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specific sunk costs the lowest of the non-recurring charges for channel termination now charged in ILEC tariffs and limit any non-recurring charge to that benchmark value.<sup>80</sup>

68. Moreover, the use of benchmarking to foster conditions that encourage competition need not be limited to non-recurring charges. For example, the Commission should also establish benchmarks for charges for circuit migration, for limits on the number of requests to transfer service processed per day, and for other charges and provisioning practices based on the least restrictive practices of ILECs.<sup>81</sup>

69. Finally, we understand that some ILECs offer more favorable circuit-specific term plans, smaller termination penalties, or even circuit portability, but in only a portion of their territories. In such cases, the Commission should extend the use of regulatory benchmarking to require that, where an ILEC offers more favorable contract terms in one part of its territory, it must offer those terms throughout its entire territory. This would have the effect of allowing customers in one area to benefit from the existence of competition in another area.

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<sup>80</sup> For a general discussion of benchmarking, see “Benchmarking and the Effects of ILEC Mergers,” Declaration of Joseph Farrell and Bridger M. Mitchell (dated Oct. 14, 1998) (attached as Attachment C to Sprint Communications Company L.P., Petition to Deny, CC Docket No. 98-141 (filed Oct. 15, 1998)).

<sup>81</sup> See *Level 3 February 22 Letter* at 13-14; [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL].

**REDACTED – FOR PUBLIC INSPECTION**

Attachment 1 to Stanley M. Besen and Bridger M. Mitchell,  
“Anticompetitive Provisions of ILEC Special Access  
Arrangements”

**STANLEY M. BESEN**

**EDUCATION**

City College of New York

B.B.A., Economics (1958)

Yale University

M.A., Economics (1960)

Ph.D., Economics (1964)

**PROFESSIONAL EXPERIENCE**

2008- Senior Consultant, Charles River Associates

1992-2008 - Vice President, Charles River Associates

1980-1992 - Senior Economist, The Rand Corporation

1990-1991 - Visiting Professor of Law and Economics, Georgetown University Law Center

1988-1989 - Visiting Henley Professor of Law and Business, Columbia University

1985-1988 - Coeditor, Rand Journal of Economics

1978-1980 - Co-Director, Network Inquiry Special Staff, Federal Communications Commission

1971-1972 - Brookings Economic Policy Fellow, Office of Telecommunications Policy, Executive Office of the President

1965-1980 - Assistant Professor, Associate Professor, Professor of Economics, Allyn R. and Gladys M. Cline Professor of Economics and Finance, Rice University

1963-1965 - Economist, Institute for Defense Analyses

1962-1963 - Acting Assistant Professor of Economics, University of California, Santa Barbara

**CONSULTANCIES**

The Rand Corporation, 1972-1978

Office of Telecommunications Policy, Executive Office of the President, 1972-1977

Department of Defense, 1967

## PROFESSIONAL ACTIVITIES/HONORS

Member, National Research Council Board on Earth Sciences and Resources, Division on Earth and Life Studies, Committee on Licensing Geographic Data and Services, 2002-2004

Member, The National Academies, Computer Science and Telecommunications Board of the Division on Engineering and Physical Science, Committee on Internet Navigation and the Domain Name System, 2001-2004

Member, Editorial Board, Economics of Innovation and New Technology, 1989-present

Member, Editorial Board, Information Economics and Policy, 1992-2004

Member, U.S. National Committee on Data for Science and Technology (CODATA), National Academy of Sciences/National Research Council, 1993-1996

Member, Office of Technology Assessment Advisory Panel on Communications Systems for an Information Age, 1986-1988

Member, Regional Telecommunications Planning Advisory Committee, City of Cincinnati, 1985

Member, Office of Technology Assessment Advisory Panel on Intellectual Property Rights in an Age of Electronics and Information, 1984-1985

Expert, World Intellectual Property Organization/UNESCO Meeting on Unauthorized Private Copying of Recordings, Broadcasts and Printed Matter, 1984

Who's Who in America, 1982-1983, 1984-1985, 1986-1987, 1988-1989, 1990-1991, 1992-1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012

Who's Who in Science and Engineering, 2011-2012

Member, Editorial Board, Southern Economic Journal, 1979-1981

Member, Task Force on National Telecommunications Policy Making, Aspen Institute Program on Communications and Society, 1977

Brookings Economic Policy Fellow, 1971-1972

Member, Technical Advisory Committee on Business Development, Model City Program, City of Houston, 1969-1971

Wilson University Fellow, 1959-1961

Overbrook Fellow, 1958-1959

Beta Gamma Sigma, 1958

## PUBLICATIONS

### Books

**Misregulating Television: Network Dominance and the FCC**, University of Chicago Press, 1984 (with T.G. Krattenmaker, A.R. Metzger, and J.R. Woodbury). Paperback edition, 1986.

**New Television Networks: Entry, Jurisdiction, Ownership and Regulation**, Final report, Network Inquiry Special Staff, Federal Communications Commission, 1980 (with T.G. Krattenmaker et al).

**Introduction to Monetary Economics**, Harper and Row, 1975.

### Articles

“An Economic Analysis of the AT&T-T-Mobile USA Wireless Merger,” **Journal of Competition Law & Economics**, forthcoming (with S.D. Kletter, S.X. Moresi, S.C. Salop, and J.R. Woodbury).

Introduction to Symposium, “The Use and Abuse of Voluntary Standard-Setting Processes in a Post-*Rambus* World: Law, Economics, and Competition Policy,” **The Antitrust Bulletin**, Spring 2012 (Guest Editor with R.J. Levinson).

“Economic Remedies for Anticompetitive Hold-up: The *Rambus* Cases,” **The Antitrust Bulletin**, Fall 2011 (with R.J. Levinson).

“The FCC’s Network Inquiry: A Thirty Year Retrospective,” **Virginia Sports & Entertainment Law Journal**, Spring 2011 (with T.G. Krattenmaker).

“Lessons from *FTC v. Rambus*,” **Icarus**, Communications & Digital Technology Industries Committee, American Bar Association Section of Antitrust Law, Summer 2010 (with R.J. Levinson).

“Standards, Intellectual Property Disclosure, and Patent Royalties after *Rambus*,” **North Carolina Journal of Law & Technology**, Spring 2009 (with R.J. Levinson).

“Regulating Intellectual (Property) Monopolies,” **Competition & Consumer Law Journal**, December 2008.

“Evaluating the Competitive Effects of Mergers of Internet Backbone Providers,” **ACM Transactions on Internet Technology**, August 2002 (with J.S. Spigel and P. Srinagesh).

“Advances in Routing Technologies and Internet Peering Agreements,” **American Economic Association Papers and Proceedings**, May 2001 (with P. Milgrom, B. Mitchell, and P. Srinagesh).

“International Coordination of Intellectual Property Protection,” in **Global Trademark & Copyright 2000, Protecting Intellectual Property Rights in the International Marketplace**, Practising Law Institute, 2000.

“Vertical and Horizontal Ownership in Cable TV: Time Warner-Turner (1996),” in J. E. Kwoka and L.J. White (editors), **The Antitrust Revolution**, Scott, Foresman, (with E.J. Murdoch, D.P. O’Brien, S.C. Salop, and J.R. Woodbury), 1998.

**REDACTED – FOR PUBLIC INSPECTION**

“Intellectual Property,” in **The New Palgrave Dictionary of Economics and the Law**, The Macmillan Press, 1998. Reprinted in R. Towse and R.W. Holzhauser (editors), **The Economics of Intellectual Property**, Edward Elgar, 2001.

“Telecommunications in the U.S.A: Evolution to Pluralism,” in B. Lange (editor), **ISDN: An International Comparison of Trends in the USA, Japan, Singapore and Europe**, Final Report to the ISDN Commission of North Rhine-Westphalia, May 1996 (with S.R. Brenner and J.R. Woodbury).

“The Standards Processes in Telecommunications and Information Technology,” in R. Hawkins, R. Mansell and J. Skea (editors), **Standards, Innovation, and Competitiveness: The Politics and Economics of Standards in Natural and Technical Environments**, Edward Elgar, 1995.

“Rate Regulation, Effective Competition, and the Cable Act of 1992,” **Hastings Communications and Entertainment Law Journal**, Fall 1994 (with J.R. Woodbury).

“Choosing How to Compete: Strategies and Tactics in Standardization,” **Journal of Economic Perspectives**, Spring 1994 (with J. Farrell).

“AM versus FM: The Battle of the Bands,” **Industrial and Corporate Change**, 1992.

“An Economic Analysis of Copyright Collectives,” **Virginia Law Review**, February 1992 (with S.N. Kirby and S.C. Salop). Reprinted in R.P. Merges (editor), **Economics of Intellectual Property Law**, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, 2007; Reprinted in Stephen E. Margolis and Craig M. Newmark (editors), **Intellectual Property and Business**, Edgar Elgar Publishing, 2010.

“The Role of the ITU in Telecommunications Standardization: Pre-Eminence, Impotence or Rubber Stamp?,” **Telecommunications Policy**, August 1991 (with J. Farrell). Reprinted as The Rand Corporation, RP-100, 1992.

**Telecommunications and Information Technology Standardization in Japan: A Preliminary Survey**, The Rand Corporation, N-3204-CUSJR, 1991.

“An Introduction to the Law and Economics of Intellectual Property,” **Journal of Economic Perspectives**, Winter 1991 (with L.J. Raskind). Translated and reprinted as “Introduzione agli Aspetti Legislativi ed Economici della Proprieta Intellettuale,” in G. Goisis (editor), **Efficienza Produttiva: Alcuni Contributi Su Noti (E Meno Noti) Argument**, CEDAM, 1994; Reprinted in K.E. Maskus (editor), **The WTO, Intellectual Property Rights and the Knowledge Economy**, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, 2004.

“The European Telecommunications Standards Institute: A Preliminary Analysis,” **Telecommunications Policy**, December 1990. Reprinted as The Rand Corporation, N-3320-NSF, 1991.

“The Prototype Model of Defense Procurement,” in T.R. Gullledge and L.A. Litteral (editors), **Cost Analysis Applications of Economics and Operations Research**, New York: Springer-Verlag, 1989 (with K. Terasawa).

“Separate Satellite Systems and INTELSAT: an American View,” **Revue de Droit de l'Informatique et des Telecoms** (Computer and Telecoms Law Review), 1989.

REDACTED – FOR PUBLIC INSPECTION

"Private Copying, Appropriability, and Optimal Copying Royalties," **Journal of Law and Economics**, October 1989 (with S.N. Kirby). Reprinted in R.P. Merges (editor), **Economics of Intellectual Property Law**, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, 2007. An earlier version appeared as The Rand Corporation, R-3546-NSF, October 1987.

**Compensating Creators of Intellectual Property: Collectives that Collect**, The Rand Corporation, R-3751-MF, May 1989 (with S.N. Kirby).

"The Economics of Telecommunications Standards," in R.W. Crandall and K. Flamm (eds.), **Changing the Rules: Technological Change, International Competition, and Regulation in Communications**, Brookings Institution, 1989 (with G. Saloner). Reprinted as "Compatibility Standards and the Market for Telecommunications Services," in T.J. Allen and M.S. Scott Morton (eds.), **Information Technology and the Corporation of the 1990s**, Oxford University Press, 1994.

**New Technologies and Intellectual Property: An Economic Analysis**, The Rand Corporation, N-2601-NSF, May 1987.

"Assessing the Effects of Bulk Power Rate Regulation: Results from a Market Experiment," **Applied Economics**, May 1987 (with J.P. Acton). Reprinted in J. Plummer and S. Troppmann (editors), **Competition in Electricity: New Markets and New Structures**, Public Utilities Reports and QED Research, 1990. An earlier and more extended version appeared as **Regulation, Efficiency, and Competition in the Exchange of Electricity: First-Year Results from the FERC Bulk Power Market Experiment**, The Rand Corporation, R-3301-DOE, October 1985.

"Discussion of Michael A. Tyler, 'The Extent of Software Piracy,'" in Frank L. Huband and R.D. Shelton (eds.), **Protection of Computer Systems and Software**, Law & Business, Inc., 1986.

**Compatibility Standards, Competition, and Innovation in the Broadcasting Industry**, The Rand Corporation, R-3453-NSF, November 1986 (with L.L. Johnson).

"Private Copying, Reproduction Costs, and the Supply of Intellectual Property," **Information Economics and Policy**, 1986. Reprinted in D. Lamberton (editor), **The Economics of Communication and Information**, Edward Elgar, 1996. An earlier version appeared as The Rand Corporation, N-2207-NSF, December 1984.

**Evaluating the Proposed Test Drawdown and Sale of Strategic Petroleum Reserve Oil**, The Rand Corporation, N-2358-DOE, 1985 (with M.A. Doyle, R.Y. Pei, W.H. Krase, and D.F. Kohler).

"Copying Costs and the Costs of Copying," in M. Greenberger (ed.), **Electronic Publishing Plus: Media for a Technological Future**, Knowledge Industries, 1985.

"Regulation of Broadcast Station Ownership: Evidence and Theory," in E.M. Noam (ed.), **Video Media Competition: Regulation, Economics, and Technology**, Columbia University Press, 1985 (with L.L. Johnson).

**The Economics of Bulk Power Exchanges**, The Rand Corporation, N-2277-DOE, May 1985 (with J.P. Acton).

REDACTED – FOR PUBLIC INSPECTION

**Regulation of Media Ownership by the Federal Communications Commission: An Assessment**, The Rand Corporation, R-3206-MF, December 1984 (with L.L. Johnson).

"The Regulation of Telecommunications Networks," **Information Society**, 1984.

**An Analysis of the Federal Communication Commission's Group Ownership Rules**, The Rand Corporation, N-2097-MF, January 1984 (with L.L. Johnson).

**Issues in the Design of a Market Experiment for Bulk Electrical Power**, The Rand Corporation, N-2029-DOE, December 1983 (with J.P. Acton).

"The Determinants of Network Television Program Prices: Implicit Contracts, Regulation, and Bargaining Power," **The Bell Journal of Economics**, Autumn 1983 (with J.R. Woodbury and G.M. Fournier).

"Regulation, Deregulation, and Antitrust in the Telecommunications Industry," **The Antitrust Bulletin**, Spring 1983 (with J.R. Woodbury).

Summary Comments in E.M. Noam (ed.), **Telecommunications Regulation Today and Tomorrow**, Law and Business, Inc./Harcourt Brace Jovanovich, 1983.

**An Economic Analysis of Mandatory Leased Channel Access for Cable Television**, The Rand Corporation, R-2989-MF, December 1982 (with L.L. Johnson).

**After Energy Price Decontrol: The Role of Government Conservation Programs**, The Rand Corporation, N-1903-DOE, October 1982 (with L.L. Johnson).

"Economic Implications of Mandated Efficiency Standards for Household Appliances: Comment," **The Energy Journal**, January 1982 (with L.L. Johnson).

"Regulating Network Television: Dubious Premises and Doubtful Solutions," **Regulation**, May/June 1981 (with T.G. Krattenmaker).

"Cable Copyright and Consumer Welfare: The Hidden Cost of the Compulsory License," Shooshan and Jackson, May 1981 (with H.M. Shooshan, C.L. Jackson, and J. Wilson).

"The Deregulation of Cable Television," **Law and Contemporary Problems**, Winter 1981 (with R.W. Crandall). Reprinted in T. G. Krattenmaker, **Telecommunications Law and Policy**, Carolina Academic Press, 1995 and 1998 (Second Edition); S. M. Benjamin, D. Lichtman, and H.A. Shelanski, **Telecommunications Law and Policy**, Carolina Academic Press, 2001; and S.M. Benjamin, D.G. Lichtman, H.A. Shelanski, and P. J. Weiser, **Telecommunications Law and Policy**, Carolina Academic Press, 2006 (Second Edition).

"An Analysis of the Network-Affiliate Relationship in Television," Network Inquiry Special Staff, Federal Communications Commission, 1980 (with S.A. Preskill).

"Copyright Liability for Cable Television: Compulsory Licensing and the Coase Theorem," **Journal of Law and Economics**, April 1978 (with W.G. Manning and B.M. Mitchell). Reprinted in R. Towse and R.W. Holzhauser (editors), **The Economics of Intellectual Property**, Edward Elgar, 2001. An earlier version appeared as **Copyright Liability for Cable Television: Is Compulsory Licensing the Solution?**, The Rand Corporation, R-2023-MF, February 1977.

**REDACTED – FOR PUBLIC INSPECTION**

"The Value of Television Time: Some Problems and Attempted Solutions: Reply," **Southern Economic Journal**, April 1978.

"Deregulating Telecommunications - Sorting Out Mixed Signals," **Regulation**, March/April 1978.

**On Measuring the Gain in Economic Welfare from Marginal Cost Pricing When a Related Market Is of Importance: The Case of Electricity and Natural Gas**, The Rand Corporation, P-5755, February 1977 (with B.M. Mitchell).

**Economic Policy Research on Cable Television: Assessing the Costs and Benefits of Cable Deregulation**, prepared for the Office of Telecommunications Policy, Executive Office of the President, December 1976 (with B.M. Mitchell, R.G. Noll, B.M. Owen, R.E. Park, and J.N. Rosse). Reprinted in Paul W. MacAvoy (ed.), **Deregulation of Cable Television**, American Enterprise Institute, 1977.

"Watergate and Television: An Economic Analysis," **Communication Research**, July 1976 (with B.M. Mitchell). An earlier version appeared as The Rand Corporation, R-1712-MF, May 1975.

"A Simultaneous Equations Model of Television Station Revenue and Expenditure," Appendix F to Rolla E. Park, Leland L. Johnson and Barry Fishman, **Projecting the Growth of Television Broadcasting: Implications for Spectrum Use**, The Rand Corporation, R-1841-FCC, February 1976.

"The Value of Television Time," **Southern Economic Journal**, January 1976. An earlier version appeared as **The Value of Television Time and the Prospects for New Stations**, The Rand Corporation, R-1328-MF, October 1973.

"The Economics of the Network-Affiliate Relationship: Reply," **American Economic Review**, December 1975 (with R. Soligo).

"Market Size, VHF Allocations, and the Viability of Television Stations," **Journal of Industrial Economics**, September 1975 (with P.J. Hanley).

"The Economics of the Cable Television 'Consensus,'" **Journal of Law and Economics**, April 1974.

**An Economic Analysis of an Alternative Method of Financing Public Broadcasting**, Broadcasting Institute of North America, 1973.

"The Economics of the Network-Affiliate Relationship in the Television Broadcasting Industry," **American Economic Review**, June 1973 (with R. Soligo).

"Education and Productivity in United States Manufacturing: Some Cross-Section Evidence," **Journal of Political Economy**, May/June 1973.

"Elasticities of Substitution and Returns to Scale in United States Manufacturing: Some Additional Evidence," **Southern Economic Journal**, October 1967.

"Cost Effectiveness Analysis for the 'War on Poverty'", in T.A. Goldman (ed.), **Cost-Effectiveness Analysis: New Approaches in Decision-Making**, Praeger, 1967 (with A.E. Fechter and A.C. Fisher).

## REDACTED – FOR PUBLIC INSPECTION

**Evaluating the Returns to Regional Economic Development Programs**, Institute for Defense Analyses, B-272, 1966.

**Internal Prices as an Administrative Tool: An Application to the Military Air Transport Service**, Institute for Defense Analyses, S-200, 1965 (with M.J. Bailey, J.G. Cross, and W.P. Sewell).

"An Empirical Analysis of Commercial Bank Lending Behavior," **Yale Economic Essays**, Fall 1965.

### Review Articles

B. R. Litman, **The Vertical Structure of the Television Broadcasting Industry: The Coalescence of Power**, **The Antitrust Bulletin**, Fall 1982.

R. G. Noll, M. J. Peck, and J. J. McGowan, **Economic Aspects of Television Regulation** (with B.M. Mitchell), **Bell Journal of Economics and Management Science**, Spring 1974. An earlier version appeared as **Economic Analysis and Television Regulation: A Review**, The Rand Corporation, R-1398-MF, December 1973.

### Reviews

B. Kahin and H.R. Varian (eds.), **Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property**, **Journal of Economic Literature**, 2001.

F.M. Fisher, **Industrial Organization, Economics, and the Law** (edited by John Monz), **Regulation**, 1991.

S.S. Wildman and S.E. Siwek, **International Trade in Films and Television Programs, Information Economics and Policy**, 1990.

G. W. Wilson, et al., **The Impact of Highway Investment on Development**, **Journal of Business**, 1967.

R. A. Gordon and L. Klein (eds.), **American Economic Association Readings in Business Cycles**, **Southwestern Social Science Quarterly**, 1966.

### Selected Presentations

"Regulating Intellectual (Property) Monopolies," Australian Competition and Consumer Commission Conference on Revisiting the Rationale for Regulation, July 2008.

Panelist, P2P File-Sharing and Its Impact on Copyright Holders, Federal Trade Commission Public Workshop on Peer-to-Peer File-Sharing Technology: Consumer Protection and Competition Issues, December 16, 2004.

American Bar Association, International Roundtable: Competition & Intellectual Property Policy Implications of International Standard-Setting, June 2002.

Panelist, DOJ/FTC Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy, Session on Licensing Terms in Standards Activities, April 18, 2002.

Panelist, Federal Communications Commission Roundtable on Media Ownership Policies, Session on Ownership Policies and Competition, October 29, 2001.

**REDACTED – FOR PUBLIC INSPECTION**

Panelist, Federal Trade Commission Hearings on Global and Innovation-Based Competition, November 30, 1995.

“The Role of Users in Information Technology Standardization,” Workshop on The Economic Dimension of Standards - Users and Governments in IT Standardisation, sponsored by MITI, MPT, and the OECD, Tokyo, November 1992.

Witness, Subcommittee on Intellectual Property and Judicial Administration, Committee on the Judiciary, U.S. House of Representatives, 1991. Prepared statement and testimony appear in **Intellectual Property and International Issues**, 102nd Congress, 1st Session.

Witness, Subcommittee on Telecommunications and Finance, Committee on Energy and Commerce, U.S. House of Representatives, 1990. Prepared statement and testimony appear in **Cable Television Regulation (Part 2)**, 101st Congress, 2nd Session.

Witness, Subcommittee on Telecommunications, Consumer Protection, and Finance, Committee on Energy and Commerce, U.S. House of Representatives, 1983. Prepared statement and testimony appear in **Options for Cable Legislation**, 98th Congress, 1st Session.

Witness, Subcommittee on Communications, Committee on Commerce, Science, and Transportation, U.S. Senate, 1982. Prepared statement and testimony appear in **Cable Television Regulation**, 97th Congress, 2nd Session.

Witness, Subcommittee on Telecommunications, Consumer Protection, and Finance, Committee on Energy and Commerce, U.S. House of Representatives, 1981. Prepared statement and testimony appear in **Status of Competition and Deregulation in the Telecommunications Industry**, 97th Congress, 1st Session.

Witness, Subcommittee on General Oversight and Minority Enterprise, Committee on Small Business, U.S. House of Representatives, 1980. Prepared statement and testimony appear in **Media Concentration (Part 1)**, 96th Congress, 2nd Session.

Panelist, Session on "The Role of Competition in the Electronic Media," Federal Trade Commission Symposium on Media Concentration, 1978. Comments reprinted in Federal Trade Commission, Bureau of Competition, **Proceedings of the Symposium on Media Concentration**, Volume I.

Witness, Subcommittee on Communications, Committee on Commerce, Science and Transportation, U.S. Senate, 1977. Prepared statement and testimony appear in **Cable Television**, 95th Congress, 1st Session.

Witness, Subcommittee on Communications, Committee on Interstate and Foreign Commerce, U.S. House of Representatives, 1976. Prepared statement and testimony appear in **Cable Television Regulation Oversight - Part 1**, 94th Congress, 2nd Session.

REDACTED – FOR PUBLIC INSPECTION

Attachment 2 to Stanley M. Besen and Bridger M. Mitchell,  
“Anticompetitive Provisions of ILEC Special Access  
Arrangements”

## BRIDGER M. MITCHELL

### EDUCATION

*A.B. Economics (1962)*

*Stanford University*

*Ph.D. Economics (1971)*

*Massachusetts Institute of Technology*

### PROFESSIONAL EXPERIENCE

2008-Present *Senior Consultant, CRA International, Oakland, CA*

1994–2008 *Vice President, CRA International, Palo Alto, CA*

1972–1994 *Senior Economist, Social Policy Department, RAND Corporation, Santa Monica, CA*

1977–1979 *Research Fellow, International Institute of Management, Science Center, Berlin*

1976 *Acting Associate Professor of Economics, Stanford University*

1973–1975 *Lecturer in Economics, UCLA*

1972 *Director, National Health Insurance Analysis Staff, Department of Health, Education, and Welfare, Washington, D.C.*

1971–1972 *Brookings Economic Policy Fellow, Office of the Secretary, Department of Health, Education, and Welfare, Washington, D.C.*

1971–1972 *Economic Policy Fellow, The Brookings Institution, Washington, D.C.*

1966–1971 *Assistant Professor of Economics, Stanford University*

### PROFESSIONAL ORGANIZATIONS

American Economics Association.

International Telecommunications Society

*Member*, Editorial Board, Information Economics and Policy, 1985–2004

*Member*, Organizing Committee, Telecommunications Policy Research Conference, 1990

*Chair*, Organizing Committee, Telecommunications Policy Research Conference, 1991–1993

*Chair*, Board of Directors, Telecommunications Policy Research Conference, 1993–1994

## CONSULTANCIES

World Bank, 1991–1994

California Public Utilities Commission, 1992

Social Security Administration, 1977–1978

Office of Telecommunications Policy, 1976–1978

Department of Health, Education, and Welfare, 1972–1978

## PUBLICATIONS

### Books

*Telecommunications Competition: The Last Ten Miles*. With I. Vogelsang. Cambridge, MA: MIT Press and AEI Press, 1997. (Also published in Korean, Korean Information Society Development Institute, 1998.)

*Universal Access to E-Mail: Feasibility and Societal Implications*. With R. H. Anderson, T. K. Bikson and S. A. Law. Santa Monica, CA: RAND, 1995.

*Telecommunications Pricing: Theory and Practice*. With I. Vogelsang. Cambridge: Cambridge University Press, 1991. (Also published in Japanese, Tuttle-Mori Agency, Inc., Tokyo, 1995.)

*Regulated Industries and Public Enterprise: European and United States Perspectives*. Editor. With P. R. Kleindorfer. Lexington, MA: Lexington Books, 1980.

*Peak-Load Pricing: European Lessons for U.S. Energy Policy*. With J. P. Acton and W. G. Manning, Jr. Cambridge, MA: Ballinger Publishing Company, 1978.

### Articles and Refereed Chapters in Books

“Bill-and-Keep and the Economics of Interconnection in Next-Generation Networks.” With Moya Dodd, Astrid Jung, Paul Paterson, Paul Reynolds. *Telecommunications Policy*, (33) June-July 2009.

“Emerging Network Technologies.” With D. Hatfield and P. Srinagesh. *Handbook of Telecommunications Economics, Vol. 2*, S. K. Majumdar, M. Cave, I. Vogelsang, (eds.), 2005.

“Advances in Routing Technologies and Internet Peering Agreements.” With S. Besen, P. Milgrom, and P. Srinagesh. *American Economic Review*, May 2001.

“Competitive Effects of Internet Peering Policies.” With P. Milgrom and P. Srinagesh. *The Internet Upheaval*, B. Compaine and I. Vogelsang, (eds.), MIT Press, 2000.

“An Economic Analysis of Telephone Number Portability.” With P. Srinagesh. *Competition, Regulation, and Convergence*, S. E. Gillett and I. Vogelsang, (eds.), Lawrence Erlbaum, 1999.

“Markup Pricing for Interconnection: A Conceptual Framework.” With I. Vogelsang. *Opening Networks to Competition: The Regulation and Pricing of Access*, D. Gabel and D. Weiman, (eds.), Kluwer Academic Publishers. Boston, 1998.

“Technological Change and the Electric Power Industry: Insights from Telecommunications.” With P. J. Spinney. *The Virtual Utility*, S. Awerbuch and A. Preston, (eds.), Kluwer Academic Publishers. Boston, 1997.

“Costs and Cross-Subsidies in Telecommunications.” *The Changing Nature of Telecommunications/Information Infrastructure*, National Academy Press, Washington, DC, 1995.

“Federal Investment Through Subsidies: Pros and Cons.” *The Changing Nature of Telecommunications/Information Infrastructure*, National Academy Press, Washington, DC, 1995.

“Expanded Competitiveness and Regulatory Safeguards in Local Telecommunications Markets.” With I. Vogelsang. *Managerial and Decision Economics*, 1995. Also published in *Deregulating Telecommunications*, R. S. Higgins and P. H. Rubin, (eds.), John Wiley, New York, 1995.

“The Regulation of Pricing of Interconnection Services.” With W. Neu, K-H Neumann, and I. Vogelsang. In Gerald Brock (ed.), *Toward a Competitive Telecommunication Industry: Selected Papers from the 1994 Telecommunications Policy Research Conference*, Lawrence Erlbaum Associates, Inc., 1995.

“Network Interconnection in the Domain of ONP.” With J. Arnbak, W. Neu, K-H Neumann, and I. Vogelsang. *European Commission DG XIII*, Brussels, November 1994.

“Network Interconnection in the Domain of ONP: Country Studies.” With J. Arnbak, G. N’Guyen, B. Ickenroth, W. Neu, K-H Neumann, and I. Vogelsang. *European Commission DG XIII*, Brussels, November 1994.

“Efficient Pricing of Telecommunications Services and the Ways to Get There.” In S. Globberman, W. T. Stanbury, and T. A. Wilson (eds.), *The Future of Telecommunications Policy in Canada*. Toronto, 1994.

“Het toewijzen van spectrum voor cellulaire telefonie: Evaringen in de VS.” *Mediaform* 4, No. 7–8 (1992): 82–84.

“Allocating Spectrum for Cellular Telephones: U.S. Experience and Issues.” In Franca Klaver and Paul Slaa (eds.), *Telecommunications: New Signposts to Old Roads*. Proceedings, IOS Press, Amsterdam, 1992.

“Telephone Penetration.” In B. Cole (ed.), *After the Breakup: Assessing the New Post-AT&T Divestiture Era*. Columbia University Press, 1991, pp. 370–376.

“Incremental Capital Costs of Telephone Access and Local Use.” In *Telecommunications Costing in a Dynamic Environment*. Hull, Quebec: Bell Canada, 1989.

“Measuring Technological Change of Heterogeneous Products.” With A. J. Alexander. *Technological Forecasting and Social Change* 27 (1985): 161–195.

“Pricing Subscriber Access to the Telephone Network.” In A. Baughcum and G. R. Faulhaber (eds.), *Telecommunications Access and Public Policy*. Norwood, NJ: Ablex, 1984.

“Response to Residential Time-of-Use Electricity Rates: How Transferable Are the Findings?” With D. F. Kohler. *Journal of Econometrics* 26 (1984): 141–177.

“Local Telephone Costs and Design of Rate Structures.” In L. Courville, A. de Fontenay, and A. R. Dobell (eds.), *Economic Analysis of Telecommunications: Theory and Applications*. North-Holland Publishing Company, 1983.

“Charging for Local Telephone Calls: How Household Characteristics Affect the Distribution of Calls in the GTE Illinois Experiment.” With R. E. Park, B. M. Wetzel, and J. H. Alleman. *Journal of Econometrics* 22 (1983): 339–364.

“Price Elasticities for Local Telephone Calls.” With R. E. Park. *Econometrica* 51, No. 6 (November 1983): 1699–1730.

“The Cost of Telephone Service: An International Comparison of Rates in Major Countries.” *Telecommunications Policy* (March 1983): 53–63.

"Welfare Analysis of Electricity Rate Changes." With J. P. Acton. In S. Berg (ed.), *Metering for Innovative Rate Structures*. Lexington, MA: Lexington Books, 1983.

"Electricity Consumption by Time of Use in a Hybrid Demand System." With J. P. Acton. In Jorg Finsinger (ed.), *Public Sector Economics*. MacMillan Press Ltd., 1983.

"Specifying and Estimating Multi-Product Cost Functions for a Regulated Telephone Company." In G. Fromm (ed.), *Studies in Public Regulation*. Cambridge, MA: MIT Press, 1981.

"Repression Effects of Mandatory vs. Optional Local Measured Telephone Services." With R. E. Park. In H. Trebling (ed.), *New Challenges for the 1980s*. East Lansing, MI: Institute of Public Utilities, 1981.

"The Effect of Time-of-Use Rates: Facts vs. Opinions." With J. P. Action. *Public Utilities Fortnightly* 107, No. 9 (April 23, 1981): 1–8.

"Alternative Measured-Service Rate Structures for Local Telephone Services." In M. A. Crew (ed.), *Issues in Public Utility Pricing and Regulation*. Lexington, MA: Lexington Books, 1980.

"New Technologies, Competition, and the Postal Service." In R. Sherman (ed.), *Postal Service Issues*. Washington, D.C. American Enterprise Institute, 1980.

"Do Time-of-Use Rates Change Load Curves? And How Would You Know?" With J. P. Acton. *Public Utilities Fortnightly* 105, No. 11 (May 22, 1980): 3–12.

"Estimating Residential Electricity Demand under Declining-Block Tariffs: An Econometric Study Using Micro Data." With J. P. Acton and R. Sohlberg. *Applied Economics* 12, No. 2 (June 1980): 145–161.

"Evaluating Time-of-Day Electricity Rates for Residential Customers." With J. P. Acton. In B. M. Mitchell and P. R. Kleindorfer (eds.), *Regulated Industries and Public Enterprise: European and United States Perspectives*. Lexington, MA: Lexington Books, 1980.

"Public Enterprise and Regulation in International Perspective." With P. R. Kleindorfer. In B. M. Mitchell and P. R. Kleindorfer (eds.), *Regulated Industries and Public Enterprise: European and United States Perspectives*. Lexington, MA: Lexington Books, 1980.

"Estimating the Autocorrelated Error Model with Trended Data: Further Results." With R. E. Park. *Journal of Econometrics* 13 (1980): 185–201.

"Telephone Call Pricing in Europe: Localizing the Pulse." In J. Wenders (ed.), *Pricing in Regulated Industries: Theory and Applications II*. Denver, CO: Mountain States Telephone and Telegraph Co., 1979.

“Pricing Policies in Selected European Telephone Systems.” In H. Dordick (ed.), *Proceedings of the Sixth Annual Telecommunications Policy Research Conference*. Lexington, MA: Lexington Books, 1979.

“Design of the Los Angeles Peak-Load Pricing Experiment for Electricity.” With J. P. Acton and W. G. Manning, Jr. *Journal of Econometrics* 11 (1979): 131–193.

“Peak-Load Pricing of Electricity.” With J. P. Acton and W. G. Manning, Jr. *Journal of Business Administration* 10, Nos. 1&2 (fall 1978/spring 1979): 349–362.

“Auswirkung Staatlicher Regulierung auf die Elektrizitätsversorgung.” With J. Müller. *Staat und Wirtschaft*, Neue Folge, Band 102 (1979): 625–650.

“The Financing of National Health Insurance.” With W. B. Scharz. In G. K. Chako (ed.), *Health Handbook*. North-Holland Publishing Company, 1979.

“Optimal Pricing of Local Telephone Service.” *American Economic Review* 68, No. 4 (September 1978): 517–537.

“Copyright Liability for Cable Television: Compulsory Licensing and the Coase Theorem.” With S. M. Besen and W. G. Manning, Jr. *Journal of Law and Economics* 21 (April 1978): 67–95. Reprinted in *The Economics of Intellectual Property*, R. Towse and R. Holzhauser (eds.), Cheltenham: Edward Elgar, 2001.

“European Industrial Response to Peak-Load Pricing of Electricity, with Implications for U.S. Energy Policy.” With J. P. Acton and W. G. Manning, Jr. In *Marginal Costing and Pricing of Electrical Energy*. Montreal: Canadian Electrical Association, May 1978.

“Tariffe Elettriche Industriali e Modulazione dei Carichi.” With J. P. Acton and W. G. Manning, Jr. *Economia delle Fonti di Energia* 22, No. 6 (1978).

“Economic Policy Research on Cable Television: Assessing the Costs and Benefits of Cable Deregulation.” With S. M. Besen, R. G. Noll, M. Owen, R. E. Park, and J. N. Rosse. In P. W. MacAvoy (ed.), *Deregulation of Cable Television*. Washington, D.C. American Enterprise Institute, 1977.

“Peak-Load Pricing in Selected European Electric Utilities.” In A. Lawrence (ed.), *Forecasting and Modeling Time-of-Day and Seasonal Electricity Demands*. Palo Alto, CA: Electric Power Research Institute, December 1977.

“A Note on Modeling of Peak Electricity Demands.” In A. Lawrence (ed.), *Forecasting and Modeling Time-of-Day and Seasonal Electricity Demands*. Palo Alto, CA: Electric Power Research Institute, December 1977.

“Lessons from the Los Angeles Rate Experiment in Electricity.” With J. P. Acton and W. G. Manning, Jr. In J. L. O’Donnell (ed.), *Adapting Regulation to Shortages, Curtailment and Inflation*. East Lansing, MI: Michigan State University, 1977.

“Watergate and Television: An Economic Analysis.” With S. M. Besen. *Communications Research* 3, No. 3 (July 1976): 243–260.

“National Health Insurance: Some Costs and Effects of Mandated Employee Coverage.” With C. E. Phelps. *Journal of Political Economy* 84, No. 3 (June 1976): 553–571.

“The Financing of National Health Insurance.” With W. B. Schwartz. *Science* 192 (May 14, 1976): 621–636.

“Impact of Competition on an Independent Telephone Company.” With W. S. Baer. *Public Utilities Fortnightly* (October 23, 1975).

“Health and Taxes: An Assessment of the Medical Deduction.” With R. J. Vogel. *Southern Economic Journal* 41, No. 4 (April 1975): 660–672.

“Cable, Cities, and Copyrights.” With W. S. Comanor. *Bell Journal of Economics and Management Science* 5, No. 1 (Spring 1974): 235–263.

“Fixed Point Estimation of Econometric Models.” *Australian Economic Papers* (December 1974): 250–266.

“Short-Run Prediction and Long-Run Simulation of the Wharton Model: Discussion.” In B. G. Hickman (ed.), *Econometric Models of Cyclical Behavior*. National Bureau of Economic Research, 1972.

“The Cost of Planning: The FCC and Cable Television.” With W. S. Comanor. *Journal of Law and Economics* 15, No. 1 (April 1972): 177–206.

“Cable Television and the Impact of Regulation.” With W. S. Comanor. *Bell Journal of Economics and Management Science* 2, No. 1 (Spring 1971): 154–212.

“Estimation of Large Econometric Models by Principal Component and Instrumental Variable Methods.” *Review of Economics and Statistics* (May 1971).

“A Linear Logarithmic Expenditure System: An Application to U.S. Data.” With L. J. Lau. Presented at the Second World Congress, Econometric Society, September 1970. *Econometrica* 39, No. 4 (1971): 87–88.

"The Choice of Instrumental Variables in the Estimation of Economy-Wide Econometric Models: Some Further Thoughts." With F. M. Fisher. *International Economic Review* 11, No. 2 (June 1970): 226–234.

"Estimating Joint Production Functions by Canonical Correlation Analysis." With P. J. Dhrymes. *Econometrica* 37, No. 4 (October 1969).

"Community Antenna Television Systems and Local Television Station Audience." With F. M. Fisher, V. E. Ferrall, Jr., and D. Belsley. *Quarterly Journal of Economics* 80 (May 1966): 227–251.

### Review Article and Reviews

R. G. Noll, M. J. Peck, and J. J. McGowan, *Economic Aspects of Television Regulation*. With S. M. Besen in *Bell Journal of Economics and Management Science* 5, No. 1 (spring 1974): 301–319.

*Economic Innovations in Public Utility Regulation*, edited by M. A. Crew. *Journal of Economics/Zeitschrift für Nationalökonomie* 59, No. 3 (July 1994).

*Economic Analysis of Product Innovation: The Case of CT Scanners* by M. Trajtenberg. *Journal of Economic Literature* 30, No. 2 (June 1992): 935–936.

*Econometric Studies of U.S. Energy Policy*, edited by D. W. Jorgenson. *Journal of Econometrics* 6 (1977).

*Structure and Performance of the U.S. Communications Industry* by Kurt Borchardt. *Annals of the American Academy of Political and Social Science* (March 1972).

*Principles of Econometrics* by K. Chu. *American Economic Review* 58, No. 5 (December 1968).

### Other Publications

"Information, Telecommunications, and Markets," 19th Pacific Telecommunications Conference, Honolulu, Jan. 22, 1997.

"Utilization of the U.S. Telephone Network." Discussion Paper No. 126, Wissenschaftliches Institut für Kommunikationsdienste, March 1994.

"Incremental Costs of Telephone Access and Local Use." R-3909-ICTF, Rand, July 1990. Also published in W. Pollard (ed.), *Marginal Cost Techniques for Telephone Services: Symposium Proceedings*. National Regulatory Research Institute, NRRI 96–1, January 1991.

"Theory of Telecommunications Pricing." With I. Vogelsang. Wissenschaftliches Institut für Kommunikationsdienste, May 1991.

"U.S. Practice of Telecommunications Pricing." With I. Vogelsang. Wissenschaftliches Institut für Kommunikationsdienste, May 1991.

"Pricing Local Exchange Services: A Futuristic View." In J. H. Alleman (ed.) and R. D. Emmerson (eds.), *Perspectives on the Telephone Industry: The Challenge for the Future*. Ballinger, 1989.

"Optimal Peak Load Pricing for Local Telephone Calls," With R. E. Park. The Rand Corporation, R-3404-1-RC, 1987.

"A Framework for Considering Local Measured Service." In Richard J. Schultz and Peter Barnes (eds.), *Local Telephone Pricing: Is There A Better Way?* Center for the Study of Regulated Industries, Montreal 1984.

"Demographic Effects of Local Calling Under Measured vs. Flat Service: Analysis of Data from the GTE Illinois Experiment." With R. E. Park. In *Pacific Telecommunications Conference Proceedings*. Pacific Telecommunications Conference '80, Honolulu, 1980.

"Economic Aspects of Measured-Service Telephone Pricing." In *Ratemaking Problems of Regulated Industries*. Proceedings of the Symposium on Problems for Regulated Industries, University of Missouri, 1980.

"The Effect of Time-of-Day Rates in the Los Angeles Electricity Rate Study." With J. P. Acton. In *Electric Rate Demonstration Conference: Papers and Proceedings*. Denver, Colorado, April 1980.

"Economic Issues in Local Measured Service." In J. A. Baude (ed.), *Perspectives on Local Measured Service*. Telecommunications Industry Workshop, Organizing Committee, Kansas City, 1979.

"Foreign Experience with Peak-Load Pricing of Electricity." In *Impact of the National Energy Act on Utilities and Industries Due to the Conversion of Coal*. Information Transfer, Silver Springs, Maryland, 1979.

"The Costs of Constructing and Operating a CATV System." In *CATV Today: A Discussion of Current Issues*. Georgetown University, School for Summer and Continuing Education, February 1975.

## Reports

*Simultaneous Ascending Auctions with Package Bidding*. Prepared for the US Federal Communications Commission, March 1998. With Paul Milgrom and Brad Miller.

*Package Bidding for Spectrum Licenses*. Prepared for the US Federal Communications Commission, October 1997. With Paul Milgrom and Brad Miller.

*Auction Design Enhancements for Non-Combinatorial Auctions.* Prepared for the US Federal Communications Commission, September 1997. With Paul Milgrom and Brad Miller.

### **Selected Filed Studies**

- White paper (with Steven R. Brenner) on behalf of the Cellular Telephone Industry Association submitted to the Federal Communications Commission, "Economic Issues in the Choice of Compensation Arrangements for Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers."
- Report (with Steven R. Brenner and Padmanabhan Srinagesh) on behalf of TCI submitted to the Federal Communications Commission, "An Economic Analysis of Terminating Access."
- Joint Declarations (with Joseph Farrell), on behalf of Sprint Communications Company submitted to the Federal Communications Commission, "Benchmarking and the Effects of ILEC Mergers."
- Report (with Jose Alberro and Padmanabhan Srinagesh) submitted to Telmex SA for use in World Trade Organization proceedings, "International Comparisons of Interconnection Rates – United States and Mexico."
- White paper (with Padmanabhan Srinagesh) on behalf of SprintPCS submitted to the Federal Communications Commission, "Transport and Termination Costs in PCS Networks: An Economic Analysis."

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# **APPENDIX B**

**tw telecom Estimate of Non-Incumbent LEC Deployment in Phoenix MSA**

As a purchaser of special access services from other carriers, tw telecom (“TWTC”) has access to lists of commercial buildings to which such carriers own last-mile facilities. By aggregating these lists, TWTC can calculate an estimate of the number of buildings with demand for special access services to which carriers other than the incumbent LEC own last-mile facilities in a given market. Because this is a very labor-intensive process, and because TWTC understands that the Commission will be conducting a similar process with information it collects in the forthcoming data request, TWTC has not completed this process for every market. However, to serve as an example for the purposes of these comments, TWTC has done so for the Phoenix MSA.

As set forth in Table 1, TWTC estimates that non-incumbent LECs have constructed last-mile facilities to less than [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] of commercial buildings in the Phoenix MSA. Therefore, TWTC estimates that the incumbent LEC controls the only last-mile facility to more than [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] of these buildings.

[BEGIN HIGHLY CONFIDENTIAL]

<b>Table 1: Non-Incumbent LEC Building Penetration</b>			
<b>MSA</b>	<b>Total Buildings w/demand of 2 DS1s or more</b>	<b>Buildings to which Non-ILECs has Constructed Loops</b>	<b>Building Penetration</b>
<b>Phoenix, AZ</b>	[REDACTED]	[REDACTED]	[REDACTED]

[END HIGHLY CONFIDENTIAL]

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# **APPENDIX C**

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**tw telecom Build/Buy Analysis**

tw telecom (“TWTC”) builds its own loop and transport facilities whenever it is efficient and cost-effective to do so. Unfortunately, for a number of reasons, there are many locations where TWTC cannot economically construct its own loop facilities. TWTC generally builds its local network in the parts of metropolitan areas containing the largest enterprise customers using fiber ring transport facilities. TWTC constructs rings to very large commercial buildings as part of the original construction of its local transport network in a metropolitan area. In the majority of cases, however, TWTC must build a stand-alone fiber lateral (*i.e.*, loop) facility to a building containing a business customer it seeks to serve on its own network after the customer has agreed to purchase service from TWTC.

In assessing whether it is cost-effective to deploy its own loop facilities, TWTC determines whether the revenue opportunity associated with a given building or a given customer is large enough to justify construction. To justify construction, the potential revenue must be sufficient to cover the total cost of construction and recurring expenses and simultaneously achieve a reasonable rate of return on investment. Costs vary based on the distance between TWTC’s transport network and the customer location (the longer the lateral facility, the greater the deployment cost), costs associated with obtaining access to poles, ducts, conduits, rights-of-way and commercial buildings, the type of services provided (electronics for higher capacity services generally cost more than electronics for lower capacity services) and the customer’s willingness to enter into a longer-term contract.

After considering these factors, a small minority of customer locations meets tw telecom’s revenue requirements. As of March 2012, TWTC has been able to deploy its own loop facilities to only an average of [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END

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HIGHLY CONFIDENTIAL] of its customer locations in five sample MSAs. Those MSAs are the Atlanta, Los Angeles, Phoenix, Seattle, and Washington DC MSAs shown in Table 1.

[BEGIN HIGHLY CONFIDENTIAL]

<b>Table.1: TWTC Building Penetration</b>			
<b>MSA</b>	<b>Total Buildings w/demand of 2 DS1s or more</b>	<b>Buildings to which TWTC has Constructed Loops</b>	<b>Building Penetration</b>
Atlanta, GA			
Los Angeles, CA			
Phoenix, AZ			
Seattle, WA			
Washington, DC			

[END HIGHLY CONFIDENTIAL]

TWTC recently conducted a build-buy analysis, taking into account the aforementioned factors, for these five MSAs in order to identify the buildings in those areas to which TWTC could potentially deploy loop facilities in the future. In conducting the build-buy analysis, we made two basic assumptions. First, we assumed that TWTC must earn an approximate monthly recurring revenue (“MRR”) per building over a 36 month period, as shown in Table 2, to justify construction of loop facilities under the best of conditions. This amount is the approximate MRR required to reach the target on-net building internal rate of return (“IRR”) of [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] that TWTC uses in the marketplace. This assumption includes the estimated average cost, including electronics, to deploy a loop facility in each MSA. Over 400 actual cost records were examined across the five MSA’s to calculate the average cost per each MSA.

[BEGIN HIGHLY CONFIDENTIAL]

<b>MISA</b>	<b>Average Construction Costs</b>	<b>Average MRR</b>
<b>Atlanta, GA</b>		
<b>Los Angeles, CA</b>		
<b>Phoenix, AZ</b>		
<b>Seattle, WA</b>		
<b>Washington, DC</b>		

[END HIGHLY CONFIDENTIAL]

These costs reflect an average cost to build lateral facilities within one mile of TWTC’s fiber network. TWTC rarely constructs these facilities beyond a mile, as it is generally cost-prohibitive to do so, except where there are extraordinary revenue opportunities. Accordingly, the build/buy analysis was limited to buildings within a mile of TWTC’s network.

Hypothetically, the MRR threshold can be met in any number of ways using a combination of customer sizes and services. Practically speaking, however, TWTC requires a firm commitment from one or several customers to justify the build and will not undertake a build until that commitment is secured. Thus, in the majority of build scenarios there must be at least one larger business customer who has committed to a level of service that can meet TWTC’s minimum MRR threshold to justify a build.

Second, TWTC assumed that it can win [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] of the revenue opportunity in a commercial building. Using these assumptions, TWTC estimated that it might be able to construct loop facilities to buildings with the amounts per month in estimated telecommunications spending shown in Table 3. TWTC then relied on GeoResults data estimating the revenue spend in the

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commercial buildings with two DS1s of demand or more in the five MSA’s to determine the percentage of such buildings to which TWTC has not constructed its own loops (“non-TWTC buildings”) but to which it *might* be able to do so in the future. Based on this analysis, TWTC determined that it might be able to build to only an average of [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] of the non-TWTC buildings in each MSA as shown in Table 4. The total number of such buildings to which TWTC has built or (assuming that barriers to entry are overcome) could theoretically build loops in each MSA are summarized in Table 5. [BEGIN HIGHLY CONFIDENTIAL]

**Table 3: Minimum Amount of Telecom Spend Required per Building**

MSA	MRR Required	Telecom Spend Required per Building
Atlanta, GA	[REDACTED]	[REDACTED]
Los Angeles, CA	[REDACTED]	[REDACTED]
Phoenix, AZ	[REDACTED]	[REDACTED]
Seattle, WA	[REDACTED]	[REDACTED]
Washington, DC	[REDACTED]	[REDACTED]

**Table 4: Buildings Viable for TWTC Build Consideration**

MSA	Total Non-TWTC Buildings (w/demand of 2 DS1s or more)	Buildings Viable for Build Consideration	Percentage of Buildings Viable for Build Consideration
Atlanta, GA	[REDACTED]	[REDACTED]	[REDACTED]
Los Angeles, CA	[REDACTED]	[REDACTED]	[REDACTED]
Phoenix, AZ	[REDACTED]	[REDACTED]	[REDACTED]
Seattle, WA	[REDACTED]	[REDACTED]	[REDACTED]
Washington, DC	[REDACTED]	[REDACTED]	[REDACTED]

<b>Table 5: Percentage of Buildings To Which TWTC Has Or Could Build Loops</b>			
<b>MSA</b>	<b>Market Penetration Percentage</b>	<b>Percentage of Buildings Viable for Build Consideration</b>	<b>Total</b>
Atlanta, GA			
Los Angeles, CA			
Phoenix, AZ			
Seattle, WA			
Washington, DC			

[END HIGHLY CONFIDENTIAL]

It should be noted that this build-buy analysis does not account for the fact, as explained, that TWTC generally cannot begin building its own loops unless and until potential customers in a given building in fact commit to purchasing the high revenue services that justify loop construction. This is why, even where TWTC has built its own transport facilities, there remain numerous buildings to which TWTC could theoretically, but cannot practically, afford to build loop facilities.

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# **APPENDIX D**

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**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Special Access for Price Cap Local Exchange Carriers	)	WC Docket No. 05-25
	)	
AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Internet Special Access Services	)	RM-10593
	)	

**DECLARATION OF KEVIN F. BRAND  
ON BEHALF OF EARTHLINK, INC.**

1. I am Executive Vice President, Customer Delivery and Care, for EarthLink, Inc. (“EarthLink”). In this position, I am responsible for delivery and post-installation customer support for the services that EarthLink provides to businesses and consumers. I joined EarthLink in 2001 and have held the positions of Vice President of Network Operations, Vice President of Products, and most recently, Chief of Consumer Products and Support. I have more than 30 years of experience in the telecommunications industry. Prior to joining EarthLink, I was Executive Vice President of Operations at CAIS Internet. Prior to that, I held a variety of management positions at AT&T, AT&T Paradyne, and AT&T Bell Laboratories in operations, customer support, product management, marketing, and technical areas.

2. EarthLink is a leading IT services, network, and communications provider to more than 150,000 businesses of all sizes and over one million consumers nationwide. EarthLink empowers customers with data and voice IP services, as well as managed IT services including cloud computing, data centers, virtualization, security, applications, premises-based

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solutions, managed solutions, and support services. Among the data and Internet services that EarthLink offers to business customers are T1, DS3, Ethernet, and DSL services.

3. The purpose of this declaration is to describe (1) the demands of businesses that currently purchase dedicated T1, DS3, and Ethernet services (hereinafter, “special access services”); and (2) the differences in terms of service quality and price between special access services and “best efforts” Internet access services (such as DSL and cable modem services) marketed to businesses.

4. Most businesses that currently subscribe to special access services demand (and receive) dedicated bandwidth at the locations where those services are being used. At those locations, businesses (such as multi-location retail businesses) require guaranteed, consistent speed to run applications that are “mission critical” to their business (*e.g.*, applications that enable them to access customer data, process credit card payments, and communicate with customers, vendors, and suppliers). They cannot tolerate the slower and inconsistent speeds that users of shared services, such as “best efforts” cable modem services, can experience during peak usage times.

5. Most businesses that currently purchase special access services demand (and receive) symmetrical bandwidth at the locations where those services are being used (*e.g.*, bank branches, hospitals, and doctors’ offices) so that employees can download as well as upload large files. By contrast, the vast majority of “best efforts” Internet access services that are offered today do not provide symmetrical speeds.

6. Most businesses that currently purchase special access services demand (and receive) greater reliability at the locations where those services are being used than can be provided with “best efforts” Internet access services. At those locations, for example, customers

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expect their special access services to be repaired within a few hours of an outage. For this reason, EarthLink’s Internet access Service Level Agreements (“SLAs”) for dedicated special access services provide that EarthLink’s “Mean Time to Repair” (“MTTR”) will be between 4 to 6 hours depending on the type of service. By contrast, EarthLink’s SLA provides that the MTTR for ADSL service will be 24 hours.

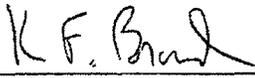
7. Most businesses that currently purchase special access services demand (and receive) greater security at the locations where those services are being used than can be provided with some “best efforts” Internet access services. For example, using dedicated connections provided by T1, DS3, and Ethernet special access services is inherently more secure for the transmission of customers’ financial data or patients’ medical records than using the shared connections provided by “best efforts” cable modem services.

8. There are also significant price differences between dedicated special access services and “best efforts” Internet access services. For example, EarthLink currently offers T1 service starting at \$289 per month. By contrast, EarthLink currently offers DSL service (up to 6 Mbps/768 Kbps) starting at \$67 per month and standalone ADSL service (up to 7 Mbps/768 Kbps) starting at \$97 per month.

9. In light of the demands of business customers that purchase special access services (*e.g.*, their need for dedicated bandwidth) and the differences between special access services and “best efforts” Internet access services, I do not believe that the vast majority of businesses currently purchasing special access services view “best efforts” Internet access services as a viable substitute.

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I declare under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

  
\_\_\_\_\_  
Kevin F. Brand

Dated: 2/8/2013

**CERTIFICATE OF SERVICE**

I, Matthew Jones, hereby certify that on this day, February 11, 2013, I caused to be served a true and correct copy of the foregoing Comments of BT Americas, Cbeyond, EarthLink, Integra, Level 3, and tw telecom via FedEx to:

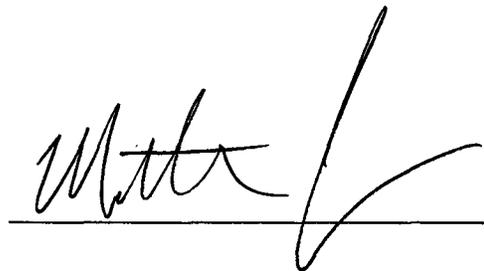
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A handwritten signature in black ink, appearing to read "Matthew Jones", is written over a horizontal line. The signature is stylized and cursive.