HAROLD WARE

BUSINESS ADDRESS

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Dr. Ware is currently Vice President, National Economic Research Associates, Inc. Dr. Ware received a B.A. *cum laude* in Economics from the State University of New York at Stony Brook, an M.S. in Mathematics Education from Yeshiva University, and M.A. and Ph.D. degrees in Economics from Cornell University.

At NERA, Dr. Ware has prepared testimony and conducted studies in antitrust cases and regulatory proceedings involving firms in a variety of industries. Much of his research has focused on telecommunications. Dr. Ware's recent work includes: analyses of emerging wireless and broadband alternatives to traditional telecommunications services; a detailed study of local competition and the desirability of reduced regulation; an international study of the indirect costs of telecommunications regulation; analysis and advice to counsel regarding payphone service competition; an analysis of the relevant market for business telecommunications services; analyses of the competitive and regulatory implications of the Telecommunications Act of 1996 and of appropriate federal universal service policies under the Act; analyses of the competitive effects of mergers on long distance service markets and wireless telecommunications markets and between telephone and cable TV companies; studies of regulatory treatment of stranded investment and appropriate depreciation policy in increasingly competitive markets; studies of demand and competition in the interexchange toll, local access, Centrex and private line markets; analyses and testimony on the planning and deployment of new electronic technology; a comparative econometric analysis of marketing costs; research on the benefits and costs of marketing; a study of the resale of cellular telephone service; and an analysis of competition in the PBX market and of damages in a PBX dealer termination case.

Dr. Ware has also studied: pricing policy regulation, competition, and demand for postal services, the impact of postal rate changes on the catalog marketing industry, the cost of fixed and mobile communications services, the cost of unserved demand for electricity, customer choice of interruptible rates, and the costs and benefits of time of day pricing for electricity. Dr. Ware's work on cases involving unregulated markets has included analyses of: the economic impacts of price discrimination and related practices; economic damages issues; and supply and demand substitutability in connection with predatory pricing.

While pursuing his graduate studies at Cornell University, Dr. Ware taught courses in economics and industrial organization and did research on cellular mobile communications in the Technology Assessment Project of the Program on Science, Technology and Society. He was co-author of three chapters in the resulting book, *Communications for a Mobile Society: An Assessment of New Technology*.

EDUCATION:

CORNELL UNIVERSITY
Ph.D., Economics, 1978

CORNELL UNIVERSITY
M.A., Economics, 1976

YESHIVA UNIVERSITY
M.S., Mathematics Education, 1974

STATE UNIVERSITY OF NEW YORK AT STONY BROOK
B.A. *cum laude*, Economics, 1969

EMPLOYMENT:

NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC.

1997- Vice President. Dr. Ware has conducted studies and prepared testimony for regulatory proceedings and antitrust cases in a variety of industries. Much of Dr. Ware's research has focused on telecommunications, including: studies of appropriate regulatory pricing and depreciation policies in competitive markets; studies of demand and competition in the local, toll, Centrex/PBX and private line markets; analyses of the planning and deployment of new electronic technology in telecommunications networks; a comparative econometric analysis of marketing costs; research on the benefits and costs of marketing; a study of two-way mobile radio use in trucking; consulting on incremental cost studies; a comparison of the costs of cellular and wireline telephone service; studies of the costs, capacity and demand for alternative access options; studies of residential demand for telephone service; an extensive study of innovative performance; and analyses of testimony and regulatory filings concerning access pricing, cross-subsidization and other pricing issues. Dr. Ware has also studied: the economics of postal pricing and catalog marketing, the cost of unserved electricity, customer choice of interruptible rates, and the costs and benefits of time of day pricing for electricity.

Dr. Ware's work on cases involving unregulated markets has included analyses of: competition in the PBX market and of damages in a PBX dealer termination case; the economic impacts of price discrimination and related practices; economic damages issues; and supply and demand substitutability in connection with predatory pricing.

1984-1997 Senior Consultant

1978-1983 Senior Economic Analyst

1977-1978 Economic Analyst

CORNELL UNIVERSITY

1975-1977 Researcher, Program on Science, Technology and Society Dr. Ware participated as an economist in a multidisciplinary assessment of an emerging technology--cellular mobile radio. He co-authored and edited three chapters in the resulting book dealing with the costs, benefits and appropriate regulatory structure of the cellular industry.

1976 Instructor, Industrial Organization, Economics 351/551 (Summer).

1974-1977 Teaching Assistant, Microeconomics/Macroeconomics

MOUNT VERNON HIGH SCHOOL

1969-1974 Mathematics Teacher

STATE UNIVERSITY OF NEW YORK AT STONY BROOK
1966-1969 Research Assistant, Department of Economics

PROFESSIONAL ACTIVITIES:

The American Economic Association

President of the Stony Brook Chapter of the National Economics Honor Society, September 1968 - June 1969 (Vice President, September 1967 - June 1968)

TESTIMONY:

Ex parte Presentation to Federal Communications Commission staff members, on behalf of Bell Atlantic, regarding the Hybrid Cost Proxy Model, September 9, 1999.

Affidavit (with C. Dippon) in the matter of Federal-State Joint Board on Universal Service, Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, Before the Federal Communications Commission, Washington, DC, July 23, 1999.

Rebuttal Affidavit (with R. Schmalensee and P. Brandon) in the matter of the Application of Southwestern Bell Telephone Company Seeking Verification That It Has Fully Complied With And Satisfied the Requirements of § 271 (c) of the Telecommunications Act of 1996, Before the Arkansas Public Service Commission, June 12, 1998.

Affidavit, "Analysis of Hybrid Cost Proxy Model" Attachment 1 to the "Comments of Bell Atlantic on Hybrid Cost Proxy Model," in the matter of Federal-State Joint Board on Universal Service, Forward-Looking Mechanism for High Cost Support for Non-Rural LECS, CC Docket No. 96-45 and CC Docket No. 97-160, before the Federal Communications Commission, November 25, 1997.

Affidavit (with K. Gordon, R. Schmalensee and W. Taylor) in the matter of Application for NYNEX Corporation for Authority to Provide In-Region, InterLATA Service in the State of Maine, Before the Federal Communications Commission, Washington, DC, May 1997.

Affidavit (with R. Schmalensee and W. Taylor) in the matter of Application for NYNEX Corporation for Authority to Provide In-Region, InterLATA Service in the State of New York, Before the Federal Communications Commission, Washington, DC, February 1997.

Affidavit (with R. Schmalensee) in the matter of Application for NYNEX Corporation for Authority to Provide In-Region, InterLATA Service in the State of New York, Response to Department of Justice Request for Comments on Section 271 Standard, Washington, DC, December 13, 1996.

Rebuttal Testimony presenting the results of a study of third-class mailers (primarily mailers of catalogs) to determine the economic impacts of various postal rate proposals, before the Postal Rate Commission, Washington, DC, Docket No. R94-1, on behalf of Direct Marketing Association, Inc., September 7, 1994.

Affidavit (with R. Rozek) in the matter of *U.S. vs. Western Electric Co. and American Telephone and Telegraph Company*, U.S. District Court for the District of Columbia, Civil Action No. 82-0192-HHG, supporting "BellSouth Corporation's Reply to the Memorandum of the United States in Response to the Bell Companies' Motion for Generic Wireless Waivers," filed September 2, 1994.

Affidavit (with R. Rozek) in the matter of *U.S. vs. Western Electric Co. and American Telephone and Telegraph Company*, U.S. District Court for the District of Columbia, Civil Action No. 82-0192-HHG, supporting "BellSouth Corporation's Opposition to AT&T's Motion for a Waiver of Section I(D) of the Decree Insofar as it Bars the Proposed AT&T-McCaw Merger," filed June 28, 1994.

Affidavit (with R. Rozek) on behalf of BellSouth Corporation before the Federal Communications Commission in the matter of *AT&T-McCaw Merger, In re Applications of American Telephone and Telegraph Company and Craig O. McCaw For Consent to the Transfer of Control of McCaw Cellular Communications, Inc. and its Subsidiaries*, File No. ENF-93-44, filed June 20, 1994.

Surrebuttal Testimony regarding how Contel has conducted its investment planning studies, forecast accuracy and the role of unquantified benefits of new technology in investment decision making, before the Missouri Public Service Commission, Case No. TR-89-196, on behalf of Contel of Missouri, Inc., December 29, 1989.

Affidavit in the matter of *United States v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, U.S. District Court for the District of Columbia, Civil Action No. 81-0192-HHG, supporting the "Request of NYNEX Corporation for a Waiver to Provide International Telecommunications to and from the United States," filed April 29, 1988.

Rebuttal Testimony regarding Planning and Deployment of Digital Technology, before the Minnesota Public utilities Commission, Docket No. P412/CI-86-354, on behalf of Northwestern Bell Telephone Company, October 5, 1987.

Direct Testimony regarding Residential Demand for Telephone Service before the New York Public Service on behalf of Continental Telephone Company of New York, Inc., November 1984

SPEECHES, PAPERS AND REPORTS:

"Costs of Telecommunications Competition Policies," (with Nigel Attenborough, Timothy Tardiff and Agustin Ros) an Assessment of the Indirect Costs of Regulation in the US, UK and Other Countries, Prepared for Telecommunications New Zealand, May 9, 2000.

Analysis of Competition for Local Residence, Business and Carrier Access Services in New Jersey (Confidential) Prepared for Bell Atlantic-New Jersey, March 2000.

"Bundled Services and BOC Entry into Long Distance Service," presented at Advanced Workshop in Regulation and Competition, Center for Research in Regulated Industries; Rutgers, Newark, New Jersey, January 7, 2000.

"Still Not Ready for Prime Time: An Assessment of Initial Results from HCPM 2, HM 5.0 and BCPM 3.0," Prepared for Bell Atlantic, January 15, 1998.

"Diversification Trends in Telecommunications: Regulatory, Technological and Market Pressures," presented at the Institute for International Research Conference on "Successfully Developing Alternative Products & Services in the Utilities Industry," New Orleans, Louisiana, November 19, 1996.

"Competition and Rate Restructuring for Postal Services," presented at the Fourth Bi-Annual Conference on Postal and Delivery Economics: Managing Change in the Postal and Delivery Industries, sponsored by the Rutgers University Center for Research in Regulated Industries, Monterey California, May 24, 1996.

"Competition, Stranded Investment and Rate Rebalancing in Telecommunications," presented at the National Association of Regulatory Utility Commissioners 107th Annual Convention and Regulatory Symposium, New Orleans, Louisiana, November 13, 1995.

(Moderator for) "Competition and Regulation" Twenty-second Annual Telecommunications Policy Research Conference, Solomon, Maryland, October 3, 1994.

"Effects of IntraLATA Toll Competition on Local Residence Rates," (Confidential Report) Prepared for Bell Atlantic-New Jersey, May 1994.

"Recovery and Avoidance of Stranded Investment in Telecommunications," Prepared for New England Power Service Company, Westborough, Massachusetts, March 10, 1994.

"The Effects of IntraLATA Competition and Presubscription on the Residence and Small Business Markets in New Jersey," (Confidential Report) Prepared for Bell Atlantic-New Jersey, December 1993.

"A Study of Demand for Optional New York Telephone Residence Services," Prepared for New York Telephone Company and Telesector Resources Group, Inc., August, 1993.

"Gaining Postal Rate Commission Acceptance of Demand-Based Pricing," presented to Government Affairs Committee of the Direct Marketing Association, Washington, DC, December 15, 1992.

"NERA Ordered Logit Analysis of Centrex and Private Line Service," prepared for New York Telephone Company, May 18, 1990.

"Regulatory, Technological and Strategic Determinants of Centrex Demand," Bellcore and Bell Canada Industry Forum on Telecommunications Demand Analysis with Dynamic Regulation, Hilton Head, South Carolina, April 24, 1990.

"Impacts of Deregulation and Competition on the PBX/Centrex Market", Seventeenth Annual Telecommunications Policy Research Conference, Airlie House, Airlie, VA, October 2, 1989.

"Regulatory Scrutiny of Marketing Expenses: Competitive Necessity vs. Regulatory Hang Ups," NERA Telecommunications Seminar, Scottsdale, Arizona, April 12-14, 1989.

"Competition in Telecommunications for Large Users in New York," NERA Telecommunications Seminar, Scottsdale, Arizona, April 12-14, 1989.

"New Directions In Telecommunications Planning" (Confidential) April, 1989.

"Telecommunications Competition For Large Business Customers in New York, A Summary of Research on Competitive Alternatives to New York Telephone Exchange Access and Private Line Service" (Confidential) June 25, 1987.

"Assessing the Competitive Potential of Regulated Markets," *Telecommunications in A Competitive Environment*, (proceedings of NERA conference held at Camelback Inn, Scottsdale, Arizona), March 4-7, 1987.

"The Bypass Question: Can We Find A Better Answer?," NERA Telecommunications Seminar, The Wigwam, Litchfield Park, Arizona, January 24-26, 1985.

PUBLICATIONS:

"Competition and Diversification Trends in Telecommunications: Regulatory, Technological and Market Pressures," *Journal of Regulatory Economics,* Published by Kluwer Academic Publishers, March 1998.

"Competition and Rate Restructuring For Postal Services" *Managing Change in the Postal and Delivery Industries,* Crew & Kleindorfer, ed., Published by Kluwer Academic Publishers, January 1997.

"The Competitive Potential of Cellular Mobile Telecommunications," *Public Utilities Fortnightly*, February 1983. Reprinted in *IEEE Communications,* November 1983.

"The Cost of Systems at 900 MHZ" (Chapter 4)
"Quantification of Some Benefits of Mobile Communications" (Chapter 10)
"The Emerging Mobile Communications Industry: Structure and Regulation" (Chapter 14) in *Communications for a Mobile Society: An Assessment of New Technology*, Raymond Bowers, ed., (Beverly Hills/London: Sage Publications, 1978).

"Market Structure and Spectrum Considerations in the Land Mobile Communications Industry," Fifth Annual Telecommunications Policy Conference, Airlie, Virginia March 30 - April 2, 1977, Vol. I, Federal Communications Commission (Washington, D.C.: National Technical Information Service, 1977).

"The Impact of Technological Change on Regulation: The Emerging Land Mobile Communications Industry," August 1977, Doctoral Dissertation, Cornell University.

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