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**BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE**

Petition to Revise Performance Based)	
Ratemaking Mechanism Rider in Atmos)	DOCKET NO. 13-00111
Energy Corporation's Tariff)	

PRE-FILED DIRECT TESTIMONY OF

CHRISTOPHER C. KLEIN, PH.D.

**ON BEHALF OF THE TENNESSEE ATTORNEY GENERAL
CONSUMER ADVOCATE AND PROTECTION DIVISION**

November 20, 2013

**IN THE TENNESSEE REGULATORY AUTHORITY
AT NASHVILLE, TENNESSEE**

IN RE:

PETITION OF ATMOS ENERGY
CORPORATION TO REVISE
PERFORMANCE BASED
RATEMAKING MECHANISM RIDER
IN TARIFF

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DOCKET NO. 13-00111

AFFIDAVIT

I, Dr. Christopher C. Klein, Regulatory Economist, on behalf of the Consumer Advocate Division of the Attorney General's Office, hereby certify that the attached Direct Testimony represents my opinion in the above-referenced case and the opinion of the Consumer Advocate Division.


CHRISTOPHER C. KLEIN

Sworn to and subscribed before me
this 20th day of Nov., 2013.




NOTARY PUBLIC

My commission expires: July 6, 2015

**BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE**

November 20, 2013

DOCKET NO. 13-00111

**PRE-FILED DIRECT TESTIMONY
DR. CHRISTOPHER C. KLEIN**

1 **Q. Please state your name and your current position.**

2 **A.**My name is Christopher C. Klein and I am a Professor in the Economics and Finance
3 Department at Middle Tennessee State University (MTSU) in Murfreesboro, Tennessee.

4 **Q. What is your educational background?**

5 **A.**I received a B. A. in Economics from the University of Alabama in 1976 and I received a
6 Ph. D. in Economics from the University of North Carolina at Chapel Hill in 1980.

7 **Q. What is your professional experience involving regulated industries?**

8 **A.**I was employed as an Economist in the Antitrust Division of the Bureau of Economics at
9 the Federal Trade Commission (FTC) in Washington, D.C., for six years starting in 1980.
10 In 1986, I was hired as the first Economist for the Tennessee Public Service Commission
11 (TPSC). Although my title changed over the years, I functioned as the Chief Economist
12 for the TPSC and, after 1996, the Tennessee Regulatory Authority (TRA), until August of
13 2002, when I assumed my current position with MTSU.

14 **Q. What were your duties at the FTC?**

15 **A.**I performed the economic analysis in antitrust investigations involving more than 20
16 industries and contributed to staff reports on mergers in the petroleum industry,
17 competition in grocery retailing, and the economics of predatory or sham litigation.

18 **Q. What was your primary responsibility at the TPSC?**

1 **A.** I was an expert witness for the staff of the TPSC in rate cases and other similar
2 proceedings involving telecommunications, natural gas, electric and water utilities, as
3 well as motor carriers. I testified in 36 dockets before the TPSC on the issues of cost of
4 capital, rate design, and competitive effects. I also filed testimony before the Federal
5 Communications Commission (FCC).

6 **Q. How did your responsibilities change when the TRA supplanted the TPSC?**

7 **A.** I oversaw the Utility Rate Division and then the Economic Analysis Division. The TRA
8 staff no longer testified in proceedings before the agency, but provided analysis and
9 advice to the TRA Directors. I was responsible for all such advice and analysis provided
10 to the Directors by these Divisions, either individually or in concert with other TRA staff,
11 in all proceedings that came before the agency for resolution. These proceedings
12 included rate cases and tariff filings by public utilities, including those associated with
13 the implementation of the federal Telecommunications Act of 1996.

14 **Q. Were you a member of any regulatory committees or boards while you worked for**
15 **the TPSC and the TRA?**

16 **A.** Yes. I was a member of the National Association of Regulatory Utility Commissioners
17 (NARUC) Staff Subcommittee on Gas. I was a member of, and Chaired, the Research
18 Advisory Committee to the Board of Directors of the National Regulatory Research
19 Institute (NRRI). I also served on the State Staff of the FCC's Federal-State Joint Board
20 in CC Docket No.80-286 (the "Separations" Joint Board) and as a Group Leader on the
21 NARUC Staff Subcommittee on Accounts Multi-state Audit Team that produced the
22 1988 Report on Bell Communications Research.

23 **Q. What is your primary responsibility at MTSU?**

1 **A.** I teach classes in the general area of applied microeconomics, including Principles of
2 Microeconomics, Intermediate Microeconomic Theory, Managerial Economics,
3 Economics of Antitrust and Regulation, and Econometrics, as well as undertaking
4 scholarly research, participating in various university committees, and serving on
5 dissertation committees.

6 **Q.** **Have you taught at any other universities?**

7 **A.** I taught classes in the Economics of Regulation and in Antitrust Economics in the
8 Economics Department at Vanderbilt University for several years while I was employed
9 at the TRA.

10 **Q.** **Are you a member of any professional organizations?**

11 **A.** I am a member of the American Economic Association, the Southern Economic
12 Association, the Industrial Organization Society, and Alpha Pi Mu: the National
13 Industrial Engineering Honor Society, as well as Beta Gamma Sigma: the International
14 Honor Society for Collegiate Schools of Business.

15 **Q.** **Have you published articles in professional or academic journals and presented
16 papers at professional meetings?**

17 **A.** More than 40 of my articles have appeared in professional or academic journals such as
18 *Energy Economics*, *Utilities Policy*, *The Electricity Journal*, *The Journal of Applied*
19 *Regulation* and many others. I have made more than 80 presentations at professional
20 meetings.

21 **Q.** **Have you testified before any other governmental bodies in Tennessee?**

22 **A.** Yes. I have testified before various committees of the Tennessee General Assembly on
23 regulatory issues, especially telecommunications issues and competition in the

telecommunications industry, as well as before the Tennessee Advisory Commission on Intergovernmental Relations and the Tennessee Regulatory Authority. A complete list is provided in my Vita attached as my Exhibit.

PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. I will address two issues raised by Atmos Energy Corporation (Atmos) in this docket: removal of the provision requiring readjustment of the deadband and deletion of the Natural Gas Intelligence (NGI) Index from the Gas Procurement Incentive Mechanism (GPIM) basket of benchmark indexes.

Q. What do you recommend in regard to the readjustment of the deadband?

A. I recommend suspending the readjustment of the deadband for the next three-year period, or until March 31, 2017. This will give the TRA three more years' experience with Atmos's GPIM as well as time to implement the review of Atmos's asset management program under the settlement agreement in Docket 07-00225. Atmos's asset management activities appear to have yielded most of the procurement savings under the GPIM (Response of Atmos to 1st Data Request of the TRA, Item #5). A procedure to review resetting of the deadband in light of the Asset Management review can then be established.

Q. What do you recommend in regard to Atmos's proposals to delete the NGI index?

A. I recommend approval as proposed by Atmos.

Q. How is your testimony organized?

1 A. I will address the proposal on resetting of the deadband first, then I will discuss my
2 recommendation for deleting the NGI index.
3

4 RESETTING THE DEADBAND

5

6 **Q. What is the deadband?**

7 A. The deadband is a range around the benchmark gas commodity cost within which Atmos
8 does not share in any of the gas commodity cost savings or excesses. The current
9 deadband is from 97.4% to 102% of the benchmark. The benchmark is computed using
10 three gas price indexes (Inside FERC, NGI, and NYMEX). If Atmos's commodity costs
11 fall below the lower end of the deadband, it is credited with half of the savings incurred
12 between its actual commodity cost and the lower end of the deadband. If its commodity
13 costs exceed the upper end of the deadband, then Atmos would bear half of those costs in
14 excess of the deadband, but this has yet to occur under the GPIM.

15 **Q. Why and how is the deadband reset?**

16 A. The deadband is reset every three years at 1% less than Atmos's actual commodity costs
17 as a percent of the benchmark. The original deadband was set at 97.7% to 102% of the
18 benchmark. The current low end of the deadband, however, is 97.4% of the benchmark,
19 because Atmos's actual commodity cost was 98.4% of the benchmark during the 2009-10
20 plan year. In 2014, if the TRA takes no action in this docket, the low end of the deadband
21 will reset to 89.9% of the benchmark, because Atmos's commodity cost in the 2012-13
22 plan year was 90.9% of the benchmark (Atmos's response to CAPD Discovery Request
23 #1, DR01).

1 **Q. How often has Atmos's commodity cost fallen below the low end of the deadband?**

2 A. So far, this has occurred only in 2002-03, 2011-12, and 2012-13 according to Atmos's
3 response to CAPD Discovery Request #1 (DR01-response). In fact, between 2003-04
4 and 2009-10, Atmos commodity cost fell within the deadband between 98.2% and 99.8%
5 of the benchmark. Until 2011-12, Atmos commodity cost was never lower than 97.4% of
6 the benchmark. In the last two years, however, Atmos's commodity cost has been 91.1%
7 and 90.9% of the benchmark.

8 **Q. How will Atmos's recent low commodity costs affect the deadband reset?**

9 A. In 2014, the low end of the deadband is currently scheduled to fall to 1 percentage point
10 less than Atmos's commodity cost performance relative to the benchmark in 2012-13.
11 Without modification in this docket, the low end of the deadband will become 89.9% of
12 the benchmark in April, 2014 (Atmos's response to CAPD Discovery Request #1,
13 DR01). This is the basis for Atmos's claim that the forthcoming reset will remove its
14 incentive to seek commodity cost savings, because the low end of the deadband will
15 become too low to beat (Direct Testimony of Rebecca M. Buchanan, p. 4).

16 **Q. Is it unreasonable to reset the deadband in this way in 2014?**

17 A. Not necessarily. It depends on the reason that Atmos has been able to beat the
18 benchmark substantially in 2011-13.

19 **Q. Under what circumstances could it be reasonable to reset the deadband?**

20 A. If Atmos has adopted a new gas procurement strategy that will permanently reduce its
21 commodity costs to substantially below the benchmark, then resetting the deadband will
22 maintain the incentive for Atmos to seek continued reductions in its commodity cost.

23 **Q. Under what circumstances would the reset be unreasonable?**

1 A. If the recent decline in Atmos's commodity cost is due to random events outside of
2 Atmos's control, or to unique circumstances that cannot be expected to recur, then the
3 reset of the deadband may deny Atmos any share of savings in commodity cost for the
4 next three-year period and effectively remove Atmos's incentive to seek reductions in its
5 commodity cost.

6 **Q. What do you recommend regarding the deadband reset in this situation?**

7 A. Since we cannot know which of the above circumstances Atmos is operating under, I
8 recommend no reset of the deadband for the next three-year period. That is, that the low
9 end of the deadband remain at 97.4% of the benchmark until 2017. During the next three
10 years, the TRA can observe Atmos's performance and better assess the need to reset the
11 deadband, or to forego resetting it indefinitely, at the end of the next three-year period in
12 2017.

13 **Q. What are the advantages of your recommendation?**

14 A. The incentive for commodity cost savings by Atmos are preserved for the next three-year
15 period, but the incentives for further commodity cost savings are not removed forever.
16 On the other hand, if the deadband reset is removed as Atmos proposes, then if Atmos's
17 commodity costs have been permanently reduced, Atmos has maxed-out its savings share
18 (capped by the PGIM at \$1.25 million) and incentives for further savings are removed.
19 My recommendation avoids this outcome of Atmos's proposal by allowing the TRA to
20 consider resetting the deadband to maintain incentives for commodity cost savings in the
21 future.

22 **Q. What are the disadvantages of your recommendation?**

1 A. If Atmos has permanently reduced its commodity costs, then shared savings of \$1.25
2 million are awarded to the company in each of the next three years for no further effort to
3 reduce costs. This outcome is limited to the next three-year period, unlike Atmos's
4 proposal to remove the reset permanently, and can be remedied with the appropriate reset
5 in 2017.

6 **Q. Are there other advantages to delaying major modifications to Atmos's PGIM?**

7 A. Yes. Under the settlement agreement in Docket 07-00225, Atmos's asset management
8 activities are to be reviewed by an independent consultant starting in the fall of 2014 and
9 culminating in a report no later than July 1, 2015 (Order Approving Stipulation and
10 Settlement Agreement, August 6, 2013, p. 4). Atmos's asset management activities are
11 apparently a major source of its commodity cost savings under the PGIM (Response of
12 Atmos to 1st Data Request of the TRA, Item #5). Hence, the consultant's review may
13 shed more light on the nature of Atmos's commodity cost savings in 2011-13 and the
14 desirability of resetting the deadband going forward.

15
16 **DELETING THE NGI INDEX**
17

18 **Q. Why do you recommend approval of Atmos's proposal to delete the NGI index from**
19 **the calculation of the benchmark?**

20 A. For two reasons. First, the effect of removing the NGI index from the PGIM savings
21 calculation has little effect (Atmos Response to CAPD Discover Request #2, DR02 –
22 Response). In fact, the savings share is a little less favorable to Atmos without the NGI
23 index than with it, but the difference is minimal. Second, the NGI index appears

1 frequently to lie between the Inside FERC and NYMEX indexes. As such, it adds little to
2 the information contained in the benchmark calculation (Atmos Response to CAPD
3 Discovery Request #3).

4 **Q. Are any other changes to the benchmark calculation indicated at this time?**

5 A. No, but the question of whether to include both the Inside FERC and the NYMEX
6 indexes in the benchmark calculation may be a potential issue to consider when the
7 deadband reset is revisited in the future.

8
9 **CONCLUSION**

10
11 **Q. Can you summarize your recommendations?**

12 A. Yes. I recommend maintaining the lower end of the deadband at its current level until
13 2017. A proceeding should be initiated to revisit the deadband reset issue at the end of
14 the 2015-16 plan year and after the consultant's report in Docket 07-00225 is received. I
15 recommend approval of Atmos's proposal to delete the NGI index from the benchmark.

16 **Q. Does this conclude your testimony at this time?**

17 A. Yes.
18
19
20
21
22
23

VITA

CHRISTOPHER C. KLEIN

EDUCATION:

Ph. D. (Economics), University of North Carolina - Chapel Hill (1980)
B. A. (Economics), University of Alabama - Tuscaloosa (1976)

EXPERIENCE:

2002-Present	Middle Tennessee State University Professor of Economics, August 2013 Associate Professor of Economics, August 2002-July 2013
2002-Present	Consultant Clients included: AGL Resources, Inc.; Reseller Coalition; Tennessee Advisory Commission on Intergovernmental Relations; Tennessee American Water Company, Inc.; Tennessee Department of Environment and Conservation; US LEC of Tennessee, Inc.; Verizon Wireless; West Virginia American Water Company, Inc.; Z-Tel Communications, Inc.
1996-2002	Tennessee Regulatory Authority Chief, Economic Analysis Division, 1997-2002 Chief, Utility Rate Division, 1996-97
1998-2001	Vanderbilt University Adjunct Associate Professor of Economics
1986-1996	Tennessee Public Service Commission Director, Utility Rate Division, 1994-96 Economist & Research Director, 1993-94 Commission Economist, 1986-1993
1990-1994	Middle Tennessee State University Adjunct Faculty, Department of Economics and Finance
1980-1986	Federal Trade Commission Economist, Bureau of Economics - Antitrust Division

PROFESSIONAL ACTIVITIES:

Editor, *Journal for Economic Educators*, 2007 to present.
Member 1994-96, State Staff, Federal-State Joint Board, Federal Communications Commission
CC Docket No.80-286 ("Separations" Joint Board).
Chair 1993-95, member 1990-95, Research Advisory Committee to the Board of Directors of the
National Regulatory Research Institute at Ohio State University.
Member 1990-95, Staff Subcommittee on Gas, National Association of Regulatory Utility
Commissioners.

Group Leader: Economics, Contracts, and Non-affiliate Revenue; NARUC* Staff Subcommittee on Accounts Multi-state Audit Team, 1988 Report on Bell Communications Research.
Referee: *Applied Economics, Contemporary Economic Policy, Eastern Economic Journal, Land Economics, Management and Decision Economics, Media Economics, Review of Industrial Organization, Social Science Quarterly, Southern Economic Journal.*
Memberships: American Economic Association (AEA, since 1981), Southern Economic Association (1982), Industrial Organization Society (1986), Western Economic Association (2003).

HONORS:

Beta Gamma Sigma, International Honor Society for Collegiate Schools of Business, 2008
Top 30 Score, 2003-2004 Student Evaluation of Faculty Performance, Jones College of Business, Middle Tennessee State University.
Resolution of Recognition, National Regulatory Research Institute, 1995
Listed in various Who's Who publications, 1990-
Certificate of Commendation, Federal Trade Commission, 1985
First in my class to complete the Ph. D., 1980
Alpha Pi Mu, National Industrial Engineering Honorary, 1973

GRANTS RECEIVED:

MTSU Jones College Summer Research Grant: 2004, 2005, 2007, 2012.
MTSU Faculty Research and Creative Activity Academic Year Grant: 2004-2005 (with Reuben Kyle)
MTSU Faculty Research and Creative Projects Committee Summer Salary Grant: 2006, 2009.

TEACHING

At MTSU

ECON 2420, Principles of Economics – Microeconomics
ECON 3520, Intermediate Microeconomic Theory
ECON 4400, Economics of Antitrust and Regulation
ECON 4570, Managerial Economics
ECON 4620, Econometrics and Forecasting
ECON 4720, Economic Issues in the Music Industry
ECON 7121, Seminar in Applied Microeconomic Theory (Ph.D. Program)
ECON 7250, Methods of Outcome Assessment (Ph.D. Program)
Student Internships (ECON/FIN 4890, ECON/FIN 5890, ECON/FIN 6440)

At Vanderbilt University

ECON 252, Antitrust Economics
ECON 283, Economics of Regulation

MTSU Dissertation Committees

Shea W. Slonaker, Chair, *Three Essays on the Recorded Music Industry*, Ph. D. 2009.
Hua Liu, *U.S. Trade Deficit, Productivity Growth and Offshore Outsourcing*, Ph. D.

2006.

Jennifer Wilgus, *A Life-Cycle Approach to Human Capital Investment and Skill-Biased Technological Change*, Ph. D. 2005.

Anealia Sasser, *A Theoretical Examination of Title IV Financial Aid for Higher Education*, D.A. 2004.

Vanderbilt University Dissertation Committees:

Aster Adams, *The Impact of Deregulation and Competition on Efficiency, Financial Performance, and Shareholder Wealth of Electric Utilities in the United States*, Ph. D. 2009.

David B. Sapper, *Trial Selection and the Effects of Sentencing Reform in Criminal Antitrust Cases: A Theoretical and Empirical Analysis*, Ph. D. 2006.

T. Randolph Beard, *Bankruptcy, Safety Expenditure, and Safety Regulation in the Motor Carrier Industry*, Ph. D. 1988

PUBLICATIONS AND WORKING PAPERS

"Is There Evidence of Random Copying Behavior in the Recorded Music Industry in the Digital Age?" with Shea W. Slonaker, submitted to *Cultural Economics*, 2013.

"The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education," with Reuben Kyle, working paper, 2013.

"Do State Funded Merit Scholarships Reduce High School Dropout Rates?" with Elizabeth A. Perry-Sizemore, working paper, 2012.

"Education Production Functions," *Encyclopedia of Educational Theory and Philosophy*, Denis Phillips, ed., Sage Publications, forthcoming.

"Econometrics as a Capstone Course in Economics," *The Journal of Economic Education*, 44(3):268-276, 2013.

"Identifying the Best Buys in U.S. Higher Education," with E. Anthon Eff and Reuben Kyle, *Research in Higher Education*, 53(8):860-887, 2012.

"Chart Turnover and Sales in the Recorded Music Industry: 1990-2005," with Shea W. Slonaker, *Review of Industrial Organization*, 36:351-372, 2010.

"What Can We Learn from Education Production Studies?" with E. Anthon Eff, *Eastern Economic Journal*, 36:450-479, 2010.

"Public Transportation Ridership Levels," with Christopher R. Swimmer, *Journal for Economic Educators*, 10(1): 40-46, Summer 2010.

"Analysis of U.S. Foreign Aid Determinants for 2003," with Joshua M. Hill, *Journal for Economic Educators*, 9(1): 48-52, Summer 2009.

"Intra-district Public School Funding Equity and Performance in Nashville, Tennessee," *Journal of Education Finance*, Summer 2008.

"A Tale of Three Inputs: Cost and Production Duality with Time Utilization of Capital," *Applied Economics Research Bulletin*, 1(1) 2008.

- "Telephone Penetration in Tennessee: Are Intrastate Universal Service Policies Effective?" with Aster R. Adams and David B. Sapper, *Journal of Applied Regulation*, 2, November 2004, pp., 87-108.
- "A Switching Regime Approach to Measuring the Effects of Technological Change in Ocean Shipping," with J. David Bass and Reuben Kyle, *Journal of Productivity Analysis*, 22:1-2, July-September, 2004, pp. 29-49..
- "The Financial Implications of Unbundling on Bell Company Profits: A Review of the Evidence," with T. Randolph Beard and George S. Ford, *CommLaw Conspectus: The Journal of Communications Law and Policy*, v. 12 n.1, Fall/Winter 2003.
- "Bell Companies as Profitable Wholesale Firms: The Financial Implications of UNE-P," with T. Randolph Beard, *Phoenix Center Policy Paper No. 17*, November 2002, www.phoenix-center.org.
- "Connecting Tennessee: Bridging the Digital Divide," with Rose M. Gregory, *NRRI Quarterly Bulletin*, vol. 21 no. 3, Spring 2001.
- "Regulation vs. Deregulation: It's All in the Externalities," *Tennessee's Business*, Middle Tennessee State University, v. 11, n. 3 (November), 2001.
- "The Role of Public Power in a Restructured Electric Power Industry," with David Sapper, *The Electricity Journal*, August/September 2001.
- "Regulator Preferences and Utility Prices: Evidence from Natural Gas Distribution Utilities," with George Sweeney, *Energy Economics*, vol. 21, n. 1, 1999.
- "Competition in Telecommunications: A Progress Report for Tennessee," *Tennessee's Business*, Middle Tennessee State University, Murfreesboro, TN; vol. 9, n. 1, 1999.
- "Technological Change and the Production of Ocean Shipping Services," with Reuben Kyle, *Review of Industrial Organization*, December 1997.
- "The Haunting of Universal Service: Open Markets, Efficient Funding and the Ghost of the Fair Rate of Return," *Proceedings of Tenth NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1996.
- "Productivity Growth in Telecommunications: The Case of Tennessee," *Proceedings of Tenth NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1996.
- "Capture vs. Compromise: Entry Regulation of Intrastate Trucking," with Reuben Kyle and Jennifer Wilgus, *Logistics and Transportation Review*, v. 32 n. 3, September 1996.
- "Price Discrimination: What is 'Undue' for a U.S. Utility?" *Utilities Policy*, vol. 4 no. 4, October 1994.
- "Single Service Price Variations and 'Subsidies' in the Pricing of Telecommunications Services," *Proceedings of Ninth NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1994.
- "What Is Undue Price Discrimination by a Regulated Utility?" *NRRI Quarterly Bulletin*, March 1994.
- "A Comparison of Cost-Based Pricing Rules for Natural Gas Distribution Utilities," *Energy Economics*, July 1993.

- "Negotiating a Transportation Rate Under Threat of Bypass: A Case Study," *Proceedings of the Eighth Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1992.
- "A Multinomial Logit Model of Intrastate Trucking Regulation in Tennessee," with Jennifer Jose and Reuben Kyle, *Papers and Proceedings of the Nineteenth Annual Meeting of the Midsouth Academy of Economics and Finance*, v. 16, 1992.
- "Ramsey Prices for Natural Gas Distribution Utilities," *Proceedings of the Seventh NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1990.
- "Intervention as Entry Deterrence: Evidence from Sham Litigation Cases," *Proceedings of the Seventh NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1990.
- Book Review, *Changing the Rules: Technological Change, International Competition, and Regulation in Communications*, Edited by Robert W. Crandall and Kenneth Flamm, Brookings 1989; *Review of Industrial Organization*, Fall 1990.
- "Double Leverage and Strategic Financing Decisions," *NRRI Quarterly Bulletin*, v. 11, n. 3, September 1990.
- "Predation in the Courts: Legal Versus Economic Analysis in Sham Litigation Cases," *International Review of Law & Economics*, June 1990.
- "Rate Design for Natural Gas Utilities: A Comparison of Ramsey and Cost of Service Pricing," *NRRI Quarterly Bulletin*, December 1989.
- "Dissecting Divestiture: A Telecommunications Book Review Article," *Review of Industrial Organization*, October 1989.
- The Economics of Sham Litigation: Theory, Cases, and Policy*, Bureau of Economics Staff Report, Federal Trade Commission, April 1989.
- "New Agreements, Non-affiliate Revenues, and Economic Issues," with Mike Amato and Francis Fok, in *Report on Bell Communications Research*, National Association of Regulatory Utility Commissioners, 1988.
- "Merger Incentives and Cost of Capital Regulation of Subsidiaries," *Midsouth Journal of Economics and Finance*, March 1988.
- "Strategic Sham Litigation: Economic Incentives in the Context of the Case Law," *International Review of Law & Economics*, December 1986.
- "Is There a Principle for Defining Industries? Comment," *Southern Economic Journal*, October 1985.
- "A Note on Defining Geographic Markets," with Ed Rifkin and Noel Uri, *Regional Science and Urban Economics*, February 1985.
- "Process Analysis, Capital Utilization, and the Existence of Dual Cost and Production Functions," FTC Bureau of Economics Working Paper No. 116, May 1984.
- "A General Theory of Hedonic Pricing of Capital as a Factor of Production," FTC Bureau of Economics Working Paper No. 105, December 1983.
- "The International Market for Crude Oil," with Fred Lipson and Harvey Blumenthal, in *Mergers in the Petroleum Industry*, Federal Trade Commission, 1982.

PRESENTATIONS

- “The Music Industry as a Vehicle for Economic Analysis,” American Economic Association National Conference on Teaching Economics, Chicago, IL, May 2013
- “Supply Innovation and Sales of Recorded Music: 1990-2010,” with Shea W. Slonaker, Southern Economic Association Annual Conference, New Orleans, LA, November 2012.
- “Econometrics as a Capstone Course in Economics,” American Economic Association National Conference on Teaching Economics, Boston, MA, May 2012.
- “Music Supply, Chart Turnover, and the Random Copying Hypothesis in the Digital Age,” with Shea W. Slonaker, International Industrial Organization Conference, Arlington, VA, March 2012.
- “Econometrics as a Capstone Course in Economics,” Southern Economic Association Annual Conference, Washington, DC, November 2011.
- “Do State Funded Merit Scholarships for Higher Education Reduce High School Dropout Rates for All Students?” with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, Washington, DC, November 2011.
- “Do State Funded Merit Scholarships for Higher Education Improve Pre-College Academic Performance?” with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, Atlanta, GA, November 2010.
- “The Effect of State Funded Merit Scholarships for Higher Education on Pre-College Academic Performance,” with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, San Antonio, TX, November 2009.
- “The Effect of State Funded Merit Scholarships for Higher Education on High School Graduation Rates,” with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, Washington, DC, November 2008.
- “Identifying the Best Buys in U.S. Higher Education,” with E. Anthon Eff and Reuben Kyle, Southern Economic Association Annual Conference, Washington, DC, November 2008.
- “Product Variety and Sales in the Recorded Music Industry: 1990-2005,” with Shea W. Slonaker, International Industrial Organization Conference, Arlington, VA, May 2008.
- “Identifying the Best Buys in U.S. Higher Education,” with E. Anthon Eff and Reuben Kyle, Academy of Economics and Finance Annual Meeting, Nashville, TN, February 2008.
- “Product Variety and Sales in the Recorded Music Industry: 1990-2005,” with Shea W. Slonaker, Academy of Economics and Finance Annual Meeting, Nashville, TN, February 2008.
- “Do State Funded Merit Scholarships Induce Students to Learn more in High school?” with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, New Orleans, LA, November 2007.
- “The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education,” with Reuben Kyle, Southern Economic Association Annual Conference, New Orleans, LA, November 2007.
- “The Shifting Appeal of Sham Litigation: Evidence from Appellate Decisions 1971-2006,” International Industrial Organization Conference, Savannah, GA, April 2007.

- "The Shifting Appeal of Sham Litigation: Evidence from Appellate Decisions 1980-2006," Scholar's Week Poster Fair, MTSU, April 2007
- "Causality Tests for Public School Funding and Performance," Southern Economic Association Meeting, Charleston, SC, November 2006.
- "The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education," with Reuben Kyle, Southern Economic Association Meeting, Washington, November 2005.
- "The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education," with Reuben Kyle, International Industrial Organization Conference, Atlanta, April 2005.
- "Anticompetitive Litigation and the "Baselessness" Standard for Antitrust Liability," Southern Economic Association Meeting, New Orleans, November 2004.
- "The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education," with Reuben Kyle, Southern Economic Association Meeting, New Orleans, November 2004.
- "VoIP: Let's Ask the Right Questions," Tennessee Regulatory Authority Forum on VoIP, Nashville Public Library, April 30, 2004.
- "Telephone Penetration in Tennessee: Are Intrastate Universal Service Policies Effective?" with Aster Rutibablira and David B. Sapper, Southern Economic Association Meeting, San Antonio, TX, November 2003.
- "Telephone Penetration in Tennessee: Are Intrastate Universal Service Policies Effective?" with Aster Rutibablira and David B. Sapper, International Industrial Organization Conference, Boston MA, April 4-5, 2003.
- "A Critique of Educational Production Functions," Southern Economic Association meeting, New Orleans, LA, November 2002.
- "Connecting Tennessee: Bridging the Digital Divide," with Rose M. Gregory, American Economic Association meeting, joint session with the Transportation and Public Utilities Group, Atlanta, GA, January 2002.
- "Long Term Contracts as Anticompetitive Devices in Telecommunications," Southern Economic Association Annual Meeting, Tampa, FL, November 2001.
- "The Role of Public Power in a Restructured Electric Power Industry," American Economic Association meeting, joint session with the Transportation and Public Utilities Group, Boston, MA, January 2000.
- "Universal Telephone Service in Tennessee: A Pre-Competition Assessment," with David Sapper, Southern Economic Association meeting, New Orleans, LA, November 1999.
- "Trucks, Planes, Trains, and Wires? Short-haul vs. Long-haul Long Distance Rates in Telecommunications," with Reuben Kyle, Southern Economic Association meeting, Baltimore, MD, November 1998.
- "The Economics of Time as a Resource," Southern Economic Association meeting, Atlanta, GA, November 1997.
- "Cost and Production Duality with Capital Utilization," Department of Economics Seminar Series, Vanderbilt University, February 1997.
- "Maximum Impropriety: The 'Baselessness' Standard for Improper Litigation," Southern Economic Association meeting, Washington, November 1996.

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- "Productivity Growth in Telecommunications: The Case of Tennessee," Tenth NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1996.
- "Productivity Growth in Telecommunications: The Case of Tennessee," Advanced Workshop in Regulation and Public Utility Economics, 15th Annual Conference, Lake George, NY, May 1996.
- "A Switching Regime Approach to Measuring the Effects of Technological Change in Ocean Shipping," with Reuben Kyle, Southern Economic Association meeting, New Orleans, November 1995.
- "Productivity Growth in Telecommunications: The Case of Tennessee," Southern Economic Association meeting, New Orleans, November 1995.
- "Local Service Price Variations and 'Subsidies' in Telecommunications," Southern Economic Association meeting, Orlando, November 1994.
- "Dynamic Effects of Regulatory Policy on Intrastate Long Distance Telephone Rates," Southern Economic Association meeting, Orlando, November 1994.
- "Single Service Price Variations and 'Subsidies' in the Pricing of Telecommunications Services," Ninth NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1994.
- "Suit, Countersuit, and Settlement in Sham Litigation," Annual Meeting of the Midsouth Academy of Economics and Finance, Nashville, February 1994.
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- "What is Undue Price Discrimination for a Public Utility?" Southern Economic Association meeting, New Orleans, November 1993.
- "Regulated Utility Prices and the Preferences of Regulators," with George Sweeney, Southern Economic Association meeting, New Orleans, November 1993.
- "A Test for Strategic Behavior Under Rate of Return Regulation," Southern Economic Association meeting, Washington, November 1992.
- "New Evidence on the Effect of Regulatory Policy on Intrastate Long Distance Telephone Rates," Southern Economic Association meeting, Washington, November 1992.
- "Technological Change and the Production of Ocean Shipping Services," with Reuben Kyle, Atlantic Economic Association meeting, Plymouth, MA, October 1992.
- "Negotiating a Transportation Rate Under Threat of Bypass: A Case Study," Eighth Biennial Regulatory Information Conference, Columbus, OH, September 1992.
- "A Multinomial Logit Model of Intrastate Trucking Regulation in Tennessee," with Jennifer W. Jose and Reuben Kyle, Midsouth Academy of Economics and Finance annual meeting, Mobile, February 1992.

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- "Suit, Countersuit, and Settlement in Sham Litigation Cases," Southern Economic Association meeting, Nashville, November 1991.
- "Implementing Third Best Pricing Rules for Natural Gas Distribution Utilities," Southern Economic Association meeting, Nashville, November 1991.
- "Trucking Regulation in Tennessee," with Jennifer Jose and Reuben Kyle, Southern Economic Association meeting, Nashville, November 1991.
- "Research and Development in Regulated Markets: The Case of Bell Communications Research," Southern Economic Association meeting, New Orleans, November 1990.
- "Incentives for Trial and Settlement in Sham Litigation," Southern Economic Association meeting, New Orleans, November 1990.
- "Ramsey Prices for Natural Gas Distribution Utilities," Seventh NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1990.
- "Intervention as Entry Deterrence: Evidence from Sham Litigation Cases," Seventh NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1990.
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- "Incentives for Trial and Settlement in Sham Litigation," Bureau of Economics Seminar, Federal Trade Commission, February 1990.
- "Estimating Ramsey Prices for Natural Gas Utilities," Southern Economic Association meeting, Orlando, November 1989.
- "Incentives for Trial and Settlement in Sham Litigation," Department of Economics Seminar Series, Auburn University, November 1989.
- "Natural Gas Rate-Making: Now and In the Future," Associated Valley Industries Natural Gas Seminar, Nashville, October 1989.
- "Estimating Ramsey Prices for Natural Gas Utilities," Advanced Workshop in Regulation and Public Utility Economics, Eighth Annual Conference, Newport, RI, May 29-31, 1989.
- "The Role of Bell Communications Research in the Telecommunications Markets," Midsouth Academy of Economics and Finance Annual Conference, Nashville, February 1989.
- "The Organizational Structures of Public Utilities Under Different Regulatory Regimes," Southern Economic Association meeting, San Antonio, November 1988.
- "New Agreements, Non-affiliate Revenues, and Economic Issues," Report on Bell Communications Research, NARUC Multi-state Audit Team, presented to NARUC Staff Sub-committee on Accounts, Kalispell, Montana, September 1988.

"Predation in the Courts: Empirical Analysis of Sham Litigation Cases," Joint Session of the Industrial Organization Society and the American Economic Association, Chicago, December 1987.

"Rate of Return on Equity," National Conference on Unit Valuation Standards, Nashville, December 1987.

"Merger Incentives and Organizational Structures Under Cost of Capital Regulation," Southern Economic Association meeting, Washington, November 1987.

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"The Incidence of Predatory Sham Litigation," Southern Economic Association meeting, New Orleans, November 1986.

"A Welfare Analysis of the Department of Justice Merger Guidelines," Southern Economic Association meeting, Dallas, November 1985.

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