**BEFORE THE TENNESSEE REGULATORY AUTHORITY**

**NASHVILLE, TENNESSEE**

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| Joint Filing of<br><br>AT&T INC.<br><br>and<br><br>BELLSOUTH CORPORATION<br>TOGETHER<br>WITH ITS CERTIFICATED<br>TENNESSEE SUBSIDIARIES,<br><br>Regarding Change of Control<br>of the Operating Authority of<br>BellSouth Corporation's Tennessee<br>Subsidiaries | ) | Docket No. 06-00093 |

**DIRECT TESTIMONY OF DEBRA J. ARON ON BEHALF OF AT&T INC. AND BELLSOUTH CORPORATION**

**JUNE 2, 2006**

**Cautionary Language Concerning Forward-Looking Statements**

We have included or incorporated by reference in this document financial estimates and other forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These estimates and statements are subject to risks and uncertainties, and actual results might differ materially from these estimates and statements. Such estimates and statements include, but are not limited to, statements about the benefits of the merger, including future financial and operating results, the combined company ' s plans, objectives, expectations and intentions, and other statements that are not historical facts. Such statements are based upon the current beliefs and expectations of the management of AT&T Inc. and BellSouth Corporation and are subject to significant risks and uncertainties and outside of our control.

Readers are cautioned that the following important factors, in addition to those discussed in this statement and elsewhere in the proxy statement/prospectus to be filed by AT&T with the SEC, and in the documents incorporated by reference in such proxy statement/prospectus, could affect the future results of AT&T and BellSouth or the prospects for the merger: (1) the ability to obtain governmental approvals of the merger on the proposed terms and schedule; (2) the failure of BellSouth shareholders to approve the merger; (3) the risks that the businesses of AT&T and BellSouth will not be integrated successfully; (4) the risks that the cost savings and any other synergies from the merger may not be fully realized or may take longer to realize than expected; (5) disruption from the merger making it more difficult to maintain relationships with customers, employees or suppliers; (6) competition and its effect on pricing, costs, spending, third-party relationships and revenues; (7) the risk that any savings and other synergies relating to the resulting sole ownership of Cingular Wireless LLC may not be fully realized or may take longer to realize than expected (8) final outcomes of various state and federal regulatory proceedings and changes in existing state, federal or foreign laws and regulations and/or enactment of additional regulatory laws and regulations; (9) risks inherent in international operations, including exposure to fluctuations in foreign currency exchange rates and political risk; (10) the impact of new technologies; (11) changes in general economic and market conditions; and (12) changes in the regulatory environment in which AT&T and BellSouth operate. Additional factors that may affect future results are contained in AT&T ' s, BellSouth's, and Cingular Wireless LLC ' s filings with the Securities and Exchange Commission ( " SEC " ), which are available at the SEC ' s website (http://www.sec.gov).Neither AT&T nor BellSouth is under any obligation, and expressly disclaim any obligation, to update, alter or otherwise revise any forward-looking statement, whether written or oral, that may be made from time to time, whether as a result of new information, future events or otherwise.

This document may contain certain non-GAAP financial measures. Reconciliations between the non-GAAP financial measures and the GAAP financial measures are available on the company's website at www.sbc.com/investor_relations.

**Table of Contents**

# DIRECT TESTIMONY OF DR. DEBRA J. ARON

## I. INTRODUCTION AND QUALIFICATIONS

**Q.1 PLEASE STATE YOUR NAME AND POSITION.**

A.1 My name is Debra J. Aron. I am the Director of the Evanston offices of LECG, LLC, ("LECG") and Adjunct Associate Professor at Northwestern University. My business address is 1603 Orrington Avenue, Suite 1500, Evanston, IL, 60201.

**Q.2 PLEASE DESCRIBE LECG, LLC.**

A.2 LECG is an economics and finance consulting firm that provides economic expertise for litigation, regulatory proceedings, and business strategy. Our firm comprises more than 200 experts from academe and business, and has 35 offices in North America, Europe, Asia Pacific, and Latin America. LECG's practice areas include antitrust analysis, intellectual property, environmental and insurance claims, market and regulatory design, valuation analysis, and labor and employment, in addition to specialties in the telecommunications, financial services, and healthcare and pharmaceuticals industries.

**Q.3 DR. ARON, PLEASE DESCRIBE YOUR QUALIFICATIONS.**

A.3 I received a Ph.D. in economics from the University of Chicago in 1985, where my honors included a Milton Friedman Fund fellowship, a Pew Foundation teaching fellowship, and a Center for the Study of the Economy and the State dissertation

fellowship. I was an Assistant Professor of Managerial Economics and Decision Sciences from 1985 to 1992, at the J. L. Kellogg Graduate School of Management, Northwestern University, and a Visiting Assistant Professor of Managerial Economics and Decision Sciences at the Kellogg School from 1993-1995. I was named a National Fellow of the Hoover Institution, a think tank at Stanford University, for the academic year 1992-1993, where I studied innovation and product proliferation in multiproduct firms. Concurrent with my position at Northwestern University, I also held the position of Faculty Research Fellow with the National Bureau of Economic Research from 1987-1990. At the Kellogg School, I have taught M.B.A. and Ph.D. courses in managerial economics, information economics, and the economics and strategy of pricing. I am a member of the American Economic Association and the Econometric Society, and an Associate member of the American Bar Association. My research focuses on multiproduct firms, innovation, incentives, and pricing, and I have published articles on these subjects in several leading academic journals, including the *American Economic Review*, the *RAND Journal of Economics*, and the *Journal of Law, Economics, and Organization*. I currently teach a graduate course in the economics and strategy of communications industries at Northwestern University.

I have consulted on numerous occasions to the telecommunications industry on competition, costing, pricing, and regulation issues in the U.S. and internationally. I have testified in several states regarding economic and antitrust principles of competition in industries undergoing deregulation; measurement of competition in telecommunications markets; the proper interpretation of Long Run Incremental Cost and its role in pricing;

the economic interpretation of pricing and costing standards in the Telecommunications Act of 1996 ("TA96" or "the Act"); limitations of liability in telecommunications; Universal Service; and proper pricing for mutual compensation for call termination. I testified in California and Ohio on the potential competitive effects of SBC's acquisition of AT&T last year. I have also submitted affidavits to the Federal Communications Commission ("FCC") on a variety of topics including competition in telecommunications markets, economic principles of cost analyses, economic principles relevant to unbundling obligations, and empirical assessment of market power. I have consulted to carriers in Europe, the Pacific, and Latin America on interconnection and competition issues, and have consulted on issues pertaining to local, long-distance, broadband, wireless, and equipment markets. I have conducted analyses of mergers in telecommunications and other industries under the U.S. Merger Guidelines. In addition, I have consulted in other industries regarding potential anticompetitive effects of bundled pricing and monopoly leveraging, market definition, and entry conditions, among other antitrust issues, as well as matters related to employee compensation and contracts, and demand estimation. In 1979 and 1980, I worked as a Staff Economist at the Civil Aeronautics Board on issues pertaining to price deregulation of the airline industry. In July 1995, I assumed my current position at LECG. My professional qualifications are detailed in my curriculum vitae, which is attached as Exhibit DJA-1.

## II. CONTEXT AND PURPOSE OF THIS PROCEEDING

**Q.4 PLEASE DESCRIBE THE PURPOSE OF YOUR TESTIMONY.**

A.4 The proposed transaction entails the merger of two communications carriers, AT&T Inc. ("AT&T") and BellSouth Corporation ("BellSouth"). The subsidiaries of these well-known companies provide a number of communications services in Tennessee, throughout the BellSouth region and, in some instances, throughout the country and the world. AT&T describes itself as a global telecommunications company that provides domestic and international voice, data, and Internet services for residential, business, and government customers. AT&T operates global communications networks that support IP as well as other data and voice traffic.[1] AT&T's mass-market services (local exchange and long-distance service, DBS video service, DSL service) are offered in a 13-state region outside of the BellSouth footprint. AT&T is also a 60 percent owner of Cingular Wireless. For its part, and through its various subsidiaries, BellSouth provides wireline local exchange, access, intra- and interLATA long-distance, and Internet services, almost exclusively within a nine-state region in the southeastern United States.[2] BellSouth also holds 40 percent ownership interest in Cingular Wireless.

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[1] Joint Filing of AT&T Inc., BellSouth Corporation, and BellSouth's Certificated Tennessee Subsidiaries Regarding Change of Control, *Joint Filing of AT&T Inc and, BellSouth Corporation together with its Certificated Tennessee Subsidiaries, Regarding Change of Control of the Authority of BellSouth Corporation's Tennessee Subsidiaries*, before the Tennessee Regulatory Authority, Nashville, Tennessee, Docket No. 06-00093, March 31, 2006, (hereafter *Joint Filing*), ¶ 5.

[2] *Joint Filing*, ¶¶ 6-8.

The purpose of my testimony is to evaluate the likely competitive effects, if any, of this transaction on consumers in Tennessee. My testimony describes the competitive landscape in Tennessee for retail mass-market[3] and business services, and assesses whether the proposed combination of AT&T and BellSouth would likely adversely affect competition for these services in Tennessee. I also seek to provide the Tennessee Regulatory Authority ("TRA") with an understanding of the profound competitive transformation being experienced in this industry today — a transformation that underlies the restructuring of the industry more generally, of which this merger is part. Intermodal competition and the development of new technologies are creating a vibrant competitive marketplace for consumers and significant challenges for incumbent providers.

**Q.5 WHAT ARE YOUR MAJOR CONCLUSIONS?**

A.5 My major conclusions are as follows:

- The merger should be understood in the context of the substantial competition facing incumbent local exchange carriers ("ILECs") today, and the unprecedented negative trends being experienced by ILECs in the mass-market (consumer and small business) wireline business across the country, including Tennessee. Consumers have available an increasing number of alternatives to incumbent-provided telephony, including cable telephony, free-standing Voice over Internet Protocol ("VoIP") services, and wireless substitution for landline service and usage.
- AT&T no longer markets its wireline local and long-distance services to mass-market customers in Tennessee. Moreover, AT&T is not a facilities-based local service provider of residential mass-market services in Tennessee. Hence, AT&T and BellSouth do not actively compete with one another for mass-market local exchange and long-distance customers. Because these companies do not compete for mass-market customers, the merger will have no adverse effect on competition for mass-market customers.

[3] Generally in my discussion, I include very small businesses as part of "mass-market" customers, and refer to larger businesses simply as "businesses."

- There are multiple alternative suppliers of traditional and VoIP communications services to business customers in Tennessee as well. Businesses are sophisticated customers with the ability and incentives to investigate their options in the marketplace. I conclude that the merger is not likely to have a negative effect on competition for business customers.

To fully understand the context and motivation for this merger, it is necessary to appreciate the great technological and regulatory changes that have occurred in the communications industry over the last several years and that continue to occur. As a result of these developments, traditional telecommunications services such as those offered by AT&T and BellSouth are, as one industry analyst put it, under "full-blown assault" from technology service platforms such as cable television, wireless telephony, and VoIP.[4] The competitive landscape of the retail communications industry today not only provides context for the business reasons for the merger, it makes implausible any adverse competitive effects from the merger.

The fact in the marketplace today is that traditional wireline companies, including BellSouth, are losing lines at a rate that is unprecedented in the history of the industry, despite the fact that this is an increasingly connected world in a growing national economy. The result of this dynamic competitive environment is that, at the end of 2005, the number of switched lines served by BellSouth in Tennessee had declined to substantially fewer mass-market and business lines than BellSouth served a decade earlier, despite the growth in population and employment in the state.

[4] Timothy Horan, *et al.*, "Transfer of Coverage: We Favor Wireless and Cable over Wireline," CIBC World Markets Equity Research, May 3, 2005, p. 3.

A proper analysis of competition in telecommunications today must incorporate an understanding of the dynamic nature of the industry and the fluid nature of today's communications markets. Sound merger analysis is forward-looking, because the object is to determine the future competitive significance of the merging parties *vis à vis* each other, and the significance of other market participants *vis à vis* the merging parties. If the merging parties would not, looking forward, be competing in any meaningful way with each other in the absence of the merger, one can conclude that the merger would have no detrimental effect on competition. To assess the forward-looking competitive pressures imposed by other market participants, one would include an evaluation of the developments of new technologies, the convergence of formerly disparate technology platforms, the ability of competitors to enter and to expand their services to customers, and the regulatory environment.

**Q.6 PLEASE DESCRIBE THE ORGANIZATION OF YOUR TESTIMONY.**

A.6 In Section III, I describe why the fact that AT&T no longer markets local and long-distance services to mass-market customers in Tennessee implies that for purposes of a competitive analysis, AT&T effectively does not compete for mass-market customers in Tennessee. In Section IV, I describe the current and forward-looking landscape of the communications industry nationally and in Tennessee, especially as it pertains to local, long-distance, wireless, and data services.[5] I begin my discussion by offering facts and

[5] For brevity, I will refer simply to the communications industry, with the understanding that it includes voice and data communications, including intermodal competitors.

perspectives on the national competitive landscape, both because the merger is, in my view, best understood in the context of national forces and trends; and because those national forces and trends are playing out in Tennessee specifically along with the rest of the nation. I then focus in specifically on Tennessee to provide perspective on the competitive landscape as it has developed and is developing in the state. The discussion illustrates changes in technology and changes in customer demands that are resulting in increased competition between and among seemingly diverse players such as cable TV providers, wireless service providers, and traditional telephone service providers. In Section V, I summarize my conclusions.

## III. THE MERGER WILL HAVE NO DETRIMENTAL EFFECT ON COMPETITION FOR MASS-MARKET CUSTOMERS BECAUSE AT&T NO LONGER MARKETS LOCAL AND LONG-DISTANCE SERVICE TO MASS-MARKET CUSTOMERS IN TENNESSEE

**Q.7 DO YOU EXPECT THE MERGER TO HAVE ANY DETRIMENTAL EFFECT ON COMPETITION FOR MASS-MARKET CUSTOMERS IN TENNESSEE?**

A.7 No. Fundamentally, the merger will not adversely affect competition for mass-market customers because AT&T does not market its local and long-distance services to mass-market customers in Tennessee and has not done so since 2004;[6] and it has retired infrastructure used to support mass-market marketing and customer care.[7] I conclude on

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[6] *Joint Filing*, ¶ 24.

[7] Memorandum Opinion and Order in WC Docket No. 05-65, *In the Matter of SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control*, before the Federal Communications Commission (hereafter *FCC SBC/AT&T Merger Order*), November 17, 2005 ¶ 103.

that basis that AT&T and BellSouth do not compete for local exchange or long-distance to mass-market customers in Tennessee.

**Q.8 PLEASE EXPLAIN.**

A.8 An assessment of the effects of a merger on competition requires assessing not the degree of competition in the market *per se*, but the effect of the merger on that competitive landscape. In some cases assessing the effect of a merger on competition would require analyzing the existing degree of competition in order to evaluate the difference between competition before and after the merger. In this case, however, AT&T no longer markets to, or competes for, wireline mass-market customers for local exchange and long-distance services in Tennessee. A merger between BellSouth and a company that does not independently compete (and does not intend to compete) for wireline mass-market customers will not change competition for such customers in the BellSouth-served territory in Tennessee.[8] AT&T not only does not compete today, it is not a significant potential competitor. In reviewing the SBC/AT&T merger the FCC concluded that, having effectively exited the mass market, AT&T would be unlikely to re-enter.[9]

Moreover, when AT&T actively competed for mass-market customers, it provided its services to mass-market customers via the unbundled network element platform ("UNE-P"). This meant that it provided service to mass-market customers entirely over the incumbent's network rather than building its own. UNE-P-based competition does

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[8] I recognize that AT&T is part owner of Cingular Wireless, which competes for BellSouth's wireline customers. However, the transaction will not adversely affect competition with respect to wireless, as I discuss later.

[9] *FCC SBC/AT&T Merger* Order, ¶ 103.

not provide the same level of social welfare benefits as does facilities-based competition, because it does not permit the competitor to engage in network-level innovation or investment. Moreover, UNE-P competition was not a sustainable form of competition. UNE-P was generally understood in the industry to be intended as a transitional regulatory scheme under which carriers would migrate to their own facilities. As events have transpired, it does not appear that the legacy AT&T (the CLEC before its acquisition by SBC) had a viable strategy for transitioning to its own facilities. Hence, for these independent reasons, the acquisition of AT&T does not harm competition with respect to mass-market local exchange service.

**Q.9 WILL THE MERGER HAVE AN EFFECT ON COMPETITION FOR STAND-ALONE LONG-DISTANCE VOICE SERVICE?**

A.9 No. Although AT&T has been a household name as a stand-alone long-distance service provider for many years, this is of little competitive import in today's communications marketplace.[10] The reason is that stand-alone long-distance service is a declining, if not vanishing, business. Increasingly, consumers are purchasing long-distance service from their local service provider, rather than as a stand-alone service from a separate provider.

[10] By stand-alone long-distance service, I am referring to the option for consumers to purchase local exchange service from one company and to purchase long-distance service from another company. Until the developments in the marketplace unleashed by the Telecommunications Act of 1996, regulatory restrictions precluded customers from purchasing long-distance service from their incumbent Regional Bell companies. Those restrictions no longer exist, and as a result, the notion of purchasing long-distance service separately from local service is fading away in the marketplace, and the distinction between local and long-distance service is increasingly blurred by wireless and wireline packages that include blocks of minutes (in the wireless case) and blocks of long-distance minutes (in the wireline case where local calling in many areas has already been provided on an unlimited basis). See Robert Crandall, *Competition and Chaos: U.S. Telecommunications since the 1996 Telecom Act* (Washington, D.C.: The Brookings Institution, 2005), pp. 78-93.

As I noted, in 2004, (the legacy) AT&T ceased its marketing efforts for stand-alone long-distance mass-market service.

AT&T's decision to abandon the stand-alone long-distance business is not an isolated occurrence in the industry. In 2004, Sprint (now Sprint Nextel) announced that it would write down the value of its long-distance network and reduce marketing stand-alone long-distance service to *business* customers, having earlier halted marketing efforts to stand-alone mass-market long-distance customers.[11] These decisions reflect the decline in demand for stand-alone long-distance service in the current environment in which customers can purchase local and long-distance services from the same provider.

**Q.10 HOW PREVALENT IS THE DECLINE OF DEMAND FOR STAND-ALONE LONG-DISTANCE SERVICE?**

A.10 The demand for stand-alone long-distance service has declined rapidly. Although the Regional Bell Operating Companies ("RBOCs") were not able to provide long-distance service in the large majority of states until at least 2002,[12] by the end of 2004, an estimated 43 percent of RBOC local exchange residential customers also subscribed to their RBOCs' long-distance service.[13] The analysts anticipate that this trend away from

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[11] Jeffrey Bartash, "Sprint to cut 700 jobs, devalue assets: Third-quarter profit from operations to exceed forecast," CBS.MarketWatch.com, Oct. 15, 2004, downloaded 5/5/05 from http://www.marketwatch.com/news/story.asp?guid=%7BDCEED6D0-5B91-4ABF-8F45-1F6DA7FA907D%7D&siteid=google&dist=google&cbsReferrer=www.google.com.

[12] "Trends in Telephone Service," Federal Communications Commission, Released June 21, 2005, Table 9.9.

[13] Ido Cohen, *et al.*, "2005: A Transition Year, Wireless Still the Way to Alpha," Credit Suisse/First Boston Equity Research Report, January 12, 2005 (hereafter *CS/FB 1/12/05*), p. 37.

long-distance as a stand-alone service will continue. According to Credit Suisse/First Boston:

> [U]ltimately there will be no real distinction between local and long distance and this transformation is already starting to take place with VoIP offerings. Further, AT&T and MCI, the primary holders of the remaining LD market share, have now announced plans to stop marketing their service despite 3-4% monthly churn rates among stand-alone LD customers. Thus, we believe that over the next five years, the vast majority of subscribers—80% plus—will take local and long distance service from the same provider.[14]

The RBOCs are not the only alternative providers of bundled local and long-distance service. CLECs also tend to market local service as part of bundles with long-distance and other services.[15] Cable companies likewise offer local/long-distance bundles.[16] Wireless services generally are sold with blocks of long-distance minutes or without differentiating between local and long-distance minutes at all. Indeed, the pricing plans of wireless services in the U.S. provide many mass-market customers with the ability to make long-distance calls at a marginal price of zero.

VoIP-based services likewise either sell long-distance minutes in blocks, or do not differentiate between local and long-distance minutes.[17] Growth in this technology, either

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[14] *CS/FB 1/12/05*, p. 37.

[15] For example, in BellSouth's region in Tennessee, Navigator Telecommunications, Momentum Telecom, and LecStar Telecom offer local and long-distance bundles. (See http://www.navtel.com/orders/tennessee1.htm; https://www.momentumtelecom.com/family/join/frmChoosePlan.aspx; and http://www.lecstar.com/corporate/scripts/productsandservices/pricingtool/Default.asp).

[16] See, for example, *Knology Complete*, www.knology.com/onlinesignup/bundleitems.cfm?bundleid=139, which offers service in BellSouth territory in Tennessee.

[17] Vonage, for example, sells a package of "anywhere" (in North America), "anytime" minutes for $14.99. See, Vonage Basic 500, http://www.vonage.com/products_basic.php.

from pure-play (independent) VoIP providers or from the cable companies, along with the competitive responses of the RBOCs that offer their own local and long-distance packages, also draws demand away from stand-alone long-distance.

In sum, intermodal and intramodal competition is eroding stand-alone long-distance service as a business. Communications carriers such as AT&T do not seek to market a mass-market stand-alone long-distance product. Therefore, on a forward-looking basis, there is no substantial competitive effect of the existing competitive overlap of AT&T's mass-market stand-alone long-distance service with that of BellSouth's.

**Q.11 HAS THE FCC OPINED ON (LEGACY) AT&T'S WITHDRAWAL FROM THE MASS MARKET AND ITS FUTURE COMPETITIVE SIGNIFICANCE IN THAT ARENA?**

A.11 Yes. In its evaluation of the SBC/AT&T merger the FCC concluded:

> Regardless of what role AT&T played in the past, we conclude that AT&T's actions to cease marketing and gradually withdraw from the mass market mean it is no longer a significant provider (or potential provider) of local service, long distance service, or bundled local and long distance service to mass market consumers. We base this conclusion on AT&T's cessation of marketing, its reductions in consumer operations, its retirement of infrastructure used to support mass market marketing and consumer care for mass market services, and its decision to "harvest" its mass market business by raising prices, resulting in a declining mass market customer base. The record indicates that AT&T's decision was the result of its own internal deliberations after determining that it would be uneconomical for it to continue to offer mass-market services. We reject as speculative and unrealistic commenters' suggestion that AT&T could readily and easily reverse its decision. The record demonstrates that once AT&T determined that mass market services were no longer a viable business opportunity, it implemented steps to close down its mass market

operations in an orderly fashion, and there is no indication that, absent the merger, AT&T would reverse this decision.[18]

## IV. NEW TECHNOLOGIES AND DEMAND FOR TELECOMMUNICATIONS AND DATA COMMUNICATIONS SERVICES DRIVE COMPETITION IN THE COMMUNICATIONS INDUSTRY

### A. The Communications Marketplace is Undergoing Profound and Unprecedented Changes

**Q.12 YOU HAVE EXPLAINED THAT AT&T'S WITHDRAWAL FROM THE MASS-MARKET IN TENNESSEE IN 2004 LEADS YOU TO CONCLUDE THAT THIS MERGER WILL HAVE NO ADVERSE EFFECTS ON THE MASS- MARKET, REGARDLESS OF THE CURRENT MARKETPLACE. IN LIGHT OF YOUR ANALYSIS OF THE EFFECTS OF THE MERGER ON MASS-MARKET COMPETITION, IS THERE A VALUE TO THE TRA UNDERSTANDING THE COMPETITIVE LANDSCAPE IN THE MARKETPLACE TODAY?**

A.12 Yes, there is. As I indicated above, in order to fully understand the motivations for this merger and the challenges facing telecommunications providers today, it is necessary to understand the regulatory and technological dynamics of the marketplace and their effects on the competitive landscape, both nationally and in Tennessee. The telecommunications

[18] *FCC SBC/AT&T Merger Order*, ¶ 103 (footnotes omitted). I recognize that mass-market customers can get VoIP-based service from AT&T in Tennessee, but as the FCC noted, AT&T is not a major provider of that service. ("We are not persuaded by commenters' claims concerning the importance of AT&T's over-the-top VoIP offering to this market. [. . .] AT&T has few VoIP subscribers ([REDACTED] nationwide); thus we cannot find that AT&T is a significant provider of this service." *FCC SBC/AT&T Merger Order*, fn. 263.)

marketplace is in significant transition, and this merger can be seen as a response to, and part of, that larger transition.

**Q.13 YOU OBSERVED THAT THE COMMUNICATIONS INDUSTRY IS UNDERGOING A TRANSITION. PLEASE EXPLAIN WHAT YOU MEAN BY THIS.**

A.13 Since the post-Depression period, incumbent telephone companies enjoyed the luxury of steady increases, virtually year after year, in demand for their services. Demand growth reflected, in the earlier years, growing penetration of telephone service into households; and in the more modern era, as telephone penetration approached 100 percent of households, growth of second lines and sheer growth in the number of households.

Upon the opening of telecommunications markets to competition in the wake of the 1996 Telecommunications Act, and as a result of the dramatic technological developments since that time, however, competition began to threaten that relatively constant demand growth. Competition began slowing the growth of demand for incumbent's voice lines until, in 1999, the decades-long trend of increasing ILEC lines actually reversed itself. Chart 1 shows the precipitous decline in retail access lines experienced by large and small ILECs in the US beginning in 1999. Indeed, the current and ongoing decrease exceeds the decrease seen during the Depression. Moreover, the

line losses are not confined to second lines. For the large ILECs such as BellSouth and AT&T, primary residential lines alone have declined by 11 percent since 1999.[19]

These declines in demand for ILEC lines are driven by fundamental and permanent structural changes to the industry, with profound effects on the economics of the traditional voice business that are not anticipated to reverse in the coming years. Analysts at Deutsche Bank, for example, are expecting the regional Bell companies to lose on average 8.0 *million* lines each year between 2006 and 2008, despite a growing economy.[20] The prediction of continued decreases in ILEC access lines is not unique to analysts at Deutsche Bank; rather it is consistent with other industry analysts.[21]

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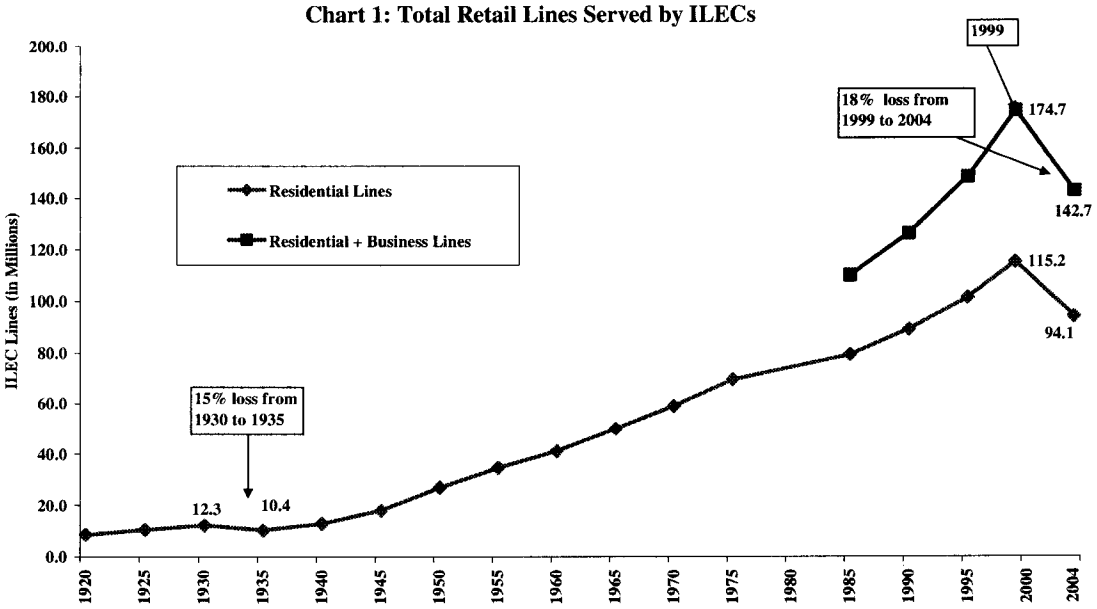
[19] Based on data from FCC ARMIS Report 43-08, Table III, downloaded 3/30/2006 at http://www.fcc.gov/wcb/armis/, and "Trends in Telephone Service," Federal Communications Commission, Industry Analysis and Technology Division Wireline Competition Bureau, June 21, 2005 (hereafter *FCC Trends*), Table 7.4.

[20] Viktor Shvets, Nigel Coe, and Andrew Kieley, "2006 preview: Out with the Old, in with the New" (hereafter *Deutsche Bank 12/05*), p. 55.

[21] See, e.g., *CS/FB 1/12/05*, pp, 36 and 46 (residential); Timothy Horan, William Maina, and Srinivas Anantha, "2006 Communications Outlook: Better Than 2005," CIBC World Markets Equity Research, December 15, 2005 (hereafter *CIBC 12/15/05*), p 11.

**Chart 1: Total Retail Lines Served by ILECs**




*Sources: Census Bureau's 1999 Statistical Abstract, Tables 1440 and 1419 of 20th Century Statistics; Census Current Population Survey, Table H1; FCC Statistics of Communications Common Carriers, 2004/2005 edition.*
*Note: Business and residental lines from 1985 to 2004 are as reported by the FCC; residential line counts before 1985 are estimated on the basis of household telephone penetration.*

Where are these lines going? In this increasingly connected world, where communications services are an ever-more-important part of business productivity and consumer enjoyment, people are not communicating less. Rather, these ILEC lines are going to alternative service providers such as cable companies, CLECs, VoIP companies, and wireless companies, or even to non-voice communications over broadband.

## B. Alternative Technologies Are Vigorously Competing with ILECs' Traditional Wireline Business Nationally

**Q.14 HOW ARE ALTERNATIVE SERVICES AFFECTING DEMAND FOR RBOC LINES FROM A NATIONAL PERSPECTIVE?**

A.14 Most obviously, looking at line and subscriber counts, communications services are being provided decreasingly by RBOCs and increasingly by wireless carriers. According to analysts at Deutsche Bank, RBOCs lost 6.5 million lines in 2004 and 8.4 million lines in 2005, and are expected to lose on average 8.0 million lines per year between 2006 and 2008, despite a growing economy.[22] Wireless carriers, in contrast, have been adding subscribers at a rapid pace: about 2.0 million per month in 2005, and a total of 122 million since December 1999.[23] Wireless service has had a devastating effect on usage on the wireline network, particularly for long-distance traffic.

**Q.15 COULD YOU PLEASE DESCRIBE THE TRENDS IN WIRELESS USAGE SUBSTITUTING FOR WIRELINE USAGE?**

A.15 Certainly. Wireless services are being used as a substitute for landline usage, both local and long-distance. The effect has been felt most strongly in the landline long-distance industry. The Yankee Group estimates that in 2004 about 60 percent of long-distance calls were placed from wireless phones,[24] and the trend has continued. The Cellular

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22 *Deutsche Bank 12/05*, p. 55.

23 CTIA Semi-Annual Wireless Industry Survey, December 2005. (See www.ctia.org.)

24 "Report Information: Personal Wireless Calling Surpasses Wireline Calling: A Wireless Substitution Update," MarketResearch.com, downloaded 03/28/06 at http://www.marketresearch.com/product/display.asp?productid=1165020&g=1.

Telecommunications and Internet Association ("CTIA") reported that wireless minutes increased during 2005 by around 30 percent over year-earlier levels;[25] in contrast, long-distance wireline switched minutes have decreased every year since 2000.[26]

**Q.16 IN ADDITION TO USAGE SUBSTITUTION, ARE YOU AWARE OF EVIDENCE THAT CUSTOMERS ARE SUBSTITUTING WIRELESS SERVICE FOR THEIR WIRELINE ACCESS LINES?**

A.16 Yes. Certainly customers are substituting wireless service for second lines that were, in past years, used for, for example, teen phones. In addition, there is a significant body of evidence that customers are increasingly substituting wireless service for their primary phone. For example, in its 10th Annual CMRS report, the FCC cited to several studies that indicate that the number of adults in households with only wireless service has increased substantially. According to the FCC, such survey respondents represented 2.8 percent of adults in the first half of 2003, 4.4 percent in the first half of 2004, and 5.5 percent in the second half of 2004.[27] The increase from 4.4 percent to 5.5 percent in six months represents on the order of 100,000 adults cutting the cord (or never getting an ILEC landline in the first place) *per week.*[28]

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[25] CTIA Semi-Annual Wireless Industry Survey, December 2005, and CTIA Semi-Annual Wireless Industry Survey, December 2004.

[26] *FCC Trends*, Table 10.2.

[27] Tenth Report, *In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, before the Federal Communications Commission, WT Docket No. 04-111, September 28, 2004, ¶¶ 196-197.

[28] The number of adults living in wireless only households was computed by multiplying the change in the percent of adults in wireless only households between the first and second half of 2004 (from ¶196 of the FCC's Tenth CMRS Report, released September 30, 2005) by the adult population 15 years and older (from the US Census Bureau for the corresponding time period). The increase in the number of adults in wireless only households

Deutsche Bank estimates that around 1.5 percent of households in the US are "cutting the cord" each quarter, and that the number of wireless-only homes went from around 6 percent at the beginning of 2005 to 9 percent (or 10 million homes) towards the end of that same year.[29] Analysts at Banc of America Securities estimate that wireless-only US households will increase from 7.9 percent year-end 2004, to 17.8 percent by year-end 2009.[30] In a survey published in October 2005, In-Stat/MDR found that currently about 9.4 percent of US wireless subscribers do not have a landline telephone and that 30 percent of US wireless subscribers will not have a landline telephone by 2009.[31]

**Q.17 WHY ARE THESE NUMBERS ON WIRELESS SUBSTITUTION FOR WIRELINE SERVICES SIGNIFICANT?**

A.17 They are significant not because of the percentage of wireless-only households *per se*, but because the speed with which the number of wireless-only households is growing indicates the competitive pressure generated by wireless services, and indicates how much of the ILEC line losses represent customers cutting the cord to go to wireless. Hence, while the above research tends to focus on the base or "stock" of wireless-only

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between first and second half of 2004 was divided by 26 weeks to compute the weekly increase in the number of adults in wireless only households.

29 *Deutsche Bank 12/05*, p. 8.

30 Douglas S. Shapiro, David W. Barden, and Joseph Bender, "Battle for the Bundle: Mapping the Battlefield, Our First Report from the Front," Banc of America Securities Equity Research, June 14, 2005, p. 34.

31 Rich Luhr and David Chamberlain, "Cutting the Cord: Consumer Profiles and Carrier Strategies for Wireless Substitution," In-Stat/MDR Report, October 2005, p. 37.

households at a point in time, one can also examine, as the FCC did, the "flow" of substitution from wireline to wireless.

Investment analysts at Deutsche Bank performed one such study. Deutsche Bank analysts examined national trends of RBOC landline access line counts over the period 1Q03 to 3Q04 to determine where, if anywhere, RBOC landlines were going, including CLECs, independent VoIP providers, cable telephony, and wireless substitution. In what I consider to be a very revealing finding, the report concluded that wireless growth accounted for about *47 percent of ILEC primary line residential landline losses* (measured relative to where ILEC residential primary line counts would have been, after accounting for economic growth).[32] That is, nearly half of primary residential lines that RBOCs either lost or never gained during that period were apparently being replaced by wireless service. Similarly, CIBC estimates that of the 9 million lines lost by ILECs between 2004 and 2005, 5 million (56%) were wireless substitute lines.[33]

Hence, while the overall percentage of customers who have "cut the cord" today may be relatively small, *the competitive impact is a full order of magnitude greater.* The competitive impact is felt in how rapidly ILECs such as BellSouth are *losing* lines to wireless—that is, in the (out)flow of customers to wireless, not the stock of lines that they currently serve. In a market in which the net flow of customers is consistently in one direction—away from the ILECs toward wireless—the stock or percentage of wireless-

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[32] Viktor Shvets, Nigel Coe, and Andrew Kieley, "Crossing the Rubicon, Act II: Indian summer wanes," Deutsche Bank Global Equity Research Analyst Report—Wireline Industry, November 26, 2004 (hereafter *Deutsche Bank 11/26/04*), Figure 6. The other 53 percent had been lost to CLECs, cable telephony, and VoIP (other than cable VoIP).

[33] *CIBC 12/15/05*, p 11.

only customers is misleading because it drastically understates the competitive impact being felt by the incessant loss of customers. These "flow" numbers are a vivid indication that wireless substitution is a substantial contributor to the ILECs' line losses and that its effect is of sufficient magnitude to be of grave concern to wireline managers in making their pricing decisions.

**Q.18 DOES THE FACT THAT THE MERGER WILL BRING CINGULAR WIRELESS UNDER SINGLE OWNERSHIP CAUSE HARM TO COMPETITION FOR MASS-MARKET CUSTOMERS IN TENNESSEE?**

A.18 No. First, Cingular Wireless is already owned by two local exchange companies, so there is no obvious effect on competitive incentives of the transfer of ownership structure that would be effectuated by this merger. While AT&T will own the entire Cingular revenue stream after the merger, it will also bear the entire cost stream. In addition to continuing competitive pressure from all wireless carriers, AT&T will also face increasing competitive pressure from cable companies, as I discuss shortly, as well as VoIP and traditional competitors. AT&T will therefore face continued imperative to compete vigorously to attract customers to – and thereby attempt to preserve that value of – its wireline network.

Second, the vigorously competitive nature of the wireless industry renders implausible any suggestion that Cingular would let down its guard as a competitor because of its common ownership with AT&T's wireline business. Cingular competes vigorously with Verizon Wireless, Sprint Nextel, T-Mobile, and a host of smaller

wireless carriers, and this competition will not be relaxed due to this merger. Moreover, I already explained that wireless carriers generally impose discipline on wireline prices, which will continue to be true after the merger.

In fact, bringing Cingular under unified AT&T / BellSouth ownership is expected to generate significant benefits to mass-market customers in Tennessee. Cingular is currently a joint venture between AT&T and BellSouth. Economic theory tells us that division of ownership and the need for coordination, such as in joint ventures, can significantly impede decision-making.[34] The experience of AT&T and BellSouth's joint ownership of Cingular bears out this concern. I understand that the joint venture structure has increased the complexity of decision-making, which has slowed the rate at which Cingular has been able to deliver new services to its customers.[35] For example, AT&T, BellSouth, and Cingular are each in the process of developing and deploying IP-based, next-generation applications and new enhanced services.[36] Because such a project would require careful coordination of complex investments and decisions, the merger can be expected to facilitate the integration of these three IP networks, generating cost savings attributable to the merger.[37]

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[34] See, e.g., Paul Milgrom and John Roberts, *Economics, Organization and Management*, (Englewood Cliffs, New Jersey: Prentice Hall, 1992), pp. 2-18 and 88-124; see also Kathryn Harrigan, *Managing for Joint Venture Success*, (Lexington, MA: Lexington Books, 1986); see also, Joseph Brodley, "Joint Ventures and Antitrust Policy," Harvard Law Review 95 (1982), p. 1529; see also Michael Peng and Oded Shenkar, "Joint Venture Dissolution as Corporate Divorce," Academy of Management Executive 16 (2002), p. 92.

[35] Direct Testimony of James S. Kahan, Tennessee Regulatory Authority Docket No. 06-00093, June 2, 2006, pp. 6-7.

[36] *Joint Filing*, ¶¶ 13-15.

[37] *Joint Filing*, ¶¶ 13-14.

**Q.19 DR. ARON, YOU INDICATED THAT VOIP IS ALSO TRANSFORMING THE COMMUNICATIONS INDUSTRY. WHAT IS VOIP?**

A.19 VoIP is a means of providing voice telephone service using "IP" or Internet protocol. VoIP calls do not traverse the caller's circuit-switched end office but instead are transmitted as Internet-conforming "packets" that are routed (rather than switched) to the called party over the public Internet or a private packet network. The calls may switch onto the public switched telephone network for purposes of *terminating* the call with a public switched telephone service ("PSTN") customer.

**Q.20 IS VOIP HAVING AN IMPACT ON THE NATIONAL MARKETPLACE TODAY?**

A.20 Yes. First, it is apparent that this new technology has established itself in the marketplace. The major national cable companies such as Comcast, Time Warner, Cox, and Cablevision are making their networks VoIP-capable and are rolling out the product in an increasing number of areas. In BLS's territory in Tennessee, Time Warner and Charter Communications offer a "triple play" package (cable TV, high-speed internet access and voice telephony) using VoIP.[38] Second, the fact that VoIP is, or can be, an application on a broadband connection means that there is room for pure-play VoIP providers such as Vonage and Net2Phone (and a myriad of others) to provide additional competitive pressure for voice telephony. According to Morgan Stanley Equity Research,

[38] *See* for Time Warner: http://www.timewarnercable.com/MidSouth/, and http://www.timewarnercable.com/CustomerService/FAQ/TWCFaqs.ashx?faqID=1159&MarketID=25&CatID=658. See also "Brass, Larisa, "Charter Rolls Out Telephone Service," April 22, 2006 at

cable telephony growth accelerated in 2005, and the six largest U.S. cable operators added 470,000 new telephony subscribers in the third quarter of 2005 alone.[39] As for the pure-play (what the FCC calls "over the top") VoIP providers, from September 2005 to March 2006, Vonage alone added on average around 19,000 subscribers per week, putting Vonage on a pace of one million new subscribers per year.[40] While the current rates of VoIP subscriber additions are mostly attributable to the success of cable companies offering VoIP over their own facilities,[41] the pure-play independents illustrate that the business is relatively easy to enter.

**Q.21 WOULD YOU CONSIDER VOIP TO BE A SPECULATIVE TECHNOLOGY TODAY?**

A.21 No. Investment analysts at UBS estimate that there are 5 million cable telephony subscribers (most are VoIP-based, insofar as the circuit switched approach is being phased out by the cable providers) and that total subscribers are increasing at an annual rate of 60 percent.[42] Moreover, according to UBS, 24 percent of cable modem users subscribe to cable telephony. Cablevision, which has completed its telephony rollout, is adding 8,000 voice subscribers per week,[43] and analysts at UBS securities expect

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http://www.knoxnews.com/kns/business/article/0,1406,KNS_376_4641778,00.html. (hereafter *Charter Telephone Service, April 22, 2006*).

39 Simon Flannery, *et al.*, "Telecom Services – 4Q05 Preview & 2006 Outlook: Execution is Everything," Morgan Stanley Equity Research, January 19, 2006, p. 19.

40 "Vonage® Activates One Millionth Line", Vonage Press Release, September 5, 2005; and "Vonage® Crosses 1.5 Million Line Mark," Vonage Press Release, March 1, 2006.

41 *Deutsche Bank* 11/26/04, pp. 18, 20; *CIBC 12/15/05*, p. 5.

42 John C. Hodulik et al., "Wireline Postgame Analysis 13.0," UBS Global Equity Research, March 14, 2006, p. 4.

43 Katherine Styponias, *et al.*, "CVC: Very Strong 4Q05 for Cable Business; Robust 2006 Guidance Demonstrates the Power of Telephony in the Bundle," Prudential Equity Group, LLC, February 27, 2006, Figure 3.

Comcast, which is still building out its telephony capabilities, to add nearly 20,000 VoIP subscribers per week in 2006, and over 20,000 per week through 2010.[44] Morgan Stanley concludes, "[t]he introduction of VoIP, especially by cable companies, represents the largest long-term competitive threat to the Bells, in our view."[45] Large cable companies such as Comcast are expected to emerge as some of the largest communications carriers in the country.[46]

Analysts are anticipating continued rapid growth of VoIP subscribership. Analysts at Deutsche Bank expect that cable telephony, specifically VoIP cable telephony (including Cox and Comcast's circuit-switched customers that Deutsche Bank believes will be migrated over to VoIP within a few years), will grow to nearly 25 million by 2013.[47] According to In-Stat/MDR, over the past year, Time Warner Cable has become the third-largest cable telephony service provider in the US.[48] Since Time Warner launched its first VoIP telephony service in May 2003 in Portland, Maine, it has expanded the service to all of its 31 cable markets across the country,[49] and recently reached the milestone of 1,000,000 phone customers.[50] Comcast Corporation, which provides cable service in some parts of Tennessee, is reported to have had around 1.2 million telephone

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44 Aryeh B. Bourkoff, *et al.*, "Comcast Corporation / Migration of Voice Business Pushes Growth to 2H," UBS Investment Research, February 3, 2006, p. 19.

45 "3Q04 Trend Tracker: Let the Good Times Roll?" Morgan Stanley analyst report, December 3, 2004, p. 22.

46 Michael Learmonth, "UPDATE 3 – Comcast to offer phone service to 40 mln by 2006," Reuters, May 26, 2004, quoting UBS Warburg analyst John Hodulik.

47 *Deutsche Bank 12/05*, p. 55.

48 Mike Paxton, "Cable Telephony Service: VoIP Drives Subscriber Growth," In-Stat Report, December 2005 (hereafter *InStat/MDR 12/05*), p. 34.

49 *InStat/MDR 12/05*, p. 34.

50 "Time Warner Cable Reaches Milestone of 1,000,000 Phone Customers," Time Warner Press Release, December 5, 2005.

customers (both VoIP and circuit-switched) nationwide as of December 2005,[51] and the company expects to offer telephone service, using VoIP technology, to approximately 80 percent of the households that its network currently passes (nationwide) by the end of 2006.[52] Comcast ended 2005 with 202,000 VoIP subscribers, and its goal for 2006 is to add another 1 million VoIP subscribers.[53] Other cable providers are also moving aggressively into VoIP. In particular, Charter Communications recently began offering VoIP telephony service in the Blount, Loudon, Sevier and Knox counties.[54]

In addition to cable companies offering VoIP over their own facilities, pure-play VoIP services from providers such as Vonage and Net2Phone are available anywhere there is a broadband connection. I already mentioned Vonage's rapid rate of customer acquisition. As of March 3 of this year, Vonage served about 1.5 million subscribers.[55] Level 3, known as a backbone and large business provider, is making a wholesale VoIP turnkey offering to pure-play VoIP providers that includes E911 service that is available to 60 million[56] of the nation's 110 million households.[57]

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51 *InStat/MDR 12/05*, p. 31.

52 "Comcast Reports First Quarter 2006 Results," Comcast Press Release, April 27, 2006, p. 2.

53 Troy D. Jensen and Munjal Shah, "Urge to Converge - The VoIP Newsletter Vol. 2.1," PiperJaffray Industry Note, February 13, 2006, p.1

54 *Charter Telephone Service, April 22 2006.* See also: http://support2.charter.com/support/telephone/contentredirect.asp?sprt_cid=a04a67da-5ac3-4279-805b-f263cc6bf716

55 "Vonage® Activates One Millionth Line", Vonage Press Release, September 5, 2005; and "Vonage® Crosses 1.5 Million Line Mark," Vonage Press Release, March 1, 2006.

56 "Level 3 Provides E911 for VoIP," downloaded 5/1/05 from *http*://www.newtelephony.com/news/51h5101127.html#.

57 U.S. Census Bureau, "American Community Survey: 2004 Data Profile," downloaded. 3/28/2006 at http://factfinder.census.gov.

**Q.22 DOES VOIP OFFER SUBSTITUTABLE SERVICES FOR LINE-RELATED FEATURES?**

A.22 Yes, and VoIP offers a much richer and more flexible slate of features than does the traditional telephone network. For example, VoIP technology provides for music or messaging on hold, "unified messaging,"[58] multiple telephone lines (i.e., telephone numbers) on a single connection, multiple area code usage (which means that the user can implement his or her own foreign exchange service), and follow-me service, among other services. Some of these services may be of special interest to businesses, as well.

## C. Competition from Alternative Technologies is Prevalent in Tennessee

**Q.23 ARE THE NATIONWIDE TRENDS YOU HAVE DESCRIBED BEING SEEN IN TENNESSEE?**

A.23 Yes. I have discussed the fact that competition in the form of wireless services, VoIP services from cable companies, and pure-play VoIP providers have emerged as significant competitors in the communications industry nationwide. The effects have also been seen in Tennessee generally, as well as in BellSouth's territory specifically.

Chart 2, which is based on publicly available ARMIS data,[59] shows that BellSouth's residential and single-line business lines in Tennessee have decreased

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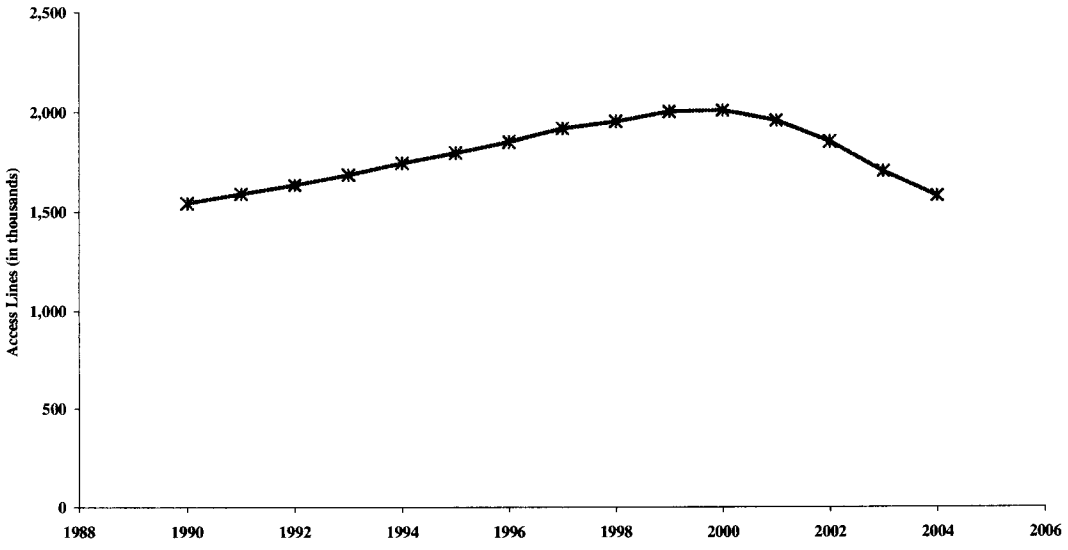
[58] Unified messaging generally refers to the integration of two separate platforms of voice and Internet over a single unified network so, for example, subscribers can receive voicemail, e-mail and fax messages in a single mailbox accessible via phone or computer.

[59] ARMIS is the Automated Reporting Management Information System at the FCC, which was initiated in 1987 for collecting financial and operational data from the largest carriers.

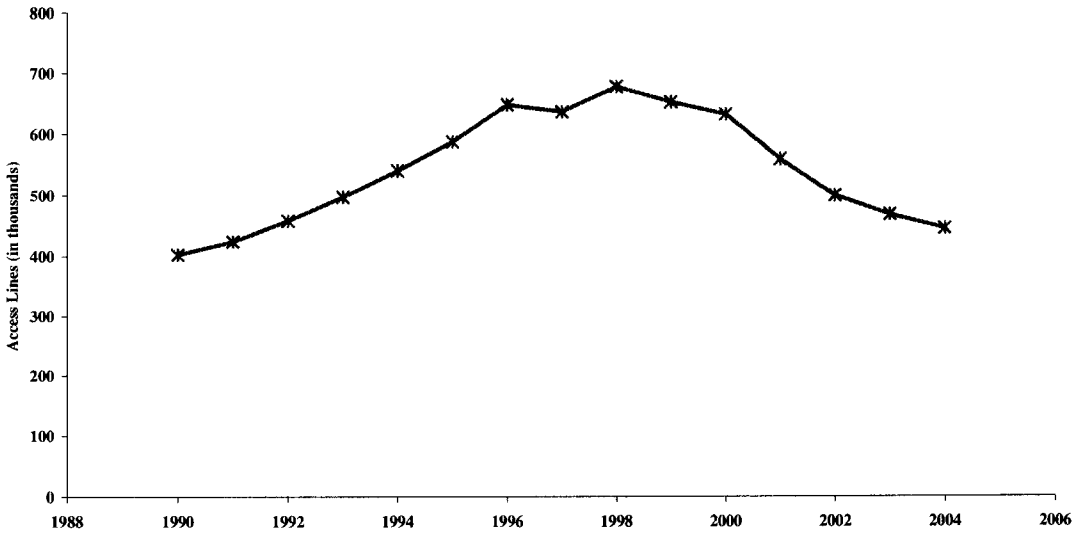
markedly on an annual basis between 2001 and 2005. Since 2001, BellSouth has lost about 400,000 (19 percent) of its residential and single-line business lines in Tennessee, or about 8,000 lines per month on average. BellSouth lines serving larger business customers in Tennessee have also declined substantially. Chart 3, which is also based on ARMIS data, shows that BellSouth-served multi-line business lines in Tennessee have decreased by about 100,000 (about 20 percent) since 2001. As a result, BellSouth finished 2005 with fewer lines (mass-market and enterprise business in aggregate) than it had a decade ago, despite the overall economic growth in Tennessee during this period.

**Chart 2: BellSouth Tennessee**
**Residential plus Single Line Business**




*Source: FCC's ARMIS Report 43-01 Table II, downloaded May 2006*

**Chart 3: BellSouth Tennessee**
**Multi-Line Business**




*Source: FCC's ARMIS Report 43-01 Table II, downloaded May 2006*

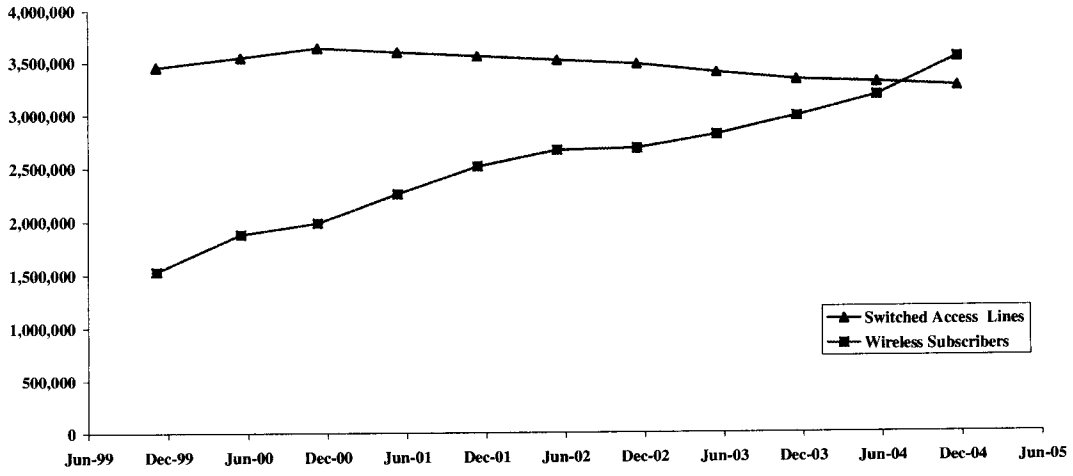
## Q.24 PLEASE DESCRIBE TENNESSEE'S WIRELESS PENETRATION.

A.24 The rate of growth of wireless subscribers in Tennessee and the percent of the population in Tennessee that uses wireless phones is similar to that of the nation as a whole. About 64 percent of the total population in Tennessee are wireless subscribers (compared to 65% nationwide).[60] This represents a substantial increase since 2000, when about 33 percent of the Tennessee population (and 32 percent of the nation's population) had a cell

[60] Based on "Local Telephone Competition: Status as of June 30, 2005," Federal Communications Commission, Industry Analysis and Technology Division Wireline Competition Bureau, April 2006 (hereafter *04/06 Local Competition Report*). Population in Tennessee and the U.S. downloaded from http://www.census.gov/population/www/projections/projectionsagesex.html and from http://www.census.gov/popest/national/asrh/NC-EST2005-sa.html.

phone.[61] As I noted earlier, the gain in wireless usage is coincident with wireline line loss and consistent with displacement of wireline service by wireless. Chart 4 illustrates the growth in wireless subscribers (and decline in switched access lines) in Tennessee. As of December 2004, there were more wireless subscribers in Tennessee than there were switched landlines.[62]

**Chart 4: Tennessee Switched Access Lines and Wireless Subscribers**
**December 1999 to December 2004**




*Source: December 2004 Local Competition Report, Tables 8, 9 and 13.*

[61] Based on *04/06 Local Competition Report*. Population in Tennessee and the U.S. downloaded from http://www.census.gov/population/www/projections/projectionsagesex.html and from http://www.census.gov/popest/national/asrh/NC-EST2005-sa.html.

[62] December 2004 is the most recently available data that allows this comparison, due to a change in methodology in FCC's most recent Local Competition Report. See *04/06 Local Competition Report*, p. 1.

**Q.25 IS THERE EVIDENCE THAT MOBILE WIRELESS SERVICES WILL BE A SIGNIFICANT FORM OF COMPETITION IN TENNESSEE IN THE FUTURE?**

A.25 Yes. Substantial network investments by mobile wireless carriers in Tennessee provide evidence that competition from mobile wireless will not only continue but strengthen in the future. Verizon Wireless made more than $230 million in network investments in the state in 2004 and 2005.[63] Similarly, Cingular reports that it invested more than $160 million in 2005 and will invest $235 million in 2006 in network upgrades in Tennessee.[64] These investments are expanding coverage and improving service quality in communities throughout the state. Verizon's network investments included adding towers near Roan Mountain and Pigeon Forge, improving coverage near the University of Tennessee at Martin and the Covington Hospital in Memphis,[65] while Cingular added cell sites in many counties of the state including Dyer, Putnam, Overton and White.[66] Both carriers are also deploying advanced data services in urban areas of the state. Verizon Wireless introduced BroadbandAccess for businesses and VCast for consumers in the Knoxville metropolitan area in August 2005.[67] BroadbandAccess provides mobile business

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63 "Tennesse Sees Wireless Network Improvements in 2005 With Verizon Wireless' $150 Million Investment," Verizon Wireless News Release, February 21, 2006, at http://news.vzw.com/news/2006/02/pr2006-02-23a.html (hereafter *Verizon Wireless News Release, 2/21/06*).

64 See "Cingular Wireless Investing $235 Million in Its Tennessee Network in 2006," Cingular News Release, March 23, 2006, at http://cingular.mediaroom.com/index.php?s=press_releases&item=1476 (hereafter *Cingular News Release, 3/23/06*) and "Cingular Wireless Completes Network Integration in Areas of West and Central Tennessee," Cingular News Release, September 27, 2005, at http://cingular.mediaroom.com/index.php?s=press_releases&item=1311 (hereafter *Cingular News Release, 9/27/05*).

65 *Verizon Wireless News Release, 2/21/06.*

66 *Cingular News Release, 9/27/05.*

67 "Wireless Braodband Arrives in Tennessee," Verizon Wireless News Release, August 29, 2005, at http://news.vzw.com/news/2005/08/pr2005-08-30b.html (hereafter *Verizon Wireless News Release, 8/29/06*).

customers with high-speed access to corporate information and the internet. VCast enables consumers to access short video content on demand. Both Verizon and Cingular plan to introduce high-speed data services to additional cities in Tennessee in 2006.[68] These substantial, ongoing network investments will make mobile wireless an increasingly attractive alternative to wireline services, strengthening competition between these two modes of communication services.

**Q.26 PLEASE DESCRIBE BROADBAND SUBSCRIPTION IN TENNESSEE.**

A.26 Since June of 2000, total broadband connections (DSL, cable modem, and other such as satellite) in Tennessee have increased by about 148,000 per year.[69] As of June 2005, the FCC estimated that there were about 613,574 residential broadband users in Tennessee.[70] The residential broadband connections in Tennessee as of June 2005 represent about 26 percent of Tennessee's households.[71]

**Q.27 ARE CABLE TELEPHONY AND VOIP AVAILABLE IN TENNESSEE?**

A.27 Yes. Time Warner has offered VoIP telephony in the Memphis region of Tennessee since 2004.[72] Knology and Charter Communications offer cable telephony services to

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[68] See *Cingular News Release 3/23/06 and Verizon Wireless News Release, 8/29/06.*

[69] I am using the term "broadband" to refer to high-speed lines as defined by the FCC in its "High-Speed Services for Internet Access" reports.

[70] "High-Speed Services for Internet Access: Status as of June 30, 2005," FCC Industry Analysis and Technology Division – Wireline Competition Bureau, April 2006 (hereafter *04/06 FCC Broadband Report*), Tables 10 and 13.

[71] *04/06 FCC Broadband Report.* Household estimates from the U.S. Census Bureau, "2004 American Community Survey," downloaded. 5/28/2006 from http://factfinder.census.gov.

[72] See http://www.timewarnercable.com/MidSouth/, and http://www.state.tn.us/tra/VoIPE911/TWCE911.ppt#2.

customers in Knoxville,[73] In addition, VoIP is also available in Tennessee from several pure-play providers. For instance, Vonage offers local exchange telephone numbers in area codes 615, 901 and 931.[74] Other VoIP providers offering local voice service in Tennessee include Net2Phone (with local telephone numbers available in area codes 423, 615, 731, 865, 901, and 931);[75] Broadvox (with local telephone numbers available in area codes 423, 615);[76] and Iconnecthere (available in area codes 901, 615, 865, 423, 931, and 731).[77]

## D. The Merger is Unlikely to Adversely Affect Competition for Business Customers in Tennessee

**Q.28 DO YOU HAVE ANY OBSERVATIONS ABOUT COMPETITION FOR BUSINESS CUSTOMERS IN TENNESSEE?**

A.28 Yes. AT&T has focused on large, national or international business customers.[78] Such customers are sophisticated consumers of telecommunications services and are capable of

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[73] See http://www.knology.com/content/forbusiness.cfm, and http://www.knology.com/mynewbill/newBill_broc.pdf.

[74] Vonage area codes cover, for example, Memphis (901), Nashville (615) and Chattanooga (423). See http://www.vonage.com/avail.php?lid=nav_avail.

[75] Net2Phone's area codes cover, for example, Memphis (901), Nashville (615), Chattanooga (423) and Knoxville (856). http://web.net2phone.com/consumer/voiceline/phone_numbers_area_codes.asp.

[76] Broadvox's area codes cover, for example, Nashville (615) and Chattanooga (423) http://www.broadvoxdirect.com/avail.aspx.

[77] Iconnecthere's area codes cover, for example, Memphis (901), Nashville (615), Chattanooga (423), Ardmore (931) and Bovilar (731). https://www.iconnecthere.com/nonmembers/eng/signup/broadband_phone/signup.asp.

[78] *Joint Filing*, ¶¶ 19-21. My discussion of the mass-market customer includes the smallest of the business customers. My discussion here focuses on larger business customers. As noted by the FCC in its SBC/AT&T merger order, "For small enterprise customers, we similarly conclude that the merger is not likely to result in anticompetitive effects, based upon AT&T's official departure from this segment of the market, as well as likely increased competition from cable and VoIP providers." *FCC SBC/AT&T Merger Order*, ¶ 65.

selecting from among a number of providers. According to the FCC in reference to the merger between SBC and AT&T:

> We find that competition for medium and large enterprise customers should remain strong after the merger because medium and large enterprise customers are sophisticated, high-volume purchasers of communications services that demand high-capacity communications services, and because there will remain a significant number of carriers competing in the market. With respect to small enterprise customers, we recognize that AT&T had announced its gradual withdrawal from that market prior to the announcement of the merger, and we conclude after examining the record that it was not exerting significant competitive pressure with respect to those customers.[79]

Similarly, because AT&T is not competing for the smallest business customers in Tennessee, the merger will have no material adverse competitive effects on these customers. To the extent that AT&T competes for larger business customers in Tennessee, these sophisticated purchasers have a variety of alternatives, including but not necessarily limited to those currently operating in Tennessee.

**Q.29 PLEASE DESCRIBE THE COMPETITIVE OPTIONS FOR BUSINESS CUSTOMERS IN TENNESSEE.**

A.29 First, I note that AT&T and BellSouth do not typically target the same kinds of businesses. While AT&T focuses on large, national and international businesses, BellSouth's focus is on small and medium-sized business.[80] Second, there are many other providers of business service active in Tennessee, just as around the nation. These

[79] *FCC SBC/AT&T Merger Order*, ¶ 56.
[80] *Joint Filing*, ¶ 21.

include Xspedius Communications, NuVox Communications, TelCove, US LEC, DeltaCom, Time Warner Telecom, Covad, and XO Communications.

**Q.30 WHAT KINDS OF SERVICES DO THESE COMPANIES PROVIDE TO BUSINESSES IN TENNESSEE?**

A.30 TelCove, for example, is "a leading provider of business critical telecommunications services" serving the business market.[81] TelCove offers Internet, Data, and Voice solutions, and owns its fiber optic network that covers 70 markets throughout the eastern half of the United States, including Tennessee.[82] NuVox Communications offers a "robust, reliable, feature rich network serving business customers in hundreds of cities across the southeast and Midwest,"[83] including Nashville and Knoxville in Tennessee. Currently, the NuVox network features 28 voice switches and 320 co-locations across a sixteen state footprint. Its product solutions include a "comprehensive set of data, Internet, voice, and bundled product solutions designed specifically for business."[84] US LEC provides voice, data and Internet services over its own network to medium and large businesses and enterprise organizations in sixteen Eastern states, including Tennessee. US LEC's services include local and long-distance calling services, VoIP service, advanced data services such as Ethernet, Frame Relay, and ATM, and dedicated and dial-

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81 "TelCove: Advanced Secure Communications" (corporate brochure), downloaded 5/23/2006 from http://www.telcove.com/about/telcove-corporate-brochure.pdf.

82 "TelCove: Advanced Secure Communications" (corporate brochure), downloaded 5/23/2006 from http://www.telcove.com/about/telcove-corporate-brochure.pdf.

83 "Who We Are: NuVox Network", downloaded 5/23/2006 from http://nuvox.com/index.php/10.

84 "News: Quick Facts," downloaded 5/23/2006 from http://www.nuvox.com/index.php/44.

up Internet services for customers in Tennessee.[85] These examples illustrate the variety of providers serving business customers in Tennessee.

**Q.31 HOW IS THE COMPETITIVE LANDSCAPE CHANGING FOR BUSINESS COMMUNICATIONS?**

A.31 As cable providers gain experience with VoIP and data applications, they are increasingly looking eagerly at the business segment as a means of broadening their revenue base. Cable companies can likewise capitalize on their metro level presence by offering regional and local business networking needs. Although cable assets have been traditionally deployed with residential consumers in mind, they pass, and may already enter, many business and government buildings located in suburban areas.

**Q.32 YOU HAVE DESCRIBED VOIP AS A VIABLE OPTION FOR MASS-MARKET CUSTOMERS. DO YOU CONSIDER VOIP TO BE SUITABLE FOR BUSINESSES?**

A.32 Yes. The essence of VoIP is the ability to transmit a voice signal over a data network, specifically, an IP network, and the ability to convert calls to and from the PSTN. Those capabilities allow VoIP to be deployed in many ways. VoIP-based service can provide a "line" over a broadband connection, whether that connection is provisioned through a cable modem, DSL modem, high capacity line (e.g. DS1), Wi-Fi, or WiMAX.

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[85] "About US LEC: Tennessee Fact Sheet," downloaded 03/28/2006 at http://www.uslec.com/kentucky-ssi.aspx; and "About US LEC: Network," downloaded 03/29/2006 at http://www.uslec.com/networks.aspx.

Configurations more important to medium and larger business customers are those that allow the provision and management of multiple lines at the same or multiple locations. These options include IP-PBX systems and IP-Centrex systems. According to the technology forecasting firm IDC about 200,000 IP-PBX systems were already deployed at the end of 2004, with 1.4 million systems expected to be deployed by 2008.[86] Stratecast Partners notes that as of 2004 a number of studies had found that approximately 50% of enterprise businesses had deployed some form of VoIP.[87]

Tennessee is no exception to the deployment of IP-based communications services for business customers, as demonstrated by firms such as NuVox, Covad, and Cinergy. For example, NuVox offers "VoxIP," an IP-based product that allows customers' T1 channels to switch between voice and Internet. According to NuVox, this product allows customers to have 24 calls in progress simultaneously and a minimum of 768 Kbps of Internet bandwidth for Internet applications on one T-1 connection.[88]

**Q.33 ARE THESE IP-BASED SERVICES REALISTICALLY USEFUL TO SMALLER BUSINESSES AS WELL**

A.33 Yes. As one industry analyst explained:

> For smaller companies and sites/branch offices, cost savings is the number one reason for choosing an integrated voice and data access service. The number of providers offering bundled IP local, long distance, and data

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[86] Phil Hochmuth, "Winning over skeptics, VoIP support builds," *Network World*, October 4, 2004.

[87] "Business VoIP Services Assessment: Communications Service Strategies & Opportunities," Volume 2, Number 6, Stratecast Partners, May 2004, p. 9 (hereafter, *Stratecast 2004*).

[88] See, "VoxIP: Keeping You Connected," downloaded 3/30/2006 from http://www.nuvox.com/index.php/79. VoIP has been available in Tennessee since August of 2005. See, "NuVox Communications Launches VoIP Service in Tennessee," NuVox Press Release, August 24, 2005, downloaded 5/29/2006 from http://www.nuvox.com/index.php/20?ID=326.

> over T1 or xDSL access are [*sic*] growing. [For as little] as $495 per month from CBeyond, customers can get five voice lines, 1,500 long distance minutes, and 1.5 Mbps Internet access. Most companies with this profile would spend this much for just local and long distance voice per month. The addition of high-speed data virtually for 'free' continues to make this a very compelling value proposition on voice alone.[89]

In addition to cost savings, a recent report by IDC explains that midsize businesses benefit from IP telephony because this technology enables businesses to unify their communications systems and to increase productivity. Many midsize businesses have fragmented communications systems, with different vendors' PBXs at different locations. IP telephony systems allow these companies to eliminate redundant infrastructure, manage all voice and data communications via a single Internet network with a single provider, and deploy the same telephony solution in every branch. IP telephony systems can improve productivity in two primary ways. First, they facilitate remote or mobile workers having transparent access to corporate voice and data applications. Second, by unifying voice, email and other corporate applications, IP telephony systems can increase individual worker efficiency and facilitate collaboration among employees. For these reasons, midsize businesses are looking to IP telephony services as a means of gaining competitive advantage.[90]

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[89] *Stratecast 2004*, p. 9.

[90] "IP Telephony: The Time is Now for Midsize Companies," IDC Executive Brief, January 2006, pp. 2-5, at http://www1.avaya.com/pc/IDC_436_PC1.pdf.

**Q.34 CAN YOU PROVIDE EXAMPLES OF BUSINESSES OR GOVERNMENT ORGANIZATIONS IN TENNESSEE THAT ARE USING VOIP COMMUNICATIONS SERVICES?**

A.34 Yes. Organizations of all sizes are implementing VoIP service in Tennessee. For example, UnumProvident Corporation, a $10 billion disability insurance company headquartered in Chattanooga, implemented an IP telephony application using Cisco equipment that allows customer service representatives to work from home. Because high quality customer service is a key component of Unumprovident's business strategy, it was essential that this teleworker application be highly reliable, secure and transparent to the caller.[91] That Unumprovident chose an IP solution for this business-critical application demonstrates that IP telephony competes successfully with traditional circuit-switched technologies. A much smaller entity, Oak Ridge schools, has also deployed a VoIP system, which they purchased from Sprint. The schools switched to VoIP because it offered lower operating costs and additional functionality, such as messaging capability in every classroom.[92]

[91] "Cisco Systems Teleworking Technology Helps Unumprovident Retain its Most Valued Call Center Employees," Cisco Systems, Customer Success Story at http://www.cisco.com/now/poweredby/PDF/whitePaper_UnumProvident.pdf?REFERRING_SITE=CISCO.COM&CREATIVE=PBY_sl_Officepark_PbyContent

[92] "Oak Ridge Schools in Tennessee Latest to Converge Voice, Data on Same Network," Sprint News Release, April 28, 2003, at http://www2.sprint.com/mr/news_dtl.do?page=print&id=1619.

**Q.35 HOW DOES DEPLOYMENT OF IP-PBX SYSTEMS AFFECT DEMAND FOR TRADITIONAL TELCO SERVICES?**

A.35 An IP-PBX system could be used to manage intracompany calls only, or it could be fully integrated with a provider's IP network to provide external calling as well. A fully integrated system using VoIP for external calling eliminates the need for traditional voice services. The flexibility of the VoIP-based systems allows a firm to migrate its installation from a standalone configuration, which uses VoIP only for internal calls, to a fully integrated system, which uses VoIP for both internal and external calls, with only software modifications.[93] The move to an integrated IP system would, however, impose greater capacity and engineering demands on the data network as interfacility traffic was shifted from the PSTN to the data network. As a result, a firm might not want to shift its usage from the PSTN to its data network immediately, but the *capability* to shift voice demand to data circuits in response to price differentials provides competitive discipline on the prices of both sets of products. That is, once a firm has an IP-PBX for internal calls, the decision to use the PSTN or VoIP for external or interoffice calls can be readily changed in response to the relative price of PSTN service and data service.

**Q.36 WHAT OTHER IP-BASED COMMUNICATIONS SYSTEMS ARE AVAILABLE TO BUSINESSES?**

A.36 In addition to systems that directly replace traditional PBX installations, some VoIP providers (and other providers) are offering what has been called IP Centrex. Like

[93] This assumes that the business customer already has an appropriate external data network.

traditional Centrex, these applications provide the functionality of a PBX system from a provider's server rather than a dedicated on-premises server. Unlike traditional Centrex, voice calls are transported from the end user's phones to the host server over a single data link, rather than over individual access lines. For example, a version of IP Centrex is being offered by many VoIP providers, including Covad and VoiceNEXT.[94]

**Q.37 ARE EQUIPMENT MANUFACTURERS ALSO ACTIVE IN THE VOIP MARKETPLACE FOR BUSINESS CUSTOMERS?**

A.37 Yes. Telecom equipment manufacturers Cisco Systems and Avaya provide network design services and actively advertise and promote the use of their equipment by network development "partners" who deal directly with clients in deploying integrated business solutions.[95]

## V. IMPLICATIONS OF INDUSTRY CHANGES FOR THE ANALYSIS OF THE MERGER

**Q.38 WHAT CONCLUSIONS SHOULD THE TRA DRAW FROM YOUR OVERVIEW OF THE COMMUNICATIONS INDUSTRY?**

A.38 There are two principal conclusions. The first is that, as I explained, because AT&T does not compete for mass-market customers in Tennessee, the merger will have no

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[94] "Covad Hosted PBX Phone System," downloaded 03/30/2006 at http://pbx.covad.com/; "What Is Hosted PBX," downloaded 03/30/2006 at http://www.voicenext.com.

[95] See http://www.avaya.com/gcm/master-usa/en-us/corporate/alliances/alliance/index.htm, downloaded 06/01/06 and http://tools.cisco.com/WWWhannels/LOCATR/jsp/ServletController.jsp, downloaded 06/01/06.

detrimental effect on mass-market competition in Tennessee. In addition, because of the variety of options available to business customers, and their sophistication as telecommunications purchasers, the merger will not plausibly affect competition for business customers either. The second is that it is clear that different technologies are now driving the competitive dynamic in the marketplace, and competitors are using these technologies to offer a variety of services with function-rich capabilities. ILECs cannot stand passively by while other providers—making massive investments in their own capabilities—attract customers with new services and combinations of telephony, video, data, and wireless services. Competition in the marketplace today increasingly demands the ability to provide more than "plain old telephone service," as the success of the variety of competitors in the marketplace in eating away ILEC lines is vivid demonstration. The fundamental competitive reality of competition in the marketplace today, with competitors offering various advanced services, new services, and service bundles, impels incumbents with legacy networks to enhance their efficiency and expand their ability to offer new service to the extent they economically can.

**Q.39 DOES THIS COMPLETE YOUR DIRECT TESTIMONY?**

A.39 Yes, it does.

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## EDUCATION

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A.B. (summa cum laude), Economics, UNIVERSITY OF CALIFORNIA AT LOS ANGELES, Los Angeles, CA, 1979

## PRESENT POSITIONS

LECG, LLC Evanston, IL, 1995-present
Director

Office Director, LECG Evanston

NORTHWESTERN UNIVERSITY, Communication Systems Strategy and Management Program, School of Communication, Evanston, IL, 2000 - present
Adjunct Associate Professor of Communication Studies

## ACADEMIC AND PROFESSIONAL EXPERIENCE

NORTHWESTERN UNIVERSITY, J. L. Kellogg Graduate School of Management, Evanston, IL, 1985–1995
Visiting Assistant Professor of Managerial Economics, 1993-1995
Assistant Professor of Managerial Economics, 1985-1992

HOOVER INSTITUTION, 1992-1993
National Fellow

UNIVERSITY OF CHICAGO, Department of Economics, Chicago, IL, 1983–1984
Instructor

CIVIL AERONAUTICS BOARD, Office of Economic Analysis, Washington, DC, Summers, 1979 and 1980
Staff Economist

## HONORS & AWARDS

Guthman Research Chair, Kellogg Graduate School of Management, Northwestern University, Summer 1994.

Hoover National Fellowship, Hoover Institution, 1992-1993.

Faculty Research Fellow, National Bureau of Economic Research, 1987-1990.

Pepsico Research Chair, Northwestern University, 1990.

Kellogg Research Professorship, Northwestern University, 1989.

National Science Foundation Research Grant, 1987-1988.

Buchanan Chair, Kellogg Graduate School of Management, Northwestern University, 1987-1988.

IBM Chair, Kellogg Graduate School of Management, Northwestern University, 1986-1987.

## RESEARCH INTERESTS

Industrial organization, antitrust economics, business strategy, pricing, information industries, network industries, telecommunications policy, theory of the firm, compensation and incentives.

## TEACHING

Courses taught: Pricing Strategy; Information, Communication, and Competition (strategy and competition in communications industries); Intermediate Microeconomic Theory; Managerial Economics (microeconomic theory as applied to business strategy and decision making) at the M.B.A. level, The Economics of Information at the Ph.D. level.

Also qualified to teach: graduate Microeconomic Theory; Industrial Organization and Labor Economics; the Economics of Personnel; Public Finance; Applied Game Theory.

## PUBLICATIONS AND WORKING PAPERS

Contributing author, *ABA Section of Antitrust Law, Telecom Antitrust Handbook, (2005)*, (Chicago: American Bar Association), 2005.

"The Proper Treatment of Spare Network Capacity in Regulatory Cost Models," with Ana Danies, May 2005.

"State Commissions Systematically Have Set UNE Prices Below Their Actual Costs," with Frank Pampush and E. Gerry Keith, 2004.

"Broadband Adoption in the United States: An Empirical Analysis," with David E. Burnstein, in *Down to the Wire: Studies in the Diffusion and Regulation of*

*Telecommunications Technologies,* Allan Shampine, ed., (Nova Science Publishers, Hauppauge, NY, 2003).

"Developments in the Theory of Vertical Foreclosure as Applied to Regulated Telecommunications Markets" (March, 2002), Prepared for Presentation at The American Bar Association Section of Antitrust Law, 50th Annual Spring Meeting.

"Modifications at HHIs for Vertical Supply Relationships" with Wenqing Li and James Langenfeld, White Paper submitted to European Commission, February 2000.

"Economic Theories of Tying and Foreclosure Applied—And Not Applied—in *Microsoft,*" with Steven S. Wildman, *Antitrust*, vol. 14, no. 1, 1999, pp.48-52.

"Effecting a Price Squeeze Through Bundled Pricing," with Steven S. Wildman, in *Competition, Regulation, and Convergence: Current Trends in Telecommunications Policy Research*, Gillett and Vogelsang, eds. (New Jersey: Lawrence Erlbaum Associates, Inc.) 1999, pp. 1-17.

"Worldwide Wait? How the Telecom Act's Unbundling Requirements Slow the Development of the Network Infrastructure," with Ken Dunmore and Frank Pampush, *Industrial and Corporate Change*," vol.7, no. 4, 1998, pp. 615-621.

"The Pricing of Customer Access in Telecommunications," with Steven S. Wildman, *Industrial and Corporate Change*, vol. 5, no. 4, 1996, pp. 1029-1047.

"Bonus and Penalty Schemes as Equilibrium Incentive Devices, With Application to Manufacturing Systems," with Pau Olivella, *Journal of Law, Economics, and Organization*, 10, Spring 1994, pp. 1-34.

"Diversification as a Strategic Preemptive Weapon," *Journal of Economics and Management Strategy*, 2, Spring 1993, pp. 41-70.

"Using the Capital Market as a Monitor: Corporate Spin-offs in an Agency Framework," *RAND Journal of Economics*, 22, Winter 1991, pp. 505-518.

"Firm Organization and the Economic Approach to Personnel Management, *American Economic Review*, vol. 80, no. 2, May 1990, pp. 23-27.

"The Introduction of New Products," with Edward P. Lazear, *American Economic Review*, vol. 80, no. 2, May 1990, pp. 421-426.

"Ability, Moral Hazard, Firm Size, and Diversification," *RAND Journal of Economics*, 19, Spring 1988, pp. 72-87.

"Worker Reputation and Productivity Incentives," *Journal of Labor Economics*, vol. 5, no. 4, October 1987, part 2, pp. S87-S106.

"The Role of Managerial Ability and Moral Hazard in the Determination of Firm Size, Growth and Diversification," Ph.D. Dissertation, University of Chicago, August 1985.

**REPRESENTATIVE PRESENTATIONS**

"Comments on 'Economic Analysis in FCC Merger Proceedings,'" Conference on Economic Analysis and FCC Decisionmaking, presented by the Federal Communications Bar Association (FCBA) and Stanford Institute for Economic Policy Research (SIEPR), Washington D.C., March 15, 2006.

"Economic Principles for Consumer Protection Rules," Pr*i* Telecom / Tech Briefing, Santa Clara, California, October 11, 2005.

"The Proper Treatment of Spare Network Capacity in Regulatory Cost Models," Presentation at the Advanced Workshop in Regulation and Competition, Center for Research in Regulated Industries, Skytop, Pennsylvania, May 2005.

"Telecommunications Regulation: What's Obsolete? What Will Become Obsolete?" Presentation at the State and City Telecom Reform Conference, Heartland Institute, Chicago, Illinois, December 2004.

"Trends in Telecommunications Demand & Supply," Presentation at the 46th Annual NARUC Regulatory Studies Program, Michigan State University, August 2004.

"The Economic Costs of Proposed Wireless Regulations in California," Presentation to Commissioners Brown and Kennedy, California Public Utilities Commission, San Francisco, California, April 2004.

"The Economics of UNE Pricing: Presentation to Staff," Ex parte presentation to the staff of the FCC, in FCC WC Docket No. 03-173: Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers, March 2004.

"The High Cost of Proposed New Wireless Regulations," Presentation to the Pacific Research Institute conference "Regulating Wireless in California: Bill of Rights... or Wrongs?," San Francisco, April 2003.

"The TELRIC Showdown," Panelist, NARUC Staff Subcommittee on Telecommunications, 2002 Annual Convention, Chicago, Illinois, November 2002.

"Economic Principles for Efficient Pricing of Municipal Rights-of-Way," National Association of Telecommunications Officers and Advisors (NATOA), Chicago, Illinois, September 2002.

"Trends in Voice and Broadband Competition in Telecommunications Markets: Markets, Strategies, and Regulation," 82nd Annual Convention of the Indiana Telecommunications Association, Lexington, Kentucky, June 2002.

"Broadband Deployment in the United States," Emerging Opportunities in Broadband Symposium, Northwestern University, Evanston, Illinois, December 2001.

"Local Competition in Illinois," Illinois Telecommunications Symposium, Northwestern University, Evanston, Illinois, December 2000.

"Licensing and Access to Innovations in Telecommunications and Information Services," Telecommunications Policy Research Conference, Alexandria, Virginia, September 2000.

"Effecting a Price Squeeze Through Bundled Pricing," Federal Communications Commission, Washington, D.C., May 1999.

"Competitive and Strategic Use of Optional Calling Plans and Volume Pricing Plans," The Institute for International Research Conference for Competitive Pricing of Telecommunications Services, Chicago, Illinois, July 1998.

"Effecting a Price Squeeze Through Bundled Pricing," Consortium for Research in Telecommunications Policy Conference, University of Michigan, Ann Arbor, Michigan, June 1998.

"The Pricing of Customer Access in Telecommunications," Conference on Public Policy and Corporate Strategy for the Information Economy, Evanston, Illinois, May 1996.

"Diversification as a Strategic Preemptive Weapon," University of Iowa, Iowa City, Iowa, February 1994.

"Diversification as a Strategic Preemptive Weapon, "University of Buffalo, Buffalo, New York, February 1994.

"Diversification as a Strategic Preemptive Weapon," University of Southern California, Los Angeles, California, December 1993.

"Strategic Pricing," Winter Meetings of the Econometric Society, Discussant, Anaheim, California, December 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Michigan State University, Lansing, Michigan, November 1993.

"Diversification as a Strategic Preemptive Weapon," Rutgers University, New Brunswick, New Jersey, November 1993.

"Diversification as a Strategic Preemptive Weapon," University of California at Santa Cruz, Santa Cruz, California, November 1993.

"Diversification as a Strategic Preemptive Weapon," Graduate School of Business, Stanford University, Stanford, California, November 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Purdue University, West Lafayette, Indiana, September 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Summer Meetings of the Econometric Society, Boston University, Boston, Massachusetts, June 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of California, Department of Economics, Berkeley, California, May 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Stanford University, Graduate School of Business, Stanford, California, May 1993.

"Diversification as a Strategic Preemptive Weapon," Stanford University, Graduate School of Business, Stanford, California, April 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Hoover Institution, Stanford, California, April 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of California, Graduate School of Business, Berkeley, California, February 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Stanford University, Department of Economics, Stanford, California, February 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Hoover Institution, Stanford, California, January 1993.

"Pricing Strategies," Session Discussant, 1992 North American Winter Meeting of The Econometric Society, Anaheim, California, January 1992.

"Diversification as a Strategic Preemptive Weapon," University of Toronto, Toronto, Canada, November 1991.

"Diversification as a Strategic Preemptive Weapon," Queen's University, Kingston, Ontario, Canada, November 1991.

"Bonuses and Penalties as Equilibrium Incentive Devices, with Application to Manufacturing Systems," University of Chicago, Chicago, Illinois, June 1991.

"The Timing of Entry into New Markets," Summer Meetings of the Econometric Society, University of Pennsylvania, Philadelphia, Pennsylvania, June 1991.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of Chicago, Chicago, Illinois, April 1991.

"Bonuses and Penalties as Equilibrium Incentive Devices, with Application to Manufacturing Systems," Winter Meetings of the Econometric Society, Washington, D.C., December 1990.

"Corporate Spin-offs in an Agency Framework," University of Washington, Seattle, Washington, October 1990.

"The Timing of Entry Into New Markets," University of British Columbia, Vancouver, British Columbia, October 1990.

"Corporate Spin-offs in an Agency Framework," Texas A&M University, College Station, Texas, April 1990.

"Firm Organization and the Economic Approach to Personnel Management," Winter Meetings of the American Economic Association, New York, New York, December 1989.

"Corporate Spin-offs in an Agency Framework," Western Finance Association Meetings, Seattle, Washington, June 1989.

"Corporate Spin-offs in an Agency Framework," University of Rochester, Rochester, New York, May 1989.

"Corporate Spin-offs in an Agency Framework," North American Summer Meetings of the Econometric Society, Minneapolis, Minnesota, June 1988.

"Competition, Relativism, and Market Choice," North American Summer Meetings of the Econometric Society, Berkeley, California, June 1987.

"Competition, Relativism, and Market Choice," University of Chicago, Chicago, Illinois, April 1987.

"Rate Reform and Competition in Electric Power," Discussant, Conference on Competitive Issues in Electric Power, Northwestern University, Evanston, Illinois, March 1987.

"Worker Reputation and Productivity Incentives," New Economics of Personnel Conference, Arizona State University, Tempe, Arizona, April 1986.

"Ability, Moral Hazard, and Firm Diversification," Various Universities, 1985, 1994, including Yale University, University of Rochester, Stanford University, University of Minnesota, California Institute of Technology, Duke University, Northwestern University, Brown University, Harvard University, University of California - Los Angeles, University of Pennsylvania.

## ACADEMIC JOURNAL REFEREEING

Dr. Aron has served as a referee for *The Rand Journal of Economics, the Journal of Political Economy, the Journal of Finance, the American Economic Review, the Quarterly Journal of Economics, the Journal of Industrial Economics, the Journal of Economics and Business, the Journal of Economic Theory, the Journal of Labor Economics, the Review of Industrial Organization, the European Economic Review, the Journal of Economics and Management Strategy, the International Review of Economics and Business, the Quarterly Review of Economics and Business, Management Science, the Journal of Public Economics, the Journal of Institutional and Theoretical Economics*, and the National Science Foundation.

## SELECTED TESTIMONY AND OTHER ENGAGEMENTS

Expert testimony before the state regulatory commission of California regarding the competitive landscape in California and the desirability of establishing a Uniform Regulatory Framework for the telecommunications industry in the state of California, February 2006.

Deposition testimony and trial testimony in the Court of Chancery in the state of Delaware regarding the possibility of "irreparable harm" to Sprint Nextel's wireless affiliates in connection with Sprint's acquisition of Nextel Corporation, November 2005 – January 2006.

Expert testimony before the state regulatory commissions of California and Ohio evaluating the economic benefits and competitive impacts of the proposed acquisition of AT&T by SBC, June – August 2005.

Expert testimony before the Oklahoma Corporation Commission regarding the proper economic principles for reduced regulation of retail telecommunications services and regarding the determination of the amount of a supersedeas bond to quantify the economic harm likely to result from the award of a stay of Commission order that would grant pricing flexibility and require broadband investment, June – August 2005.

Expert testimony before the Kansas Corporation Commission regarding the sustainability of competition in Kansas, June 2005.

Cost and economic analysis for a large telecommunications firm regarding tariffed volume and term-discounted pricing plans for special access services based on regulatory requirements for consistency of prices with cost structure, March 2005.

Expert testimony before the Missouri Public Service Commission evaluating the potential competitive reclassification of local service in Missouri, January 2005.

Expert testimony before the state regulatory commissions of Ohio and Wisconsin regarding the effects of UNE pricing on the competitive telecommunications markets, July 2004.

Expert testimony before the Florida Public Utilities Commission and the Georgia Public Service Commission, written expert testimony before the public utilities commissions in Mississippi, Alabama, North Carolina, South Carolina, Tennessee, and Kentucky, and deposition testimony, regarding the proper principles for determining which network elements should be provided to competitors on an unbundled basis at regulated rates; including testimony in support of a business case model of the viability of efficient competitive entry in specific geographic markets in each aforementioned state, January-March 2004.

*Ex parte* presentation "The Economics of UNE Pricing," to the Federal Communications Commission staff, with William Rogerson, March 2004.

White Papers, "The Economics of UNE Pricing," December 2003, and "A Further Analysis of the Economics of UNE Pricing," January 2004, with William Rogerson, submitted to the Federal Communications Commission in FCC WC Docket No. 03-173: Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers.

White Paper, "The Effects Of Below-Cost TELRIC-Based UNE Prices On CLEC And ILEC Investment," submitted to the Federal Communications Commission in FCC WC Docket No. 03-173: Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers, January 2004.

Expert testimony before the Illinois Public Utilities Commission regarding the proper determination of Total Element Long Run Incremental Cost (TELRIC) for establishing prices for network elements, March 2004.

Expert testimony before the Illinois General Assembly regarding the effects of current regulated UNE pricing of telecommunications elements on competitive telecommunications markets in Illinois, May 2003.

Expert testimony before the Pubic Utilities Commission of Ohio on issues related to rights-of-way fees charged to electric, water, and telecommunications companies in the City of Toledo, Ohio, March 2003.

Reports evaluating the cost impacts and public policy implications of the proposed California Consumer Protection rules on wireless carriers and customers, February 2003 and September 2003.

Expert testimony before the state regulatory commissions in Ohio, Illinois, Indiana, and Kansas on the economic principles for evaluating anticompetitive claims regarding "winback" pricing by incumbent telecommunications carriers, 2002 - 2003.

Report pertaining to the economic and antitrust analysis of price squeezes, and the suitability of imputation rules as a protection against an anticompetitive price squeeze, for a carrier in a foreign market, 2002.

Expert testimony before the Michigan Public Service Commission pertaining to allegations of anticompetitive effects of long term contracts, 2002.

For a small manufacturer of telecommunications equipment, consulting support to evaluate the antitrust implications of a proposed acquisition, 2002.

White Paper submitted to the Texas Public Service Commission pertaining to the competitive effects of "winback" and "retention" pricing, 2002.

In Order Instituting Rulemaking on the Commission's Own Motion to Assess and Revise the new Regulatory Framework for Pacific Bell and Verizon California Incorporated, written declaration submitted to the California Public Utilities Commission pertaining to the economic incentives created by modifications to the State's alternative regulation plan and competitive reclassification of services, 2002.

Statement to the Federal Communications Commission regarding the potential economic causes of sustained price increases for cable television services, 2002.

Expert testimony before the Kansas Corporation Commission regarding the antitrust principles relevant to establishing rules for competitive reclassification of services under governing state law, 2002.

For a national wireless telecommunications carrier, consulting support pertaining to litigation regarding access charges, 2001.

Expert testimony before the Missouri Public Service Commission pertaining to price squeeze allegations in the long-distance market, 2001.

Expert affidavit submitted to the Circuit Court in the state of Wisconsin, pertaining to irreparable harm caused if court declined to grant a stay of disputed performance remedy plan, 2001.

Expert testimony before the public utilities commissions of Illinois, Ohio, California, and Indiana, pertaining to the economic viability of constructing and provisioning ADSL services, including market definition and examination of competitive conditions, 2001.

Expert testimony before the Illinois Commerce Commission pertaining to the proper economic principles governing unbundling obligations, 2001.

In the matter of H & R Mason Contractor's et al. v. Motorola, Inc. et al., before the Circuit Court of Cook County, Illinois, expert affidavit examining the economic impediments to class certification, focusing on the determinants of price in the relevant equipment markets, April 2001.

For a competitive local exchange provider in a foreign market, consulting support regarding the proper determination of avoided costs for resale of incumbent services, April 2001.

For a major Japanese telecommunications equipment manufacturer, evaluated the revenue potential and desirability of entering several advanced services equipment markets worldwide, for the purposes of assisting the client to evaluate a proposed acquisition, February 2001.

Expert testimony in the Illinois Commerce Commission's Investigation Into Certain Payphone Issues, examined the economic and public policy issues pertaining to pricing of access lines for independent pay telephone providers, April 2001.

In the matter of the Illinois Public Utility Commission's Investigation Into Tariff Providing Unbundled Local Switching And Shared Transport, expert testimony regarding economic antitrust perspectives on obligations of firms to affirmatively help their competitors, and related public policy issues, April 2001.

In response to Request for Consultations by the U.S. Trade Representative (USTR) with the Government of Mexico before the World Trade Organization (WTO) regarding barriers to competition in Mexico's telecommunications market, analyzed regulated switched access rates in the U.S. in comparison with those charged by Telmex, November 2000.

Declaration submitted to the Texas Public Utility Commission, analyzed proposed regulation aimed at preventing incumbents from executing a price squeeze; developed a framework for evaluating claims of a price squeeze consistent with antitrust principles of predation, August 2000.

For a taxicab company, analysis of regulatory requirements in the City of Chicago pertaining to valuation of medallions and valuation of capital for purposes of regulatory ratemaking proceeding, 2000.

Written and oral testimony before the public utility commissions of Illinois and Michigan in various arbitration matters pertaining to the proper compensation for the use by competitors of client's facilities for foreign exchange services, 2000.

For a firm in the aluminum fabrication industry, in the matter of a potential merger between vertically integrated competitors, developed a methodology for adjusting the HHI measure of market concentration to account for the vertical control by the merging parties of downstream competitors, 2000.

For a large newspaper publisher, in the possible acquisition of the San Francisco Chronicle, analyzed the potential antitrust impediments to an acquisition by the client of the Chronicle, including issues of geographic and product market definition, the interplay between advertising markets and customer markets, and the relevant implications of the Newspaper Preservation Act, 1999.

Testimony before the Illinois Commerce Commission regarding the proper economic interpretation of the standards for declaring a service competitive under the Illinois Public Utilities Act, and quantification of the extent of competition in relevant Illinois markets, including discussion of market definition; the relevance of entry conditions; the relevance of resale competition and analysis of various resale entry strategies; the interdependence of

resale and facilities-based entry strategies; and implementation of a technology-based method of measuring market participation, 1999-2000.

For a firm in the consumer mapmaking business, analyzed market definition, concentration, and efficiencies from a proposed merger, 1999.

Affidavit submitted jointly with Robert G. Harris to the Federal Communications Commission in the matter of "unbundled network elements" and commenting on the proper interpretation of the "Necessary and Impair" standard, including discussion of entry conditions and the business-case approach to valuation of an entry strategy, April 1999; reply affidavit May 1999.

Affidavit, "An Analysis of Market Power in the Provision of High-Capacity Access in the Chicago LATA," submitted to the Federal Communications Commission, including an analysis of the US DOJ merger guidelines and their applicability to regulatory relief in a regulated market, as well as extensive empirical modeling of the costs and business case for network buildout of high capacity facilities, February 1999.

White Paper, "Proper Recovery of Incremental Signaling System 7 (SS7) Costs for Local Number Portability," submitted to the Federal Communications Commission, April 1999.

**PROFESSIONAL ORGANIZATIONS**

Member, Telecommunications Policy Research Conference Program Committee

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**PERSONAL INFORMATION**

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