.08	276.35	258.34	235.48	230.03	218.69	206.89	220.05	217.99	213.22	206.76	204.23	208.09	206.20	200.71	*199.00*	*199.00*	Common Shs Outst'g [D]	*199.00*
14.7	10.4	12.7	14.7	14.0	16.0	17.6	20.4	15.7	14.4	13.6	11.7	11.6	12.1	12.7	14.1	16.2		Avg Ann'l P/E Ratio	*15.0*
.88	.69	.81	.92	.89	.90	.93	1.03	.82	.72	.73	.62	.60	.65	.73	.80	.92		Relative P/E Ratio	*.90*
.7%	1.3%	1.2%	1.2%	1.6%	1.7%	1.3%	1.1%	1.5%	1.7%	1.7%	1.9%	1.8%	1.6%	1.3%	1.2%	.9%		Avg Ann'l Div'd Yield	*1.0%*
119569	135962	146850	153144	167940	179589	189894	213989	238587	262173	*292600*	*311000*	Sales ($mill) [A]	*370000*
1.4%	1.5%	1.5%	1.5%	1.3%	1.3%	1.3%	1.4%	1.8%	1.5%	*1.5%*	*1.5%*	Operating Margin	*1.6%*
169.6	194.5	232.5	241.2	284.0	295.0	280.2	326.8	390.6	419.0	*425*	*430*	Depreciation ($mill)	*450*
923.4	1141.7	1286.0	1303.8	1430.0	1502.2	1632.2	1930.5	2330.3	2405.0	*2715*	*2935*	Net Profit ($mill)	*3980*
38.0%	36.4%	32.5%	30.7%	21.3%	20.6%	20.8%	21.3%	23.7%	19.8%	*24.0%*	*24.0%*	Income Tax Rate	*24.0%*
.8%	.8%	.9%	.9%	.9%	.8%	.9%	.9%	1.0%	.9%	*.9%*	*.9%*	Net Profit Margin	*.9%*
d450.0	d2366	d2429	d2515	d1975	d1449	d797.4	d2556	d4198	d6032	*d5000*	*d3500*	Working Cap'l ($mill)	*d200*
1995.6	3493.0	3870.2	3781.6	4510.8	4354.4	3618.3	6383.7	4632.4	4146.1	*4000*	*3800*	Long-Term Debt ($mill)	*3200*
1956.9	633.5	2129.4	2064.5	2932.8	2878.9	d1019.0	223.4	d211.6	522.0	*2530*	*4845*	Shr. Equity ($mill)	*12000*
24.2%	28.8%	22.5%	23.5%	20.4%	21.9%	65.4%	30.5%	55.3%	51.5%	*57.0%*	*59.5%*	Return on Total Cap'l	*72.0%*
47.2%	NMF	60.4%	63.2%	48.8%	52.2%	NMF	NMF	NMF	NMF	*NMF*	*NMF*	Return on Shr. Equity	*NMF*
36.2%	NMF	46.8%	47.6%	37.4%	40.4%	NMF	NMF	NMF	NMF	*NMF*	*NMF*	Retained to Com Eq	*NMF*
23%	22%	22%	25%	23%	23%	21%	19%	17%	16%	*16%*	*16%*	All Div'ds to Net Prof	*15%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $4731.0 mill. **Due in 5 Yrs** $1981.2 mill.
LT Debt $4165.9 mill. **LT Interest** $130.0 mill.

(Total interest coverage: 15.2x) (82% of Cap'l)

Leases, Uncapitalized $218.1 mill.

No Defined Pension Benefits Plan

Pfd Stock None
Common Stock 197,046,826 shs.
as of 7/26/24

MARKET CAP: $46.0 billion (Large Cap)

CURRENT POSITION ($MILL.)

	2022	2023	6/30/24
Cash Assets	3388.2	2592.1	3306.2
Receivables	18452.7	20911.1	24051.5
Inventory (LIFO)	15556.4	17454.8	18301.5
Other	2192.5	1840.8	1648.1
Current Assets	39589.8	42798.8	47307.3
Accts Payable	40192.9	45836.0	49883.0
Other	3285.1	2995.2	3090.9
Current Liab.	43788.0	48831.2	52973.9

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	12.5%	8.5%	*7.5%*
"Cash Flow"	13.5%	11.5%	*4.0%*
Earnings	13.5%	11.0%	*6.5%*
Dividends	11.0%	4.5%	*4.5%*
Book Value	-45.5%	-70.5%	*NMF*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	52516	49154	53405	58912	213989
2022	59628	57719	60064	61174	238587
2023	62846	63457	66947	68922	262173
2024	72253	68414	74240	*77693*	*292600*
2025	*77000*	*75675*	*78500*	*79825*	*311000*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	2.18	2.53	2.16	2.39	9.26
2022	2.58	3.22	2.62	2.61	11.03
2023	2.71	3.50	2.92	2.86	11.99
2024	3.28	3.80	3.34	*3.23*	*13.65*
2025	*3.55*	*4.20*	*3.55*	*3.45*	*14.75*

Cal-endar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.42	.42	.42	.44	1.70
2021	.44	.44	.44	.46	1.78
2022	.46	.46	.46	.485	1.86
2023	.485	.485	.485	.51	1.86
2024	.51	.51	.51		

BUSINESS: Cencora (formerly AmerisourceBergen) was created by the merger of AmeriSource Health and Bergen Brunswig. The company is a full-service wholesale distributor of pharmaceutical products and related health-care services in the U.S. The company changed its name to Cencora in Aug., '23. It operates in two segments: U.S. Healthcare Solutions and International Healthcare Solutions. Acq'd. Alliance Healthcare in June '21; PharmaLax Holding GmbH, January, '23. 2023 deprec. rate: 8.8%. Walgreens Boots Alliance owns 15.3% of common; Off. & dir., 15.8% (1/24 Proxy). Has about 46,000 employees. Inc.: DE. President & CEO: Steven H. Collis. Address: 1 West First Avenue, Conshohocken, PA 19428. Telephone: 610-727-7000. Internet: www.cencora.com

Cencora likely recorded another record performance in fiscal 2024 (ended September 30th). (The company was slated to release year-end results shortly after this Issue went to press.) We think it posted fourth quarter earnings of $3.23 per share, well above the previous year's tally, on a 12% year-to-year bump in sales. The company should continue to benefit from elevated demand for its extensive line of products as a global pharmaceutical service leader. U.S. Healthcare Solutions and International Healthcare Solutions sales probably rose double digits and mid-single digits, respectively. Too, volume growth in GLP-1 weight loss medicine, along with a favorable sales mix and reduced interest expense, will likely remain strong throug the end of this year.

We have upped our fiscal 2024 profit estimate by $0.05 a share. Improving economic conditions and resilient consumer spending, along with drugmaking volume growth all augur well for top- and bottom-line growth in the just-concluded year and long term. Cencora is also well positioned in the specialty market, which creates opportunities to partner with those early in the drug development process through its consulting arm (AmerisourceBergen). Management raised its 2024 earnings outlook ahead of investor conferences in September. All told, the company now looks for profits to reach $13.60-$13.70 per share versus the previous range of $13.55-$13.65 a share. This represents 13% growth at the midpoint from the fiscal 2023 level.

Investors seem to be unsure of Cencora's long-term prospects of late. Indeed, these shares have swayed up and down over the past three months, but have stayed relatively flat. The company continues to be dragged down by its biggest customer, Walgreens Boots Alliance, and its strategic review leading to store closures amid a challenging retail environment. Walgreen's further cut its equity stake in Cencora, which is now down 2%, to 10%.

These shares are an attractive selection for the year ahead. But, capital appreciation potential out to 2027-2029 is less appealing this time around. Indeed, we look for the stock to trade between $255-$345 over that interim.

Zachary J. Hodgkinson November 8, 2024

(A) Fiscal year ends Sept. 30th. **(B)** Diluted earnings. Excludes n/r (losses)/gains: '10, $0.06. Next egs. report due late January. EPS may not tally due to rounding.

(C) Dividend historically paid in early March, June, September, and Dec. **(D)** In millions.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	50
Earnings Predictability	100

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CSG SYSTEMS INT'L NDQ-CSGS

RECENT PRICE **48.18** | P/E RATIO **16.8** (Trailing: 21.7 Median: 21.0) | RELATIVE P/E RATIO **0.90** | DIV'D YLD **2.5%** | **VALUE LINE**

TIMELINESS 1 Raised 10/25/24
SAFETY 3 Lowered 5/3/24
TECHNICAL 4 Lowered 10/18/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$40-$88	$64 (35%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	110	(+130%)	*24%*
Low	75	(+55%)	*14%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	120	122	98
to Sell	107	116	144
Hld's(000)	30652	31413	29373

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	29.8	32.1	38.8	49.8	51.3	48.8	58.7	54.9	59.5	66.6	69.4	55.6						
Low:	18.0	23.2	23.7	32.4	35.5	30.4	31.3	36.3	42.6	52.4	46.2	39.6						

LEGENDS
11.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029: 128, 96, 80, 64, 48, 40, 32, 24, 16, 12

Percent shares traded: 30, 20, 10

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-3.8	23.3
3 yr.	6.1	17.5
5 yr.	3.2	78.3

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	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
	13.60	14.26	16.10	21.72	22.44	22.15	22.13	23.12	23.59	23.56	26.39	30.31	30.28	32.20	34.85	39.58	*42.40*	*49.10*	Revenues per sh
	2.59	2.59	3.13	3.38	3.39	3.47	2.75	3.34	3.23	3.11	3.88	4.56	3.84	4.47	3.87	4.65	*6.25*	*7.30*	"Cash Flow" per sh
	1.70	1.64	1.90	1.41	1.47	1.84	1.36	1.93	1.90	1.87	2.01	2.55	1.82	2.26	1.41	2.20	*2.80*	*3.35*	Earnings per sh [A]
	- -	- -	- -	- -	- -	.45	.62	.70	.74	.79	.84	.89	.94	1.00	1.06	1.12	*1.20*	*1.28*	Div'ds Decl'd per sh [B]
	.62	1.15	.42	.66	.98	.89	.77	.58	.44	.86	1.72	1.13	.90	.82	1.18	.95	*1.15*	*1.20*	Cap'l Spending per sh
	4.31	6.04	6.95	8.12	9.68	10.85	10.83	10.62	7.79	10.23	10.89	12.06	12.91	13.44	11.36	9.25	*12.95*	*16.95*	Book Value per sh [C]
	34.72	35.13	34.12	33.82	33.73	33.75	33.95	32.56	32.26	33.52	33.16	32.89	32.71	32.50	31.27	29.54	*29.00*	*28.00*	Common Shs Outst'g [D]
	8.4	9.3	10.4	12.1	12.1	12.6	19.6	16.1	21.7	22.0	20.2	18.6	24.4	21.2	42.2	24.2	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio
	.51	.62	.66	.76	.77	.71	1.03	.81	1.14	1.11	1.09	.99	1.25	1.15	2.44	1.36			Relative P/E Ratio
	- -	- -	- -	- -	- -	1.9%	2.3%	2.3%	1.8%	1.9%	2.1%	1.9%	2.1%	2.1%	1.8%	2.1%			Avg Ann'l Div'd Yield
							751.3	752.5	761.0	789.6	875.1	996.8	990.5	1046.5	1089.8	1169.3	*1230*	*1375*	Revenues ($mill)
							18.3%	21.3%	24.7%	21.6%	22.2%	22.0%	20.3%	21.7%	18.5%	18.1%	*20.5%*	*20.5%*	Operating Margin
							47.6	44.1	41.2	42.9	62.6	67.1	66.9	72.8	77.0	71.3	*100*	*110*	Depreciation ($mill)
							45.6	64.6	62.9	61.4	66.1	82.8	58.7	72.3	44.1	66.2	*81.5*	*94.0*	Net Profit ($mill)
							39.6%	35.1%	37.1%	30.0%	24.0%	21.7%	31.2%	28.3%	27.5%	28.3%	*23.0%*	*22.0%*	Income Tax Rate
							6.1%	8.6%	8.3%	7.8%	7.6%	8.3%	5.9%	6.9%	4.0%	5.7%	*6.6%*	*6.8%*	Net Profit Margin
							266.9	158.1	307.9	331.7	249.2	250.4	278.4	53.1	238.8	301.4	*400*	*450*	Working Cap'l ($mill)
							233.3	135.0	327.0	309.2	352.3	346.5	337.2	137.2	375.5	535.0	*500*	*375*	Long-Term Debt ($mill)
							367.7	345.8	251.4	342.7	361.0	396.7	422.4	436.6	355.2	273.3	*375*	*475*	Shr. Equity ($mill) [B]
							8.5%	14.6%	12.3%	10.7%	10.5%	12.3%	8.8%	13.9%	7.2%	10.1%	*10.0%*	*11.5%*	Return on Total Cap'l
							12.4%	18.7%	25.0%	17.9%	18.3%	20.9%	13.9%	16.6%	12.4%	24.2%	*21.5%*	*19.5%*	Return on Shr. Equity
							6.8%	12.2%	15.4%	10.1%	10.6%	13.5%	6.5%	9.1%	3.0%	11.8%	*12.5%*	*12.0%*	Retained to Com Eq
							45%	34%	38%	44%	42%	35%	53%	45%	76%	51%	*43%*	*38%*	All Div'ds to Net Prof

CAPITAL STRUCTURE as of 6/30/24
Total Debt $540.5 mill. **Due in 5 Yrs** $243.0 mill.
LT Debt $533.0 mill. **LT Interest** $28.0 mill.
(Total interest coverage: 3.8x) (66% of Cap'l)

Leases, Uncapitalized Annual rentals $17.0 mill.
No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 29,503,000 shares
as of 8/6/24

MARKET CAP: $1.4 billion (Small Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	150.4	186.3	110.4
Receivables	327.0	349.8	350.8
Other	288.6	326.1	297.8
Current Assets	766.0	862.2	759.0
Accts Payable	47.7	46.4	52.9
Debt Due	37.5	7.5	7.5
Other	442.0	506.9	416.0
Current Liab.	527.2	560.8	476.4

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	5.0%	7.5%	*7.5%*
"Cash Flow"	2.5%	5.0%	*12.5%*
Earnings	2.0%	.5%	*15.5%*
Dividends	- -	6.0%	*5.5%*
Book Value	1.5%	3.5%	*9.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	253.1	255.1	263.2	275.1	1046.5
2022	264.4	262.2	273.3	289.9	1089.8
2023	298.7	286.3	286.9	297.4	1169.3
2024	295.1	290.3	*315*	*329.6*	*1230*
2025	*330*	*340*	*350*	*355*	*1375*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.61	.60	.50	.54	2.26
2022	.19	.17	.40	.66	1.41
2023	.68	.45	.62	.44	2.20
2024	.68	.48	*.72*	*.92*	*2.80*
2025	*.75*	*.80*	*.85*	*.95*	*3.35*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.235	.235	.235	.235	.94
2021	.25	.25	.25	.25	1.00
2022	.265	.265	.265	.265	1.06
2023	.28	.28	.28	.28	1.12
2024	.30	.30	.30		

BUSINESS: CSG Systems International, Inc. provides business support solutions and services to the majority of the global communications service providers, including Comcast, DISH, Charter, and AT&T, among many others. Broadband/Cable/Satellite (51% of '23 revenues); Telecommunications (21%); Other (28%). Acquired U.K-based Intec Telecom, 11/10. Has about 5,700 employees. R&D spending: 12% of 2023 revenues. The Vanguard Group, Inc owns 13.1% of common stock; BlackRock, Inc., 17.3%; Officers & directors, 3.1% (4/24 proxy). Incorporated: Delaware. Chairman: Ron Cooper. President & CEO: Brian Shepherd. Address: 6175 S. Willow Drive, 10th Floor, Greenwood Village, CO 80111. Telephone: 303-200-2000. Internet: www.csgi.com.

CSG Systems International reported softer-than-expected top- and bottom-line results in the June period. Revenues of $290 million and earnings of $0.48 per share edged only modestly higher year over year, with both figures falling short of consensus estimates. An uneven macroeconomic climate probably continued to pressure customer IT spending budgets, while restructuring and reorganization charges, as well as R&D expenses, kept a lid on profits in the second quarter. Demand for the company's Software-as-a-Service products remained solid, offsetting a weaker performance from the software and services division.

We are trimming our current-year financial outlook at this juncture. Largely a consequence of softer second-quarter results, we now think CSG Systems will generate revenues of $1.23 billion this year (down $25 million from our previous call) and earnings of $2.80 per share (down $0.20). Our revised forecasts still suggest respectable year-over-year top-line growth and solid bottom-line expansion. Further, we think the stage is set for a strong showing in 2025, supported by a healthier operating landscape, resilient margins, and waning restructuring costs.

The company is returning a decent amount of capital to shareholders. In the recent period, leadership repurchased about $10 million worth of stock, and announced an additional $100 million buyback authorization. Meanwhile, the dividend yield is roughly on par with the *Value Line* median.

Growth over the pull to late decade is likely to be driven by a mix of organic expansion and acquisitions. Demand for the company's cloud-based IT solutions is poised to remain strong, particularly among telecommunications customers. Moreover, management is apt to keep its foot on the pedal, in terms of strategic acquisition activity.

A variety of investors can find something to like here at the moment. Shares of CSG Systems have been upgraded two notches for Timeliness, to 1 (Highest). What's more, total return potential over both the 18-month and 3- to 5-year windows is attractive at the recent quotation.

Nicholas Patrikis *November 1, 2024*

(A) Diluted earnings. Excl. n/r gain/(losses): '08, 14¢; '09, (42¢); '10, ($1.23); '11, (13¢); '12, (4¢); '13, (25¢); '14, (26¢); '15, (6¢). Excl. discontinued ops.: '07, 2¢; '08, 1¢; '09, 4¢. Egs. may not sum due to rounding. Next earnings report due mid-November. **(B)** Dividends historically paid in late March, June, Sept., and Dec. **(C)** Includes intangibles. At 12/31/23: $413.1 million, or $13.98 a share. **(D)** In millions.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	60
Earnings Predictability	65

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CSW INDUSTRIALS NDK-CSWI

RECENT PRICE 337.63 | P/E RATIO 41.2 (Trailing: 48.1 Median: NMF) | RELATIVE P/E RATIO 2.25 | DIV'D YLD 0.2% | VALUE LINE 1111

TIMELINESS 2 Raised 7/26/24
SAFETY 2 Raised 7/31/20
TECHNICAL 3 Raised 8/23/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

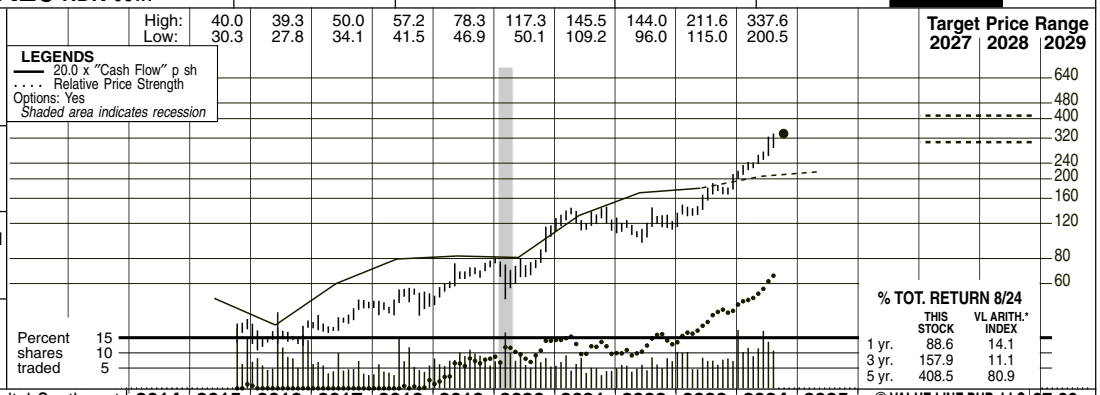
Low-High	Midpoint (% to Mid)
$293-$465	$379 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	415	(+25%)	*6%*
Low	305	(-10%)	*-2%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	102	117	119
to Sell	78	95	116
Hld's(000)	12687	12860	13025



On September 30, 2015, Capital Southwest spun off its industrial subdidiaries to form a company called CSW Industrials. On November 15, 2015, the company became an independent publicly-traded entity when it issued 15 million shares to the public at $35.20 a share. The underwriting syndicate included BoFA Merril Lynch, Wells Fargo, and Citibank. The stock trades on the NASDAQ under the symbol CSWI.

CAPITAL STRUCTURE as of 6/30/24
Total Debt $115.0 mill. **Due in 5 Yrs** $67.4 mill.
LT Debt $115.0 mill. **LT Interest** $9.1 mill.
(Total interest coverage 10.6x) (15% of Cap'l)

Leases, Uncapitalized Annual rentals $.6 mill.
No Defined Benefit Pension Plan
Pfd Stock None
Common Stock 15,530,975 shs.
as of 7/29/24

MARKET CAP: $5.2 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	39.9	16.2	18.9
Receivables	57.6	90.7	143.2
Inventory	57.3	127.4	156.8
Other	3.8	16.4	12.3
Current Assets	158.6	250.7	331.2
Accts Payable	17.7	39.5	55.0
Debt Due	.6	.6	- -
Other	35.0	58.3	66.5
Current Liab.	53.3	98.4	121.5

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	- -	17.0%	*4.5%*
"Cash Flow"	- -	22.0%	*12.0%*
Earnings	- -	23.5%	*13.5%*
Dividends	- -	- -	*9.5%*
Book Value	- -	15.0%	*9.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Jun.30	Sep.30	Dec.31	Mar.31	Full Year
2021	161.3	155.6	136.3	173.2	626.4
2022	199.9	191.2	171.1	195.7	757.9
2023	203.4	203.7	175.0	210.7	792.8
2024	226.2	*215*	*185*	*198.8*	*825*
2025	*225*	*250*	*190*	*215*	*880*

Calendar	EARNINGS PER SHARE [A] Jun.30	Sep.30	Dec.31	Mar.31	Full Year
2021	1.27	1.14	.52	1.17	4.20
2022	1.88	1.57	1.01	1.74	6.20
2023	1.97	1.93	1.59	1.03	6.52
2024	2.47	*2.13*	*1.60*	*2.00*	*8.20*
2025	*2.20*	*2.30*	*1.80*	*2.20*	*8.50*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.135	.135	.135	.135	.54
2021	.135	.15	.15	.15	.59
2022	.17	.17	.17	.17	.68
2023	.17	.19	.19	.21	.76
2024	.21	.21	.21		

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
- -	20.42	20.64	20.55	23.28	26.17	26.78	39.88	48.97	51.10	*51.55*	*53.35*	Revenues per sh	*61.60*
- -	2.53	1.86	3.00	3.98	4.12	4.05	6.57	8.53	8.98	*10.95*	*11.50*	"Cash Flow" per sh	*15.70*
- -	1.62	.87	2.09	2.96	3.02	2.66	4.20	6.20	6.52	*8.20*	*8.50*	Earnings per sh [A]	*12.00*
- -	- -	- -	- -	- -	.54	.54	.59	.68	.76	*.84*	*.92*	Div'ds Decl'd per sh	*1.16*
- -	.71	.59	.35	.50	.78	.56	1.00	.90	1.07	*1.00*	*1.05*	Cap'l Spending per sh	*1.20*
- -	16.48	17.19	16.74	17.53	18.77	26.33	29.86	33.97	39.69	*44.05*	*49.70*	Book Value per sh	*58.85*
- -	15.66	15.85	15.88	15.04	14.74	15.65	15.71	15.48	15.51	*16.00*	*16.50*	Common Shs Outst'g [B]	*17.50*
- -	21.1	39.0	20.4	17.3	22.8	34.5	29.8	19.5	27.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*30.0*
- -	1.06	2.05	1.03	.93	1.21	1.77	1.61	1.13	1.55			Relative P/E Ratio	*1.65*
- -	- -	- -	- -	- -	.8%	.6%	.5%	.6%	.4%			Avg Ann'l Div'd Yield	*.3%*
- -	319.8	327.1	326.2	350.2	385.9	419.2	626.4	757.9	792.8	*825*	*880*	Revenues ($mill)	*1050*
- -	19.3%	13.0%	20.1%	21.2%	17.4%	19.7%	21.4%	23.0%	24.8%	*25.5%*	*25.5%*	Operating Margin	*27.5%*
- -	14.2	15.8	14.9	13.8	14.8	23.0	36.9	35.6	37.6	*45.0*	*50.0*	Depreciation ($mill)	*65.0*
- -	25.5	13.7	32.7	46.1	45.9	40.3	66.4	96.4	101.6	*130*	*140*	Net Profit ($mill)	*210*
- -	42.4%	46.4%	32.3%	25.0%	20.4%	21.2%	26.4%	23.3%	27.0%	*23.0%*	*23.5%*	Income Tax Rate	*24.0%*
- -	8.0%	4.2%	10.0%	13.2%	11.9%	9.6%	10.6%	12.7%	12.8%	*15.8%*	*15.9%*	Net Profit Margin	*20.0%*
- -	123.9	108.6	82.7	102.1	90.9	131.8	105.3	152.3	215.6	*210*	*220*	Working Cap'l ($mill)	*240*
- -	89.1	72.6	23.5	30.9	10.3	241.8	252.2	253.0	166.0	*115*	*115*	Long-Term Debt ($mill)	*320*
- -	258.0	272.4	265.8	263.7	276.7	412.0	469.1	525.7	615.7	*705*	*820*	Shr. Equity ($mill)	*1030*
- -	7.8%	4.4%	11.7%	15.9%	16.2%	6.3%	9.6%	13.2%	13.8%	*15.0%*	*14.0%*	Return on Total Cap'l	*17.5%*
- -	9.9%	5.0%	12.3%	17.5%	16.6%	9.8%	14.2%	18.3%	16.5%	*18.5%*	*17.0%*	Return on Shr. Equity	*20.5%*
- -	9.9%	5.0%	12.3%	17.5%	13.6%	7.8%	12.1%	16.3%	14.6%	*16.0%*	*15.0%*	Retained to Com Eq	*18.5%*
- -	- -	- -	- -	- -	18%	20%	14%	11%	12%	*10%*	*11%*	All Div'ds to Net Prof	*10%*

BUSINESS: CSW Industrials, Inc., is a diversified industrial holding company. It has three business segments: Contractor Solutions (67% of fiscal 2023 sales and 77% of operating income), Specialized Reliability (19% and 14%), and Engineered Building (14% and 9%). Serves the following markets; HVAC, refrigeration, coatings and sealants, railroad, industrial, plumbing, building safety, energy, mining, and specialty lubricants. CSW has about 2,400 employees. Incorp.: DE. Off. & Dir. own 1.4% of stock; T. Rowe Price, 7.3%; Neuberger Berman, 7.1%; BlackRock, 7.3%; Vanguard, 5.6% (7/24 Proxy). C.E.O.: Joseph B. Armes. Address: 5420 Lyndon B. Johnson Freeway, Ste. 500, Dallas, TX 75240. Tel.: (214) 884-3777. Internet: www. cswindustrials.com.

CSW Industrials continues to power upward and onward. Since 2017, the annual top-line tallies have shown positive comparisons. And other than a blip in 2020, the annual bottom-line figures have done the same. We don't look for any changes this year. The company's twin appeals are its diverse industrial business lines and the fact that it doesn't take much of a drop in COGS to elevate the bottom line considerably. The aforementioned positives have been aptly reflected by the stock price (see graph above).

A major acquisition may be coming. Since our mid-June report, thanks to lower debt and higher shareholders' equity, the long-term debt-to-total capital ratio has come down, to 15% from 21%. The healthy fiscal first-quarter share-net tally raised cash flow. CSW also enhanced its ability to issue short-term paper. These factors point to CSW making a larger-than-normal buy. We wouldn't be surprised to see the company acquire an entity to boost its core Contractor Solutions division (67% of fiscal 2023 sales). This operation houses businesses that deal with electrical, air conditioning, flooding, and plumbing problems. CSW's shareholder base consists of a relatively low number of large institutional investors who seem to be able to agree on most matters. They have no reason to do otherwise given the company's stellar operating history.

We have raised this stock's long-term Target Price Range. It would seem foolish not to. One can easily make a case that global economic growth will slow, and even enter recessionary territory. But even if that were to occur, CSW has proved that it can operate profitably in all but the most dire of situations. This is thanks to its diversified and cost-efficient business model. Plus, if the company were to consummate a relatively major acquisition (as we suggested) it would be in an even better position to control its chosen markets with selling price discipline.

This report is aimed at portfolio managers and wealth advisers rather than the individual retail investor. The float is slim and the price of a single share is high. Interested readers should consult with their advisers to see if they want to take this equity for a spin.

Jeremy J. Butler *September 13, 2024*

(A) Diluted earnings. Next earnings report due late October. Earnings may not sum due to change in shares outstanding. Fiscal year ends March 31st of following year.
(B) In millions.
(C) Quarterly dividend payment of $0.135 a share initiated in the second quarter of 2019. Dividends paid in mid February, May, August, and November.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	85
Earnings Predictability	75

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CVS HEALTH NYSE-CVS

RECENT PRICE 56.05 | P/E RATIO 9.2 (Trailing: 8.8 Median: 11.0) | RELATIVE P/E RATIO 0.50 | DIV'D YLD 5.1% | VALUE LINE

TIMELINESS 3 Lowered 11/29/24
SAFETY 3 Lowered 7/19/24
TECHNICAL 3 Raised 11/29/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

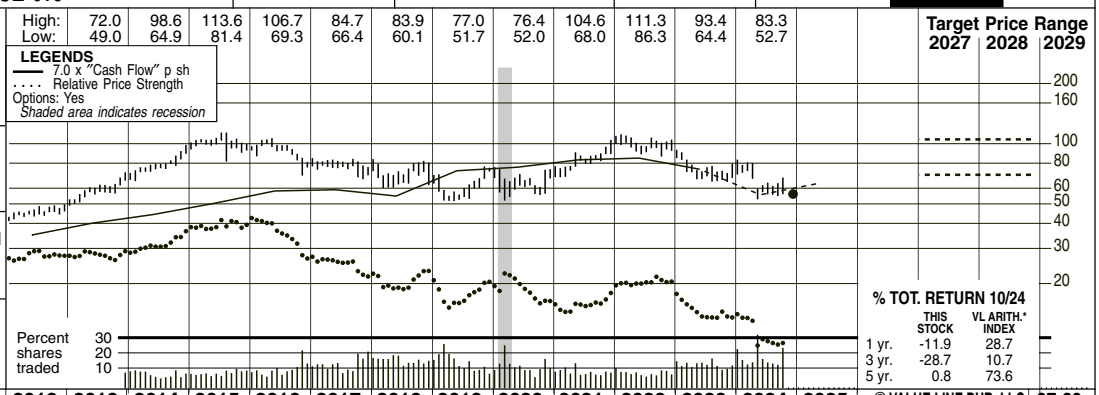
Low-High	Midpoint (% to Mid)
$45-$95	$70 (25%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	105	(+85%)	*20%*
Low	70	(+25%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	917	880	683
to Sell	1177	1181	1383
Hld's(000)	1020980	994504	1030151



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
60.80	70.98	70.74	82.51	100.03	107.42	122.25	139.23	167.32	182.21	150.25	197.22	205.12	220.96	248.05	277.78	*295.60*	*311.75*	Sales per sh	*355.75*
3.37	3.73	3.79	4.11	4.99	5.74	6.33	7.20	8.30	8.43	7.82	10.46	10.91	11.86	12.11	10.66	*7.95*	*9.10*	"Cash Flow"per sh	*12.20*
2.44	2.63	2.69	2.80	3.43	4.00	4.51	5.16	5.84	5.90	7.08	7.08	7.50	8.40	8.69	8.74	*5.85*	*6.85*	Earnings per sh A	*9.50*
.26	.31	.35	.50	.65	.90	1.10	1.40	1.70	2.00	2.00	2.00	2.00	2.05	2.26	2.64	*2.70*	*2.90*	Div'ds Decl'd per sh B■	*3.60*
23.90	25.71	27.66	29.32	30.63	32.15	33.30	33.78	34.71	37.17	44.96	49.05	52.97	56.79	54.63	59.36	*61.00*	*61.35*	Book Value per sh D	*69.15*
1438.8	1391.0	1363.0	1298.0	1231.0	1180.0	1140.0	1101.0	1061.0	1014.0	1295.0	1302.0	1310.0	1322.0	1300.0	1288.0	*1255.0*	*1235.0*	Common Shs Outst'g C	*1175.0*
15.0	12.0	12.1	12.9	13.2	14.7	17.4	19.7	15.9	13.2	10.0	8.7	8.6	9.8	11.5	8.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*9.0*
.90	.80	.77	.81	.84	.83	.92	.99	.83	.66	.54	.46	.44	.53	.66	.48			Relative P/E Ratio	*.50*
.7%	1.0%	1.1%	1.4%	1.4%	1.5%	1.4%	1.4%	1.8%	2.6%	2.8%	3.3%	3.1%	2.5%	2.3%	3.5%			Avg Ann'l Div'd Yield	*4.0%*
139367	153290	177526	184765	194579	256776	268706	292111	322467	357776	*371000*	*385000*	Sales ($mill)	*418000*
19.6%	18.7%	17.6%	16.8%	21.0%	39.9%	40.6%	20.2%	18.7%	15.9%	*14.0%*	*14.0%*	Gross Margin	*16.0%*
8.5%	8.2%	7.8%	7.3%	7.9%	7.7%	8.2%	7.5%	6.8%	6.2%	*4.5%*	*4.5%*	Operating Margin	*5.0%*
7800	9600	9709	9803	9967	9941	9962	9940	9674	9395	*9250*	*9100*	Number of Stores	*9100*
5287.0	5837.0	6332.0	6064.0	7406.0	9247.0	9855.4	11165	11499	11272	*7370*	*8465*	Net Profit ($mill)	*11340*
39.8%	39.1%	38.6%	38.1%	26.5%	25.6%	25.9%	25.6%	25.3%	24.5%	*25.5%*	*25.5%*	Income Tax Rate	*25.5%*
3.8%	3.8%	3.6%	3.3%	3.8%	3.6%	3.7%	3.8%	3.6%	3.2%	*2.0%*	*2.2%*	Net Profit Margin	*2.7%*
6956.0	7209.0	4792.0	581.0	1234.0	d3001	d5648	d7799	d4054	d11331	*d15000*	*d12000*	Working Cap'l ($mill)	*d9000*
11695	26267	25615	22181	71444	64699	59207	51971	50476	58638	*59000*	*55215*	Long-Term Debt ($mill)	*42820*
37958	37196	36830	37691	58225	63864	69389	75075	71015	76461	*76570*	*75790*	Shr. Equity ($mill)	*81235*
11.1%	9.7%	10.7%	10.7%	6.7%	8.4%	8.8%	9.8%	10.4%	9.3%	*6.5%*	*7.5%*	Return on Total Cap'l	*10.0%*
13.9%	15.7%	17.2%	16.1%	12.7%	14.5%	14.2%	14.9%	16.2%	14.7%	*9.5%*	*11.0%*	Return on Shr. Equity	*14.0%*
10.5%	11.5%	12.2%	10.7%	9.2%	10.4%	10.4%	11.4%	12.1%	10.6%	*5.5%*	*6.5%*	Retained to Com Eq	*8.5%*
24%	27%	29%	34%	28%	28%	27%	24%	25%	28%	*47%*	*43%*	All Div'ds to Net Prof	*36%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $65534 mill. **Due in 5 Yrs** $21670 mill.
LT Debt $59824 mill. **LT Interest** $2625 mill.
(Total interest coverage; 5.2x)
(47% of Cap'l)
Leases, Uncapitalized Annual rentals $2716 mill.

Pension Assets-12/23 $5379 mill. **Oblig.** $4736 mill.

Pfd Stock None

Common Stock 1,258,407,645 shs.
as of 10/30/24
MARKET CAP: $70.5 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	15723	11455	9680
Receivables	27276	35227	36179
Inventory (FIFO)	19090	18025	17649
Other	3593	3151	3835
Current Assets	65682	67858	67343
Accts Payable	14838	14897	15713
Debt Due	1778	2972	5710
Other	53120	61320	63204
Current Liab.	69736	79189	84627

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	10.0%	8.5%	*6.0%*
"Cash Flow"	9.0%	7.0%	*1.0%*
Earnings	9.5%	6.5%	*1.5%*
Dividends	13.0%	4.0%	*8.0%*
Book Value	6.5%	8.0%	*3.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	69097	72616	73794	76604	292111
2022	76826	80636	81159	83846	322467
2023	85278	88921	89764	93813	357776
2024	88437	91234	95428	*95091*	*371000*
2025	*93200*	*95600*	*97200*	*99000*	*385000*

Calendar	EARNINGS PER SHARE A Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	2.04	2.42	1.97	1.97	8.40
2022	2.22	2.40	2.09	1.98	8.69
2023	2.20	2.21	2.21	2.12	8.74
2024	1.31	1.83	1.09	*1.62*	*5.85*
2025	*1.45*	*1.90*	*1.95*	*1.55*	*6.85*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.50	.50	.50	.50	2.00
2021	.50	.50	.50	.50	2.00
2022	.55	.55	.55	.55	2.20
2023	.605	.605	.605	.605	2.42
2024	.665	.665	.665		

BUSINESS: CVS Health Corp. is the nation's foremost integrated health-care services provider, combining a leading pharmacy benefit manager and a leading health insurer with the U.S.'s largest pharmacy chain (9,000-plus locations). It fills or manages 4 bill. prescriptions per year via its Pharmacy & Consumer Wellness (29% of '23 revenue before intersegment eliminations) and Health Services (46%) segments. The Health Care Benefits segment (25%) covered 25.7 million medical members. Acq'd Caremark in 11/06 and Aetna in 11/18. Has roughly 300,000 empl. Off./Dir. own less than 1.0% of common stock; Vanguard, 8.9%; BlackRock, 7.4% (4/24 proxy). CEO: Karen S. Lynch. Inc.: DE. Addr: One CVS Drive, Woonsocket, RI 02895. Telephone: 401-765-1500. Internet: www.cvs.com.

CVS Health shares remain under pressure. On November 6th, the company posted September-period revenue growth of 6.3% year over year, to $95.4 billion, beating the Wall Street consensus estimate by $27 million. Share earnings more than halved, to $1.09, trailing the consensus by $0.37. Unlike what management did with prior quarterly earnings releases, it did not provide its top- and bottom-line forecasts for 2024. (The outlook it provided when posting its second-quarter results was $369 billon-$372 billion in revenues and adjusted share-earnings of $6.40-$6.65.) It noted the prospective pressures of a higher medical benefits ratio (MBR; medical costs as a percentage of premium revenue) and possibly a PDR (premium deficiency reserve) on its group Medicare business related to 2025 dates of service. Taking a conservative stance on fourth-quarter performance, we look for full-year share earnings of $5.85.

The Health Care Benefits segment is still seeing increased healthcare utilization by its Medicare Advantage (MA) members and higher acuity among its Medicaid members. Consequently, in the third quarter, the segment MBR rose 950 basis points, to 95.2%.

Management also did not provide a forecast for 2025 and onward. Instead, it laid out its thinking on each segment. Pharmacy & Consumer Wellness' margins should benefit from a new "cost-plus" model for drug pricing. But the segment's revenue may continue to be negatively impacted by a possible continuation of front-store (non-script) sales weakness amid the macroeconomic backdrop. Health Benefits' coverage adjustments will likely result in 5%-10% fewer members. But improvements in the Stars (quality) ratings for its MA health plans ought to eventually yield bonus payments from the Centers for Medicare & Medicaid Services and, hence, a lower MBR. CVS expects slower growth by the Health Services segment at first, but sees opportunities for upside over the course of 2025. Management also embarked on a multiyear initiative to streamline and optimize operations, and looks to save $500 million in 2025.

CVS shares' total return potential out to 2027-2029 is above average.

Phillip M. Seligman *November 29, 2024*

(A) From cont. oper.; based on diluted shares. Excl. net nonrecurring items: '10, (18¢); '11, (23¢); '12, (42¢); '13, (26¢); '14, (46¢); '15, (50¢); '16, (93¢); '17, (55¢); '18, ($5.06); '19, ($2.00); '20, ($2.04); '21, ($2.45); '22, ($5.55); '23, ($2.27); '24 Q1-Q3, ($1.88). Next egs. report due early Feb. **(B)** Dividends are historically paid in early Jan., May, Aug., Nov. ■ Div'd reinvest. plan avail. May not add due to rounding. **(C)** In mill. **(D)** Incl. intangibles of $120.5 billion, or $93.56 a share, as of 12/31/23.

Company's Financial Strength	B++
Stock's Price Stability	55
Price Growth Persistence	15
Earnings Predictability	100

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CASELLA WASTE SYS. NDQ-CWST

RECENT PRICE **99.45** | P/E RATIO **NMF** (Trailing: NMF Median: NMF) | RELATIVE P/E RATIO **NMF** | DIV'D YLD **Nil** | VALUE LINE **406**

TIMELINESS 4 Raised 11/8/24
SAFETY 3 New 2/21/20
TECHNICAL 2 Raised 10/4/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$86-$145	$116 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	165	(+65%)	*14%*
Low	110	(+10%)	*3%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	137	147	153
to Sell	155	137	124
Hld's(000)	57601	58308	59891

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	6.2	5.9	7.2	13.4	23.2	34.5	47.7	63.6	89.8	92.8	95.8	109.1						
Low:	3.8	3.4	3.6	5.0	11.1	22.2	26.8	34.4	53.4	63.9	72.3	80.0						

LEGENDS
22.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	30.3	28.7
3 yr.	13.4	10.7
5 yr.	125.6	73.6

Percent shares traded: 21, 14, 7

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	21.59	20.14	17.54	17.82	11.78	12.42	9.08	13.31	13.93	14.17	15.39	15.55	15.46	17.30	20.99	21.80	*24.65*	*26.20*	Revenues per sh [D]	*28.15*
	2.81	2.04	2.05	.79	.17	.93	.87	1.21	1.58	1.24	2.08	2.33	3.63	2.81	3.47	3.38	*3.80*	*4.05*	"Cash Flow" per sh	*5.40*
	d.02	d.55	d.14	d1.37	d1.62	d.58	d.15	d.32	.05	d.52	.15	.66	1.86	.80	1.03	.46	*.30*	*.45*	Earnings per sh [A]	*1.50*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
	2.25	2.10	2.08	2.21	1.42	1.15	1.36	1.22	1.34	1.71	1.88	2.16	2.16	2.40	2.53	2.67	*2.40*	*2.50*	Cap'l Spending per sh	*2.00*
	2.58	1.94	3.54	.61	.29	d.21	d.30	d.52	d.60	d.90	d.37	2.57	7.23	8.22	9.63	17.62	*24.70*	*25.70*	Book Value per sh [B]	*27.75*
	25.67	25.93	26.58	26.98	38.66	40.07	40.58	41.05	40.57	42.29	42.93	47.79	50.10	51.41	51.69	58.00	*62.50*	*63.00*	Common Shs Outst'g [C]	*64.00*
	- -	- -	- -	- -	- -	- -	- -	- -	NMF	- -	NMF	NMF	28.4	NMF	NMF	NMF	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*NMF*
	- -	- -	- -	- -	- -	- -	- -	- -	NMF	- -	NMF	NMF	1.46	NMF	NMF	NMF			Relative P/E Ratio	*NMF*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -			Avg Ann'l Div'd Yield	*Nil*
	368.4	546.5	565.0	599.3	660.7	743.3	774.6	889.2	1085.1	1264.5	*1540*	*1650*	Revenues ($mill)	*1800*
	17.4%	16.7%	19.1%	21.2%	20.4%	19.1%	20.2%	21.1%	21.1%	21.9%	*21.0%*	*21.5%*	Operating Margin	*23.0%*
	41.5	62.7	61.9	74.4	82.7	79.8	90.8	103.6	126.4	170.7	*220*	*225*	Depreciation ($mill)	*250*
	d6.0	d13.0	2.1	d21.8	6.4	31.7	91.1	41.1	53.1	25.4	*20.0*	*30.0*	Net Profit ($mill)	*95.0*
	- -	- -	71.9%	- -	- -	- -	- -	29.2%	29.2%	31.4%	*31.5%*	*31.5%*	Income Tax Rate	*31.5%*
	NMF	NMF	.4%	NMF	1.0%	4.3%	11.8%	4.6%	4.9%	2.0%	*1.2%*	*1.7%*	Net Profit Margin	*5.3%*
	d7.7	d8.7	d3.8	d4.2	d14.4	d27.8	116.1	d5.7	29.9	147.4	*450*	*480*	Working Cap'l ($mill)	*600*
	534.1	522.2	504.0	477.6	542.0	509.0	530.4	542.5	585.0	1007.7	*1045*	*1040*	Long-Term Debt ($mill)	*1000*
	d12.3	d21.5	d24.5	d37.9	d15.8	122.8	362.1	422.5	497.9	1021.8	*1545*	*1620*	Shr. Equity ($mill)	*1775*
	1.3%	1.4%	4.5%	NMF	3.5%	7.0%	11.5%	5.4%	6.0%	2.4%	*2.0%*	*2.5%*	Return on Total Cap'l	*4.5%*
	- -	- -	- -	- -	- -	25.8%	25.2%	9.7%	10.7%	2.5%	*1.0%*	*2.0%*	Return on Shr. Equity	*5.5%*
	- -	- -	- -	- -	- -	25.8%	25.2%	9.7%	10.7%	2.5%	*1.0%*	*2.0%*	Retained to Com Eq	*5.5%*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $1083.9 mill. **Due in 5 Yrs** $800 mill.
LT Debt $1045.5 mill. **LT Interest** $65.0 mill.
(LT int. earned: 3.4x)
(41% of Cap'l)
Leases, Uncapitalized Annual rentals $12.3 mill.

No Defined Benefit Pension Plan
Pfd Stock None.

Common Stock 63,313,652 shs.
(includes Cl. B shs. 988,200)
as of 7/15/24
MARKET CAP: $6.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	71.2	220.9	519.0
Receivables	100.9	157.3	168.1
Other	35.4	48.1	56.0
Current Assets	207.5	426.3	743.1
Accts Payable	74.3	116.8	101.6
Debt Due	9.0	35.8	38.4
Other	94.3	126.3	151.3
Current Liab.	177.6	278.9	291.3

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	3.5%	6.5%	*6.5%*
"Cash Flow"	17.5%	14.5%	*10.0%*
Earnings	- -	- -	*12.5%*
Dividends	- -	- -	*Nil*
Book Value	48.5%	- -	*9.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	189.5	215.9	242.0	241.8	889.2
2022	234.0	283.7	295.3	272.1	1085.1
2023	262.6	289.6	352.7	359.6	1264.5
2024	341.0	377.2	411.6	*410.2*	*1540*
2025	*395*	*400*	*420*	*435*	*1650*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.08	.23	.31	.18	.80
2022	.08	.34	.44	.16	1.03
2023	.07	.10	.31	d.03	.46
2024	d.07	.12	.10	*.15*	*.30*
2025	*.05*	*.10*	*.15*	*.15*	*.45*

Calendar	QUARTERLY DIVIDENDS PAID■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

BUSINESS: Casella Waste Systems, Inc. operates as a regional vertically integrated solid waste, recycling, and resource management service. It provides resource management services to residential, commercial, municipal, and industrial customers in the northeastern U.S. It owns and operates 64 solid waste collection operations, 71 transfer stations, 29 recycling facilities, eight Subtitle D landfills, three landfill gas-to-energy facilities, and one landfill permitted to accept construction and demolition materials. Has 4,200 employees (12/23). Offs./dirs. own 17.1% of stock. Vanguard, 7.8%; BlackRock, 5.5%; Conestoga, 5.2% (4/24 Proxy). Chairman & CEO: John W. Casella. Inc.: DE. Addr.: 25 Greens Hill Ln., Rutland, VT 05701. Tel.: 802-775-0325. Internet: www.casella.com.

Casella Waste Systems, Inc. reported mixed third-quarter results. Revenues increased 16.7% year over year, to $411.6 million, thanks to recently completed acquisitions, higher collection and disposal pricing, and better recycling commodity volumes. However, share earnings fell significantly to $0.10 per share, down from $0.31 in the same quarter last year. This decline was primarily due to increased operating costs associated with recent acquisitions, higher insurance expense accruals linked to two specific incidents, and a $2 million decrease in landfill volumes for construction and demolition materials.

Casella has continued to expand its footprint across key regions. On October 1st, the company acquired Royal Carting and Welsh Sanitation, securing collection and transfer operations in New York's middle and lower Hudson Valley regions and growing into western Connecticut. This purchase is expected to generate over $90 million in annualized revenues. During the first nine months, Casella closed five acquisitions, including Whitetail Disposal in eastern Pennsylvania, LMR Disposal in western New Jersey, and additional tuck-ins in the Eastern region. In comparison, 2023 saw a series of strategic acquisitions, including the equity interests of four wholly owned subsidiaries of GFL Environmental Inc. and Twin Bridges, which bolstered the trash hauler's footprint in the Mid-Atlantic and greater Albany, New York areas.

Despite some cost headwinds, the bottom line will likely recover in 2025. For 2024, share earnings will probably take a step back to about $0.30, reflecting acquisition-related costs. However, strategic pricing, cost controls, and expected macroeconomic improvements will likely contribute to a 50% recovery in next year's earnings per share, to $0.45. Plus, as benefits from recent purchases and stabilization of recycling commodity prices continue, share earnings are expected to improve even more.

Shares of Casella Waste Systems are untimely. Moreover, the equity has below-average long-term capital appreciation potential at the recent quotation. There are better investment options within the *Value Line* universe.

Emma Jalees *November 15, 2024*

(A) Based on diluted shares. Next earnings report due late February. Egs. may not sum due to rdg./shs. out.
(B) Incl. intang. At '23; $977.1 mill., $16.85/sh.
(C) In millions.
(D) Three- to five-year Target Price Range calculated using 5.0x book value per share.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	95
Earnings Predictability	30

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QUEST DIAGNOST. NYSE-DGX

RECENT PRICE 162.11 | P/E RATIO 17.5 (Trailing: 18.3 Median: 15.0) | RELATIVE P/E RATIO 0.95 | DIV'D YLD 1.9% | VALUE LINE

TIMELINESS 3 Lowered 9/27/24
SAFETY 2 Raised 3/20/09
TECHNICAL 3 Lowered 11/29/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$119-$185	$152 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	215	(+35%)	9%
Low	160	(Nil)	2%

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	345	346	362
to Sell	385	394	354
Hld's(000)	99131	99181	97986

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	64.1	68.5	89.0	93.6	113.0	116.5	108.9	131.8	174.2	172.5	157.4	162.6								
Low:	52.5	50.5	60.1	59.7	90.1	78.9	79.9	73.0	113.4	120.4	119.6	123.0								
	38.04	41.67	43.05	47.71	46.63	49.63	51.63	52.40	54.85	57.10	55.79	58.09	70.95	90.66	89.04	83.35	*88.55*	*97.20*	Revenues per sh	*115.70*
	4.75	5.52	5.70	6.42	6.23	6.22	6.01	6.99	7.19	7.90	8.79	9.22	14.20	18.78	14.57	12.66	*13.25*	*14.30*	"Cash Flow" per sh	*18.45*
	3.27	3.88	4.05	4.53	4.36	4.00	4.10	4.77	5.15	5.67	6.31	6.56	11.18	14.24	9.95	8.71	*8.90*	*9.75*	Earnings per sh [A]	*13.40*
	.40	.40	.40	.47	.81	1.20	1.32	1.52	1.65	1.80	1.95	2.12	2.21	2.42	2.64	2.79	*2.96*	*3.15*	Div'ds Decl'd per sh [B]	*3.95*
	1.12	.93	1.20	1.03	1.15	1.60	2.14	1.84	2.14	1.87	2.84	3.01	3.14	3.39	3.64	3.68	*3.65*	*3.75*	Cap'l Spending per sh	*4.15*
	18.92	22.30	23.57	23.46	26.29	27.42	29.87	32.76	33.78	36.45	38.64	42.41	50.82	54.15	53.09	56.81	*62.15*	*66.80*	Book Value per sh [C]	*78.20*
	190.57	178.92	171.16	157.42	158.33	144.00	144.00	143.00	137.00	135.00	135.00	133.00	133.00	119.00	111.00	111.00	*111.00*	*110.00*	Common Shs Outst'g [D]	*110.00*
	15.1	13.7	13.0	12.2	13.6	14.8	14.5	14.8	15.2	17.7	16.2	14.9	10.0	9.7	13.9	15.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*14.0*
	.91	.91	.83	.77	.87	.83	.76	.75	.80	.89	.88	.79	.51	.52	.80	.88			Relative P/E Ratio	*.80*
	.8%	.8%	.8%	.9%	1.4%	2.0%	2.2%	2.2%	2.1%	1.8%	1.9%	2.2%	2.0%	1.7%	1.9%	2.0%			Avg Ann'l Div'd Yield	*2.1%*
	7435.0	7493.0	7515.0	7709.0	7531.0	7726.0	9437.0	10788	9883.0	9252.0	*9830*	*10690*	Revenues ($mill)	*12725*
	17.4%	18.4%	19.8%	18.6%	20.4%	19.7%	25.9%	26.8%	21.3%	19.5%	*19.6%*	*20.1%*	Operating Margin	*22.5%*
	314.0	304.0	249.0	270.0	309.0	329.0	361.0	408.0	437.0	439.0	*480*	*495*	Depreciation ($mill)	*555*
	551.0	695.0	736.0	796.0	878.0	897.0	1528.0	1827.0	1180.0	966.8	*990*	*1080*	Net Profit ($mill)	*1475*
	30.9%	34.3%	36.4%	21.1%	17.0%	21.8%	23.5%	24.6%	18.0%	23.0%	*23.0%*	*23.0%*	Income Tax Rate	*25.0%*
	7.4%	9.3%	9.8%	10.3%	11.7%	11.6%	16.2%	16.9%	11.9%	10.4%	*10.1%*	*10.1%*	Net Profit Margin	*11.6%*
	d106.0	328.0	550.0	249.0	d95.0	500.0	1282.0	988.0	347.0	557.0	*700*	*900*	Working Cap'l ($mill)	*1300*
	3244.0	3492.0	3728.0	3748.0	3429.0	3966.0	4013.0	4010.0	3978.0	4410.0	*5500*	*5350*	Long-Term Debt ($mill)	*4000*
	4301.0	4684.0	4628.0	4921.0	5216.0	5641.0	6759.0	6444.0	5893.0	6307.0	*6900*	*7350*	Shr. Equity ($mill)	*8600*
	8.4%	9.4%	9.7%	10.0%	11.0%	10.1%	14.9%	18.2%	12.7%	10.1%	*10.0%*	*9.5%*	Return on Total Cap'l	*12.5%*
	12.8%	14.8%	15.9%	16.2%	16.8%	15.9%	22.6%	28.4%	20.0%	15.3%	*14.5%*	*14.5%*	Return on Shr. Equity	*17.0%*
	8.5%	10.3%	11.1%	11.2%	11.7%	10.8%	18.2%	23.6%	14.8%	10.4%	*9.5%*	*10.0%*	Retained to Com Eq	*12.0%*
	34%	31%	30%	31%	30%	32%	19%	17%	26%	32%	*33%*	*32%*	All Div'ds to Net Prof	*29%*

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	20.4	28.7
3 yr.	11.0	10.7
5 yr.	66.7	73.6

CAPITAL STRUCTURE as of 9/30/24
Total Debt $6427 mill. **Due in 5 Yrs** $2500 mill.
LT Debt $5648 mill. **LT Interest** $310 mill. (46% of Cap'l)

Leases, Uncapitalized: Ann'l rentals $175.0 mill.
No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 111,615,181 shares
as of 10/15/24
MARKET CAP: $18.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	315	686	764
Receivables	1195	1210	1376
Inventory (FIFO)	192	190	184
Other	196	286	297
Current Assets	1898	2372	2623
Payables & Other	1396	1359	1313
Debt Due	155	456	779
Current Liab.	1551	1815	2092

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '20-'22 to '27-'29
Revenues	6.5%	10.0%	*4.5%*
"Cash Flow"	10.0%	16.0%	*3.0%*
Earnings	11.0%	16.0%	*3.5%*
Dividends	12.0%	7.0%	*7.0%*
Book Value	7.5%	8.0%	*6.0%*

Calendar	QUARTERLY REVENUES ($ mill.) [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	2720	2550	2774	2744	10788
2022	2611	2453	2486	2333	9883
2023	2331	2338	2295	2288	9252
2024	2366	2397	2488	*2579*	*9830*
2025	*2575*	*2615*	*2700*	*2800*	*10690*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	3.76	3.18	3.96	3.34	14.24
2022	3.22	2.36	2.36	1.98	9.95
2023	2.04	2.30	2.22	2.15	8.71
2024	2.04	2.35	2.30	*2.21*	*8.90*
2025	*2.20*	*2.55*	*2.55*	*2.45*	*9.75*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.53	.56	.56	.56	2.21
2021	.56	.62	.62	.62	2.42
2022	.62	.66	.66	.66	2.60
2023	.66	.71	.71	.71	2.79
2024	.71	.75	.75	.75	

BUSINESS: Quest Diagnostics provides diagnostic testing, information, and services to patients, physicians, hospitals, insurers, employers, government agencies, and other commercial clinical labs. It operates a network of patient-service centers and principal labs, and phlebotomists in physicians offices. Offers routine tests, anatomic pathology services, and central laboratory testing performed with clinical research trials. Annual patient volume approximates one-third of the U.S. adult population. Has 48,000 employees. Vanguard owns 12.1% of common; BlackRock, 9.4%; offs. & dirs. own less than 1.0% (4/24 proxy). Chairman and CEO: James E. Davis. Inc.: DE. Addr.: 500 Plaza Drive, Secaucus, New Jersey 07094. Tel.: 973-520-2700. Internet: www.questdiagnostics.com.

Quest Diagnostics' acquisition of LifeLabs was completed at the end of the summer. The transaction closed at a price tag of $1 billion for DGX to purchase Canada's leading provider of laboratory diagnostic information and digital health connectivity systems. The two companies had an existing relationship, with LifeLabs participating in Quest's Global Diagnostic Network, an expertise sharing group of the 12 leading labs globally. LifeLabs will continue to work under that name with the same management team and headquarters. Quest will provide innovations and resources and foster greater access to specialized testing. Improving online appointment scheduling and processing are two early goals of the marriage. Data security, a problem for the acquired in the past, will be enhanced.

The company will likely earn about $8.90 a share this year. Top-line growth should come in around 6% aided by organic gains and contributions from the aforementioned purchase. DGX is winning new customers and expanding its reach via physician deals and hospital pacts. In all, eight bolt-on acquisitions are likely to be sealed in 2024. Still, our earnings figure only calculates to a 2% year-over-year increase, as the cost of doing business rose sharply throughout the year and a larger debt burden also dinged profitability. Additionally, the in-house projection is that Hurricane Milton negatively impacted business in the fourth quarter to the tune of $15 million in revenues and approximately $0.08 a share in earnings.

Revenues should climb above the $10-billion level next year. Canada has a growing/aging population, which should be a boon for LifeLabs. Deals with health systems are apt to continue in earnest, and help move the volume needle, as will forays into digital pathology and other advanced screening options. For 2025, we think the top line will approach $10.7 billion, with an earnings gain in the vicinity of 10%, to $9.75 a share.

These good-quality shares are not currently appealing. The stock has a neutral designation for Timeliness, its quote is just inside the bottom rung of our 3- to 5-year Target Price Range, and the yield is lower on the higher denominator.

Erik M. Manning *November 29, 2024*

(A) Diluted earnings. Excludes nonrecurring: '11, d$1.61; '12, d8¢; '13, $1.58; '17, 17¢; '18, $1.02; '19, 43¢; '20, d71¢; '21, $1.31; '22, $1.98; '23, d$1.22. Excludes disc. operations gain: '19, 15¢. Quarterly figures may not sum due to rounding. Next earnings report due late January.
(B) Dividends historically paid mid-January, April, July, October.
(C) Includes intangibles. In '23: $8.9 billion, $80.18/sh.
(D) In millions.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	75
Earnings Predictability	60

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DANAHER CORP. NYSE-DHR

RECENT PRICE 244.12 | P/E RATIO 43.4 (46.1 / 28.0) | RELATIVE P/E RATIO 2.38 | DIV'D YLD 0.5% | VALUE LINE

TIMELINESS — Suspended 9/22/23
SAFETY 1 Raised 7/5/24
TECHNICAL — Suspended 9/22/23
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$197-$325	$261 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	355	(+45%)	*8%*
Low	290	(+20%)	*3%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	997	1068	991
to Sell	941	855	916
Hld's(000)	584954	586692	585062

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	77.4	87.5	97.6	102.8	95.2	110.9	154.0	248.3	334.0	328.6	279.3	281.7								
Low:	56.2	70.1	81.3	75.7	78.2	91.8	96.4	119.6	211.2	233.7	182.1	222.5								
	19.92	17.29	20.03	23.40	26.56	27.39	28.27	29.94	24.39	26.31	28.36	25.75	31.34	41.19	43.21	32.32	*33.00*	*34.95*	Revenues per sh	*44.30*
	2.76	2.39	2.98	3.80	4.57	4.76	5.02	5.96	5.00	5.32	5.64	5.11	7.43	11.80	12.80	8.64	*8.90*	*9.45*	"Cash Flow" per sh	*13.00*
	2.12	1.81	2.31	2.83	3.23	3.42	3.63	4.30	3.34	3.50	3.74	3.26	4.89	8.61	9.66	5.65	*5.50*	*6.00*	Earnings per sh A	*9.00*
	.06	.06	.08	.09	.13	.08	.33	.54	.58	.55	.62	.67	.71	.81	.96	1.06	*1.08*	*1.20*	Div'ds Decl'd per sh B	*1.60*
	.30	.29	.33	.49	.67	.79	.85	.92	.85	.89	.93	.91	1.11	1.81	1.58	1.87	*1.60*	*1.75*	Cap'l Spending per sh	*2.10*
	15.39	17.98	20.80	24.58	27.66	32.07	33.19	34.49	33.23	37.84	40.22	41.15	51.33	58.60	66.48	72.36	*70.85*	*74.15*	Book Value per sh C	*88.55*
	637.40	646.96	659.18	687.73	687.50	698.10	704.30	686.80	692.20	696.60	701.50	695.50	711.00	715.00	728.30	739.20	*720.00*	*715.00*	Common Shs Outst'g D	*700.00*
	17.0	17.1	17.3	17.3	16.4	19.3	21.3	20.4	25.8	24.5	27.0	41.0	37.9	31.9	27.9	42.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*36.0*
	1.02	1.14	1.10	1.09	1.04	1.08	1.12	1.03	1.35	1.23	1.46	2.18	1.95	1.72	1.61	2.37			Relative P/E Ratio	*2.00*
	.2%	.2%	.2%	.2%	.2%	.1%	.4%	.6%	.7%	.6%	.6%	.5%	.4%	.3%	.4%	.4%			Avg Ann'l Div'd Yield	*.5%*
							19914	20563	16882	18330	19893	17911	22284	29453	31471	23890	*23750*	*25000*	Revenues ($mill)	*31000*
							21.9%	24.4%	23.0%	23.2%	23.7%	24.9%	27.0%	34.6%	34.7%	30.8%	*31.0%*	*31.5%*	Operating Margin	*34.0%*
							938.5	1051.3	1128.1	1238.3	1307.7	1189.5	1775.0	2168.0	2222.0	2166.0	*2350*	*2400*	Depreciation ($mill)	*2700*
							2598.4	3045.2	2332.2	2469.8	2650.9	2432.3	3646.0	6433.0	7209.0	4221.0	*4050*	*4350*	Net Profit ($mill)	*6400*
							25.4%	20.2%	16.4%	16.0%	19.5%	26.4%	18.9%	16.5%	13.1%	16.3%	*16.0%*	*16.0%*	Income Tax Rate	*16.0%*
							13.0%	14.8%	13.8%	13.5%	13.3%	13.6%	16.4%	21.8%	22.9%	17.7%	*17.1%*	*17.4%*	Net Profit Margin	*20.6%*
							4034.9	1666.3	d208.9	2057.7	2252.3	20665	6400.0	3508.0	7494.0	5663.0	*2700*	*3000*	Working Cap'l ($mill)	*4000*
							3401.5	12025	9674.2	10327	9688.5	21517	21193	22168	19086	16707	*16000*	*15500*	Long-Term Debt ($mill)	*14000*
							23378	23690	23003	26358	28214	30271	39766	45167	50082	53486	*51000*	*53000*	Shr. Equity ($mill)	*62000*
							9.9%	8.8%	7.4%	6.9%	7.2%	4.8%	6.2%	9.7%	10.6%	6.2%	*6.5%*	*6.5%*	Return on Total Cap'l	*8.5%*
							11.1%	12.9%	10.1%	9.4%	9.4%	8.0%	9.2%	14.2%	14.4%	7.9%	*8.0%*	*8.0%*	Return on Shr. Equity	*10.5%*
							10.1%	11.4%	8.4%	7.9%	7.9%	6.7%	7.9%	13.6%	13.2%	6.4%	*6.5%*	*6.5%*	Retained to Com Eq	*8.5%*
							9%	12%	17%	15%	16%	22%	21%	12%	11%	19%	*19%*	*20%*	All Div'ds to Net Prof	*18%*

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	15.5	14.1
3 yr.	-4.9	11.1
5 yr.	118.8	80.9

CAPITAL STRUCTURE as of 9/27/24
Total Debt $17524 mill. **Due in 5 Yrs** $7900 mill.
LT Debt $16324 mill. **LT Interest** $300 mill. (24% of Cap'l)

Leases, Uncapitalized Annual rentals $204.0 mill.
Pension Assets-12/23 $2.7 bill. **Oblig.** $3.2 bill.

Common Stock 722,275,141 shs. **as of 10/17/24**

MARKET CAP: $176 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/27/24
Cash Assets	5995	5864	2627
Receivables	4918	3922	3507
Inventory (LIFO)	3110	2594	2678
Other	1860	1557	1248
Current Assets	15883	13937	10060
Accts Payable	2296	1766	1596
Debt Due	591	1695	1200
Other	5502	4813	4543
Current Liab.	8389	8274	7339

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	4.0%	8.0%	*2.0%*
"Cash Flow"	9.5%	16.0%	*2.5%*
Earnings	9.5%	17.5%	*2.0%*
Dividends	25.5%	10.0%	*9.0%*
Book Value	9.0%	12.0%	*5.0%*

Calendar	QUARTERLY REVENUES ($ mill.) A Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	6858	7218	7229	8148	29453
2022	7688	7751	7663	8369	31471
2023	5949	5912	5624	6405	23890
2024	5796	5743	5798	*6413*	*23750*
2025	*6100*	*6100*	*6100*	*6700*	*25000*

Calendar	EARNINGS PER SHARE A Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	2.29	2.40	1.54	2.39	8.61
2022	2.31	2.25	2.10	2.99	9.66
2023	1.65	1.24	1.26	1.50	5.65
2024	1.45	1.22	1.12	*1.71*	*5.50*
2025	*1.50*	*1.30*	*1.30*	*1.90*	*6.00*

Calendar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.17	.18	.18	.18	.71
2021	.18	.21	.21	.21	.81
2022	.21	.25	.25	.25	.96
2023	.25	.27	.27	.27	1.06
2024	.27	.27	.27		

BUSINESS: Danaher Corp. is a global science and technology innovator committed to accelerating the power of science and technology to improve human health. The company uses a growth-via-acquisition strategy and is constituted of 15 operating companies divided into three segments: Biotechnology, Life Sciences, and Diagnostics. In 2023, acquired Abcam plc for $5.6 billion. Made 7 acquisitions in 2022 ($582 million); 11 in 2021, $1.3 billion; 1 in 2020 (GE's Biopharma unit, $21 billion. Foreign sales were 60% of '23 revenues. Offs. and dirs. own 10.9% of common; Vanguard, 7.6%; BlackRock, 6.9% (3/24 Proxy). CEO: Rainer M. Blair. Inc.: DE. Addr.: 2200 Pennsylvania Ave., N.W., Suite 800W, Wash., D.C. 20037-1701. Tel.: 202-828-0850. Web: www.danaher.com.

Danaher's latest results were a mixed bag. September-period revenues rose 3%, year over year, topping expectations of $5.6 billion, while GAAP earnings per share (which is what we use) fell 11%, missing our call of $1.55; adjusted share profit of $1.71 came in about flat but beat the consensus by $0.15. Solid revenue gains in the Diagnostics and Life Sciences units offset declines in the Biotechnology (bioprocessing) category, though this continued to show improvement. The Cepheid respiratory line stood out, too, as it gained more market share in molecular testing. Still, core revenue was up just a tad. The stock slipped 10% in price, on the mixed showing and some profit-taking.

We have scaled back our estimates across the board, as post-spinoff operations get on a steadier footing. Recall that Danaher completed the separation of its environmental and applied solutions business (known as Veralto) around this time last year. While there are some bright spots within the existing business, demand has been subdued as weak funding has forced customers to reprioritize drug-development activities. Management currently expects core revenues for both the fourth quarter and full year of 2024 to be down at a low single-digit rate. Given this and the recent bottom-line pressure, we now think 2024 will be an overall flattish year. We've cut our revenue and share-profit calls for 2024 (from $23.9 billion and $6.25), but see a pickup next year, as the remaining operations gain traction.

The picture should get rosier over the long haul. With its restructured product portfolio focused on life sciences and diagnostics, Danaher stands to benefit from opportunities for higher core revenue growth, wider margins, more robust cash flow, and additional strategic acquisitions.

The Timeliness rank on Danaher stock remains suspended. It will be reinstated once the company establishes a track record under its new configuration. While the dividend yield is modest at the recent price, the issue's prospects for capital appreciation seem respectable when looking through a 3- to 5-year lens. Conservative types may also like the top-notch Safety rank of 1, Financial Strength of A+, and good Price Stability score.

J. Susan Ferrara *November 8, 2024*

(A) Diluted egs. May not sum due to rounding. 2016 and 2023 restated to reflect spinoffs. Excl. nonrecur. gains/(losses); '09, (16¢); '10, 33¢; '15, (63¢); '16, (26¢). Excl. gains/(loss) from discont. ops.; 15, $1.07; '16, 57¢; '17, 3¢; '19, 79¢; '23, 73¢. Next egs. report due early February.
(B) Dividends paid in late March, June, Sept., and Dec. **(C)** Incl. intang. '23: $62.35 mill., $84.35/sh. **(D)** In mills., adj. for stock splits.
(E) Spun off Envista (NVST) 9/19. **(F)** Spun off Veralto (VLTO) 10/23.

Company's Financial Strength	A+
Stock's Price Stability	75
Price Growth Persistence	85
Earnings Predictability	70

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DOLBY LABORATORIES NYSE-DLB

RECENT PRICE 76.53 | P/E RATIO 28.3 (Trailing: 34.9 Median: 26.0) | RELATIVE P/E RATIO 1.52 | DIV'D YLD 1.6% | VALUE LINE

TIMELINESS 4 Lowered 2/23/24
SAFETY 2 Raised 4/20/18
TECHNICAL 4 Lowered 10/4/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

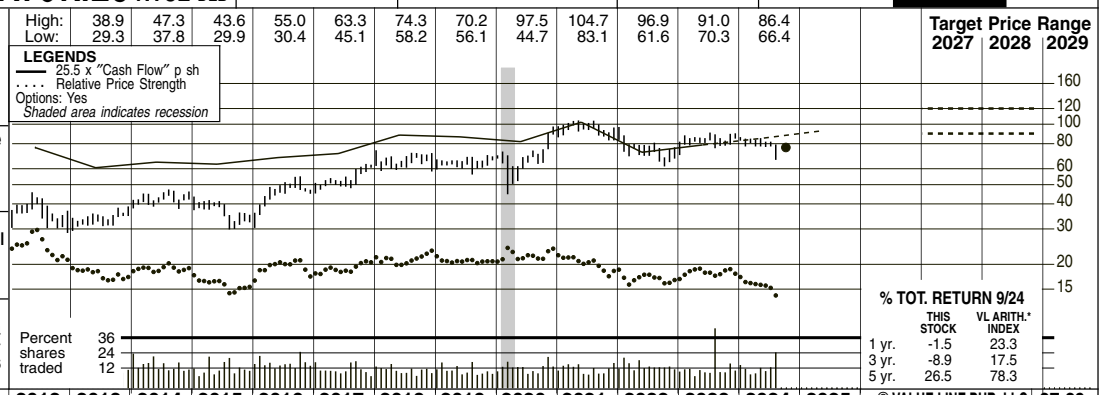
Low-High	Midpoint (% to Mid)
$65-$111	$88 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	120	(+55%)	*13%*
Low	90	(+20%)	*6%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	196	180	197
to Sell	194	215	186
Hld's(000)	56338	55025	54868



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
5.69	6.32	8.25	8.79	9.04	8.94	9.39	9.61	10.11	10.59	11.35	12.40	11.58	12.68	13.08	13.64	***13.40***	***14.00***	Revenues per sh [A]	***15.80***
1.99	2.39	2.85	3.25	3.01	2.38	2.54	2.48	2.67	2.80	3.47	3.40	3.21	4.02	2.84	2.97	***3.35***	***3.65***	"Cash Flow" per sh	***4.15***
1.74	2.11	2.46	2.75	2.46	1.84	1.99	1.75	1.81	1.95	2.59	2.44	2.25	2.97	1.81	2.05	***2.55***	***2.75***	Earnings per sh [A B]	***3.15***
- -	- -	- -	- -	- -	- -	- -	.40	.48	.56	.64	.76	.88	.88	1.00	1.08	***1.20***	***1.28***	Div'ds Decl'd per sh [E]	***1.44***
.12	.12	.34	.44	1.63	.26	.77	1.56	.99	.98	.71	.96	.66	.54	.50	.32	***.30***	***.40***	Cap'l Spending per sh	***.40***
9.33	11.78	13.17	15.30	16.79	14.55	16.72	17.89	19.43	20.92	21.21	23.04	24.25	25.70	23.43	24.72	***25.75***	***27.35***	Book Value per sh [C]	***30.65***
112.47	113.85	111.86	108.74	102.44	101.76	102.29	101.04	101.42	102.16	103.24	100.14	100.30	101.07	95.88	95.28	***95.50***	***95.00***	Common Shs Outst'g [D]	***95.00***
24.7	16.2	22.4	18.4	14.6	17.8	20.6	22.3	23.0	25.7	24.6	26.4	28.8	31.6	44.3	38.5	***Bold figures are Value Line estimates***		Avg Ann'l P/E Ratio	***33.5***
1.49	1.08	1.42	1.15	.93	1.00	1.08	1.12	1.21	1.29	1.33	1.41	1.48	1.71	2.56	2.23			Relative P/E Ratio	***1.85***
- -	- -	- -	- -	- -	- -	- -	1.0%	1.2%	1.1%	1.0%	1.2%	1.4%	.9%	1.2%	1.4%			Avg Ann'l Div'd Yield	***1.4%***
960.2	970.6	1025.7	1081.5	1171.9	1241.6	1161.8	1281.3	1253.8	1299.7	***1280***	***1330***	Revenues ($mill) [A]	***1500***
34.1%	29.1%	30.9%	32.0%	32.5%	30.5%	26.7%	34.4%	23.5%	26.6%	***27.5%***	***28.0%***	Operating Margin	***28.5%***
53.3	69.1	85.2	84.3	81.3	85.1	90.9	95.9	88.5	82.6	***75.0***	***85.0***	Depreciation ($mill)	***95.0***
206.1	181.4	185.9	201.8	276.8	255.2	231.4	310.2	184.1	200.7	***245***	***260***	Net Profit ($mill)	***300***
24.4%	25.4%	21.0%	21.1%	11.3%	9.5%	3.4%	10.3%	14.6%	19.4%	***23.0%***	***24.0%***	Income Tax Rate	***20.0%***
21.5%	18.7%	18.1%	18.7%	23.6%	20.5%	19.9%	24.2%	14.7%	15.4%	***19.0%***	***19.6%***	Net Profit Margin	***20.0%***
816.5	708.6	546.6	765.6	1029.9	1074.6	1280.1	1444.8	1033.4	1065.6	***1125***	***1150***	Working Cap'l ($mill)	***1300***
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	***Nil***	***Nil***	Long-Term Debt ($mill)	***Nil***
1710.0	1807.1	1970.3	2136.7	2189.6	2307.4	2432.6	2598.0	2246.2	2355.1	***2460***	***2600***	Shr. Equity ($mill)	***2910***
12.1%	10.0%	9.4%	9.4%	12.6%	11.1%	9.5%	11.9%	8.2%	8.5%	***10.0%***	***10.0%***	Return on Total Cap'l	***10.5%***
12.1%	10.0%	9.4%	9.4%	12.6%	11.1%	9.5%	11.9%	8.2%	8.5%	***10.0%***	***10.0%***	Return on Shr. Equity	***10.5%***
12.1%	7.8%	7.0%	6.8%	9.6%	7.7%	5.9%	8.5%	3.7%	4.2%	***5.5%***	***5.5%***	Retained to Com Eq	***5.5%***
- -	23%	26%	28%	24%	30%	38%	29%	54%	51%	***47%***	***47%***	All Div'ds to Net Prof	***46%***

CAPITAL STRUCTURE as of 6/28/24
Total Debt None

Leases, Uncapitalized: Annual rentals $37.7 mill.
No Defined Benefit Pension Plan
Preferred Stock None

Common Stock 95,347,623 shares
as of 7/26/24
Includes 35,670,779 Class B shares
(Each Class B share entitled to 10 votes)

MARKET CAP: $7.2 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/28/24
Cash Assets	817.6	957.2	905.9
Receivables	243.6	262.2	285.8
Inventory (Avg Cst)	23.5	35.6	34.7
Other	226.2	232.8	242.2
Current Assets	1310.9	1487.8	1468.6
Accts Payable	14.2	20.9	16.4
Debt Due	- -	- -	- -
Other	263.3	401.3	338.1
Current Liab.	277.5	422.2	354.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	3.5%	4.0%	*6.5%*
"Cash Flow"	2.0%	3.0%	*8.0%*
Earnings	- -	2.5%	*9.5%*
Dividends	- -	11.0%	*9.0%*
Book Value	4.5%	3.5%	*6.0%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2021	389.9	319.6	286.8	285.0	1281.3
2022	351.6	334.4	289.6	278.2	1253.8
2023	334.9	375.9	298.3	290.6	1299.7
2024	315.6	364.5	288.8	***311.1***	***1280***
2025	***345***	***375***	***295***	***315***	***1330***

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2021	1.30	.73	.52	.42	2.97
2022	.77	.36	.39	.29	1.81
2023	.82	.98	.17	.09	2.05
2024	.69	1.01	.40	***.45***	***2.55***
2025	***.80***	***1.05***	***.45***	***.45***	***2.75***

Calendar	QUARTERLY DIVIDENDS PAID [E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.22	.22	.22	.22	.88
2021	.22	.22	.22	.25	.91
2022	.25	.25	.25	.27	1.02
2023	.27	.27	.27	.30	1.11
2024	.30	.30	.30		

BUSINESS: Dolby Laboratories, Inc. designs and supplies technologies for entertainment in the home, theater, car, and elsewhere. The company develops sound technologies that create a more enjoyable listening experience and are used in movie soundtracks, DVDs, television, satellite and cable broadcasts, video games, and personal computers that provide surround sound and noise reduction. '23 international revenues: 64%. Has 2,246 employees. Dagmar Dolby owns 99.8% of Class B shares and controls 85.8% of voting rights (12/23 Proxy). Chairman: Peter Gotcher. President, CEO & Director: Kevin J. Yeaman. Incorporated: Delaware. Address: 1275 Market Street, San Francisco, CA, 94103. Telephone: 415-558-0200. Internet: www.dolby.com.

Dolby Laboratories' fiscal 2024 third-quarter results were mixed. (Years end September 30th.) The leader of licensed audio, video, and voice technologies posted earnings of $0.40 per share, topping our tally of $0.34, and increasing 135% over the same prior-year period. Total revenue, in contrast, clocked in at $288.8 million, a decline of 3% year-over-year, as cinema products were pressured by sluggish box office numbers and customers continue to delay or forgo capital expenditure projects.

For fiscal 2024, management expects the top line to contract approximately 1% to 2% from the prior year. This is being attributed to weak revenues in foundational audio, soft aggregate devices shipped, and lower-than-expected unit sales in set-top boxes and gaming consoles. On a positive note, Dolby Atmos and Dolby Vision have outperformed due to strong content growth driving high device attachment rates. Overall, we are maintaining our call for earnings of $2.55 per share on revenues of $1.28 billion.

The recent acquisition of THEO Technologies enhances the Dolby's new range of cloud video solutions that support real-time interactive streaming. THEO Technologies is a leading provider of high-value video tools embraced by top sports and entertainment companies worldwide. The acquisition provides an ultra-low latency streaming solution for Dolby, ultimately improving the quality, flexibility, and targeting of its advertising in a non-intrusive way. This should result in increased monetization opportunities without compromising the end-viewers experience.

Meanwhile, Dolby continues to position itself for new licensing opportunities through its vast patent catalog. The company's patents are primarily monetized through a network of patent pools. These are collaborative licensing structures that enable industry efficiency and promote long-term growth by accelerating the adoption of Dolby's next-generation standardized technologies.

This issue remains untimely. At the recent quotation, DLB stock offers solid 18-month prospects while, on a 3- to 5-year basis, capital appreciation potential is just below the *Value Line* median.

Michal Worth *October 11, 2024*

(A) Fiscal year ends last Friday in September.
(B) Diluted earnings per share. May not sum due to rounding. Next earnings report due November. Excl. nonrecur. (loss): '18, ($1.55).
(C) Includes intangibles; at 6/28/24: $553.1 million, or $5.80 per share.
(D) In millions.
(E) Quarterly dividend initiated 11/14. Dividends paid in February, May, August, and November. Company paid a $4.00/share special dividend on December 27, 2012.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	75
Earnings Predictability	70

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F5, INC. NDQ-FFIV

RECENT PRICE **248.74** | P/E RATIO **24.9** (Trailing: 26.0 Median: 22.0) | RELATIVE P/E RATIO **1.30** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 2 Raised 11/15/24
SAFETY 2 Raised 12/10/21
TECHNICAL 3 Raised 10/18/24
BETA .90 (1.00 = Market)

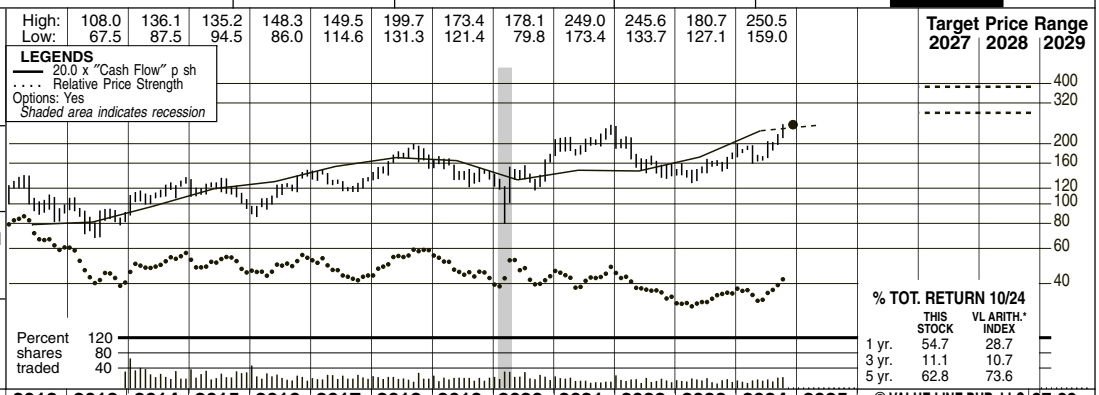
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$214-$330 $272 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	385	(+55%)	*12%*
Low	285	(+15%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	259	247	272
to Sell	233	238	244
Hld's(000)	53713	54102	55995



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
8.22	8.34	10.98	14.55	17.50	18.97	23.60	27.37	30.54	33.39	35.89	37.15	38.48	42.92	45.04	47.51	48.48	*52.30*	Revenues per sh [A]	*69.25*
1.24	1.51	2.18	3.31	3.94	4.06	4.87	5.95	6.47	7.70	8.52	8.22	6.60	7.36	7.31	8.57	11.60	*12.40*	"Cash Flow" per sh	*14.60*
.89	1.14	1.86	2.96	3.45	3.50	4.09	5.03	5.38	6.50	7.32	7.08	5.01	5.34	5.27	6.55	9.55	*10.10*	Earnings per sh [A B]	*11.90*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*Nil*	Div'ds Decl'd per sh	*Nil*
.35	.15	.16	.38	.38	.34	.31	.86	.97	.62	.89	1.72	.98	.51	.56	.92	.52	*.70*	Cap'l Spending per sh	*.95*
9.08	10.20	12.49	13.97	16.89	19.70	18.66	18.77	18.15	19.64	21.35	29.18	36.54	38.91	41.25	47.30	53.87	*60.10*	Book Value per sh	*81.95*
79.09	78.33	80.36	79.15	78.72	78.09	73.39	70.14	65.32	62.59	60.22	60.37	61.10	60.65	59.86	59.21	58.09	*56.00*	Common Shs Outst'g [C]	*52.00*
31.4	24.1	35.0	36.2	31.8	25.2	25.5	24.2	20.1	20.4	21.1	21.9	26.6	34.8	36.3	22.5	18.7		Avg Ann'l P/E Ratio	*28.0*
1.89	1.61	2.23	2.27	2.02	1.42	1.34	1.22	1.06	1.03	1.14	1.17	1.37	1.88	2.10	1.25	1.05		Relative P/E Ratio	*1.55*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			Avg Ann'l Div'd Yield	*Nil*
1732.0	1919.8	1995.0	2090.0	2161.4	2242.4	2350.8	2603.4	2695.8	2813.2	2816.1	*2930*	Revenues ($mill) [A]	*3600*
31.2%	31.5%	30.3%	30.5%	30.9%	26.2%	21.1%	19.6%	19.6%	23.1%	27.5%	*26.0%*	Operating Margin	*27.0%*
46.1	52.6	56.8	61.1	59.5	68.5	95.9	115.4	115.6	112.7	107.0	*110*	Depreciation ($mill)	*125*
311.2	365.0	365.9	420.8	453.7	427.7	307.4	331.2	322.2	394.9	566.8	*585*	Net Profit ($mill)	*635*
37.4%	35.0%	33.5%	26.9%	24.9%	21.0%	22.4%	14.4%	16.4%	18.7%	18.5%	*20.0%*	Income Tax Rate	*20.0%*
18.0%	19.0%	18.3%	20.1%	21.0%	19.1%	13.1%	12.7%	12.0%	14.0%	20.1%	*20.0%*	Net Profit Margin	*17.6%*
361.9	433.0	444.6	524.7	463.3	406.1	505.2	219.6	72.2	376.0	619.8	*925*	Working Cap'l ($mill)	*1830*
--	--	--	--	--	--	369.0	349.8	349.8	--	--	*Nil*	Long-Term Debt ($mill)	*Nil*
1369.3	1316.7	1185.3	1229.4	1285.5	1761.5	2232.3	2360.2	2469.0	2800.2	3129.4	*3365*	Shr. Equity ($mill)	*4260*
22.7%	27.7%	30.9%	34.2%	35.3%	24.3%	12.0%	12.2%	13.0%	14.1%	18.1%	*16.0%*	Return on Total Cap'l	*15.0%*
22.7%	27.7%	30.9%	34.2%	35.3%	24.3%	13.8%	14.0%	13.0%	14.1%	18.1%	*16.0%*	Return on Shr. Equity	*15.0%*
22.7%	27.7%	30.9%	34.2%	35.3%	24.3%	13.8%	14.0%	13.0%	14.1%	18.1%	*16.0%*	Retained to Com Eq	*15.0%*
--	--	--	--	--	--	--	--	--	--	--	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 9/30/24
Total Debt Nil **Due in 5 Yrs.** Nil
LT Debt Nil **LT Interest** Nil

Leases, Uncapitalized Annual rentals $50.4 mill.

No Defined Benefit Pension Plan

Pfd Stock None
Common Stock 58,614,865 shares
as of 11/12/2024

MARKET CAP: $14.6 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	884.6	797.2	1074.6
Receivables	469.9	454.8	389.0
Inventory	68.4	35.9	76.4
Other	489.3	560.9	569.5
Current Assets	1912.2	1848.8	2109.5
Accts Payable	113.2	63.3	67.9
Debt Due	349.8	--	--
Other	1377.0	1409.5	1421.8
Current Liab.	1840.0	1472.8	1489.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '22-'24 to '27-'29
Revenues	9.0%	6.0%	*8.5%*
"Cash Flow"	8.0%	2.5%	*11.0%*
Earnings	7.0%	0.5%	*10.0%*
Dividends	--	--	*Nil*
Book Value	10.0%	15.0%	*12.0%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	624.6	645.3	651.5	682.0	2603.4
2022	687.1	634.2	674.5	700.0	2695.8
2023	700.4	703.2	702.6	707.0	2813.2
2024	692.6	681.4	695.5	746.7	2816.1
2025	*710*	*720*	*735*	*765*	*2930*

Fiscal Year Ends	EARNINGS PER SHARE [AB] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	1.41	.70	1.46	1.80	5.34
2022	1.51	.92	1.37	1.49	5.27
2023	1.20	1.34	1.48	2.55	6.55
2024	2.32	2.00	2.44	2.80	9.55
2025	*2.35*	*2.30*	*2.55*	*2.90*	*10.10*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

BUSINESS: F5, Inc. (formerly F5 Networks) is a leading developer and provider of software defined application services designed to ensure the security and availability of applications delivered over Internet Protocol networks. It offers a range of services including consulting, training, installation, maintenance, and other technical support. Its core technology is a programmable software platform called Traffic Management Operating System. R&D: 19.2% of fiscal 2023 revenues. Has 6,524 employees. Off./Dir. own less than 1% of common; The Vanguard Group, 12.0%; BlackRock, Inc., 9.9%; (1/24 proxy). Pres. and CEO: Francois Locoh-Donou. Chairman: Alan J. Higginson. Inc.: WA. Address: 801 5th Avenue, Seattle, WA 98119. Telephone: (206) 272-5555. Internet: www.f5.com.

After three-consecutive quarters of year-to-year declines, F5's revenues looked to be getting back in gear at the close of fiscal 2024. (The year ended September 30th.) Revenues rose 6% in the final quarter, to $746.7 million, topping management's guidance range of $720 million-$740 million. The Products segment (47% of revenues in the September interim) managed to restore growth, advancing 10% year-to-year compared to declines in the previous quarters. This can be attributed to strong software growth (+19%) from an increased base of subscription renewals and recurring revenue streams (i.e. the maintenance portion of its global services arm) owing to the company's new tiered pricing and software strategy. This more than offset weak, albeit improving system sales (-3%), as it no longer incentivizes customers toward multi-year maintenance contracts. Also, new business activity from projects that were previously delayed have begun their software engagements with F5 ahead of schedule. Fiscal 2024 revenues were flat, given an anticipated backlog headwind of $180 million from fiscal 2023's dislocated order fulfillments.

Profits are certainly on the rise, as well. Fiscal fourth-quarter and full-year GAAP earnings per share rose 10% and 46%, year over year, to $2.80 and $9.55, respectively. The company's operations got a large boost from cost-cutting efforts and improving demand from North American enterprise customers. Looking ahead, project wins garnered during this AI boom era should begin to pay off in the next two years. In addition, several key measures such as improved backlog, win rates, and operating efficiencies have all been trending in a positive direction. Additionally, firming industry demand for its application delivery controlling solutions from greater need for network convergence should pave the way for improved revenues and profits in fiscal 2025. In fact, the company noted early customer traction for its F5 Distributed Cloud Services, as enterprise carriers are at the early stages of their AI adoption cycles.

Even after the year-long price ascent, this timely stock has decent capital gains potential out to 2027-2029.

Oriatal J. Haiby *December 6, 2024*

(A) Fiscal year ends September 30th.

(B) Diluted earnings. May not sum due to rounding and/or change in share count. Next earnings report due late January.

(C) In millions.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	60
Earnings Predictability	70

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ALPHABET INC. NDQ-GOOG

RECENT PRICE **165.80** | P/E RATIO **21.4** (Trailing: 23.8 Median: 25.0) | RELATIVE P/E RATIO **1.15** | DIV'D YLD **0.5%** | **VALUE LINE**

TIMELINESS 2 Lowered 8/16/24
SAFETY 1 Raised 5/12/17
TECHNICAL 3 Lowered 10/18/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

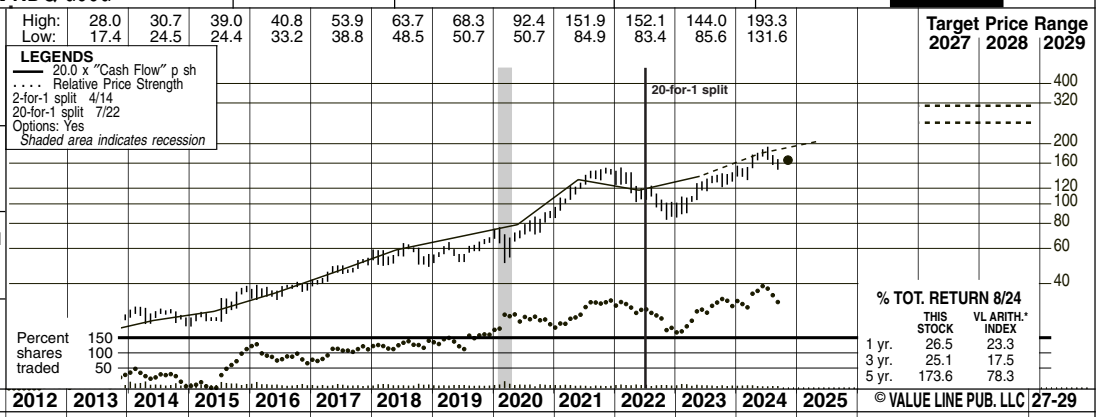
Low-High	Midpoint (% to Mid)
$142-$275	$209 (25%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	310	(+85%)	*17%*
Low	255	(+55%)	*12%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	1677	1659	1773
to Sell	1621	1770	1800
Hld's(000)	3403100	3334188	3364323



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
1.73	1.86	2.28	2.91	3.81	4.45	4.85	5.46	6.53	7.98	9.84	11.76	13.52	19.46	22.01	24.67	*28.35*	*32.25*	Revenues per sh	*52.25*
.52	.61	.74	.86	.97	1.12	1.31	1.45	1.79	2.29	2.95	3.41	3.94	6.61	5.86	6.88	*8.95*	*10.35*	"Cash Flow" per sh	*14.45*
.42	.51	.66	.74	.81	.90	1.04	1.14	1.39	1.80	2.33	2.58	2.93	5.61	4.56	5.80	*7.65*	*8.70*	Earnings per sh [A]	*11.25*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*.60*	*.86*	Div'ds Decl'd per sh	*1.21*
.19	.06	.31	.26	.25	.55	.81	.72	.74	.95	1.81	1.71	1.65	1.86	2.45	2.59	*4.00*	*4.40*	Cap'l Spending per sh	*4.25*
2.24	2.83	3.60	4.47	5.44	6.50	7.68	8.75	10.06	10.97	12.77	14.63	16.48	19.00	19.94	22.74	*26.55*	*30.40*	Book Value per sh	*50.35*
12605	12711	12852	13005	13187	13440	13612	13747	13826	13896	13911	13767	13504	13242	12849	12460	*12250*	*12000*	Common Shs Outst'g [B]	*11000*
27.6	21.5	20.3	19.1	19.8	24.6	27.0	26.3	26.7	25.6	23.8	23.1	25.2	22.3	25.3	20.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*25.0*
1.66	1.43	1.29	1.20	1.26	1.38	1.42	1.32	1.40	1.29	1.29	1.23	1.29	1.21	1.46	1.15			Relative P/E Ratio	*1.40*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			Avg Ann'l Div'd Yield	*.4%*
66001	74989	90272	110855	136819	161857	182527	257637	282836	307394	*347000*	*387000*	Revenues ($mill)	*575000*
30.9%	31.3%	32.2%	31.0%	29.0%	29.0%	29.7%	35.0%	31.9%	31.3%	*31.0%*	*31.0%*	Operating Margin	*30.0%*
3523.0	4132.0	5267.0	6103.0	8164.0	10856	12905	11555	15287	11946	*16000*	*20000*	Depreciation ($mill)	*35000*
14306	15826	19478	25705	32814	36025	40269	76033	59972	73795	*93715*	*104000*	Net Profit ($mill)	*123750*
18.9%	16.8%	19.3%	12.1%	11.3%	12.8%	16.2%	16.2%	15.9%	13.9%	*16.0%*	*16.0%*	Income Tax Rate	*16.0%*
21.7%	21.1%	21.6%	23.2%	24.0%	22.3%	22.1%	29.5%	21.2%	24.0%	*27.0%*	*26.9%*	Net Profit Margin	*21.5%*
63880	70804	88652	100125	101056	107357	117462	123889	95495	89716	*84000*	*85000*	Working Cap'l ($mill)	*95000*
3228.0	1995.0	3935.0	3969.0	4012.0	4554.0	13932	14817	14701	13253	*13250*	*14000*	Long-Term Debt ($mill)	*16000*
104500	120331	139036	152502	177628	201442	222544	251635	256144	283379	*325000*	*365000*	Shr. Equity ($mill)	*554000*
13.3%	13.0%	13.7%	16.5%	18.1%	17.5%	17.1%	28.6%	22.2%	25.0%	*28.0%*	*27.5%*	Return on Total Cap'l	*22.0%*
13.7%	13.2%	14.0%	16.9%	18.5%	17.9%	18.1%	30.2%	23.4%	26.0%	*29.0%*	*28.5%*	Return on Shr. Equity	*22.5%*
13.7%	13.2%	14.0%	16.9%	18.5%	17.9%	18.1%	30.2%	23.4%	26.0%	*26.5%*	*26.0%*	Retained to Com Eq	*20.0%*
--	--	--	--	--	--	--	--	--	--	*8%*	*10%*	All Div'ds to Net Prof	*11%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $13238 mill. **Due in 5 Yrs.** $8960 mill.
LT Debt $13238 mill. **LT Interest** $489 mill. (4% of Cap'l)

Leases, Uncapitalized: Annual rentals $3179 mill.
No Defined Benefit Pension Plan

Pfd Stock None
Common Stock 12,322,000,000 shares (5,860,000,000 Class A shares, 866,000,000 Class B shares, and 5,596,000,000 Class C shares) [C]

MARKET CAP: $2.2 trillion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	113762	110916	100725
Receivables	40258	47964	47087
Inventory	--	--	--
Other	10775	12650	14183
Current Assets	164795	171530	161995
Accts Payable	5128	7493	6092
Debt Due	--	--	--
Other	64172	74321	71821
Current Liab.	69300	81814	77913

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	20.0%	22.5%	*15.5%*
"Cash Flow"	20.5%	24.5%	*14.5%*
Earnings	19.5%	25.0%	*13.5%*
Dividends	--	--	*NMF*
Book Value	15.0%	13.0%	*16.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	55314	61880	65118	75325	257637
2022	68011	69685	69092	76048	282836
2023	69787	74604	76693	86310	307394
2024	80539	84742	*86000*	*95719*	*347000*
2025	*89000*	*95000*	*96000*	*107000*	*387000*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	1.31	1.36	1.40	1.53	5.61
2022	1.23	1.21	1.06	1.05	4.56
2023	1.17	1.44	1.55	1.64	5.80
2024	1.89	1.89	*1.85*	*2.02*	*7.65*
2025	*2.00*	*2.15*	*2.15*	*2.40*	*8.70*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	--	--	--	--	--
2021	--	--	--	--	--
2022	--	--	--	--	--
2023	--	--	--	--	--
2024	--	.20	.20		

BUSINESS: Alphabet Inc. is the successor and parent holding company of Google Inc., which operates the world's leading Internet search engine. The company derives revenues primarily through delivering targeted advertising. Revenues are also derived from the licensing of search technology and solutions to enterprises. Revenues in 2023: United States, 47%; International, 53%. Has 182,502 employees. Off. & dir. own less than 1% of Class A common stock, 89.4% of Class B; The Vanguard Group, 8.4%; BlackRock, 7.1% of Class A (6/24 Proxy). CEO & Dir.: Sundar Pichai. Co-founder & Dir.: Larry Page. Co-founder & Dir.: Sergey Brin. Inc.: DE. Addr.: 1600 Amphitheatre Parkway, Mountain View, CA 94043. Telephone: 650-253-0000. Internet: www.google.com.

Alphabet Inc. will probably post solid results for the September period, building on a healthy performance from the June quarter. Year over year, revenues likely increased 12%, to $86.0 billion and earnings probably rose 19%, from $1.55 per share to $1.85 per share. The top-line performance likely reflected a mid-teen increase in YouTube ad revenue, and continued growth in Google Cloud. Cloud revenue rose 29% in the second quarter, driven in part by higher contribution from AI solutions. AI investment likely rose too, spurred by the need for additional infrastructure.

Shares of the tech giant have dropped roughly 10% since our August review. In August, Google lost its antitrust case with the U.S. government. As part of the decision, a U.S. District Court judge referred to Google as a monopolist and ruled that Google maintained a monopoly in two product markets, general search services and general text advertising. Through Google's distribution agreements (with browser developers, smartphone makers, and wireless carriers) the tech giant pays approximately $25 billion to be the default search engine on browsers and mobile devices. The court ruled these distribution agreements to be exclusive and harmful to competition. Google plans to appeal the decision, but the appeals process could take several years to complete. In October, the Justice Department (DOJ) released potential remedies for the case, including a possible breakup of Google, as well as restrictions on Alphabet's exclusive agreements. With all the uncertainty surrounding the case, some investors may be sitting on the sidelines for now. The view ought to change though, on November 20th when the DOJ files its final proposal on this landmark legal decision.

Shares of Alphabet are ranked to outperform the broader market averages in the year ahead (Timeliness: 2). Furthermore, our current projections point to attractive upside potential over both the 18-month and 3- to 5-year time frames. Also worth noting is the top-notch grade for Financial Strength (A++) and high scores for Price Stability (85 of 100) and Price Growth Persistence (100). GOOG also possesses our top rank for Safety (1).

Kathleen Uckert *November 1, 2024*

(A) Diluted earnings per share for Class A and B common stock and Class C capital stock. Excludes nonrecurring gains/(losses): '08, ($0.17); '14, ($0.03); '17, ($0.90); '18, ($0.15); '19, (0.12). Qtly egs. may not sum. Next earnings report due early February. **(B)** In millions. **(C)** Class A common stock entitled to one vote per share. Class B common stock entitled to 10 votes per share. Class C common stock is nonvoting. **(D)** Quarterly dividends initiated with first payment on 6/17/24.

Company's Financial Strength	A++
Stock's Price Stability	85
Price Growth Persistence	100
Earnings Predictability	70

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HUNTINGTON INGALLS NYSE-HII

RECENT PRICE 196.30 | P/E RATIO 14.4 (Trailing: 11.1 Median: 14.0) | RELATIVE P/E RATIO 0.78 | DIV'D YLD 2.6% | VALUE LINE

TIMELINESS 4 Lowered 11/15/24
SAFETY 3 Lowered 11/29/24
TECHNICAL 3 Lowered 11/29/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$162-$328	$245 (25%)

2027-29 PROJECTIONS

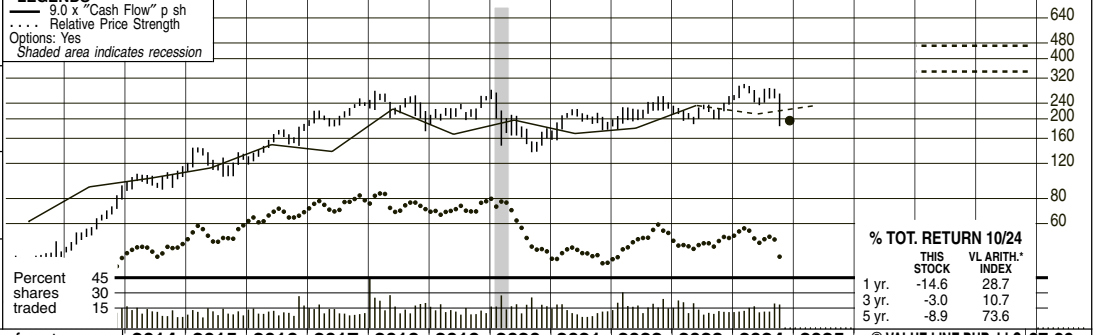
	Price	Gain	Ann'l Total Return
High	465	(+135%)	*25%*
Low	345	(+75%)	*17%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	296	320	348
to Sell	241	244	274
Hld's(000)	35848	35656	36167

High:	93.0	116.3	144.0	189.2	253.4	276.7	260.8	279.7	224.1	260.0	260.0	299.5
Low:	43.0	87.4	102.8	118.2	183.4	173.8	186.7	136.4	156.4	177.2	188.5	184.3

LEGENDS
9.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession



% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-14.6	28.7
3 yr.	-3.0	10.7
5 yr.	-8.9	73.6

On March 31, 2011, in a tax-free transaction to its shareholders, defense contractor Northrop Grumman spun off its shipbuilding division Huntington Ingalls. Stockholders recieved one Huntington share for every six shares of Northrop owned. At that time, Huntington began trading on the NYSE under the ticker HII.

CAPITAL STRUCTURE as of 9/30/24
Total Debt $2613 mill. **Due in 5 Yrs** $1945 mill.
LT Debt $1715 mill. **LT Interest** $79.3 mill.
(tot. Int. Coverage 10.9x)
(39% of Cap'l)
Leases, Uncapitalized Annual rentals $59.0 mill.

Pension Assets-12/23 $6873 mill.
Oblig. $6242 mill.

Common Stock 39,129,347 shares
as of 10/25/24

MARKET CAP: $7.7 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	467	430	10
Receivables	636	461	436
Inventory (Avg Cst)	183	183	1919
Other	1460	1806	264
Current Assets	2746	2880	2629
Accts Payable	642	554	579
Debt Due	399	231	898
Other	1854	2247	1859
Current Liab.	2895	3032	3336

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	6.5%	8.0%	*5.5%*
"Cash Flow"	12.0%	.5%	*10.5%*
Earnings	21.0%	- -	*10.0%*
Dividends	37.0%	13.0%	*12.0%*
Book Value	14.5%	16.5%	*11.0%*

Calendar	QUARTERLY SALES ($ mill.) A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2278	2231	2338	2677	9524
2022	2576	2662	2626	2812	10676
2023	2674	2787	2916	3177	11554
2024	2805	2977	2749	***3069***	***11600***
2025	***2960***	***3040***	***3035***	***3115***	***12150***

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	3.68	3.20	3.65	2.99	13.50
2022	3.50	4.44	3.44	3.07	14.44
2023	3.23	3.27	3.70	6.90	17.07
2024	3.87	4.38	2.56	***3.44***	***14.25***
2025	***3.75***	***3.90***	***3.80***	***4.15***	***15.60***

Calendar	QUARTERLY DIVIDENDS PAID D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	1.03	1.03	1.03	1.14	4.23
2021	1.14	1.14	1.14	1.18	4.60
2022	1.18	1.18	1.18	1.24	4.78
2023	1.24	1.24	1.24	1.30	5.02
2024	1.30	1.30	1.30		

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	144.03	149.95	152.99	164.99	195.13	218.11	231.14	238.10	267.57	287.07	***296.30***	***307.60***	Sales per sh	***341.50***
	11.24	12.65	16.54	15.30	24.89	18.63	21.90	18.78	19.98	25.76	***24.50***	***26.95***	"Cash Flow" per sh	***40.25***
	6.85	8.36	12.14	10.46	19.11	14.01	17.14	13.50	14.44	17.07	***14.25***	***15.60***	Earnings per sh A	***29.00***
	1.00	1.70	2.10	2.52	3.02	3.61	4.23	4.60	4.78	5.02	***5.20***	***5.24***	Div'ds Decl'd per sh D	***5.32***
	3.42	4.02	6.17	8.00	11.05	12.99	8.72	8.28	7.12	7.32	***7.35***	***7.55***	Cap'l Spending per sh	***11.05***
	28.26	31.83	35.78	38.98	36.18	38.92	46.94	70.20	87.44	102.98	***106.15***	***114.45***	Book Value per sh B	***182.40***
	48.30	46.81	46.20	45.10	41.90	40.80	40.50	40.00	39.90	39.86	***39.15***	***39.50***	Common Shs Outst'g C	***40.00***
	14.6	14.7	12.7	20.1	12.2	15.7	10.8	14.6	15.0	12.9	*Bold figures are*		Avg Ann'l P/E Ratio	***14.0***
	.77	.74	.67	1.01	.66	.84	.55	.79	.87	.72	*Value Line*		Relative P/E Ratio	***.80***
	1.0%	1.4%	1.4%	1.2%	1.3%	1.6%	2.3%	2.3%	2.2%	2.2%	*estimates*		Avg Ann'l Div'd Yield	***1.3%***
	6957.0	7020.0	7068.0	7441.0	8176.0	8899.0	9361.0	9524.0	10676	11554	***11600***	***12150***	Sales ($mill)	***13660***
	12.9%	14.6%	14.5%	14.3%	14.3%	10.4%	10.6%	7.6%	7.3%	8.6%	***7.5%***	***8.0%***	Operating Margin	***11.5%***
	205.0	188.0	191.0	211.0	207.0	180.0	191.0	207.0	218.0	347.0	***385***	***400***	Depreciation ($mill)	***450***
	338.0	404.0	573.0	479.0	836.0	580.0	696.0	544.0	579.0	681.0	***575***	***625***	Net Profit ($mill)	***1160***
	33.3%	36.1%	26.9%	38.0%	13.9%	19.2%	14.1%	12.5%	19.5%	20.2%	***15.5%***	***15.5%***	Income Tax Rate	***15.5%***
	4.9%	5.8%	8.1%	6.4%	10.2%	6.5%	7.4%	5.7%	5.4%	5.9%	***5.0%***	***6.7%***	Net Profit Margin	***8.5%***
	1234.0	1010.0	799.0	804.0	d84.0	d105.0	218.0	363.0	d149.0	d152.0	***d650***	***385***	Working Cap'l ($mill)	***410***
	1592.0	1273.0	1278.0	1279.0	1283.0	1286.0	1686.0	3298.0	2506.0	2445.0	***2615***	***2615***	Long-Term Debt ($mill)	***285***
	1365.0	1490.0	1653.0	1758.0	1516.0	1588.0	1901.0	2808.0	3489.0	4093.0	***4180***	***4520***	Shr. Equity ($mill) B	***7295***
	14.0%	17.1%	20.8%	17.3%	30.9%	21.4%	21.0%	9.6%	10.5%	10.4%	***8.5%***	***9.0%***	Return on Total Cap'l	***15.5%***
	24.8%	27.1%	34.7%	27.2%	55.1%	36.5%	36.6%	19.4%	16.6%	16.6%	***14.0%***	***14.0%***	Return on Shr. Equity	***16.0%***
	21.2%	21.7%	28.7%	20.7%	46.4%	27.1%	27.6%	12.7%	11.1%	11.8%	***9.0%***	***9.0%***	Retained to Com Eq	***13.0%***
	14%	20%	17%	24%	16%	26%	25%	34%	33%	29%	***37%***	***234***	All Div'ds to Net Prof	***19%***

BUSINESS: Huntington Ingalls Industries (HII) designs, manufactures, and maintains nuclear and non-nuclear ships for the U.S. Navy and Coast Guard. Operates in three segments: Ingalls builds amphibious assault ships, destroyers and cutters; Newport News is the sole domestic maker of aircraft carriers, and also builds nuclear-powered submarines, in part with Electric Boat of General Dynamics; Mission Technologies offers services. Officers & directors own less than 1.0% of stock; Vanguard Group, 12.7%; BlackRock, 9.5% (3/24 Proxy). Backlog at 12/31/23: $48.1 billion. 43,000 employees. Executive Chrmn.: Kirkland Douglas. CEO: Chris Kastner. Inc.: DE. Address: 4101 Washington Ave., Newport News, VA 23607. Tel.: (757) 380-2000. Internet: www.huntingtoningalls.com

Huntington Ingalls fourth-quarter results will be closely watched for any discussion of its status with the U.S. Navy. The stock fell sharply following the third-quarter update, when analysts learned the company had failed to achieve a contract with its key customer for the Virginia- and Columbia-class submarine programs. This has forced it to alter its production plans. The issue is the impact the pandemic had on both its workforce and supply chain. A high percentage of skilled shipbuilders retired during the work stoppage and the new workers are still considered fairly 'green', given the complexities of modern shipbuilding. We note, too, the company's submarine work is done at Newport News as a subcontractor to General Dynamics' Electric Boat division in Connecticut. The contract concerns 17 boats and will be in effect for years to come. Moreover, the U.S. Navy and HII have a unique and mutually-significant relationship that must go forward, so a resolution is imperative for both parties. We await further developments.

The company's shipbuilding has been less active, of late. In the third quarter, Ingalls Shipbulding revenues declined 6.6% to $664 million, due to lower volumes of work on amphibious assault ships and the *Legend*-class National Security Cutter program, partially offset by higher volumes on the destroyer program. Ingalls was awarded a $9.6 billion multi-ship procurement contract to build four amphibious assault ships, including LPD 33, 34 and 35, as well as a large-deck amphibious landing dock (LHA 10). Newport News Shipbuilding revenues declined by 2.8%, to $1.412 billion, due to lower support work on nuclear programs and adjustments on Virginia-class programs, offset by increased work on Columbia-class submarines. In the quarter, the shipyard delivered the final module of the Virginia-class *Utah* (SSN 801) submarine.

The Mission Technologies business remains active. It generated revenues of $709 million in the period, up 3.5% year to year, on growth in cyber and electronic warfare programs and the space business.

HII shares are ranked 4 (Below Average) for Timeliness but offer attractive potential gains to 2027-2029.

Glenn Pierr Johnson *November 29, 2024*

(A) Fully diluted earnings. May not sum due to change in shares outstanding. Next earnings report due in late January.
(B) Includes intangibles. In 2023: $3.51 billion ($88.57/sh).
(C) In millions.
(D) Dividend paid in February, May, August, and December.

Company's Financial Strength	A
Stock's Price Stability	35
Price Growth Persistence	45
Earnings Predictability	75

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HEARTLAND EXPRESS NDQ-HTLD

RECENT PRICE 10.90 | P/E RATIO NMF (Trailing: NMF Median: 24.0) | RELATIVE P/E RATIO NMF | DIV'D YLD 0.7% | VALUE LINE 320

TIMELINESS 4 Lowered 11/1/24
SAFETY 2 Raised 8/21/20
TECHNICAL 3 Raised 10/18/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

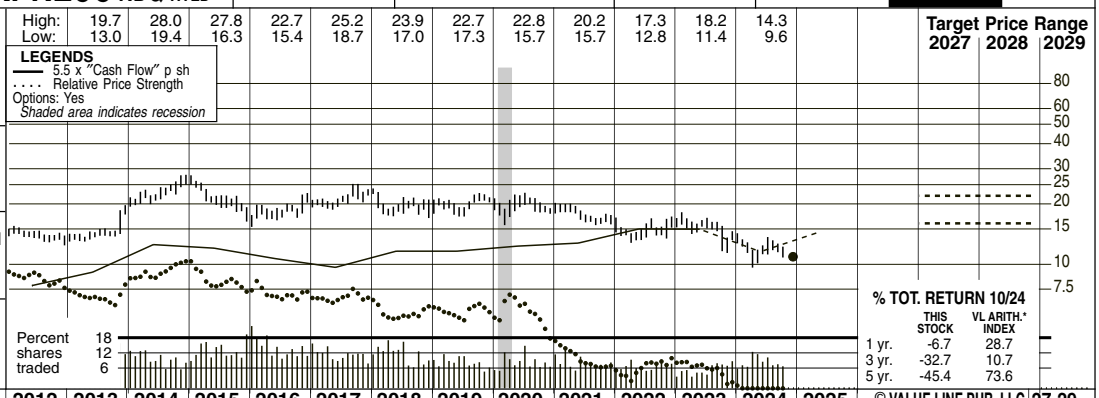
Low-High	Midpoint (% to Mid)
$9-$17	$13 (20%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	22	(+100%)	*19%*
Low	16	(+45%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	68	83	90
to Sell	81	80	81
Hld's(000)	43982	43066	40799



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
6.64	5.07	5.51	6.11	6.44	6.87	10.27	8.75	7.36	7.29	7.46	7.28	8.00	7.69	12.26	15.28	*13.65*	*15.00*	Revenues per sh	*18.00*
1.23	1.28	1.36	1.47	1.42	1.66	2.28	2.19	1.94	1.75	2.11	2.11	2.24	2.32	2.73	2.71	*2.10*	*2.65*	"Cash Flow" per sh	*3.90*
.73	.62	.68	.78	.71	.83	.96	.84	.68	.51	.88	.89	.87	1.00	1.04	.19	*d.33*	*.10*	Earnings per sh A	*1.00*
.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	*.08*	*.08*	Div'ds Decl'd per sh C	*.08*
.38	.87	.16	1.46	.79	1.60	2.42	2.58	1.03	2.21	2.07	2.00	2.53	1.68	2.03	2.64	*2.50*	*2.60*	Cap'l Spending per sh	*2.95*
3.82	4.05	3.69	3.94	3.43	4.69	5.62	5.59	6.07	6.90	7.52	8.35	8.98	9.21	10.83	10.95	*10.55*	*10.55*	Book Value per sh	*12.35*
94.23	90.69	90.69	86.48	84.77	84.72	84.87	84.12	83.29	83.30	81.93	82.03	80.65	78.92	78.98	79.04	*78.00*	*77.00*	Common Shs Outst'g B	*75.00*
20.9	23.4	22.8	19.8	19.6	17.6	23.8	25.7	27.4	41.4	22.3	22.6	22.5	17.8	14.2	NMF	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*19.0*
1.26	1.56	1.45	1.24	1.25	.99	1.25	1.29	1.44	2.08	1.20	1.20	1.16	.96	.82	NMF			Relative P/E Ratio	*1.05*
.5%	.6%	.5%	.5%	.6%	.5%	.4%	.4%	.4%	.4%	.4%	.4%	.4%	.5%	.5%	.5%			Avg Ann'l Div'd Yield	*.4%*
871.4	736.3	612.9	607.3	610.8	596.8	645.3	607.3	968.0	1207.5	*1065*	*1150*	Revenues ($mill)	*1350*
23.7%	26.1%	29.8%	27.5%	27.1%	27.3%	29.2%	34.5%	28.1%	20.0%	*16.5%*	*19.0%*	Operating Margin	*24.0%*
108.6	111.0	105.6	103.7	100.5	100.2	109.9	104.1	133.4	199.0	*190*	*195*	Depreciation ($mill)	*220*
84.8	73.1	56.4	42.3	72.7	73.0	70.8	79.3	82.1	14.8	*d25.0*	*7.5*	Net Profit ($mill)	*75.0*
35.5%	37.4%	34.5%	34.4%	20.9%	24.9%	24.9%	25.2%	36.7%	25.6%	*NMF*	*25.0%*	Income Tax Rate	*25.0%*
9.7%	9.9%	9.2%	7.0%	11.9%	12.2%	11.0%	13.1%	8.5%	1.2%	*NMF*	*0.6%*	Net Profit Margin	*5.6%*
81.9	70.2	136.6	95.5	167.8	88.4	122.0	161.6	73.0	45.9	*55.0*	*70.0*	Working Cap'l ($mill)	*115*
24.6	--	--	--	--	--	--	--	399.1	290.7	*195*	*175*	Long-Term Debt ($mill)	*100*
476.6	469.9	505.8	574.6	616.0	684.7	724.3	727.1	855.5	865.3	*825*	*815*	Shr. Equity ($mill)	*1015*
17.0%	15.5%	11.1%	7.4%	11.8%	10.7%	9.8%	10.9%	6.9%	2.2%	*NMF*	*1.5%*	Return on Total Cap'l	*7.5%*
17.8%	15.5%	11.1%	7.4%	11.8%	10.7%	9.8%	10.9%	9.6%	1.7%	*NMF*	*1.0%*	Return on Shr. Equity	*8.0%*
16.3%	14.1%	9.8%	6.2%	10.7%	9.7%	8.9%	10.0%	8.9%	1.0%	*NMF*	*Nil*	Retained to Com Eq	*7.5%*
8%	10%	12%	16%	9%	9%	9%	8%	8%	43%	*NMF*	*85%*	All Div'ds to Net Prof	*8%*

CAPITAL STRUCTURE as of 9/30/24

Total Debt $206.8 mill. **Due in 5 Yrs** $206.8 mill.
LT Debt $198.1 mill. **LT Interest** $23.0 mill. (19% of Cap'l)

Leases, Uncapitalized $5.0 mill.

No Defined Pension Benefit Plan

Pfd Stock None

Common Stock 78,495,000 shs.

MARKET CAP: $850 million (Small Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	49.5	28.1	30.7
Receivables	139.8	102.7	100.0
Other	40.5	38.5	26.4
Current Assets	229.8	169.3	157.1
Accts Payable	62.7	37.8	41.6
Debt Due	14.0	9.3	8.7
Other	80.1	76.4	84.4
Current Liab.	156.8	123.5	134.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	4.5%	3.5%	*9.0%*
"Cash Flow"	5.5%	4.5%	*8.5%*
Earnings	3.0%	7.5%	*6.0%*
Dividends	--	--	*Nil*
Book Value	10.0%	9.5%	*3.5%*

Calendar	QUARTERLY REVENUES ($ mill.) A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	152.4	154.1	152.6	148.1	607.3
2022	151.3	187.8	274.0	354.9	968.0
2023	330.9	306.2	295.0	275.4	1207.5
2024	270.3	274.7	259.9	*260.1*	*1065*
2025	*275*	*290*	*290*	*295*	*1150*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.17	.26	.31	.26	1.00
2022	.21	.29	.33	.21	1.04
2023	.16	.11	d.14	.06	.19
2024	d.19	d.04	d.12	*.02*	*d.33*
2025	*d.10*	*.05*	*.05*	*.10*	*.10*

Calendar	QUARTERLY DIVIDENDS PAID C Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.02	.02	.02	.02	.08
2021	.02	.02	.02	.02	.08
2022	.02	.02	.02	.02	.08
2023	.02	.02	.02	.02	.08
2024	.02	.02	.02		

BUSINESS: Heartland Express, Inc. is a short- to medium-haul truckload carrier. Provides nationwide transportation services to major shippers with a combined fleet of company-owned and owner-operator tractors. Primary routes are between locations east of the Rocky Mountains, with selected service to the West. Targets customers that require multiple, time-sensitive shipments. Avg. length of haul: 400-500 miles. Acq'd Smith Transport, 5/22, CFI, 8/22. Has 6,300 employees. Off./dir. own 39.8% of com. stock; American Century, 10.2%; BlackRock, 9.3%; Vanguard, 6.6%. (4/24 Proxy). Chairman, CEO, & Pres. Michael J. Gerdin. Inc.: NV. Addr.: 901 N. Kansas Ave. N. Liberty, IA 52317. Telephone: 319-626-3600. Internet: www.heartlandexpress.com.

Conditions in Heartland's markets remain challenging. We had expected the environment to improve as 2024 progressed, but that has not been the case, as the company posted a loss of $0.12 per share in the September period. While this was a slight improvement from the deficit of $0.14 a year ago, it was worse than the loss in the June quarter and fell well short of our estimate of a $0.01 loss per share. The company has now posted deficits in four of the past five quarters, and management stated that recent conditions have been the worst in its 45-year history.

The problems stem from disruptions caused by the pandemic. During that time, demand for shipping rose dramatically and capacity expanded as a result. Now, with demand returning to more normal levels, excess capacity exists throughout the industry. Spot freight rates have declined steadily over the past two years, and industry shipments were down 5.2% in September. However, this is leading to the demise of smaller, weaker carries, and will gradually result in a more balanced supply and demand environment in the industry. Another potential positive development is new legislation that takes effect later this month. This program mandates that all states are connected to a centralized database for Commercial Drivers Licenses. The effect of the legislation is that drivers who have committed certain serious violations could lose their license. This could also result in a de facto reduction in capacity.

This issue is expected to continue to lag the market in the year ahead. The shares have been in a multi-year slide due to the tough industry environment and the adverse impacts from two acquisitions. However, we still believe there is above average recovery potential for the stock out to late decade. The cyclical downturn in the industry is sure to improve in the coming years, and bolster the company's results. Moreover, management has made good progress on debt reduction. To finance the above-mentioned acquisitions, Heartland took on a total of $450 million in debt. But, as of the end of September, it had reduced debt by more than half. We note, too, that the stock carries an above-average Safety rank (2) and a low Beta.

Stuart J. Benway, CFA November 15, 2024

(A) Diluted shares. Excludes non-recurring gains: '17, $0.39; '22, $0.68. Quarterly revenues and/or earnings may not sum due to rounding. Next earnings report due early February. **(B)** In millions. **(C)** Dividends paid in late March, June, September, and December.

Special dividends: $2.00, '07; $1.00, '10; $1.00 '12; $0.50, '21.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	10
Earnings Predictability	30

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J&J SNACK FOODS NDQ-JJSF

RECENT PRICE 172.12 | P/E RATIO 35.2 (Trailing: 38.2 Median: 33.0) | RELATIVE P/E RATIO 1.89 | DIV'D YLD 1.8% | VALUE LINE

TIMELINESS 3 Raised 10/11/24
SAFETY 2 Lowered 10/14/22
TECHNICAL 2 Lowered 10/11/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

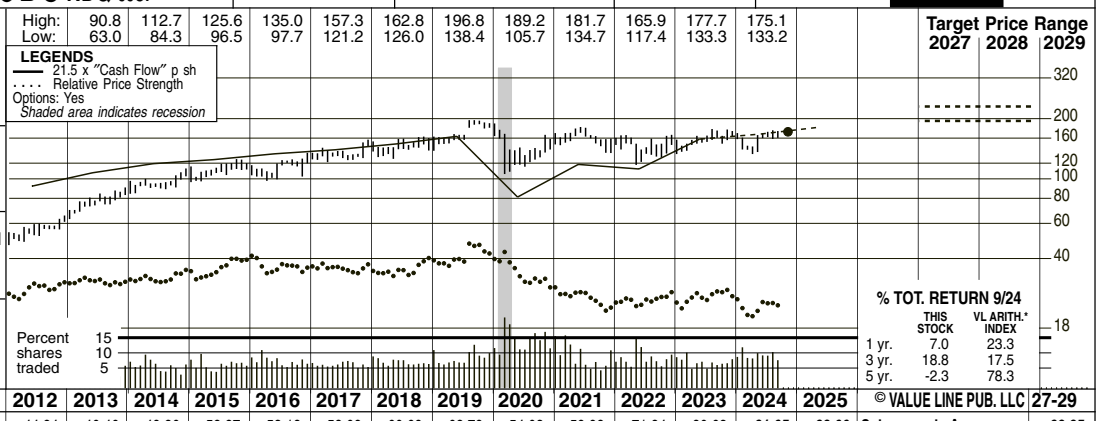
Low-High	Midpoint (% to Mid)
$144-$252	$198 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	225	(+30%)	*9%*
Low	165	(-5%)	*1%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	111	93	107
to Sell	95	123	106
Hld's(000)	14856	14736	15013



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
33.57	35.25	37.68	39.73	44.24	46.46	49.26	52.27	53.18	58.09	60.69	62.79	54.03	59.98	71.84	80.63	***81.05***	***82.00***	Sales per sh [A]	***82.25***
2.92	3.45	3.94	3.93	4.28	4.99	5.54	5.81	6.22	6.52	6.95	7.59	3.77	5.50	5.22	7.35	***7.80***	***8.45***	"Cash Flow" per sh	***9.45***
1.47	2.21	2.59	2.58	2.86	3.41	3.82	3.73	4.05	4.21	4.46	5.00	.96	2.91	2.46	4.08	***4.65***	***5.45***	Earnings per sh [A B]	***6.50***
.37	.39	.43	.47	.52	.64	1.28	1.44	1.56	1.68	1.80	2.00	2.30	2.42	2.60	2.84	***3.00***	***3.10***	Div'ds Decl'd per sh [C] ■	***3.40***
1.22	1.47	1.81	1.56	2.28	1.92	2.08	2.68	2.61	3.87	3.20	3.02	3.06	2.81	4.54	5.42	***4.60***	***3.50***	Cap'l Spending per sh	***2.50***
16.90	18.51	20.58	23.09	25.32	27.66	30.13	32.12	34.17	36.56	40.48	44.13	42.80	44.31	44.91	47.15	***48.40***	***49.55***	Book Value per sh [D]	***53.05***
18.75	18.53	18.49	18.73	18.78	18.68	18.67	18.68	18.67	18.66	18.75	18.90	18.92	19.08	19.22	19.33	***19.50***	***20.00***	Common Shs Outst'g [E]	***22.00***
20.6	16.1	16.2	18.3	18.7	20.9	23.8	28.8	27.9	30.7	32.0	32.3	NMF	54.6	NMF	NMF	***Bold figures are Value Line estimates***		Avg Ann'l P/E Ratio	***35.0***
1.24	1.07	1.03	1.15	1.19	1.17	1.25	1.45	1.46	1.54	1.73	1.72	NMF	2.95	NMF	NMF			Relative P/E Ratio	***1.90***
1.2%	1.1%	1.0%	1.0%	1.0%	.9%	1.4%	1.3%	1.4%	1.3%	1.3%	1.2%	1.5%	1.5%	1.8%	1.9%			Avg Ann'l Div'd Yield	***1.8%***
919.5	976.3	992.8	1084.2	1138.3	1186.5	1022.0	1144.6	1380.7	1558.8	***1580***	***1640***	Sales ($mill) [A]	***1810***
15.1%	15.3%	15.4%	14.8%	13.8%	14.0%	6.9%	10.5%	8.4%	11.2%	***11.5%***	***12.0%***	Operating Margin	***15.0%***
31.7	38.3	40.1	42.4	46.4	48.6	53.0	49.4	53.1	63.1	***60.0***	***60.0***	Depreciation ($mill)	***65.0***
71.8	70.2	76.0	79.2	83.9	94.8	18.3	55.6	47.2	78.9	***95.0***	***110***	Net Profit ($mill)	***145***
35.4%	37.3%	35.0%	35.2%	29.0%	25.1%	14.7%	24.9%	23.5%	26.6%	***26.0%***	***27.0%***	Income Tax Rate	***27.5%***
7.8%	7.2%	7.7%	7.3%	7.4%	8.0%	1.8%	4.9%	3.4%	5.1%	***5.8%***	***6.6%***	Net Profit Margin	***7.9%***
179.6	229.7	252.8	262.8	264.9	385.2	365.5	417.2	262.8	250.3	***255***	***290***	Working Cap'l ($mill)	***495***
.4	1.2	1.2	.9	.8	.7	.4	.4	55.3	27.6	***15.0***	***10.0***	Long-Term Debt ($mill)	***5.0***
562.5	599.9	638.0	682.3	759.1	833.8	809.5	845.7	863.2	911.5	***945***	***995***	Shr. Equity ($mill)	***1170***
12.8%	11.7%	11.9%	11.6%	11.0%	11.4%	2.3%	6.6%	5.2%	8.7%	***10.0%***	***11.0%***	Return on Total Cap'l	***12.5%***
12.8%	11.7%	11.9%	11.6%	11.1%	11.4%	2.3%	6.6%	5.5%	8.7%	***10.0%***	***11.0%***	Return on Shr. Equity	***12.0%***
9.0%	7.3%	7.4%	7.1%	6.7%	7.0%	NMF	1.3%	NMF	2.7%	***3.5%***	***4.5%***	Retained to Com Eq	***6.0%***
29%	37%	38%	39%	39%	39%	NMF	81%	103%	68%	***63%***	***57%***	All Div'ds to Net Prof	***52%***

CAPITAL STRUCTURE as of 6/29/24
Total Debt $12.2 mill. **Due in 5 Yrs** $.2 mill.
LT Debt $12.0 mill. **LT Interest** $.01 mill.

Leases, Uncapitalized Annual rentals $94.1 mill.

No Defined Pension Benefit Plan
Pfd Stock None

Common Stock 19,423,721 shs.
as of 8/2/24
MARKET CAP: $3.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/29/24
Cash Assets	39.2	49.6	64.0
Receivables	208.1	198.1	208.7
Inventory	180.5	171.5	179.7
Other	16.8	11.0	8.7
Current Assets	444.6	430.2	461.1
Accts Payable	108.1	90.8	108.6
Debt Due	0.1	0.2	0.2
Other	73.6	88.9	94.4
Current Liab.	181.8	179.9	203.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	5.0%	4.5%	*3.5%*
"Cash Flow"	3.0%	-1.5%	*5.5%*
Earnings	.5%	-6.0%	*9.0%*
Dividends	17.0%	9.5%	*6.5%*
Book Value	6.0%	4.0%	*2.5%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) [A] Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2021	241.0	256.2	324.3	323.1	1144.6
2022	318.5	281.5	380.2	400.4	1380.7
2023	351.3	337.8	425.8	443.9	1558.8
2024	348.3	359.7	440.0	***432***	***1580***
2025	***355***	***365***	***455***	***465***	***1640***

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2021	.09	.32	1.52	.98	2.91
2022	.58	.17	.81	.90	2.46
2023	.34	.36	1.82	1.57	4.08
2024	.37	.69	1.87	***1.72***	***4.65***
2025	***.50***	***.80***	***2.15***	***2.00***	***5.45***

Calendar	QUARTERLY DIVIDENDS PAID [C] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.575	.575	.575	.575	2.30
2021	.575	.575	.633	.633	2.42
2022	.633	.633	.633	.70	2.60
2023	.70	.70	.735	.735	2.87
2024	.735	.735	.78		

BUSINESS: J&J Snack Foods Corp. manufactures snack foods and distributes frozen carbonated and juice beverages mainly in the United States, Mexico and Canada. It sells to snack bars, food stands, fast food operators, stadiums, sports arenas, warehouse club stores, schools, colleges, movie theaters, and others. In addition, it sells various food products through a chain of specialty snack food retail outlets. Has 5,000 employees. Officers/directors own 22.2% of company; Trust for Gerald B. Shreiber, 20.2%; BlackRock,12.2; The Vanguard Group, 8.1% (1/24 proxy). Incorporated: New Jersey. President & CEO: Dan Fachner. Chairman: Gerald B. Schreiber. Address: 6000 Central Highway, Pennsauken, NJ 08109. Telephone: 856-665-9533. Internet: www.jjsnack.com.

J&J Snack Foods is on track to deliver a double-digit bottom-line advance in fiscal 2024 (ended September 28th). Although the macroeconomic environment remains under strain and weakness in the theater industry has slowed sales growth in the mainstay Foodservice division (accounts for 60% of total sales), the manufacturer and distributor of snack foods and frozen beverages has benefited from pockets of operational improvement. Indeed, sales have been driven by increased demand for a broader portfolio of new products that have been well received by consumers in the Retail and Foodservice divisions. However, fiscal fourth-quarter sales are expected to feel the adverse effect of one less sales week versus the year-ago period. Meanwhile, ongoing efforts to realign operations have continued to bear fruit, as the completion of three new regional distribution centers and addition of six production lines, has expanded capacity. Notably, 85% of sales orders in the June quarter were shipped from the new distribution network (versus 26% a year ago). This initiative has shortened the average length of haul and improved throughput in order to lift product margins ahead.

Top-line momentum should pick up in fiscal 2025. We expect fiscal 2025 sales to be up about 4%, versus our estimate of a 1% uptick in fiscal 2024. Actions taken to expand *Dippin' Dots* placement, as well as adding new selling opportunities for churros with large quick-service restaurant customers, should begin to pay off. A sharper focus on innovation and brand promotions ought to lift volumes across most core products. Recent weakness in the theater industry should ease with the release of children's movies (*Moana 2*) leading to a pickup in sales across the Frozen Beverage and Foodservice units. This is especially true as the company is progressing with the full-location rollout of *Dippin' Dots* across *AMC, Cinemark,* and *Marcus Theaters*. It is also testing new freezer placements in convenience stores in order to gain share.

The neutrally ranked stock remains richly valued. The P/E multiple has been historically high, offering little room for appreciation over the next 3 to 5 years.

Oriatal J. Haiby *October 11, 2024*

(A) Fiscal year ends last Saturday in September. **(B)** Diluted earnings. Qrtly may not sum due to changes in share count. Excludes nonrecurring gain: '11, $0.35; '18, $1.05. Next earnings report due early November. **(C)** Dividends historically paid early January, April, July, and October. ■ Div'd reinvest. plan available. **(D)** Includes intangibles. At 9/30/23: $368.6 million, or $19.07 a share. **(E)** In millions.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	45
Earnings Predictability	30

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J. HENRY & ASSOC. NDQ-JKHY

RECENT PRICE **184.97** | P/E RATIO **31.7** (Trailing: 35.4 Median: 33.0) | RELATIVE P/E RATIO **1.70** | DIV'D YLD **1.2%** | **VALUE LINE**

TIMELINESS 3 Lowered 6/14/24
SAFETY 1 Raised 8/11/17
TECHNICAL 3 Lowered 10/11/24
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$158-$248 $203 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	205	(+10%)	*4%*
Low	165	(-10%)	*-1%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	321	287	332
to Sell	309	305	280
Hld's(000)	68371	67534	67228

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	59.4	63.8	79.9	91.1	119.8	163.7	152.9	201.0	180.0	212.6	184.2	186.9								
Low:	37.9	51.9	60.1	73.2	88.1	112.8	121.0	123.6	141.6	155.4	136.6	157.0								
	8.60	8.92	9.80	11.20	11.94	13.25	14.64	15.54	17.21	18.48	19.91	20.17	22.15	23.76	26.66	28.50	***30.75***	***33.05***	Revenues per sh [A]	***35.70***
	1.68	1.70	1.81	2.08	2.33	2.68	3.07	3.28	3.81	3.82	4.29	4.15	4.55	4.92	5.68	7.65	***6.65***	***7.50***	"Cash Flow" per sh	***8.65***
	1.17	1.22	1.38	1.59	1.78	2.04	2.36	2.59	3.12	3.14	3.65	3.52	3.86	4.12	4.94	5.02	5.18	***5.95***	Earnings per sh [A]	***6.85***
	.28	.32	.36	.40	.44	.56	.84	.94	1.06	1.18	1.36	1.54	1.66	1.78	1.90	2.02	***2.20***	***2.30***	Div'ds Decl'd per sh [B]	***2.55***
	.36	.38	.64	.37	.48	.54	.40	.67	.72	.54	.52	.70	.70	.31	.48	.54	***.75***	***.85***	Cap'l Spending per sh	***.95***
	6.96	7.49	8.79	10.19	11.43	12.58	12.56	12.26	12.66	13.33	16.42	18.56	20.22	17.83	18.96	22.07	***25.60***	***27.10***	Book Value per sh [D]	***29.30***
	86.40	83.61	85.40	86.36	86.03	85.24	82.64	80.85	78.70	77.42	77.17	76.99	76.63	74.00	72.88	72.89	***72.00***	***71.00***	Common Shs Outst'g [C]	***70.00***
	21.5	15.3	17.0	18.1	18.0	20.1	23.3	24.1	24.8	29.1	31.5	39.7	40.0	39.2	35.3	35.2	***31.5***		Avg Ann'l P/E Ratio	***27.0***
	1.29	1.02	1.08	1.14	1.15	1.13	1.23	1.21	1.30	1.46	1.70	2.11	2.05	2.12	2.04	2.04	***1.77***		Relative P/E Ratio	***1.50***
	1.1%	1.7%	1.5%	1.4%	1.4%	1.4%	1.5%	1.5%	1.4%	1.3%	1.2%	1.1%	1.1%	1.1%	1.1%	1.1%	***1.3%***		Avg Ann'l Div'd Yield	***1.4%***
							1210.1	1256.2	1354.6	1431.1	1536.6	1552.7	1697.1	1758.2	1942.9	2077.7	2215.6	***2345***	Revenues ($mill) [AE]	***2550***
							30.2%	29.6%	30.4%	29.2%	28.5%	25.4%	25.5%	25.7%	27.0%	32.3%	***28.0%***	***29.0%***	Operating Margin	***29.5%***
							52.9	54.2	50.6	49.7	48.0	47.4	52.2	52.5	50.8	190.7	***105***	***110***	Depreciation ($mill)	***125***
							201.1	211.2	248.9	245.8	283.1	271.9	296.7	311.5	362.9	366.6	***373***	***423***	Net Profit ($mill)	***480***
							35.4%	33.3%	31.0%	33.0%	27.6%	21.7%	22.2%	21.7%	23.2%	22.7%	***22.0%***	***22.0%***	Income Tax Rate	***22.0%***
							16.6%	16.8%	18.4%	17.2%	18.4%	17.5%	17.5%	17.7%	18.7%	17.6%	***16.8%***	***18.0%***	Net Profit Margin	***19.2%***
							d44.4	49.9	d11.8	48.8	d19.4	99.5	174.2	22.8	69.7	104.2	d1.8	***250***	Working Cap'l ($mill)	***375***
							3.7	50.1	- -	50.0	- -	- -	.2	100.1	115.0	275.0	60.0	***Nil***	Long-Term Debt ($mill)	***Nil***
							1038.2	991.5	996.2	1032.1	1266.8	1429.0	1549.7	1319.3	1381.6	1608.5	1842.4	***1925***	Shr. Equity ($mill)	***2050***
							19.4%	20.4%	25.1%	22.8%	22.4%	19.1%	19.2%	22.0%	24.3%	19.9%	***19.5%***	***22.0%***	Return on Total Cap'l	***23.5%***
							19.4%	21.3%	25.0%	23.8%	22.3%	19.0%	19.1%	23.6%	26.3%	22.8%	***20.0%***	***22.0%***	Return on Shr. Equity	***23.5%***
							12.5%	13.6%	16.5%	14.9%	14.1%	10.7%	10.9%	13.5%	16.2%	13.6%	***11.5%***	***13.5%***	Retained to Com Eq	***14.5%***
							35%	36%	34%	37%	37%	44%	43%	43%	38%	40%	***42%***	***39%***	All Div'ds to Net Prof	***37%***

Target Price Range 2027 2028 2029

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	17.7	23.3
3 yr.	11.0	17.5
5 yr.	27.1	78.3

CAPITAL STRUCTURE as of 6/30/24
Total Debt $60.0 mill. **Due in 5 Yrs** $60.0 mill.
LT Debt $60.0 mill. **LT Interest** $4.5 mill. (3% of Cap'l)
Leases, Uncapitalized: Annual rentals $11.4 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 72,900,000 shs.
as of 3/31/24
MARKET CAP: $13.5 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	48.8	12.2	38.3
Receivables	348.1	361.3	333.0
Other	216.6	254.5	260.7
Current Assets	613.5	628.0	632.0
Accts Payable	21.0	19.2	25.3
Debt Due	- -	- -	- -
Other	522.8	504.6	608.5
Current Liab.	543.8	523.8	633.8

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	8.0%	7.5%	*5.5%*
"Cash Flow"	10.0%	9.0%	*6.0%*
Earnings	10.0%	7.5%	*6.5%*
Dividends	15.0%	9.5%	*5.0%*
Book Value	5.5%	7.0%	*7.0%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [AE] Sep. 30	Dec. 31	Mar. 31	Jun. 30	Full Fiscal Year
2021	451.8	422.4	433.8	450.2	1758.2
2022	488.1	493.9	478.3	482.6	1942.9
2023	529.2	505.3	508.6	534.6	2077.7
2024	571.4	545.7	538.6	559.9	2215.6
2025	***610***	***575***	***585***	***575***	***2345***

Fiscal Year Ends	EARNINGS PER SHARE [A] Sep. 30	Dec. 31	Mar. 31	Jun. 30	Full Fiscal Year
2021	1.19	.94	.95	1.04	4.12
2022	1.38	1.30	1.16	1.10	4.94
2023	1.46	1.10	1.12	1.34	5.02
2024	1.39	1.26	1.19	1.38	5.18
2025	***1.60***	***1.40***	***1.45***	***1.50***	***5.95***

Cal-endar	QUARTERLY DIVIDENDS PAID [B] Mar.31	June.30	Sept.30	Dec.31	Full Year
2020	.43	.43	.43	.43	1.72
2021	.46	.46	.46	.46	1.78
2022	.49	.49	.49	.49	1.90
2023	.52	.52	.52	.52	2.08
2024	.55	.55	.55		

BUSINESS: Jack Henry & Associates Inc. provides integrated computer systems and services to banks and other financial institutions. It has developed several banking application software systems that it markets, along with computer hardware, to financial institutions. In addition, it performs data conversion, software installation, and software customization for the implementation of its systems. Acquired BancData Solutions, 4/00; Symitar Systems, 6/00; Transcend Systems, 3/02. It has a business partnership with SEDONA, an IBM Advanced Business Partner. Has about 7,120 employees. Off. & dir. own less than 1% of stock (10/24 Proxy). Chairman, Pres., and CEO: Dave Foss. Inc.: DE. Addr.: 663 Highway 60, P.O. Box 807, Monett, MO 65708. Tel.: 417-235-6652. Web: www.jackhenry.com.

Jack Henry finished fiscal 2024 on a strong note (year ended June 30th). Fourth-quarter revenues rose 5% year over year, to $560 million, while earnings edged modestly higher, to $1.38 per share, with both figures coming in on par with our expectations. Notable growth in data processing and hosting, as well as card processing, transactions, and digital services, suggests that demand for technology among the financial services sector remains resilient despite the challenging economic climate. Moreover, the company delivered a solid bottom-line performance in the June period while navigating rising operating costs, such as research & development and general & administrative.

The company should continue to fire on all cylinders in fiscal 2025. First, product demand is apt to accelerate further, as financial services providers are not hesitating to spend on technology upgrades. In particular, we think cybersecurity products and services are a main focus amongst Jack Henry's expanding client roster. Elsewhere, operating margins are poised to widen going forward, which ought to support our call for bottom-line growth of 14% in the current fiscal year.

The balance sheet is in excellent condition. At the end of fiscal 2024, the company's long-term debt-to-total-capital ratio was only 3%. The stock is also ranked 1 (Highest) for Safety.

Shares of the integrated computer systems provider have rallied to a 52-week high in recent sessions. After trading relatively flat since the start of 2024, Jack Henry stock has risen roughly 10% in value over the past three months. Strong June-period financial results were probably the catalyst behind the gain.

But investment appeal is limited at this juncture. Jack Henry shares recently traded at the midpoint of our 3- to 5-year Target Price Range. What's more, the stock remains neutrally ranked for the year ahead, and offers slightly below-average capital appreciation potential over the 18-month horizon. Although we are bullish on the company's long-term business prospects, it appears that most of the growth we envision out to late decade is already reflected in the recent quotation.

Nicholas Patrikis *November 1, 2024*

Company's Financial Strength	A+
Stock's Price Stability	90
Price Growth Persistence	85
Earnings Predictability	100

(A) Fiscal year ends June 30th. Diluted earnings per share. Next earnings report due mid-November. Quarterly earnings may not sum due to rounding.
(B) Dividends historically paid in early March, June, September, and December.
(C) In millions.
(D) Includes intangibles, as of fiscal '24: $827.0 million, $11.49/share.
(E) Adopted accounting standards update No. 2014-09 as of 7/1/18.

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JUNIPER NETWORKS NYSE-JNPR

RECENT PRICE **36.20** | P/E RATIO **19.4** (Trailing: 21.4 Median: 15.0) | RELATIVE P/E RATIO **1.01** | DIV'D YLD **2.4%** | **VALUE LINE**

TIMELINESS — Suspended 1/19/24
SAFETY 2 Raised 12/11/20
TECHNICAL — Suspended 1/19/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$24-$43	$34 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	45	(+25%)	*8%*
Low	35	(-5%)	*2%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	275	250	256
to Sell	228	311	257
Hld's(000)	297918	281627	283209

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	23.0	28.8	32.4	29.2	31.0	30.8	28.8	26.5	35.9	38.1	34.5	39.8						
Low:	15.6	18.4	21.2	21.2	23.9	23.6	22.4	15.2	22.4	25.2	24.9	29.1						

LEGENDS
11.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	48.3	28.7
3 yr.	42.8	10.7
5 yr.	81.4	73.6

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	6.78	6.38	7.79	8.45	8.59	9.43	11.12	12.65	13.09	13.75	13.42	13.23	13.56	14.72	16.42	17.37	*15.10*	*16.40*	Sales per sh	*20.35*
	1.31	1.01	1.39	1.17	.86	1.24	1.53	2.08	2.18	2.78	2.48	2.30	2.11	2.28	2.43	2.69	*2.05*	*2.50*	"Cash Flow" per sh	*3.55*
	1.04	.73	1.08	.88	.53	.89	1.05	1.61	1.65	2.11	1.88	1.72	1.55	1.74	1.95	2.26	*1.65*	*1.95*	Earnings per sh [A]	*2.90*
	- -	- -	- -	- -	- -	- -	.20	.40	.40	.40	.72	.76	.80	.80	.84	.88	*.88*	*.92*	Div'ds Decl'd per sh [E]	*1.15*
	.31	.29	.35	.51	.69	.47	.46	.55	.56	.41	.43	.33	.31	.31	.33	.50	*.40*	*.50*	Cap'l Spending per sh	*.75*
	11.20	11.21	12.58	13.47	13.77	14.75	11.82	11.91	13.02	12.81	13.92	13.73	13.86	13.42	13.86	14.03	*14.75*	*13.25*	Book Value per sh [D]	*10.05*
	526.75	519.34	525.38	526.41	508.40	495.20	416.20	384.00	381.10	365.50	346.40	335.90	327.70	321.60	322.90	320.30	*332.50*	*320.00*	Common Shs Outst'g [B]	*300.00*
	22.5	30.4	27.0	34.6	35.8	22.3	22.8	16.4	14.8	13.3	14.5	15.0	14.7	15.9	15.9	13.2	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*14.0*
	1.35	2.02	1.72	2.17	2.28	1.25	1.20	.83	.78	.67	.78	.80	.75	.86	.92	.74			Relative P/E Ratio	*.80*
	- -	- -	- -	- -	- -	- -	.8%	1.5%	1.6%	1.4%	2.6%	2.9%	3.5%	2.9%	2.7%	3.0%			Avg Ann'l Div'd Yield	*2.8%*
							4627.1	4857.8	4990.1	5027.2	4647.5	4445.4	4445.1	4735.4	5301.2	5564.5	*5025*	*5250*	Sales ($mill)	*6100*
							18.5%	22.6%	22.5%	26.9%	22.2%	20.6%	19.3%	19.2%	18.4%	19.2%	*17.5%*	*18.5%*	Operating Margin	*21.5%*
							149.8	156.5	190.5	208.1	193.1	175.7	171.8	158.0	142.9	126.1	*135*	*145*	Depreciation ($mill)	*170*
							487.9	643.0	639.7	809.0	666.4	597.5	519.7	576.2	642.6	736.4	*550*	*650*	Net Profit ($mill)	*900*
							24.8%	25.5%	26.7%	26.4%	17.2%	18.7%	19.0%	19.5%	19.2%	19.0%	*20.0%*	*20.0%*	Income Tax Rate	*20.0%*
							10.5%	13.2%	12.8%	16.1%	14.3%	13.4%	11.7%	12.2%	12.1%	13.2%	*10.9%*	*12.4%*	Net Profit Margin	*14.8%*
							1444.2	1110.5	2236.0	2446.3	2739.3	1665.9	1110.1	1080.1	1538.2	1691.5	*1750*	*1800*	Working Cap'l ($mill)	*1750*
							1349.0	1648.8	2133.7	2136.3	1789.1	1683.9	1705.8	1686.8	1601.3	1616.8	*1600*	*1575*	Long-Term Debt ($mill)	*1500*
							4919.1	4574.4	4962.5	4680.9	4823.2	4610.6	4543.5	4316.9	4475.1	4492.7	*4900*	*4245*	Shr. Equity ($mill)	*3010*
							8.3%	11.0%	9.7%	12.6%	10.8%	10.1%	8.9%	10.0%	11.1%	12.7%	*9.0%*	*12.0%*	Return on Total Cap'l	*20.5%*
							9.9%	14.1%	12.9%	17.3%	13.8%	13.0%	11.4%	13.3%	14.4%	16.4%	*11.0%*	*15.5%*	Return on Shr. Equity	*30.0%*
							8.2%	10.6%	9.8%	14.1%	8.6%	7.3%	5.6%	7.3%	8.3%	10.1%	*5.5%*	*8.0%*	Retained to Com Eq	*18.0%*
							18%	24%	24%	19%	37%	44%	51%	45%	42%	38%	*53%*	*47%*	All Div'ds to Net Prof	*40%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $1,632.6 mill. **Due in 5 Yrs** $400 mill.
LT Debt $1,632.6 mill. **LT Interest** $80 mill.
(Total Interest Coverage '23: 12.4x) (26% of Cap'l)

Leases, Uncapitalized Annual rentals $47.1 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 331,089,000 shares
(as of 10/29/24)
MARKET CAP: $12.0 billion (Large Cap)

CURRENT POSITION ($MILL.)	**2022**	**2023**	**9/30/24**
Cash Assets [C]	1090.4	1207.5	1231.7
Receivables	1227.3	1044.1	958.1
Other	1299.4	1543.9	1335.7
Current Assets	3617.1	3795.5	3525.5
Accts Payable	347.4	295.1	258.0
Debt Due	- -	- -	- -
Deferred Sales	1020.5	1130.0	1118.1
Other	711.0	678.9	672.0
Current Liab.	2078.9	2104.0	2048.1

ANNUAL RATES of change (per sh)	**Past 10 Yrs.**	**Past 5 Yrs.**	**Est'd '21-'23 to '27-'29**
Sales	6.0%	4.0%	*4.0%*
"Cash Flow"	8.5%	- -	*6.5%*
Earnings	10.0%	1.0%	*6.5%*
Dividends	- -	10.5%	*5.5%*
Book Value	- -	1.0%	*-5.0%*

Calendar	**QUARTERLY SALES ($ mill.) Mar.31**	**Jun.30**	**Sep.30**	**Dec.31**	**Full Year**
2021	1074.4	1172.3	1188.8	1299.9	4735.4
2022	1168.2	1269.6	1414.6	1448.8	5301.2
2023	1371.8	1430.1	1397.8	1364.8	5564.5
2024	1148.9	1189.6	1331.0	*1355.5*	*5025*
2025	*1175*	*1300*	*1375*	*1400*	*5250*

Calendar	**EARNINGS PER SHARE [A] Mar.31**	**Jun.30**	**Sep.30**	**Dec.31**	**Full Year**
2021	.30	.43	.46	.56	1.74
2022	.31	.42	.58	.65	1.95
2023	.48	.58	.60	.61	2.26
2024	.29	.31	.48	*.57*	*1.65*
2025	*.38*	*.44*	*.52*	*.61*	*1.95*

Calendar	**QUARTERLY DIVIDENDS PAID [E] Mar.31**	**Jun.30**	**Sep.30**	**Dec.31**	**Full Year**
2020	.20	.20	.20	.20	.80
2021	.20	.20	.20	.20	.80
2022	.21	.21	.21	.21	.84
2023	.22	.22	.22	.22	.88
2024	.22	.22	.22		

BUSINESS: Juniper Networks is a leading provider of high-performance network infrastructure. Designs, develops and sells products and services for routing, switching, Wi-Fi, network security, and software-defined networking technologies. Cloud customers accounted for 21% of 2023 revs.; Telecom/Cable, 33%; Enterprise, 46%. Subcontracts most manufacturing. Int'l sales were 45% of total in 2023. Had 11,150 employees at 12/31/23. Officers & directors own about 1.3% of common shares; Vanguard, 12.7%; BlackRock, 10.8%; Dodge & Cox, 10.6% (4/24 Proxy). Chairman: Scott Kriens. CEO: Rami Rahim. Chief Scientist: Pradeep Sindhu. Incorp.: Delaware. Address: 1133 Innovation Way, Sunnyvale, CA 94089. Telephone: 408-936-5396. Internet: www.juniper.net.

Juniper's days as an independent company may well be drawing to a close. The company went public in 1999, and its stock briefly traded above $200 a share in 2000. Since then, however, this equity has rarely ventured above $40, and last January the company agreed to be acquired by Hewlett Packard Enterprise in a deal that would pay $40 in cash for each JNPR share.

The stock, though, has declined 7% since the start of November. It is now trading at the widest discount to the proposed takeover price since last June. Recent news report suggest the Department of Justice is close to making a decision on the merger, and the market clearly has concerns that the DOJ will seek to halt the transaction on antitrust grounds. The elevated regulatory risk means most investors will likely want to remain on the sidelines, though it does leave room for healthy upside in the event the deal is finalized according to HPE's original late 2024-early 2025 timetable.

Sales and earnings remain under pressure. Third-quarter profits slid 20% year over year, to $0.48 a share, the fourth straight negative comparison. The downturn was mostly driven by lower revenues, particularly from enterprise customers, which declined 17% year over year. The weak top- and bottom-line comparisons are apt to continue through the end of 2024, with full-year sales and earnings likely falling 10% and 27%, respectively.

There have been some notable bright spots. For starters, while earnings in both the first and second quarters fell well short of Wall Street's expectations, the company's latest results were a few pennies above the consensus. Sales to all three customer verticals (enterprise, service provider, and cloud) rose on a sequential basis. The improvement was particularly notable in the cloud space (up 30%), where customers upped their spending to support artificial intelligence initiatives. Too, product orders have been on the rebound, rising 60% year over year, Cloud customers led the way here, too, though orders from enterprise clients and service providers also strengthened. This firming in demand should augur well for a return to top- and bottom-line growth in 2025.

Robert M. Greene *December 6, 2024*

(A) Diluted earnings. Stock-comp. expense excluded, beginning in '17. Excls. nonrecur. gain/(losses): '08, (13¢); '09, (32¢); '10, 7¢; '11, (9¢); '12, (17¢); '13, (3¢); '14, ($1.76); '15, (2¢); '16, (12¢); '17, ($1.31); '18, (28¢); '19, (73¢); '20, (78¢); '21, (98¢); '22, (55¢); '23 ($1.31). Next egs. report due late Jan. Quart. egs. may not add due to changes in shares out. **(B)** In mills. **(C)** Excludes LT investments. At 12/31/23: $116.8 mill. **(D)** Includes goodwill. At 12/31/23: $3.826 bill., $11.95 per share. **(E)** Div'ds paid late March, June, Sep., and Dec.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	30
Earnings Predictability	90

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KRAFT HEINZ CO. NDQ-KHC

RECENT PRICE 35.11 | P/E RATIO 11.4 (Trailing: 11.8 Median: NMF) | RELATIVE P/E RATIO 0.61 | DIV'D YLD 4.6% | VALUE LINE

TIMELINESS 4 Lowered 10/4/24
SAFETY 2 Raised 7/12/24
TECHNICAL 5 Lowered 10/11/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

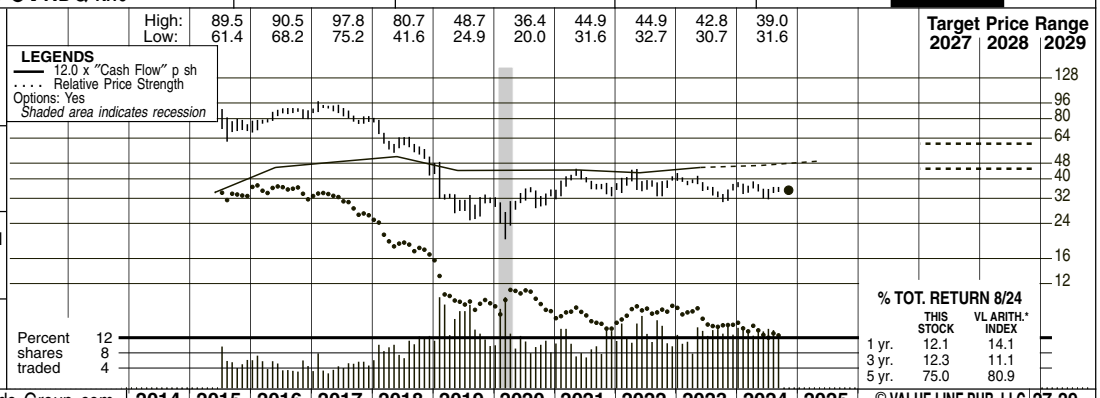
Low-High	Midpoint (% to Mid)
$31-$48	$40 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	60	(+70%)	*18%*
Low	45	(+30%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	546	518	591
to Sell	508	535	496
Hld's(000)	946581	951396	967376



In July of 2015, Kraft Foods Group completed a merger with privately held ketchup king H.J. Heinz Co., thus forming a new public entity: The Kraft Heinz Company. The large-cap food issue began trading on the NASDAQ stock exchange on July 6, 2015 under the ticker symbol KHC.

CAPITAL STRUCTURE as of 6/29/24
Total Debt $19934 mill. **Due in 5 Yrs** $6600 mill.
LT Debt $19265 mill. **LT Interest** $950 mill.
(Total interest coverage: 6.1x) (37% of Cap'l)

Leases, Uncapitalized Annual rentals $136 mill.

Pension Assets-12/23 $4.67 bill. **Oblig.** $3.89 bill.

Pfd Stock None

Common Stock 1,209,078,897 shs.
as of 7/27/24

MARKET CAP: $42.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/29/24
Cash Assets	1040	1400	900
Receivables	2120	2112	2160
Inventory	3651	3614	3573
Other	1086	803	897
Current Assets	7897	7929	7530
Accts Payable	4848	4627	4448
Debt Due	837	638	669
Other	3343	2772	2351
Current Liab.	9028	8037	7468

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	- -	- -	*3.0%*
"Cash Flow"	- -	-2.0%	*4.0%*
Earnings	- -	-3.5%	*4.5%*
Dividends	- -	-8.0%	*1.5%*
Book Value	- -	-3.5%	*1.0%*

Fiscal Year Begins	QUARTERLY SALES ($ mill.) Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Fiscal Year
2021	6394	6615	6324	6709	26042
2022	6045	6554	6505	7381	26485
2023	6489	6721	6570	6860	26640
2024	6411	6476	***6500***	***6913***	***26300***
2025	***6500***	***6650***	***6700***	***7150***	***27000***

Fiscal Year Begins	EARNINGS PER SHARE A Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Fiscal Year
2021	.72	.78	.65	.79	2.93
2022	.60	.70	.63	.85	2.78
2023	.69	.79	.72	.78	2.98
2024	.69	.78	***.77***	***.81***	***3.05***
2025	***.73***	***.80***	***.80***	***.87***	***3.20***

Calendar	QUARTERLY DIVIDENDS PAID C Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.40	.40	.40	.40	1.60
2021	.40	.40	.40	.40	1.60
2022	.40	.40	.40	.40	1.60
2023	.40	.40	.40	.40	1.60
2024	.40	.40	.40		

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
- -	22.61	21.77	21.52	21.53	20.46	21.41	21.28	21.62	21.87	***21.90***	***23.00***	Sales per sh	***25.60***
- -	2.85	3.80	4.05	4.31	3.67	3.68	3.70	3.58	3.81	***3.90***	***4.10***	"Cash Flow" per sh	***4.70***
- -	2.19	3.33	3.55	3.53	2.85	2.88	2.93	2.78	2.98	***3.05***	***3.20***	Earnings per sh A	***3.80***
- -	1.13	2.35	2.45	2.50	1.60	1.60	1.60	1.60	1.60	***1.60***	***1.64***	Div'ds Decl'd per sh C	***1.76***
- -	.53	1.03	1.00	.68	.63	.49	.74	.75	.83	***.90***	***.85***	Cap'l Spending per sh	***.90***
- -	47.52	47.15	54.17	42.34	42.28	40.97	40.28	39.74	40.66	***40.95***	***41.30***	Book Value per sh	***42.85***
- -	1214.0	1216.5	1219.0	1220.0	1221.0	1223.0	1224.0	1225.0	1218.0	***1200.0***	***1175.0***	Common Shs Outst'g B	***1140.0***
- -	18.5	24.9	24.2	17.1	11.5	10.7	13.0	13.7	12.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***14.0***
- -	.93	1.31	1.22	.92	.61	.55	.70	.79	.69			Relative P/E Ratio	***.80***
- -	2.8%	2.8%	2.9%	4.1%	4.9%	5.2%	4.2%	4.2%	4.4%			Avg Ann'l Div'd Yield	***3.3%***
- -	27447	26487	26232	26268	24977	26185	26042	26485	26640	***26300***	***27000***	Sales ($mill)	***29200***
- -	24.3%	29.2%	30.0%	27.0%	24.3%	25.5%	25.9%	24.8%	23.5%	***23.0%***	***23.5%***	Operating Margin	***26.0%***
- -	779.0	536.0	583.0	950.0	994.0	969.0	910.0	919.0	961.0	***980***	***990***	Depreciation ($mill)	***1020***
- -	3582.0	4089.0	4356.0	4304.0	3488.0	3537.0	3620.0	3471.0	3679.0	***3700***	***3810***	Net Profit ($mill)	***4355***
- -	16.3%	26.7%	28.2%	20.4%	27.4%	35.0%	11.0%	29.9%	19.2%	***22.0%***	***23.0%***	Income Tax Rate	***25.0%***
- -	13.1%	15.4%	16.6%	16.4%	14.0%	13.5%	13.9%	13.1%	13.8%	***13.8%***	***14.0%***	Net Profit Margin	***14.9%***
- -	2848.0	d748.0	d2866	1572.0	222.0	2761.0	d70.0	d1131	d108.0	***125***	***275***	Working Cap'l ($mill)	***2650***
- -	25151	29713	28333	30770	28216	28070	21061	19233	19394	***19000***	***18600***	Long-Term Debt ($mill)	***17250***
- -	66005	57358	66034	51657	51623	50103	49298	48678	49526	***49150***	***48525***	Shr. Equity ($mill)	***48850***
- -	4.8%	5.3%	5.3%	6.0%	5.2%	5.4%	6.6%	5.8%	6.0%	***6.0%***	***6.5%***	Return on Total Cap'l	***7.5%***
- -	5.4%	7.1%	6.6%	8.3%	6.8%	7.1%	7.3%	7.1%	7.4%	***7.5%***	***8.0%***	Return on Shr. Equity	***9.0%***
- -	2.4%	2.1%	2.2%	2.2%	3.0%	3.2%	3.4%	3.1%	3.5%	***3.5%***	***4.0%***	Retained to Com Eq	***5.0%***
- -	61%	70%	66%	74%	56%	55%	54%	56%	53%	***53%***	***51%***	All Div'ds to Net Prof	***46%***

BUSINESS: The Kraft Heinz Company is among the largest food and beverage companies in the world, and a leading domestic player in the foodservice space, with several $1 billion-plus brands. Among these are *Kraft*, *Heinz*, *ABC*, *Capri Sun*, *Classico*, *Jell-O*, *Kool-Aid*, *Lunchables*, *Maxwell House*, *Ore-Ida*, *Oscar Mayer*, *Philadelphia*, *Plasmon*, *Quero*, *Weight Watchers Smart Ones*, and *Velveeta*. Walmart represented about 21% of net sales in 2023. Roughly 69% of sales are in United States. Has about 36,000 employees. Berkshire Hathaway owns 26.8% of common stock; BlackRock; 7.5%; offs./dirs. less than 1% (3/24 proxy). CEO: Carlos Abrams-Rivera. Inc.: DE. Addr.: One PPG Place, Pittsburgh, PA 15222. Tel.: 412-456-5700. Internet: www.kraftheinzcompany.com.

Kraft Heinz's stock price has been firm. After bottoming this summer, KHC is roughly 10% higher. Operating results have gradually improved, albeit despite the soft top line. Net sales were down 2.4% in the second quarter and off 1.5% in the first half of 2024. Pricing (up 2% through the first six months) has offset volume declines (down 3.3%). An expanded gross profit margin (up 210 basis points in the June-period to 35.5%) helped offset the disappointing sales performance though.

Immediate prospects are dependent on balancing promotional strategy with recent cost progress. Kraft is in the midst of a multi-year turnaround (see below) but appears to have some low-hanging fruit in terms of opportunities to increase profits. Select promotional spending in certain North American categories (30% to 40% of the domestic portfolio, according to management on the latest conference call) may not detract from modest progress made on the cost side of late. Similarly, innovation with certain products, along with rising overseas volumes, seems to offer promise in the near term.

Improving results in non-domestic and non-core markets hold the key to attaining our long-term price objective. Investments in product innovation and supply chains will need to pay off. There also appears to be market share available in the foodservice business, where a restructured salesforce is paying dividends already. If these areas can consistently contribute better profitability, we think the P/E ratio may edge upwards, as Wall Street rewards a more balanced business profile not just dependent on cost-cutting and major brands. In recent years, management has reorganized internally to coordinate marketing between different segments. An Away from Home division has been established, and performance incentives have also been realigned with a focus on profitable growth.

A modest valuation and generous yield offer support. Untimely KHC is better suited for patient, long-term accounts. Cautious investors may want to postpone entry until better earnings growth is evident, but total-return potential over the long haul is compelling on a risk-adjusted basis.

Charles C. Moran *October 11, 2024*

(A) Earnings based on diluted shares outstanding. Excludes nonrecurring items: '18, ($11.89); '20, ($2.59);'21 ($2.11); '22, $0.87; '23, ($0.49). Quarterly figures may not sum to full-year totals due to rounding and/or changes in shares outstanding. Next earnings report due late Oct.
(B) In millions.
(C) Dividend payments typically made in March, June, September, and December.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	5
Earnings Predictability	95

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KNIGHT-SWIFT TRANS. NYSE-KNX

RECENT PRICE 53.07 | P/E RATIO 34.5 (Trailing: NMF Median: NMF) | RELATIVE P/E RATIO 1.92 | DIV'D YLD 1.1% | VALUE LINE 323

TIMELINESS 3 Raised 11/15/24
SAFETY 3 New 11/24/17
TECHNICAL 4 Lowered 11/1/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

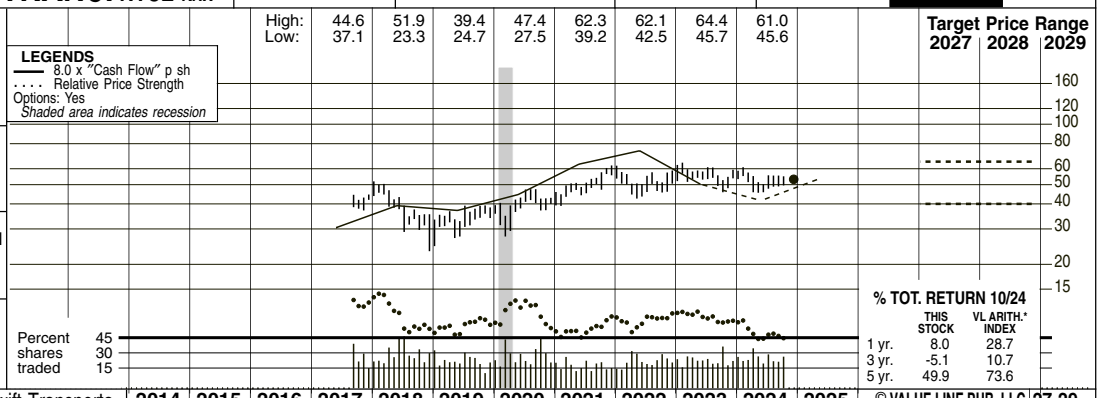
Low-High	Midpoint (% to Mid)
$44-$72	$58 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	65	(+20%)	7%
Low	40	(-25%)	-5%

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	226	212	216
to Sell	246	236	251
Hld's(000)	143561	139097	151873



Knight Transportation and Swift Transportation merged on September 8, 2017, to form Knight-Swift Transportation Holdings, Inc. Operates the largest truckload fleet in North America, as well as extensive rail intermodal and non-asset based freight brokerage and logistics management services. The new combined company trades under the KNX ticker on the New York Stock Exchange. The terms of the merger agreement dictated that each Swift share be converted into .72 shares of Knight-Swift by means of a reverse stock split, and each share of Knight was exchanged for one Knight-Swift share.

CAPITAL STRUCTURE as of 9/30/24
Total Debt $2467.8 mill. **Due in 5 Yrs** $2089 mill.
LT Debt $2195.4 mill. **LT Interest** $100 mill.
(Incl. $467 mill. in finance leases) (24% of Cap'l)

Leases, Uncapitalized $130.3 mill.
No Defined Benefit Pension Plan
Pfd Stock None
Common Stock 161,893,000 shs.
as of 10/23/24
MARKET CAP: $8.6 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	196.8	168.5	166.3
Receivables	842.3	888.6	835.2
Other	454.5	651.9	436.1
Current Assets	1493.6	1709.0	1437.6
Accts Payable	220.9	355.2	293.2
Debt Due	71.5	459.8	272.4
Other	601.6	1010.3	863.9
Current Liab.	894.0	1825.3	1429.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	--	22.0%	4.5%
"Cash Flow"	--	14.5%	Nil
Earnings	--	-1.0%	-1.5%
Dividends	--	10.5%	10.0%
Book Value	--	6.0%	4.0%

Calendar	QUARTERLY REVENUES ($ mill.) A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1223.0	1315.7	1642.4	1816.9	5998.0
2022	1827.0	1961.1	1896.8	1743.6	7428.6
2023	1636.9	1553.0	2019.9	1931.9	7141.7
2024	1822.5	1846.7	1876.7	*1894.1*	*7440*
2025	*1900*	*1950*	*2050*	*2100*	*8000*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.83	.98	1.30	1.61	4.72
2022	1.35	1.41	1.27	1.00	5.03
2023	.73	.49	.41	.09	1.72
2024	.12	.24	.34	*.35*	*1.05*
2025	*.35*	*.50*	*.80*	*.85*	*2.50*

Calendar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.08	.08	.08	.08	.32
2021	.08	.10	.10	.10	.38
2022	.12	.12	.12	.12	.48
2023	.14	.14	.14	.14	.56
2024	.16	.16	.16		

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
Revenues per sh A	--	--	--	13.63	30.92	28.38	28.06	36.14	46.22	44.25	*45.95*	*49.70*		*54.70*
"Cash Flow" per sh	--	--	--	3.81	4.90	4.64	5.57	7.90	9.22	5.84	*5.20*	*6.75*		*7.90*
Earnings per sh A	--	--	--	4.34	2.58	2.16	2.74	4.72	5.03	1.72	*1.05*	*2.50*		*3.50*
Div'ds Decl'd per sh B	--	--	--	.24	.24	.24	.32	.38	.48	.56	*.64*	*.72*		*.84*
Cap'l Spending per sh	--	--	--	2.18	4.37	4.86	3.13	3.22	4.98	3.60	*3.85*	*4.00*		*4.50*
Book Value per sh C	--	--	--	29.43	31.59	33.20	35.24	39.36	43.22	43.91	*44.10*	*46.20*		*53.75*
Common Shs Outst'g D	--	--	--	178.00	172.84	170.69	166.55	165.98	160.71	161.39	*162.00*	*161.00*		*160.00*
Avg Ann'l P/E Ratio	--	--	--	9.4	14.9	15.7	14.4	10.5	10.2	32.1	*Bold figures are Value Line estimates*			*15.0*
Relative P/E Ratio	--	--	--	.47	.80	.84	.74	.57	.59	1.80				*1.00*
Avg Ann'l Div'd Yield	--	--	--	.6%	.6%	.7%	.8%	.8%	.9%	1.0%				*.7%*
Revenues ($mill) A	--	--	--	2425.5	5344.1	4844.0	4673.9	5998.0	7428.6	7141.8	*7440*	*8000*		*8750*
Operating Margin	--	--	--	16.3%	18.6%	18.8%	23.1%	25.6%	27.0%	14.0%	*14.0%*	*15.0%*		*19.5%*
Depreciation ($mill)	--	--	--	193.7	387.5	420.1	460.8	522.6	659.8	665.0	*675*	*685*		*700*
Net Profit ($mill)	--	--	--	484.3	459.3	371.8	467.2	788.2	821.2	278.3	*170*	*405*		*565*
Income Tax Rate	--	--	--	--	22.4%	21.8%	24.3%	22.7%	23.3%	13.3%	*21.0%*	*21.0%*		*21.0%*
Net Profit Margin	--	--	--	20.0%	8.6%	7.7%	10.0%	13.1%	11.1%	3.9%	*2.3%*	*5.1%*		*6.5%*
Working Cap'l ($mill)	--	--	--	313.6	292.6	d103.0	83.7	339.5	599.6	d116.3	*5.0*	*330*		*1450*
Long-Term Debt ($mill)	--	--	--	616.9	630.8	336.4	647.2	1553.7	1412.0	1697.2	*1750*	*1750*		*1750*
Shr. Equity ($mill)	--	--	--	5237.7	5460.9	5666.2	5869.8	6533.2	6945.0	7087.4	*7145*	*7435*		*8600*
Return on Total Cap'l	--	--	--	8.3%	7.8%	6.4%	7.3%	9.9%	10.1%	3.5%	*3.0%*	*5.5%*		*6.0%*
Return on Shr. Equity	--	--	--	9.2%	8.4%	6.6%	8.0%	12.1%	11.8%	3.9%	*2.5%*	*5.5%*		*6.5%*
Retained to Com Eq	--	--	--	8.8%	7.6%	5.8%	7.0%	11.1%	10.7%	3.0%	*1.5%*	*4.0%*		*5.0%*
All Div'ds to Net Prof	--	--	--	5%	9%	11%	12%	8%	10%	33%	*51%*	*29%*		*24%*

BUSINESS: Knight-Swift Transportation Holdings, Inc., including its subsidiaries, is the largest provider of truckload services in North America, with an asset-based fleet of approximately 21,000 tractors and 87,865 trailers, and access to substantial additional capacity through its brokerage and intermodal capabilities. The company's services includes irregular route, dedicated, expedited, port drayage, and cross-border U.S./Mexico/Canada transport. Off. & directors own 3.0% of common stock; BlackRock, Inc., 9.9%; Wellington, 9.7%; Vanguard Group, 9.3% (4/24 proxy). Inc: DE. Has about 28,100 employees. Chairman: Kevin P. Knight. President and CEO: David A Jackson. Address: 20002 North 19th Ave. Phoenix, AZ 85027. Tel.: (602) 269-2000. Internet: www.knight-swift.com.

Although third-quarter earnings came in slightly higher than expected, Knight-Swift's full-year results are set to decline in 2024. Challenging conditions in the trucking industry have pressured the bottom line. Earnings came in at $0.34 a share, on revenues of about $1.9 billion. The result was two pennies above the consensus call, but fell $0.07 from the previous year's tally. The freight mover has been weighed down by fitful demand in the Intermodal and Logistics segments. Moreover, an unfavorable revenue mix in the truckload segment has strained operating income. The active hurricane season was problematic for the company's operations in the southeastern region, as well. Moreover, we expect these trends to continue in the fourth quarter. All told, we are standing pat with our 2024 estimates, which would see earnings slip to $1.05 a share, down 39% from the previous year's showing.

Next year holds more promise. The company's focus on enhancing pricing, cost control and overall productivity should pay off in 2025. Knight-Swift's decision to exit the insurance business is a positive and is in line with ongoing efforts to streamline operations and focus on higher-margined revenue sources. As the economy regains momentum, stabilizing demand trends, moderating inflation, and improved manufacturing activity should translate into more predictable volume growth for Knight-Swift.

The long-term operational outlook is favorable. Although the company is unlikely to match pandemic-fueled gains anytime soon, the recovery prospects are solid. We expect the aforementioned factors to revive revenue growth, while effective cost control helps operating margins to expand by 550 basis points over the stretch to 2027–2029. What's more, the balance sheet is solid.

However, Knight-Swift's shares are trading at an elevated P/E multiple that sits well above their historical median. On point, the stock lacks appeal from the current quotation. The shares are already trading within our Target Price Range out to late decade. All told, investors should hold off for a more attractive entry point.

Simon R. Shoucair *November 15, 2024*

(A) Dil. shares. Pro-forma data in '17, restated to include Swift following 9/17 merger. Pro-forma GAAP egs. in '17, non-GAAP after. Excl. nonrecur. gns./losses: '18, (22¢); '19, (36¢); '20, (34¢); '21, (27¢); '22, (30¢); '23, (38¢). Rev's. and/or egs. may not sum due to rounding or changes in shares out. Rev's incl. fuel surcharges. Next egs. report due late January. **(B)** Div. initiated 12/17. Paid around late March, June, Sept., and Dec. **(C)** Incl. intang. In 2023: $5.9 bill.; $36.60 p/sh. **(D)** In millions.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	65
Earnings Predictability	45

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L3HARRIS TECH. NYSE-LHX

RECENT PRICE 244.27 | P/E RATIO 28.7 (Trailing: 38.6 Median: NMF) | RELATIVE P/E RATIO 1.55 | DIV'D YLD 1.9% | VALUE LINE

TIMELINESS 2 Raised 9/27/24
SAFETY 2 New 1/17/20
TECHNICAL 3 Lowered 10/11/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$211-$315	$263 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	450	(+85%)	*18%*
Low	330	(+35%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	609	603	644
to Sell	511	487	491
Hld's(000)	161642	159255	161415

On July 1, 2019, Harris Corp. (NYSE: HRS) and L3 Technologies (NYSE: LLL) completed a merger of equals. The newly formed company was incorporated as L3Harris Technologies, and began trading on the NYSE under the ticker LHX.

CAPITAL STRUCTURE as of 9/27/24
Total Debt $12910 mill. **Due in 5 Yrs** $4280 mill.
LT Debt $11093 mill. **LT Interest** $683.6 mill.
(Total interest coverage: 4.4x)
(37% of Cap'l)

Leases, Uncapitalized $134.0 mill.

No Defined Benefit Pension Plan
Pfd Stock None

Common Stock 189,668,364 shs.
as of 10/18/24

MARKET CAP: $46.3 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/27/24
Cash Assets	880	560	539
Receivables	1251	1230	1042
Inventory	1291	1472	1399
Other	3332	4793	5322
Current Assets	6754	8055	8302
Accts Payable	1945	2106	2049
Debt Due	820	1602	1177
Other	3011	4296	4747
Current Liab.	5776	8004	7973

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	--	--	*5.5%*
"Cash Flow"	--	--	*7.5%*
Earnings	--	--	*11.0%*
Dividends	--	--	*2.0%*
Book Value	--	--	*1.0%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) AF Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Fiscal Year
2021	4567	4668	4229	4350	17814
2022	4103	4135	4246	4578	17062
2023	4471	4693	4915	5340	19419
2024	5211	5299	5292	***5498***	***21300***
2025	***5405***	***5500***	***5450***	***5645***	***22000***

Fiscal Year Ends	EARNINGS PER SHARE ABF Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Fiscal Year
2021	3.18	2.01	2.39	2.46	9.09
2022	2.44	2.42	d1.56	2.17	5.49
2023	1.76	1.83	2.02	.83	6.44
2024	1.48	1.92	2.10	***2.50***	***8.00***
2025	***1.75***	***2.15***	***2.45***	***2.65***	***9.00***

Cal-endar	QUARTERLY DIVIDENDS PAID C Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.85	.85	.85	.85	3.40
2021	1.02	1.02	1.02	1.02	4.08
2022	1.12	1.12	1.12	1.12	4.48
2023	1.14	1.14	1.14	1.14	4.56
2024	1.16	1.16	1.16		

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	--	--	--	--	--	42.71	88.51	92.27	89.51	102.31	***112.70***	***117.00***	Sales per sh A	***130.25***
	--	--	--	--	--	5.83	10.47	14.58	10.49	12.45	***14.20***	***15.25***	"Cash Flow" per sh	***19.45***
	--	--	--	--	--	3.68	5.19	9.09	5.49	6.44	***8.00***	***9.00***	Earnings per sh AB	***13.00***
	--	--	--	--	--	1.50	3.40	4.08	4.48	4.56	***4.64***	***4.72***	Div'ds Decl'd per sh C	***4.96***
	--	--	--	--	--	.80	1.79	1.74	1.32	2.37	***2.40***	***2.40***	Cap'l Spending per sh	***2.55***
	--	--	--	--	--	104.14	100.81	99.52	97.18	98.86	***100.55***	***101.60***	Book Value per sh	***104.85***
	--	--	--	--	--	216.90	205.57	193.07	190.60	189.81	***189.00***	***188.00***	Common Shs Outst'g D	***185.00***
	--	--	--	--	--	NMF	36.2	23.4	42.4	30.0	*Bold figures are*		Avg Ann'l P/E Ratio	***30.0***
	--	--	--	--	--	NMF	1.86	1.26	2.45	1.66	*Value Line*		Relative P/E Ratio	***1.65***
	--	--	--	--	--	.7%	1.8%	1.9%	1.9%	2.4%	*estimates*		Avg Ann'l Div'd Yield	***1.0%***
	--	--	--	--	--	9263.0	18194	17814	17062	19419	***21300***	***22000***	Sales ($mill)	***24100***
	--	--	--	--	--	13.8%	12.1%	16.0%	16.8%	15.5%	***16.0%***	***17.0%***	Operating Margin	***20.0%***
	--	--	--	--	--	442.0	1032.0	967.0	938.0	1166.0	***1170***	***1175***	Depreciation ($mill)	***1190***
	--	--	--	--	--	823.0	1121.0	1847.0	1061.0	1198.0	***1510***	***1695***	Net Profit ($mill)	***2405***
	--	--	--	--	--	8.0%	17.7%	19.3%	16.7%	1.9%	***2.0%***	***3.0%***	Income Tax Rate	***6.0%***
	--	--	--	--	--	8.9%	6.2%	10.4%	6.2%	6.2%	***7.0%***	***7.7%***	Net Profit Margin	***10.0%***
	--	--	--	--	--	2303.0	2427.0	1808.0	978.0	51.0	***100***	***200***	Working Cap'l ($mill)	***500***
	--	--	--	--	--	6694.0	6908.0	7048.0	6225.0	11160	***11100***	***11000***	Long-Term Debt ($mill)	***10700***
	--	--	--	--	--	22587	20724	19213	18523	18765	***19000***	***19100***	Shr. Equity ($mill)	***19400***
	--	--	--	--	--	3.0%	4.5%	7.5%	4.9%	4.9%	***6.0%***	***6.5%***	Return on Total Cap'l	***9.0%***
	--	--	--	--	--	3.6%	5.4%	9.6%	5.7%	6.4%	***8.0%***	***9.0%***	Return on Shr. Equity	***12.5%***
	--	--	--	--	--	2.2%	1.9%	5.4%	1.1%	1.8%	***3.5%***	***4.0%***	Retained to Com Eq	***7.5%***
	--	--	--	--	--	41%	65%	44%	81%	72%	***58%***	***52%***	All Div'ds to Net Prof	***38%***

BUSINESS: L3Harris Technologies was formed on 7/1/19 as a merger between Harris Corp. and L3 Technologies. It develops, manufactures, markets, and services high-technology communications systems for commercial customers and governments (76% of total '23 sales were to the U.S. gov't). In '19, L3 Harris sold its Vision Night Business to Elbit Systems of America for $350 mill. R&D was 2% of sales in '23. Has 50,000 employees. Officers and directors own 1.0% of common stock; The Vanguard Group, 10.7%; BlackRock, 9.2%; Capital World Investors 8.5%; T.Rowe Price, 5.1% (3/24 proxy). Chairman & CEO: Christopher E. Kubasik. Incorporated: DE. Address: 1025 West NASA Boulevard, Melbourne, Fl. 32919. Telephone: 321-727-9100. Internet: www.l3harris.com.

L3Harris' top line is on a solid growth trajectory. At the Integrated Mission Systems (IMS) segment, sales have expanded, thanks to higher aircraft missionization volumes and increased electronics demand for space and munitions programs. A surge in volumes in the Commercial Aviations Solutions business has also been a plus. At the Space & Airborne Systems (SAS) segment, revenues have remained flat. This reflects the divestiture of the Antenna business in the second quarter of 2024. Excluding the divestiture impact, organic revenue has risen because of growth in classified programs in the Intel and Cyber businesses. The Communication Systems (CS) segment has benefited from robust demand for the company's communications equipment, related waveforms, and night vision devices. Growth for software defined tactical radios has been especially strong across international markets, in particular from NATO countries. Sales will likely expand 10% to $21.3 billion, this year. In 2025, a more modest gain of 3% to $22.0 billion, is probable.

We anticipate that share earnings will advance. Last year, L3Harris launched an enterprise transformation program called LHX Next. LHX Next was designed to help lower costs over the long-term. Management notes that progress has been made on the initiative and expects the company to exceed its 2024 cost savings target of $400 million. As a result, management is updating its 2024 savings objective to at least $600 million and now expects to reach the overall goal of $1 billion a year earlier than previously expected. The bottom line should step up 24% to $8.00 a share, in 2024. Next year, share earnings ought to improve by a smaller 13% to $9.00.

Since our August report, this stock's Timeliness rank has moved up one notch, to 2 (Above Average). L3Harris' long-term outlook is promising, as countries throughout the world have boosted their defense spending in response to the wars in Ukraine and Israel. The stock holds above-average appreciation potential to 2027-2029. This good-quality issue, ranked 2 for Safety, may be appealing to conservative investors.

Keith R. Foldesi *November 29, 2024*

(A) Fiscal years end around December 31st.
(B) Fully diluted earnings. Next earnings report due late February.
(C) Quarterly dividends historically paid mid-March, June, September, and December.
(D) In millions.
(E) 2019 data only includes financials from post merger, which was completed on July 1st.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	35
Earnings Predictability	55

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LOCKHEED MARTIN NYSE-LMT

RECENT PRICE **530.96** | P/E RATIO **19.7** (Trailing: 19.2 Median: 17.0) | RELATIVE P/E RATIO **1.06** | DIV'D YLD **2.5%** | **VALUE LINE**

TIMELINESS 2 Lowered 10/25/24
SAFETY 1 Raised 3/24/06
TECHNICAL 2 Raised 11/15/24
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$389-$608 $499 (-5%)

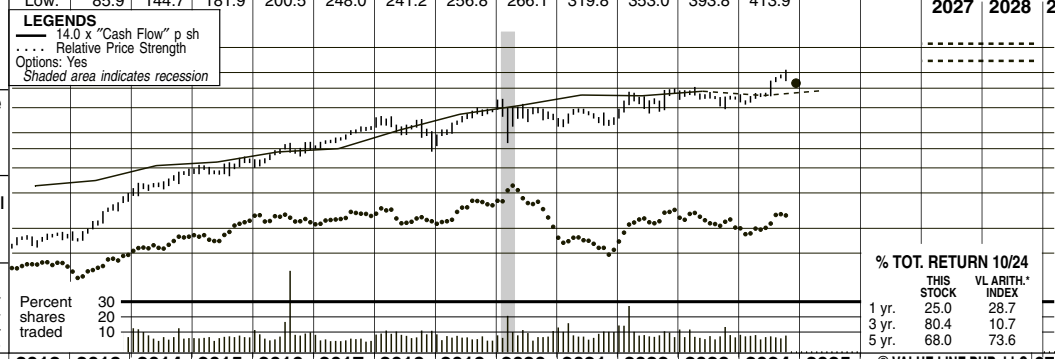
2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	835	(+55%)	*14%*
Low	685	(+30%)	*9%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	1178	1096	1184
to Sell	980	1060	974
Hld's(000)	180311	177572	175878

High:	150.0	198.7	227.9	269.9	323.9	363.0	400.0	442.5	397.0	499.0	508.1	618.9
Low:	85.9	144.7	181.9	200.5	248.0	241.2	256.8	266.1	319.8	353.0	393.8	413.9



% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	25.0	28.7
3 yr.	80.4	10.7
5 yr.	68.0	73.6

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
108.81	121.18	132.38	143.80	146.98	142.19	145.22	152.25	163.49	179.75	191.32	213.61	234.40	247.39	259.78	279.63	***301.90***	***321.75***	Sales per sh	***400.00***
10.34	10.41	10.08	11.36	11.63	12.35	14.68	15.28	17.19	17.85	22.09	26.50	29.31	33.10	32.75	34.55	***32.90***	***35.00***	"Cash Flow" per sh	***53.65***
7.86	7.78	7.23	7.82	8.36	9.57	11.21	11.46	12.38	13.33	17.59	21.95	24.50	27.48	26.09	27.55	***26.65***	***28.50***	Earnings per sh A	***46.00***
1.83	2.34	2.64	3.25	4.15	4.78	5.49	6.15	6.77	7.46	8.20	9.00	9.80	10.60	11.40	12.15	***12.75***	***13.20***	Div'ds Decl'd per sh B■	***14.75***
2.36	2.28	2.37	2.52	2.93	2.62	2.69	3.10	3.68	4.14	4.55	5.30	6.33	5.62	6.57	7.00	***7.40***	***8.25***	Cap'l Spending per sh	***9.75***
7.30	11.07	10.72	3.10	.12	15.42	10.83	10.22	5.23	d2.41	4.96	11.17	21.56	40.44	36.48	28.29	***31.35***	***33.05***	Book Value per sh C	***38.35***
392.70	372.90	346.00	323.37	321.00	319.00	314.00	303.00	289.00	284.00	281.00	280.00	279.00	271.00	254.00	241.64	***236.00***	***230.00***	Common Shs Outst'g D	***215.00***
12.7	9.8	10.5	9.9	10.6	11.8	15.1	17.7	19.2	21.5	18.2	15.9	15.5	13.1	16.5	16.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***16.5***
.76	.65	.67	.62	.67	.66	.79	.89	1.01	1.08	.98	.85	.80	.71	.95	.93			Relative P/E Ratio	***.90***
1.8%	3.1%	3.5%	4.2%	4.7%	4.2%	3.2%	3.0%	2.8%	2.6%	2.6%	2.6%	2.6%	2.9%	2.6%	2.7%			Avg Ann'l Div'd Yield	***1.9%***
						45600	46132	47248	51048	53762	59812	65398	67044	65984	67571	***71250***	***74000***	Sales ($mill)	***86000***
						13.7%	13.5%	13.3%	13.2%	12.8%	16.0%	15.2%	15.5%	14.7%	14.7%	***14.5%***	***15.0%***	Operating Margin	***16.5%***
						994.0	1026.0	1215.0	1195.0	1161.0	1189.0	1290.0	1364.0	1404.0	1430.0	***1475***	***1500***	Depreciation ($mill)	***1650***
						3614.0	3605.0	3753.0	3873.0	5046.0	6230.0	6888.0	7607.0	6914.0	6920.0	***6285***	***6555***	Net Profit ($mill)	***9900***
						31.3%	28.2%	23.2%	26.5%	13.6%	14.0%	16.4%	13.4%	10.0%	14.6%	***15.5%***	***16.0%***	Income Tax Rate	***17.5%***
						7.9%	7.8%	7.9%	7.6%	9.4%	10.4%	10.5%	11.3%	10.5%	10.2%	***8.8%***	***8.9%***	Net Profit Margin	***11.5%***
						1217.0	2141.0	2566.0	4824.0	1705.0	3123.0	5445.0	5818.0	5104.0	3584.0	***5500***	***6000***	Working Cap'l ($mill)	***6750***
						6169.0	14305	14282	13513	12604	11404	11669	11670	15429	17291	***19000***	***19000***	Long-Term Debt ($mill)	***19500***
						3400.0	3097.0	1511.0	d683.0	1394.0	3127.0	6015.0	10959	9266.0	6835.0	***7400***	***7600***	Shr. Equity ($mill)	***8250***
						39.5%	22.0%	25.9%	32.7%	38.4%	45.1%	40.6%	34.8%	29.3%	30.6%	***26.0%***	***26.5%***	Return on Total Cap'l	***37.5%***
						NMF	NMF	NMF	--	NMF	NMF	NMF	69.4%	74.6%	NMF	***NMF***	***NMF***	Return on Shr. Equity	***NMF***
						54.5%	54.0%	NMF	--	NMF	NMF	68.6%	42.6%	42.1%	56.5%	***44.5%***	***46.5%***	Retained to Com Eq	***NMF***
						49%	54%	55%	56%	47%	41%	40%	39%	44%	44%	***48%***	***46%***	All Div'ds to Net Prof	***32%***

CAPITAL STRUCTURE as of 9/30/24
Total Debt $19,321 mill. **Due in 5 Yrs** $4,765 mill.
LT Debt $19,179 mill. **LT Interest** $1,025 mill.
(Total interest coverage: 8.6x)
(73% of Cap'l)
Leases, Uncapitalized Annual rentals $339 million

Pension Assets-12/23 $22.8 bill.
Oblig. $29.0 bill.
Preferred Stock None

Common Stock 237,035,273 shs **as of 10/18/24**

MARKET CAP: $126 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	2547	1442	3151
Receivables	14823	15315	16365
Inventory (Avg Cost)	3088	3132	3234
Other	533	632	461
Current Assets	20991	20521	23211
Accts Payable	2117	2312	3221
Debt Due	118	168	142
Other	13652	14457	14447
Current Liab.	15887	16937	17810

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	6.0%	7.5%	*7.5%*
"Cash Flow"	11.0%	11.5%	*8.0%*
Earnings	12.0%	13.0%	*9.5%*
Dividends	10.5%	8.0%	*4.5%*
Book Value	20.0%	NMF	*1.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	16258	17029	16028	17729	67044
2022	14964	15446	16583	18991	65984
2023	15126	16693	16878	18874	67571
2024	17195	18122	17104	***18829***	***71250***
2025	***17750***	***18500***	***18500***	***19250***	***74000***

Calendar	EARNINGS PER SHARE A Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	6.56	6.52	6.93	7.47	27.48
2022	6.44	5.59	6.71	7.40	26.09
2023	6.61	6.63	6.73	7.58	27.55
2024	6.39	6.85	6.80	***6.61***	***26.65***
2025	***6.65***	***6.95***	***7.10***	***7.80***	***28.50***

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	2.40	2.40	2.40	2.60	9.80
2021	2.60	2.60	2.60	2.80	10.60
2022	2.80	2.80	2.80	3.00	11.40
2023	3.00	3.00	3.00	3.15	12.15
2024	3.15	3.15	3.15	3.30	

BUSINESS: Lockheed Martin provides a broad range of products and services to the world's governments and commercial customers. Areas of concentration include space and missile systems, electronics, and aeronautics. Program base includes F-16, F-22, F-35 aircraft, ballistic and other missile systems, C-130 transport planes, and Titan launch vehicles. Sold its IS&GS business to Leidos 8/16. More than 70% of sales are to the U.S. Government. Has 122,000 employees. Off./dir. own less than 1% of common stock; State Street, 14.9%; Vanguard, 8.9%; BlackRock, 7.4% (3/24 proxy). Chrmn., Pres. & CEO: James D. Taiclet. Inc.: MD. Addr.: 6801 Rockledge Drive, Bethesda, MD 20817-1877. Tel.: 301-897-6000. Internet: www.lockheedmartin.com.

Lockheed Martin's backlog is building. At the close of the recent third quarter, that measure stood at a healthy $166 billion. As orders rise, sales are advancing to records. Lockheed's September-quarter sales gain was modest, due to U.S. government delays in funding the F-35 jet fighter program. We expect such funds to begin flowing soon, boosting top-line expansion at the Aeronautics division. Meanwhile, the Missiles & Fire Control and Rotary & Mission Systems divisions are contributing nicely to sales and operating income growth. Given geopolitical risks, the United States and key allies are ramping purchases of tactical and strike missiles. Too, demand is keen for integrated warfare systems, as well as transport and attack helicopters. It's notable that C-130 transport plane business at Aeronautics is favorable. Additionally, commercial and military needs should keep the Space division a dependable contributor to profits.

Management is strengthening the company's operating profile. We look for sales to trend from $67.6 billion in 2023 to $71.25 billion this year and to $74.0 billion in 2025. The F-35 funding delays will probably lead to share earnings dipping to $26.65 in the current year from $27.55 in 2023. A rebound to $28.50 seems likely for 2025. The start and conclusion of defense programs often causes quarter-to-quarter volatility in results. Lockheed tries to manage this by adding to business. Also important, the company is working to make its supply chain more resilient with some supplier redundancy. Too, efforts are under way to better utilize digital technology in products and processes. Furthermore, international partnerships are being inked to bolster global capacity and sales.

Stockholders are reaping rewards. Lockheed is buying back shares, and the board of directors has raised the repurchase authorization to $10.3 billion. Also, the quarterly dividend will be increased to $3.30 a share from $3.15 a share, starting with the yearend 2024 payment.

This timely equity is a reliable producer of positive total returns. Recent concern about possible cuts to the U.S. defense budget appear unfounded. At the current share price, the issue offers worthwhile gains to 2027-2029.

David M. Reimer *November 29, 2024*

(A) Diluted earnings. Excludes nonrecurring gains/(losses): '10, 76¢; '11, (4¢); '13, (44¢); '17, ($6.69); '21, ($4.72); '22, ($4.43). Excludes discontinued operations: '16, $5.11; '20, ($0.20). Earnings may not sum to total due to rounding. Next earnings report due late January.
(B) Dividends historically paid in late March, June, September, and December. ■ Dividend reinvestment plan available.
(C) Includes intangibles. In 2023: $13.0 billion, $53.80/share. **(D)** In millions.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	80
Earnings Predictability	95

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MCKESSON NYSE-MCK

RECENT PRICE 508.95 | P/E RATIO 15.8 (18.2 / 12.0) | RELATIVE P/E RATIO 0.87 | DIV'D YLD 0.6% | VALUE LINE

TIMELINESS 2 Lowered 11/8/24
SAFETY 1 Raised 11/12/21
TECHNICAL 3 Lowered 10/25/24
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$453-$841 $647 (25%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	760	(+50%)	7%
Low	620	(+20%)	2%

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	692	702	779
to Sell	606	636	620
Hld's(000)	112176	111730	114070

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	166.6	214.4	243.6	199.4	169.3	178.9	154.8	187.7	251.0	401.8	476.3	637.5								
Low:	96.7	159.5	160.1	114.5	133.8	106.1	109.2	112.6	169.3	237.6	331.8	462.7								
	393.48	401.11	444.78	522.27	540.38	596.80	773.23	848.37	940.91	1031.5	1128.0	1435.1	1506.0	1820.5	2034.64	2376.55	*2755.90*	*3024.20*	Sales per sh [A]	*3869.55*
	6.03	6.37	7.19	8.57	9.30	11.50	15.68	14.11	16.58	17.80	19.07	22.60	23.23	30.43	31.60	33.18	*38.05*	*41.80*	"Cash Flow" per sh	*54.15*
	4.28	4.58	5.00	5.83	6.33	8.35	11.11	9.84	11.61	12.62	13.57	14.95	17.21	23.69	25.94	27.44	*32.00*	*35.00*	Earnings per sh [AB]	*46.00*
	.48	.48	.72	.80	.80	.92	.96	1.08	1.12	1.30	1.51	1.62	1.67	1.83	2.09	2.40	*2.75*	*3.11*	Div'ds Decl'd per sh [C■]	*4.00*
	1.45	1.39	1.54	1.71	1.79	1.80	1.62	2.17	1.91	2.01	2.24	2.25	2.85	2.68	2.87	3.32	*3.55*	*3.65*	Cap'l Spending per sh	*4.15*
	22.85	27.79	28.65	29.07	31.20	36.96	34.55	39.66	52.58	48.53	42.60	31.63	d.13	d15.67	d13.65	d15.16	*d11.40*	*4.05*	Book Value per sh [D]	*65.20*
	271.00	271.00	252.00	235.00	226.61	230.58	231.55	225.00	211.00	202.00	190.00	161.00	158.19	145.00	136.00	130.00	*127.00*	*124.00*	Common Shs Outst'g [E]	*115.00*
	11.2	11.8	13.6	13.8	14.9	16.8	17.9	20.1	14.1	12.1	9.7	9.3	9.4	9.3	13.5	16.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.0*
	.67	.79	.87	.87	.95	.94	.94	1.01	.74	.61	.52	.50	.48	.50	.78	.90			Relative P/E Ratio	*.85*
	1.0%	.9%	1.1%	1.0%	.8%	.7%	.5%	.5%	.7%	.9%	1.1%	1.2%	1.0%	.8%	.6%	.5%			Avg Ann'l Div'd Yield	*.5%*
							179045	190884	198533	208357	214319	231051	238228	263966	276711	308951	*350000*	*375000*	Sales ($mill) [A]	*445000*
							2.9%	2.3%	2.3%	1.8%	2.0%	1.6%	2.1%	2.1%	1.9%	1.7%	*2.0%*	*2.0%*	Operating Margin	*2.0%*
							1017.0	885.0	910.0	951.0	949.0	922.0	887.0	760.0	608.0	635.0	*670*	*700*	Depreciation ($mill)	*775*
							2614.0	2290.0	2589.0	2644.0	2674.0	2716.0	2788.0	3652.0	3689.0	3679.0	*4160*	*4480*	Net Profit ($mill)	*5450*
							30.6%	27.9%	24.2%	19.7%	17.8%	18.4%	18.6%	18.1%	18.8%	17.7%	*18.0%*	*18.0%*	Income Tax Rate	*18.0%*
							1.5%	1.2%	1.3%	1.3%	1.2%	1.2%	1.2%	1.4%	1.3%	1.2%	*1.2%*	*1.2%*	Net Profit Margin	*1.2%*
							3173.0	3366.0	1336.0	451.0	839.0	d402.0	1279.0	d2235	d3665	d4387	*d4500*	*d3500*	Working Cap'l ($mill)	*d1000*
							8180.0	6535.0	7305.0	6751.0	7265.0	6335.0	6406.0	5080.0	4626.0	5579.0	*5580*	*5580*	Long-Term Debt ($mill)	*4000*
							8001.0	8924.0	11095	9804.0	8094.0	5092.0	d21.0	d2272	d1857	d1971	*d1450*	*500*	Shr. Equity ($mill) [D]	*7500*
							17.3%	16.0%	14.9%	16.8%	18.2%	24.8%	45.3%	NMF	NMF	NMF	*NMF*	*76.0%*	Return on Total Cap'l	*48.5%*
							32.7%	25.7%	23.3%	27.0%	33.0%	53.3%	- -	- -	NMF	NMF	*NMF*	*NMF*	Return on Shr. Equity	*73.0%*
							29.8%	22.9%	21.1%	24.3%	29.4%	47.6%	- -	- -	NMF	NMF	*NMF*	*NMF*	Retained to Com Eq	*66.5%*
							9%	11%	10%	10%	11%	11%	10%	8%	8%	9%	*8%*	*9%*	All Div'ds to Net Prof	*8%*

LEGENDS
13.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	36.7	14.1
3 yr.	179.7	11.1
5 yr.	321.4	80.9

CAPITAL STRUCTURE as of 6/30/24
Total Debt $5635 mill. **Due in 5 Yrs** $4314 mill.
LT Debt $5584 mill. **LT Interest** $250 mill.

Leases, Uncapitalized Annual rentals $359 mill.
Pension Assets 3/24-$171 mill. **Oblig.** $174 mill.

Preferred Stock None
Common Stock 129,676,762 shares

MARKET CAP: $66.0 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	4678	4583	2302
Receivables	19410	21622	23743
Inventory	19691	21139	25571
Other	513	626	636
Current Assets	44292	47970	52252
Accts Payable	42490	47097	51704
Debt Due	968	50	51
Other	4499	5210	4679
Current Liab.	47957	52357	56434

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	14.0%	15.0%	*11.0%*
"Cash Flow"	12.5%	12.0%	*9.5%*
Earnings	14.0%	15.5%	*10.0%*
Dividends	9.5%	10.0%	*11.5%*
Book Value	- -	- -	*NMF*

Fiscal Year Begins	QUARTERLY SALES ($ mill.) [A] Jun.30	Sep.30	Dec.31	Mar.31	Full Fiscal Year
2021	62674	66576	68614	66102	263966
2022	67154	70157	70490	68910	276711
2023	74483	77215	80898	76355	308951
2024	79283	*87000*	*93000*	*90717*	*350000*
2025	*89000*	*94000*	*98000*	*94000*	*375000*

Fiscal Year Begins	EARNINGS PER SHARE [AB] Jun.30	Sep.30	Dec.31	Mar.31	Full Fiscal Year
2021	5.56	6.15	6.15	5.83	23.69
2022	5.83	6.06	6.90	7.19	25.94
2023	7.27	6.23	7.74	6.18	27.44
2024	7.88	*6.90*	*8.35*	*8.87*	*32.00*
2025	*8.00*	*8.50*	*9.00*	*9.50*	*35.00*

Calendar	QUARTERLY DIVIDENDS PAID [C■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.41	.41	.41	.42	1.65
2021	.42	.42	.42	.47	1.73
2022	.47	.47	.47	.54	1.95
2023	.54	.54	.54	.62	2.24
2024	.62	.62	.62	.71	

BUSINESS: McKesson Corporation provides supply, information, and care management products and services designed to reduce costs and improve quality across the healthcare industry. It reports financial results in four reportable segments: U.S. Pharmaceutical (90% of 2023 sales), International (4%), Medical-Surgical Solutions (4%), and Prescription Technology Solutions (2%). New reporting structure began in September, 2020. Has about 51,000 employees The Vanguard Group owns 9.3% of common stock; BlackRock, Inc., 9.0%; officers & directors, less than 1% (6/24 proxy). Chairman: Donald Knauss, CEO: Brian Tyler. Incorporated: Delaware. Address: 6555 State Hwy 161, Irving, Texas 75039. Telephone: (800) 826-9360. Internet: www.mckesson.com.

McKesson stock has retreated from its recent all-time high. To wit, shares of the provider of medical supplies, services, and technology slipped roughly 20% from their peak of over $630, partly due to profit-taking but also as results for the fiscal first quarter ended June 30th missed expectations. Although sales in the period rose 6%, year over year, they fell short of Street estimates and our $82 billion target. The U.S. Pharmaceutical segment still led the way, on higher script volumes from specialty products, retailer national account customers, and GLP-1 drugs. Lower contributions from access programs in the Prescription Tech unit and less favorable customer mix and demand shifts in the Medical Surgical branch were a drag, however. Meantime, adjusted share profit beat the consensus and our call of $7.15, but included a big equity investment gain of $0.62. (September-quarter results were due out after this report went to press.)

Nonetheless, earnings seem poised to rise at a solid pace in fiscal 2024 and beyond. McKesson is counting on expansion in key growth areas of oncology and biopharma. Consistent with this, it recently acquired a 70% stake in Florida Cancer Specialists & Research Institute, while it is selling its noncore Canadian businesses Rexall and Well.ca. A lower stock count should help per-share comparisons, too. All told, management has raised its adjusted share-profit outlook for this year to $31.75-$32.55, from a previous range of $31.25-$32.05, representing an increase of 16%-19%, while it expects sales growth of 13%-15%. We have thus bumped up our fiscal 2024 top- and bottom-line forecasts (from $340 billion and $31.50), and see sturdy gains out to late decade.

The company is returning a portion of capital to shareholders. With its solid cash flow, the board of directors recently approved a 15% hike in the quarterly cash dividend, to $0.71, payable October 1st. It also increased the share-repurchase program by $4.0 billion, to $9.9 billion.

High-quality McKesson stock has appeal. It remains favorably ranked for Timeliness. And, given its recent price pullback, upside potential for the 18-month and 2027-2029 slots looks good on a risk-adjusted basis (Safety: 1, Highest).

J. Susan Ferrara *November 8, 2024*

(A) Fiscal years end March 31st of following year. **(B)** Diluted earnings. Excludes nonrecurring: '08, ($1.33); '09, 4¢; '10, (43¢); '11, (24¢); '12 (74¢); '16, $11.67; '17, ($12.32); '18, ($13.40), '19 ($9.96), '20, ($45.47); '21, ($16.43); '22, ($0.89); '23, ($5.05). Next earnings report due mid-Feb. **(C)** Dividends paid in January, April, July & October. ■ Dividend reinvestment plan available. **(D)** Includes intangibles. In '23: $12.2 billion, $94.17 a share. **(E)** In millions.

Company's Financial Strength	A++
Stock's Price Stability	90
Price Growth Persistence	40
Earnings Predictability	95

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McCORMICK NYSE-MKC

RECENT PRICE 82.30 | P/E RATIO 27.7 (Trailing: 29.1 Median: 26.0) | RELATIVE P/E RATIO 1.49 | DIV'D YLD 2.0% | VALUE LINE

TIMELINESS 3 Raised 7/26/24
SAFETY 2 Lowered 7/12/24
TECHNICAL 3 Raised 10/11/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$54-$97	$76 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	110	(+35%)	*10%*
Low	80	(-5%)	*2%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	445	436	417
to Sell	447	434	441
Hld's(000)	216354	216392	215736

	37.6	38.5	43.7	53.9	53.3	78.0	86.7	105.5	98.8	107.4	94.4	85.5
High:	30.4	31.4	35.3	39.2	44.8	49.2	59.5	56.1	77.9	71.2	59.1	63.9
Low:												

LEGENDS
23.0 x "Cash Flow" p sh
Relative Price Strength
2-for-1 split 12/20
Options: Yes
Shaded area indicates recession

2-for-1

Target Price Range 2027 2028 2029

200 160 100 80 60 50 40 30 20

Percent shares traded 30 20 10

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-0.2	14.1
3 yr.	-1.6	11.1
5 yr.	7.3	80.9

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
12.21	12.11	12.54	13.90	15.13	15.72	16.54	16.87	17.60	18.45	20.47	20.12	20.99	23.64	23.69	24.85	*24.90*	*25.65*	Sales per sh [A]	*29.60*
1.41	1.53	1.70	1.78	1.92	2.00	2.12	2.18	2.36	2.56	3.08	3.30	3.47	3.78	3.30	3.46	*3.65*	*3.90*	"Cash Flow" per sh	*4.60*
1.07	1.17	1.33	1.40	1.52	1.57	1.69	1.74	1.89	2.13	2.49	2.68	2.83	3.05	2.53	2.70	*2.90*	*3.10*	Earnings per sh [A B]	*3.70*
.44	.48	.52	.56	.62	.68	.74	.80	.86	.94	1.04	1.14	1.24	1.36	1.48	1.56	*1.69*	*1.79*	Div'ds Decl'd per sh ■ [C]	*2.24*
.33	.31	.33	.36	.42	.38	.52	.50	.61	.70	.64	.65	.84	1.04	.98	.98	*.95*	*.95*	Cap'l Spending per sh	*1.10*
4.06	5.06	5.49	6.08	6.41	7.42	7.05	6.56	6.49	9.77	12.00	12.96	14.71	16.50	17.46	18.88	*20.05*	*21.05*	Book Value per sh [D]	*23.60*
260.20	263.60	266.20	266.10	265.36	262.33	256.54	254.60	250.60	262.00	264.20	265.80	266.90	267.30	268.10	268.10	*268.50*	*269.00*	Common Shs Outst'g [E]	*267.00*
17.2	13.7	14.8	17.1	18.7	22.0	20.6	22.5	25.1	22.9	23.3	28.3	30.9	28.7	35.6	29.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*26.0*
1.04	.91	.94	1.07	1.19	1.24	1.08	1.13	1.32	1.15	1.26	1.51	1.59	1.55	2.06	1.65			Relative P/E Ratio	*1.40*
2.4%	3.0%	2.6%	2.3%	2.2%	2.0%	2.1%	2.0%	1.8%	1.9%	1.8%	1.5%	1.4%	1.6%	1.6%	2.0%			Avg Ann'l Div'd Yield	*2.0%*
						4243.2	4296.3	4411.5	4834.1	5408.9	5347.4	5601.3	6317.9	6350.5	6662.2	*6675*	*6875*	Sales ($mill) [A]	*7900*
						16.8%	16.8%	17.4%	18.4%	20.2%	21.3%	21.1%	20.2%	17.6%	18.4%	*19.5%*	*20.5%*	Operating Margin	*20.5%*
						102.7	105.9	108.7	125.2	150.7	158.8	165.0	186.3	200.6	199.3	*205*	*210*	Depreciation ($mill)	*240*
						441.6	449.5	483.4	546.7	663.0	717.5	760.9	822.8	683.9	727.3	*780*	*835*	Net Profit ($mill)	*995*
						26.3%	26.2%	25.8%	23.8%	15.3%	19.5%	19.5%	20.7%	20.9%	22.0%	*21.5%*	*21.5%*	Income Tax Rate	*21.0%*
						10.4%	10.5%	11.0%	11.3%	12.3%	13.4%	13.6%	13.0%	10.8%	10.9%	*11.5%*	*12.1%*	Net Profit Margin	*12.6%*
						294.2	166.3	d.9	d330.3	d521.8	d604.2	d962.9	d1028	d1046	d1097	*d875*	*d750*	Working Cap'l ($mill)	*100*
						1014.1	1052.7	1054.0	4443.9	4052.9	3625.8	3753.8	3973.3	3642.3	3339.9	*3300*	*3300*	Long-Term Debt ($mill)	*4000*
						1809.4	1670.2	1626.6	2559.9	3170.9	3444.2	3926.1	4411.0	4680.5	5060.7	*5385*	*5655*	Shr. Equity ($mill)	*6300*
						16.5%	17.5%	19.1%	8.5%	10.3%	11.2%	10.8%	10.6%	9.1%	9.9%	*9.0%*	*9.5%*	Return on Total Cap'l	*9.5%*
						24.4%	26.9%	29.7%	21.4%	20.9%	20.8%	19.4%	18.7%	14.6%	14.4%	*14.5%*	*15.0%*	Return on Shr. Equity	*16.0%*
						13.8%	14.6%	16.3%	12.1%	12.3%	12.1%	11.0%	10.4%	6.1%	6.1%	*6.0%*	*6.0%*	Retained to Com Eq	*9.5%*
						44%	46%	45%	43%	41%	42%	43%	44%	58%	58%	*58%*	*58%*	All Div'ds to Net Prof	*54%*

CAPITAL STRUCTURE as of 5/31/24
Total Debt $4464.8 mill. **Due in 5 Yrs** $2.6 bill.
LT Debt $3325.8 mill. **LT Interest** $160 mill.
(LT interest earned: $30 mill.) (40% of Cap'l)
Leases, Uncapitalized Annual rentals $61 mill.
Pension Assets-11/23 $897.8 mill.
Oblig. $936.2 mill.

Pfd Stock None
Common Stock 268,630,137 shs
(Includes 252,015,474 non-voting shs.)

MARKET CAP: $22.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	5/31/24
Cash Assets	334.0	166.6	166.3
Receivables	573.7	587.5	598.5
Inventory (Avg. Cost)	1340.1	1126.5	1158.2
Other	138.9	121.0	146.4
Current Assets	2386.7	2001.6	2069.4
Accts Payable	1171.0	1119.3	1210.3
Debt Due	1507.3	1071.5	1139.0
Other	754.1	908.1	635.0
Current Liab.	3432.4	3098.9	2984.3

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	5.0%	5.0%	*4.0%*
"Cash Flow"	6.5%	5.5%	*4.5%*
Earnings	6.5%	5.0%	*4.5%*
Dividends	9.0%	9.0%	*6.5%*
Book Value	10.0%	13.5%	*8.0%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.)[A] Feb.28	May 31	Aug.31	Nov.30	Full Fiscal Year
2021	1481	1556	1549	1730	6317.9
2022	1522	1536	1595	1695	6350.5
2023	1565	1659	1684	1752	6662.2
2024	1603	1643	1680	*1749*	*6675*
2025	*1625*	*1700*	*1740*	*1810*	*6875*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Feb.28	May 31	Aug.31	Nov.30	Full Fiscal Year
2021	.72	.69	.80	.84	3.05
2022	.63	.48	.69	.73	2.53
2023	.59	.60	.65	.86	2.70
2024	.63	.69	.83	*.75*	*2.90*
2025	*.70*	*.70*	*.75*	*.95*	*3.10*

Calendar	QUARTERLY DIVIDENDS PAID [C] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.31	.31	.31	.31	1.24
2021	.34	.34	.34	.34	1.36
2022	.37	.37	.37	.37	1.48
2023	.39	.39	.39	.39	1.56
2024	.42	.42	.42		

BUSINESS: McCormick & Company, Inc. is a manufacturer, marketer, and distributor of spices, seasonings, flavorings, mixes, and condiments for the consumer, industrial, and foodservice markets. Has two segments: Consumer (accounted for 57% of total sales in fiscal 2023) and Flavor Solutions (43%). Acq. Reckitt Benckiser's Food Division (French's Mustard and Frank's RedHot), 8/17; Cholula Hot Sauce, 11/20; FONA Int'l, 12/20. For'gn operations were 39% of sales in 2023. Has 13,800 employees. Off./dir. own 23% of common stock, (including Lawrence E. Kurzius, 12.3%) (2/24 Proxy). Chrmn. Lawrence Kurtzius. CEO & Pres.: Brendan Foley. Inc.: MD. Addr.: 24 Schilling Road, Suite 1, Hunt Valley, MD 21031. Tel.: 410-771-7301. Internet: www.mccormick.com.

McCormick's earnings recovery is on track. (Fiscal 2024 ends November 30th.) After releasing its third-quarter earnings as we went to press, management reiterated its financial 2024 outlook, stating that adjusted operating income is expected to rise 4% to 6% over prior-year levels. Even though top-line growth remains stagnant overall with slight currency impact, efforts to broaden profitability have been successful. The flavor solutions business, in particular, has had a lot of costs taken out, particularly related to the supply chain. All in all operating margins should widen about 100 basis points this fiscal year. In fiscal 2025, we currently estimate that earnings per share will increase in the high-single digits area.

The company continues to execute well, making us more confident about near-term earnings momentum. Recent priorities such as optimizing packaging to improve pricing, as well as gap-price management have bolstered earnings gains this year. The latter strategy broadly identifies opportunities to exploit pricing in different channels, market segments, and alter value perceptions where possible.

Private label competition remains in check for now. As an industry leader in its category, McCormick is always contending with the threat of private label offerings that are less expensive, even though it is a leading supplier of private label products within some of its spices and seasonings categories. Innovation and packaging has retained market share, especially in core categories. Plus, measures to have more price points in the same category for different levels of consumers seem to be successful.

This stock is still neutrally ranked for year-ahead relative price performance. Income-seeking investors ought to appreciate the decent dividend payout. The Above-Average (2) Safety Rank and high Financial Strength scores should appeal to conservative accounts as well. Buy-and-hold investors looking for superior long-term total returns may want to look elsewhere within the food processing industry, though. Risk-adjusted appreciation is below the *Value Line* median, assuming MKC's lofty P/E ratio contracts.

Charles C. Moran *October 11, 2024*

(A) Fiscal year ends Nov. 30th. **(B)** Diluted Non-GAAP earnings. Excl. nonrecurring gains/(losses): '13, (11¢); '14, (2¢); '17, (27¢); '18, $1.02; '19, (6¢); '20, (5¢); '21, (25¢); '22 (1¢); '23 Q1-Q2, (11¢). Next earnings report due early January. Earnings may not add due to rounding. **(C)** Divs. historically paid in mid-Jan., Apr., July & Oct. ■ Div'd reinvestment plan available. **(D)** Includes intangibles. In fiscal 2023: $9616.8 million, $35.87/sh. **(E)** In mill., adjusted for split.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	75
Earnings Predictability	95

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MSC INDUS. DIRECT NYSE-MSM

RECENT PRICE **85.33** | P/E RATIO **17.7** (Trailing: 15.8 Median: 17.0) | RELATIVE P/E RATIO **0.96** | DIV'D YLD **3.9%** | **VALUE LINE**

TIMELINESS 4 Lowered 3/22/24
SAFETY 2 Raised 7/7/23
TECHNICAL 5 Lowered 10/4/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$73-$119	$96 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	155	(+80%)	*19%*
Low	115	(+35%)	*11%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	216	216	193
to Sell	202	235	256
Hld's(000)	43174	43638	43807

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	87.9	96.6	82.2	95.1	105.7	99.9	86.9	87.8	96.2	88.0	105.8	104.8								
Low:	71.4	76.0	54.5	54.2	65.4	73.3	64.6	44.9	77.5	71.3	76.8	75.1								
Sales per sh A	28.69	23.78	26.95	32.19	37.51	38.74	45.23	47.20	50.61	51.21	57.32	60.91	57.41	58.47	66.08	72.25	*67.80*	*69.55*	Sales per sh A	*77.20*
"Cash Flow" per sh	4.05	2.43	2.81	3.95	4.70	4.69	5.06	4.92	5.36	5.17	6.30	6.53	5.98	6.10	7.42	7.58	*6.20*	*6.40*	"Cash Flow" per sh	*7.55*
Earnings per sh AB	3.04	2.00	2.37	3.43	4.11	3.91	3.94	3.78	3.76	4.00	5.10	5.32	4.73	4.81	6.15	6.31	*4.85*	*5.00*	Earnings per sh AB	*6.00*
Div'ds Decl'd per sh C	.76	.80	.82	.88	1.00	1.20	1.32	1.60	1.72	1.80	2.22	2.64	3.00	3.00	3.00	3.16	*3.32*	*3.40*	Div'ds Decl'd per sh C	*4.00*
Cap'l Spending per sh	.34	.36	.48	.41	.76	1.41	1.15	.83	1.55	.83	.80	.94	.85	.97	1.10	1.25	*1.30*	*1.45*	Cap'l Spending per sh	*1.50*
Book Value per sh D	11.47	12.86	14.33	15.81	18.90	21.92	22.70	21.62	19.41	21.73	24.82	26.77	23.65	20.75	24.17	26.07	*27.70*	*29.40*	Book Value per sh D	*38.05*
Common Shs Outst'g F	62.03	62.64	62.78	62.80	62.80	63.43	61.62	61.66	56.58	56.39	55.90	55.22	55.61	55.47	55.87	56.73	*56.50*	*56.50*	Common Shs Outst'g F	*57.00*
Avg Ann'l P/E Ratio	15.1	18.3	20.2	18.2	17.2	19.9	21.7	20.1	18.0	21.5	17.0	15.0	14.4	17.4	13.3	13.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*21.0*
Relative P/E Ratio	.91	1.22	1.28	1.14	1.09	1.12	1.14	1.01	.94	1.08	.92	.80	.74	.94	.77	.78			Relative P/E Ratio	*1.50*
Avg Ann'l Div'd Yield	1.7%	2.2%	1.7%	1.4%	1.4%	1.5%	1.5%	2.1%	2.5%	2.1%	2.6%	3.3%	4.4%	3.6%	3.7%	3.6%			Avg Ann'l Div'd Yield	*2.9%*
Sales ($mill) A	2787.1	2910.4	2863.5	2887.7	3203.9	3363.8	3192.4	3243.2	3691.9	4009.3	*3830*	*3930*	Sales ($mill) A	*4400*
Operating Margin	16.5%	15.4%	15.6%	15.2%	13.5%	14.1%	13.5%	13.0%	14.7%	14.2%	*12.0%*	*12.5%*	Operating Margin	*13.0%*
Depreciation ($mill)	64.9	69.7	71.9	63.0	63.2	65.4	69.1	68.8	70.4	75.1	*76.0*	*78.0*	Depreciation ($mill)	*84.0*
Net Profit ($mill)	247.1	233.8	231.2	228.5	289.2	295.3	263.7	269.8	344.0	354.7	*275*	*285*	Net Profit ($mill)	*345*
Income Tax Rate	36.7%	37.8%	37.8%	37.4%	18.9%	24.6%	23.8%	20.7%	24.3%	24.8%	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
Net Profit Margin	8.9%	8.0%	8.1%	7.9%	9.0%	8.8%	8.3%	8.3%	9.3%	8.9%	*7.2%*	*7.3%*	Net Profit Margin	*7.8%*
Working Cap'l ($mill)	652.2	609.8	502.9	447.9	657.0	752.7	829.1	752.4	817.7	668.1	*755*	*865*	Working Cap'l ($mill)	*1245*
Long-Term Debt ($mill)	240.2	214.8	339.8	201.0	311.2	266.4	497.0	583.6	468.9	224.4	*300*	*275*	Long-Term Debt ($mill)	*200*
Shr. Equity ($mill)	1398.6	1332.9	1098.4	1225.1	1387.3	1478.6	1314.9	1150.9	1350.4	1479.2	*1565*	*1660*	Shr. Equity ($mill)	*2170*
Return on Total Cap'l	15.2%	15.3%	16.3%	16.2%	17.3%	17.2%	14.9%	15.8%	19.4%	19.5%	*15.5%*	*15.5%*	Return on Total Cap'l	*15.0%*
Return on Shr. Equity	17.7%	17.5%	21.1%	18.7%	20.8%	20.0%	20.1%	23.4%	25.5%	24.0%	*17.5%*	*17.0%*	Return on Shr. Equity	*16.0%*
Retained to Com Eq	11.8%	10.1%	11.4%	10.3%	11.8%	10.1%	7.4%	8.9%	13.1%	12.0%	*5.5%*	*5.5%*	Retained to Com Eq	*5.5%*
All Div'ds to Net Prof	33%	42%	46%	45%	43%	49%	63%	62%	49%	50%	*68%*	*68%*	All Div'ds to Net Prof	*67%*

CAPITAL STRUCTURE as of 6/1/24
Total Debt $506.1 mill. **Due in 5 Yrs** $270.8 mill.
LT Debt $299.8 mill. **LT Interest** $12.0 mill.
(Total interest coverage: 27.5x) (18% of Cap'l)
Leases, Uncapitalized: $20.0 mill.
No Defined Benefit Pension Plan

Pfd Stock None
Common Stock 56,122,955 shs. E
as of 6/17/24

MARKET CAP: $4.8 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/1/24
Cash Assets	43.5	50.1	25.9
Receivables	687.6	435.4	419.8
Inventory (FIFO)	715.6	726.5	665.6
Other	96.9	105.5	101.6
Current Assets	1543.6	1317.5	1212.9
Accts Payable	217.4	226.3	205.6
Debt Due	325.7	229.9	206.3
Other	182.8	193.2	171.6
Current Liab.	725.9	649.4	583.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '20-'22 to '27-'29
Sales	5.5%	3.5%	*4.5%*
"Cash Flow"	4.5%	4.0%	*4.5%*
Earnings	3.5%	5.0%	*5.0%*
Dividends	11.5%	9.5%	*5.0%*
Book Value	2.0%	0.5%	*8.5%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) AB Nov.Per	Feb.Per	May.Per	Aug.Per	Full Fiscal Year
2021	771.9	774.0	866.3	831.0	3243.2
2022	848.5	862.5	958.6	1022.2	3691.9
2023	957.7	961.6	1054.5	1035.4	4009.3
2024	954.0	935.3	979.4	*961.3*	*3830*
2025	*965*	*965*	*1000*	*1000*	*3930*

Fiscal Year Ends	EARNINGS PER SHARE AB Nov.Per	Feb.Per	May.Per	Aug.Per	Full Fiscal Year
2021	1.10	1.03	1.42	1.26	4.81
2022	1.25	1.29	1.82	1.79	6.15
2023	1.48	1.45	1.74	1.64	6.31
2024	1.25	1.18	1.33	*1.09*	*4.85*
2025	*1.20*	*1.20*	*1.30*	*1.30*	*5.00*

Calendar	QUARTERLY DIVIDENDS PAID C Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.75	.75	.75	.75	3.00
2021	.75	.75	.75	.75	3.00
2022	.75	.75	.75	.79	3.04
2023	.79	.79	.79	.83	3.20
2024	.83	.83	.83		

BUSINESS: MSC Industrial Direct Co. markets industrial products to small- and mid-sized customers throughout the U.S. It distributes a full line of industrial products, such as cutting tools, abrasives, measuring instruments, safety equipment, fasteners, welding supplies, and electrical supplies for customers' maintenance, repair, and operations (MRO) supply requirements. MSC guarantees same-day shipping of products, since over 99% of products are kept in stock. '23 depreciation rate: 11.3%. Has about 7,000 employees. Chairman: Mitchell Jacobson. President & CEO: Erik Gershwind. Officers & directors own 18.8% of class A common stock (12/23 Proxy). Incorporated: NY. Address: 75 Maxess Rd., Melville, NY 11747. Tel.: 516-812-2000. Internet: www.mscdirect.com.

MSC Industrial Direct likely finished fiscal 2024 (ended August 31st) on a weak note. Softer volumes and higher costs have placed pressure on the top and bottom lines. Management noted in its last release that unexpected gross margin pressure and slower average daily sales, particularly within the Core segment, were problematic. Delays in upgrading the company's online catalog, as well as internal channel inefficiencies have also contributed to sluggish volumes. In addition, backlogs have begun to level out. This is largely due to the continued strain from inflationary conditions, higher borrowing costs, and the related slowdown in capital spending. Although the company's leadership assured that swift actions would be taken to ease gross margin pressure, it was unlikely quick enough to salvage fourth-quarter performance. Accordingly, we have lowered our earnings call to $1.09 a share, down from $1.33 previously. This reduction brings our estimate for the fiscal year down to $4.85 a share, from $5.10.

We expect an operational recovery to take shape in fiscal 2025. The recent interest rate cut by the Federal Reserve offers some promise that economic conditions will stabilize and improve before long. This should help to revive demand and boost performance in the year to come. In addition, the company's efforts to enhance its vending programs with artificial intelligence, along with strong growth in its implant solutions business, should pay off. Furthermore, MSC Industrial Direct's new pricing, platform, and related marketing programs ought to help revive sales growth, while greater emphasis on margins will enable a relatively swift bottom-line rebound, as well.

The long-term outlook is favorable. MSC Industrial Direct is among the leading suppliers of high-precision tools with a dominant presence in the metalworking, maintenance, repair, and operations. Despite current macro challenges, the company's initiatives in automation, productivity improvements, and a growing e-commerce platform paint an appealing picture for the long haul.

Though untimely, the stock offers decent total return potential over the next 3 to 5 years.

Simon R. Shoucair *October 4, 2024*

(A) Fiscal year ends the Sat. closest to Aug. 31st. **(B)** Dil. egs. Q4 egs. set to be reported after this review went to press. Next egs. report due early Jan. Sales and/or egs. may not sum due to rounding or changes in shares out. **(C)** Div. paid in late Jan., Apr., Jul., Oct. Paid special div'ds: $1.00, '10; $3.00, '14; $5.00, '19; $3.50, '20; $0.94, '21; $0.09, '22; $0.20, '23. **(D)** Includes intang. In fiscal 2023: $828.8 mill., $14.61 a share. **(E)** Each class A sh./one vote. Each class B sh./10 votes. Class B not publicly traded. **(F)** In mill.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	25
Earnings Predictability	90

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NEWMARKET CORP. NYSE-NEU

RECENT PRICE 558.21 | P/E RATIO 11.6 (Trailing: 13.0 Median: 20.0) | RELATIVE P/E RATIO 0.61 | DIV'D YLD 1.8% | VALUE LINE

TIMELINESS 3 Lowered 2/16/24
SAFETY 1 Raised 8/28/20
TECHNICAL 2 Lowered 11/8/24
BETA .75 (1.00 = Market)

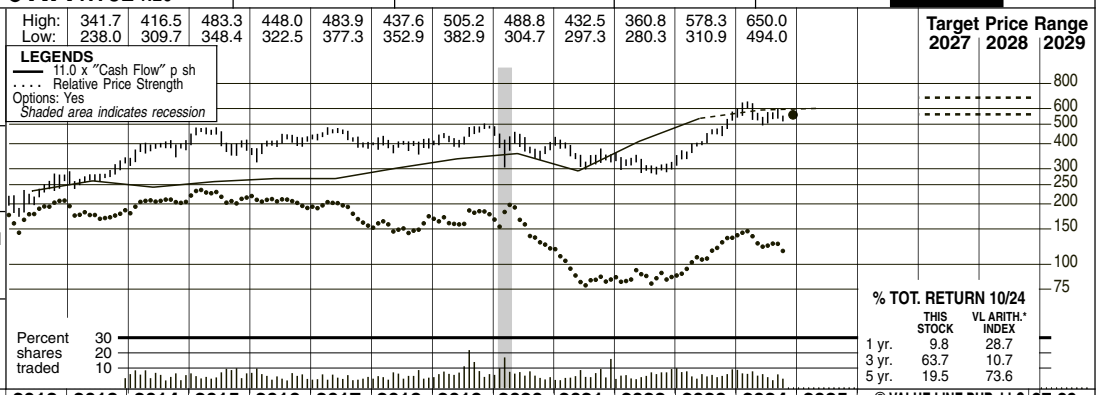
18-Month Target Price Range
Low-High Midpoint (% to Mid)
$480-$816 $648 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	680	(+20%)	7%
Low	560	(Nil)	2%

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	159	145	142
to Sell	112	138	161
Hld's(000)	5906	5908	6101



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
106.42	100.60	128.07	160.36	165.70	174.08	187.55	179.18	173.01	186.62	204.73	195.75	184.13	227.36	284.97	281.38	*296.35*	*303.15*	Revenues per sh	*305.25*
6.66	12.75	15.30	18.67	21.09	23.73	22.07	23.51	24.34	24.34	27.40	30.55	32.47	26.56	37.29	48.68	*55.75*	*54.75*	"Cash Flow" per sh	*54.20*
4.75	10.65	12.09	15.09	17.85	19.90	18.38	19.45	20.54	19.54	20.34	22.73	24.64	17.71	27.77	40.44	*47.55*	*46.00*	Earnings per sh [A]	*44.30*
.80	1.08	1.57	2.39	3.00	3.55	4.40	5.60	6.40	6.85	7.00	7.15	7.60	7.80	8.40	8.85	*9.50*	*9.80*	Div'ds Decl'd per sh [B]	*11.05*
2.09	2.47	5.54	3.99	2.89	4.46	4.80	10.59	12.06	12.62	6.67	5.31	8.54	7.62	5.79	5.04	*5.10*	*5.40*	Cap'l Spending per sh	*7.35*
19.15	30.12	35.03	41.00	29.98	43.70	33.81	32.44	40.79	51.07	43.80	61.05	69.57	73.54	78.58	112.31	*146.35*	*162.10*	Book Value per sh [C]	*186.30*
15.20	15.21	14.03	13.40	13.42	13.10	12.45	11.95	11.85	11.78	11.18	11.19	10.92	10.36	9.70	9.59	*9.60*	*9.50*	Common Shs Outst'g [D]	*9.50*
12.4	6.7	8.9	10.7	12.6	14.2	20.8	21.9	19.6	22.3	19.6	19.4	16.1	20.1	11.3	10.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*14.0*
.75	.45	.57	.67	.80	.80	1.09	1.10	1.03	1.12	1.06	1.03	.83	1.09	.65	.59			Relative P/E Ratio	*.80*
1.4%	1.5%	1.5%	1.5%	1.3%	1.3%	1.2%	1.3%	1.6%	1.6%	1.8%	1.6%	1.9%	2.2%	2.7%	2.1%			Avg Ann'l Div'd Yield	*1.8%*
2335.4	2140.8	2049.5	2198.4	2289.7	2190.3	2010.9	2356.1	2764.8	2698.4	*2845*	*2880*	Revenues ($mill)	*2900*
16.7%	18.6%	19.9%	17.8%	15.9%	19.4%	19.7%	14.5%	15.8%	20.8%	*21.0%*	*20.0%*	Operating Margin	*16.5%*
41.5	42.3	44.9	55.3	71.8	87.6	84.0	84.3	82.3	78.0	*80.0*	*85.0*	Depreciation ($mill)	*95.0*
233.3	238.6	243.4	231.3	234.7	254.3	270.6	190.9	279.5	388.9	*455*	*435*	Net Profit ($mill)	*420*
31.2%	29.6%	29.1%	26.7%	19.1%	23.3%	18.3%	22.9%	19.6%	20.5%	*21.0%*	*21.0%*	Income Tax Rate	*23.0%*
10.0%	11.1%	11.9%	10.5%	10.3%	11.6%	13.5%	8.1%	10.1%	14.4%	*16.0%*	*15.1%*	Net Profit Margin	*14.5%*
537.5	511.1	542.3	516.9	542.1	570.5	585.6	663.1	768.2	675.4	*730*	*740*	Working Cap'l ($mill)	*860*
363.5	494.6	507.3	602.9	771.0	642.9	598.8	789.9	1003.7	663.5	*1085*	*950*	Long-Term Debt ($mill)	*750*
421.0	387.6	483.3	601.6	489.9	683.1	759.8	762.1	762.4	1077.1	*1405*	*1540*	Shr. Equity ($mill)	*1770*
30.7%	27.8%	25.4%	20.1%	19.7%	20.3%	20.9%	13.4%	16.8%	23.4%	*20.5%*	*18.5%*	Return on Total Cap'l	*16.5%*
55.4%	61.6%	50.4%	38.5%	47.9%	37.2%	35.6%	25.0%	36.7%	36.1%	*32.5%*	*28.5%*	Return on Shr. Equity	*23.5%*
41.3%	43.3%	34.7%	24.7%	31.5%	25.3%	24.6%	13.8%	25.6%	28.2%	*26.0%*	*22.0%*	Retained to Com Eq	*18.0%*
25%	30%	31%	36%	34%	32%	31%	45%	30%	22%	*20%*	*21%*	All Div'ds to Net Prof	*25%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $1085.0 mill. **Due in 5 Yrs** $884.3 mill.
LT Debt $1085.0 mill. **LT Interest** $41.1 mill.
(Total interest coverage: 3.2x) (44% of Cap'l)

Leases, Uncapitalized Annual rentals $5.3 mill.
Pension Assets-12/23: $51.2 mill.
Oblig.: $67.8 mill.
Pfd Stock None

Common Stock 9,595,112 shs.
as of 10/28/24
MARKET CAP: $5.4 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	68.7	111.9	80.3
Receivables	453.7	432.3	487.6
Inventory (FIFO)	631.4	456.2	534.5
Other	38.3	39.2	35.2
Current Assets	1192.1	1039.6	1137.6
Accts Payable	273.3	231.1	259.4
Debt Due	--	--	--
Other	150.6	133.0	142.6
Current Liab.	423.9	364.1	402.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	4.5%	7.0%	*2.5%*
"Cash Flow"	6.0%	8.0%	*6.5%*
Earnings	5.0%	7.5%	*7.5%*
Dividends	11.0%	4.5%	*5.0%*
Book Value	8.5%	14.5%	*13.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	566.6	590.7	622.2	576.6	2356.1
2022	662.6	723.6	696.0	682.6	2764.8
2023	702.8	685.1	667.2	643.3	2698.4
2024	696.7	710.2	724.9	*713.2*	*2845*
2025	*710*	*720*	*730*	*720*	*2880*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	6.38	4.75	4.80	1.65	17.71
2022	5.75	6.54	6.32	9.26	27.77
2023	10.10	10.36	11.60	8.38	40.44
2024	11.23	11.63	13.79	*10.90*	*47.55*
2025	*11.50*	*11.75*	*11.75*	*11.00*	*46.00*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	1.90	1.90	1.90	1.90	7.60
2021	1.90	1.90	1.90	2.10	7.80
2022	2.10	2.10	2.10	2.10	8.40
2023	2.10	2.10	2.25	2.25	8.70
2024	2.25	2.25	2.50	2.50	

BUSINESS: NewMarket Corporation develops, manufactures, and blends chemical additives through its Afton Chemical and Ethyl Corp. units. Has two segments: Petroleum Additives (99% of '23 revenues) provides lubricant, engine oil, driveline, industrial, and fuel additives under the HiTEC, GREENBURN, TecGARD, BioTEC, and MMT brands and TEL name. Other (1%) sells high-octane fuel. Has about 2,120 employees. Bruce C. Gottwald owns 12.0% of stock; Thomas Gottwald, 5.9%; Floyd Gottwald, 4.9%; Bank of America, 9.4%; Vanguard, 7.5%; BlackRock, 6.3%; The London Co., 6.9% (3/24 Proxy). Chairman, Pres. & CEO: Thomas E. Gottwald. Incorp.: VA. Address: 330 South Fourth St, Richmond, VA 23219-4350. Tel.: 804-788-5000. Internet: www.newmarket.com.

NewMarket's AMPAC acquisition was a smart move. The company bought AMPAC (American Pacific Corp) in January for $700 million using relatively low-cost long-term debt. Based in Cedar City, Utah, AMPAC is the leading North American manufacturer of performance additives, which are used in solid state rocket motors for space launch and military defense applications. AMPAC complements NEU's existing petroleum additives business, and utilizes its technological expertise. Like NEU, AMPAC has high barriers to entry, and is therefore higher margin. Indeed, its operating margin of 22% is higher than NewMarket's historical average. Already, AMPAC is posting impressive sales tallies, as exhibited by the third-quarter figure of $59.1 million. This contribution led to the record share-net tally of $13.79. The debt used to buy AMPAC should be paid off fairly promptly using the company's strong cash flow-generating ability.

Over the next few years, we look for the top line to stagnate. This is because we expect the sale of petroleum additives (86% of third-quarter sales) to gradually decline as demand for internal combustion engines falls, replaced by the growing use of electric vehicles. Offsetting this decrease will probably be steady growth in the newer Specialty Materials segment, led by AMPAC. Military defense will probably be ramped up as the U.S. becomes more guarded as regards conflicts around the world. Government-funded and private space launches are also likely to increase.

Bottom-line postings are liable to be more erratic. With the growth in the Specialty Materials unit, NewMarket will become more reliant on oil as a raw material, the cost of which is notoriously capricious. Combined with the fluctuating cost of other esoteric raw materials such as polyisobutylene, friction modifiers, alcohols, solvents, and detergents, margins are likely to be more erratic.

This equity has subpar long-term total-return potential. Unless readers already own this stock, we don't advise them to buy it. The float is very slim, trading volume is negligible, and the price of an individual share is prohibitive. Better choices can be found elsewhere.

Jeremy J. Butler *November 22, 2024*

(A) Diluted earnings. Excl. non-recurring gains/(losses): '13, $1.65. Next earnings report due late January.
(B) Dividends historically paid in first week of January, April, July, and October. Special cash dividend of $.90 a share paid in 4Q, 2012.
(C) Incl. intangibles: At 12/31/23, $124.6 mill., $12.99/share.
(D) In millions.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	25
Earnings Predictability	65

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NORTHROP GRUMMAN NYSE-NOC

RECENT PRICE **488.68** | P/E RATIO **18.4** (Trailing: 18.8 Median: 16.0) | RELATIVE P/E RATIO **0.99** | DIV'D YLD **1.8%** | **VALUE LINE**

TIMELINESS 2 Raised 8/23/24
SAFETY 1 Raised 9/21/07
TECHNICAL 2 Raised 11/8/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$421-$646	$534 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	795	(+65%)	*14%*
Low	650	(+35%)	*9%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	715	641	662
to Sell	549	670	652
Hld's(000)	126310	125821	121452

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	116.2	153.2	194.0	253.8	311.2	360.9	383.9	385.0	408.0	556.3	547.8	555.6						
Low:	64.2	109.2	141.6	175.0	223.9	223.6	237.1	263.3	282.9	364.6	414.6	418.6						

LEGENDS
13.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	10.0	28.7
3 yr.	49.7	10.7
5 yr.	56.4	73.6

Percent shares traded

© VALUE LINE PUB. LLC	27-29
Revenues per sh	*384.60*
"Cash Flow" per sh	*51.90*
Earnings per sh [A]	*38.00*
Div'ds Decl'd per sh [B]■	*12.00*
Cap'l Spending per sh	*15.40*
Book Value per sh [C]	*141.55*
Common Shs Outst'g [D]	*130.00*
Avg Ann'l P/E Ratio	*19.0*
Relative P/E Ratio	*1.05*
Avg Ann'l Div'd Yield	*1.7%*
Revenues ($mill)	*50000*
Operating Margin	*15.5%*
Depreciation ($mill) [E]	*1750*
Net Profit ($mill)	*5000*
Income Tax Rate	*17.0%*
Net Profit Margin	*10.0%*
Working Cap'l ($mill)	*3100*
Long-Term Debt ($mill)	*15000*
Shr. Equity ($mill)	*18400*
Return on Total Cap'l	*15.5%*
Return on Shr. Equity	*27.0%*
Retained to Com Eq	*18.5%*
All Div'ds to Net Prof	*32%*

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	103.63	110.00	119.46	104.03	106.35	113.78	120.86	129.76	139.99	148.22	176.40	201.87	220.73	228.49	238.98	261.74	*284.85*	*302.80*
	7.77	7.52	8.52	10.36	10.49	11.29	12.76	13.55	15.17	14.30	23.62	27.58	31.37	34.35	34.71	32.49	*35.95*	*38.50*
	5.32	4.87	5.80	7.41	7.81	8.35	9.75	10.39	12.19	11.47	18.49	21.21	23.65	25.63	25.54	23.29	*26.00*	*28.00*
	1.57	1.69	1.84	1.97	2.15	2.38	2.71	3.10	3.50	3.90	4.70	5.16	5.67	6.16	6.76	7.34	*8.05*	*8.84*
	2.08	2.13	2.65	1.92	1.40	1.68	2.83	2.60	5.26	5.33	7.32	7.54	8.52	9.06	9.37	11.82	*12.25*	*12.50*
	36.45	41.34	46.59	40.71	40.12	49.00	36.47	30.46	30.04	40.49	47.99	52.61	63.45	82.80	99.98	98.56	*103.80*	*114.45*
	327.01	306.87	290.96	253.89	237.13	216.74	198.41	181.30	175.07	174.09	170.61	167.64	166.72	156.10	153.16	150.11	*145.00*	*142.00*
	12.4	9.9	10.5	8.3	8.2	10.4	12.9	16.1	17.4	23.0	16.8	15.1	13.8	13.6	18.3	19.7	*Bold figures are Value Line estimates*	
	.75	.66	.67	.52	.52	.58	.68	.81	.91	1.16	.91	.80	.71	.73	1.06	1.10		
	2.4%	3.5%	3.0%	3.2%	3.4%	2.7%	2.1%	1.9%	1.6%	1.5%	1.5%	1.6%	1.7%	1.8%	1.4%	1.6%		
							23979	23526	24508	25803	30095	33841	36799	35667	36602	39290	*41300*	*43000*
							15.3%	15.1%	14.9%	14.6%	15.2%	14.7%	14.5%	13.8%	13.7%	13.6%	*14.0%*	*14.5%*
							462.0	467.0	456.0	475.0	800.0	1018.0	1267.0	1239.0	1342.0	1338.0	*1375*	*1450*
							2069.0	1990.0	2200.0	2015.0	3229.0	3606.0	3963.0	4123.0	3974.0	3539.0	*3835*	*4020*
							29.6%	28.7%	24.7%	33.9%	13.7%	17.1%	16.8%	10.4%	14.9%	16.2%	*17.0%*	*17.0%*
							8.6%	8.5%	9.0%	7.8%	10.7%	10.7%	10.8%	11.6%	10.9%	9.0%	*9.3%*	*9.3%*
							2292.0	877.0	1226.0	9384.0	1406.0	1251.0	5764.0	2896.0	901.0	1764.0	*1850*	*2600*
							5925.0	6416.0	7058.0	14399	13883	12770	14261	12777	11805	13786	*14700*	*14700*
							7235.0	5522.0	5259.0	7048.0	8187.0	8819.0	10579	12926	15312	14795	*15050*	*16250*
							16.8%	17.9%	19.1%	10.2%	15.9%	17.9%	17.1%	17.1%	15.6%	13.3%	*14.0%*	*14.0%*
							28.6%	36.0%	41.8%	28.6%	39.4%	40.9%	37.5%	31.9%	26.0%	23.9%	*25.0%*	*25.0%*
							20.8%	25.1%	29.7%	18.8%	29.4%	30.9%	28.5%	24.3%	19.1%	16.4%	*17.0%*	*17.0%*
							27%	30%	29%	34%	25%	24%	24%	24%	26%	32%	*31%*	*32%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $16278 mill. **Due in 5 Yrs** $4979 mill.
LT Debt $14689 mill. **Total Interest** $630 mill.
(Total Interest Coverage: 8.3x)
(50% of Cap'l)
Leases, Uncapitalized $363 mill.
Pension Assets-12/23 $30.25 bill. **Oblig.** $30.4 bill.

Pfd Stock None

Common Stock 145,695,342 shs.
as of 10/21/24

MARKET CAP: $71.2 billion (Large Cap)

CURRENT POSITION ($MILL)	2022	2023	9/30/24
Cash Assets	2577	3109	3272
Receivables	1511	1454	1694
Inventory (Avg Cost)	978	1109	1504
Other	7422	8034	7797
Current Assets	12488	13706	14267
Accts Payable	2587	2110	2352
Debt Due	1072	70	1590
Other	7928	9762	8966
Current Liab.	11587	11942	12908

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	8.5%	9.5%	*7.5%*
"Cash Flow"	12.0%	14.0%	*8.0%*
Earnings	12.0%	12.0%	*8.0%*
Dividends	12.0%	11.0%	*10.0%*
Book Value	8.0%	19.0%	*7.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	9157	9151	8720	8639	35667
2022	8797	8801	8971	10033	36602
2023	9301	9576	9775	10638	39290
2024	10133	10218	9996	*10953*	*41300*
2025	*10325*	*10425*	*10700*	*11550*	*43000*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	6.57	6.42	6.63	6.00	25.63
2022	6.10	6.06	5.89	7.50	25.54
2023	5.50	5.34	6.18	6.27	23.29
2024	6.32	6.36	7.00	*6.32*	*26.00*
2025	*6.55*	*6.70*	*7.30*	*7.45*	*28.00*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	1.32	1.45	1.45	1.45	5.67
2021	1.45	1.57	1.57	1.57	6.16
2022	1.57	1.73	1.73	1.73	6.76
2023	1.73	1.87	1.87	1.87	7.34
2024	1.87	2.06	2.06		

BUSINESS: Northrop Grumman Corporation operates in several main sectors. It is a leading maker of manned and unmanned airborne systems; a designer of electronic warfare items; makes space systems and provides advanced information systems. Acquired satellite and missile systems maker Orbital ATK in 2018. Has approximately 101,000 employees. Consolidated backlog at 12/31/23: $84.2 billion. U.S. Government accounted for 86% of total revenues in '23. Officers & directors own less than 1% of common stock; State Street Corp., 9.4%; Vanguard Group, 8.2%; Capital Int'l Investors, 7.7% (4/24 Proxy). Chair, CEO & Pres.: Kathy J. Warden. Inc.: DE. Address: 2980 Fairview Park Drive, Falls Church, VA 22042. Tele.: 703-280-2900. Int.: www.northropgrumman.com.

Northrop Grumman appears on pace for record profits this year. The defense contractor's margins were hit hard by the surge in materials and labor costs that came with the post-pandemic macro environment. The company seems to be turning that situation around this year in part from improved economies of scale that have come with the 6% top-line growth over the first nine months of 2024, as compared to the comparable-2023 stretch. Earnings surprised strongly to the upside in the third quarter, prompting management to lift its targets for the full year by $0.75 a share. Accordingly, we've raised our 2024 estimate by $0.80, to $26.00 a share, and our 2025 forecast by $0.30 to $28.00. The stock's reaction since the third-quarter release has been a mild selloff, as Wall Street was likely disappointed by management's failure to raise its revenue guidance range of $41.0 billion to $41.4 billion for 2024. At the midpoint, the in-house outlook represents a 4%-5% year-on-year increase. And, 2024 seems to be a tale of two halves with some softer percentage gains taking place in the final two periods.

We're looking for top-line growth to reaccelerate some starting from the back half of next year. Some older programs are winding down at this point, while some in the design and development stage ought to begin going into the production phase in coming quarters or ramping up towards that end. Newer projects include: the Next-Generation Overhead Infrared program for the building of two satellites designed to detect missile threats; the Glide Phase Interceptor missile defense system designed to shoot down hypersonic weapons during their glide phase; the B-21 Raider strategic bomber, expected to remain in a low-rate initial production phase to late decade; the Model 437 Vanguard, a stealth aircraft being developed to provide a versatile, cost-effective, and expendable craft; and the Sentinel Intercontinental Ballistic Missile. **These shares are ranked to outperform the broader market averages over the next six to 12 months (Timeliness: 2, Above Average).** Annual total return prospects appear worthwhile, especially on a risk-adjusted basis.

Anthony J. Glennon *November 29, 2024*

(A) Diluted earnings. Excl. net nonrecurring gains/(losses): '08, ($9.09); '09, 34¢; '10, $1.02; '11, 11¢; '19, ($7.99); '20, ($4.62); '21, $17.91; '22, $5.93; '23, ($9.76). Next earnings report due late January.
(B) Div'd historically paid in March, June, Sept., and Dec. ■ Div'd reinvest. plan available.
(C) Incl. intang. assets. In 2023: $17.8 bill., $118.72/sh.
(D) In millions.
(E) Depreciation on accelerated basis.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	80
Earnings Predictability	90

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ORACLE NYSE-ORCL

RECENT PRICE 173.76 | P/E RATIO 28.4 (Trailing: 30.1 Median: 15.0) | RELATIVE P/E RATIO 1.53 | DIV'D YLD 0.9% | VALUE LINE

TIMELINESS 3 Raised 3/29/24
SAFETY 1 Raised 5/22/09
TECHNICAL 3 Raised 11/1/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

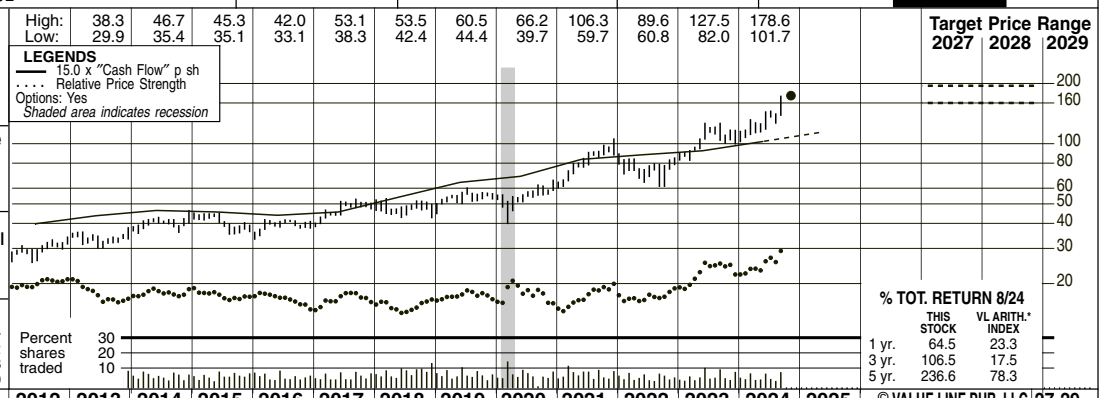
Low-High	Midpoint (% to Mid)
$131-$258	$195 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	195	(+10%)	*4%*
Low	160	(-10%)	*-1%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	1316	1322	1452
to Sell	1047	1167	1103
Hld's(000)	1180111	1184878	1215609



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
4.39	4.69	5.38	7.07	7.59	8.02	8.58	8.81	8.97	9.16	9.98	11.77	12.74	14.39	15.93	18.41	19.22	*21.90*	Sales per sh [A]	*31.60*
1.37	1.53	1.75	2.32	2.65	2.91	3.10	3.04	2.93	3.04	3.61	4.28	4.59	5.57	5.87	6.16	6.84	*7.65*	"Cash Flow" per sh	*11.20*
1.30	1.44	1.67	2.22	2.46	2.68	2.87	2.77	2.61	2.74	3.13	3.52	3.85	4.67	4.90	5.12	5.56	*6.30*	Earnings per sh [AB]	*9.30*
- -	.05	.20	.20	.24	.30	.48	.51	.60	.64	.76	.81	.96	1.04	1.28	1.36	1.60	*1.64*	Div'ds Decl'd per sh [E]	*2.40*
.05	.11	.05	.09	.13	.14	.13	.32	.29	.49	.43	.49	.51	.76	1.69	3.21	2.49	*3.75*	Cap'l Spending per sh	*4.00*
4.47	5.01	6.13	7.85	8.91	9.61	10.50	11.21	11.45	13.02	11.44	6.49	3.94	1.86	d2.33	.40	3.16	*5.30*	Book Value per sh [D]	*8.00*
5150.0	5005.0	5026.0	5068.0	4905.0	4646.0	4464.0	4343.0	4131.0	4137.0	3997.0	3359.0	3067.0	2814.0	2665.0	2713.0	2755.0	*2650.0*	Common Shs Outst'g [C]	*2500.0*
15.8	13.1	13.7	13.0	12.0	12.0	12.5	15.1	14.8	15.0	15.5	14.1	14.0	13.4	17.4	15.9	20.6		Avg Ann'l P/E Ratio	*19.0*
.95	.87	.87	.82	.76	.67	.66	.76	.78	.75	.84	.75	.72	.72	1.01	.89	1.15		Relative P/E Ratio	*1.00*
- -	.3%	.9%	.7%	.8%	.9%	1.3%	1.2%	1.6%	1.6%	1.6%	1.6%	1.8%	1.7%	1.5%	1.7%	1.4%		Avg Ann'l Div'd Yield	*1.5%*
38305	38253	37056	37900	39878	39526	39073	40481	42440	49954	52961	*58000*	Sales ($mill) [A]	*79000*
48.9%	47.3%	44.9%	45.3%	47.0%	47.1%	48.0%	50.7%	50.8%	46.9%	49.4%	*47.5%*	Operating Margin	*46.5%*
608.0	712.0	871.0	1000.0	1165.0	1230.0	1382.0	1537.0	1972.0	2526.0	3129.0	*3200*	Depreciation ($mill)	*4200*
13214	12489	11236	11560	13244	13137	12683	14125	13661	14176	15710	*17100*	Net Profit ($mill)	*23840*
22.5%	23.6%	23.2%	22.8%	21.1%	18.5%	18.4%	15.9%	16.3%	16.3%	19.2%	*18.0%*	Income Tax Rate	*19.0%*
34.5%	32.6%	30.3%	30.5%	33.2%	33.2%	32.5%	34.9%	32.2%	28.4%	29.7%	*29.5%*	Net Profit Margin	*30.2%*
33749	47892	47105	50337	56769	27756	34940	31403	12122	d2086	d8990	*d3000*	Working Cap'l ($mill)	*6500*
22667	39959	40105	48112	56128	51673	69226	75995	72110	86420	76264	*75000*	Long-Term Debt ($mill)	*80000*
46878	48663	47289	53860	45726	21785	12074	5238.0	d6220	1073.0	8704.0	*14090*	Shr. Equity ($mill)	*20000*
19.7%	14.7%	13.7%	12.2%	14.0%	19.3%	16.8%	18.9%	22.7%	18.2%	20.6%	*19.0%*	Return on Total Cap'l	*24.0%*
28.2%	25.7%	23.8%	21.5%	29.0%	60.3%	105.0%	NMF	NMF	NMF	NMF	*NMF*	Return on Shr. Equity	*NMF*
23.5%	21.0%	18.4%	16.6%	22.1%	46.8%	79.6%	NMF	NMF	NMF	NMF	*NMF*	Retained to Com Eq	*NMF*
16%	18%	23%	23%	24%	22%	24%	22%	25%	26%	28%	*26%*	All Div'ds to Net Prof	*27%*

CAPITAL STRUCTURE as of 8/31/24
Total Debt $84515 mill. **Due in 5 Yrs** $21516 mill.
LT Debt $75314 mill. **LT Interest** $3250 mill.
(99% of Cap'l)
Leases, Uncapitalized Annual rentals $906.0 mill.

No Defined Benefit Pension Plan
Pfd Stock None

Common Stock 2,770,968,000 shs.
as of 9/6/24

MARKET CAP: $481 billion (Large Cap)

CURRENT POSITION ($MILL.)	2023	2024	8/31/24
Cash Assets	10187	10661	10911
Receivables	6915	7874	8021
Other	3902	4019	4140
Current Assets	21004	22554	23072
Accts Payable	1204	2357	2207
Debt Due	4061	10605	9201
Deferred Revenue	8970	9313	11455
Other	8855	9269	9182
Current Liab.	23090	31544	32045

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '22-'24 to '27-'29
Sales	8.5%	11.5%	*11.0%*
"Cash Flow"	8.0%	11.5%	*10.5%*
Earnings	7.0%	10.5%	*10.0%*
Dividends	15.5%	14.0%	*12.0%*
Book Value	-27.0%	-47.5%	*NMF*

Fiscal Year Ends	QUARTERLY SALES ($ mill.)[A] Aug.Per	Nov.Per	Feb.Per	May.Per	Full Fiscal Year
2021	9368	9800	10086	11227	40481
2022	9728	10360	10513	11839	42440
2023	11445	12275	12398	13837	49954
2024	12453	12941	13280	14287	52961
2025	13307	*14200*	*14600*	*16293*	*58000*

Fiscal Year Ends	EARNINGS PER SHARE [AB] Aug.Per	Nov.Per	Feb.Per	May.Per	Full Fiscal Year
2021	.93	1.06	1.16	1.54	4.67
2022	1.03	1.21	1.13	1.53	4.90
2023	1.03	1.21	1.22	1.66	5.12
2024	1.19	1.34	1.41	1.62	5.56
2025	1.39	*1.50*	*1.60*	*1.81*	*6.30*

Cal-endar	QUARTERLY DIVIDENDS PAID [E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.24	.24	.24	.24	.96
2021	.24	.32	.32	.32	1.20
2022	.32	.32	.32	.32	1.28
2023	.32	.40	.40	.40	1.52
2024	.40	.40	.40	.40	

BUSINESS: Oracle Corporation provides products and services that adresss all aspects of corporate information technology environments. Oracle's products are delivered via a range of deployment models, including on-premise, cloud-based, and hybrid. 2022 revenue breakdown: cloud services and license support, 84%; hardware systems, 5.7%; Services, 10.3%. Foreign sales, 37.5%. R&D, 16.8% of 2024 sales. Employed 164,000 at 5/31/23. Stock owners: Lawrence J. Ellison, 41.6%; other officers & directors, 0.6%; Vanguard Group: 5.4%. (9/24 proxy). Chairman & CTO: Lawrence J. Ellison; Chief Executive Officer: Safra A. Catz. Inc.: Delaware. Address: 2300 Oracle Way, Austin, TX 78741. Telephone: 737-867-1000. Internet: www.oracle.com.

Oracle's year-over-year earnings growth resumed in the August interim. (Fiscal 2025 ends May 31st.) After a negative comparison in the previous quarter, earnings jumped 18% to $1.39 per share, or $0.09 above our estimate. Revenues climbed 7%. The total Remaining Performance Obligations were up 53% to $99 billion. Cloud Application revenue rose 10% to $3.5 billion, while Cloud infrastructure revenue soared 45%. In-roads into the multicloud market are making ORCL a big player in the datacenter industry.

A new, widely-hailed deal with Amazon Web Services is further solidifying Oracle's position within the datacenter landscape. Customers will now be able to use Oracle database technology within Amazon's cloud network. Oracle already has arrangements with Microsoft Azure and Google. The Amazon collaberation includes its latest technology *Exadata* hardware and its database software version 23ai. allowing greater flexibility for its customers. Still,

The datacenter buildout continues to ramp. At quarter end, 162 datacenters were either in operation or being constructed. To enable the large language models that require such massive datacenters, Oracle must purchase enormous sums of GPU chips. In the August period, it signed $3 billion worth of cloud GPU contracts. Its ability to secure optimal NVDA chips is not in question.

We are raising our long-term projections, as well as the expected 2027-2029 earnings multiple. The combination of a higher annual revenue growth rate forecast (11% currently), as well as greater confidence in Oracle's cloud software strategy, have prompted us to grant the stock a premium multiple. The P/E ratio is now 19x versus the prior 18x. We think that this level is justified considering the accelerated growth rates.

The stock is ranked to perform in line with the market averages over the coming year. Unfortunately for investors looking to initiate a position, the stock has ripped higher throughout much of the year. Even though we have raised our Target Price Range, 3- to 5-year capital appreciation looks well below the *Value Line* median at the recent price.

Charles C. Moran *November 1, 2024*

(A) Fiscal year ends May 31st.
(B) Diluted earnings. Excl. nonrec. items: '08, d24¢; '09, d35¢; '10, d46¢; '11, d55¢; '12, d50¢; '13, d60¢; '14, d49¢; '15, d56¢; '16, d54¢; '17, d53¢; '18, d$2.23; '19, d55¢; '20, d77¢; '21, d12¢; '22, d2.47. Quarters may not sum to annual figure, due to changes in diluted shares outstanding. Next earnings report due late Dec.
(C) In millions. **(D)** Incl. intang. In 2024, $69.1 bill., $31.27 a share. **(E)** Div'ds usually paid late January, April, July, and October.

Company's Financial Strength	A+
Stock's Price Stability	60
Price Growth Persistence	80
Earnings Predictability	100

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O'REILLY AUTO. NDQ-ORLY

RECENT PRICE 1151.42 | P/E RATIO 27.2 (Trailing: 29.0 Median: 21.0) | RELATIVE P/E RATIO 1.49 | DIV'D YLD Nil | VALUE LINE

TIMELINESS 3 Lowered 3/15/24
SAFETY 2 Raised 7/21/23
TECHNICAL 3 Lowered 10/11/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$1005-$1619	$1312 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	1595	(+40%)	*9%*
Low	1175	(Nil)	*1%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	589	598	632
to Sell	558	619	587
Hld's(000)	50321	50186	50918

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	135.6	196.8	278.0	292.8	284.0	363.2	454.3	488.0	710.9	870.9	1006	1171							Target Price Range	2027 2028 2029
Low:	87.1	128.2	179.0	225.1	169.4	217.6	329.9	251.5	424.0	562.9	767.3	914.5								
Sales per sh	26.53	35.26	38.27	45.52	51.02	60.87	69.21	81.51	92.55	106.49	120.65	134.23	163.16	198.83	231.10	267.68	*296.45*	*327.20*	Sales per sh	*424.65*
"Cash Flow" per sh	2.32	3.28	4.20	5.41	6.30	7.81	9.33	11.68	13.52	16.22	20.03	21.98	29.06	37.19	40.58	46.65	*49.45*	*54.10*	"Cash Flow" per sh	*71.05*
Earnings per sh A	1.64	2.23	3.05	3.81	4.75	6.03	7.34	9.17	10.73	12.67	16.10	17.88	23.53	31.10	33.44	38.47	*41.30*	*46.00*	Earnings per sh A	*62.95*
Div'ds Decl'd per sh	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
Book Value per sh	16.93	19.54	22.76	22.37	17.40	18.00	19.36	20.07	17.52	7.75	4.47	5.25	1.97	d.99	d17.01	d29.44	*d41.60*	*d42.30*	Book Value per sh	*d24.95*
Common Shs Outst'g B	134.83	137.47	141.03	127.18	121.18	109.24	104.26	97.74	92.85	84.30	79.04	75.62	71.12	67.03	62.35	59.07	*56.50*	*54.40*	Common Shs Outst'g B	*48.70*
Avg Ann'l P/E Ratio	16.4	16.2	15.9	16.8	18.8	18.9	21.2	25.2	25.1	18.5	18.3	21.9	17.9	18.1	21.0	23.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.0*
Relative P/E Ratio	.99	1.08	1.01	1.05	1.20	1.06	1.12	1.27	1.32	.93	.99	1.17	.92	.98	1.21	1.32			Relative P/E Ratio	*1.20*
Avg Ann'l Div'd Yield	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -			Avg Ann'l Div'd Yield	*Nil*
Sales ($mill)							7216.1	7966.7	8593.1	8977.7	9536.4	10150	11604	13328	14410	15812	*16750*	*17800*	Sales ($mill)	*20680*
Gross Margin							54.1%	54.9%	55.0%	55.2%	55.6%	55.8%	55.2%	55.1%	53.7%	53.5%	*53.0%*	*53.0%*	Gross Margin	*54.0%*
Operating Margin							20.3%	21.6%	22.3%	21.8%	21.7%	21.6%	23.6%	24.4%	23.0%	22.5%	*22.0%*	*22.0%*	Operating Margin	*23.0%*
Number of Stores							4366	4571	4829	5019	5219	5460	5616	5784	5971	6157	*6350*	*6550*	Number of Stores	*7110*
Net Profit ($mill)							778.2	931.2	1037.7	1133.8	1324.5	1391.0	1752.3	2164.7	2172.7	2346.6	*2390*	*2550*	Net Profit ($mill)	*3125*
Income Tax Rate							36.3%	36.2%	36.6%	30.8%	21.8%	22.3%	22.7%	22.2%	22.4%	21.9%	*22.5%*	*22.5%*	Income Tax Rate	*22.5%*
Net Profit Margin							10.8%	11.7%	12.1%	12.6%	13.9%	13.7%	15.1%	16.2%	15.1%	14.8%	*14.3%*	*14.3%*	Net Profit Margin	*15.1%*
Working Cap'l ($mill)							236.4	d36.4	d142.7	d249.7	d350.9	d635.7	d762.6	d1370	d2015	d2103	*d2000*	*d1900*	Working Cap'l ($mill)	*d1600*
Long-Term Debt ($mill)							1396.6	1390.0	1887.0	2978.4	3417.1	3890.5	4123.2	3827.0	4371.7	5570.1	*5570*	*5570*	Long-Term Debt ($mill)	*5200*
Shr. Equity ($mill)							2018.4	1961.3	1627.1	653.0	353.7	397.3	140.3	d66.4	d1061	d1739	*d2350*	*d2300*	Shr. Equity ($mill)	*d1215*
Return on Total Cap'l							23.6%	28.6%	30.5%	32.5%	36.7%	34.1%	43.0%	59.5%	68.0%	82.5%	*78.5%*	*82.0%*	Return on Total Cap'l	*81.5%*
Return on Shr. Equity							38.6%	47.5%	63.8%	NMF	NMF	NMF	NMF	- -	- -	- -	*NMF*	*NMF*	Return on Shr. Equity	*NMF*
Retained to Com Eq							38.6%	47.5%	63.8%	NMF	NMF	NMF	NMF	- -	- -	- -	*NMF*	*NMF*	Retained to Com Eq	*NMF*
All Div'ds to Net Prof							- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	20.2	14.1
3 yr.	90.2	11.1
5 yr.	194.4	80.9

CAPITAL STRUCTURE as of 6/30/24
Total Debt $5397.8 mill. **Due in 5 Yrs** $3250.9 mill.
LT Debt $5397.8 mill. **LT Interest** $200 mill.
(more than 100% of Cap'l)
(Total interest coverage: 15.9x)
Leases, Uncapitalized $390.2 mill.
No Defined Benefit Pension Plan

Pfd Stock None
Common Stock 58,005,664 shs.

as of 7/29/24

MARKET CAP: $66.8 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	108.6	279.1	145.0
Receivables	343.2	375.0	475.6
Inventory (LIFO)	4359.1	4658.4	4788.7
Other	237.4	245.8	270.2
Current Assets	5048.3	5558.3	5679.5
Accts Payable	5881.1	6091.7	6226.2
Debt Due	300.0	750.9	- -
Other	882.7	818.8	1897.0
Current Liab.	7063.8	7661.4	8123.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	16.0%	17.0%	*10.5%*
"Cash Flow"	20.5%	20.0%	*9.5%*
Earnings	21.5%	21.0%	*10.5%*
Dividends	- -	- -	*Nil*
Book Value	- -	- -	*NMF*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	3091	3466	3480	3291	13328
2022	3296	3671	3799	3644	14410
2023	3708	4069	4203	3832	15812
2024	3976	4272	*4440*	*4062*	*16750*
2025	*4225*	*4540*	*4720*	*4315*	*17800*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	7.06	8.33	8.07	7.64	31.10
2022	7.17	8.78	9.17	8.37	33.44
2023	8.28	10.22	10.72	9.26	38.47
2024	9.20	10.55	*11.65*	*9.90*	*41.30*
2025	*10.25*	*11.75*	*13.00*	*11.00*	*46.00*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

BUSINESS: O'Reilly Automotive, Inc. supplies aftermarket autoparts, tools, equipment, and accessories to both "do-it-yourself" (DIY) customers and professional mechanics or service technicians. Also offers services, including used oil/battery recycling and wiper/bulb replacement. As of Dec. 31, 2023, operated 6,157 stores in 47 states, Mexico, and Puerto Rico. Acquired Canada's Groupe Del Vasto, 1/22/24. At 1/31/24, had 90,302 employees, including 14,688 part-timers. Offs./dirs. own 1.2% of common stock; Vanguard Group, 8.5%; BlackRock, 6.9% (3/24 Proxy). CEO: Brad Beckham; Chairman: Greg Henslee. Incorporated: Missouri. Address: 233 South Patterson, Springfield, Missouri 65802. Telephone: 417-862-6708. Internet: www.oreillyauto.com.

We have lowered our 2024 share-earnings estimate for O'Reilly Automotive by $1.50. At $41.30, our new call represents an increase of 7% over the $38.47 that the retailer and distributor of aftermarket auto parts tallied in 2023. Key assumptions include acquisition-aided revenue of $16.75 billion (up 6%, year over year) and a 50-basis-point compression in the Missouri company's net profit margin.

Our less-positive near-term stance largely reflects growing concern about the Do-It-Yourself (DIY) segment (53% of total company 2023 revenues). In the latest June quarter, comparable-store sales within O'Reilly's DIY business surprisingly fell by almost 1%, as a decline in overall transaction volume more than offset greater price realization. As we understand it, people who tinker on their own cars (as a hobby or out of necessity) are generally spending less money these days on discretionary/vanity items, while also putting off maintenance whenever possible. That seems to be especially the case for lower-income households.

The long-term picture still seems pretty bright. Within the United States alone, the market for aftermarket autoparts represents an estimated $147 billion-a-year opportunity for O'Reilly and its peers. Additionally, through the acquisitions of Mayoreo de Autopartes y Aceites (completed November 2019) and Groupe Del Vasto (January 2024), O'Reilly entered the Mexican and Canadian markets, which together serve large vehicle populations totaling more than 81 million. Too, the DIY business should ultimately bounce back, as car owners can only defer maintenance for so long before they run the risk of a more costly breakdown.

O'Reilly's share price was recently the seventh-highest within the S&P 500 Index. With that in mind, we think that a stock split could be a catalyst for higher trading volume and more attractive shareholder returns, even as several brokerages already enable investors to buy fractional stakes in many high-priced stocks.

We continue to like the O'Reilly Automotive story but still consider its shares a bit expensive. A pullback in price would get us more excited.

Nils C. Van Liew *October 18, 2024*

(A) Next earnings report due late October. Earnings may not sum due to rounding. Excludes nonrecurring charges: '10, $0.14; '11, $0.11.

(B) In millions.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	95
Earnings Predictability	100

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OSI SYSTEMS, INC. NDQ-OSIS

RECENT PRICE 131.41 | P/E RATIO 16.2 (17.2 / 23.0) | RELATIVE P/E RATIO 0.89 | DIV'D YLD Nil | VALUE LINE

TIMELINESS 4 Lowered 11/8/24
SAFETY 2 Raised 5/12/23
TECHNICAL 2 Raised 11/8/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$109-$216	$163 (25%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	235	(+80%)	*11%*
Low	175	(+35%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	108	104	136
to Sell	114	126	115
Hld's(000)	15203	15054	15771

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	78.5	74.8	96.8	88.3	96.6	82.9	114.4	102.6	102.2	103.2	139.9	158.7								
Low:	39.0	51.8	66.0	48.2	53.8	50.5	70.2	50.0	88.0	69.3	78.4	120.4								
Sales per sh A	35.12	33.91	32.47	33.63	40.01	40.28	45.47	48.60	43.87	51.42	60.41	65.07	64.74	64.24	70.14	76.14	92.86	*100.30*	Sales per sh A	*111.75*
"Cash Flow" per sh	1.87	1.66	2.30	2.66	3.32	3.60	5.12	6.30	4.45	4.78	5.32	6.66	6.94	6.60	9.13	7.76	10.28	*10.75*	"Cash Flow" per sh	*12.35*
Earnings per sh AB	.78	.63	1.28	1.71	2.24	2.15	2.33	3.17	1.30	1.07	1.40	3.46	4.05	4.03	6.45	5.34	7.38	*8.10*	Earnings per sh AB	*9.50*
Div'ds Decl'd per sh	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	Div'ds Decl'd per sh	*Nil*
Cap'l Spending per sh	.68	.62	.99	.69	3.46	7.90	2.74	.78	.94	.91	2.40	1.51	1.13	.88	.88	.94	1.33	*1.65*	Cap'l Spending per sh	*1.45*
Book Value per sh D	15.67	15.85	17.12	19.73	21.90	24.03	26.69	29.51	28.60	30.46	27.14	30.37	31.77	35.84	37.84	43.25	52.11	*47.75*	Book Value per sh D	*65.30*
Common Shs Outst'g C	17.74	17.41	18.33	19.51	19.82	19.91	19.94	19.72	18.91	18.69	18.03	18.17	18.01	17.85	16.87	16.79	16.57	*16.75*	Common Shs Outst'g C	*17.00*
Avg Ann'l P/E Ratio	30.9	27.6	18.5	20.7	22.5	30.2	27.7	22.0	54.4	66.4	53.7	24.0	22.6	21.9	13.9	17.6	17.3		Avg Ann'l P/E Ratio	*21.5*
Relative P/E Ratio	1.86	1.84	1.18	1.30	1.43	1.70	1.46	1.11	2.86	3.34	2.90	1.28	1.16	1.18	.80	1.02	.96		Relative P/E Ratio	*1.20*
Avg Ann'l Div'd Yield	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		Avg Ann'l Div'd Yield	*Nil*
Sales ($mill) A							906.7	958.2	829.7	961.0	1089.3	1182.1	1166.0	1146.9	1183.2	1278.4	1538.8	*1680*	Sales ($mill) A	*1900*
Operating Margin							16.3%	16.8%	14.3%	15.4%	14.7%	14.2%	13.8%	14.8%	14.2%	13.3%	15.0%	*16.0%*	Operating Margin	*17.5%*
Depreciation ($mill)							54.2	59.0	57.9	68.2	69.8	56.2	49.8	43.9	38.7	38.5	42.2	*45.0*	Depreciation ($mill)	*50.0*
Net Profit ($mill)							47.9	65.2	26.2	21.1	26.2	64.8	75.3	74.1	115.4	91.8	128.2	*135*	Net Profit ($mill)	*160*
Income Tax Rate							36.9%	26.7%	26.3%	18.1%	29.0%	24.8%	12.6%	24.9%	17.7%	17.6%	20.5%	*20.0%*	Income Tax Rate	*20.0%*
Net Profit Margin							5.3%	6.8%	3.2%	2.2%	2.4%	5.5%	6.5%	6.5%	9.7%	7.2%	8.3%	*8.1%*	Net Profit Margin	*8.5%*
Working Cap'l ($mill)							269.2	292.2	187.5	306.9	207.4	258.9	287.6	364.6	132.2	268.2	400.9	*600*	Working Cap'l ($mill)	*450*
Long-Term Debt ($mill)							10.4	8.6	6.1	241.8	249.0	257.8	267.1	276.4	48.7	136.5	129.4	*460*	Long-Term Debt ($mill)	*330*
Shr. Equity ($mill)							532.2	581.8	540.8	569.2	489.4	551.7	572.2	639.8	638.4	726.2	863.5	*800*	Shr. Equity ($mill)	*1110*
Return on Total Cap'l							8.8%	11.1%	4.8%	3.0%	4.4%	8.7%	9.7%	8.8%	17.1%	11.8%	14.3%	*12.0%*	Return on Total Cap'l	*12.0%*
Return on Shr. Equity							9.0%	11.2%	4.8%	3.7%	5.3%	11.7%	13.2%	11.6%	18.1%	12.6%	14.8%	*16.0%*	Return on Shr. Equity	*15.5%*
Retained to Com Eq							9.0%	11.2%	4.8%	3.7%	5.3%	11.7%	13.2%	11.6%	18.1%	12.6%	14.8%	*16.0%*	Retained to Com Eq	*15.5%*
All Div'ds to Net Prof							- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $476.3 mill. **Due in 5 Yrs** $468.1 mill.
LT Debt $468.1 mill. **LT Interest** $30.0 mill.
(Interest Coverage: 7.3x) (37% of Capital)

Leases, Uncapitalized Annual rentals $31.0 mill.

Pension Assets-6/23 $6.5 mill. **Oblig.** $18.2 mill.

Common Stock 16,710,749 shares
as of 10/21/24

MARKET CAP: $2.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2023	2024	9/30/24
Cash Assets	76.8	95.3	85.1
Receivables	380.8	648.2	687.6
Inventory (FIFO)	338.0	397.9	456.0
Other	44.3	74.1	81.3
Current Assets	839.9	1215.5	1310.0
Accts Payable	139.0	191.1	269.1
Debt Due	8.1	8.2	8.2
Other	424.6	615.3	435.2
Current Liab.	571.7	814.6	712.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	6.0%	5.5%	*6.0%*
"Cash Flow"	9.5%	10.0%	*7.0%*
Earnings	10.0%	33.0%	*10.5%*
Dividends	- -	- -	*Nil*
Book Value	5.5%	5.0%	*8.0%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) A Sep.30	Dec.31	Mar.31	Jun.30	Full Fiscal Year
2021	254.9	276.0	283.8	332.2	1146.9
2022	279.2	276.7	290.5	336.8	1183.2
2023	268.1	295.6	302.9	411.8	1278.4
2024	279.2	373.2	405.4	481.0	1538.8
2025	344.0	*400*	*430*	*506*	*1680*

Fiscal Year Ends	EARNINGS PER SHARE AB Sep.30	Dec.31	Mar.31	Jun.30	Full Fiscal Year
2021	.51	1.10	1.03	1.40	4.03
2022	1.04	1.09	2.41	1.94	6.45
2023	.65	.96	1.27	2.46	5.34
2024	.75	2.11	1.95	2.55	7.38
2025	1.05	*2.20*	*2.10*	*2.75*	*8.10*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

BUSINESS: OSI Systems designs and manufactures electronic systems and components for homeland security, healthcare, defense, and aerospace markets worldwide. Operates in three segments: Security, Healthcare, and Optoelectronics & Manufacturing. The Security segment (Rapidscan) offers baggage and parcel inspection systems. Healthcare offers patient, cardiology, and remote monitoring systems. Optoelectronics & Manufacturing offers specialized components and manufacturing services. Has 6,425 empls. Off. & Dir. own 5.3% common stock; BlackRock, 15.8%; Vanguard Group, 12.6% (10/24). Chairman, CEO & President: Deepak Chopra. Inc.: DE. Addr.: 12525 Chadron Ave., Hawthorne, CA 90250. Tel.: (310) 978-0516. Internet: www.osi-systems.com.

OSI Systems has extended its momentum into fiscal 2025. (Years end June 30th.) Fiscal 2024 was a banner year for the provider of advanced security and electronic system solutions, yielding top- and bottom-line records in the fourth-quarter and full-year. The brisk pace has continued into fiscal 2025, with record first-quarter sales of $344 million, a 23% increase compared to the $279 million reported for the same quarter of the prior year. For the bottom line, reported earnings expanded 40% year-over-year, to $1.05 per share, and comfortably topped our call of $0.88 per share.

Heightened demand for high-performance threat detection screening solutions is providing a tailwind. Spurred by public and private sector mandates, OSI's backlog remains near all-time highs due to its broad, leading security platforms. More importantly, the company has an attractive one-stop-shop advantage demonstrated by its ability to develop and operate comprehensive large-scale solutions with cutting-edge screening systems, staffing, training, and maintenance. This has resulted in a robust pipeline of opportunities, primarily within the company's Security division and, more specifically, for its global security operations software.

Management is focused on highly recurring and reoccurring sales across diverse, high-margin end markets. The strategy revolves around flexible, multi-year, security-as-a-service and software-as-a-service solutions.

Meanwhile, the company recently closed its $300 million aggregate principal offering of senior convertible notes. The offering size was increased from its previous $275 million due to outsized demand slots. The notes will accrue interest at a rate of 2.25% per annum, payable semi-annually in arrears beginning on February 1, 2025. OSI intends to use roughly $80 million on stock repurchases and the remainder for reducing the balance of its revolving credit facility.

OSI shares carry a rank of 4 (Below Average), on *Value Line's* Timeliness scale. Concurrently, this issue holds attractive 18-month upside and solid capital appreciation potential out to 2027-2029.

Michal Worth *November 8, 2024*

(A) Fiscal years end June 30th.
(B) GAAP Diluted EPS. Excludes nonrecurring loss: '18, $2.97 U.S. tax reform chrg. only. Quarterly earnings may not sum due to rounding differences. Next earnings report due late January.
(C) In millions.
(D) Includes intangibles, at 9/30/24: $564.7 million, or $33.79 per share.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	45
Earnings Predictability	55

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PRESTIGE CON NYSE-PBH

RECENT PRICE **74.64** | P/E RATIO **16.8** (Trailing: 18.1 Median: 14.0) | RELATIVE P/E RATIO **0.92** | DIV'D YLD **Nil** | VALUE LINE **1200**

TIMELINESS 3 Raised 8/23/24
SAFETY 2 Raised 3/15/24
TECHNICAL 2 Raised 8/30/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$63-$107	$85 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	100	(+35%)	*8%*
Low	75	(Nil)	*Nil*

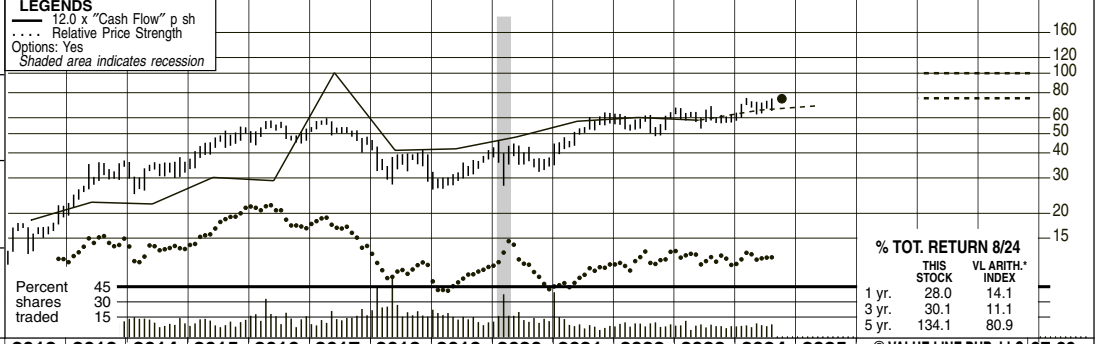
Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	126	135	142
to Sell	141	131	144
Hld's(000)	50855	50617	51087

High:	36.7	38.2	54.3	58.1	59.6	46.4	41.4	46.1	63.8	64.1	68.5	75.3						
Low:	19.5	24.9	33.3	43.6	40.1	27.8	26.3	27.4	34.7	48.5	52.9	57.9						

LEGENDS
12.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029



% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	28.0	14.1
3 yr.	30.1	11.1
5 yr.	134.1	80.9

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
6.26	6.04	6.71	8.77	12.20	11.62	13.81	15.28	16.66	19.63	18.94	19.23	18.90	21.62	22.69	22.59	*23.05*	*24.25*	Revenues per sh	*29.45*
d.27	.89	.78	.95	1.54	1.89	1.85	2.51	2.43	8.38	3.44	3.50	4.00	4.81	5.01	4.86	*5.35*	*5.75*	"Cash Flow" per sh	*6.95*
d.49	.65	.58	.73	1.27	1.62	1.49	1.88	1.93	7.55	2.79	2.78	3.25	4.04	4.21	4.21	*4.45*	*4.75*	Earnings per sh [A]	*5.75*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
.01	.01	.01	.01	.20	.05	.12	.07	.06	.24	.20	.29	.45	.19	.16	.19	*.30*	*.40*	Cap'l Spending per sh	*.50*
5.90	6.58	7.22	8.00	9.34	10.87	12.13	14.11	15.53	22.22	21.27	23.38	27.21	31.38	29.12	33.22	*37.75*	*42.25*	Book Value per sh [B]	*55.55*
49.94	50.03	50.12	50.29	51.13	51.82	51.76	52.76	52.96	53.04	51.53	50.09	49.91	50.28	49.69	49.82	*49.00*	*48.50*	Common Shs Outst'g [C]	*45.00*
--	10.9	16.8	16.3	14.5	19.2	22.9	25.3	27.0	6.3	12.2	12.5	11.9	13.6	13.7	14.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.0*
--	.73	1.07	1.02	.92	1.08	1.21	1.27	1.42	.32	.66	.67	.61	.73	.79	.82			Relative P/E Ratio	*.85*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			Avg Ann'l Div'd Yield	*Nil*
714.6	806.2	882.1	1041.2	975.8	963.0	943.4	1086.8	1127.7	1125.4	*1130*	*1175*	Revenues ($mill)	*1325*
31.5%	36.3%	32.1%	34.2%	33.5%	33.6%	35.3%	33.7%	34.1%	33.3%	*34.5%*	*34.5%*	Operating Margin	*35.0%*
17.7	32.7	25.4	40.2	31.8	32.8	35.1	36.3	37.0	30.7	*36.0*	*38.0*	Depreciation ($mill)	*48.0*
78.3	99.9	103.1	404.5	145.5	142.3	164.7	205.4	212.0	211.3	*225*	*240*	Net Profit ($mill)	*265*
38.6%	36.4%	36.6%	--	24.0%	25.6%	19.3%	21.7%	23.3%	24.0%	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
11.0%	12.4%	11.7%	38.9%	14.9%	14.8%	17.5%	18.9%	18.8%	18.8%	*19.9%*	*20.4%*	Net Profit Margin	*20.0%*
102.7	142.3	172.4	180.3	173.9	215.8	147.7	149.9	231.0	257.9.0	*465*	*625*	Working Cap'l ($mill)	*1000*
1588.7	1625.3	2193.7	1993.0	1798.6	1734.9	1486.5	1481.2	1347.5	1126.0	*1100*	*1000*	Long-Term Debt ($mill)	*700*
627.6	744.3	822.5	1178.6	1095.8	1171.0	1358.3	1577.6	1447.1	1655.1	*1850*	*2045*	Shr. Equity ($mill)	*2500*
5.4%	6.0%	5.0%	14.4%	6.8%	6.6%	7.2%	7.8%	8.8%	8.8%	*9.0%*	*9.0%*	Return on Total Cap'l	*9.0%*
12.5%	13.4%	12.5%	34.3%	13.3%	12.2%	12.1%	13.0%	14.6%	12.8%	*12.0%*	*11.5%*	Return on Shr. Equity	*10.5%*
12.5%	13.4%	12.5%	34.3%	13.3%	12.2%	12.1%	13.0%	14.6%	12.8%	*12.0%*	*11.5%*	Retained to Com Eq	*10.5%*
--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $1092.2 mill. **Due in 5 Yrs** 10.0 mill.
LT Debt $1091.4 mill. **LT Interest** $64.0 mill.
(Total interest coverage: 19.9x) (39% of Cap'l)

Leases, Uncapitalized Annual rentals $30.9 mill.
No Defined Benefit Plan

Pfd Stock None
Common Stock 49,557,371 shares
as of 8/2/24

MARKET CAP: $3.7 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	58.5	46.5	34.3
Receivables	167.0	176.8	171.7
Inventory	162.1	138.7	152.0
Other	4.1	13.0	10.8
Current Assets	391.7	375.0	368.7
Accts Payable	62.7	39.0	39.6
Debt Due	2.8	1.5	.8
Other	95.2	76.6	73.7
Current Liab.	160.7	117.1	114.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	7.5%	4.0%	*4.5%*
"Cash Flow"	13.0%	0.5%	*6.0%*
Earnings	13.0%	0.5%	*5.5%*
Dividends	--	--	*Nil*
Book Value	13.0%	9.5%	*10.0%*

Calendar	QUARTERLY REVENUES ($ mill.) [E] Jun.Per.	Sep.Per.	Dec.Per.	Mar.Per.	Full Year
2021	269.2	276.2	274.5	266.9	1086.8
2022	277.0	289.2	275.5	285.9	1127.7
2023	279.3	286.3	282.7	277.0	1125.4
2024	266.8	*285*	*290*	*288.2*	*1130*
2025	*275*	*300*	*300*	*300*	*1175*

Calendar	EARNINGS PER SHARE [A] Jun.Per.	Sep.Per.	Dec.Per.	Mar.Per.	Full Year
2021	1.14	.89	.99	1.02	4.04
2022	1.09	1.02	1.04	1.07	4.22
2023	1.06	1.07	1.06	1.02	4.21
2024	.90	*1.10*	*1.20*	*1.25*	*4.45*
2025	*1.02*	*1.20*	*1.25*	*1.28*	*4.75*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	NO CASH DIVIDENDS BEING PAID				
2021					
2022					
2023					
2024					

BUSINESS: Prestige Consumer Healthcare, Inc., engages in the marketing, sale, and distribution of over-the-counter (OTC) healthcare and household cleaning products, primarily in the United States, Canada (North America) and Australia. The company has two operating segments: North American OTC Healthcare (85% of '23 sales) and International OTC Healthcare (15%). Prestige Consumer distributes its products through various retail channels. Has about 560 employees. All directors and officers own 1.6% of common stock; BlackRock, 18.3%; Vanguard, 11.6% (6/24 proxy). Chairman, CEO & President: Ronald M. Lombardi. Address: 660 White Plains Road NA, Tarrytown, NY 10591. Telephone: (914) 524-6800. Internet: www.prestigebrands.com.

Prestige Consumer Healthcare's stock has rallied some 17% since our mid-June review. Investors were pleased with second-quarter share earnings of $0.90, which came in ahead of consensus estimates, despite softer sales of $267 million (down roughly 4% year to year). In addition, debt reduction and share repurchases during the period were probably well received.

We look for earnings to pick up in fiscal 2024 on the strength of a slowly improving consumer climate. Efforts to cool inflation have been somewhat successful, albeit in increments, with the core figure down to 3.2% as of July. The company's bottom line will likely pick up a tailwind from pockets of respectable demand, particularly from the international segment where growth has been firm. There are a few products that have been bright spots in the North American segment, including *Luden's*, *Chloraseptic*, and *Dramamine*. Management asserted in its recent report that consumption remains healthy for its portfolio. This reinforces conviction in our full-year revenue outlook. We expect supply chain challenges to gradually improve as the year progresses, enabling full-year adjusted earnings per share growth of 5% to 6%.

The operating outlook for fiscal 2025 is also favorable. The company's core over-the-counter portfolio continues to benefit from relatively resilient demand in its channels. While inflation remains a factor, sticky pricing actions and effective cost controls should bolster margins as the economy stabilizes and market trends even out. These factors ought to boost the top and bottom lines going forward.

Long-term prospects are mixed, though. Aforementioned pricing strength across a number of categories is reassuring, especially in the e-commerce channel. We look for effective growth strategies, including marketing and investments in Prestige's e-commerce channel to enhance the sales mix over the long haul. On the downside, however, the stock's recent price gains have limited the appreciation potential over the 18-month and 3- to 5-year timelines. It is also worth noting that the equity has a below-average score for Price Growth Persistence.

Simon R. Shoucair *September 13, 2024*

(A) Fiscal year ends March 31st of the following calendar year. Diluted non-GAAP earnings. Next earnings report due early October.

(B) Incl. intangibles. In '23: $2848.3 mill., $57.17 p/sh.

(C) In millions.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	40
Earnings Predictability	50

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PFIZER INC. NYSE-PFE

RECENT PRICE **30.07** | P/E RATIO **17.8** (Trailing: NMF, Median: 23.0) | RELATIVE P/E RATIO **0.97** | DIV'D YLD **5.6%** | **VALUE LINE**

TIMELINESS 3 Raised 9/6/24
SAFETY 2 Lowered 12/22/23
TECHNICAL 4 Raised 8/23/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

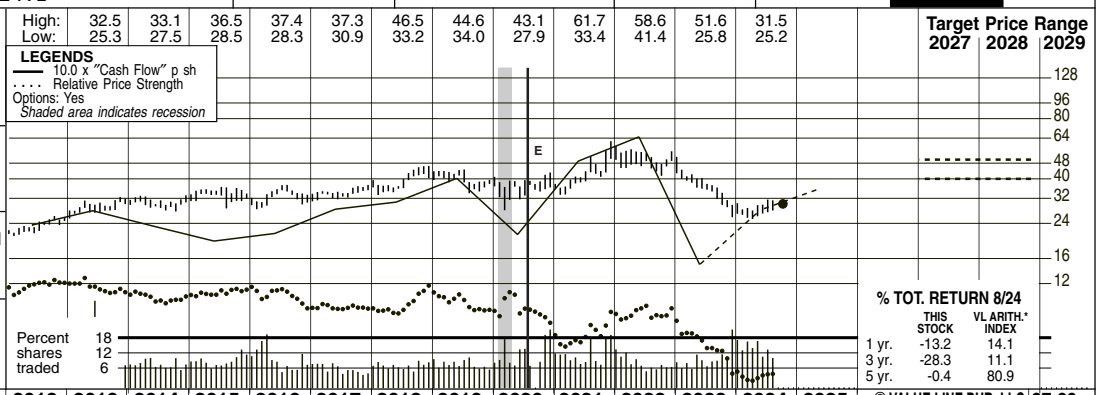
Low-High	Midpoint (% to Mid)
$18-$35	$27 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	50	(+65%)	*17%*
Low	40	(+35%)	*12%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	1099	1361	1361
to Sell	1802	1421	1389
Hld's(000)	3882719	3730316	3755815



Target Price Range 2027 2028 2029: 128, 96, 80, 64, 48, 40, 32, 24, 16, 12

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-13.2	14.1
3 yr.	-28.3	11.1
5 yr.	-0.4	80.9

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	7.16	6.20	8.46	8.90	8.11	8.06	7.89	7.91	8.70	8.79	9.38	9.35	7.53	14.46	17.87	10.36	*10.80*	*11.25*	Sales per sh	*12.90*
	1.94	1.66	2.09	2.34	2.35	2.77	2.32	1.96	2.13	2.82	3.07	4.03	2.11	4.91	6.49	1.49	*2.80*	*3.60*	"Cash Flow" per sh	*4.90*
	1.18	1.23	1.03	1.11	1.26	1.65	1.41	1.11	1.17	1.73	1.87	2.87	1.24	3.93	5.47	.37	*1.70*	*2.50*	Earnings per sh A	*3.75*
	1.28	.80	.72	.80	.88	.96	1.04	1.12	1.20	1.28	1.36	1.44	1.52	1.56	1.60	1.64	*1.68*	*1.72*	Div'ds Decl'd per sh B■	*1.84*
	.25	.15	.19	.22	.18	.19	.19	.23	.30	.33	.36	.39	.40	.48	.58	.69	*.70*	*.70*	Cap'l Spending per sh	*.75*
	8.52	11.15	10.95	10.84	11.16	11.92	11.33	10.48	9.81	11.92	11.09	11.41	11.36	13.74	17.03	15.77	*15.60*	*15.95*	Book Value per sh C	*17.15*
	6746.0	8070.0	8012.0	7575.0	7276.0	6399.0	6291.0	6175.0	6070.0	5979.0	5717.0	5534.0	5567.0	5620.0	5616.0	5646.0	*5650.0*	*5650.0*	Common Shs Outst'g D	*5650.0*
	16.4	12.8	16.3	17.6	18.4	17.6	21.5	30.3	28.1	19.7	20.9	13.9	29.5	10.7	9.1	NMF	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*12.0*
	.99	.85	1.04	1.10	1.17	.99	1.13	1.53	1.47	.99	1.13	.74	1.51	.58	.53	NMF			Relative P/E Ratio	*.65*
	6.6%	5.1%	4.3%	4.1%	3.8%	3.3%	3.4%	3.3%	3.7%	3.8%	3.5%	3.6%	4.1%	3.7%	3.2%	4.4%			Avg Ann'l Div'd Yield	*4.1%*
							49605	48851	52824	52546	53647	51750	41908	81288	100330	58496	*61000*	*63500*	Sales ($mill)	*73000*
							46.5%	44.8%	44.6%	47.8%	49.1%	47.4%	40.5%	35.8%	44.8%	24.3%	*28.0%*	*34.0%*	Operating Margin	*40.0%*
							5537.0	5157.0	5757.0	6269.0	6384.0	6010.0	4777.0	5191.0	5064.0	6290.0	*6300*	*6300*	Depreciation ($mill)	*6400*
							9088.0	6949.0	7198.0	10606	11143	16269	6984.0	22414	31366	2134.0	*9600*	*14130*	Net Profit ($mill)	*21180*
							25.5%	22.2%	13.4%	13.4%	5.9%	7.8%	6.4%	7.6%	9.6%	9.6%	*15.0%*	*15.0%*	Income Tax Rate	*15.0%*
							18.3%	14.2%	13.6%	20.2%	20.8%	31.4%	16.7%	27.6%	31.3%	3.6%	*15.7%*	*22.3%*	Net Profit Margin	*29.0%*
							36071	14405	7834.0	10714	18068	d4501	9147.0	17022	9121.0	d4461	*1000*	*3000*	Working Cap'l ($mill)	*10000*
							31541	28818	31398	33538	32909	35955	37133	36195	32884	61538	*57000*	*54000*	Long-Term Debt ($mill)	*45000*
							71301	64720	59544	71308	63407	63143	63238	77201	95661	89014	*88000*	*90000*	Shr. Equity ($mill)	*97000*
							9.4%	8.0%	8.6%	10.7%	12.3%	17.2%	7.7%	20.3%	24.9%	2.2%	*7.5%*	*10.5%*	Return on Total Cap'l	*15.5%*
							12.7%	10.7%	12.1%	14.9%	17.6%	25.8%	11.0%	29.0%	32.8%	2.4%	*11.0%*	*15.5%*	Return on Shr. Equity	*22.0%*
							3.5%	NMF	NMF	4.1%	5.0%	13.0%	NMF	17.7%	23.4%	NMF	*NMF*	*5.0%*	Retained to Com Eq	*11.0%*
							73%	100%	102%	72%	72%	49%	121%	39%	29%	NMF	*99%*	*69%*	All Div'ds to Net Prof	*49%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $69450 mill. **Due in 5 Yrs** $21129 mill.
LT Debt $57506 mill. **LT Interest** $2209 mill. (40% of Cap'l)

Leases, Uncapitalized Annual rentals $639.0 mill.

Pension Assets-12/23 $17.5 bill. **Oblig.** $18.0 bill.

Common Stock 5,666,695,064 shs. **as of 7/31/24**

MARKET CAP: $170 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	22732	12690	7100
Receivables	10952	11177	11393
Inventory (LIFO)	8981	10189	11447
Other	8594	9277	7885
Current Assets	51259	43333	37825
Accts Payable	6809	6710	5106
Debt Due	2945	10350	11944
Other	32384	30734	26769
Current Liab.	42138	47794	43819

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	5.5%	9.5%	*-1.5%*
"Cash Flow"	5.5%	10.0%	*2.0%*
Earnings	9.5%	15.5%	*2.5%*
Dividends	6.0%	4.5%	*2.5%*
Book Value	3.0%	7.0%	*1.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	14516	18899	24035	23838	81288
2022	25661	27742	22638	24289	100330
2023	18282	12734	13232	14249	58496
2024	14879	13283	*15000*	*17838*	*61000*
2025	*15500*	*15000*	*16000*	*17000*	*63500*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.86	1.02	1.43	.62	3.93
2022	1.37	1.73	1.51	.87	5.47
2023	.97	.41	d.42	d.60	.37
2024	.55	.01	*.55*	*.59*	*1.70*
2025	*.54*	*.56*	*.69*	*.71*	*2.50*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.38	.38	.38	.38	1.52
2021	.39	.39	.39	.39	1.56
2022	.40	.40	.40	.40	1.60
2023	.41	.41	.41	.41	1.64
2024	.42	.42	.42		

BUSINESS: Pfizer Inc. is a research-based, global biopharmaceutical company engaged in the discovery, development, manufacture, and distribution of healthcare products. Its core Biopharma operating segment includes three customer groups; Primary Care (internal medicine, migraine, vaccines, and COVID-19 products); Specialty Care (inflammation & immunology, rare disease, and hospital products); and Oncology. Completed spinoff of consumer healthcare (8/19); Upjohn generics (11/20). Acq. Seagen (12/23). Has 88,000 employees. Off./dirs. own less than 1% of comm. stock; Vanguard, 9.0%; BlackRock, 7.7%; State St., 5.1% (3/24 proxy). Chrmn./CEO: Albert Bourla. Inc.: DE. Addr.: 66 Hudson Boulevard East, New York, NY 10001. Tel.: 212-733-2323. Internet: www.pfizer.com.

Pfizer delivered better-than-expected second-quarter results. The New York-based drugmaker surpassed consensus expectations on both the top and bottom lines in the June period. The performance was highlighted by strength in the Oncology portfolio, where sales increased 26% year over year on the back of good showings from cancer therapies *Xtandi* and *Padcev*. Surging growth in heart disease drug *Vyndaqel* (+69%) also fueled a stronger-than-anticipated improvement in the Specialty Care business (+12%), which helped to mitigate persistent COVID-19-related weakness in Primary Care (-16%). It is worth noting that this represented Pfizer's first quarterly top-line gain since COVID-19 sales peaked in late 2022.

Leadership raised its full-year forecasts. The company now expects 2024 sales in the range of $59.5 billion-$62.5 billion (previously $58.5 billion-$61.5 billion), implying year-over-year growth of 4% at the midpoint. The revision reflected underlying strength in the business during the first half and a roughly $500 million uptick in projected *Paxlovid* sales. Pfizer also boosted its adjusted earnings outlook to $2.45-$2.65 a share (previously $2.15-$2.35), representing meaningful improvement from $1.84 it posted in 2024. Subscribers should be aware that this is a non-GAAP metric that excludes items such as the amortization of intangible assets and certain acquisition-related costs.

The company appears poised to build on this momentum in 2025. Weakening demand for COVID-19 products has been a significant drag on performance in recent years. However, with the brunt of this impact now in the rear view mirror, comparisons should continue to see relief over the back half of 2024 and in 2025. An aggressive cost-reduction plan, which leadership anticipates will result in savings of $1.5 billion by the end of 2027, coupled with further pipeline development and acquisition-related contributions (specifically from last year's $43 billion purchase of Seagen), also represent key catalysts.

The stock holds an Average (3) rank for Timeliness. Our longer-term projections suggest attractive risk-adjusted return potential out to 2027-2029, underpinned by a 5%-plus dividend yield.

Michael Ratty *September 27, 2024*

(A) Diluted earnings (GAAP). May not sum due to change in share count. Excludes tax gain of $1.79/sh. in '17; Discontinued ops. of $0.47/sh in '20. Next earnings report due late October.
(B) Dividends paid in early Mar., Jun, Sep., Dec.■ Div'd reinvest. plan.
(C) Includes intangibles. In '23: $132.68 bill., $23.50/sh.
(D) In millions.
(E) Completed spinoff of Upjohn (11/20).

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	35
Earnings Predictability	30

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PROGRESSIVE CORP. NYSE-PGR

RECENT PRICE **256.52** | P/E RATIO **18.4** (Trailing: 19.7 Median: 16.0) | RELATIVE P/E RATIO **0.99** | DIV'D YLD **0.2%** | **VALUE LINE**

TIMELINESS 3 Lowered 11/1/24
SAFETY 1 Raised 9/4/20
TECHNICAL 2 Lowered 11/29/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

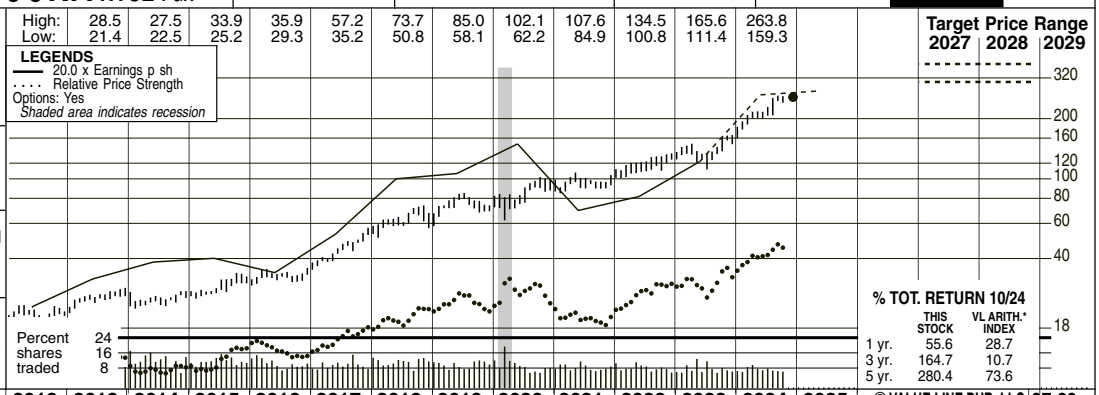
Low-High	Midpoint (% to Mid)
$225-$395	$310 (20%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	375	(+45%)	*10%*
Low	305	(+20%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	633	746	778
to Sell	556	574	581
Hld's(000)	503383	493853	500446



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
20.15	20.83	21.61	24.31	26.49	28.71	31.30	34.10	38.76	44.23	53.04	61.91	67.09	75.92	84.19	100.23	*120.25*	*132.55*	P/C Prem Earned per sh [A]	*153.85*
.94	.75	.79	.78	.73	.71	.69	.78	.83	.97	1.41	1.78	1.60	1.47	2.15	3.23	*4.15*	*5.00*	Investment Inc per sh	*8.15*
1.09	1.75	1.62	1.71	1.14	1.40	2.78	2.57	1.90	2.92	5.61	5.65	8.26	3.50	2.93	4.89	*7.95*	*9.75*	Underwriting Inc per sh	*16.05*
d.10	1.57	1.51	1.48	1.15	1.58	1.92	2.01	1.70	2.65	5.01	5.32	7.47	3.48	4.08	6.11	*13.15*	*13.80*	Earnings per sh [B]	*17.00*
.15	.16	.40	.40	.41	.28	.49	.69	.89	.68	1.12	2.81	2.65	6.40	.40	.40	*.44*	*.48*	Div'ds Decl'd per sh [C]	*.75*
6.23	8.55	9.13	9.47	9.94	10.39	11.79	13.29	14.56	15.96	17.71	22.54	28.26	30.35	26.32	33.80	*43.15*	*48.40*	Book Value per sh	*68.40*
676.50	672.60	662.40	613.00	604.60	595.80	587.80	583.60	579.90	581.70	583.20	584.60	585.20	584.40	584.90	585.30	*585.00*	*585.00*	Common Shs Outst'g [D]	*585.00*
279%	179%	213%	208%	213%	246%	212%	218%	224%	278%	352%	330%	301%	314%	445%	415%			Price to Book Value	*495%*
- -	9.7	12.9	13.3	18.4	16.2	13.0	14.4	19.2	16.8	12.4	14.0	11.4	27.4	28.7	23.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.0*
- -	.65	.82	.83	1.17	.91	.68	.73	1.01	.84	.67	.75	.59	1.48	1.66	1.28			Relative P/E Ratio	*1.10*
.8%	1.1%	2.0%	2.0%	1.9%	1.1%	2.0%	2.4%	2.7%	1.5%	1.8%	3.8%	3.1%	6.7%	.3%	.3%			Avg Ann'l Div'd Yield	*.2%*
						18399	19899	22474	25730	30933	36192	39262	44368	49241	58664	*70360*	*77550*	P/C Premiums Earned [A]	*90000*
						72.3%	72.1%	75.1%	73.1%	70.2%	70.4%	64.0%	75.8%	77.4%	77.8%	*75.0%*	*74.0%*	Loss to Prem Earned	*71.0%*
						18.8%	20.4%	20.0%	20.3%	19.2%	20.5%	23.7%	19.6%	19.1%	17.3%	*18.0%*	*18.0%*	Expense to Prem Writ	*18.0%*
						8.9%	7.5%	4.9%	6.6%	10.6%	9.1%	12.3%	4.6%	3.5%	4.9%	*7.0%*	*8.0%*	Underwriting Margin	*11.0%*
						13.4%	16.0%	- -	25.7%	17.6%	38.8%	20.2%	49.1%	20.6%	29.4%	*20.0%*	*20.0%*	Income Tax Rate	*20.0%*
						1145.0	1185.6	995.9	1551.5	2939.7	3156.6	4423.6	2143.5	2251.3	3609.9	*7695*	*8075*	Net Profit ($mill)	*9950*
						2.4%	2.4%	2.4%	2.3%	2.6%	2.8%	2.2%	1.7%	2.5%	2.9%	*3.3%*	*3.7%*	Inv Inc/Total Inv	*5.0%*
						25788	29819	33428	38701	46575	54895	64098	71132	75465	88691	*95000*	*100000*	Total Assets ($mill)	*125000*
						6928.6	7754.3	8440.8	9284.8	10822	13673	17039	18232	15891	20277	*25250*	*28300*	Shr. Equity ($mill)	*40000*
						16.5%	15.3%	11.8%	16.7%	27.2%	23.1%	26.0%	11.8%	14.2%	17.8%	*30.5%*	*28.5%*	Return on Shr. Equity	*25.0%*
						12.3%	10.1%	5.7%	12.5%	22.0%	11.3%	17.2%	NMF	12.9%	16.8%	*29.5%*	*27.5%*	Retained to Com Eq	*24.0%*
						25%	34%	52%	25%	23%	53%	36%	NMF	12%	8%	*3%*	*3%*	All Div'ds to Net Prof	*5%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $6891.8 mill. **Due in 5 Yrs** Nil
LT Debt $6891.8 mill. **LT Interest** $415.0 mill. (20% of Cap'l)
Leases, Uncapitalized Annual rentals $74 mill.

No Defined Pension Benefit Plan
Pfd Stock None

Common Stock 585,811,503 shs.
as of 10/3/24
MARKET CAP: $150.3 billion (Large Cap)

FINANCIAL POSITION ($MILL.)	2022	2023	9/30/24
Bonds	46651.9	60378.2	74411.2
Stocks	4034.7	3830.5	4232.0
Premiums Due	10416.9	11958.2	15135.4
Other	14361.5	12523.9	11423.9
Total Assets	75465.0	88690.8	105202.5
Loss Reserves	30359.3	34389.2	38061.5
Unearned Prems	17293.6	20133.7	24772.5
Other	11931.1	13890.8	15209.2
Total Liabilities	59584.0	68413.7	78043.2

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Premium Inc	12.5%	14.0%	*10.0%*
Invest Income	12.0%	16.5%	*23.5%*
Earnings	12.5%	8.0%	*24.5%*
Dividends	21.0%	22.0%	*NMF*
Book Value	11.5%	13.5%	*14.5%*

Calendar	NET PREM. EARNED ($ mill.) [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	10420	10982	11364	11601	44368
2022	11803	12148	12398	12891	49241
2023	13533	14464	14894	15772	58664
2024	16149	17210	18297	*18704*	*70360*
2025	*19000*	*19300*	*19550*	*19700*	*77550*

Calendar	EARNINGS PER SHARE [B E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.72	.72	.14	.90	3.48
2022	1.12	.96	.49	1.51	4.08
2023	.65	.40	2.09	2.97	6.11
2024	3.75	2.31	3.97	*3.12*	*13.15*
2025	*3.20*	*3.65*	*3.40*	*3.55*	*13.80*

Calendar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	2.35	.10	.10	.10	2.65
2021	4.60	.10	.10	1.60	6.40
2022	.10	.10	.10	.10	.40
2023	.10	.10	.10	.10	.40
2024	.85	.10	.10	.10	

BUSINESS: The Progressive Corporation is an insurance holding company that writes standard and nonstandard (i.e., high risk) private passenger automobile coverage. Also writes recreational vehicle, mobile home, nonstandard commercial vehicle, and credit-related insurance. Progressive has a significant presence in Florida, Texas, California, New York, Georgia, and Michigan, among other states. Has 55,100 employees. Officers and directors control less than 1% of common stock outstanding; The Vanguard Group, 8.8%; BlackRock, 8.0% (3/24 Proxy). President and Chief Executive Officer: Tricia Griffith. Incorporated: OH. Address: 6300 Wilson Mills Road, Mayfield Village, Ohio 44143. Telephone: 440-461-5000. Internet: www.progressive.com.

Progressive continues to shine in 2024. Looking at it with more granularity, third-quarter operating earnings, which excludes capital transactions from the investment portfolio, came in at $3.97 a share, which was nearly double the previous year's tally of $2.09. Net premiums earned increased 23% on a year-over-year basis, to nearly $18.3 billion, thanks to new business, coupled with healthy pricing on existing policies. The combined ratio was also a positive factor, as it improved 3.4% from last year, to 89%. Pricing trends in the auto insurance market have been positive for quite some time, which has provided a shot in the arm for Progressive's bottom line.

We look for the positive momentum to continue next year, albeit at a much more measured clip. It should be noted that 2025 results will be up against a likely very difficult 2024 comparison. We don't see the aforementioned positive pricing cadence reversing course anytime soon. A still healthy economic backdrop for the most part has enabled auto insurers to combat cost inflation by passing along much of the burden to consumers. Another factor to keep an eye on is investment income. This line item has been very strong over the past several quarters, thanks to elevated bond reinvestment rates and increased invested assets. However, the Federal Reserve has begun paring borrowing costs and we look for this trend to continue through 2025. Recent economic data and a changing of the guard in Washington, DC are factors that bear watching and could cause the central bank to be more cautious with its rate-cutting initiatives.

We project that earnings will hit the $17.00-a-share mark by the 2027-2029 time frame. Our view is based on continued healthy rate increases and a roughly average dollar amount of aggregate losses relative to historical averages over that time frame.

These shares offer above-average gains potential for the 18 months ahead. They also have worthwhile risk-adjusted total return potential for the pull to 2027-2029. Conservative investors seeking an insurance holding to add to their portfolios would do well to consider this stock.

Alan G. House *November 29, 2024*

(A) Incl. some D&O liab. insurance. **(B)** Dil. EPS. Inc. cap. gains/(losses): '08, $1.39; '10, 10¢; '11, 11¢; '12, 33¢; '13, 35¢; '14, 23¢; '15, 14¢; '16, 6¢; '18, (59¢); '19, $1.41; '20, $2.19; '21, $2.18; '22, ($2.90). Next qrtly. egs report mid-Jan. **(C)** Beginning in 2007, a variable div'd is considered once a year at yearend. Returned to quarterly payout policy effective 2019. Approx. pmt. dates: mid.-Jan., April, July, and Oct. Has paid special dividend intermittently. **(D)** In millions. **(E)** Qtrs. may not sum due to change in sh. count.

Company's Financial Strength	A+
Stock's Price Stability	100
Price Growth Persistence	100
Earnings Predictability	45

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PARSONS CORP. NDQ-PSN

RECENT PRICE 94.37 | P/E RATIO 32.2 (Trailing: 43.7 Median: NMF) | RELATIVE P/E RATIO 1.74 | DIV'D YLD Nil | VALUE LINE

TIMELINESS 3 Raised 8/16/24
SAFETY 3 New 9/6/19
TECHNICAL 3 Raised 11/8/24
BETA .90 (1.00 = Market)

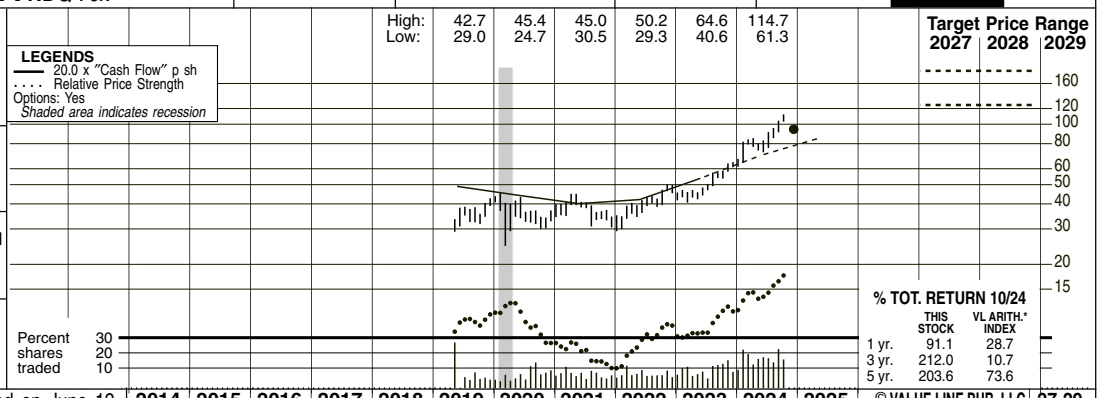
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$75-$140 $108 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	185	(+95%)	*18%*
Low	125	(+30%)	*8%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	143	172	190
to Sell	114	146	155
Hld's(000)	104316	104214	104555



Parsons Corp. was founded on June 12, 1944 by Ralph M. Parsons in Los Angeles. Initial operations delivered electronics, instrumentation, and engineering for missles and rockets during the Cold War. In May of 2019, the company closed its initial public offering of 18,518,500 shares of its common stock at a price of $27.00 per share. Goldman Sachs & Co. LLC, BofA Merrill Lynch, and Morgan Stanley served as joint lead book-running managers for the offering.

CAPITAL STRUCTURE as of 9/30/24
Total Debt $1133.0 mill. **Due in 5 Yrs** $480.0 mill.
LT Debt $1133.0 mill. **LT Interest** $62.5 mill.
Total Interest Coverage: 6.1x)
(33% of Cap'l)
Leases, Uncapitalized Annual rentals $67.5 mill.

No Defined Pension Plan Available

Common Stock 106,189,949 shares
as of 10/21/24

MARKET CAP: $10.0 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	262.5	272.9	558.8
Receivables	717.3	915.6	1035.0
Inventory	- -	- -	- -
Other	740.0	949.0	960.9
Current Assets	1719.8	2137.5	2554.7
Accts Payable	210.4	242.8	300.2
Debt Due	- -	- -	- -
Other	897.7	1168.1	1349.4
Current Liab.	1108.1	1410.9	1649.6

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	- -	- -	*11.0%*
"Cash Flow"	- -	- -	*20.0%*
Earnings	- -	- -	*33.0%*
Dividends	- -	- -	*Nil*
Book Value	- -	- -	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.)[A] Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	875.0	879.0	956.1	950.7	3660.8
2022	949.1	1008	1134	1103	4195.3
2023	1173	1356	1418	1494	5442.7
2024	1536	1671	1810	*1753*	*6770*
2025	*1680*	*1815*	*1955*	*1900*	*7350*

Calendar	EARNINGS PER SHARE[A] Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	.09	.06	.18	.26	.59
2022	.19	.17	.27	.24	.87
2023	.23	.38	.42	.39	1.42
2024	.49	.63	.65	*.78*	*2.55*
2025	*.70*	*.80*	*.80*	*.90*	*3.20*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	- -	- -	- -	- -	- -	39.29	38.29	35.31	40.07	51.42	*63.85*	*68.70*	Revenues per sh	*76.35*
	- -	- -	- -	- -	- -	2.45	2.21	2.01	2.10	2.68	*3.50*	*4.30*	"Cash Flow" per sh	*6.70*
	- -	- -	- -	- -	- -	1.30	.97	.59	.87	1.42	*2.55*	*3.20*	Earnings per sh [A]	*5.20*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
	- -	- -	- -	- -	- -	.67	.33	.20	.29	.38	*.40*	*.45*	Cap'l Spending per sh	*.65*
	- -	- -	- -	- -	- -	16.19	17.72	18.34	19.52	21.61	*22.10*	*24.30*	Book Value per sh [B]	*28.80*
	- -	- -	- -	- -	- -	100.67	102.36	103.67	104.70	105.84	*106.00*	*107.00*	Common Shs Outst'g [C]	*110.00*
	- -	- -	- -	- -	- -	25.2	37.3	NMF	46.0	35.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*30.0*
	- -	- -	- -	- -	- -	1.34	1.92	NMF	2.66	2.00			Relative P/E Ratio	*1.65*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -			Avg Ann'l Div'd Yield	*Nil*
	- -	- -	- -	- -	3560.5	3954.8	3918.9	3660.8	4195.3	5442.7	*6770*	*7350*	Revenues ($mill)	*8400*
	- -	- -	- -	- -	6.5%	4.5%	7.0%	6.6%	7.0%	8.4%	*8.8%*	*9.5%*	Operating Margin	*11.2%*
	- -	- -	- -	- -	63.3	125.7	128.0	144.2	123.5	122.8	*100*	*115*	Depreciation ($mill)	*170*
	- -	- -	- -	- -	222.3	120.5	98.5	64.1	96.7	161.1	*270*	*345*	Net Profit ($mill)	*570*
	- -	- -	- -	- -	7.8%	- -	26.3%	21.0%	23.9%	21.3%	*23.0%*	*23.0%*	Income Tax Rate	*23.0%*
	- -	- -	- -	- -	6.2%	3.0%	2.5%	1.8%	2.3%	3.0%	*4.0%*	*4.7%*	Net Profit Margin	*6.8%*
	- -	- -	- -	- -	482.6	382.0	655.7	601.6	611.7	726.6	*1000*	*1125*	Working Cap'l ($mill)	*1500*
	- -	- -	- -	- -	430.1	250.6	541.7	591.9	745.9	749.0	*1120*	*1200*	Long-Term Debt ($mill)	*1000*
	- -	- -	- -	- -	908.8	1629.9	1813.8	1900.8	2043.6	2287.2	*2340*	*2600*	Shr. Equity ($mill)	*3170*
	- -	- -	- -	- -	17.4%	7.0%	4.6%	2.9%	3.9%	5.8%	*8.5%*	*10.0%*	Return on Total Cap'l	*14.5%*
	- -	- -	- -	- -	24.5%	7.4%	5.4%	3.4%	4.7%	7.0%	*11.5%*	*13.5%*	Return on Shr. Equity	*18.0%*
	- -	- -	- -	- -	24.5%	7.4%	5.4%	3.4%	4.7%	7.0%	*11.5%*	*13.5%*	Retained to Com Eq	*18.0%*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

BUSINESS: Parsons Corporation engages in the design and manufacture of digitally enabled solutions for the defense, intelligence, and critical infrastructure markets. There are two main segments, Federal Solutions (FS; 55% of 2023 revenues) and Critical Infrastructure (CI; 45%). The FS segment supplies high-end services to the U.S. government, including cybersecurity, missile defense, and subsurface munitions detection. The CI business provides engineering and design services for physical and digital projects around the globe. Has over 18,500 employees. Officers & directors own less than 1% of stock (3/24 Proxy). Chair. & CEO: Carey Smith. Inc.: DE. Address: 5875 Trinity Parkway #300, Centreville, Virginia 20120. Tel.: 703-988-8500. Internet: parsons.com.

Parsons is winning new contracts at a very healthy clip. The third-quarter performance was highlighted by a handful of awards of more than $100 million each. The Federal Solutions arm inked a $287 million options deal with a confidential customer. A $245 million pact on a general services administration contract to support the Department of Defense (DoD) and its strategic partners was locked up. Too, a lead design award for State Route 400 express lanes in Georgia on a project valued at $4.6 billion overall and a subcontracting position on a rail station agreement in Honolulu are now on the books. This list does not even touch on some government contract wins and high-profile deals in New York and Saudi Arabia that have upped the company's profile in the highly competitive defense, intelligence, and infrastructure sectors.

Bolt-on acquisitions continue to steadily roll in. In our last report, we touched on the $200 million BlackSignal purchase that bolstered PSN's ties to the DoD, particularly in areas like electronic warfare and cyber security. Separately, at the beginning of this month, BCC Engineering was purchased in an all-cash transaction valued at $230 million. This entity provides planning, design, and management services for transportation, civil, and structural engineering work in Florida, Georgia, Texas, South Carolina, and Puerto Rico. Parsons' play is on large infrastructure possibilities in the southeastern U.S., where the Infrastructure Investment and Jobs Act is spending heavily on building highways.

Our revenue expectations are up across the board. The ramp-up of existing contracts, coupled with many more coming on board, are beefing up the top line on both sides of the portfolio (Federal Solutions and Critical Infrastructure). Expansion into the Middle East is going well and heightened relationships with important government agencies has helped. Out to 2027-2029, we now see revenues surpassing the $8 billion level, translating to share earnings north of the $5.00 line.

This stock has a neutral designation for Timeliness. Conversely, its appreciation potential three to five years out is above average.

Erik M. Manning *November 29, 2024*

(A) Diluted earnings. May not sum due to changes in shares outstanding. Next earnings report is due mid-February.
(B) Includes intangible assets. In 2023: $2068.2 mill., $19.54 per share.
(C) In millions.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	65
Earnings Predictability	55

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RLI CORP. NYSE-RLI

RECENT PRICE 175.40 | P/E RATIO 30.7 (Trailing: 27.2 Median: 30.0) | RELATIVE P/E RATIO 1.66 | DIV'D YLD 0.7% | VALUE LINE

TIMELINESS 3 Raised 5/3/24
SAFETY 2 Raised 6/5/20
TECHNICAL 4 Lowered 11/29/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$151-$237	$194 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	210	(+20%)	*6%*
Low	155	(-10%)	*-2%*

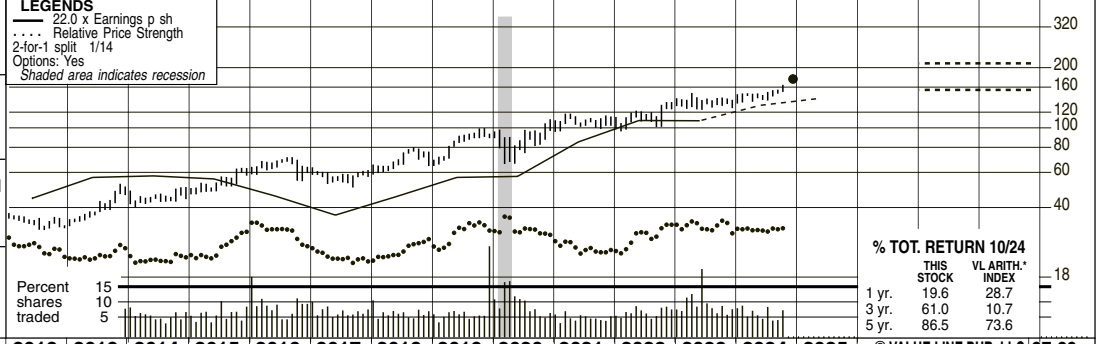
Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	147	174	204
to Sell	169	165	149
Hld's(000)	36661	35877	36733

	52.6	50.7	63.2	71.5	63.7	80.0	99.9	110.6	117.8	134.8	149.6	177.8
High:	32.3	40.0	46.6	54.3	50.3	58.5	64.5	66.0	95.5	96.2	123.0	132.3
Low:												

LEGENDS
22.0 x Earnings p sh
Relative Price Strength
2-for-1 split 1/14
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029



% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	19.6	28.7
3 yr.	61.0	10.7
5 yr.	86.5	73.6

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
12.31	11.57	11.77	12.72	13.56	14.68	15.95	16.08	16.58	16.72	17.78	18.70	19.18	21.66	25.17	28.36	*34.20*	*41.65*	P/C Prem Earned per sh	*51.45*
1.84	1.58	1.59	1.50	1.38	1.23	1.29	1.26	1.21	1.24	1.40	1.54	1.50	1.52	1.89	2.64	*3.10*	*3.50*	Investment Inc per sh	*5.00*
1.94	2.04	2.27	2.78	1.49	2.48	2.48	2.49	1.74	.60	.94	1.51	1.54	2.87	3.92	d4.62	*4.10*	*5.65*	Underwriting Inc per sh	*6.70*
2.50	2.35	2.66	2.80	2.02	2.57	2.62	2.53	2.08	1.67	2.06	2.57	2.60	3.87	4.95	4.94	*5.90*	*6.40*	Earnings per sh [A]	*8.25*
.49	.54	.57	.60	.63	.67	.71	.75	.79	.83	.87	.91	.95	.99	1.03	1.07	*1.14*	*1.18*	Div'ds Decl'd per sh [B]■	*1.42*
16.49	19.57	18.87	19.35	18.73	19.29	19.61	18.91	18.74	19.34	18.13	22.18	25.16	27.14	25.89	30.97	*38.10*	*45.35*	Book Value per sh	*60.20*
42.95	42.53	41.93	42.32	42.53	42.98	43.10	43.54	43.95	44.15	44.50	44.87	45.14	45.29	45.47	45.64	*45.00*	*45.00*	Common Shs Outst'g [C]	*45.00*
163%	130%	146%	159%	182%	208%	230%	283%	346%	296%	379%	379%	349%	396%	441%	432%			Price to Book Value	*300%*
10.8	10.8	10.4	11.0	16.9	15.6	17.2	21.1	31.1	34.3	33.4	32.7	33.8	27.8	23.1	27.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.0*
.65	.72	.66	.69	1.08	.88	.91	1.06	1.63	1.73	1.80	1.74	1.74	1.50	1.33	1.51			Relative P/E Ratio	*1.20*
1.8%	2.1%	2.1%	1.9%	1.8%	1.7%	1.6%	1.4%	1.2%	1.4%	1.3%	1.1%	1.1%	.9%	.9%	.8%			Avg Ann'l Div'd Yield	*.8%*
						687.4	700.2	728.6	737.9	791.3	839.1	865.7	980.9	1144.5	1294.3	*1540*	*1875*	P/C Premiums Earned	*2315*
						43.2%	42.7%	48.0%	54.4%	54.1%	49.3%	51.2%	46.5%	44.9%	66.4%	*49.0%*	*48.0%*	Loss to Prem Earned	*50.0%*
						41.3%	41.8%	41.5%	42.0%	40.6%	42.7%	40.8%	40.2%	39.5%	39.9%	*39.0%*	*38.5%*	Expense to Prem Writ	*37.0%*
						15.6%	15.5%	10.5%	3.6%	5.3%	8.1%	8.0%	13.2%	15.6%	-6.3%	*12.0%*	*13.5%*	Underwriting Margin	*13.0%*
						20.5%	30.7%	26.5%	8.8%	12.3%	16.9%	35.3%	54.1%	13.9%	2.5%	*15.0%*	*15.0%*	Income Tax Rate	*15.0%*
						115.2	112.0	92.9	74.6	92.2	117.4	118.4	178.1	209.4	224.6	*265*	*290*	Net Profit ($mill)	*370*
						2.9%	2.7%	2.6%	2.5%	2.8%	2.6%	2.3%	2.1%	2.6%	3.3%	*3.8%*	*4.0%*	Inv Inc/Total Inv	*5.0%*
						2776	2737	2778	2947	3105	3546	3938	4508	4767	5180	*5535*	*6015*	Total Assets ($mill)	*7500*
						845.1	823.5	823.6	853.6	806.8	995.4	1136.0	1229.4	1177.3	1413.5	*1715*	*2040*	Shr. Equity ($mill)	*2710*
						13.6%	13.6%	11.3%	8.7%	11.4%	11.8%	10.4%	14.5%	17.8%	15.9%	*15.5%*	*14.0%*	Return on Shr. Equity	*13.5%*
						10.0%	9.7%	7.1%	4.5%	6.6%	7.7%	6.7%	10.8%	13.8%	12.4%	*12.5%*	*11.5%*	Retained to Com Eq	*11.5%*
						27%	29%	37%	49%	42%	35%	36%	25%	22%	22%	*19%*	*18%*	All Div'ds to Net Prof	*17%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $100.0 mill. **Due in 5 Years** Nil

(5% of Cap'l)
Leases,Uncapitalized Annual rentals $4.1 million

No Defined Benefit Pension Plan
Pfd Stock None

Common Stock 45,821,466 shs.
as of 10/15/24

MARKET CAP: $8.0 billion (Mid Cap)

FINANCIAL POSITION ($MILL.)	2022	2023	9/30/24
Bonds	2667.0	2855.8	3176.1
Stocks	498.4	590.0	729.7
Other	1601.7	1734.4	1886.0
Total Assets	4508.3	5180.2	5791.8
Unearned Prems	4767.1	892.3	1010.8
Reserves	2315.6	2446.0	2611.9
Other	489.0	428.4	420.7
Total Liab'ties	3589.7	3766.7	4043.4

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Premium Inc	5.0%	5.5%	*15.0%*
Invest Income	4.0%	9.5%	*16.5%*
Earnings	6.5%	19.0%	*10.5%*
Dividends	5.0%	4.5%	*5.5%*
Book Value	4.0%	8.5%	*13.5%*

Calendar	NET PREMIUMS EARNED ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	228.6	241.0	253.4	257.9	980.9
2022	269.2	282.8	291.5	301.0	1144.5
2023	307.7	322.3	318.4	345.9	1294.3
2024	360.7	379.1	389.5	*410.7*	*1540*
2025	*430*	*455*	*480*	*510*	*1875*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.87	1.09	.65	1.26	3.87
2022	1.43	1.49	.50	1.53	4.95
2023	1.63	1.16	.61	1.54	4.94
2024	1.89	1.72	1.31	*.98*	*5.90*
2025	*1.78*	*1.65*	*1.40*	*1.57*	*6.40*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.23	.24	.24	.24	.95
2021	.24	.25	.25	.25	.99
2022	.25	.26	.26	.26	1.03
2023	.26	.27	.27	.27	1.07
2024	.27	.29	.29		

BUSINESS: RLI Corp., through its subsidiaries RLI Insurance and Mt. Hawley, writes multiple lines of insurance on an admitted basis in all 50 states. Also underwrites specialty property and casualty insurance on an admitted basis and excess and surplus business on a non-admitted basis. Underwrites earthquake risks (in California). Other companies in the group include: Replacement Lens, Inc.; License Express Services, Inc. Has 1,001 employees. The Vanguard Group owns 10.0% of common stock; State Street 9.5%; BlackRock 7.8%; officers & directors, 4.9% (3/24 proxy). President and Chief Executive Officer: Craig Kliethermes. Incorporated: Illinois. Address: 9025 North Lindbergh Drive, Peoria, Illinois 61615. Telephone: 309-692-1000. Internet: www.rlicorp.com.

RLI is on pace for a solid earnings increase in 2024. Although fourth-quarter profits will likely decline year over year against a difficult comparison, the bottom line ought to improve nearly 20% for the full year. During the third quarter, the company's combined ratio improved 9.1% from last year, to 89.6%. This implies that RLI generated $11.40 in pretax income for every $100 in policies insured. This was quite impressive, given that Hurricanes Beryl and Helene resulted in nearly $33 million in catastrophe losses. The improvement relative to last year was partially due to $58.2 million in losses related to the Hawaiian wildfires in 2023. RLI also benefited from a nearly 15% increase in net investment income relative to 2023.

We look for the good times to continue in 2025. While industrywide losses are poised to remain relatively high compared to historical standards, we believe that this might not be a negative going forward. This is because catastrophes can be viewed as a bit of a double-edged sword. On one hand, they cut into profits as claims are paid out. However, they also give insurers greater bargaining clout in the following years' renewal season. Hence, we look for rate increases, coupled with new business wins, to result in a solid uptick in net premiums earned in 2025. One line item that is worth keeping an eye on is net investment income. Reduced interest rates might well result in lower bond yields, as the Federal Reserve likely continues to ease borrowing costs next year. However, recent data, along with a new Presidential administration, could cause fewer cuts than were initially expected. Overall, we look for increased invested assets, coupled with still decent bond reinvestment rates, to boost investment income.

Earnings per share are poised to advance at a low double-digit annual clip, on average, over the pull to 2027-2029. Our optimism is based on a decent economy over that time frame.

The share price has increased sharply since our late-August report. As such, the ascent discounts a portion of their long-term gains potential. However, existing shareholders will soon be rewarded with a $4.00-a-share special dividend.

Alan G. House *November 29, 2024*

(A) Dil. egs. Excl. nonrecurr. (net): '08, (70¢); '09, (19¢); '10, 35¢; '11, 25¢; 12, 38¢; '13, 66¢; '14, 47¢; '15, 59¢; '16, 48¢; 17, (69¢); '18, (63¢); '19, $1.66; '20, 86¢; '21, $2.24; '22, $7.79. Next egs. report due late January.
(B) Div'ds. paid late March, June, Sept., and Dec. ■ Div'd. reinvest. plan avail. Pays a special dividend intermittently.
(C) In mill., adj. for split.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	85
Earnings Predictability	90

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ROLLINS, INC. NYSE-ROL

RECENT PRICE 47.86 | P/E RATIO 46.0 (Trailing: 49.3 Median: 47.0) | RELATIVE P/E RATIO 2.56 | DIV'D YLD 1.4% | VALUE LINE 398

TIMELINESS 3 Lowered 11/8/24
SAFETY 2 Raised 3/6/09
TECHNICAL 2 Raised 10/4/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

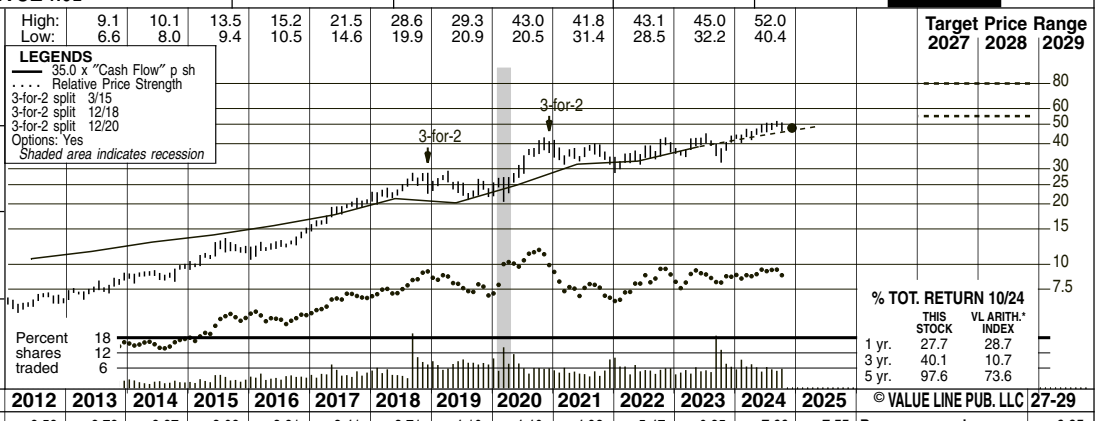
Low-High	Midpoint (% to Mid)
$40-$74	$57 (20%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	80	(+65%)	*15%*
Low	55	(+15%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	326	309	345
to Sell	241	263	251
Hld's(000)	251472	247199	253487



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
2.02	2.15	2.29	2.44	2.58	2.72	2.87	3.02	3.21	3.41	3.71	4.10	4.40	4.93	5.47	6.35	*7.00*	*7.55*	Revenues per sh	*9.25*
.20	.23	.25	.28	.30	.33	.37	.40	.45	.50	.61	.58	.71	.90	.93	1.10	*1.25*	*1.40*	"Cash Flow" per sh	*1.75*
.14	.16	.18	.20	.23	.25	.28	.31	.34	.39	.47	.41	.53	.71	.75	.89	*1.00*	*1.15*	Earnings per sh [A]	*1.50*
.05	.06	.07	.08	.09	.11	.12	.14	.18	.20	.25	.28	.24	.34	.43	.54	*.62*	*.66*	Div'ds Decl'd per sh [B]■	*.72*
.03	.03	.03	.04	.04	.04	.06	.08	.07	.05	.06	.06	.05	.06	.06	.07	*.10*	*.10*	Cap'l Spending per sh	*.10*
.45	.53	.60	.66	.72	.89	.94	1.06	1.16	1.33	1.45	1.66	1.91	2.20	2.57	2.39	*2.85*	*3.45*	Book Value per sh [C]	*4.55*
506.46	500.70	496.74	493.60	492.80	492.29	491.14	492.19	490.03	490.48	490.96	491.15	491.61	491.91	492.45	484.08	*484.50*	*485.00*	Common Shs Outst'g [D]	*486.00*
24.4	22.1	24.7	29.0	29.1	30.7	32.0	36.9	37.0	47.4	NMF	NMF	NMF	NMF	47.3	43.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*45.0*
1.47	1.47	1.57	1.82	1.85	1.72	1.68	1.86	1.94	2.38	NMF	NMF	NMF	NMF	2.73	2.45			Relative P/E Ratio	*2.50*
1.5%	1.6%	1.6%	1.4%	1.4%	1.4%	1.4%	1.2%	1.4%	1.1%	1.0%	1.1%	.8%	.9%	1.2%	1.4%			Avg Ann'l Div'd Yield	*1.1%*
1411.6	1485.3	1573.4	1674.0	1821.6	2015.5	2161.2	2424.3	2695.8	3073.3	*3380*	*3650*	Revenues ($mill)	*4500*
18.6%	19.2%	19.7%	20.9%	20.7%	19.8%	21.1%	22.0%	21.7%	22.4%	*23.0%*	*23.5%*	Operating Margin	*24.5%*
43.5	44.5	50.9	56.6	66.8	81.1	88.3	94.2	91.3	99.8	*110*	*120*	Depreciation ($mill)	*130*
137.7	152.1	167.4	190.7	231.7	203.3	260.8	350.7	368.6	435.0	*485*	*555*	Net Profit ($mill)	*725*
37.3%	37.5%	35.8%	35.2%	25.4%	22.1%	26.5%	26.1%	26.1%	25.8%	*26.0%*	*26.0%*	Income Tax Rate	*26.0%*
9.8%	10.2%	10.6%	11.4%	12.7%	10.1%	12.1%	14.5%	13.7%	14.2%	*14.3%*	*15.2%*	Net Profit Margin	*16.1%*
31.3	60.9	13.2	d31.8	d13.0	d100.2	d157.7	d138.8	d145.2	d170.1	*d130*	*d100*	Working Cap'l ($mill)	*d70.0*
--	--	--	--	--	279.0	185.8	136.3	39.9	490.8	*440*	*430*	Long-Term Debt ($mill)	*300*
462.7	524.0	568.5	653.9	711.9	815.8	941.4	1082.0	1267.2	1155.6	*1390*	*1700*	Shr. Equity ($mill)	*2205*
29.8%	29.0%	29.4%	29.2%	32.5%	18.9%	23.4%	28.8%	28.3%	27.0%	*27.0%*	*27.0%*	Return on Total Cap'l	*29.5%*
29.8%	29.0%	29.4%	29.2%	32.5%	24.9%	27.7%	32.4%	29.1%	37.6%	*35.0%*	*33.0%*	Return on Shr. Equity	*33.0%*
16.6%	15.7%	14.1%	13.8%	15.4%	6.1%	10.7%	13.1%	12.4%	14.8%	*13.5%*	*14.0%*	Retained to Com Eq	*17.0%*
44%	46%	52%	53%	53%	76%	62%	59%	57%	61%	*61%*	*58%*	All Div'ds to Net Prof	*48%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $445.2 mill. **Due in 5 Yrs** Nil.
LT Debt $445.2 mill. **LT Interest** $30.0 mill. (25% of Cap'l)
Leases, Uncapitalized Annual rentals $104.0 mill.

Pension Assets-12/23 $3.3 mill. **Oblig.** $3.0 mill.
Pfd Stock None

Common Stock 484,305,016 shs.
as of 10/14/24
MARKET CAP: $23.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	95.3	103.8	95.3
Receivables	155.8	178.2	226.5
Inventory	29.7	37.0	39.3
Other	67.8	87.6	125.4
Current Assets	348.6	406.6	486.5
Accts Payable	42.8	49.2	58.2
Debt Due	15.0	- -	- -
Other	436.0	527.5	563.9
Current Liab.	493.8	576.7	622.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	8.0%	10.0%	*6.5%*
"Cash Flow"	12.5%	13.5%	*8.0%*
Earnings	13.0%	14.5%	*9.0%*
Dividends	16.5%	16.0%	*8.0%*
Book Value	12.0%	12.5%	*12.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	535.6	638.2	650.2	600.3	2424.3
2022	590.7	714.0	729.7	661.4	2695.8
2023	658.0	820.8	840.4	754.1	3073.3
2024	748.3	891.9	916.3	*823.5*	*3380*
2025	*810*	*900*	*925*	*1015*	*3650*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.19	.20	.19	.13	.71
2022	.15	.20	.22	.17	.75
2023	.18	.22	.26	.22	.89
2024	.19	.27	.28	*.26*	*1.00*
2025	*.20*	*.30*	*.30*	*.35*	*1.15*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.080	.053	.053	.053	.239
2021	.080	.080	.080	.100	.340
2022	.100	.100	.100	.130	.430
2023	.130	.130	.130	.150	.540
2024	.150	.150	.150	.165	

BUSINESS: Rollins, Inc. owns and operates Orkin LLC Exterminating, one of the world's largest pest- and termite-control service providers. Has over 500 locations (including franchises) in the U.S., Canada, Europe, Latin America, the Caribbean, the Middle East, and Asia. Commercial and residential pest contol account for 81% of revenues, and the balance is mainly from the termite business. Acquired HomeTeam Pest Defense, 4/08; Crane Pest Control, 12/08; two acquisitions in Australia in 2014. Has approx. 19,000 employ. Rollins family & other dirs. own 74.4% and less than 1.0%, resp., of stock (3/24 proxy). Chairman: Gary W. Rollins. CEO: Jerry E. Gahlhoff. Inc.: DE. Address: 2170 Piedmont Rd., N.E., Atlanta, GA 30324. Telephone: 404-888-2000. Internet: www.rollins.com.

Rollins posted solid third-quarter results. The top and bottom lines increased about 9% and 8% year over year, to $916 million and $0.28 per share, respectively. Key contributors to revenue growth included healthy demand across the board, with residential pest control revenue up 6.4%, commercial pest control rising 9.4%, and termite and ancillary services climbing 14.5%. Organic growth of 7.7% was further supported by acquisitions, which added 2.1%, partially offset by divestitures. Although Hurricane Helene caused some operational disruptions, the resilience across segments helped maintain momentum, especially in recurring revenue for residential services and substantial activity in commercial and termite services.

Near-term share-profit prospects look promising. Demand has continued to remain strong in both the residential and commercial segments, which represent 47% and 33% of Rollins' total revenue, respectively. Bottom-line growth was bolstered by ongoing pricing strategies that more than offset inflationary pressures. Meanwhile, the company saw leverage across various cost categories, particularly fleet costs and materials and supplies. However, investments in personnel and rising insurance and claims expenses pressured profits slightly. Additionally, Rollins expects continued strong performance in the fourth quarter, in line with its organic revenue growth target of 7% to 8%, together with an additional 2% to 3% from acquisitions. All told, we estimate share earnings to advance more than 12% in 2024 and 15% in 2025, to $1.00 and $1.15 per share, respectively.

Gary W. Rollins will transition to Executive Chairman Emeritus, with Vice Chairman John F. Wilson succeeding him as Executive Chairman. This succession will be effective January 1, 2025.

The board has approved a 10% year-over-year increase in the quarterly dividend, to $0.165 per share. The new amount will be paid on December 10th.

Good-quality shares of Rollins are ranked to mirror the broader market averages. Still, the equity has above-average 18-month capital appreciation potential, at present.

Emma Jalees *November 15, 2024*

(A) Dil. shs. Excl. nonrec. gains: '09, 2¢. 2017 excl. one-time tax impact: 5¢. Egs may not sum due to rdg. and/or change in shs. out. Next egs. rpt. due late February.
(B) Div'd paid in mid-Mar., Jun., Sept., and Dec. Excl. special div'd: $0.08 paid 12/12, $0.06 paid 12/13, $0.07 paid 12/14, $0.10 paid 10/17, $0.14 paid 11/18, $0.05 paid 12/19, $0.13 paid 12/20, and $0.08 paid 12/21.
■ Div'd reinvest. plan available.
(C) Incl. intang. In '23: $1,616 mill., $3.30/sh.
(D) In mill., adj. for stock splits.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	95
Earnings Predictability	90

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RUSH ENTERPRISES NDQ-RUSHA

RECENT PRICE **50.59** | P/E RATIO **14.6** (Trailing: 13.5 Median: 14.0) | RELATIVE P/E RATIO **0.80** | DIV'D YLD **1.4%** | **VALUE LINE**

TIMELINESS 2 Raised 8/16/24
SAFETY 3 New 10/27/17
TECHNICAL 2 Raised 10/18/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

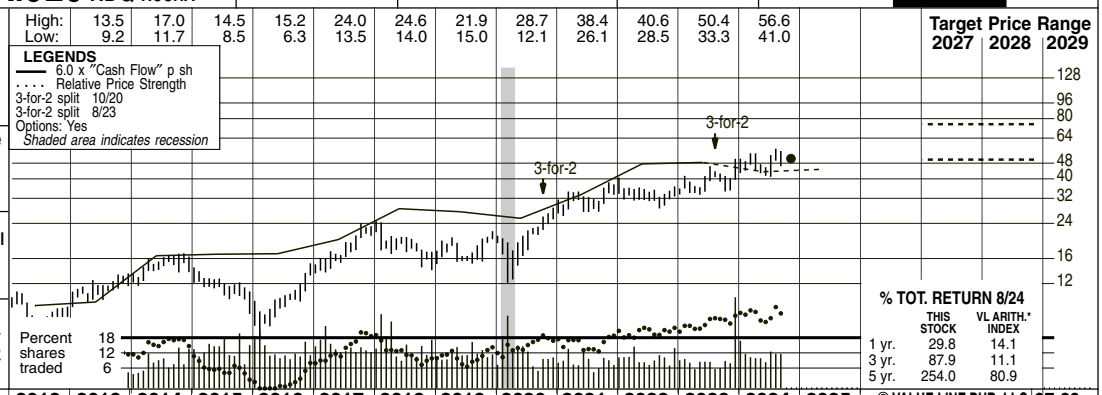
Low-High	Midpoint (% to Mid)
$40-$74	$57 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	75	(+50%)	*11%*
Low	50	(Nil)	*1%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	127	111	128
to Sell	116	138	127
Hld's(000)	65857	63744	63307



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
19.91	14.84	17.75	30.04	35.41	38.36	52.67	54.79	47.72	52.62	66.14	71.34	57.43	61.57	86.99	101.83	*94.95*	*98.10*	Revenues per sh	*104.40*
.81	.56	.84	1.32	1.56	1.62	2.75	2.80	2.82	3.32	4.74	4.57	4.24	5.58	7.92	8.07	*7.25*	*7.45*	"Cash Flow" per sh	*9.70*
.33	.07	.28	.64	.70	.56	.87	.72	.44	.97	1.53	1.68	1.36	2.78	4.57	4.15	*3.45*	*4.05*	Earnings per sh [A]	*4.70*
--	--	--	--	--	--	--	--	--	--	.11	.22	.27	.49	.53	.62	*.70*	*.73*	Div'ds Decl'd per sh	*.90*
.82	.60	1.00	1.73	1.96	2.17	2.91	4.05	2.23	2.34	2.86	3.60	1.65	2.01	2.98	4.74	*4.70*	*4.40*	Cap'l Spending per sh	*4.40*
5.01	5.10	5.51	6.18	6.97	7.54	8.52	9.30	9.77	11.61	12.82	14.24	15.38	17.62	21.37	24.04	*27.35*	*30.50*	Book Value per sh [B]	*35.30*
83.12	83.54	84.37	85.91	87.28	88.23	89.75	90.89	88.32	89.58	83.25	81.44	82.46	83.26	81.64	77.83	*79.00*	*79.50*	Common Shs Outst'g [C]	*80.00*
17.4	NMF	22.8	13.1	12.2	20.6	16.9	16.2	22.2	18.1	12.2	10.7	15.0	11.4	7.3	9.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*13.0*
1.05	NMF	1.45	.82	.78	1.16	.89	.82	1.17	.91	.66	.57	.77	.62	.42	.52			Relative P/E Ratio	*.70*
--	--	--	--	--	--	--	--	--	--	.6%	1.2%	1.3%	1.6%	1.6%	1.6%			Avg Ann'l Div'd Yield	*1.5%*
4727.4	4979.7	4214.6	4713.9	5506.2	5809.8	4735.9	5126.1	7101.7	7925.0	*7500*	*7800*	Revenues ($mill)	*8350*
6.5%	6.2%	6.8%	7.6%	8.3%	7.7%	9.4%	11.4%	11.5%	10.8%	*9.5%*	*10.0%*	Operating Margin	*11.5%*
167.2	188.8	208.9	208.0	255.6	230.9	234.8	222.9	254.8	281.0	*300*	*350*	Depreciation ($mill)	*400*
80.0	66.1	40.6	89.2	139.1	141.6	114.9	241.4	391.4	347.1	*275*	*240*	Net Profit ($mill)	*375*
38.8%	38.7%	38.9%	40.0%	24.1%	25.3%	24.3%	23.0%	23.0%	24.7%	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
1.7%	1.3%	1.0%	1.9%	2.5%	2.4%	2.4%	4.7%	5.5%	4.4%	*3.7%*	*3.1%*	Net Profit Margin	*4.5%*
170.9	79.6	118.4	202.9	194.6	205.2	330.9	321.0	439.0	587.0	*700*	*800*	Working Cap'l ($mill)	*1000*
475.2	565.8	542.5	532.4	488.7	507.9	478.7	424.8	368.9	511.6	*490*	*485*	Long-Term Debt ($mill)	*475*
764.3	844.9	862.8	1040.4	1066.9	1159.5	1268.0	1466.7	1744.5	1870.9	*2160*	*2425*	Shr. Equity ($mill)	*2825*
6.9%	5.2%	3.4%	6.1%	9.6%	9.4%	6.9%	12.8%	19.0%	14.9%	*11.5%*	*9.5%*	Return on Total Cap'l	*12.5%*
10.5%	7.8%	4.7%	8.6%	13.0%	12.2%	9.1%	16.5%	22.4%	18.6%	*13.0%*	*10.0%*	Return on Shr. Equity	*13.5%*
10.5%	7.8%	4.7%	8.6%	12.2%	10.6%	7.3%	13.7%	19.9%	15.8%	*10.0%*	*8.0%*	Retained to Com Eq	*11.0%*
--	--	--	--	7%	13%	20%	17%	11%	15%	*20%*	*18%*	All Div'ds to Net Prof	*19%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $1760.4 mill. **Due in 5 Yrs** $1287.1 mill.
LT Debt $493.7 mill. **LT Interest** $75.0 mill.
Includes capitalized leases
(Total interest coverage: 15.4x)
(20% of Cap'l)
Leases, Uncapitalized Annual rentals $23.5 mill.
No Defined Benefit Pension Plan

Pfd Stock None
Common Stock 78,755,782 shares out.
incl. 62,058,119 Cl.A and 16,697,663 Cl.B shares
as of 8/1/24
MARKET CAP: $4.0 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	201.0	183.7	167.3
Receivables	220.7	235.8	286.8
Inventory	1429.4	1801.4	1894.2
Other	16.6	39.4	29.4
Current Assets	1867.7	2260.3	2377.7
Accts Payable	171.7	162.1	166.6
Debt Due	962.4	1175.9	1266.7
Other	294.6	335.3	324.0
Current Liab.	1428.7	1673.3	1757.3

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	9.0%	8.5%	*3.5%*
"Cash Flow"	17.0%	14.5%	*5.0%*
Earnings	19.5%	31.5%	*3.0%*
Dividends	--	--	*8.5%*
Book Value	12.0%	13.0%	*8.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1232	1316	1267	1311	5126.1
2022	1563	1791	1864	1883	7101.7
2023	1912	2003	1981	2029	7925.0
2024	1872	2027	*1840*	*1761*	*7500*
2025	*1900*	*1950*	*1965*	*1985*	*7800*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.53	.67	.80	.78	2.78
2022	1.07	1.28	1.06	1.16	4.57
2023	1.07	1.17	.96	.95	4.15
2024	.88	.97	*.80*	*.80*	*3.45*
2025	*.90*	*1.00*	*1.05*	*1.10*	*4.05*

Calendar	QUARTERLY DIVIDENDS PAID [D] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.058	.058	.062	.093	.27
2021	.120	.120	.127	.127	.49
2022	.127	.127	.14	.14	.53
2023	.14	.14	.17	.17	.62
2024	.17	.17	.18		

BUSINESS: Rush Enterprises, Inc. operates a national network of commercial vehicle dealerships and repair facilities under the name Rush Truck Centers (100 locations in 22 states). All dealerships are franchised and offer vehicles manufactured by Peterbilt, International, Hino, Ford, Isuzu, Mitsubishi Fuso, IC Bus, or Blue Bird. Vehicle backlog order (12/23): $4,216 mill.. Has 7,418 employees. Pres./CEO/Chrmn.: W.M. "Rusty" Rush owns less than 1% of the Cl. A and 39.4% of the Class B common stock. Off./Dir. own 5.3% of total Class A stock. Inst'l ownership of Class A; BlackRock, Inc, 11.9%; The Vanguard Group, 10.6% (4/24 proxy). Inc.: Texas. Address: 555 I.H. 35 South, Ste. 500 New Braunfels, TX 78130. Telephone: 830-302-5200. Internet: www.rushenterprises.com.

Rush Enterprises faced significant market challenges during the first half of 2024. Demand for Class 8 trucks remained soft, though sales were partly supported by strength in the public sector and vocational segments. Meanwhile, Class 4-7 commercial vehicle sales remained stable. The ongoing freight recession and high interest rates pressured its over-the-road customers notably. Rush's aftermarket parts and services revenues also suffered. Consequently, the top line for the first half of 2024 was slightly down at $3.899 billion, versus $3.915 billion in the same period last year. However, share earnings declined sharply, to $1.85 from the prior year's $2.24.

The road ahead remains challenging, but gradual improvement in profitability seems likely. The freight recession is expected to persist throughout the year, further softening Class 8 truck sales and pricing. However, Class 4-7 commercial vehicle sales are anticipated to remain stable. Furthermore, upcoming emissions regulations beginning with 2027 vehicle models may prompt some customers to delay purchases. Despite these headwinds, the company is prepared to implement additional expense reductions to offset declining truck sales. Overall, we estimate 2024 share earnings will fall at a double-digit rate, to $3.45. However, as market conditions stabilize, demand for Class 4-7 and Class 8 trucks should gradually recover, with share earnings likely improving 17% to 18% next year.

Still, Rush has some positive long-term growth drivers. Many of the company's truck centers are strategically located near its customers, offering significant opportunities to provide contract maintenance and aftermarket services to large fleets. Additionally, Rush has been investing in technology to enhance its customer experience. These initiatives should support long-term expansion once current market challenges subside.

The company remains shareholder friendly. Recently, the board raised the quarterly dividend to $0.18 per share, marking a 5.9% year-over-year increase.

Shares of Rush are timely. However, the equity has limited long-term capital appreciation potential.

Emma Jalees *October 18, 2024*

(A) Diluted earnings. '17 excl. tax benefit $1.35. Excludes discontinued operations gains/(losses): '10, $0.12. Next earnings report due October 29th. Earnings may not sum due to rounding and/or changes in share count.
(B) Includes intangibles: '23, $420.7 mill. $5.41 a share.
(C) In millions, adjusted for stock split.
(D) Initiated dividend 8/18. Payments are historically made in February, May, August, and November.

Company's Financial Strength	B+
Stock's Price Stability	80
Price Growth Persistence	80
Earnings Predictability	60

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SERVICE CORP. INT'L NYSE-SCI

RECENT PRICE 82.17 | P/E RATIO 22.1 (Trailing: 24.2 Median: 21.0) | RELATIVE P/E RATIO 1.23 | DIV'D YLD 1.5% | VALUE LINE 400

TIMELINESS 3 Lowered 7/26/24
SAFETY 3 Raised 1/23/09
TECHNICAL 3 Lowered 11/15/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$64-$100	$82 (0%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	135	(+65%)	*14%*
Low	90	(+10%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	184	218	232
to Sell	232	208	214
Hld's(000)	127396	125501	124111

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	19.6	23.4	32.0	28.9	38.1	47.1	48.7	53.0	71.7	75.1	74.7	83.3								
Low:	13.9	16.8	22.1	20.2	28.5	35.2	38.9	33.9	45.6	56.8	52.9	64.1								
	8.64	8.08	9.12	10.46	11.42	12.04	14.76	15.25	16.00	16.59	17.58	17.83	20.57	25.40	26.69	26.27	*28.90*	*30.15*	Revenues per sh	*34.20*
	1.00	.95	1.01	1.19	1.29	1.25	1.54	1.92	1.71	2.42	2.69	2.78	3.97	5.75	5.09	4.62	*4.90*	*5.30*	"Cash Flow" per sh	*6.70*
	.52	.51	.50	.61	.70	.67	.82	1.14	.90	1.55	1.79	1.90	2.91	4.57	3.80	3.47	*3.55*	*3.95*	Earnings per sh [A]	*5.10*
	.16	.16	.16	.20	.23	.27	.34	.44	.51	.58	.68	.72	.78	.88	1.02	1.12	*1.19*	*1.28*	Div'ds Decl'd per sh [B]	*1.65*
	.62	.33	.41	.53	.55	.53	.71	.77	1.02	1.15	1.30	1.32	1.30	1.86	2.40	2.32	*2.60*	*2.80*	Cap'l Spending per sh	*3.70*
	5.18	5.84	6.16	6.28	6.36	6.66	6.75	6.05	5.77	7.55	9.05	10.06	10.27	11.71	10.87	9.87	*11.50*	*11.35*	Book Value per sh [C]	*16.20*
	249.47	254.02	240.14	221.52	211.12	212.38	202.90	195.77	189.41	186.62	181.47	181.19	170.72	163.11	153.94	156.09	*143.50*	*141.00*	Common Shs Outst'g [D]	*136.00*
	17.9	11.3	16.6	17.0	17.7	25.9	24.8	24.0	28.9	21.3	22.2	23.3	15.1	12.6	17.4	18.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.0*
	1.08	.75	1.06	1.07	1.13	1.46	1.31	1.21	1.52	1.07	1.20	1.24	.78	.68	1.01	1.08			Relative P/E Ratio	*1.20*
	1.7%	2.8%	1.9%	1.9%	1.9%	1.6%	1.7%	1.6%	2.0%	1.8%	1.7%	1.6%	1.8%	1.5%	1.5%	1.7%			Avg Ann'l Div'd Yield	*1.5%*
							2994.0	2986.4	3031.1	3095.0	3190.2	3230.8	3511.5	4143.1	4108.7	4099.8	*4150*	*4250*	Revenues ($mill)	*4650*
							21.1%	22.9%	22.6%	23.3%	23.9%	25.0%	28.2%	31.9%	28.2%	27.5%	*27.0%*	*27.5%*	Operating Margin	*28.5%*
							140.0	141.5	147.2	153.1	153.7	151.0	155.3	159.3	175.3	191.3	*190*	*195*	Depreciation ($mill)	*215*
							172.5	233.8	177.0	298.5	335.2	352.9	521.7	777.9	607.9	529.3	*510*	*555*	Net Profit ($mill)	*695*
							55.8%	36.5%	45.7%	27.5%	23.0%	22.3%	22.5%	23.5%	25.1%	24.1%	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
							5.8%	7.8%	5.8%	9.6%	10.5%	10.9%	14.9%	18.8%	14.8%	12.9%	*12.3%*	*13.1%*	Net Profit Margin	*14.9%*
							d155.1	d211.0	d183.5	d347.7	d224.4	d183.1	d439.7	d287.2	d439.4	d250.8	*d300*	*d325*	Working Cap'l ($mill)	*d300*
							2963.8	3071.7	3196.6	3135.3	3532.2	3513.5	3514.2	3901.3	4251.1	4649.2	*4750*	*4700*	Long-Term Debt ($mill)	*4550*
							1368.7	1184.7	1092.7	1409.4	1641.9	1823.3	1752.7	1909.4	1673.2	1541.3	*1650*	*1600*	Shr. Equity ($mill)	*2200*
							6.0%	7.5%	6.0%	8.4%	8.2%	8.4%	11.5%	14.7%	11.7%	10.5%	*9.5%*	*10.0%*	Return on Total Cap'l	*11.5%*
							12.6%	19.7%	16.2%	21.2%	20.4%	19.4%	29.8%	40.7%	36.3%	34.3%	*31.0%*	*34.5%*	Return on Shr. Equity	*31.5%*
							7.4%	12.3%	7.2%	13.5%	12.9%	12.1%	21.9%	33.0%	26.8%	23.2%	*20.5%*	*23.5%*	Retained to Com Eq	*21.5%*
							41%	37%	56%	36%	37%	37%	26%	19%	26%	32%	*34%*	*32%*	All Div'ds to Net Prof	*32%*

LEGENDS
17.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	52.3	28.7
3 yr.	24.9	10.7
5 yr.	94.7	73.6

CAPITAL STRUCTURE as of 9/30/24
Total Debt $4828.0 mill. **Due in 5 Yrs** $2289.3 mill.
LT Debt $4743.7 mill. **LT Interest** $239.5 mill.
(LT interest earned: 4.7x)
(75% of Cap'l)
Leases, Uncapitalized Annual rentals $10.0 mill.

Pension Assets-12/23 Nil
Oblig. $15.4 mill.
Pfd Stock None

Common Stock 144,628,958 shs.
as of 10/31/24
MARKET CAP: $11.9 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	191.9	221.6	185.4
Receivables	96.8	97.9	81.0
Inventory	31.7	33.6	34.6
Other	39.5	145.2	88.1
Current Assets	359.9	498.3	389.1
Accts Payable	217.7	303.5	658.9
Debt Due	90.7	63.3	84.3
Other	490.9	382.3	- -
Current Liab.	799.3	749.1	743.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	9.0%	8.5%	*4.5%*
"Cash Flow"	15.5%	19.5%	*4.5%*
Earnings	20.0%	25.5%	*4.5%*
Dividends	16.5%	12.0%	*8.5%*
Book Value	5.5%	11.0%	*7.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1078.0	987.5	1034.4	1043.2	4143.1
2022	1112.4	990.9	977.7	1027.7	4108.7
2023	1028.7	1013.4	1001.9	1055.8	4099.8
2024	1045.4	1034.0	1014.0	*1056.6*	*4150*
2025	*1065*	*1050*	*1050*	*1085*	*4250*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.32	.92	1.16	1.17	4.57
2022	1.34	.84	.68	.92	3.80
2023	.93	.83	.78	.93	3.48
2024	.89	.79	.79	*1.08*	*3.55*
2025	*.95*	*.90*	*1.00*	*1.10*	*3.95*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.19	.19	.19	.21	.78
2021	.21	.21	.23	.23	.88
2022	.25	.25	.25	.27	1.02
2023	.27	.27	.29	.29	1.12
2024	.29	.30	.30		

BUSINESS: Service Corp. International is the largest funeral services provider and cemetery operator in North America. The company owns and operates 1,483 funeral service locations and 489 cemeteries across 44 states in USA, 8 Canadian Provinces, and Puerto Rico (12/31/23). It also owns and operates flower shops, limousine services, and burial vaults. Acquired Keystone North America in March, 2010. Approximately 24,922 employees. Baillie Gifford & Co. owns 9.5% of common stock; The Vanguard Group, 10.1%; BlackRock, Inc., 9.2%. Officers & Directors, 4.6% (3/24 proxy). Chairman, President & CEO: Thomas L. Ryan. Incorporated: Texas. Address: 1929 Allen Parkway, Houston, Texas 77019. Telephone: 713-522-5141. Internet: www.sci-corp.com.

Service Corp. delivered modest top- and bottom-line growth during the recent September period. Net revenues during the third quarter reached $1.014 billion, which was relatively in line with our estimate of $1.015 billion. Of note, the funeral segment increased revenue by $11.2 million year over year, due to newly constructed properties and more deaths. Whereas, the cemetery business generated top-line growth of just .2%, to $448 million, which was mainly a result of newly-acquired properties. However, higher cost of revenues and increased payroll expenses led to negative comparisons for the profit margin. In any case, stock buybacks allowed earnings per share to come in higher than its performance in the comparable prior-year period.

We have lowered our 2024 full-year earnings-per-share estimate to $3.55, which is down a nickel from our previous report in August. This adjustment is due to the higher-than-expected cost of revenue. To wit, we now look for an adjusted profit margin of 12.3% versus our previous projection of 12.5%.

The long-term outlook remains favorable. Barring a cure for death, the largest deathcare provider in North America is likely to generate higher top-line comparisons in each sequential year out to 2027-2029. Moreover, the Baby Boomer generation (born 1946-1964) has approached the age range of 60-years to 78-years old, which augurs well for the company's long-term prospects. In fact, this generation makes up nearly 21% of the United States population. Meanwhile, favorable pricing actions and cost-cutting initiatives could enhance the profit margin.

The backlog continues to grow. As of September 30th, the backlog stood at $15.99 billion from both trust and insurance-funded preneed sales. Given the nature of this company's services, the conversion rate should be close to 100%.

Conservative investors will find this equity worthwhile. It holds our highest score for Price Growth Persistence, and the dividend yield is competitive within the industry. Despite the potential for below-average gains across most investment horizons, we consider this a relatively safe investment.

Collin Cicconi *November 15, 2024*

(A) Diluted earnings. Excl. nonrecurring gains/losses: '08, (15¢); '09, (2¢); '17, $1.30; '18, 60¢; '19, 9¢; '20, (3¢); '21, (15¢); '22, (27¢); '23, 6¢; '24 Q2, 2¢; Q3, 2¢. Next earnings report due mid February.
(B) Dividends historically paid late March, June, Sep., and Dec.
(C) Includes intangibles: In '23: $1,977.2 million, $12.67/share.
(D) In millions.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	100
Earnings Predictability	65

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SELECTIVE INSUR. NDQ-SIGI

RECENT PRICE **98.08** | P/E RATIO **17.1** (Trailing: 27.5 Median: 15.0) | RELATIVE P/E RATIO **0.92** | DIV'D YLD **1.6%** | **VALUE LINE**

TIMELINESS 3 Lowered 5/24/24
SAFETY 2 Raised 3/1/24
TECHNICAL 5 Lowered 11/29/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$82-$152	$117 (20%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	180	(+85%)	*18%*
Low	130	(+35%)	*9%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	170	148	149
to Sell	123	164	168
Hld's(000)	50288	50224	51267

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	28.3	27.7	37.9	44.0	62.4	67.2	81.4	70.9	91.5	98.8	108.2	109.6						
Low:	19.5	21.4	25.5	29.3	38.5	53.6	58.1	37.1	62.8	66.8	87.7	81.0						

LEGENDS
13.0 x Earnings p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-11.7	28.7
3 yr.	20.1	10.7
5 yr.	39.8	73.6

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	28.28	26.88	26.39	26.45	28.72	31.04	33.93	34.69	37.08	39.17	41.33	43.68	44.77	50.13	55.91	63.12	*72.15*	*72.60*	P/C Prem Earned per sh	*73.85*
	2.48	2.23	2.71	2.71	2.39	2.41	2.54	2.12	2.26	2.77	3.31	3.74	3.79	5.43	4.78	6.41	*6.45*	*6.50*	Investment Inc per sh	*6.65*
	d.26	d.04	d.44	d1.94	d1.14	.61	1.29	2.64	2.61	2.72	2.19	2.84	1.98	3.34	20.91	22.15	*22.20*	*22.25*	Underwriting Inc per sh	*22.40*
	1.43	1.39	1.35	.34	.59	1.65	2.17	2.70	2.75	3.11	3.66	4.40	4.15	6.50	5.03	5.89	*3.70*	*7.70*	Earnings per sh [A]	*12.00*
	.52	.52	.52	.52	.52	.52	.53	.57	.61	.66	.74	.83	.94	1.03	1.14	1.25	*1.45*	*1.65*	Div'ds Decl'd per sh [B]■	*2.25*
	16.84	18.83	19.96	20.39	19.77	20.63	23.36	24.37	26.42	29.28	30.40	36.91	42.38	46.24	38.63	48.72	*52.45*	*53.20*	Book Value per sh	*55.40*
	52.88	53.24	53.68	54.41	55.16	55.92	54.59	57.36	57.97	58.50	58.95	59.46	59.91	60.18	60.25	60.64	*61.00*	*62.00*	Common Shs Outst'g [C]	*65.00*
	133%	80%	81%	80%	91%	117%	103%	124%	141%	172%	198%	190%	134%	165%	198%	204%	*Bold figures are Value Line estimates*		Price to Book Value	*270%*
	15.7	10.8	12.0	48.1	30.5	14.6	11.1	11.2	13.5	16.2	16.4	15.9	13.7	11.8	15.2	16.9			Avg Ann'l P/E Ratio	*13.0*
	.94	.72	.76	3.02	1.94	.82	.58	.56	.71	.81	.89	.85	.70	.64	.88	.94			Relative P/E Ratio	*.70*
	2.3%	3.5%	3.2%	3.2%	2.9%	2.2%	2.2%	1.9%	1.6%	1.3%	1.2%	1.2%	1.7%	1.3%	1.5%	1.3%			Avg Ann'l Div'd Yield	*2.3%*
							1852.6	1989.9	2149.6	2291.0	2436.2	2597.2	2681.8	3017.3	3373.4	3827.6	*4400*	*4500*	P/C Premiums Earned	*4800*
							62.5%	57.7%	57.4%	58.7%	61.5%	59.7%	61.0%	60.1%	62.7%	64.9%	*64.0%*	*63.0%*	Loss to Prem Earned	*60.0%*
							33.7%	34.7%	35.5%	34.4%	33.2%	13.1%	13.7%	12.5%	32.3%	31.4%	*32.0%*	*32.0%*	Expense to Prem Writ	*32.0%*
							3.8%	7.6%	7.0%	6.9%	5.3%	27.1%	25.3%	27.4%	5.0%	3.7%	*4.0%*	*5.0%*	Underwriting Margin	*8.0%*
							27.0%	28.4%	28.1%	27.7%	18.0%	18.9%	18.7%	20.8%	20.0%	20.3%	*21.0%*	*22.0%*	Income Tax Rate	*25.0%*
							124.5	157.1	161.7	184.9	218.6	264.4	249.7	403.8	303.1	357.2	*225*	*475*	Net Profit ($mill)	*780*
							3.0%	2.5%	2.5%	2.9%	3.5%	3.5%	3.2%	4.3%	3.7%	4.5%	*5.0%*	*6.0%*	Inv Inc/Total Inv	*9.0%*
							6582	6904	7356	7686	7953	8797	9688	10461	10802	11803	*13500*	*13600*	Total Assets ($mill)	*13900*
							1275.6	1398.0	1531.4	1713.0	1791.8	2194.9	2738.9	2982.9	2527.6	2954.4	*3200*	*3300*	Shr. Equity ($mill)	*3600*
							9.8%	11.2%	10.6%	10.8%	12.2%	12.0%	9.1%	13.5%	13.0%	12.1%	*7.0%*	*14.5%*	Return on Shr. Equity	*21.5%*
							7.5%	9.0%	8.4%	8.6%	9.8%	9.9%	7.7%	12.0%	10.0%	9.6%	*4.0%*	*11.5%*	Retained to Com Eq	*17.5%*
							23%	20%	21%	20%	19%	18%	22%	17%	23%	21%	*39%*	*21%*	All Div'ds to Net Prof	*19%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $508.2 mill. **Due in 5 Yrs** $508.2 mill.
LT Debt $508.2 mill. **LT Interest** $28.8 mill. (15% of Cap'l)
Leases, Uncapitalized $7.2 million.
Pension Assets-12/23 $345 mill. **Oblig.** $325 mill.
Pfd Stock None

Common Stock 60,794,017 shs.
as of 10/18/24

MARKET CAP: $6.0 billion (Mid Cap)

FINANCIAL POSITION ($MILL.)	2022	2023	9/30/24
Bonds	6643.3	7521.9	8110.6
Stocks	162.0	187.2	205.6
Mortgages	- -	- -	- -
Other	3997.0	4093.4	5156.9
Total Assets	10802.3	11802.5	13473.1
Unearned Prems	1992.8	2330.7	2655.0
Reserves	5144.8	5336.9	6452.0
Other	1137.1	1180.6	1198.3
Total Liab.	8274.7	8848.2	10305.3

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Premium Inc	6.5%	6.0%	*4.5%*
Invest Income	7.5%	13.0%	*3.5%*
Earnings	21.0%	12.5%	*17.5%*
Dividends	7.5%	10.0%	*16.0%*
Book Value	7.5%	8.0%	*4.0%*

Calendar	NET PREM. EARNED ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	725.0	740.5	767.3	784.5	3017.3
2022	812.3	834.4	853.9	872.8	3373.4
2023	902.3	942.2	981.9	1001.2	3827.6
2024	1050.9	1080.2	1112.2	*1156.7*	*4400*
2025	*1075*	*1105*	*1140*	*1180*	*4500*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.76	1.97	1.18	1.59	6.50
2022	1.41	1.17	.99	1.46	5.03
2023	1.44	.99	1.51	1.94	5.89
2024	1.33	d1.10	1.40	*2.07*	*3.70*
2025	*2.35*	*d.10*	*2.40*	*3.05*	*7.70*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.23	.23	.23	.25	.94
2021	.25	.25	.25	.28	1.03
2022	.28	.28	.28	.30	1.14
2023	.30	.30	.30	.35	1.25
2024	.35	.35	.35		

BUSINESS: Selective Insurance Group, Inc. is a holding company for ten property/casualty insurance companies. (Main subsidiary: Selective Insurance Company of America.) Markets products primarily in the East and Midwest. New Jersey accounted for 18% of premiums written in '23. Mix of 2023 premiums written: personal lines, 27%; commercial lines, 73%. Commercial premiums by industry (as percentage of total): automobile, 29%; general liability, 33%; workers' compensation, 12%; other, 26%. Has 2,650 employees. Officers/directors own 1.0% of common stock; BlackRock, 12.8% (4/24 Proxy). Chairman, President & CEO: John J. Marchioni. Inc.: NJ. Address: 40 Wantage Ave., Branchville, NJ 07890. Telephone: 973-948-3000. Internet: www.selective.com.

Selective Insurance has reported terrific top-line results. Net premiums written and earned are trending upward, thanks to accelerating renewal pure prices and stable Standard Commercial Lines retention. Higher direct new business and strong retention have also been a plus. The Investments segment generated 13.1 points of annualized ROE (return on equity) in the most recent quarter, as net investment income was $93 million, up 16% from a year ago. Selective successfully added Washington, Oregon, and Nevada to its Standard Commercial Lines footprint in early October. The company now covers 35 states and the District of Columbia. Management plans to add three more states, Kansas, Montana, and Wyoming, over the next two years. Over time, Selective plans to expand its Standard Commercial Lines footprint to be near national.

Although the bottom line is encountering headwinds, we think it will make a comeback in 2025. Selective's combined ratio has increased by 13.4 points, up from 6.6 points a year ago, due to elevated catastrophe losses. Losses resulted from 19 named storms in the most recent quarter, with Hurricane Helene estimated at $85 million of pre-tax losses. However, management is taking steps to improve the profitability of the company. For example, Selective is continuing the migration of its Standard Personal Lines products and services towards customers in the mass affluent market. This is where management believes Selective's coverage and servicing capabilities can be more competitive. The business also plans to limit the migration in states where, due to regulatory constraints, it cannot charge risk-adequate premiums.

Selective's stock is neutrally ranked for year-ahead relative price performance. The issue offers above-average recovery potential out to late decade. Selective also has a below-average Beta coefficient. The Federal Reserve recently began lowering interest rates, which should help to spur the economy. Many economists expect another rate cut in December. This good-quality equity, ranked 2 for Safety, may be suitable for accounts with a long-term investment horizon.

Keith R. Foldesi *November 29, 2024*

(A) Non-GAAP operating income per diluted share. Excl. loss from discontinued ops.: '08, 1¢; '09, 15¢; '10, 7¢; '11, 1¢. Excl. nonrecurring charge: '22, $1.49. EPS may not total due to rounding. Next earnings report due mid February. **(B)** Dividends historically paid in early March, June, September, December. ■ Div'd reinvestment plan available. **(C)** In millions.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	85
Earnings Predictability	65

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SCHNEIDER NAT'L NYSE-SNDR

RECENT PRICE **28.57** | P/E RATIO **29.2** (Trailing: 42.3 Median: NMF) | RELATIVE P/E RATIO **1.62** | DIV'D YLD **1.4%** | VALUE LINE **328**

TIMELINESS 3 Raised 7/19/24
SAFETY 2 Raised 11/15/24
TECHNICAL 3 Lowered 11/15/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

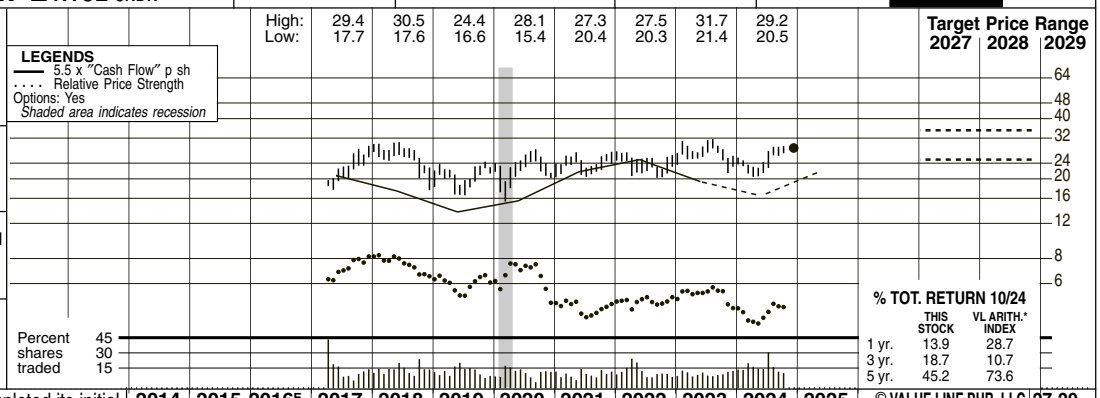
Low-High	Midpoint (% to Mid)
$18-$33	$26 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	35	(+25%)	*6%*
Low	25	(-10%)	*-2%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	124	151	139
to Sell	140	112	127
Hld's(000)	50232	50195	52843



Schneider National, Inc. completed its initial public offering on April 5, 2017. At that time, 28.9 million Class B shares were sold to the public at an average price of $19 per share. The underwriting syndicate included Morgan Stanley, UBS Investment Bank, BofA Merrill Lynch, Citigroup, and Credit Suisse.

	2014	2015	2016E	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	--	--	--	24.78	28.12	26.80	25.67	31.57	37.10	30.90	*30.55*	*33.05*	Revenues per sh	*40.45*
	--	--	--	3.78	3.17	2.48	2.83	3.95	4.54	3.50	*3.00*	*4.00*	"Cash Flow" per sh	*5.40*
	--	--	--	2.28	1.52	.83	1.19	2.28	2.56	1.34	*.70*	*1.40*	Earnings per sh	*2.50*
	--	--	--	.15	.24	.24	.26	.28	.32	.36	*.38*	*.38*	Div'ds Decl'd per sh	*.40*
	--	--	--	3.01	2.90	2.63	2.36	3.04	3.90	2.55	*2.55*	*2.60*	Cap'l Spending per sh	*2.60*
	--	--	--	10.69	12.05	12.63	11.59	13.64	15.94	16.60	*17.10*	*18.05*	Book Value per sh C	*20.05*
	--	--	--	176.88	177.00	177.12	177.34	177.66	178.02	178.00	*175.00*	*174.00*	Common Shs Outst'g D	*173.00*
	--	--	--	9.9	16.9	25.0	19.1	10.4	9.4	9.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*12.0*
	--	--	--	.50	.91	1.33	.98	.56	.54	.55			Relative P/E Ratio	*.65*
	--	--	--	.7%	.9%	1.2%	1.1%	1.2%	1.3%	1.3%			Avg Ann'l Div'd Yield	*1.3%*
	--	--	4045.7	4383.6	4977.0	4747.0	4552.8	5608.7	6604.4	5498.9	*5350*	*5750*	Revenues ($mill)	*7000*
	--	--	16.0%	14.8%	15.5%	14.9%	14.6%	14.8%	14.4%	12.5%	*11.0%*	*14.0%*	Operating Margin	*16.5%*
	--	--	266.0	279.0	291.3	292.9	290.5	296.2	350.0	382.5	*400*	*450*	Depreciation ($mill)	*500*
	--	--	156.9	389.9	268.9	147.0	211.7	405.4	457.8	238.5	*125*	*245*	Net Profit ($mill)	*430*
	--	--	40.9%	--	26.2%	25.8%	25.2%	25.2%	24.2%	22.0%	*24.5%*	*24.5%*	Income Tax Rate	*25.0%*
	--	--	3.9%	8.9%	5.4%	3.1%	4.6%	7.2%	6.9%	4.3%	*2.3%*	*4.3%*	Net Profit Margin	*6.6%*
	--	--	246.4	632.0	801.7	940.5	686.1	558.3	713.4	505	*465*	*540*	Working Cap'l ($mill)	*665*
	--	--	439.6	420.6	359.6	305.8	266.4	208.9	141.8	197.6	*125*	*125*	Long-Term Debt ($mill)	*125*
	--	--	1186.5	1890.2	2132.3	2236.4	2055.5	2423.8	2837.2	2956.8	*2990*	*3140*	Shr. Equity ($mill)	*3465*
	--	--	10.3%	17.2%	11.0%	6.1%	9.4%	15.6%	15.5%	8.0%	*3.5%*	*7.0%*	Return on Total Cap'l	*12.0%*
	--	--	13.2%	20.6%	12.6%	6.6%	10.3%	16.7%	16.1%	8.0%	*4.0%*	*8.0%*	Return on Shr. Equity	*12.5%*
	--	--	13.2%	19.3%	10.7%	4.7%	8.1%	14.7%	14.2%	6.0%	*2.0%*	*5.5%*	Retained to Com Eq	*10.5%*
	--	--	--	7%	15%	29%	21%	12%	12%	27%	*53%*	*27%*	All Div'ds to Net Prof	*16%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $263.7 mill. **Due in 5 Yrs** $210.0 mill.
LT Debt $124.7 mill. **LT Interest** $15.0 mill. (4% of Cap'l)

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 175,215,177 shs. **as of 7/26/24**

MARKET CAP: $5.0 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2021	2022	9/30/24
Cash Assets	431.6	159.6	179.0
Receivables	643.7	575.7	541.1
Other	275.0	375.6	367.7
Current Assets	1350.3	1110.9	1087.8
Accts Payable	276.7	241.3	208.5
Debt Due	73.3	104.5	139.0
Other	286.9	260.4	309.7
Current Liab.	636.9	606.2	657.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	--	5.5%	*3.5%*
"Cash Flow"	--	4.0%	*5.0%*
Earnings	--	5.0%	*3.5%*
Dividends	--	9.0%	*4.0%*
Book Value	--	5.5%	*4.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1228.6	1360.8	1444.5	1574.8	5608.7
2022	1620.5	1746.9	1675.3	1561.7	6604.4
2023	1428.7	1346.5	1352.0	1371.7	5498.9
2024	1319.0	1316.7	1315.7	*1398.6*	*5350*
2025	*1400*	*1400*	*1450*	*1500*	*5750*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.31	.60	.62	.75	2.28
2022	.52	.73	.70	.62	2.56
2023	.55	.43	.20	.15	1.34
2024	.11	.21	.18	*.20*	*.70*
2025	*.25*	*.35*	*.35*	*.45*	*1.40*

Calendar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.06	.065	.065	.065	.26
2021	.065	.07	.07	.07	.28
2022	.07	.08	.08	.08	.31
2023	.08	.09	.09	.09	.35
2024	.09	.095	.095		

BUSINESS: Schneider National, Inc., founded in 1935, operates a transportation and logistics business throughout North America. It offers truckload, intermodel, and logistics solutions and has one of the largest for-hire trucking fleets. As of 12/31/23, it had about 8,400 customers, including 150 of the Fortune 500 companies. Has a fleet of trucks, tractors, trailers, containers, and chassis in excess of 109,000. Owner-operators represented 18% of total driver capacity in 2023. Has approximately 17,300 employees. Inc.: WI. CEO, Pres. & Dir.: Mark B. Rourke. Chairman: James L. Welch. Off./dir. own 40.0% of Class A stock and 11.3% of Class B (4/24 proxy). Address: 3101 South Packerland Drive, Green Bay, WI 54313. Telephone: (920) 592-2000. Internet: www.schneider.com

Schneider National's stock price is up a modest 4% since our mid-August review. The equity is up 17% year to date and is trading well above its historical median P/E multiple. The trucker's third-quarter results came in at $0.18 a share, which was below consensus estimates of $0.23. Despite the lackluster showing, investors appear to be bidding up trucking stocks due to more positive economic data.

The road ahead is likely to be challenging for the freight mover. Schneider's operations have been under pressure for several quarters, as fitful demand trends and rising costs have weighed heavily on the top and bottom lines. During the September interim, the top line decreased 3% year over year, to $1.32 billion. The bottom line fell 10% over the previous-year tally. The company continued to face headwinds in the freight market, resulting in higher operating costs and softer revenue per order.

Management has lowered its guidance for 2024. The company's leadership is now expecting earnings per share to come in somewhere between $0.66 and $0.72 versus its previous range of $0.80 - $0.90. Accordingly we have reduced our estimate for the year to $0.70 a share to reflect the added margin pressure from ongoing freight conditions and higher costs.

On the upside, we are optimistic about a recovery in 2025. While economic uncertainty continues, we believe there are signs of fundamental improvements that offer encouragement. Schneider's management highlighted modest contractual price gains, as for the first time in two years, spot prices remain under pressure, but signs of stabilization suggest a bottom has been reached.

The long-term picture is unexciting. While we expect revenues and profits to bounce back nicely, the stock is already trading at 29x 12 months EPS, which leaves limited room for price appreciation potential over the 18-month and the 3- to 5-year time lines. The subpar rating for Price Growth Persistence (35 out of 100) echoes this sentiment. What's more, the stock is ranked 3 (Average) for relative year-ahead price performance. In our opinion, investors should consider alternatives, for now.

Simon R. Shoucair *November 15, 2024*

(A) Fully diluted earnings. Next earnings release due late January. Egs. may not sum due to rdg./shs. out.
(B) Dividends historically paid in early January, April, July, and October. Paid special div $2.00/sh on Oct 26, 2020.
(C) Includes intangibles. In 2023: $230.2 million or $1.28 per share.
(D) In millions.
(E) Pro forma.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	35
Earnings Predictability	45

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UNIFIRST 'A' NYSE-UNF

RECENT PRICE 179.53 | P/E RATIO 24.3 (Trailing: 23.1 Median: 23.0) | RELATIVE P/E RATIO 1.35 | DIV'D YLD 0.8% | VALUE LINE 403

TIMELINESS 3 Raised 7/12/24
SAFETY 2 Raised 5/27/16
TECHNICAL 1 Raised 11/15/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$156-$267	$212 (20%)

2027-29 PROJECTIONS

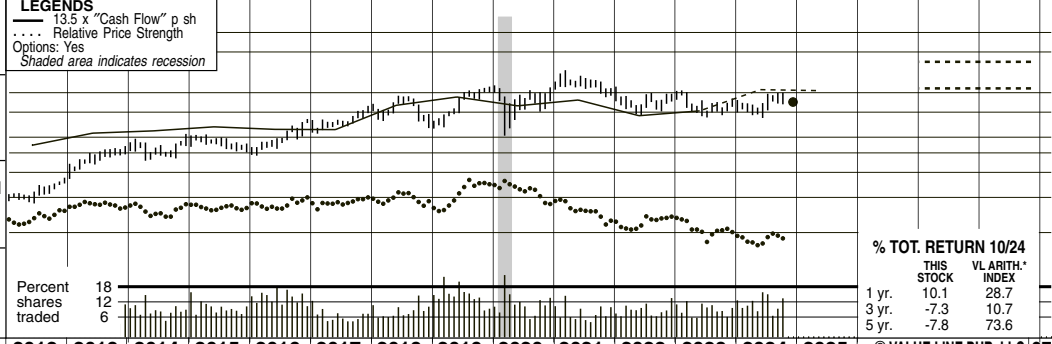
	Price	Gain	Ann'l Total Return
High	285	(+60%)	*13%*
Low	210	(+15%)	*5%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	98	124	148
to Sell	109	110	122
Hld's(000)	14591	14481	14681

High:	108.3	124.6	123.9	147.6	171.8	193.0	214.4	217.9	258.9	214.7	205.6	200.1
Low:	74.2	91.6	100.8	96.9	124.9	133.2	132.4	121.9	189.8	154.7	150.5	149.6

LEGENDS
13.5 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession



% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	10.1	28.7
3 yr.	-7.3	10.7
5 yr.	-7.8	73.6

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
52.95	52.32	51.74	57.06	62.97	67.72	69.57	72.46	72.44	78.47	88.63	95.54	95.47	96.78	107.18	119.41	*129.95*	*132.45*	Revenues per sh [A]	*150.00*
5.94	6.90	6.96	7.10	8.09	9.31	9.56	10.02	9.73	9.69	12.82	14.09	12.73	13.62	11.37	12.03	*15.36*	*15.15*	"Cash Flow" per sh	*18.60*
3.15	3.92	3.90	3.85	4.76	5.81	5.95	6.15	5.70	5.28	7.45	8.52	7.13	7.94	5.46	5.53	7.77	*7.25*	Earnings per sh [AB]	*9.50*
.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.30	.45	1.00	1.00	1.20	1.24	*1.32*	*1.40*	Div'ds Decl'd per sh [C]	*1.75*
3.82	3.37	2.52	3.21	3.74	5.17	4.58	5.03	4.85	5.35	5.89	6.33	6.18	7.08	7.73	9.20	*8.59*	*9.05*	Cap'l Spending per sh	*10.65*
28.81	32.37	35.71	40.15	44.96	50.63	56.58	61.80	67.35	71.67	76.53	86.67	92.14	99.26	102.63	107.17	*112.87*	*117.55*	Book Value per sh [D]	*134.70*
19.32	19.37	19.83	19.88	19.95	20.01	20.05	20.10	20.27	20.28	19.14	18.94	18.90	18.87	18.67	18.70	*18.68*	*18.50*	Common Shs Outst'g [E]	*18.00*
13.2	8.6	11.9	13.5	12.2	14.5	17.2	18.3	19.3	25.8	22.3	18.8	26.2	26.9	34.6	32.3	21.9		Avg Ann'l P/E Ratio	*26.0*
.79	.57	.76	.85	.78	.81	.91	.92	1.01	1.30	1.20	1.00	1.35	1.45	2.00	1.87	1.22		Relative P/E Ratio	*1.45*
.4%	.4%	.3%	.3%	.3%	.2%	.1%	.1%	.1%	.1%	.2%	.3%	.5%	.5%	.6%	.7%	.8%		Avg Ann'l Div'd Yield	*.7%*
1394.9	1456.6	1468.0	1591.0	1696.5	1809.4	1804.2	1826.2	2000.8	2233.0	2427.4	*2450*	Revenues ($mill) [A]	*2700*
19.0%	19.1%	19.3%	16.4%	16.4%	17.4%	15.4%	16.5%	12.2%	11.4%	13.4%	*13.5%*	Operating Margin	*14.0%*
71.7	77.1	81.6	88.9	96.7	103.3	104.7	106.0	108.8	121.2	141.4	*145*	Depreciation ($mill)	*165*
119.9	124.3	115.6	107.7	148.7	163.6	135.8	151.1	103.4	103.7	145.5	*135*	Net Profit ($mill)	*170*
38.6%	38.3%	40.4%	38.9%	20.6%	26.4%	23.7%	23.2%	23.0%	25.3%	*24.5%*	*25.0%*	Income Tax Rate	*25.0%*
8.6%	8.5%	7.9%	6.8%	8.8%	9.0%	7.5%	8.3%	5.2%	4.6%	6.0%	*5.5%*	Net Profit Margin	*6.3%*
398.3	477.7	625.0	636.3	586.3	724.0	759.2	849.1	820.1	572.9	634.3	*650*	Working Cap'l ($mill)	*725*
.2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	Long-Term Debt ($mill)	*Nil*
1134.5	1242.2	1364.8	1453.2	1465.0	1641.2	1741.1	1873.0	1915.9	2004.0	2108.5	*2175*	Shr. Equity ($mill)	*2425*
10.6%	10.0%	8.5%	7.4%	10.2%	10.0%	7.8%	8.1%	5.4%	5.2%	*6.9%*	*6.0%*	Return on Total Cap'l	*7.0%*
10.6%	10.0%	8.5%	7.4%	10.2%	10.0%	7.8%	8.1%	5.4%	5.2%	6.9%	*6.0%*	Return on Shr. Equity	*7.0%*
10.3%	9.8%	8.3%	7.2%	9.9%	9.5%	6.9%	7.1%	4.3%	4.1%	5.7%	*5.0%*	Retained to Com Eq	*5.5%*
2%	2%	2%	3%	3%	5%	12%	12%	20%	21%	17%	*19%*	All Div'ds to Net Prof	*18%*

CAPITAL STRUCTURE as of 8/31/24
Total Debt None

Leases, Uncapitalized Annual rentals $19.6 mill.
Pension Assets-8/23 $3.0 mill. **Oblig.** $3.5 mill.

Common Stock 18,613,145 shs.
as of 6/28/24
(Incl. 15,022,850 Comm. Stock and 3,590,295 Class B shares. Class B shrs. have 10 votes for every Comm. shr., but are paid 80% of Common dividend.)
MARKET CAP: $3.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	8/31/24
Cash Assets	376.4	79.4	175.1
Receivables	249.2	279.1	278.9
Inventory (LIFO)	151.5	148.3	156.9
Other	286.7	333.3	304.8
Current Assets	1063.8	840.1	915.7
Accts Payable	82.1	92.7	92.5
Debt Due	- -	- -	- -
Other	161.6	174.5	188.9
Current Liab.	243.7	267.2	281.4

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	5.5%	6.0%	*5.5%*
"Cash Flow"	4.0%	3.0%	*7.0%*
Earnings	3.0%	.5%	*7.0%*
Dividends	22.5%	41.5%	*7.5%*
Book Value	8.5%	7.5%	*4.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Nov.Per	Feb.Per	May Per	Aug.Per	Full Fiscal Year
2021	446.8	449.8	464.3	465.3	1826.2
2022	486.2	486.7	511.5	516.4	2000.8
2023	541.8	542.7	576.7	571.8	2233.0
2024	593.5	590.7	603.3	639.9	2427.4
2025	*600*	*600*	*610*	*640*	*2450*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Nov.Per	Feb.Per	May Per	Aug.Per	Full Fiscal Year
2021	2.20	1.71	2.21	1.82	7.94
2022	1.77	.97	1.33	1.39	5.46
2023	1.82	.95	1.29	1.47	5.53
2024	2.26	1.09	2.03	2.39	7.77
2025	*2.15*	*1.00*	*1.85*	*2.25*	*7.25*

Calendar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.25	.25	.25	.25	1.00
2021	.25	.25	.25	.30	1.05
2022	.30	.30	.30	.31	1.21
2023	.31	.31	.31	.33	1.26
2024	.33	.33	.33		

BUSINESS: UniFirst Corporation is a leading company in the industrial laundry business. Manufactures, rents, cleans, and delivers uniforms, as well as some non-garment items. Serves over 300,000 customer locations in the United States, Canada, and Europe. Sales breakdown: U.S. & Canadian Rental and Cleaning and Corporate segments, 88% of 2024 revenues; Specialty Garments, 8%; and First Aid, 4%. '23 depreciation rate: 5.4%. Has about 14,000 employees. Ronald Croatti Trust owns 5.5% of shares outstanding (20.3% of voting rights); Officers & directors, 1.1% (12/23 proxy). Chrmn.: Raymond C. Zemlin. Pres. & CEO: Steve Sintros. Inc.: Massachusetts. Address: 68 Jonspin Road, Wilmington, MA. 01887. Telephone: 978-658-8888. Internet: www.unifirst.com.

UniFirst generated positive comparisons for the top- and bottom-line in the recent August interim. Fiscal 2024 fourth-quarter revenue advanced 12% from the prior-year period, to $639.9 million. This was largely due to an increase in demand for services provided by its Core Laundry segment, which generated revenue of $564.1 million. Meanwhile, stronger results from U.S. nuclear operations helped the Specialty Garment business reach revenue of $46.5 million. (Both of which reflect year-over-year gains of 12%.) Meanwhile, the operating margin for Core Laundry and Special Garments increased from the year-ago period by 200 basis points and 210 basis points, respectively, to 8.0% and 18.5%. As a result, fiscal-fourth-quarter earnings-per-share advanced by 63% over the prior-year period, rising to $2.39. Looking at full-fiscal-year metrics, the top-line grew 8.7% year-over-year, to $2.427 billion, and share-earnings rose 41%, to $7.77.

Fiscal-year 2025 should generate modest top-line growth, but higher operational spending appears likely to offset such gains. Our revenue estimate is set slightly above UniFirst's outlook of $2.425 billion and $2.445 billion. Meanwhile, management indicated that expenses for the Key Initiatives will take away from Core Laundry's operating margin by an estimated 70 basis points throughout fiscal 2025. (Recall that this initiative was meant to promote operating-margin improvement by focusing on synergistic opportunities around a previous project aimed at automation.) This is primarily why we look for fiscal 2025 earnings per share to fall short of the prior year, to $7.25. We also note that this is above the company's outlook range of share earnings between $6.79 and $7.19.

These higher-quality shares could be worth considering at the recent quotation. We think gains will track the broader market in the next six to 12 months. Meanwhile appreciation potential over the next 18 months and three to five years is solid. We believe conservative accounts will find the high Financial Strength rating of 'A' appealing. Meanwhile, the equity pays a small dividend, which helps sweeten the pot.

Collin Cicconi *November 15, 2024*

(A) Fiscal year ends last Saturday in August. **(B)** Diluted earnings. Excludes nonrec. gains/(losses): '12, 21¢; '15, (11¢); '16, 47¢; '17, ($1.84); '18, 76¢; '19, 81¢. Next earnings report due early January. **(C)** Amount listed is for comm. stock. Class B shares receive 80% of comm. div'd. Div'd. payment dates are typically in early March, June, September, and December. **(D)** Incl. intangibles in '24: $768.8 mill., $41.16/sh. **(E)** In millions.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	55
Earnings Predictability	75

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UNITEDHEALTH GRP. NYSE-UNH

RECENT PRICE **589.65** | P/E RATIO **20.4** (Trailing: 21.8 Median: 19.0) | RELATIVE P/E RATIO **1.10** | DIV'D YLD **1.4%** | **VALUE LINE**

TIMELINESS 3 Lowered 3/22/24
SAFETY 1 Raised 6/13/14
TECHNICAL 2 Raised 11/29/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$494-$884	$689 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	785	(+35%)	*9%*
Low	645	(+10%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	1726	1670	1688
to Sell	1294	1433	1462
Hld's(000)	805512	799073	818325

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	75.9	104.0	126.2	164.0	231.8	287.9	300.0	368.0	509.2	558.1	554.7	630.7								
Low:	51.4	69.6	95.0	107.5	156.1	208.5	208.1	187.7	320.3	445.7	445.7	436.4								
	67.60	75.97	86.70	95.20	108.56	123.98	136.77	164.86	194.16	207.59	235.67	255.44	271.82	305.63	347.07	402.19	*436.80*	*468.65*	Revenues per sh	*577.80*
	3.86	4.20	5.25	5.86	6.71	7.09	7.44	7.88	10.34	12.55	15.71	18.26	20.20	22.62	26.21	29.80	*32.05*	*34.75*	"Cash Flow" per sh	*47.45*
	2.95	3.24	4.10	4.73	5.28	5.50	5.70	6.01	8.05	10.07	12.87	15.11	16.88	19.02	22.19	25.12	*27.60*	*30.10*	Earnings per sh [A]	*42.00*
	.03	.03	.41	.61	.80	1.05	1.41	1.88	2.38	2.88	3.45	4.14	4.83	5.60	6.40	7.29	*8.18*	*9.15*	Div'ds Decl'd per sh [B]	*12.50*
	.66	.64	.81	1.00	1.05	1.32	1.60	1.63	1.79	2.09	2.15	2.18	2.17	2.61	3.00	3.66	*3.80*	*3.85*	Cap'l Spending per sh	*4.00*
	17.30	20.58	23.78	26.44	30.60	32.54	34.02	35.39	40.10	49.30	53.85	60.78	69.23	76.26	83.27	96.06	*101.30*	*109.00*	Book Value per sh	*133.35*
	1201.0	1147.0	1086.0	1070.0	1019.0	988.00	954.00	953.00	952.00	969.00	960.00	948.00	946.00	941.00	934.00	924.00	*918.00*	*915.00*	Common Shs Outst'g [D]	*900.00*
	10.9	8.1	8.0	9.8	10.4	11.9	14.7	19.4	16.8	18.4	19.3	16.6	17.8	21.2	23.0	19.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.0*
	.66	.54	.51	.61	.66	.67	.77	.98	.88	.93	1.04	.88	.91	1.15	1.33	1.11			Relative P/E Ratio	*.95*
	.1%	.1%	1.2%	1.3%	1.5%	1.6%	1.7%	1.6%	1.8%	1.5%	1.4%	1.7%	1.6%	1.4%	1.3%	1.5%			Avg Ann'l Div'd Yield	*1.8%*
							130474	157107	184840	201159	226247	242155	257141	287597	324162	371622	*401000*	*428800*	Revenues ($mill)	*520000*
							9.0%	8.1%	8.5%	9.0%	9.0%	9.6%	10.2%	9.7%	10.1%	10.1%	*10.3%*	*10.6%*	Operating Margin	*14.2%*
							1478.0	1693.0	2055.0	2245.0	2428.0	2720.0	2891.0	3103.0	3400.0	3972.0	*4080*	*4250*	Depreciation ($mill)	*4900*
							5619.0	5813.0	7792.0	9918.0	12654	14593	16220	18184	21080	23563	*25335*	*27540*	Net Profit ($mill)	*37800*
							41.8%	42.6%	37.9%	30.2%	21.4%	20.0%	23.1%	19.7%	20.9%	19.7%	*22.0%*	*23.0%*	Income Tax Rate	*24.0%*
							4.3%	3.7%	4.2%	4.9%	5.6%	6.0%	6.3%	6.3%	6.5%	6.3%	*6.3%*	*6.4%*	Net Profit Margin	*7.3%*
							d7067	d11259	d15373	d13379	d14517	d19148	d18702	d16534	d20168	d20617	*d10500*	*d9500*	Working Cap'l ($mill)	*d8000*
							16007	25460	25777	28835	34581	36808	38648	42383	54513	58263	*73000*	*71000*	Long-Term Debt ($mill)	*66500*
							32454	33725	38177	47776	51696	57616	65491	71760	77772	88756	*93000*	*99750*	Shr. Equity ($mill)	*120000*
							12.1%	10.4%	13.0%	13.7%	15.5%	16.3%	16.3%	16.6%	16.7%	17.1%	*16.5%*	*17.5%*	Return on Total Cap'l	*21.5%*
							17.3%	17.2%	20.4%	20.8%	24.5%	25.3%	24.8%	25.3%	27.1%	26.5%	*27.0%*	*27.5%*	Return on Shr. Equity	*31.5%*
							13.1%	11.9%	14.5%	15.0%	18.1%	18.5%	17.8%	18.0%	19.4%	18.9%	*19.0%*	*19.0%*	Retained to Com Eq	*22.0%*
							24%	31%	29%	28%	26%	27%	28%	29%	28%	29%	*30%*	*30%*	All Div'ds to Net Prof	*30%*

% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	8.0	28.7
3 yr.	29.1	10.7
5 yr.	142.6	73.6

CAPITAL STRUCTURE as of 9/30/24
Total Debt $78010 mill. **Due in 5 Yrs** $19500 mill.
LT Debt $74101 mill. **LT Interest** $40755 mill.
(44% of Cap'l)
Leases, Uncapitalized Annual rentals $1038.0 mill.

No Defined Benefit Pension Plan
Pfd Stock None

Common Stock 920,284,334 shs.

as of 10/31/24
MARKET CAP: $543 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	27911	29628	37134
Receivables	17681	21276	20024
Other	23477	27533	35100
Current Assets	69069	78437	92258
Accts Payable	27715	31958	33080
Debt Due	3110	4274	3909
Other	58412	62822	64576
Current Liab.	89237	99054	101565

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	12.5%	10.5%	*8.5%*
"Cash Flow"	15.0%	15.5%	*11.0%*
Earnings	15.5%	16.5%	*12.0%*
Dividends	23.0%	17.5%	*12.0%*
Book Value	11.0%	12.5%	*8.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	70196	71321	72337	73743	287597
2022	80149	80332	80894	82787	324162
2023	91931	92903	92361	94427	371622
2024	99796	98855	100820	*101529*	*401000*
2025	*106750*	*105805*	*107700*	*108545*	*428800*

Calendar	EARNINGS PER SHARE[A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	5.32	4.70	4.52	4.48	19.02
2022	5.49	5.57	5.79	5.34	22.19
2023	6.26	6.14	6.56	6.16	25.12
2024	6.91	6.80	7.15	*6.74*	*27.60*
2025	*7.55*	*7.45*	*7.80*	*7.30*	*30.10*

Calendar	QUARTERLY DIVIDENDS PAID[B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	1.08	1.25	1.25	1.25	4.83
2021	1.25	1.45	1.45	1.45	5.60
2022	1.45	1.65	1.65	1.65	6.40
2023	1.65	1.88	1.88	1.88	7.29
2024	1.88	2.10	2.10		

BUSINESS: UnitedHealth Group is a diversified health and well-being company. It offers products and services to individuals through four operating segments: UnitedHealthcare (network-based health care benefits), OptumHealth, OptumInsight, and OptumRx (information and technology based health services, consulting, and Pharmacy Benefits Management). Acquired Amil Participacoes (Brazil) 4/13; Change Healthcare 10/22; LHC Group 2/23. Medical cost ratio: 83.2% in 2023. Has 440,000 employees. Vanguard owns 9.1% of common; BlackRock; officers & directors own 0.33% (4/24 Proxy). CEO: Andrew P. Witty. Incorporated: Minnesota. Address: 9900 Bren Road East, Minnetonka, Minnesota 55343. Telephone: 952-936-1300. Internet: www.unitedhealthgroup.com.

UnitedHealth Group's third-quarter results sat well with the investment community, it was the outlook that no one liked. The company posted its first quarterly revenue tally above the $100 billion mark and beat earnings expectations by a dime. Still, on the conference call the focus was on Medicare Advantage and Medicaid headwinds that had been pressuring the company, and the whole medical services industry, for the last year-plus. Leadership was clear that these woes would continue to be a problem into 2025. Still, the legacy health insurance business did just fine, continuing to post impressive membership growth, particularly in domestic commercial offerings. Too, the Optum branches remain in growth mode, with Optum Health and Optum Rx leading the charge, Even with that good news, the share price stumbled on the day quarterly financials were disclosed.

The results of the Presidential election was the shot in the arm the slumping quotation was looking for. The broader health insurance sector saw many of its shares propped up, with UNH posting an impressive 6% gain in value on the day the results were made official. The crux of the investor enthusiasm centers on the fact that the Biden Administration has been looking to lower reimbursement rates for senior healthcare. A Republican win seems to have eased that pressure significantly. More specifically, insurers that run Medicare Advantage (MA) were particularly giddy. These programs are private versions of the main government-run enrollment programs.

Our 2025 headline estimates are down some, but upside clearly exists. We are taking a wait-and-see approach to just how beneficial a regime change could be in the White House. In that vein, we are lowering our expectations to revenues of $428.8 billion and share earnings of $30.10 (previously $431.9 billion and $31.20).

These top-quality shares are not all that appealing in the current market. This does not look like an ideal time to get involved with this blue chip. UNH stock is neutrally ranked for Timeliness, offers below-average capital appreciation potential three to five years hence, and has a yield subpar to the *Value Line* median.

Erik M. Manning *November 29, 2024*

(A) Diluted earnings. Excludes nonrecurring gains/(losses): '16, 80¢; '17, 65¢; '18, 68¢; '19, 78¢; '20, (85¢); '21, (94¢); '22, ($1.01); '23, ($1.26). May not sum due to rounding or change in share count. Next earnings report due mid-January.
(B) Quarterly dividend initiated 6/10. Dividends historically paid in late March, June, September, and December.
(C) Includes intangibles. In '23, $118.9 billion, $128.67/share.
(D) In millions.

Company's Financial Strength	A+
Stock's Price Stability	85
Price Growth Persistence	95
Earnings Predictability	95

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UNITED PARCEL SVC. NYSE-UPS

RECENT PRICE 133.00 | P/E RATIO 16.3 (Trailing: 17.9 Median: 17.0) | RELATIVE P/E RATIO 0.91 | DIV'D YLD 4.9% | VALUE LINE 315

TIMELINESS 2 Raised 11/15/24
SAFETY 2 Lowered 11/18/22
TECHNICAL 3 Raised 11/15/24
BETA .80 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$110-$190	$150 (15%)

2027-29 PROJECTIONS

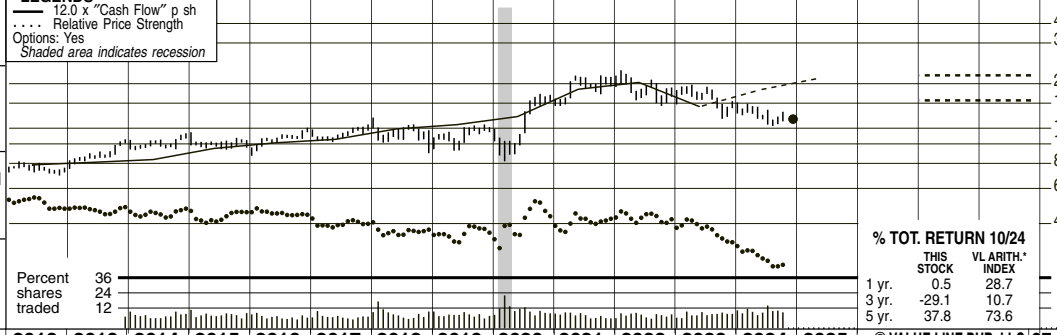
	Price	Gain	Ann'l Total Return
High	220	(+65%)	*17%*
Low	165	(+25%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	975	1099	976
to Sell	1128	981	1075
Hld's(000)	515922	506571	514627

High:	105.4	113.1	114.4	120.4	125.2	135.5	125.3	178.0	220.2	233.7	197.8	161.5
Low:	75.0	93.2	93.6	87.3	102.1	89.9	92.6	82.0	154.8	154.9	133.7	123.1

LEGENDS
12.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession



% TOT. RETURN 10/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	0.5	28.7
3 yr.	-29.1	10.7
5 yr.	37.8	73.6

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
51.72	45.62	50.19	55.15	56.80	60.00	64.34	65.87	70.17	76.68	83.75	86.50	97.88	111.86	116.84	106.66	*106.45*	*111.20*	Revenues per sh	*134.45*
5.42	4.09	5.43	6.20	6.56	6.75	6.97	7.91	8.44	8.78	9.92	10.39	11.41	15.64	16.90	12.80	*11.70*	*13.05*	"Cash Flow" per sh	*16.65*
3.50	2.31	3.56	4.23	4.53	4.61	4.75	5.43	5.75	6.01	7.24	7.53	8.23	12.13	12.94	8.78	*7.50*	*8.70*	Earnings per sh A	*12.00*
1.77	1.80	1.88	2.08	2.28	2.48	2.68	2.92	3.12	3.12	3.64	3.84	4.04	4.08	6.08	6.48	*6.52*	*6.84*	Div'ds Decl'd per sh B■	*7.90*
2.65	1.61	1.41	2.08	2.26	2.23	2.57	2.69	3.42	6.09	7.32	7.45	6.26	4.82	5.55	6.05	*4.70*	*5.45*	Cap'l Spending per sh	*7.00*
6.81	7.69	8.08	7.31	4.88	7.01	2.37	2.79	.47	1.16	3.52	3.81	.76	16.39	23.04	20.29	*20.45*	*21.20*	Book Value per sh C	*26.85*
995.44	992.85	987.12	963.00	953.00	924.00	905.00	886.00	868.00	859.00	858.00	856.60	864.60	869.70	858.80	852.80	*855.00*	*850.00*	Common Shs Outst'g D	*820.00*
18.4	22.6	18.1	16.7	16.7	19.3	21.2	18.5	18.4	18.6	15.6	14.7	15.8	15.7	14.6	19.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
1.11	1.51	1.15	1.05	1.06	1.08	1.12	.93	.97	.94	.84	.78	.81	.85	.84	1.09			Relative P/E Ratio	*.90*
2.7%	3.5%	2.9%	2.9%	3.0%	2.8%	2.7%	2.9%	2.9%	2.8%	3.2%	3.5%	3.1%	2.1%	3.2%	3.8%			Avg Ann'l Div'd Yield	*4.1%*
						58232	58363	60906	65872	71861	74094	84628	97287	100338	90958	*91000*	*94500*	Revenues ($mill)	*110250*
						15.5%	16.9%	17.0%	16.1%	13.3%	14.2%	13.5%	16.5%	17.0%	14.6%	*13.5%*	*14.5%*	Operating Margin	*16.5%*
						1923.0	2084.0	2224.0	2282.0	2207.0	2360.0	2698.0	2953.0	3188.0	3366.0	*3600*	*3685*	Depreciation ($mill)	*3800*
						4389.0	4923.0	5104.0	5259.0	6301.0	6543.0	7166.0	10652	11326	7554.0	*6400*	*7400*	Net Profit ($mill)	*9850*
						35.5%	34.0%	34.5%	33.8%	21.3%	22.0%	23.5%	22.0%	22.0%	21.8%	*23.5%*	*23.5%*	Income Tax Rate	*23.5%*
						7.5%	8.4%	8.4%	8.0%	8.8%	8.8%	8.5%	10.9%	11.3%	8.3%	*7.0%*	*7.8%*	Net Profit Margin	*8.9%*
						3169.0	2512.0	2119.0	2840.0	2123.0	1690.0	3200.0	7365.0	4077.0	1737.0	*2585*	*2700*	Working Cap'l ($mill)	*2500*
						9864.0	11316	12394	20278	19931	21818	22031	19784	17321	18916	*18700*	*18700*	Long-Term Debt ($mill)	*15150*
						2141.0	2470.0	405.0	1000.0	3021.0	3267.0	657.0	14253	19786	17306	*17500*	*18000*	Shr. Equity ($mill)	*22000*
						38.0%	36.9%	41.4%	25.8%	28.8%	27.4%	33.1%	32.3%	31.5%	21.9%	*17.5%*	*20.0%*	Return on Total Cap'l	*26.5%*
						NMF	NMF	NMF	NMF	NMF	NMF	NMF	NMF	57.2%	43.6%	*36.5%*	*41.0%*	Return on Shr. Equity	*45.0%*
						NMF	NMF	NMF	NMF	NMF	NMF	NMF	NMF	31.4%	12.6%	*5.0%*	*9.0%*	Retained to Com Eq	*15.5%*
						54%	51%	52%	53%	48%	49%	47%	32%	45%	71%	*87%*	*79%*	All Div'ds to Net Prof	*66%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $22205 mill. **Due in 5 Yrs** $7177 mill.
LT Debt $20197 mill. **LT Interest** $885 mill.
(54% of Cap'l)

Leases, Uncapitalized: Annual rentals $709 mill.
Pension Assets-12/23 $43618 mill.
Oblig. $48057 mill.

Pfd Stock None
Common Stock 856,577,824 shs.
as of 7/17/24

MARKET CAP: $114 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	7595	6072	6532
Receivables	12729	11342	9174
Other	1893	1999	3117
Current Assets	22217	19413	18823
Accts Payable	7512	6340	5299
Debt Due	2341	3348	2008
Other	8287	7988	7778
Current Liab.	18140	17676	15085

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	7.0%	8.0%	*3.0%*
"Cash Flow"	9.0%	11.0%	*3.5%*
Earnings	9.5%	12.0%	*3.5%*
Dividends	9.5%	11.0%	*6.0%*
Book Value	12.0%	NMF	*5.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	22908	23424	23184	27771	97287
2022	24378	24766	24161	27033	100338
2023	22925	22055	21061	24917	90958
2024	21706	21818	22245	*25231*	*91000*
2025	*22500*	*22750*	*23100*	*26150*	*94500*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	2.77	3.06	2.71	3.59	12.13
2022	3.05	3.29	2.99	3.62	12.94
2023	2.20	2.54	1.57	2.47	8.78
2024	1.43	1.79	1.76	*2.52*	*7.50*
2025	*1.75*	*2.15*	*2.10*	*2.70*	*8.70*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	1.01	1.01	1.01	1.01	4.04
2021	1.02	1.02	1.02	1.02	4.08
2022	1.52	1.52	1.52	1.52	6.08
2023	1.62	1.62	1.62	1.62	6.48
2024	1.63	1.63	1.63		

BUSINESS: United Parcel Service, Inc. is the world's largest integrated air and ground package delivery carrier. Also provides specialized transportation and logistics services. Service is offered throughout the U.S. and in over 220 other countries and territories. Domestic package operations accounted for 66% of '23 revenues; international (20%); supply chain & freight (14%). Fleet owned and leased (at 12/31/23): 563 planes and 135,000 ground vehicles. Has about 500,000 employees (over 70% unionized). Officers and directors own less than 1.0% of common stock; BlackRock Inc., 6.4%; Vanguard, 7.9% (3/24 Proxy). CEO: Carol B. Tomé. Incorporated: Delaware. Address: 55 Glenlake Pkwy., NE, Atlanta GA 30328. Tel.: 404-828-6000. Internet: www.ups.com.

United Parcel Service reported its first revenue and profit growth in two years during the third quarter. This was primarily driven by the Domestic segment's 6.5% year-over-year rise in average daily volume, the highest level in over three years, supported by SMB growth and an emphasis on retail B2B. Concurrently, domestic revenue per piece (yield) declined 2.2%, partly due to an increase in lower-yielding packages, such as those with lighter weights and shorter zone shipments. Additional yield headwinds included shifts in customer composition and a decrease in fuel surcharges. Domestic cost per piece fell 4.1%, owing to productivity gains and cost-saving initiatives.

Wage increases are being offset by price hikes. A 5.9% general rate increase will take effect on December 23, 2024, two weeks before FedEx's identical move. UPS is also using data-driven insights and modifiers to fine-tune pricing and drive peak season surcharges. Higher prices seem necessary, but they could accelerate the shift towards cheaper and slower delivery services, putting pressure on yields in the long term. Encouragingly, the company reported strong customer acceptance (take rates) for surcharges going into peak season.

UPS acknowledges the potential for further demand weakness and is taking steps to counteract this. It looks to improve operational efficiency through automation and facility optimization. Efforts to grow market share include better visibility processes for more consistent pickup times, AI-enabled chatbots for customer service, and Saturday delivery in Europe. The company has been collaborating with customers on holiday volume expectations and promotion timing. It will adjust staffing levels and cut capacity to match demand and avoid over-hiring.

Preparations for the new USPS contract are underway. The contract, formerly held by FedEx, took effect on October 1st. Volumes should stabilize in the first quarter of 2025.

The risk-reward ratio is decent here. If UPS can demonstrate steady progress in cost reduction through network optimization and productivity gains, it may warrant a higher valuation.

Kevin Downing *November 15, 2024*

(A) Pro forma diluted earnings. May not sum due to changes in share count. Next earnings report due late January.
(B) Dividends historically paid early March, June, September, and December. ■ Dividend reinvestment plan available.
(C) Includes intangibles. In 2023: $8177 mill., $9.59 per share.
(D) In millions.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	60
Earnings Predictability	75

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UNIVERSAL CORP. NYSE-UVV

RECENT PRICE **53.11** | P/E RATIO **10.6** (Trailing: 10.9 Median: 14.0) | RELATIVE P/E RATIO **0.57** | DIV'D YLD **6.1%** | **VALUE LINE**

TIMELINESS 4 Lowered 6/7/24
SAFETY 2 Raised 4/12/24
TECHNICAL 3 Raised 9/27/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$43-$71	$57 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	95	(+80%)	*20%*
Low	70	(+30%)	*12%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	91	91	92
to Sell	91	94	106
Hld's(000)	19904	19248	19514

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	63.6	60.1	58.9	64.2	83.4	77.0	63.2	58.3	60.9	64.1	67.5	67.8								
Low:	48.1	38.3	39.0	49.9	52.1	45.9	49.1	37.0	44.9	43.6	44.4	45.2								
	102.19	102.43	110.65	105.21	105.45	109.50	100.55	93.33	81.95	81.58	89.12	78.21	80.90	85.69	104.66	111.85	*120.00*	*119.25*	Revenues per sh [A]	*117.25*
	6.35	8.10	7.90	5.21	6.98	7.45	6.17	5.77	5.19	5.84	5.65	4.51	5.39	5.67	7.39	7.09	*7.40*	*8.50*	"Cash Flow" per sh	*12.15*
	4.32	5.68	5.30	3.25	4.66	5.25	4.06	3.92	3.87	3.97	4.11	2.86	3.53	3.47	4.97	4.78	*5.00*	*6.00*	Earnings per sh [A B]	*9.40*
	1.82	1.86	1.90	1.94	1.98	2.02	2.06	2.10	2.14	2.18	2.80	3.04	3.08	3.10	3.14	3.18	*3.22*	*3.26*	Div'ds Decl'd per sh [C ■]	*3.38*
	1.43	2.37	1.68	1.64	1.32	1.97	2.58	2.08	1.41	1.37	1.55	1.44	2.70	2.17	2.23	2.69	*2.80*	*2.90*	Cap'l Spending per sh	*3.10*
	32.66	37.39	41.85	41.73	44.79	50.19	50.95	52.94	50.90	53.85	53.50	51.05	53.33	54.60	56.90	58.49	*60.00*	*61.55*	Book Value per sh	*65.50*
	25.00	24.33	23.24	23.26	23.34	23.22	22.59	22.72	25.27	24.93	24.99	24.42	24.52	24.55	24.56	24.57	*25.00*	*26.00*	Common Shs Outst'g [D]	*29.00*
	10.2	7.4	7.9	13.0	10.6	10.5	11.9	13.5	15.5	14.8	14.7	18.8	13.1	15.4	10.9	11.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*9.0*
	.61	.49	.50	.82	.67	.59	.63	.68	.81	.74	.79	1.00	.67	.83	.63	.61			Relative P/E Ratio	*.50*
	4.1%	4.4%	4.5%	4.6%	4.0%	3.7%	4.3%	4.0%	3.6%	3.7%	4.6%	5.6%	6.7%	5.8%	5.8%	5.7%			Avg Ann'l Div'd Yield	*4.0%*
	2271.8	2120.4	2071.2	2033.9	2227.2	1910.0	1983.4	2103.6	2569.8	2748.6	*3000*	*3100*	Revenues ($mill) [A]	*3400*
	8.8%	10.3%	10.6%	10.1%	9.8%	9.0%	10.6%	10.5%	9.3%	10.3%	*11.0%*	*12.0%*	Operating Margin	*15.0%*
	39.7	36.8	35.9	34.8	37.1	38.4	44.7	52.5	57.3	58.3	*60.0*	*65.0*	Depreciation ($mill)	*80.0*
	114.6	109.0	106.3	110.8	104.1	71.7	87.4	86.6	124.1	115.9	*125*	*155*	Net Profit ($mill)	*275*
	24.0%	31.5%	33.5%	33.5%	27.2%	31.1%	23.4%	27.2%	8.3%	19.0%	*20.0%*	*21.0%*	Income Tax Rate	*24.0%*
	5.0%	5.1%	5.1%	5.4%	4.7%	3.8%	4.4%	4.1%	4.8%	4.2%	*4.2%*	*5.0%*	Net Profit Margin	*8.0%*
	1363.7	1392.3	1293.4	1321.3	1334.4	1212.2	1262.2	1229.3	1360.9	1391.2	*1400*	*1500*	Working Cap'l ($mill)	*1800*
	370.0	370.0	368.7	369.1	368.5	368.8	518.2	518.5	616.8	617.4	*700*	*800*	Long-Term Debt ($mill)	*1100*
	1362.7	1414.2	1286.5	1342.4	1337.1	1246.7	1307.3	1340.5	1397.1	1437.2	*1500*	*1600*	Shr. Equity ($mill)	*1900*
	7.1%	6.5%	6.9%	6.9%	6.5%	5.0%	5.4%	5.4%	7.4%	7.3%	*7.0%*	*8.0%*	Return on Total Cap'l	*10.0%*
	8.4%	7.7%	8.3%	8.3%	7.8%	5.7%	6.7%	6.5%	8.9%	8.1%	*8.5%*	*10.0%*	Return on Shr. Equity	*14.5%*
	4.6%	3.9%	3.5%	4.2%	2.6%	NMF	.9%	.8%	3.3%	2.6%	*3.0%*	*4.5%*	Retained to Com Eq	*9.0%*
	54%	57%	57%	49%	67%	105%	86%	88%	62%	68%	*64%*	*54%*	All Div'ds to Net Prof	*36%*

Target Price Range 2027 2028 2029: 200, 160, 100, 80, 60, 50, 40, 30, 20

% TOT. RETURN 9/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	19.1	23.3
3 yr.	31.3	17.5
5 yr.	29.0	78.3

LEGENDS: 7.0 x "Cash Flow" p sh; Relative Price Strength; Options: Yes; *Shaded area indicates recession*

Percent shares traded: 45, 30, 15

CAPITAL STRUCTURE as of 6/30/24
Total Debt $617.5 mill. **Due in 5 Yrs** $445.0 mill.
LT Debt $617.5 mill. **LT Interest** $82.8 mill.
(Total interest coverage: 4.6x)
(30% of Cap'l)
Leases, Uncapitalized Annual Rentals $40.2 mill.
Pension Assets-3/24 $222.0 mill.
Oblig. $241.4 mill.

Common Stock 24,692,747 shares
as of 8/5/24

MARKET CAP: $1.3 billion (Small Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	81.7	64.7	101.7
Receivables	519.7	585.1	435.9
Inventory	1016.7	1036.8	1390.0
Other	129.9	116.3	270.9
Current Assets	1748.0	1802.9	2198.5
Accts Payable	173.8	89.0	79.7
Debt Due	- -	- -	- -
Other	344.9	353.0	766.4
Current Liab.	518.7	442.0	846.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-1.0%	2.5%	*2.5%*
"Cash Flow"	- -	3.5%	*10.5%*
Earnings	-.5%	1.0%	*13.5%*
Dividends	4.5%	5.5%	*1.5%*
Book Value	2.0%	1.0%	*2.5%*

Fiscal Year Begins	QUARTERLY REVENUES ($ mill.) [A] Jun.30	Sep.30	Dec.31	Mar.31	Full Fiscal Year
2021	350.0	454.0	652.6	647.0	2103.6
2022	429.8	651.0	795.0	694.0	2569.8
2023	517.7	638.5	821.5	770.9	2748.6
2024	597.1	*660*	*845*	*897.9*	*3000*
2025	*620*	*685*	*870*	*925*	*3100*

Fiscal Year Begins	EARNINGS PER SHARE [A B] Jun.30	Sep.30	Dec.31	Mar.31	Full Fiscal Year
2021	.26	.78	1.40	1.03	3.47
2022	.27	.88	1.67	2.15	4.97
2023	d.08	1.12	2.12	1.61	4.78
2024	.01	*1.15*	*2.15*	*1.69*	*5.00*
2025	*.30*	*1.40*	*2.55*	*1.75*	*6.00*

Cal-endar	QUARTERLY DIVIDENDS PAID [C ■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.76	.76	.77	.77	3.06
2021	.77	.77	.78	.78	3.10
2022	.78	.78	.79	.79	3.14
2023	.79	.79	.80	.80	3.18
2024	.80	.80	.81		

BUSINESS: Universal Corporation (formerly Universal Leaf Tobacco) is the largest leaf tobacco exporter/importer in the world. Engaged in the purchasing, processing, and selling of tobacco to cigarette, pipe tobacco, and cigar manufacturers. Tobacco sales consist primarily of flue-cured and burley tobaccos. Conducts business in more than 30 countries and employs more than 25,000 permanent and seasonal workers. Sold lumber and building products business, 9/06; majority of agri-products division, 9/06. Officers & directors own 3.1% of stock; BlackRock, Inc., 16.3% (6/24 Proxy). Chairman, President, and CEO: Preston Wigner. Inc.: VA. Address: 9201 Forest Hill Avenue, Richmond, VA 23235. Telephone: 804-359-9311. Internet: www.universalcorp.com.

Universal has been performing well despite some challenges. Revenues have increased, thanks to a surge in sales of new ingredients products as well as existing offerings, notably fruit juices. Accelerated tobacco crop purchasing by certain customers and lower inventory write-downs have also benefited results. However, Universal is facing some challenges. The company's uncommitted tobacco inventory levels have remained low. Management believes that global leaf tobacco supply remains in an undersupply position. Looking ahead, the business expects that recent elevated green tobacco prices will incentivize farmers to increase planting for the next season. This would potentially lead to more balanced markets in the coming years. Management will work closely with Universal's contract farmers to provide guidance and support to promote increased production. We estimate the top line will rise 9%, to $3.0 billion, in fiscal 2024. In fiscal 2025, sales will probably expand by a smaller 3%, to $3.1 billion. (Note that Preston Wigner has succeeded George Freeman as CEO, who retired).

The company has announced the opening of its enhanced Universal Ingredients Shank's manufacturing campus in Lancaster, Pennsylvania. This upgrade is the result of Universal's $30 million expansion project, which adds new beverage-focused extraction and aseptic processing technology to the existing campus. The project significantly increases the campus' physical production capacity and service capabilities.

Notwithstanding headwinds, the bottom line should improve in the coming quarters. Selling, general, and administrative costs have advanced because of unfavorable foreign currency comparisons. On a more upbeat note, gains in volume have outpaced rising expenses, allowing for a better bottom-line performance. We estimate the bottom line will step up 5%, to $5.00 a share, in fiscal 2024. In fiscal 2025, share earnings will likely improve by a larger 20%, to $6.00.

These shares are ranked 4 (Below Average) for Timeliness. Nonetheless, the equity offers above-average recovery potential out to late decade. This issue may be alluring to buy-and-hold investors.

Keith R. Foldesi *October 11, 2024*

(A) Fiscal year ends March 31st. **(B)** Diluted earnings. Excluding nonrecurring & disc. op. gains (losses): '10, (14¢); '11, ($1.83); '16, $2.99; '17, (41¢). May not sum to total due to change in shares outstanding and conversion of preferred stock. Next earnings report due early November. **(C)** Dividends historically paid in Feb., May, Aug., and Nov. ■ Div'd. reinvestment plan avail. **(D)** In millions.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	25
Earnings Predictability	70

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VERTEX PHARM. INC. NDQ-VRTX

RECENT PRICE **467.01** | P/E RATIO **27.9** (Trailing: NMF, Median: NMF) | RELATIVE P/E RATIO **1.51** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 5 Lowered 8/16/24
SAFETY 1 Raised 12/1/23
TECHNICAL 2 Lowered 11/8/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$393-$701	$547 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	670	(+45%)	*10%*
Low	545	(+15%)	*4%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	770	763	824
to Sell	531	601	600
Hld's(000)	237093	234102	236471

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	90.0	124.4	143.5	125.0	167.9	194.9	225.7	306.1	243.0	324.8	413.0	519.9								
Low:	42.7	59.8	97.4	71.5	73.3	144.1	161.0	197.5	176.4	214.7	282.2	391.0								
	1.16	.51	.70	6.74	7.03	5.18	2.40	4.19	6.86	9.83	11.94	16.07	23.88	29.76	34.75	38.30	*42.35*	*46.10*	Revenues per sh	*58.80*
	d2.83	d3.06	d3.56	.31	d.32	d1.70	d2.79	d2.01	d.20	1.28	2.38	4.96	10.86	9.70	13.50	14.75	*d.75*	*18.60*	"Cash Flow" per sh	*23.90*
	d3.27	d3.71	d3.77	.14	d.50	d1.98	d3.14	d2.31	d.46	1.04	2.06	4.51	10.29	9.01	12.82	13.89	*d1.60*	*17.50*	Earnings per sh [A]	*22.50*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
	.21	.12	.19	.17	.33	.22	.21	.18	.23	.39	.37	.29	1.00	.92	.80	.78	*1.05*	*1.10*	Cap'l Spending per sh	*1.30*
	1.58	5.48	2.48	3.76	4.60	5.80	4.45	3.82	4.66	8.01	17.38	23.50	33.43	39.69	54.13	68.22	*64.20*	*80.10*	Book Value per sh	*130.80*
	151.25	199.96	203.52	209.30	217.29	233.79	241.76	246.31	248.30	253.25	255.17	258.99	259.89	254.48	257.01	257.70	*257.00*	*256.00*	Common Shs Outst'g [B]	*250.00*
	- -	- -	- -	NMF	- -	- -	- -	- -	- -	NMF	NMF	41.2	24.6	22.8	21.4	24.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*27.0*
	- -	- -	- -	NMF	- -	- -	- -	- -	- -	NMF	NMF	2.19	1.26	1.23	1.24	1.37			Relative P/E Ratio	*1.50*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -			Avg Ann'l Div'd Yield	*Nil*
	580.4	1032.3	1702.2	2488.7	3047.6	4162.8	6205.7	7574.4	8930.7	9869.2	*10880*	*11800*	Revenues ($mill)	*14700*
	NMF	NMF	4.3%	18.3%	24.2%	31.4%	48.0%	38.3%	49.2%	40.1%	*NMF*	*44.0%*	Operating Margin	*48.0%*
	63.3	62.3	61.4	61.4	72.4	106.9	109.5	125.6	148.3	181.3	*220*	*240*	Depreciation ($mill)	*300*
	d737.6	d556.3	d112.1	263.5	533.7	1176.8	2711.7	2342.1	3322.0	3619.6	*d415*	*4520*	Net Profit ($mill)	*5675*
	- -	- -	- -	- -	12.7%	15.6%	13.0%	14.2%	21.5%	17.4%	*NMF*	*17.0%*	Income Tax Rate [C]	*20.0%*
	NMF	NMF	NMF	10.6%	17.5%	28.3%	43.7%	30.9%	37.2%	36.7%	*NMF*	*38.3%*	Net Profit Margin	*38.6%*
	1178.2	900.8	1039.0	1841.7	2722.8	3488.0	6255.9	7418.6	10492.7	10596.8	*5700*	*6000*	Working Cap'l ($mill)	*8000*
	319.9	266.9	35.0	20.5	19.7	- -	- -	- -	- -	- -	*Nil*	*Nil*	Long-Term Debt ($mill)	*Nil*
	1075.0	940.0	1156.6	2028.6	4435.2	6085.2	8686.8	10100	13913	17580	*16500*	*20500*	Shr. Equity ($mill)	*32700*
	NMF	NMF	NMF	12.9%	12.0%	19.3%	31.2%	23.2%	23.9%	20.6%	*NMF*	*22.0%*	Return on Total Cap'l	*17.5%*
	NMF	NMF	NMF	13.0%	12.0%	19.3%	31.2%	23.2%	23.9%	20.6%	*NMF*	*22.0%*	Return on Shr. Equity	*17.5%*
	NMF	NMF	NMF	13.0%	12.0%	19.3%	31.2%	23.2%	23.9%	20.6%	*NMF*	*22.0%*	Retained to Com Eq	*17.5%*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 9/30/24
Total Debt None

Leases, Uncapitalized Annual rentals $42.1 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 257,529,290 shs.
as of 10/31/24
MARKET CAP: $120 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	10778.5	11218.3	6524.5
Receivables	1442.2	1563.4	1750.6
Inventory	460.6	738.8	1079.8
Other	553.5	623.7	449.2
Current Assets	13234.8	14144.2	9804.1
Accts Payable	303.9	364.9	395.8
Debt Due	- -	- -	- -
Other	2438.2	3182.5	3577.3
Current Liab.	2742.1	3547.4	3973.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	17.5%	27.5%	*9.5%*
"Cash Flow"	- -	58.5%	*11.0%*
Earnings	- -	65.5%	*11.0%*
Dividends	- -	- -	*Nil*
Book Value	26.0%	36.0%	*16.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1724.3	1793.4	1984.1	2072.6	7574.4
2022	2097.5	2196.2	2334.3	2302.7	8930.7
2023	2374.8	2493.2	2483.5	2517.7	9869.2
2024	2690.6	2645.6	2771.9	*2771.9*	*10880*
2025	*2750*	*2950*	*3000*	*3100*	*11800*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2.49	.26	3.28	3.00	9.01
2022	2.96	3.13	3.59	3.15	12.82
2023	2.69	3.52	3.97	3.71	13.89
2024	4.21	d13.92	4.01	*4.10*	*d1.60*
2025	*4.30*	*4.30*	*4.50*	*4.40*	*17.50*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

BUSINESS: Vertex Pharmaceuticals Inc. discovers, develops, and commercializes transformative medicines for serious diseases. Current treatments are primarily focused on cystic fibrosis (CF). It also has a pipeline of investigational small molecule drugs for other illnesses, beyond CF, such as pain and kidney disease, and has programs for cell and genetic therapies. Approved CF drugs incl.: *Kalydeco* (ivacaftor) (1/12); *Orkambi* (lumacaftor/ivacaftor) (7/15); *Symdeko* (tezacaftor/ivacaftor) (2/18); *Trikafta* (10/19). Has about 5,400 empls. Off./dirs. less than 1% of common stock; Vanguard, 8.6% (4/24 proxy). Chrmn.: Dr. Jeffrey M. Leiden. Pres. & CEO: Dr. Reshma Kewalramani. Inc.: MA. Addr.: 50 Northern Ave., Boston, MA 02210. Tel.: 617-341-6100. Internet: www.vrtx.com.

Vertex Pharmaceuticals stock has been hovering near its all-time high, as regulatory approval on a couple of breakthrough drugs is pending. Notably, the biotech firm is awaiting the FDA's nod on vanzacaftor triple, a three-drug blend of vanzacaftor, tezacaftor, and deutivacaftor; the agency granted priority review (reduces time from 10 months to six) and set a target action date for January 2, 2025. In pivotal studies, the drug was shown to effectively treat cystic fibrosis (CF), a debilitating lung disease, in patients six years and older. If approved, the new once-daily therapy could surpass *Trikafta/Kaftrio*, Vertex's highly successful three-drug combo. Similarly, suzetrigine (VX-548), an investigational non-opioid compound developed to treat moderate-to-severe acute pain, is awaiting the FDA's decision, set for January 30th.

The company is making strides in other therapeutic areas, too. While Vertex remains committed to its strategy of treating the underlying cause of CF across a broader, younger patient group via new drugs, label expansions on existing medicines, and new (reimbursement) markets, its R&D pipeline has a number of other promising drug programs. Many of these target such illnesses/conditions as kidney disease, Type 1 diabetes, muscular dystrophy, protein deficiency, and neuropathic pain. In addition to suzetrigine, a few key compounds are on pace to soon advance to Phase III, namely povetacicept (for kidney disease like nephropathy) and VX-880 (for Type 1 diabetes).

We are upbeat about Vertex's top- and bottom-line prospects from 2025 onward. This is especially as new drugs are launched. For this year, however, we expect a loss, due to the integration of the Alpine acquisition in the second quarter, even though leadership raised its revenue forecast to $10.8 billion-$10.9 billion on continued growth in the CF franchise and contributions from the recent launch of *CASGEVY*, (a treatment for severe sickle cell disease and beta thalassemia approved late last year for ages 12 and up).

This high-quality/low-risk equity remains untimely. At this price, appreciation potential for the 18-month and 3- to 5-year windows is decent.

J. Susan Ferrara *November 29, 2024*

(A) Diluted earnings. Excl. non-recur. gain: '18, $6.03 (one-time tax benefit). Qtly. egs. may not sum due to difference in shs. outstanding/rounding. Next egs. rpt. due early Feb.

(B) In millions. Note: share count in '13 reflects the conversion of convertible notes into 8.3 mill. shs.

(C) As of 12/31/23, had total net oper. loss carryforwards of about $691.8 mill. and tax credits of $355.4 million.

Company's Financial Strength	A+
Stock's Price Stability	90
Price Growth Persistence	80
Earnings Predictability	25

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WATERS CORP. NYSE-WAT

RECENT PRICE 325.51 | P/E RATIO 28.1 (32.4 / 24.0) | RELATIVE P/E RATIO 1.54 | DIV'D YLD Nil | VALUE LINE

TIMELINESS 2 Raised 10/25/24
SAFETY 2 Raised 5/27/11
TECHNICAL 2 Raised 11/8/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$263-$499	$381 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	475	(+45%)	*10%*
Low	350	(+10%)	*2%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	302	257	328
to Sell	302	328	284
Hld's(000)	59031	57682	57092

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	108.9	117.7	137.4	162.5	202.0	220.2	255.2	252.7	428.2	372.2	351.0	367.2								
Low:	85.0	93.6	111.8	112.0	134.7	167.9	175.0	154.4	244.8	265.6	231.9	279.2								
	16.09	15.92	17.89	20.38	20.62	22.45	23.93	25.07	27.09	29.10	33.10	38.45	37.96	45.87	50.28	49.96	*49.40*	*53.55*	Sales per sh	*68.35*
	4.00	4.04	4.84	5.50	5.58	5.76	5.75	6.31	7.16	8.38	9.34	10.32	9.47	12.59	14.18	13.66	*13.30*	*15.40*	"Cash Flow" per sh	*19.90*
	3.25	3.34	4.06	4.69	5.19	5.20	5.07	5.65	6.41	7.49	8.05	8.69	8.36	11.17	11.73	10.84	*10.55*	*12.35*	Earnings per sh [A]	*16.25*
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	Div'ds Decl'd per sh	*.30*
	.71	1.00	.68	.94	1.17	1.40	1.10	1.23	1.19	1.08	1.31	2.62	2.77	2.66	2.98	2.71	*2.75*	*2.95*	Cap'l Spending per sh	*3.75*
	6.75	9.02	11.64	13.50	16.42	20.79	22.79	25.27	28.77	28.16	21.44	d3.46	3.73	6.05	8.54	19.44	*29.85*	*41.35*	Book Value per sh [B]	*63.25*
	97.89	94.12	91.85	90.83	89.39	84.82	83.15	81.47	80.02	79.34	73.12	62.59	62.31	60.73	59.10	59.18	*59.30*	*59.00*	Common Shs Outst'g [C]	*55.00*
	17.7	14.4	16.7	17.9	16.0	18.8	21.1	22.3	21.7	23.2	24.4	25.4	25.0	29.8	27.2	26.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*25.5*
	1.07	.96	1.06	1.12	1.02	1.06	1.11	1.12	1.14	1.17	1.32	1.35	1.28	1.61	1.57	1.49			Relative P/E Ratio	*1.40*
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			Avg Ann'l Div'd Yield	*.1%*
							1989.3	2042.3	2167.4	2309.1	2419.9	2406.6	2365.4	2785.9	2972.0	2956.4	*2930*	*3160*	Sales ($mill)	*3750*
							28.9%	30.7%	31.2%	34.0%	33.0%	31.7%	30.5%	32.1%	33.8%	33.3%	*33.0%*	*35.0%*	Operating Margin	*36.0%*
							46.4	45.3	51.7	61.5	58.0	53.8	68.7	71.6	130.4	165.9	*170*	*175*	Depreciation ($mill)	*190*
							431.6	469.1	521.5	603.7	625.2	592.2	521.6	692.8	707.8	642.2	*620*	*735*	Net Profit ($mill)	*905*
							12.0%	13.4%	13.1%	11.8%	14.5%	12.7%	14.6%	14.1%	15.5%	12.8%	*14.0%*	*14.0%*	Income Tax Rate	*14.0%*
							21.7%	23.0%	24.1%	26.1%	25.8%	24.6%	22.1%	24.9%	23.8%	21.7%	*21.2%*	*23.3%*	Net Profit Margin	*24.1%*
							2272.1	2649.4	3115.2	3663.9	2214.3	721.2	596.0	948.4	978.2	963.3	*970*	*1010*	Working Cap'l ($mill)	*1150*
							1240.0	1493.0	1702.0	1897.5	1148.2	1580.8	1206.5	1513.9	1524.9	2305.5	*2000*	*1900*	Long-Term Debt ($mill)	*1600*
							1894.7	2058.9	2301.9	2233.8	1567.3	d216.3	232.1	367.6	504.5	1150.3	*1770*	*2440*	Shr. Equity ($mill)	*3480*
							14.2%	13.7%	13.6%	14.9%	23.9%	45.2%	38.0%	38.0%	35.8%	20.0%	*18.0%*	*18.0%*	Return on Total Cap'l	*18.5%*
							22.8%	22.8%	22.7%	27.0%	39.9%	--	NMF	NMF	NMF	55.8%	*35.0%*	*30.0%*	Return on Shr. Equity	*26.0%*
							22.8%	22.8%	22.7%	27.0%	39.9%	--	NMF	NMF	NMF	55.8%	*35.0%*	*30.0%*	Retained to Com Eq	*25.5%*
							--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	All Div'ds to Net Prof	*2%*

LEGENDS
20.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029: 640, 480, 400, 320, 240, 200, 160, 120, 80, 60

Percent traded: 24, 16, 8

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	23.3	14.1
3 yr.	-16.3	11.1
5 yr.	63.5	80.9

CAPITAL STRUCTURE as of 6/29/24
Total Debt $2006.0 mill. **Due in 5 Yrs** $1610 mill.
LT Debt $2006.0 mill. **LT Interest** $98.0 mill.
(Total interest coverage: 8.4x) (59% of Capital)

Leases, Uncapitalized Annual rentals $30.3 mill.

Pension Assets-12/23 $86.6 mill. **Obligations** $92.4 mill.

Common Stock 59,361,927 shares
as of 7/26/24

MARKET CAP: $19.3 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/29/24
Cash Assets	481.4	396.0	327.4
Receivables	722.9	702.2	610.1
Inventory	455.7	516.2	522.9
Other	103.9	138.5	143.3
Current Assets	1763.9	1752.9	1603.7
Accts Payable	93.3	84.7	78.4
Debt Due	50.0	50.0	--
Other	642.4	654.9	684.1
Current Liab.	785.7	789.6	762.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	8.5%	10.5%	*6.0%*
"Cash Flow"	9.0%	10.0%	*6.5%*
Earnings	8.5%	9.0%	*6.5%*
Dividends	--	--	*Nil*
Book Value	-4.0%	-15.5%	*33.0%*

Calendar	QUARTERLY SALES ($ mill.) Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	608.5	681.7	659.2	836.5	2785.9
2022	690.6	714.3	708.6	858.5	2972.0
2023	684.6	740.6	711.7	819.5	2956.4
2024	636.8	708.5	*715*	*869.7*	*2930*
2025	*680*	*775*	*780*	*925*	*3160*

Calendar	EARNINGS PER SHARE [A] Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2021	2.37	2.69	2.60	3.51	11.17
2022	2.62	2.72	2.60	3.81	11.73
2023	2.38	2.55	2.27	3.65	10.84
2024	1.72	2.40	*2.45*	*3.98*	*10.55*
2025	*2.25*	*2.75*	*3.05*	*4.30*	*12.35*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020					
2021	NO CASH DIVIDENDS BEING PAID				
2022					
2023					
2024					

BUSINESS: Waters Corp. manufactures, distributes, and services high-performance and ultra-performance liquid chromatography (HPLC and UPLC) and mass spectrometry systems, chemistry consumables, and related products through its Waters division (88% of '23 sales) and thermal analysis, rheometry, and calorimetry instruments through its TA division (12%). HPLC and UPLC are used to identify and analyze the components of a variety of chemicals and materials. As of 12/31/23, has approx. 7,900 employees. Offs./dirs. own less than 1% of common stock; Vanguard, 11.5%; BlackRock, 9.5% (3/24 Proxy). Chairman: Flemming Ornskov, MD; President & CEO: Udit Batra, Ph.D. Inc.: DE. Address: 34 Maple Street, Milford, MA 01757. Tel: 508-482-2314. Internet: www.waters.com.

Waters Corporation probably had a solid third quarter, all things considered. Indeed, on a GAAP basis, management recently expected the Massachusetts-based maker of analytical instruments to earn between $2.42 and $2.52 a share for the three-month period ended September 30th, up 7%–11% from the prior year's $2.27-a-share tally. Key assumptions included currency-neutral top-line growth of 1%–3% and a sales headwind from foreign exchange of 1.5%.

The market backdrop has been challenging of late. To wit, instrument sales declined 17% in the June quarter and probably remained fairly weak in the September period. That said, barring a recession, capital spending ought to gradually improve, as attractive financing becomes more readily available (with a global move toward lower interest rates) and as economic stimulus plans in key markets like China take hold. Additionally, Waters should continue to benefit from ongoing efficiency programs and strong demand for services and single-use products.

Management has sized Waters' overall market opportunity at roughly $12 billion and figured that it should grow at an average annual clip of 4%–6% for the foreseeable future. Among the increasing number of lucrative prospects is providing environmental tools to detect trace amounts of harmful PFAS chemicals in ground soil and drinking water. According to leadership, PFAS testing is currently a $350 million-a-year category that is expanding around 20% annually. With that in mind, we look for Waters' new *Oasis* Dual-phase Analysis Cartridges, which streamline sample prep for PFAS workflows, to gain good traction. What's more, *Oasis* adds to the company's portfolio of consumables, which generally enjoy recurring sales and attractive profit margins.

Since our last report in August, shares of Waters Corp. have moved up a notch on our Timeliness scale and are now ranked to outperform the broader market over the next 12 months. Still, at the recent quotation, less nimble, buy-and-hold investors should probably turn the page or wait for a better entry point

Nils C. Van Liew *November 8, 2024*

(A) Diluted earnings. Excludes non-recurring gains (losses): '08 ($0.04); '18 ($0.40). Figures may not sum due to rounding. Next earnings report due early February.
(B) Includes intangibles; at 12/31/23: $1934.6 mill., $32.69/sh.
(C) In millions.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	100
Earnings Predictability	95

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WERNER ENTERPR'S NDQ-WERN

RECENT PRICE 37.31 | P/E RATIO 41.9 (Trailing: 43.9 Median: 17.0) | RELATIVE P/E RATIO 2.33 | DIV'D YLD 1.5% | VALUE LINE 330

TIMELINESS 3 Raised 4/26/24
SAFETY 2 Raised 5/19/23
TECHNICAL 5 Lowered 11/1/24
BETA .75 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$32-$50	$41 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	50	(+35%)	9%
Low	40	(+5%)	4%

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	134	129	134
to Sell	118	116	128
Hld's(000)	54778	55788	57640

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	25.4	31.7	33.4	29.0	39.8	43.9	39.2	47.4	49.8	48.8	50.3	42.7								
Low:	21.8	23.5	22.5	20.9	24.2	28.7	27.3	29.0	38.5	35.8	35.0	33.1								
	30.26	23.18	24.98	27.49	27.80	27.91	29.70	29.08	27.84	29.23	34.89	35.58	34.92	41.56	52.04	51.76	*49.20*	*52.40*	Revenues per sh	*60.00*
	3.28	2.95	3.20	3.59	3.69	3.57	3.83	4.40	4.00	4.28	5.70	6.01	6.38	7.63	8.21	6.66	*5.70*	*6.85*	"Cash Flow" per sh	*7.85*
	.94	.79	1.10	1.40	1.40	1.18	1.36	1.71	1.09	1.27	2.38	2.38	2.59	3.45	3.71	1.93	*.70*	*1.30*	Earnings per sh [A]	*2.50*
	.20	.20	.20	.20	.20	.20	.20	.22	.24	.27	.34	.36	.36	.43	.51	.54	*.56*	*.64*	Div'ds Decl'd per sh [BE]	*.72*
	2.88	2.47	2.42	4.15	3.89	2.91	4.12	6.31	7.45	4.37	7.38	6.08	6.08	5.64	8.02	9.44	*4.75*	*5.00*	Cap'l Spending per sh [C]	*6.00*
	10.42	9.80	9.21	9.95	9.76	10.62	11.58	13.00	13.78	16.36	17.95	16.04	17.59	20.18	22.83	24.20	*23.80*	*24.35*	Book Value per sh	*28.25*
	71.58	71.90	72.65	72.85	73.25	72.71	72.04	72.00	72.17	72.41	70.44	69.25	67.93	65.79	63.22	63.44	*61.50*	*61.00*	Common Shs Outst'g [D]	*60.00*
	20.7	22.0	19.9	17.1	16.8	20.1	19.3	16.4	22.9	24.1	15.3	14.2	15.7	13.2	11.1	21.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*18.0*
	1.25	1.47	1.27	1.07	1.07	1.13	1.02	.83	1.20	1.21	.83	.76	.81	.71	.64	1.24			Relative P/E Ratio	*1.00*
	1.0%	1.2%	.9%	.8%	.9%	.8%	.8%	.8%	1.0%	.9%	.9%	1.1%	.9%	.9%	1.2%	1.3%			Avg Ann'l Div'd Yield	*1.6%*
							2139.3	2093.5	2009.0	2116.7	2457.9	2463.7	2372.2	2734.4	3290.0	3283.5	*3025*	*3150*	Revenues ($mill)	*3600*
							15.8%	18.8%	16.7%	17.2%	18.6%	19.4%	21.0%	21.4%	18.5%	15.0%	*13.5%*	*14.5%*	Operating Margin	*15.5%*
							177.0	193.2	209.7	217.6	230.2	249.5	253.7	267.7	279.9	299.5	*305*	*310*	Depreciation ($mill)	*320*
							98.7	123.7	79.1	92.1	171.4	166.9	179.9	234.3	238.9	123.0	*45.0*	*80.0*	Net Profit ($mill)	*150*
							39.0%	38.5%	37.9%	37.7%	24.5%	24.8%	24.8%	24.4%	24.9%	25.0%	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
							4.6%	5.9%	3.9%	4.4%	7.0%	6.8%	7.6%	8.6%	7.3%	3.8%	*1.5%*	*2.5%*	Net Profit Margin	*4.2%*
							239.8	223.8	158.2	168.0	146.3	157.5	182.9	362.5	453.1	304.0	*250*	*255*	Working Cap'l ($mill)	*375*
							75.0	75.0	160.0	75.0	50.0	225.0	175.0	422.5	687.5	646.2	*700*	*700*	Long-Term Debt ($mill)	*800*
							833.9	935.7	994.8	1184.8	1264.8	1111.0	1195.0	1327.6	1443.6	1528.3	*1465*	*1485*	Shr. Equity ($mill)	*1695*
							10.9%	12.3%	7.0%	7.4%	13.1%	12.7%	13.2%	13.5%	11.5%	6.5%	*3.0%*	*4.5%*	Return on Total Cap'l	*6.5%*
							11.8%	13.2%	8.0%	7.8%	13.6%	15.0%	15.1%	17.6%	16.5%	8.0%	*3.0%*	*5.5%*	Return on Shr. Equity	*9.0%*
							10.1%	11.6%	6.2%	6.2%	11.7%	12.7%	13.0%	15.5%	14.3%	6.0%	*.5%*	*3.0%*	Retained to Com Eq [E]	*6.5%*
							15%	12%	22%	20%	13%	15%	14%	12%	13%	27%	*80%*	*49%*	All Div'ds to Net Prof	*29%*

CAPITAL STRUCTURE as of 9/30/24
Total Debt $690.0 mill. **Due in 5 Yrs** $175.0 mill.

LT Debt $690.0 mill. **LT Interest** $32.0 mill. (32% of Cap'l)

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 61,807,803 shs.

MARKET CAP: $2.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	9/30/24
Cash Assets	107.2	61.7	54.7
Receivables	518.8	444.9	384.0
Other	136.6	128.0	108.3
Current Assets	762.6	634.6	547.0
Accts Payable	124.5	136.0	164.4
Debt Due	6.3	2.5	- -
Other	178.7	192.1	193.3
Current Liab.	309.5	330.6	357.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	5.0%	8.5%	*3.5%*
"Cash Flow"	8.0%	12.0%	*1.0%*
Earnings	9.5%	19.0%	*-3.0%*
Dividends	8.0%	12.0%	*6.5%*
Book Value	7.5%	7.0%	*4.0%*

Calendar	QUARTERLY REVENUES ($ mill.)[A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	616.4	649.8	702.9	765.2	2734.4
2022	764.6	836.3	827.6	861.5	3290.0
2023	832.7	811.1	817.7	822.0	3283.5
2024	769.1	760.8	745.7	*749.4*	*3025*
2025	*770*	*770*	*800*	*810*	*3150*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.68	.86	.79	1.13	3.45
2022	.96	.87	.90	.99	3.71
2023	.60	.52	.42	.39	1.93
2024	.14	.17	.15	*.24*	*.70*
2025	*.20*	*.30*	*.35*	*.45*	*1.30*

Calendar	QUARTERLY DIVIDENDS PAID [BE] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.09	.09	.09	.09	.36
2021	.09	.10	.12	.12	.43
2022	.12	.12	.13	.13	.50
2023	.13	.13	.14	.14	.54
2024	.14	.14	.14	.14	

BUSINESS: Werner Enterprises, Inc. is a truckload carrier of general commodities throughout the continental U.S., Canada, and Mexico. Targets service-sensitive segment of dry-van, flatbed, and temperature-controlled truckload market. Provides dedicated and regional carriage. As of 12/23, the company had 8,000 trucks (7,740 company-owned) and about 30,810 trailers. 2023 depr. rate was 10.1%. Werner has 13,809 employees. Officers/directors, own 1.2% of common stock; BlackRock, 13.1%; Vanguard Group, 9.0%; Macquarie Group, 7.0% (4/24 proxy). Chairman, President, and CEO: Derek J. Leathers. Incorporated: Nebraska. Address: 14507 Frontier Rd., P.O. Box 45308, Omaha, NE 68145. Telephone: 402-895-6640. Internet: www.werner.com.

Werner's difficulties continued in the recent third quarter. The company reported share profits of $0.15, on revenues of $746 million for the September stanza. Both figures came in below expectations, as soft freight market conditions have continued to hamper performance for the trucker. Management noted that weaker volumes were exacerbated by higher expenses. Elevated health insurance claims, higher interest expense, pressure on Logistics gross margin, and higher costs in the school network were the major culprits during the period. The push back on price hikes also contributed to the top- and bottom-line pressure. The trucker's operating ratio also rose 270 basis points from the previous year to 95.3%. These factors will likely continue to weigh on operational results for the remainder of this year. On point, we have lowered our estimate for 2024 by $0.45 to $0.70 a share to reflect ongoing margin strain.

We are cautiously optimistic that performance will improve in 2025. The trucker is still working to capture market share and management is reportedly seeking to improve cost controls with better utilization, fleet consolidation, and emphasis on higher-margined freight. We also expect growth initiatives to gain traction next year. Efforts to boost rates in the One-Way business, expanding the Dedicated segment, and structural improvements through cost savings, coupled with tech-enabled operational synergies, should bear fruit before long. Meanwhile, on the international front, the trucker's operations in Mexico and cross-border related business is growing in the double-digits. Dedicated revenue per truck has risen, and the Logistics segment returned to positive operating income. These combined factors ought to help the company recover from its current earnings slump.

Although we like the operational outlook over the long haul, the current stock price already reflects much of the growth we envision. We believe revenues and earnings are poised to recover nicely. However, the P/E multiple is well above the historical median and price appreciation potential over the 18-month and 3- to 5-year spans is unappealing. Investors should wait for a better entry point.

Simon R. Shoucair *November 15, 2024*

(A) Diluted shares. May not sum due to rounding. Next earnings report due early February.
(B) Dividends historically paid late Jan., May, July, and Oct.
(C) Net of equipment sales.
(D) In millions.
(E) Excludes special dividend of $2.10/sh., paid 12/08; $1.25/sh., paid 12/09; $1.60/sh., paid 12/10; $0.50, paid 12/11; $1.50, paid 11/12; $3.75, paid 5/19.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	65
Earnings Predictability	55

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WATSCO, INC. NYSE-WSO

RECENT PRICE 475.42 | P/E RATIO 32.8 (Trailing: 36.4 Median: 26.0) | RELATIVE P/E RATIO 1.79 | DIV'D YLD 2.4% | VALUE LINE 1154

TIMELINESS 4 Raised 5/24/24
SAFETY 1 Raised 9/18/20
TECHNICAL 2 Raised 8/30/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$383-$691	$537 (15%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	615	(+30%)	9%
Low	500	(+5%)	4%

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	297	363	346
to Sell	318	315	331
Hld's(000)	35754	35691	36048

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	98.1	108.9	133.1	159.5	172.0	192.9	183.0	249.3	319.0	316.0	433.2	520.4								
Low:	73.6	84.3	103.0	106.6	134.1	131.9	136.4	133.0	224.3	220.7	251.5	373.3								
	60.02	62.29	87.66	90.22	99.41	107.79	112.68	116.48	118.79	116.63	121.37	124.90	131.22	161.86	187.73	186.33	*188.10*	*190.40*	Sales per sh	*216.85*
	2.38	1.61	2.82	3.10	3.45	4.19	4.84	5.44	5.71	5.94	7.07	7.08	7.67	11.52	16.33	14.62	*14.75*	*16.35*	"Cash Flow" per sh	*20.90*
	2.18	1.40	2.49	2.74	3.03	3.68	4.32	4.90	5.15	5.54	6.49	6.50	7.01	10.78	15.41	13.67	*13.90*	*15.50*	Earnings per sh [A]	*19.90*
	1.75	1.89	2.04	2.23	2.48	1.15	2.00	2.80	3.60	4.60	5.60	6.40	6.93	7.63	8.55	9.80	*10.55*	*11.55*	Div'ds Decl'd per sh [C]	*13.45*
	.14	.18	.26	.42	.36	.42	.61	.67	1.23	.48	.46	.47	.43	.66	.92	1.06	*.75*	*.85*	Cap'l Spending per sh	*1.00*
	20.15	22.96	23.56	24.32	21.67	24.20	25.25	27.11	28.31	34.86	35.98	37.58	38.59	42.91	48.75	57.04	*68.05*	*77.40*	Book Value per sh [D]	*96.40*
	28.33	32.14	32.45	33.01	34.52	34.73	35.01	35.31	35.53	37.23	37.46	38.19	38.52	38.80	38.75	39.09	*40.40*	*40.70*	Common Shs Outst'g [B]	*41.50*
	19.2	32.9	22.7	23.1	23.9	23.8	22.6	24.8	26.3	27.5	26.3	24.7	28.1	25.8	17.6	25.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*28.0*
	1.16	2.19	1.44	1.45	1.52	1.34	1.19	1.25	1.38	1.38	1.42	1.32	1.44	1.39	1.02	1.41			Relative P/E Ratio	*1.55*
	4.2%	4.1%	3.6%	3.5%	3.4%	1.3%	2.1%	2.3%	2.7%	3.0%	3.3%	4.0%	3.5%	2.7%	3.2%	2.8%			Avg Ann'l Div'd Yield	*2.4%*
							3944.5	4113.2	4220.7	4342.0	4546.7	4770.4	5054.9	6280.2	7274.3	7283.8	*7600*	*7750*	Sales ($mill)	*9000*
							8.2%	8.7%	8.7%	8.6%	8.5%	8.0%	8.2%	10.1%	11.6%	11.0%	*11.1%*	*11.5%*	Operating Margin	*13.0%*
							17.9	19.1	20.1	22.0	22.1	24.5	25.9	28.1	31.7	35.1	*35.0*	*35.0*	Depreciation ($mill)	*40.0*
							151.4	172.9	182.8	199.0	242.9	246.0	269.6	418.9	601.2	536.3	*560*	*630*	Net Profit ($mill)	*825*
							30.6%	31.6%	31.0%	28.6%	19.7%	18.5%	19.2%	20.5%	15.2%	19.7%	*20.5%*	*19.5%*	Income Tax Rate	*20.0%*
							3.8%	4.2%	4.3%	4.6%	5.3%	5.2%	5.3%	6.7%	8.3%	8.2%	*7.4%*	*8.1%*	Net Profit Margin	*9.2%*
							870.3	911.0	925.3	920.9	1084.2	1085.0	997.3	1234.7	1392.2	1679.9	*1975*	*2150*	Working Cap'l ($mill)	*2250*
							303.2	245.3	235.3	21.8	135.2	155.7	4.8	98.2	11.4	27.6	*15.0*	*25.0*	Long-Term Debt ($mill)	*100*
							884.0	957.3	1005.8	1298.0	1347.8	1435.4	1486.7	1664.9	1889.2	2229.8	*2750*	*3150*	Shr. Equity ($mill)	*4000*
							13.0%	14.6%	14.9%	15.3%	16.5%	15.6%	18.1%	23.8%	31.6%	23.8%	*20.5%*	*20.0%*	Return on Total Cap'l	*20.0%*
							17.1%	18.1%	18.2%	15.3%	18.0%	17.1%	18.1%	25.2%	31.8%	24.1%	*20.5%*	*20.0%*	Return on Shr. Equity	*20.5%*
							9.2%	7.8%	5.5%	2.7%	2.5%	.3%	.3%	7.5%	14.2%	6.8%	*5.0%*	*5.0%*	Retained to Com Eq	*7.0%*
							46%	57%	70%	82%	86%	98%	99%	70%	55%	72%	*76%*	*75%*	All Div'ds to Net Prof	*68%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $120.1 mill. **Due in 5 Yrs** $120.1 mill.
LT Debt $15.7 mill. **LT Interest** $5.0 mill.
Includes Capital Leases
(Interest coverage: over 25x)
(5% of Cap'l)
Leases, Uncapitalized: Annual rentals $100 mill.
No Defined Pension Benefit Plan

Common Stock 40,339,214 shs.
includes 5,549,880 Class B shs.
Each Class B share entitled to 10 votes
as of 7/30/24
MARKET CAP: $19.2 billion (Large Cap)

CURRENT POSITION ($MILL.)

	2022	2023	6/30/24
Cash Assets	147.5	210.1	424.9
Receivables	747.1	797.8	1001.3
Inventory (FIFO)	1370.2	1347.3	1573.5
Other	33.9	36.7	34.7
Current Assets	2298.7	2391.9	3034.4
Accts Payable	456.1	369.4	564.1
Debt Due	90.6	100.3	104.4
Other	359.8	242.3	276.7
Current Liab.	906.5	712.0	945.2

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Sales	6.0%	8.0%	*4.0%*
"Cash Flow"	14.5%	17.5%	*7.5%*
Earnings	15.5%	18.0%	*7.0%*
Dividends	15.5%	12.0%	*7.5%*
Book Value	7.0%	7.0%	*12.5%*

QUARTERLY SALES ($ mill.)[A]

Calendar	Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	1136	1850	1783	1512	6281
2022	1524	2133	2036	1581	7274
2023	1551	2003	2127	1603	7284
2024	1565	2139	***2225***	***1725***	***7600***
2025	***1580***	***2150***	***2270***	***1750***	***7750***

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2021	1.39	3.71	3.62	2.02	10.78
2022	2.90	4.93	4.03	3.55	15.41
2023	2.83	4.42	4.35	2.06	13.67
2024	2.17	4.49	***4.65***	***2.59***	***13.90***
2025	***2.75***	***4.95***	***4.80***	***3.00***	***15.50***

QUARTERLY DIVIDENDS PAID [C]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	1.60	1.775	1.775	1.775	6.925
2021	1.775	1.95	1.95	1.95	7.625
2022	1.95	2.20	2.20	2.20	8.55
2023	2.45	2.45	2.45	2.45	9.80
2024	2.45	2.70	2.70		

BUSINESS: Watsco, Inc. distributes heating, ventilation, and air conditioning (HVAC) equipment, as well as related parts and supplies, in the United States and overseas. Its HVAC equipment includes residential central ACs; light commercial ACs; gas, electric, and oil furnaces; commercial AC and heating equipment and systems; and other specialized equipment. Officers and directors own 0.7% of Class A stock; BlackRock, Inc., 11.7%; The Vanguard Group, 9.4%; Albert H. Nahmad owns 75.9% of Class B shares (4/24 proxy). Has about 7,425 employees. Chairman & Chief Executive Officer: Albert H. Nahmad. Incorporated: Florida. Address: 2665 South Bayshore Drive, Suite 901, Miami, Florida 33133. Telephone: 305-714-4100. Internet: www.watsco.com.

Watsco registered steady results in the recent second quarter. The top line grew 7%, to $2.1 billion, with a 4% increase in same-store sales and 3% from stores acquired over the last 12 months. The sales mix showed strong growth in HVAC equipment, while sales of non-equipment HVAC products experienced a slight decline, which contributed to a modest narrowing of the gross margin. Changes in the mix of OEM brands also affected the gross margin (was 27.1% in the quarter). SG&A expenses as a percentage of sales held essentially flat at 15%.

Earnings look to remain stable this year, and extend further in 2025. Watsco's acquisition of Gateway Supply Company in May 2024 will likely support continued top-line growth through the year. We also expect energy regulations that came into effect last year to drive some demand growth. Recently introduced products with smart thermostats and energy-efficient heat pumps align with stricter energy efficiency regulations and are expected to boost profitability through the end of the year and into 2025.

Watsco is poised for decent long-term earnings growth through several strategic initiatives. For one, the company's ongoing investment towards improving inventory management systems should better align supply with customer demand, and reduce excess inventory and associated costs. The e-commerce platform is expected to grow as a portion of sales (represented 36% of total sales in the recent quarter), which should in principle, enhance customer retention by improving the productivity of contractors. Lastly, Watsco will likely continue to add small and medium-sized distributors to its platform through acquisitions. Management has proven to be both patient and effective at allocating capital in this regard.

We suggest investors pass on untimely Watsco shares. The business' Financial Strength and low-risk characteristics should be enticing for conservative investors. However, we think new buyers may be overpaying at the recent share price. A forward earnings-per-share multiple of 33x is markedly higher than historical norms and could end up limiting capital appreciation potential out to 2027-2029.

Lucas Vanarthos *September 13, 2024*

(A) Diluted earnings based off of earnings allocated to Watsco shareholders, which is net income less earnings attributed to noncontrolling interest. Excludes nonrecurring gains/(losses): '12, (33¢); '17, 27¢. Next earnings report due late October. May not sum due to change in shares outstanding.
(B) In millions.
(C) Dividend historically paid late-Jan., April, July, and Oct. Excludes $5/share special dividend paid 10/31/12. **(D)** Includes intangibles. In 2023: $675.3 million, $17.10/sh.

Company's Financial Strength	A+
Stock's Price Stability	85
Price Growth Persistence	95
Earnings Predictability	80

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WESTERN UNION NYSE-WU

RECENT PRICE 11.59 | P/E RATIO 6.7 (Trailing: 6.9 Median: 11.0) | RELATIVE P/E RATIO 0.36 | DIV'D YLD 8.1% | VALUE LINE

TIMELINESS 2 Lowered 8/9/24
SAFETY 3 New 11/24/06
TECHNICAL 4 Lowered 8/2/24
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$8-$14	$11 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	20	(+75%)	*19%*
Low	14	(+20%)	*10%*

Institutional Decisions

	4Q2023	1Q2024	2Q2024
to Buy	216	195	188
to Sell	216	239	227
Hld's(000)	316388	316406	309836

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	19.5	18.7	22.8	22.3	22.7	22.2	28.0	28.5	26.6	20.4	14.8	14.2
Low:	13.2	14.6	16.7	16.0	18.4	16.4	16.8	17.4	15.7	12.3	10.1	11.2

Target Price Range 2027 | 2028 | 2029

LEGENDS
6.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

% TOT. RETURN 8/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-1.9	23.3
3 yr.	-26.8	17.5
5 yr.	-31.0	78.3

The Western Union Company, a leader in global money transfer processes and services was spunoff in a 100% tax-free offering to the shareholders of First Data Corp. on September 29, 2006. Approximately 765 million shares of common stock were distributed.

CAPITAL STRUCTURE as of 6/30/24
Total Debt $2635.8 mill. **Due in 5 Yrs** $2000.0 mill.
LT Debt $2635.8 mill. **LT Interest** $50.0 mill.
(Total interest coverage: 7.5x)
(86% of Tot. Cap'l)

Leases, Uncapitalized Annual rentals $45.9 mill.

No Defined Benefit Pension Plan

Common Stock 337,775,781 shares
as of 7/25/24

MARKET CAP: $3.9 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	1285.9	1268.6	1033.0
Receivables	- -	- -	- -
Inventory	- -	- -	- -
Other	- -	- -	- -
Current Assets	1285.9	1268.6	1033.0
Accts Payable	464.0	453.0	376.5
Debt Due	- -	- -	- -
Other	1063.8	1172.0	869.9
Current Liab.	1527.8	1625.0	1246.4

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	2.5%	.5%	*1.5%*
"Cash Flow"	2.0%	1.5%	*1.5%*
Earnings	2.0%	2.0%	*-.5%*
Dividends	8.5%	6.0%	*2.5%*
Book Value	-3.5%	- -	*NMF*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1210.0	1289.7	1286.3	1284.8	5070.8
2022	1155.7	1138.3	1089.6	1091.9	4475.5
2023	1037.0	1170.0	1097.8	1052.3	4357.0
2024	1049.1	1066.4	*1031*	*1043.5*	*4190*
2025	*1025*	*1060*	*1055*	*1070*	*4210*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.44	.54	.63	.64	2.19
2022	.51	.51	.45	.32	1.76
2023	.43	.51	.43	.37	1.74
2024	.45	.44	*.44*	*.42*	*1.75*
2025	*.43*	*.45*	*.46*	*.46*	*1.80*

Calendar	QUARTERLY DIVIDENDS PAID D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.225	.225	.225	.225	.90
2021	.235	.235	.235	.235	.94
2022	.235	.235	.235	.235	.94
2023	.235	.235	.235	.235	.94
2024	.235	.235	.235		

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	10.75	10.92	11.26	12.04	12.67	12.66	11.76	12.88	11.98	12.43	*12.50*	*12.75*	Revenues per sh	*13.85*
	2.16	2.21	2.26	2.14	2.53	2.35	2.44	2.81	2.33	2.36	*2.30*	*2.35*	"Cash Flow" per sh	*2.75*
	1.59	1.62	1.66	1.60	1.87	1.71	1.87	2.19	1.76	1.74	*1.75*	*1.80*	Earnings per sh A	*2.15*
	.50	.62	.64	.70	.76	.80	.90	.94	.94	.94	*.94*	*.94*	Div'ds Decl'd per sh D	*1.00*
	.13	.19	.14	.15	.31	.12	.09	.10	.09	.07	*.10*	*.10*	Cap'l Spending per sh	*.15*
	2.49	2.80	1.87	d1.07	d.70	d.09	.45	.90	1.28	1.37	*1.10*	*.85*	Book Value per sh B	*.55*
	521.50	502.40	481.50	459.00	441.20	418.00	411.20	393.80	373.50	350.50	*335.00*	*330.00*	Common Shs Outst'g C	*320.00*
	10.5	12.0	11.8	12.3	10.4	12.5	11.9	10.2	9.3	7.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*8.0*
	.55	.60	.62	.62	.56	.67	.61	.55	.54	.40			Relative P/E Ratio	*.65*
	3.0%	3.2%	3.3%	3.6%	3.9%	3.7%	4.0%	4.2%	5.7%	7.7%			Avg Ann'l Div'd Yield	*4.3%*
	5607.2	5483.7	5422.9	5524.3	5589.9	5292.1	4835.0	5070.8	4475.5	4357.0	*4190*	*4210*	Revenues ($mill)	*4430*
	25.2%	25.4%	24.3%	21.7%	24.8%	24.7%	25.5%	26.6%	23.9%	23.7%	*21.0%*	*22.0%*	Operating Margin	*23.0%*
	271.9	270.2	263.2	262.9	264.7	257.7	225.6	208.2	183.8	183.6	*180*	*185*	Depreciation ($mill)	*195*
	852.4	837.8	824.2	718.0	851.9	724.6	777.8	897.1	684.7	645.2	*585*	*625*	Net Profit ($mill)	*690*
	12.0%	11.0%	9.7%	11.5%	14.1%	20.4%	13.0%	12.7%	9.9%	15.2%	*16.0%*	*18.0%*	Income Tax Rate	*20.0%*
	15.2%	15.3%	15.2%	13.0%	15.2%	13.7%	16.1%	17.7%	15.3%	14.8%	*14.0%*	*14.9%*	Net Profit Margin	*15.5%*
	609.8	308.6	d618.4	d1185	d830.3	d465.8	d189.5	d591.4	d241.9	d356.4	*d380*	*d445*	Working Cap'l ($mill)	*d5.0*
	3720.4	3225.6	2786.1	3033.6	3308.7	2984.3	2987.2	2733.4	2436.8	2139.7	*2200*	*2100*	Long-Term Debt ($mill)	*2000*
	1300.4	1404.9	902.2	d491.4	d309.8	d39.5	186.6	355.6	477.8	479.0	*360*	*290*	Shr. Equity ($mill) B	*175*
	18.7%	19.9%	24.4%	31.0%	30.9%	27.2%	26.4%	30.7%	25.2%	26.6%	*20.0%*	*22.5%*	Return on Total Cap'l	*28.5%*
	NMF	59.6%	NMF	- -	- -	- -	NMF	NMF	NMF	NMF	*NMF*	*NMF*	Return on Shr. Equity	*NMF*
	45.2%	37.1%	NMF	- -	- -	- -	NMF	NMF	67.1%	61.8%	*NMF*	*NMF*	Retained to Com Eq	*NMF*
	31%	38%	38%	45%	40%	47%	48%	43%	53%	54%	*54%*	*49%*	All Div'ds to Net Prof	*47%*

BUSINESS: The Western Union Company is a leader in global money movement and payment services. Services are available through a global network of 400,000 agent locations in more than 200 countries. About 90% of locations are outside of the United States. Consumer Money transfer segment accounted for about 92% of '23 revenues; Consumer Services, 7%; Business Solutions, 1%. Sold Business Solutions business, 7/24. International consisted of 62% of revenues. Employs 11,000. Pres. & CEO: Devin McGranahan. Chrmn: Jack Greenberg. Off./Dir. own less than 1% of common stock; Vanguard, 11.2%; BlackRock, 10% (4/24 proxy). Inc.: DE. Address: 7001 East Belleview Avenue, Denver, CO 80237. Tel.: 866-405-5012. Internet: www.westernunion.com.

Western Union's bottom-line performance appears to be stuck in neutral. During the June quarter, the money transfer and services company saw its top and bottom line slip on an annual basis. Moreover, still-high inflation continues to have a significant effect on customers (particularly the low-income consumer), weakening their purchasing power and ability to send cash using Western Union's money remittance offering. In fact, revenues across the core Consumer Money Transfer (CMT) division declined 9%, year to year, as a result of price reductions and efforts to reduce transactions originating in Iraq. This made for tough comparisons that resulted in a 35% decline in the Middle East, Africa, and South Asia region. The stronger dollar should continue dampening Western Union's prospects in the near term, especially considering that a significant portion of its business is derived from overseas. All told, we forecast earnings of $1.75 a share, which is at the midpoint of management's share earnings guidance of $1.70-$1.80, and represents a three-year stretch of flat earnings.

The top and bottom lines should recover modestly next year. Management noted plans to return the CMT division and digital business arm to double-digit revenue growth in order to bolster the top line. While the company has acknowledged that the market has become increasingly competitive and pricing pressures are likely to persist, it continues to invest in the Evolve strategy (began late 2022) in order to restore revenue growth by next year. Indeed, the roll out of several products and features, including a new retail point-of-sale system and a next-generation digital application and wallet, should create efficiencies, generate repeat transactions, and help retain customers.

The stock is slated to outperform the broader market averages in the year ahead. These shares have fallen 8% in price since our early August review, making recovery potential worthwhile over the 2027-2029 time frame. Moreover, income-oriented investors may be enticed by the stock's generous dividend. In fact, the distribution payment is secure and will likely stay at the current level for the foreseeable future.

Oriatal J. Haiby *November 1, 2024*

(A) Diluted earnings. Next earnings report due early February. Excludes nonrecurring gains/(losses): '11, 27¢; '12, (5¢); '16 ($1.16); '17 ($2.85); '19, 75¢.
(B) Includes intangibles. In 2023: $2414.8 million, $6.89 a share.
(C) In millions.
(D) Quarterly dividend initiated in December, 2009. Dividends are typically paid late March, June, September, and December.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	20
Earnings Predictability	85

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THE VALUE LINE Investment Survey®

Part 1 Summary & Index

File at the front of the *Ratings & Reports* binder. Last week's *Summary & Index* should be removed.

December 6, 2024

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The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.2

26 Weeks Ago	Market Low	Market High
17.9	3-23-20 11.0	11-11-24 18.9

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.9%

26 Weeks Ago	Market Low	Market High
2.1%	3-23-20 3.7%	11-11-24 1.9%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

35%

26 Weeks Ago	Market Low	Market High
45%	3-23-20 145%	11-11-24 35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

11%

26 Weeks Ago	Market Low	Market High
14%	3-23-20 72%	11-11-24 13%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

Numeral in parenthesis after the industry is rank for probable performance (next 12 months).

	PAGE
Advertising (47)	2381
Aerospace/Defense (45)	701
Air Transport (15)	301
Apparel (43)	2101
Asset Management (34)	2212
Automotive (48)	101
*Auto Parts (29)	968
Bank (58)	602
Bank (Midwest) (33)	775
Beverage (77)	1957
Biotechnology (88)	828
Brokers & Exchanges (27)	1782
Building Materials (12)	1101
*Cable TV (11)	1001
Chemical (Basic) (38)	1594
Chemical (Diversified) (78)	2420
Chemical (Specialty) (74)	544
Computers/Peripherals (41)	1410
Computer Software (44)	2571
Cyber Security (70)	2008
Diversified Co. (25)	1747
Drug (75)	1604
E-Commerce (39)	1805
Educational Services (18)	1981
Electrical Equipment (2)	1301
*Electric Util. (Central) (81)	901
Electric Utility (East) (91)	128
Electric Utility (West) (84)	2199
Electronics (13)	1324
*Engineering & Const (22)	1009
Entertainment (73)	2330
Entertainment Tech (93)	1991
Environmental (54)	405
Financial Svcs. (Div.) (8)	2530
Food Processing (61)	1901
Furn/Home Furnishings (60)	1155
Healthcare Information (85)	818
Heavy Truck & Equip (19)	140
Homebuilding (20)	1132
Hotel/Gaming (49)	2348
Household Products (71)	1191
Human Resources (67)	1634
Industrial Services (5)	373
Information Services (31)	423
IT Services (4)	2606
Insurance (Life) (21)	1554
Insurance (Prop/Cas.) (24)	751
Internet (16)	2624
Investment Banking (28)	1795
Investment Co. (--)	1209
Investment Co.(Foreign) (--)	416
Machinery (35)	1701
Maritime (50)	332
Medical Services (46)	789
Med Supp Invasive (69)	160
Med Supp Non-Invasive (68)	197
Metal Fabricating (6)	729
Metals & Mining (Div.) (87)	1577
Natural Gas Utility (89)	534
Natural Gas (Div.) (79)	523
Oil/Gas Distribution (32)	579
Oilfield Svcs/Equip. (83)	2404
Packaging & Container (17)	1175
Paper/Forest Products (62)	1167
Petroleum (Integrated) (63)	501
Petroleum (Producing) (59)	2389
Pipeline MLPs (55)	592
Power (86)	1219
Precious Metals (72)	1564
Precision Instrument (51)	113
Public/Private Equity (80)	2429
Publishing (52)	2374
Railroad (23)	339
R.E.I.T. (90)	1510
Recreation (56)	2301
Reinsurance (14)	2000
Restaurant (57)	349
Retail Automotive (40)	2116
Retail Building Supply (65)	1144
Retail (Hardlines) (10)	2167
Retail (Softlines) (7)	2187
Retail Store (30)	2136
Retail/Wholesale Food (1)	1940
Semiconductor (82)	1352
Semiconductor Equip (64)	1391
Shoe (9)	2157
Steel (42)	738
*Telecom. Equipment (53)	948
*Telecom. Services (66)	916
Thrift (26)	1501
Tobacco (3)	1974
*Toiletries/Cosmetics (92)	993
Trucking (37)	316
Water Utility (76)	1775
Wireless Networking (36)	570

*Reviewed in this week's issue.

In three parts: This is Part 1, the Summary & Index. Part 2 is Selection & Opinion. Part 3 is Ratings & Reports. Volume LXXX, No. 18.
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THE VALUE LINE Investment Survey®

Part 1 Summary & Index

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Highest Growth Stocks 39

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.5

26 Weeks Ago	Market Low	Market High
18.1	3-23-20 11.0	11-11-24 18.9

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

2.0%

26 Weeks Ago	Market Low	Market High
2.1%	3-23-20 3.7%	11-11-24 1.9%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

40%

26 Weeks Ago	Market Low	Market High
45%	3-23-20 145%	11-11-24 35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

14%

26 Weeks Ago	Market Low	Market High
14%	3-23-20 72%	11-11-24 13%

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Apparel (36)	2101
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Bank (60)	602
*Bank (Midwest) (37)	775
Beverage (77)	1957
*Biotechnology (88)	828
Brokers & Exchanges (26)	1782
Building Materials (12)	1101
Cable TV (27)	999
Chemical (Basic) (41)	1594
Chemical (Diversified) (78)	2420
Chemical (Specialty) (74)	544
Computers/Peripherals (43)	1410
Computer Software (47)	2571
Cyber Security (75)	2008
Diversified Co. (16)	1747
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Electric Util. (Central) (81)	901
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Oilfield Svcs/Equip. (87)	2404
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THE VALUE LINE Investment Survey®

Part 1
Summary & Index

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November 22, 2024

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The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.9

26 Weeks Ago	Market Low	Market High
18.2	3-23-20 11.0	11-11-24 18.9

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.9%

26 Weeks Ago	Market Low	Market High
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The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

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The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

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THE VALUE LINE Investment Survey®

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November 15, 2024

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The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.0

26 Weeks Ago	Market Low	Market High
17.6	3-23-20 11.0	10-17-24 18.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

2.1%

26 Weeks Ago	Market Low	Market High
2.1%	3-23-20 3.7%	10-17-24 2.0%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

40%

26 Weeks Ago	Market Low	Market High
45%	3-23-20 145%	10-17-24 40%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

16%

26 Weeks Ago	Market Low	Market High
14%	3-23-20 72%	10-17-24 14%

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THE VALUE LINE Investment Survey®

Part 1 Summary & Index

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November 8, 2024

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The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.2

26 Weeks Ago	Market Low 3-23-20	Market High 10-17-24
17.4	11.0	18.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

2.0%

26 Weeks Ago	Market Low 3-23-20	Market High 10-17-24
2.1%	3.7%	2.0%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

40%

26 Weeks Ago	Market Low 3-23-20	Market High 10-17-24
50%	145%	40%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

14%

26 Weeks Ago	Market Low 3-23-20	Market High 10-17-24
14%	72%	14%

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Numeral in parenthesis after the industry is rank for probable performance (next 12 months).

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Air Transport (7)	301
Apparel (26)	2101
Asset Management (12)	2212
*Automotive (52)	101
Auto Parts (34)	966
Bank (41)	2501
Bank (Midwest) (51)	775
Beverage (80)	1957
Biotechnology (91)	827
Brokers & Exchanges (40)	1782
Building Materials (21)	1101
Cable TV (49)	999
Chemical (Basic) (8)	1594
Chemical (Diversified) (47)	2420
Chemical (Specialty) (59)	545
Computers/Peripherals (22)	1410
Computer Software (48)	2571
Cyber Security (82)	2008
Diversified Co. (17)	1747
Drug (60)	1604
E-Commerce (43)	1805
Educational Services (71)	1981
Electrical Equipment (2)	1301
Electric Util. (Central) (81)	901
*Electric Utility (East) (85)	128
Electric Utility (West) (86)	2199
Electronics (10)	1324
Engineering & Const (27)	1007
Entertainment (64)	2330
Entertainment Tech (93)	1991
Environmental (29)	406
Financial Svcs. (Div.) (15)	2530
Food Processing (35)	1901
Furn/Home Furnishings (62)	1155
Healthcare Information (67)	817
*Heavy Truck & Equip (25)	140
Homebuilding (4)	1132
Hotel/Gaming (63)	2348
Household Products (65)	1191
Human Resources (37)	1634
Industrial Services (13)	372
Information Services (20)	424
IT Services (5)	2606
Insurance (Life) (3)	1554
Insurance (Prop/Cas.) (38)	750
Internet (45)	2624
Investment Banking (55)	1795
Investment Co. (--)	1209
Investment Co.(Foreign) (--)	417
Machinery (44)	1701
Maritime (76)	332
Medical Services (18)	789
*Med Supp Invasive (74)	160
*Med Supp Non-Invasive (66)	197
Metal Fabricating (23)	728
Metals & Mining (Div.) (83)	1577
Natural Gas Utility (84)	535
Natural Gas (Div.) (88)	523
Oil/Gas Distribution (32)	585
Oilfield Svcs/Equip. (89)	2404
Packaging & Container (11)	1175
Paper/Forest Products (75)	1167
Petroleum (Integrated) (54)	501
Petroleum (Producing) (77)	2389
Pipeline MLPs (56)	598
Power (79)	1219
Precious Metals (73)	1564
*Precision Instrument (72)	113
Public/Private Equity (87)	2429
Publishing (31)	2374
Railroad (28)	339
R.E.I.T. (90)	1510
Recreation (39)	2301
Reinsurance (6)	2000
Restaurant (58)	349
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Steel (30)	737
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Thrift (36)	1501
Tobacco (9)	1974
Toiletries/Cosmetics (92)	991
Trucking (42)	316
Water Utility (78)	1775
Wireless Networking (57)	572

*Reviewed in this week's issue.

In three parts: This is Part 1, the Summary & Index. Part 2 is Selection & Opinion. Part 3 is Ratings & Reports. Volume LXXX, No. 14.
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THE VALUE LINE Investment Survey®

Part 1
Summary & Index

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November 1, 2024

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Med Supp Non-Invasive (62)	201
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Part 1 Summary & Index

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October 25, 2024

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The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.7

26 Weeks Ago	Market Low 3-23-20	Market High 10-14-24
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The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

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26 Weeks Ago	Market Low 3-23-20	Market High 10-14-24
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*Reviewed in this week's issue.

In three parts: This is Part 1, the Summary & Index. Part 2 is Selection & Opinion. Part 3 is Ratings & Reports. Volume LXXX, No. 12.

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October 18, 2024

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The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.2

26 Weeks Ago	Market Low 3-23-20	Market High 9-24-24
18.4	11.0	18.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

2.0%

26 Weeks Ago	Market Low 3-23-20	Market High 9-24-24
2.1%	3.7%	2.0%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

40%

26 Weeks Ago	Market Low 3-23-20	Market High 9-24-24
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The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

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THE VALUE LINE Investment Survey®

Part 1
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October 11, 2024

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Advertising (64)	2382	Electric Util. (Central) (75)	901	Investment Co.(Foreign) (--)	417	*Reinsurance (3)	2000
Aerospace/Defense (26)	701	Electric Utility (East) (83)	132	Machinery (43)	1701	Restaurant (55)	349
Air Transport (21)	301	Electric Utility (West) (84)	2200	Maritime (48)	332	Retail Automotive (53)	2116
Apparel (37)	2101	Electronics (11)	1324	Medical Services (10)	789	Retail Building Supply (74)	1144
Asset Management (29)	2213	Engineering & Const (42)	1007	Med Supp Invasive (70)	164	Retail (Hardlines) (18)	2166
Automotive (44)	101	Entertainment (73)	2331	Med Supp Non-Invasive (59)	201	Retail (Softlines) (32)	2189
Auto Parts (36)	966	*Entertainment Tech (93)	1991	Metal Fabricating (65)	728	Retail Store (33)	2136
Bank (51)	2501	Environmental (22)	406	Metals & Mining (Div.) (89)	1577	*Retail/Wholesale Food (1)	1940
Bank (Midwest) (40)	775	Financial Svcs. (Div.) (9)	2533	Natural Gas Utility (80)	535	Semiconductor (81)	1352
*Beverage (71)	1957	*Food Processing (47)	1901	Natural Gas (Div.) (86)	523	Semiconductor Equip (52)	1391
Biotechnology (90)	827	Furn/Home Furnishings (56)	1155	Oil/Gas Distribution (39)	585	Shoe (5)	2156
Brokers & Exchanges (68)	1782	Healthcare Information (77)	817	Oilfield Svcs/Equip. (88)	2405	Steel (13)	737
Building Materials (16)	1101	Heavy Truck & Equip (20)	144	Packaging & Container (14)	1175	Telecom. Equipment (54)	946
Cable TV (27)	999	Homebuilding (2)	1132	Paper/Forest Products (87)	1167	Telecom. Services (69)	916
Chemical (Basic) (8)	1594	Hotel/Gaming (72)	2349	Petroleum (Integrated) (28)	501	Thrift (17)	1501
Chemical (Diversified) (46)	2422	Household Products (62)	1191	Petroleum (Producing) (79)	2390	*Tobacco (4)	1974
Chemical (Specialty) (58)	545	Human Resources (50)	1634	Pipeline MLPs (34)	598	Toiletries/Cosmetics (92)	991
Computers/Peripherals (35)	1410	Industrial Services (12)	372	Power (82)	1219	Trucking (23)	316
Computer Software (66)	2577	Information Services (41)	424	Precious Metals (57)	1564	Water Utility (76)	1775
*Cyber Security (78)	2008	IT Services (15)	2610	Precision Instrument (63)	113	Wireless Networking (60)	572
Diversified Co. (24)	1747	Insurance (Life) (7)	1554	Public/Private Equity (85)	2431		
Drug (38)	1604	Insurance (Prop/Cas.) (19)	750	Publishing (67)	2375		
E-Commerce (61)	1805	Internet (25)	2627	Railroad (49)	339		
*Educational Services (31)	1981	Investment Banking (45)	1795	R.E.I.T. (91)	1510		
Electrical Equipment (6)	1301	Investment Co. (--)	1209	Recreation (30)	2301		

*Reviewed in this week's issue.

In three parts: This is Part 1, the Summary & Index. Part 2 is Selection & Opinion. Part 3 is Ratings & Reports. Volume LXXX, No. 10.
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THE VALUE LINE Investment Survey®

Part 1
Summary & Index

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October 4, 2024

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Highest Growth Stocks 39

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.4

26 Weeks Ago	Market Low 3-23-20	Market High 9-24-24
18.3	11.0	18.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

2.0%

26 Weeks Ago	Market Low 3-23-20	Market High 9-24-24
2.1%	3.7%	2.0%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

40%

26 Weeks Ago	Market Low 3-23-20	Market High 9-24-24
45%	145%	40%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

14%

26 Weeks Ago	Market Low 3-23-20	Market High 9-24-24
10%	72%	14%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

Numeral in parenthesis after the industry is rank for probable performance (next 12 months).

	PAGE		PAGE		PAGE		PAGE
Advertising (61)	2382	Electric Util. (Central) (76)	901	Investment Co.(Foreign) (--)	417	Reinsurance (3)	2000
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Apparel (42)	2101	Electronics (11)	1324	Medical Services (8)	789	Retail Building Supply (83)	1144
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Chemical (Basic) (15)	1594	Hotel/Gaming (70)	2349	Petroleum (Integrated) (24)	501	Thrift (12)	1501
Chemical (Diversified) (43)	2422	Household Products (58)	1191	Petroleum (Producing) (54)	2390	Tobacco (4)	1974
Chemical (Specialty) (50)	545	Human Resources (56)	1634	Pipeline MLPs (23)	598	Toiletries/Cosmetics (92)	991
Computers/Peripherals (44)	1410	Industrial Services (10)	372	Power (82)	1219	Trucking (38)	316
Computer Software (64)	2577	Information Services (33)	424	Precious Metals (74)	1564	*Water Utility (77)	1775
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Electrical Equipment (7)	1301	Investment Co. (--)	1209	Recreation (37)	2301		

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THE VALUE LINE Investment Survey®

Part 1 Summary & Index

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September 27, 2024

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Highest Growth Stocks 39

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.3

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
18.1	11.0	18.2

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

2.1%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
2.1%	3.7%	2.1%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

40%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
45%	145%	45%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

15%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
12%	72%	14%

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Asset Management (37)	2213	Engineering & Const (39)	1007	Med Supp Invasive (56)	164	Retail (Hardlines) (19)	2166
Automotive (31)	101	Entertainment (74)	2331	Med Supp Non-Invasive (51)	201	Retail (Softlines) (23)	2189
Auto Parts (33)	966	Entertainment Tech (93)	1991	Metal Fabricating (62)	728	Retail Store (40)	2136
Bank (42)	2501	Environmental (11)	406	*Metals & Mining (Div.) (90)	1577	Retail/Wholesale Food (1)	1940
Bank (Midwest) (27)	775	Financial Svcs. (Div.) (6)	2533	Natural Gas Utility (82)	535	Semiconductor (77)	1352
Beverage (59)	1957	Food Processing (38)	1901	Natural Gas (Div.) (88)	523	Semiconductor Equip (65)	1391
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Brokers & Exchanges (80)	1790	Healthcare Information (70)	817	Oilfield Svcs/Equip. (86)	2405	Steel (25)	737
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Computer Software (69)	2577	Information Services (29)	424	*Precious Metals (81)	1564	Water Utility (78)	1783
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Diversified Co. (35)	1750	*Insurance (Life) (5)	1554	Public/Private Equity (89)	2431		
*Drug (41)	1604	Insurance (Prop/Cas.) (18)	750	Publishing (64)	2375		
E-Commerce (66)	1811	Internet (28)	2627	Railroad (47)	339		
Educational Services (50)	1981	Investment Banking (44)	1802	*R.E.I.T. (91)	1510		
Electrical Equipment (12)	1301	Investment Co. (--)	1209	Recreation (36)	2301		

*Reviewed in this week's issue.

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The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

17.7

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
17.9	11.0	18.2

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

2.1%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
2.1%	3.7%	2.1%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

45%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
45%	145%	45%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

16%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
11%	72%	14%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.3

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
17.8	11.0	18.2

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

2.0%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
2.2%	3.7%	2.1%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all stocks in the VL Universe

40%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
45%	145%	45%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all stocks in the VL Universe

13%

26 Weeks Ago	Market Low 3-23-20	Market High 7-16-24
12%	72%	14%

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Apparel (63)	2101
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Biotechnology (84)	827
Brokers & Exchanges (81)	1790
*Building Materials (15)	1101
Cable TV (27)	999
Chemical (Basic) (32)	1590
Chemical (Diversified) (60)	2422
Chemical (Specialty) (53)	545
Computers/Peripherals (25)	1412
Computer Software (62)	2577
Cyber Security (79)	2008
Diversified Co. (41)	1750
Drug (54)	1600
E-Commerce (58)	1811
Educational Services (49)	1981
Electrical Equipment (19)	1301
Electric Util. (Central) (73)	901
Electric Utility (East) (75)	132
Electric Utility (West) (80)	2200
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Information Services (31)	424
IT Services (21)	2610
Insurance (Life) (7)	1550
Insurance (Prop/Cas.) (18)	750
Internet (30)	2627
Investment Banking (44)	1802
*Investment Co. (--)	1209
Investment Co.(Foreign) (--)	417
Machinery (42)	1701
Maritime (47)	332
Medical Services (8)	789
Med Supp Invasive (70)	164
Med Supp Non-Invasive (34)	201
Metal Fabricating (61)	728
Metals & Mining (Div.) (86)	1573
Natural Gas Utility (83)	535
Natural Gas (Div.) (89)	523
Oil/Gas Distribution (55)	585
Oilfield Svcs/Equip. (88)	2405
*Packaging & Container (12)	1175
*Paper/Forest Products (87)	1167
Petroleum (Integrated) (14)	501
Petroleum (Producing) (68)	2390
Pipeline MLPs (51)	598
*Power (77)	1219
Precious Metals (56)	1560
Precision Instrument (74)	113
Public/Private Equity (90)	2431
Publishing (28)	2375
Railroad (48)	339
R.E.I.T. (91)	1510
Recreation (20)	2301
Reinsurance (3)	2000
Restaurant (67)	349
Retail Automotive (50)	2116
*Retail Building Supply (85)	1144
Retail (Hardlines) (23)	2166
Retail (Softlines) (26)	2189
Retail Store (40)	2136
Retail/Wholesale Food (1)	1940
Semiconductor (72)	1357
Semiconductor Equip (39)	1394
Shoe (9)	2156
Steel (16)	737
Telecom. Equipment (36)	946
Telecom. Services (78)	916
Thrift (13)	1501
Tobacco (4)	1974
Toiletries/Cosmetics (92)	991
Trucking (29)	316
Water Utility (76)	1783
Wireless Networking (82)	572

*Reviewed in this week's issue.

In three parts: This is Part 1, the Summary & Index. Part 2 is Selection & Opinion. Part 3 is Ratings & Reports. Volume LXXX, No. 6.
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S&P Capital IQ PRO

American Water Works Company, Inc. | Credit Ratings

NYSE: AWK (MI KEY: 4004387; SPCIQ KEY: 250885)

Agency S&P Global Ratings

A

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
5/7/2015

Upgrade | CreditWatch/Outlook: Stable
5/7/2015

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:American Water Works Co. Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A	5/7/2015	6/25/2024	A-	Upgrade | CreditWatch/Outlook	Stable	5/7/2015
Local Currency LT	A	5/7/2015	6/25/2024	A-	Upgrade | CreditWatch/Outlook	Stable	5/7/2015
Foreign Currency ST	A-1	5/7/2015	6/25/2024	A-2	Upgrade		
Local Currency ST	A-1	5/7/2015	6/25/2024	A-2	Upgrade		

Ratings History

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
American Water Capital Corp.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A	5/7/2015	6/25/2024	A-	Stable	5/7/2015
Elizabethtown Water Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	NR	8/24/2005		A+	NR	8/24/2005
New Jersey-American Water Co. Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A	5/7/2015	6/25/2024	A-	Stable	5/7/2015
New York Water Service Corp.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	NR	6/16/2016		A+	NR	6/16/2016
Pennsylvania-American Water Co. Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A	5/7/2015	6/25/2024	A-	Stable	5/7/2015

S&P Credit Ratings and Research provided by S&P Global Ratings

'Last Review Date' indicates the date on which an Issue/Issuer Credit Rating was last formally reviewed within a twelve-month period or when a Credit Rating Action was last published. For certain dependent instruments, the 'Last Review Date' will only be updated in the event of a Credit Rating change of the linked organization.

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S&P Capital IQ PRO

American States Water Company | Credit Ratings

NYSE: AWR (MI KEY: 4093614; SPCIQ KEY: 304353)

Agency S&P Global Ratings

A

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
7/7/2023

Downgrade | CreditWatch/Outlook: Stable
7/7/2023

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:American States Water Co.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A	7/7/2023	4/26/2024	A+	Downgrade | CreditWatch/Outlook	Stable	7/7/2023
Local Currency LT	A	7/7/2023	4/26/2024	A+	Downgrade | CreditWatch/Outlook	Stable	7/7/2023

Ratings History

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Golden State Water Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A+	7/30/2010	4/26/2024	A+	Stable	7/7/2023

S&P Credit Ratings and Research provided by S&P Global Ratings

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S&P Capital IQ PRO

California Water Service Group | Credit Ratings

NYSE: CWT (MI KEY: 4721056; SPCIQ KEY: 257568)

Agency S&P Global Ratings

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
California Water Service Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A+	11/6/2002	1/3/2024	A+	Stable	4/9/2019

S&P Credit Ratings and Research provided by S&P Global Ratings

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S&P Capital IQ PRO

Global Water Resources, Inc. | Credit Ratings

NASDAQGM: GWRS (MI KEY: 5000843; SPCIQ KEY: 44732344)

Agency S&P Global Ratings

No data is available at this time.

S&P Credit Ratings and Research provided by S&P Global Ratings

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S&P Capital IQ PRO

Middlesex Water Company | Credit Ratings

NASDAQGS: MSEX (MI KEY: 4104374; SPCIQ KEY: 288070)

Agency S&P Global Ratings

A

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
8/20/2015

CreditWatch/Outlook: Stable
11/9/2022

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:Middlesex Water Co.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A	8/20/2015	10/10/2024	A	CreditWatch/Outlook	Stable	11/9/2022
Local Currency LT	A	8/20/2015	10/10/2024	A	CreditWatch/Outlook	Stable	11/9/2022

Ratings History

S&P Credit Ratings and Research provided by S&P Global Ratings

'Last Review Date' indicates the date on which an Issue/Issuer Credit Rating was last formally reviewed within a twelve-month period or when a Credit Rating Action was last published. For certain dependent instruments, the 'Last Review Date' will only be updated in the event of a Credit Rating change of the linked organization.

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S&P Capital IQ PRO

SJW Group | Credit Ratings

NASDAQGS: SJW (MI KEY: 5000889; SPCIQ KEY: 301316)

Agency S&P Global Ratings

A-

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
10/16/2019

CreditWatch/Outlook: Negative
9/19/2023

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:SJW Group)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A-	10/16/2019	3/28/2024	A-	CreditWatch/Outlook	Negative	9/19/2023
Local Currency LT	A-	10/16/2019	3/28/2024	A-	CreditWatch/Outlook	Negative	9/19/2023

Ratings History

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Connecticut Water Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A-	1/25/2019	12/9/2024	A-	Negative	9/19/2023
Connecticut Water Service Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A-	1/25/2019	12/9/2024	A-	Negative	9/19/2023
San Jose Water Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A	5/18/2010	3/28/2024	A	Stable	10/16/2019

S&P Credit Ratings and Research provided by S&P Global Ratings

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S&P Capital IQ PRO

Essential Utilities, Inc. | Credit Ratings

NYSE: WTRG (MI KEY: 4092620; SPCIQ KEY: 296276)

Agency S&P Global Ratings

A-

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
3/19/2024

Downgrade | CreditWatch/Outlook: Stable
3/19/2024

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:Essential Utilities Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A-	3/19/2024	8/22/2024	A	Downgrade | CreditWatch/Outlook	Stable	3/19/2024
Local Currency LT	A-	3/19/2024	8/22/2024	A	Downgrade | CreditWatch/Outlook	Stable	3/19/2024

Ratings History

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Aqua Pennsylvania Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A-	3/19/2024	8/22/2024	A	Stable	3/19/2024
Peoples TWP LLC	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	NR	12/17/1997		A-	NR	12/17/1997
PNG Companies LLC	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A-	3/19/2024	8/22/2024	A	Stable	3/19/2024

S&P Credit Ratings and Research provided by S&P Global Ratings

'Last Review Date' indicates the date on which an Issue/Issuer Credit Rating was last formally reviewed within a twelve-month period or when a Credit Rating Action was last published. For certain dependent instruments, the 'Last Review Date' will only be updated in the event of a Credit Rating change of the linked organization.

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American Water Works Company, Inc.

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Ratings & Assessments: Organization List

Parent/Subsidiary | 8 Items	Domicile	Long Term Rating	Long Term Ra
American Water Works Company, Inc.	UNITED STATES	Baa1, Not on Watch	LT Issuer Rati
American Water Capital Corp.	UNITED STATES	Baa1, Not on Watch	LT Issuer Rati
American Water Works Company, Inc. (Old)	UNITED STATES	--	--
American Water Capital Corp. (Old)	UNITED STATES	--	--
New Jersey-American Water Company, Inc.	UNITED STATES	A3, Not on Watch	LT Issuer Rati
Pennsylvania-American Water Company	UNITED STATES	A3, Not on Watch	LT Issuer Rati
Indiana-American Water Company, Inc.	UNITED STATES	--	--
Missouri-American Water Company	UNITED STATES	--	--

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American States Water Company

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Ratings & Assessments: Organization List

Parent/Subsidiary | 2 Items	Domicile	Long Term Rating	Long Term Ra
American States Water Company	UNITED STATES	--	--
Golden State Water Company	UNITED STATES	A2, Not on Watch	Senior Unsec Curr

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California Water Service Group

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Ratings & Assessments: Organization List

Parent/Subsidiary | 2 Items	Domicile	Long Term Rating	Long Term Ra
California Water Service Group	UNITED STATES	--	--
California Water Service Co.	UNITED STATES	--	--

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WATER

Global Water Resources, Inc. GWRS

Long Term Rating

Not Rated

About the Company

This company, based in the United States of America, is a water resource management firm, owns, operates, and manages regulated water, wastewater, and recycled water utilities. It was incorporated in 2003 and has registered headquarters located in Phoenix, Arizona. The company is involved in managing the entire water cycle by owning and operating the water, wastewater and recycled water utilities within the same geographic areas in order to both conserve water and maximize its total economic and social value. It focuses on the broad issues of water supply and scarcity and applies principles of water conservation through water reclamation and reuse. It also provides water meter and/or wastewater service for a new residence or business.

Read More

Headquarters	Ticker
Phoenix, United States Of America	GWRS
Registration Year	Full Time Employees
2008	109
Sector	Website
Water	https://www.gwresources.com

Source: Moody's (As of Nov 2024)

SECTOR OUTLOOK

Global Macro Outlook 2025-26: Growth, inflation and interest rates to settle at lower, stable levels. G-20 economies are growing at a steady pace amid monetary policy easing, and face risks from potentially significant changes to US trade, fiscal, immigration and regulatory policies.

Read More

Source: Moody's Ratings

Sector Research

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SECTOR COMMENT

Water and wastewater utilities – Global: Spate of cyber incidents highlight sector's elevated cyber risk

29 Jan 2024 | Moody's Ratings

COMPILATION

Credit Outlook: 18 November 2024

18 Nov 2024 | Moody's Ratings

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Middlesex Water Co

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Ratings & Assessments: Organization List

Parent/Subsidiary | 1 Item	Domicile	Long Term Rating	Long Term Ra
Middlesex Water Co	UNITED STATES	--	--

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WATER

SJW Group SJW

Long Term Rating

Not Rated

About the Company

This company, formed in 1985, is engaged in the provision of management holding services to its subsidiaries. Formerly known as SJW Corp., it has its registered head office in the city of San Jose in California, USA. The company has the following subsidiaries: San Jose Water Company, a water utility with both regulated and non-regulated businesses; SJW Land Company, which owns commercial buildings and undeveloped land; and SJWTX Water Inc., a Texas corporation. SJW Land Company, a wholly owned subsidiary the company, was incorporated in 1985. SJW Land Company owns commercial buildings, other undeveloped land primarily in the San Jose metropolitan area, a property in each of Florida, Texas, Arizona, Tennessee, and Connecticut, and a 70 percent limited partnership interest in a three-story office building located near the HP Pavilion in downtown San Jose. SJWTX Water, Inc., a majority owned subsidiary of the company was incorporated in the State of Texas in September 2005. SJWTX Water, Inc. is doing business as Canyon Lake Water Service Company (CLWSC). CLWSC serves a population of approximately 20,000 with more than 7,000...

Read More

Headquarters	Ticker
San Jose, United States Of America	SJW
Registration Year	Full Time Employees
2015	808
Sector	Website
Water	https://www.sjwgroup.com

Source: Moody's (As of Nov 2024)

SECTOR OUTLOOK

Global Macro Outlook 2025-26: Growth, inflation and interest rates to settle at lower, stable levels. G-20 economies are growing at a steady pace amid monetary policy easing, and face risks from potentially significant changes to US trade, fiscal, immigration and regulatory policies.

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Essential Utilities, Inc.

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Ratings & Assessments: Organization List

Parent/Subsidiary | 5 Items	Domicile	Long Term Rating	Long Term Ra
Essential Utilities, Inc.	UNITED STATES	Baa2, Not on Watch	Senior Unsec Curr
Aqua Pennsylvania, Inc.	UNITED STATES	--	--
PNG Companies LLC	UNITED STATES	Baa2, Not on Watch	Senior Secure
Hope Gas, Inc.	UNITED STATES	--	--
Peoples Natural Gas Company, The	UNITED STATES	--	--

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Dependent Variable: RP
Method: ML ARCH - Student's t distribution (BFGS / Marquardt steps)
Date: 12/04/24 Time: 11:10
Sample: 1 1187
Included observations: 1187
Convergence achieved after 33 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	3.176282	0.507198	6.262410	0.0000
Variance Equation				
C	0.000121	3.82E-05	3.165552	0.0015
RESID(-1)^2	0.128319	0.025659	5.000861	0.0000
GARCH(-1)	0.821038	0.032086	25.58906	0.0000
T-DIST. DOF	9.323363	2.142743	4.351136	0.0000

R-squared	-0.019739	Mean dependent var	0.005676
Adjusted R-squared	-0.019739	S.D. dependent var	0.053671
S.E. of regression	0.054198	Akaike info criterion	-3.354696
Sum squared resid	3.483837	Schwarz criterion	-3.333300
Log likelihood	1996.012	Hannan-Quinn criter.	-3.346632
Durbin-Watson stat	1.793345		

Dependent Variable: RP
Method: ML ARCH - Student's t distribution (BFGS / Marquardt steps)
Date: 12/04/24 Time: 11:12
Sample (adjusted): 25 1187
Included observations: 1163 after adjustments
Convergence achieved after 34 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	1.533559	0.502507	3.051815	0.0023
Variance Equation				
C	5.26E-05	2.01E-05	2.621470	0.0088
RESID(-1)^2	0.106041	0.020265	5.232785	0.0000
GARCH(-1)	0.873175	0.022002	39.68582	0.0000
T-DIST. DOF	11.52018	3.613483	3.188109	0.0014

R-squared	-0.015251	Mean dependent var	0.003295
Adjusted R-squared	-0.015251	S.D. dependent var	0.054676
S.E. of regression	0.055092	Akaike info criterion	-3.355476
Sum squared resid	3.526798	Schwarz criterion	-3.333727
Log likelihood	1956.209	Hannan-Quinn criter.	-3.347271
Durbin-Watson stat	1.784369		

Dependent Variable: RP
Method: ML ARCH - Student's t distribution (BFGS / Marquardt steps)
Date: 12/04/24 Time: 11:13
Sample (adjusted): 25 1187
Included observations: 1163 after adjustments
Convergence achieved after 34 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	2.828975	0.507024	5.579568	0.0000
Variance Equation				
C	0.000112	3.68E-05	3.047359	0.0023
RESID(-1)^2	0.130001	0.026073	4.986068	0.0000
GARCH(-1)	0.824149	0.031443	26.21089	0.0000
T-DIST. DOF	9.007376	2.063234	4.365658	0.0000

R-squared	-0.015575	Mean dependent var	0.004732
Adjusted R-squared	-0.015575	S.D. dependent var	0.053975
S.E. of regression	0.054394	Akaike info criterion	-3.348769
Sum squared resid	3.437985	Schwarz criterion	-3.327020
Log likelihood	1952.309	Hannan-Quinn criter.	-3.340564
Durbin-Watson stat	1.802096		

Key Variables as of December 31, 2023

Risk Free Rate*	
Kroll Normalized Risk-free Rate	3.5%
Spot 10-year Treasury Yield	3.87%
Spot 20-year Treasury Yield	4.21%
Spot 30-year Treasury Yield	4.1%

Equity Risk Premium*	
Kroll Recommended	5.5%
Supply-side Long-term (1926–2023)	6.22%
Historical Long-term (1926–2023)	7.17%

* Normalized Risk-free Rate and Recommended ERP are as of February 5, 2024. Spot risk-free rates are as of February 1, 2024. All other data as of December 31, 2023.

CRSP Deciles Size Premium

	Market Capitalization of Smallest Company (in USD millions)	Market Capitalization of Largest Company (in USD millions)	Size Premium (Return in Excess of CAPM)
Decile			
Mid Cap	3,011.224	14,820.048	0.66%
Low Cap	555.880	3,010.806	1.24%
Micro Cap	1.576	554.523	2.91%
Breakdown of CRSP Deciles 1 - 10			
1	36,942.976	2,662,326.048	-0.06%
2	14,910.719	36,391.113	0.46%
3	7,493.607	14,820.048	0.61%
4	4,622.261	7,461.284	0.64%
5	3,011.224	4,621.785	0.95%
6	1,864.293	3,010.806	1.21%
7	1,050.083	1,862.491	1.39%
8	555.880	1,046.037	1.14%
9	213.039	554.523	1.99%
10	1.576	212.644	4.7%
Breakdown of CRSP 10th Decile			
10A	97.464	212.644	3.29%
10W	153.796	212.644	2.38%
10X	97.464	153.670	4.43%
10B	1.576	97.398	7.64%
10Y	57.815	97.398	6.22%
10Z	1.576	57.448	10.73%

Source: Kroll Cost of Capital Navigator (kroll.com/costofcapitalnavigator)

KROLL

Kroll Recommended U.S. Equity Risk Premium (ERP) and Corresponding Risk-free Rates (R_f); January 2008–Present

For additional information, please visit kroll.com/cost-of-capital-resource-center

Date	Risk-free Rate (R_f)	R_f (%)	Kroll Recommended U.S. ERP (%)	What Changed
Current Guidance:				
June 5, 2024 – UNTIL FURTHER NOTICE*	Normalized 20-year U.S. Treasury yield*	3.50*	5.00	*ERP*
June 8, 2023 – June 4, 2024*	Normalized 20-year U.S. Treasury yield*	3.50*	5.50	*ERP*
October 18, 2022 – June 7, 2023*	Normalized 20-year U.S. Treasury yield*	3.50*	6.00	*ERP*
June 16, 2022 – October 17, 2022*	Normalized 20-year U.S. Treasury yield*	3.50*	5.50	*Rf*
April 7, 2022 – June 15, 2022	Normalized 20-year U.S. Treasury yield	3.00	5.50	*Rf*
December 7, 2020 – April 6, 2022	Normalized 20-year U.S. Treasury yield	2.50	5.50	*ERP*
June 30, 2020 – December 6, 2020	Normalized 20-year U.S. Treasury yield	2.50	6.00	*Rf*
March 25, 2020 – June 29, 2020	Normalized 20-year U.S. Treasury yield	3.00	6.00	*ERP*
December 19, 2019 – March 24, 2020	Normalized 20-year U.S. Treasury yield	3.00	5.00	*ERP*
September 30, 2019 – December 18, 2019	Normalized 20-year U.S. Treasury yield	3.00	5.50	R_f
December 31, 2018 – September 29, 2019	Normalized 20-year U.S. Treasury yield	3.50	5.50	*ERP*
September 5, 2017 – December 30, 2018	Normalized 20-year U.S. Treasury yield	3.50	5.00	*ERP*
November 15, 2016 – September 4, 2017	Normalized 20-year U.S. Treasury yield	3.50	5.50	R_f
January 31, 2016 – November 14, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.50	*ERP*
December 31, 2015	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2014	Normalized 20-year U.S. Treasury yield	4.00	5.00	
December 31, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.00	
February 28, 2013 – January 30, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.00	*ERP*
December 31, 2012	Normalized 20-year U.S. Treasury yield	4.00	5.50	
January 15, 2012 – February 27, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.50	*ERP*
December 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	6.00	
September 30, 2011 – January 14, 2012	Normalized 20-year U.S. Treasury yield	4.00	6.00	*ERP*
July 1 2011 – September 29, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
June 1, 2011 – June 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
May 1, 2011 – May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2010 – April 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
June 1, 2010 – November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
December 31, 2009	Spot 20-year U.S. Treasury yield	Spot	5.50	
December 1, 2009 – May 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	*ERP*
June 1, 2009 – November 30, 2009	Spot 20-year U.S. Treasury yield	Spot	6.00	R_f
December 31, 2008	Normalized 20-year U.S. Treasury yield	4.50	6.00	
November 1, 2008 – May 31, 2009	Normalized 20-year U.S. Treasury yield	4.50	6.00	R_f
October 27, 2008 – October 31, 2008	Spot 20-year U.S. Treasury yield	Spot	6.00	*ERP*
January 1, 2008 – October 26, 2008	Spot 20-year U.S. Treasury yield	Spot	5.00	*Initialized*

*** We recommend using the spot 20-year U.S. Treasury yield as the proxy for the risk-free rate, if the prevailing yield as of the valuation date is higher than our recommended U.S. normalized risk-free rate of 3.5%. This guidance is effective when developing USD-denominated discount rates as of June 16, 2022 and thereafter.**

"Normalized" in this context means that in months where the risk-free rate is deemed to be abnormally low, a proxy for a longer-term sustainable risk-free rate is used.

To learn more about cost of capital issues, and to ensure that you are using the most recent Kroll's Global Cost of Capital Inputs, visit kroll.com/cost-of-capital-resource-center.

This and other related resources can also be found in the online Cost of Capital Navigator platform. To learn more about the Cost of Capital Navigator and other Kroll valuation and industry data products, visit kroll.com/costofcapitalnavigator.

BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION
NASHVILLE, TENNESSEE

PETITION OF LIMESTONE WATER UTILITY OPERATING COMPANY, LLC, TO INCREASE CHARGES, FEES AND RATES AND FOR APPROVAL OF A GENERAL RATE INCREASE AND CONSOLIDATED RATES	))))))	**DOCKET NO. 24-00044**

VERIFICATION

STATE OF NEW JERSEY)
)
COUNTY OF CAMDEN)

I, DYLAN W. D'ASCENDIS, being duly sworn, state that I am authorized to testify on behalf of Limestone Water Utility Operating Company, LLC in the above-referenced docket, that if present before the Commission and duly sworn, my testimony would be as set forth in my pre-filed testimony in this matter, and that my testimony herein is true and correct to the best of my knowledge, information, and belief.

DYLAN W. D'ASCENDIS

Sworn to and subscribed before me
this 9th day of Jan, 2025.

Notary Public

My Commission Expires: 12/16/25

LINDA LAUDANO
NOTARY PUBLIC
STATE OF NEW JERSEY
ID # 50146069
MY COMMISSION EXPIRES DEC. 16, 2025

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was served via U.S. Mail or electronic mail upon:

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This the 13th day of January 2025.

Melvin J. Malone