



**LEC Pricing Flexibility FNPRM**  
**List of Commenters**  
**CC Docket Nos. 96-262, 94-1 , 98-157**  
**October 29, 1999**

Ad Hoc Telecommunications Users Committee ("Ad Hoc")

The State of Alaska ("Alaska")

Allegiance Telecom, Inc. ("Allegiance")

Alltel Communications, Inc. ("Alltel")

American Public Communications Council ("APCC")

Association for Local Telecommunications Services ("ALTS")

AT&T Corp. ("AT&T")

Bell Atlantic Telephone Companies ("Bell Atlantic")

BellSouth Corporation ("BellSouth")

Cable & Wireless USA, Inc. ("C&W USA")

Competitive Communications Group, LLC ("CCG")

CoreComm Limited ("CoreComm")

Cox Communications, Inc. ("Cox")

CTSI, Inc. ("CTSI")

Focal Communications Corp. ("Focal") and Hyperion Telecommunications, Inc.  
d/b/a Adelphia Business Solutions ("Adelphia")

General Services Administration ("GSA")

GTE Service Corporation ("GTE")

The State of Hawaii ("Hawaii")

MCI WorldCom, Inc. ("MCI")

MGC Communications, Inc. ("MGC")

McLeodUSA Telecommunications Services, Inc. ("McLeodUSA")

Minnesota CLEC Consortium ("MCC")

National Rural Telecom Association ("NRTA")

The National Telephone Cooperative Association ("NTCA")

State of New York Department of Public Service ("NYDPS")

Organization for the Promotion and Advancement of Small Telecommunications Companies ("OPASTCO")

Rainier Cable, Inc. ("RCI")

RCN Telecom Services, Inc. ("RCN")

Rural Independent Competitive Alliance ("RICA")

SBC Communications, Inc. ("SBC")

Sprint Corporation ("Sprint")

Time Warner Telecom ("Time Warner")

Total Telecommunications Services, Inc. ("TTS")

United States Telephone Association ("USTA")

U S WEST, Inc. ("U S WEST")

Public Service Commission of Wisconsin ("Wisconsin")



## X-FACTOR ADJUSTMENTS

One of the major LEC arguments against the Commission's proposed growth adjustments is that they involve double counting the effect of productivity gains that are already reflected in the measurement of TFP growth. Although there may be some justification for this concern, it can be addressed by making a relatively minor adjustment to the X-Factor.

Taylor points out that adding a q factor to the price cap formula or changing to a different measure of output would require the X-Factor to be recalculated and reduced accordingly.<sup>1</sup> AT&T agrees that the various components of a price cap formula are inextricably related and should not be viewed in isolation from one another. When performing a TFP analysis to determine the X-Factor, it is necessary to take into account how the price cap formulas actually work.<sup>2</sup> For example, suppose a "full q" adjustment were applied to the local switching rate, whereby the rate is reduced at each annual filing by the recent percentage growth in minutes. From the LECs' perspective, the impact of this adjustment on revenue would be equivalent to constant demand (i.e., no growth) for local switching minutes under the existing price cap formula without a q factor. It would therefore be appropriate to treat the quantity of local switching minutes as constant when measuring the growth in total output in a TFP study. This can be accomplished by the following calculations:

1. Interstate switched access revenue is split between *local switching* and *other switched access* components. Revenue shares are calculated for the two components.
2. The growth in switched access minutes is weighted by the revenue share associated with *other switched access* in calculating the index of total LEC output.

This effectively removes the growth in local switching minutes from the index of total output. The new output index is then used to calculate TFP growth and the X-Factor.<sup>3</sup>

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<sup>1</sup> Taylor at 25; USTA at 18.

<sup>2</sup> AT&T has addressed this point with respect to the common line formula and g factor. See, for example, AT&T Ex Parte, attached to January 27, 1998 letter from Brian W. Masterson to the FCC, CC Dockets Nos. 96-262 and 94-1.

<sup>3</sup> The Commission has recently published two new studies that estimate X-Factors. See X-Factor FNPRM, CC Docket Nos. 96-262 and 94-1, FCC 99-345, released November 15, 1999, Appendices B and C. AT&T is currently reviewing these studies to determine what adjustments for the q factor would be appropriate within the context of these studies.

Because local switching accounts for only about 4%-5% of the LECs' total regulated revenues, adjusting for the q factor by removing the growth in local switching minutes would have only a small impact on the X-Factor.<sup>4</sup> For example, if the historical growth in local switching minutes averaged 7% annually and local switching rates accounted for 4.5% on average of total revenue, removing the entire growth of local switching minutes reduces the growth in total output, TFP and the X-Factor by only 0.315% ( $4.5\% * 7\%$ ).<sup>5</sup>

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<sup>4</sup> Interstate local switching rates accounted for 4.25% of total RBOC regulated revenues in 1992 and 4.65% in 1997.

<sup>5</sup> The growth of each type of output in a TFP study is weighted by its share of total revenue to calculate growth in the index of total output. If local switching has a 4.5% share of total revenue, reducing the annual growth in local switching minutes by 7 percentage points has the effect of reducing growth in total output by 4.5% of 7, which amounts to 0.315 percentage points.

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**US WEST RECALCULATION OF CURRENT COMMON LINE REVENUE REQUIREMENT  
FOR 1998 AND 1999 ANNUAL FILINGS WITH CAPPED SLC PLUS PICC REVENUE PER LINE**

		<b>RECALCULATION OF 1998 ANNUAL FILING</b>			<b>RECALCULATION OF 1999 ANNUAL FILING</b>
		<u>USW TRANS. 926 IN EFFECT PRIOR TO 1998 ANNUAL FILING</u>			<u>USW TRANS. 977 IN EFFECT PRIOR TO 1999 ANNUAL FILING</u>
LINE 1	PROPOSED SLC REVENUE	\$851,514,684		PROPOSED SLC REVENUE	\$887,775,698
LINE 2	PROPOSED PICC REVENUE	\$189,284,211		PROPOSED PICC REVENUE	\$205,302,766
LINE 3 = L1+L2	TOTAL PROPOSED LINE REVENUE	\$1,040,798,895		TOTAL PROPOSED LINE REVENUE	\$1,093,078,464
LINE 4	1996 LINES	180,645,780		1997 LINES	188,233,416
LINE 5 = L3/L4	PROPOSED LINE REVENUE/LINE	\$5.76		PROPOSED LINE REVENUE/LINE	\$5.81
		<u>USW TRANS. 935 1998 ANNUAL FILING</u>		<u>USW TRANS. 995 1999 ANNUAL FILING</u>	
LINE 6 = L5	FORMER LINE REVENUE/LINE	\$5.76		FORMER LINE REVENUE/LINE	\$5.81
LINE 7	1997 LINES	188,233,416		1998 LINES	200,075,460
LINE 8 = L6*L7	RECALC. CURRENT LINE REVENUE	\$1,084,515,406		RECALC. CURRENT LINE REVENUE	\$1,161,845,655
LINE 9	MOU/OTHER CURRENT REVENUE	\$60,979,451		MOU/OTHER CURRENT REVENUE	\$91,795,524
LINE 10 = L8+L9	RECALC. TOTAL CURRENT REV.	\$1,145,494,857		RECALC. TOTAL CURRENT REV.	\$1,253,641,179
LINE 11	FILED TOTAL CURRENT REVENUE (Trans. 935, CAP-1, line 610)	\$1,153,899,727		FILED TOTAL CURRENT REVENUE (Trans. 995, CAP-1, line 610)	\$1,287,005,144
LINE 12 = L11-L10	<b>DIFFERENCE</b>	<b>\$8,404,870</b>		<b>DIFFERENCE</b>	<b>\$33,363,965</b>

**EXPLANATORY NOTES:**

Line 12 shows the additional revenue resulting from the changing mix of lines from one year to the next, due to the number of multiline business lines increasing by more than other types of lines.

Line 11 shows current Common Line revenue based on current rates applied to base year demand.

Line 10 shows what current Common Line revenue would be if the number of each type of line had increased by the same percentage over the prior base year. It is calculated by multiplying the current number of lines by the amount of SLC and PICC revenue per line calculated in Line 5 to obtain Line 8, and then adding in other Common Line revenue.

The difference between Line 11 and Line 10 represents the additional revenue attributable to the change in mix of lines.





Enterprise Institute, a Visiting Lecturer of Public and International Affairs at the Woodrow Wilson School at Princeton University, and as a Research Associate Professor of Psychology at the American University.

Dr. Warren-Boulton's area of specialization is in the economics of industrial organization. Dr. Warren-Boulton has authored numerous publications, primarily in the application of industrial organization economics to antitrust and regulation, including a number of papers that consider appropriate public policy toward regulated industries, including telecommunications. Dr. Warren-Boulton has served as an expert witness or consultant on a number of mergers and other antitrust matters, starting in 1981 as an expert witness for the DOJ in *U.S. v. AT&T*, and most recently, for the States and the DOJ in *United States of America v. Microsoft*. A complete description of Dr. Warren-Boulton's background and publications can be found in his Curriculum Vita, a copy of which is attached as Exhibit A to this statement.

Based on his expertise in the economics of industrial organization, Dr. Warren-Boulton will testify as follows:

1. Both the provision of originating access by a LEC and the provision of terminating access by a LEC are subject to market failures.

For originating access, the source of the market failure is that each IXC must charge the same prices for long distance to all its customers, regardless of the originating (or terminating) access fees charged by a particular long distance customer's LEC.

For terminating access, the source of the market failure is that the recipient of an interexchange call does not pay for the call.

2. As a result of these market failures, under unconstrained market conditions, prices for both originating and terminating access will be set by LECs at levels that exceed their competitive levels.

Since the customers of any one LEC account for only a small share of the total number of

customers of an IXC such as AT&T, each LEC can increase its originating access fees to such IXCs without its local exchange customers facing higher long-distance prices as a result. Similarly, since the LEC's local exchange customers do not bear, as a consequence of their choosing to be a customer of that LEC for local exchange service, the cost of terminating access charges levied by that LEC, each LEC can raise its terminating access fees without affecting the demand it faces for its local exchange service. In both markets, the connection between a price charged by the LEC and the demand for its services is severed.

3. Under these conditions, a ruling by the FCC that would prevent AT&T or other IXCs from being able simply to refuse to purchase originating access from a LEC regardless of the originating access fee charged by that LEC would further exacerbate these market failures, and motivate profit-maximizing LECs to charge prices for originating access that exceed even monopoly levels.

4. Allowing AT&T or other IXCs to refuse to purchase originating access from a LEC because of the originating access fees charged by that LEC could at least constrain originating access charges to their monopoly level. Similarly, allowing IXCs to decline terminating access service for calls made by the IXC's long distance customers to local exchange customers of a LEC could constrain termination fees to their monopoly level.

5. Given that neither AT&T nor any other IXC has market power in the market for long distance service provided to any individual LEC's customers, no IXC can force originating access fees below competitive levels, and perhaps not even below monopoly levels, by refusing to provide long distance service to customers of a LEC that charges excessively high fees for originating access.

6. Allowing CLECs to charge supra-competitive access fees that exceed even those of the ILECs cannot be justified on the grounds that this provides a subsidy to entry into local exchange. Entry into markets, even markets subject to incumbent market power, should be neither taxed nor

subsidized. Where market failures such as monopoly power exist, policies should be directed at reducing barriers to entry rather than creating additional market distortions. And, even if a credible "second-best" argument could be made for subsidizing CLEC entry into the local exchange market, there is no reason why such a subsidy should be financed through a quasi-tax on long distance that is likely to be relatively ineffective (given that any pass-through rate by the CLEC is likely to be significantly less than one) and grossly inefficient (since long-distance demand elasticity is relatively high, and because the "tax" may even be set above the monopoly level).

**CURRICULUM VITAE****FREDERICK R. WARREN-BOULTON**

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**Education**

- 1975 Ph.D., Economics, Princeton University
- 1969 M.A., Economics, Princeton University
- 1969 M.P.A., (Master of Public Affairs) Woodrow Wilson School of Public & International Affairs, Princeton University
- 1967 B.A., Economics, Yale University, *cum laude* with High Honors in Economics

**Experience**

- Principal, MICRA: Microeconomic Consulting and Research Associates, Inc., Washington, D.C.; August 1991 - present.
- Resident Scholar, American Enterprise Institute for Public Policy Research, Washington, D.C.; May 1989 - April 1990, Adjunct Scholar, May 1990 - present.
- Visiting Lecturer of Public and International Affairs, Woodrow Wilson School of Public and International Affairs, Princeton University, Princeton, NJ; Spring Semester, 1991
- Senior Vice President, ICF Consulting Associates, Inc., Washington, D.C.; November 1989 - August 1991.
- Research Associate Professor of Psychology, The American University, Washington, D.C.; September 1983 - 1990.
- Deputy Assistant Attorney General for Economic Analysis, Antitrust Division, U.S. Department of Justice, Washington, D.C.; October 1985 - May 1989.

## **FREDERICK R. WARREN-BOULTON**

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Director, Economic Policy Office, Antitrust Division, U.S. Department of Justice, Washington, D.C.;  
September 1983 - September 1985.

Research Associate, Center for the Study of American Business, Washington University in St. Louis;  
July 1978 - June 1985.

Associate Professor, Department of Economics, Washington University in St. Louis; July 1978 - June  
1985. Chairman, Graduate Committee, 1978 - 1980. Chairman, Undergraduate Committee,  
1980 - 1983.

Assistant Professor, Department of Economics, Washington University in St. Louis; September 1972  
- June 1978.

Assistant in Instruction, Woodrow Wilson School of Public and International Affairs, Princeton  
University, Princeton, N.J.; 1969 - 1971.

Research Consultant, Ford Foundation, Kingston, Jamaica, W.I.; Summer 1969.

### **Fields Taught**

Graduate: Industrial Organization, Economic Development and Planning, Microeconomic Theory,  
International Trade, International Finance, Economic Theories of Behavior, Applied  
Microeconomics.

Undergraduate: Government and Business, Industrial Organization, International Trade, International  
Finance, Economic Development, Intermediate Microeconomic Theory, Intermediate  
Macroeconomic Theory, Introductory Microeconomic Theory, Introductory Macroeconomic  
Theory.

### **Grants**

National Science Foundation. Grant title: "Income Maximizing in Choice and Rate Effects," 1988 -  
1991.

National Science Foundation. Grant title: "Application of Economic Theory to Operant Schedule  
Effects," 1985 - 1987.

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National Science Foundation. Grant title: "Income and Choice," 1983 - 1985.

### Professional Activities

Referee, *American Economic Review*, *The Bell Journal of Economics/Rand Journal*, *Economic Inquiry*, *Industrial Organization Review*, *Journal of Industrial Economics*, *Journal of Law and Economics*, *Journal of Political Economy*, *Quarterly Journal of Economics*, *Southern Economic Journal*.

Member, Editorial Board, *International Journal of the Economics of Business*.

Member, American Bar Association, American Economic Association, Southern Economic Association, Western Economic Association.

### Languages

French, German

### Publications

"Market Definition and the Price Effects of Mergers: Staples- Office Depot (1997)," in *The Antitrust Revolution: Economics, Competition and Policy*, John E. Kwoka and Lawrence J. White, eds.; Oxford University Press, third edition, 1999, with Serdar Dalkir.

"Unilateral Price Effects: Staples and Office Depot," in *The M&A Lawyer*, June 1998, Vol. 2, No. 3, with Serdar Dalkir. Available in revised form as "How Do You Know an Office Superstore? Staples and Office Depot," on <http://www.antitrust.org/cases/>.

"Resale Price Maintenance Reexamined: Monsanto v. Spray-Rite (1984)," in *The Antitrust Revolution: Economics, Competition and Policy*, John E. Kwoka and Lawrence J. White, eds.; Oxford University Press, third edition, 1999.

"Exclusionary Behavior in the Market for Operating System Software: the Case of Microsoft," in *Opening Networks to Competition: the Regulation and Pricing of Access*, David Gabel and David F. Weiman, eds.; Kluwer Academic Publishers, 1998, with Kenneth C. Baseman and Glenn A. Woroch.

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"The Economics of Intellectual Property Protection for Software: The Proper Role for Copyright," American Council on Interoperable Systems, Washington, D.C., June 1994, and *StandardView: ACM Perspectives on Standardization* 3-2 (June 1995), pp.68-78, with Kenneth C. Baseman and Glenn A. Woroch.

"Microsoft Plays Hardball: Use of Nonlinear Pricing and Technical Incompatibility to Exclude Rivals in the Market for Operating Software," *The Antitrust Bulletin* 40-2 (Summer 1995), pp.265-315, with Kenneth C. Baseman and Glenn F. Woroch.

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"A Commentary on the 1992 U.S. Merger Guidelines," *International Merger Law*, 22 (June 1992), pp. 14-19.

"The Use of Stock Market Returns in Antitrust Analysis of Mergers," *Review of Industrial Organization*, 7-1 (1992), pp. 1-11, and *Economic Analysis Group Discussion Paper #88-1*, January 1988, with Robert H. McGuckin and Peter Waldstein.

"Implications of U.S. Experience with Horizontal Mergers and Takeovers for Canadian Competition Policy," in *The Law and Economics of Competition Policy*, Frank Mathewson, Michael Trebilcock and Michael Walker, eds.; The Fraser Institute, Vancouver, B.C., 1990.

"Maricopa and Maximum-Price Agreements: Time for a New Legal Standard?" *Journal of Health Economics*, 7 (June 1988), pp. 185-190.

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- "Maximizing Present Value: A Model to Explain Why Moderate Response Rates Obtain on Variable-Interval Schedules," *Journal of the Experimental Analysis of Behavior*, 49 (May 1988), pp. 331-338, with Alan Silberberg and Toshio Asano.
- "Sources of the 'Crisis' in Liability Insurance: An Economic Analysis," in *Yale Journal of Regulation*, 5 (Summer 1988), pp. 367-395; *Economic Analysis Group Discussion Paper #88-2*, February 1988; and *An Update on the Liability Crisis: Tort Policy Working Group*, U.S. Government Printing Office: 181-487:60075, March 1987, with Richard N. Clark and David D. Smith.
- "State and Federal Regulation in the Market for Corporate Control," *The Antitrust Bulletin*, 32 (Fall 1987), pp. 661-691, and *Economic Analysis Group Discussion Paper #86-4\**, January 1986, with Margaret E. Guerin-Calvert and Robert H. McGuckin.
- "Income and Choice Between Different Goods," *Journal of the Experimental Analysis of Behavior*, 48 (September 1987), pp. 263-275, with Alan Silberberg and David Shurtleff.
- "Inferior-Good and Giffen-Good Effects in Monkey Choice Behavior," *Journal of Experimental Psychology: Animal Behavior Processes*, 13 (1987), pp. 292-301, with Alan Silberberg and Toshio Asano.
- "Efficiencies, Failing Firms, and Alternatives to Merger: A Policy Synthesis," *The Antitrust Bulletin*, 31 (Summer 1986), pp. 431-450, and *Economic Analysis Group Discussion Paper #86-14*, August 1986, with John Kwoka.
- Oil Pipeline Deregulation: Report of the U.S. Department of Justice*, U.S. Government Printing Office: 1986, 491-510:40159, May 1986, with Charles J. Untiet.
- "Merger Policy and Enforcement at the Antitrust Division: The Economist's View," *Antitrust Law Journal*, 54 (Spring 1985), pp. 109-115.
- "Reanalysis of the Equation for Simple Action," *Journal of the Experimental Analysis of Behavior*, 43 (March 1985), pp. 265-277, with Alan Silberberg, Michael Gray and Randolph Ollom.
- "Considering the Effects of Financial Incentive and Professional Ethics on 'Appropriate' Medical Care," *Journal of Health Economics*, 3 (December 1984), pp. 223-237, with Robert Woodward.

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"Paying the Doctor: A Model of Work-Leisure Decisions under Alternative Remunerations," *Proceedings of the American Statistical Association*, 1979, with Robert Woodward.

*Vertical Control of Markets: Business and Labor Practices.* Ballinger Publishing Company, Cambridge, Mass., 1978.

"Vertical Control by Labor Unions," *American Economic Review*, 67 (June 1977), pp. 309-322. Reprinted as Publication Number 17, Center for the Study of American Business, November 1977.

"Vertical Control with Variable Proportions," *Journal of Political Economy*, 82 (July - August 1974), pp. 783-802.

*Preliminary Survey of Jamaican Management Manpower: Resources and Requirements.* Jamaican Institute of Management, 1969.

**Conference, Seminar, Working and Discussion Papers**

"Proving Damages in a Business Case," Business Litigation Seminar, Business Law Section of the Florida Bar, November 20 (Tampa) -21 (Miami), 1997.

"Basic Economics for Lawyers," Section of Antitrust Law, American Bar Association, New York, N.Y., October 3-4, 1996.

"Vertical Control in the Entertainment Industry," Chair's Showcase Program: The Integration, Disintegration and Reintegration of the Entertainment Industry, American Bar Association, Section of Antitrust Law, 44th Annual Antitrust Spring Meeting, Washington D.C., March 28, 1996.

"Privatization and Regulation in the Restructuring of Electric Utilities in Eastern Europe," IBRD Conference on the Privatization of Electric Utilities, Prague, The Czech Republic, September 1993.

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"Implications of the United States Experience with Regulation and Antitrust for Competition Policy in Countries in Transition from Centrally Planned Economies to Market Economies," IBRD/EDI/USAID Seminar on Microeconomics, Vienna, Austria, July 1993.

"The Economics of Punitive Damages." Punitive Damages after TXO: American Bar Association Antitrust Section Meeting, New York, August, 1993.

"Regulatory Alternatives for FERC Following the Energy Policy Act of 1992," The Federal Energy Bar Association Mid-Year Meeting, Washington, D.C., November 19, 1992.

"The Economics of Credit Card Interest Rate Caps," Seminars at the Economic Analysis Group, U.S. Department of Justice, September 29, 1992; the Board of Governors of the Federal Reserve System, October 7, 1992; and the D.C. Bar Association, November 19, 1992.

"Straws in the Bottleneck: A Proposal for Efficient Network Interconnection," presented at the Tenth Biennial Conference of the International Telecommunications Society, Cannes, France, June 1992; *Journal of Regulatory Economics* Editors' Conference, San Diego, October 1992, with John Woodbury and Glenn Woroch.

"Economic Principles of Penalties for Antitrust Violations, and the Role of the Economist in Corporate Sentencing," Corporate Sentencing Under the Federal Sentencing Guidelines for An Antitrust Defendant, The Federal Bar Association, Antitrust and Trade Regulation Section, May 1992.

"The State of Antitrust in 1991: A Kindler, Gentler Antitrust?," The CATO Institute Conference, 1991, with Steve Calkins.

"Economic Analysis and Policy Implications of the Financial Interest and Syndication Rule," Telecommunications Policy Research Conference, October 1990, with John Woodbury.

"The Design and Evaluation of Competitive Rules Joint Ventures for Mergers and Natural Monopolies," American Enterprise Institute conference on Policy Approaches to the Deregulation of Network Industries, October 1990, and at the American Economic Association Meetings, December 1989, with John Woodbury.

"Regulation and the Partially Monopolized Network: Lessons from Telecommunications," American Enterprise Institute conference on Policy Approaches to the Deregulation of Network Industries, October 1990, with Roger Noll.

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- "Price Regulation and Common Carrier Regulation," AEI Conference on Oil Pipeline Deregulation, American Enterprise Institute.
- "Regulation of New Crude-Oil Pipelines: Natural Monopoly and Information Externalities," AEI Conference on Oil Pipeline Deregulation, American Enterprise Institute.
- "Economic Theory as the Missing Link in the Merger Guidelines," American Bar Association Antitrust Section Spring Meeting, March 1990.
- "Testing the Structure-Competition Relationship on Cross-Sectional Firm Data," *Economic Analysis Group Discussion Paper #88-6*, May 1988, and at the Southern Economic Association Meetings, November 1986, with Donald M. Brown.
- "Deterring Criminal Antitrust Behavior: Sanctions versus Structure," Stanford University Conference, June 1987.
- "Deregulation of Electric Power Generation," New Mexico State University Conference, September 1986, and Edison Electric Institute, April 1987.
- "Do Successful Tender Offers Benefit Bondholders?" Southern Economic Association Meetings, November 1986, with Catherine Benham, Donald M. Brown and Susan E. Woodward.
- "Professional Ethics and Financial Incentives: 'Appropriate' Medical Care," *Washington University Department of Economics Working Paper #40*, May 1982, with Robert Woodward.
- "Hospital Care Expenditure Inflation: Crisis or Consumption?" *Washington University Department of Economics Working Paper #43*, December 1982, with Robert Woodward and Walter Chien.
- "Transfer Pricing within U.S. Corporations," Sixth U.S.-Soviet Economic Symposium; Alma-Ata, Kazakhstan, U.S.S.R., May - June, 1981.
- "The Impact of Automobile Mileage Standards," Western Economic Association Meetings, 1979, with Michael Smirlock.
- "The Effect of Factor-Augmenting Technical Change on Factory Demand, and the Response by Factor Suppliers," Western Economic Association Meetings, October 1977.
- "Vertical Integration in Telecommunications," Telecommunications Policy Research Conference, April 1974.

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**Other Papers**

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"Implementing Competitive Rules Joint Ventures for Railroads," IBRD (World Bank), April, 1995.

"Critical Loss and Critical Elasticity: Their Derivation and Use in Market Definition for Mergers," November 1994.

"When Nominally Monopolistically-Competitive Firms are Really Perfectly Competitive: Going First-Class on the Paris Metro," July 1986.

"Mandatory Energy Performance Standards and Residential Energy Demand," 1981, with Alan Rockwood and Richard Adams.

"The Effects of Endogenous Quality Change on Demand and Costs," October 1977.

**Testimony, Depositions, Commissioned Studies, and Government Consulting**

State of New York, et al., and U.S. Department of Justice: Expert Witness in United States of America v. Microsoft Corporation, and State of New York ex rel. v. Microsoft Corporation. Declaration May 15, 1998, Report September 3, 1998, Deposition September 26, 1998, Direct Testimony and Trial Testimony November 19 - December 1, 1998.

Brunswick Corporation: Expert witness in Concord Boat Co. et. al. v. Brunswick Corporation. U.S. District Court, Eastern District of Arkansas, Western Division. Trial testimony June 11, 1998. Depositions February 2-4, 1998.

Bepco, Inc.: Deposition in Bepco, Inc. et. al. v. Allied Signal, Inc. and Allied Signal Truck Brake System Company, November 25-26, 1998.

St. Louis Convention and Visitors Commission: Declaration in St. Louis Convention and Visitors Commission v. National Football League, et al.; U.S. District Court, Eastern District of Missouri, Eastern Division, C.A. No. 4:95CV02443 JCH, September 12, 1997.

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AT&T: (a) Direct Testimony and Deposition in State of Indiana, Indiana Utility Regulatory Commission, Cause No. 397051994, April 1994; (b) Position Paper on Docket No. 94-07-02: Development of the Assumptions, Tests, Analysis and Review to Govern Telecommunications Service Reclassifications in Light of the 8 Criteria Set Forth in Section 8 of Public Act 94-83. State Of Connecticut, Department of Public Utility Control, October 1994; (c) Comments on the Position Papers on Docket No. 94-07-02. State Of Connecticut, Department of Public Utility Control, November 1994; (d) Rebuttal Testimony in Kansas Corporation Commission Docket No. 190, 492-U, July 15, 1996; (e) Direct and Rebuttal Testimony in AT&T Communications of the Southwest Inc. , Missouri Case No. TO-97-40; (f) In the Matter of Southwestern Bell Telephone Company - Kansas Compliance with Section 271 of the Federal Telecommunications of 1996, Docket No. 97-SWBT-411-GIT; (g) Application of Ernest G. Johnson, Director of the Public Utility Division Oklahoma Corporation Commission to Explore The Requirements of Section 271 Of The Telecommunications Act of 1996, Cause No. PUD 970000064; (h) Declaration in In the Matter of Implementation of the Pay Telephone Reclassification and Compensation Provisions of the Telecommunications Act of 1996, Federal Communications Commission, CC Docket No. 96-128, September 9, 1997.

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Leo One USA: Affidavit in Amendment of Part 25 of the Commission's Rules to Establish Rules and Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Service, FCC Docket No. 96-220, December 20, 1996.

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