

**NATIONAL ECONOMIC
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Dr. Tardiff received a B.S. with honors in Mathematics from the California Institute of Technology in Pasadena and a Ph.D. degree in Social Science from the University of California, Irvine, under a National Science Foundation Pre-doctoral Fellowship and an NSF Grant for Improving Dissertation Research in the Social Sciences.

Dr. Tardiff joined the faculties of the Department of Civil Engineering and the Division of Environmental Studies at the University of California, Davis. He taught undergraduate and graduate level courses in transportation and environmental policy analysis. His research included applications of econometric models of consumer choice to transportation planning problems. Dr. Tardiff's research was funded by the National Science Foundation, the Institute of Transportation Studies and the California Department of Transportation.

Prior to joining NERA, Dr. Tardiff's work included transportation, energy, public utility and telephone industry projects for the U.S. Departments of Transportation and Energy, the California Energy Commission, and several telephone and electric utilities.

Since joining NERA, he has evaluated pricing policies for increasingly competitive telecommunications markets, including appropriate mechanisms for pricing access services to competitors; studied actual and potential competition for services provided by telephone operating companies; analyzed the demand and revenue impacts of new telephone rate structures; developed and evaluated damage studies used in major telecommunications antitrust actions; analyzed the market potential for cellular radio; evaluated the investment and marketing programs of telephone companies; and developed a demand model for analyzing the market potential for alternative employee health care plans, including health maintenance organizations.

Dr. Tardiff has published extensively in the transportation literature. He has presented and published papers on the telecommunications industry. These papers address the issues of pricing and costing policies for emerging competition in telecommunications markets; evaluating and forecasting the impacts of telephone rate plans such as local measured service; analyzing the markets for new telecommunications products and services; and local competition and the bypass issue.

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EDUCATION

UNIVERSITY OF CALIFORNIA, IRVINE
Ph.D., Social Sciences, 1974

CALIFORNIA INSTITUTE OF TECHNOLOGY
B.S., Mathematics, 1971

EMPLOYMENT

NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC.

1992 Vice President. Works on cases, mainly legal and regulatory, on issues of pricing policy, assessing demand for new and existing products and services, and economic damages. This work involves studies, often involving econometric demand analysis methods, for telecommunications, utilities and other clients. Specific areas have included: assessment of competition in the telecommunications industry; analysis of alternative approaches for regulating telephone utilities; evaluation of the benefits from telecommunication products and services; analyzing the demand for local services, toll, and carrier access; evaluation of the prudence of telephone company investments; damage studies for telecommunications antitrust cases; evaluation of methods for environmental damage assessment; and analysis of energy conservation programs.

1984-1992 Senior Consultant

CHARLES RIVER ASSOCIATES, INC.--Boston, Massachusetts

1979-1984 Director of Marketing Research. Managed program to apply econometric customer demand models to marketing research problems in telecommunications, electric utilities, transportation and other industries.

Senior Research Associate. Performed studies on urban transportation, freight transportation, energy and telecommunications issues.

UNIVERSITY OF CALIFORNIA, DAVIS--Davis, California

1974-1979 Assistant Professor, Department of Civil Engineering and Division of Environmental Studies. Taught undergraduate and graduate course in transportation and environmental policy and quantitative research methods; conducted research on passenger transportation demand, (including econometric issues).

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FELLOWSHIPS, GRANTS, AWARDS

First Place, Dissertation Contest of the Transportation Science
Section of the Operations Research Society of America.

NSF Research Initiation Grant (Engineering Division), 1976-1978.

NSF Grant for Improving Doctoral Dissertation Research in the Social Sciences,
1973-1974.

NSF Predoctoral Fellowship, 1972-1974.

Public Health Service Traineeship, 1971-1972.

AFFILIATIONS

American Economic Association
International Telecommunications Society

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TESTIMONY

California Public Utilities Commission, on behalf of Pacific Bell, "Evaluation of MCI's Universal Service Funding Proposal," March 10, 1995.

California's Public Utilities Commission, on behalf of Pacific Bell, "Franchise Services and Universal Service," March 10, 1995 (with Richard D. Emmerson) .

Illinois Commerce Commission on behalf of GTE North: surrebuttal testimony on the benefits of intraMSA presubscription, September 30, 1994.

Illinois Commerce Commission on behalf of GTE North: rebuttal testimony on the benefits of intraMSA presubscription, September 16, 1994.

"Economic Evaluation of OIR/OII on Open Access and Network Architecture Development: Reply Comments," prepared for filing with the California Public Utilities Commission on behalf of Pacific Bell, March 31, 1994 (with Richard D. Emmerson).

"Declaration of Timothy J. Tardiff on Pacific Bell's Productivity Under Price Caps," prepared for filing with the Federal Communications Commission, on behalf of Pacific Bell, February 28, 1994.

"Regulation of Mobile and Wireless Telecommunications: Economic Issues," prepared for filing with the California Public Utilities Commission on behalf of Pacific Bell, February 25, 1994

"Economic Evaluation of OIR/OII on Open Access and Network Architecture Development," prepared for filing with the California Public Utilities Commission on behalf of Pacific Bell, February 8, 1994 (with Richard D. Emmerson).

"Access to Intelligent Networks: Economic Issues," prepared for filing with the Federal Communications Commission, on behalf of Pacific Bell, December 1, 1993.

"The Effect of SFAS 106 on Economy-Wide Wage Rates," prepared for filing with the California Public Utilities Commission on behalf of Pacific Bell, October 1, 1993

"Economic Evaluation of the NRF Review: Reply Comments," prepared for filing with the California Public Utility Commission on behalf of Pacific Bell, May 7, 1993. William E. Taylor and Timothy J. Tardiff, Study Directors.

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"Performance Under Alternative Forms of Regulation in the U.S. Telecommunications Industry," prepared for filing with the Canadian Radio-television and Telecommunications Commission on behalf of AGT Limited, April 13, 1993. Timothy J. Tardiff and William E. Taylor, Study Directors.

"Pacific Bell's Performance Under the New Regulatory Framework: An Economic Evaluation of the First Three Years," prepared for filing with the California Public Utility Commission on behalf of Pacific Bell, April 8, 1993. William E. Taylor and Timothy J. Tardiff, Study Directors.

"Pricing Interconnection and the Local Exchange Carrier's Competitive Interstate Services," prepared for filing with the Federal Communications Commission, on behalf of Pacific Bell, February 19, 1993.

"The Treatment of FAS 106 Accounting Changes Under Price Cap Regulation: Reply Comments," prepared for filing with the Federal Communications Commission on behalf of Pacific Bell, July 1992. William E. Taylor and Timothy J. Tardiff, Study Directors.

"Costs and Benefits of IntraLATA Presubscription," prepared for filing with the State of New York Public Service Commission on behalf of New York Telephone, May 1, 1992. Timothy J. Tardiff and William E. Taylor, Study Directors.

"The New Regulatory Framework 1990-1992: An Economic Review," prepared for filing with the California Public Utility Commission on behalf of Pacific Bell, May 1, 1992. William E. Taylor and Timothy J. Tardiff, Study Directors.

"The Treatment of FAS 106 Accounting Changes Under Price Cap Regulation," prepared for filing with the Federal Communications Commission on behalf of Pacific Bell, April 15, 1992. William E. Taylor and Timothy J. Tardiff, Study Directors.

"The Treatment of FAS 106 Accounting Changes Under Pacific Bell's Price Regulation Plan," prepared for filing with the California Public Utilities Commission on behalf of Pacific Bell, November 15, 1991. William E. Taylor and Timothy J. Tardiff, Study Directors.

"The Treatment of FAS 106 Accounting Changes Under Pacific Bell's Price Regulation Plan: Economic Analysis of the DRA Supplemental Testimony," prepared for filing with the California Public Utilities Commission on behalf of Pacific Bell, January 21, 1992. William E. Taylor and Timothy J. Tardiff, Study Directors.

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California Public Utilities Commission on behalf of Pacific Bell: economic principles for pricing flexibility for Centrex service, Filed November 1990.

Expert Witness on State Transportation Energy Forecasting, California Energy Commission, Sacramento, September 1980.

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SELECTED CLIENT REPORTS

Quantifying the Handicaps of Unequal Access, (Confidential) Prepared for Japan Telecom, January 1994.

Overcoming Unequal Access: The International Experience, with S. Krom, (Confidential) Prepared for Japan Telecom, January 1994.

Market Potential For Cellular Radio And Other Personal Communications Products, (Confidential) Prepared for Pac Tel Corporation, July 1990.

Customer Demand for Local Telephone Services: Models and Applications, Prepared for South Central Bell Telephone Company, August 1987.

Evaluation Plans for Conservation and Load Management Programs, Prepared for New England Electric System, July 1987.

Telecommunications Competition for Large Business Customers in New York (Confidential). Prepared for NYNEX Corporation, June 1987.

"Estimation of Residential Conservation Service Program Electricity Savings," Prepared for Southern California Edison Company, July 1984.

The Demand for Local Telephone Service Upon the Introduction of Optional Local Measured Service. In part. Final report, prepared for Southern New England Telephone, July 1982.

Transit Strategies to Improve Air Quality in the Philadelphia Region. In part. Final report prepared for the Delaware Valley Regional Planning Commission, April 1982.

Estimation of Energy Impacts of State Transportation Improvement Program Projects. In part. Final report prepared for the California Energy Commission, January 1982.

Consumer Representation for Transportation Energy Conservation. In part. Final report prepared for the U.S. Department of Energy, July 1981.

Indicators of Supply and Demand for Transportation Fuels. In part. Prepared for the California Energy Commission, December 1980.

State of the Art in Research on Consumer Impacts of Fuel Economy Policies: Recent Findings and Recommendations for Further Research. In part. Prepared for the National Highway Traffic Safety Administration, January 1980.

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SELECTED PUBLICATIONS AND PRESENTATIONS

Tardiff, T.J., W.E. Taylor, and C.J. Zarkadas, "Periodic Review of Price Cap Plans: Economic Issues," presented at the Telecommunications Policy Research Conference, Solomons, Maryland, October 2, 1994.

Participant in AGT International Symposium on Local Interconnection Policy, Emerald Lake, British Columbia, Canada, May 27-28, 1994.

Tardiff, T.J., "Effects of Presubscription and Other Attributes on Long-Distance Carrier Choice," Presented at the 1994 National Telecommunications Forecasting Conference, Boston, Massachusetts, May 24, 1994.

Tardiff, T.J., "Access Charges and Toll Prices in the United States: An Economic Evaluation," Presented to representatives of Japanese Long-Distance Companies, New York, New York, May 16, 1994.

Tardiff, T.J. and W.E. Taylor, "Telephone Company Performance Under Alternative Forms of Regulation in the U.S.," presented at the Telecommunications Policy Research Conference, Solomons, Maryland, October 4, 1993.

Tardiff, T.J., "Interconnection and LEC Competitive Services: Pricing and Economic Efficiency," presented at the Telestrategies Conference: The Access Charge Revolution, Washington, D.C. May 18, 1993.

Hausman, J., T. Tardiff, and A. Belinfante, "The Effects of the Breakup of AT&T on Telephone Penetration in the United States," The American Economic Review, Vol. 83, May 1993, pp. 178-184.

Tardiff, T.J., "Assessing the Demand for New Products and Services: Theory and Practice," presented at the NRR Conference on Telecommunications Demand for New and Existing Services, Denver, Colorado, August 6, 1992.

Tardiff, T.J., "Price and Cost Standards for Increasingly Competitive Telecommunications Services," presented at the Ninth International Conference of the International Telecommunications Society, Sophia Antipolis, France, June 17, 1992.

Tardiff, T.J. "Modeling The Demand For New Products and Services," presented at the NTDS Forum, Santa Fe, New Mexico, September 27, 1991.

Tardiff, T.J. and C. Zarkadas, "Forecasting Tutorial," presented at the National Telecommunications Forecasting Conference, May 29, 1991.

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Tardiff, T.J. and W.E. Taylor, "Pricing the Competitive Services of Regulated Utilities," National Economic Research Associates, Working Paper No. 7, May 1991.

Hausman, J.A. and T.J. Tardiff, "Growth in New Product Demand Taking into Account The Effects of Price and Competing Products: Mobile Telecommunications," Presented at the Massachusetts Institute of Technology Telecommunications Business and Economics Program Second Annual Symposium, Cambridge, Massachusetts, November 1990.

Tardiff, T.J., "Structuring Telecommunications in Other Countries: View from the UK, Europe and Canada," Presented at the United State Telephone Association Affiliated Interest Issues Committee 1990 Fall Conference, Traverse City, Michigan, September 1990.

Tardiff, T.J. and M.O Bidwell, Jr., "Evaluating a Public Utility's Investments: Cash Flow vs. Revenue Requirement," Public Utilities Fortnightly, May 10, 1990.

Tardiff, T.J. and C.J. Zarkadas, "Forecasting Demand for New Services: Who, What, and When," Presented at the Bellcore/Bell Canada Demand Analysis Forum, Hilton Head South Carolina, April 1990.

Tardiff, T.J., "Consumer Welfare with Discrete Choice Models: Implications for Flat versus Measured Local Telephone Service," Presented at the Bellcore/Bell Canada Demand Analysis Forum, Hilton Head South Carolina, April 1990.

Tardiff, T.J., "Telephone Regulation in California: Towards Incentive Regulation and Competition," Presented to the Bell Canada Economic Council, Hull, Quebec, Canada, February 1990.

Tardiff, T.J., "Measuring Competitiveness in Telecommunications Markets," in National Economic Research Associates, Telecommunications in a Competitive Environment. Proceeding of the Third Biennial Telecommunications Conference, Scottsdale, Arizona, April 1989, pp. 21-34.

Hausman, J.A., T.J. Tardiff, and H. Ware, "Competition in Telecommunications for Large Users in New York," in National Economic Research Associates, Telecommunications in a Competitive Environment. Proceeding of the Third Biennial Telecommunications Conference, Scottsdale, Arizona, April 1989, pp. 1-19.

Perl, L.J. and T.J. Tardiff, "Effects of Local Service Price Structures on Residential Access Demand," Presented at the International Telecommunications Society North American Regional Meeting, Ottawa, Ontario, Canada, June 1989.

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Tardiff, T.J. and W.E. Taylor, "Costing Principles for Competitive Assessment," in Telecommunications Costing in a Dynamic Environment, Proceedings of the Bellcore-Bell Canada Conference on Telecommunications Costing, 1989, pp. 497-518.

Tardiff, T.J., "Forecasting the Impact of Competition for Local Telephone Services." Presented at the Bellcore National Forecasting Conference, New Orleans, April 1987.

Tardiff, T.J., "Is Bypass Still a Threat," in National Economic Research Associates, Telecommunications in a Competitive Environment. Proceedings of Conference held in Scottsdale, Arizona, March 1987, pp. 27-41.

Tardiff, T.J., "Benefit Measurement with Customer Choice Models." Presented at the Bellcore Telecommunications Demand Modeling Conferences, New Orleans, October 1985.

Tardiff, T.J., "The Economics of Bypass," Presented at the Bellcore Competitive Analysis and Bypass Tracking Conference. Denver, March 1985.

Tardiff, T.J., "Class of Service Choice Model." Presented at the Telecommunications Marketing Forum. Chicago, September 1984.

Tardiff, T.J., "Demand for New Telecommunications Product and Services." Presented at the Fifth International Conference on Futures Analyses, Forecasting and Planning for Telecommunications. Vancouver, July 1984.

Tardiff, T.J., "Pricing and Marketing in the Competitive Local Access Market." In Present and Future Pricing Issues in Electric, Gas, and Telecommunications Industry. Proceeding of the Ninth Annual Rate Symposium on Problems of Regulated Industries. Columbia: University of Missouri, 1983.

Tardiff, T.J., J. Hausman and A. Baughcum, "The Demand for Optional Local Measured Service." In Adjusting to Regulatory, Pricing and Marketing Realities. Proceedings of the Fourteenth Annual Conference of the Institute of Public Utilities. East Lansing: Michigan State University, 1983.

Tardiff, T.J., W.B. Tye, L. Sherman, M. Kinnucan, and D. Nelson, Application of Disaggregate Travel Demand Models. National Cooperative Highway Research Program Report 253, 1982.

Tardiff, T.J., D. Wyckoff, and B. Johnson, "Shippers' Preferences for Trucking Services: An Application of the Ordered Logit Model." Proceedings of the Transportation Research Forum, Vol. 23, 1982.

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- Tardiff, T.J., P. M. Allaman, and F. C. Dunbar, New Approaches to Understanding Travel Behavior. National Cooperative Highway Research Program Report 250, 1982.
- Tardiff, T.J., E. Ziering, J. Benham and D. Brand, "Energy Impacts of Transportation System Improvements." Transportation Research Record 870: 10-15, 1982.
- Tardiff, T.J. and O.S. Scheffler, "Destination Choice Models for Shopping Trips in Small Urban Areas." Proceedings of the Transportation Research Forum, Vol. 22, 1982.
- Tardiff, T.J., J.L. Benham and S. Greene, Methods for Analyzing Fuel Supply Limitations on Passenger Travel. National Cooperative Highway Research Program Report 229, 1980.
- Tardiff, T.J., "Vehicle Choice Models: Review of Previous Studies and Directions for Further Research." Transportation Research 14A: 327-336, 1980.
- Tardiff, T.J., "Specification Analysis for Quantal Choice Models." Transportation Science 13: 179-190.
- Tardiff, T.J., "Attitudinal Market Segmentation for Transit Design, Marketing and Policy Analysis." Transportation Research Record 735: 1-7, 1979.
- Tardiff, T.J., "Definition of Alternatives and Representation of Dynamic Behavior in Spatial Choice Models." Transportation Research Record 723: 25-30, 1979.
- Tardiff, T.J., "Use of Alternative Specific Constants in Choice Modeling." Institute of Transportation Studies, University of California, Berkeley and Irvine, Report No. UCI-ITS-SP-78-6, December 1978.
- Tardiff, T.J. and G.J. Fielding, "Relationship Between Social-Psychological Variables and Individual Travel Behavior." Proceedings of the Transportation Research Forum, Vol. 19, 1978.
- Tardiff, T.J., T.N. Lam, and B.F. Odell, "Effects of Employment and Residential Location Choices on Urban Structure: A Dynamic Stochastic Simulation." Transportation Research Record 673: 86-93, 1978.
- Tardiff, T.J., "Casual Inferences Involving Transportation Attitudes and Behavior." Transportation Research 11: 397-404, 1977.
- Tardiff, T.J., "A Note on Goodness of Fit Statistics for Probit and Logit Models." Transportation 5: 377-388, 1976.

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Tardiff, T.J., "The Effects of Socioeconomic Status on Transportation Attitudes and Behavior." Ph.D. Dissertation, School of Social Science, University of California, Irvine, 1974.

April 1995



ATTACHMENT 3

**THE ECONOMICS OF STRUCTURAL
SEPARATION FROM THE PERSPECTIVE
OF ECONOMIC EFFICIENCY**

FINAL REPORT

Agreement No. 9500046315

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April 4, 1995

**THE ECONOMICS OF STRUCTURAL SEPARATION
FROM THE PERSPECTIVE OF ECONOMIC EFFICIENCY:
ABSTRACT PREPARED BY RRC, INC.**

This report addresses the key issues in the debate about whether to adopt regulations that require BOCs to offer enhanced services only through separate subsidiaries. Our analysis evaluates these issues using the criteria of consumer welfare and efficiency in production, innovation, and marketing. Economic analysis indicates the BOCs should be allowed to provide enhanced services through an integrated structure. Replacing a market determined structure with a structure prescribed by regulatory fiat will result in significant welfare losses.

A forced subsidiary structure imposes significant costs that will ultimately be borne by consumers of LEC basic services and enhanced services. The imposed costs include one-time separation costs, higher costs of basic and enhanced services due to loss of joint production complementarities, and higher costs of innovation and a slowing of innovation due to loss of technological synergies arising only from an integrated structure.

The benefits claimed by the proponents of structural separation are either overstated or nonexistent. Some benefits are provided by regulations other than structural separation, such as ONA. Proponents claim that structural separation would provide necessary safeguards against access discrimination. However, the necessary conditions for profitable access discrimination are not met. Even if access discrimination was profitable, structural separation would have no effect on the result. In contrast with what is assumed by proponents of structural separation, the BOCs could not engage in access discrimination without being detected. There are sufficient safeguards against access discrimination in existing penalties, ONA provisions, anti trust laws, and the threat of regulatory change.

Proponents claim that in an integrated structure, BOCs will be able to shift costs from enhanced services into the rate base for basic services, resulting in higher prices to basic service rate payers and prices below cost for enhanced services provided by BOCs. The premise is that BOCs will use their monopoly in local services to try to monopolize the enhanced services market. This strategy is not founded in economic analysis, which indicates the BOCs are more likely to benefit from selling access to a competitive market. The economic incentives are for the BOCs to price enhanced services to maximize profits.

Any of the benefits sought by the proponents of structural separation are available with market driven unbundling and the pricing of the unbundling at cost. These non-structural remedies are available with ONA. Most importantly, the coming competition in LEC basic services will require the BOCs to aggressively market their LEC basic services if they are to maintain their market position.

The lessons from other industries underscore the benefits of market determined firm organization. In the banking industry, the natural gas pipeline industry, and the airline industry, regulators have attempted to level the playing field only to withhold welfare enhancing efficiencies from the market. Structural separation in the production of enhanced services would be a replication of these mistakes.

In summary, if structural separation is imposed, consumers of LEC basic services and enhanced services will pay higher prices and wait longer for products to be introduced, implying significant welfare costs.

The Economics of Structural Separation from the Perspective of Economic Efficiency

I. Introduction

Current controversy centers on whether the regional Bell Operating Companies (BOCs) should be allowed to continue providing enhanced telecommunications services through an integrated firm structure or whether enhanced services must be offered through separate subsidiaries with separately located facilities and separate management. Proponents of structural separation argue that only by separating the provision of basic local service from enhanced service can the public be protected from various abuses. Some consumer groups see separation as protecting basic service customers from being charged costs attributable to enhanced services under the existing integrated firm structure. Some enhanced service providers (ESPs), such as MCI, see structural separation as a safeguard against potential monopolistic abuses from the BOCs attempting to leverage their monopoly power in basic services into the enhanced services markets. Still other providers of enhanced services feel that structural separation would eliminate an important BOC cost advantage, with the result being a "level playing field". In contrast, the BOCs argue that the separation of basic services from enhanced services would result in a higher cost, more inefficient form of organizational structure, with the result that both consumers of basic services and enhanced services will pay higher prices.

Interestingly, the claims of both sides may be true to varying degrees, leaving policy makers in a conundrum of choosing between conflicting policy goals. For example, how are policy makers to resolve the tradeoff between a "level, but high cost playing field" favoring independent enhanced service providers versus higher prices to consumers of basic and enhanced services? Fortunately, if policy makers are willing to adopt as their policy criterion the notion of economic efficiency, very clear policy directives emerge. This report views the structural separation issue as a problem for applied welfare analysis, requiring policy makers to make informed estimates about the costs and benefits of structural separation.

Section II identifies three distinct costs arising from structural separation. First, separation would result in significant "one-time separation costs" associated with physically disrupting ongoing integrated operations, changing physical locations, modifying software and hardware equipment, incurring search costs associated with new personnel, and disposing of excess capacity in the parent company. Second, structural separation would raise the day-to-day costs of providing basic and enhanced services because cost complementarities favor joint production. Third, structural separation would impose both higher research and development (R & D) costs and slower new product innovation, because technological synergies arising from joint R & D would be lost with separation.

Section III considers the alleged benefits arising from structural separation. Specifically, we address three benefits claimed by proponents of structural separation. First, structural separation is believed by some to provide stronger safeguards against access discrimination, thereby fostering competition in enhanced services markets. Second, separation is presumed to prevent accounting abuses from loading the costs of enhanced services into the basic service rate base since enhanced services would effectively reside in a separate subsidiary for accounting purposes. Third, separation would presumably eliminate the incentive to cross subsidize the price of enhanced services by using profits earned in the basic service market to underprice enhanced services, allowing BOCs to monopolize these markets as well.

Section IV recapitulates the findings of Section II and III and argues that structural separation will only result in substantial costs and minor benefits. Instead of structural separation, we emphasize the importance of two key non-structural remedies that will produce the benefits sought in Section III without resulting in the costs in Section II. Specifically, we emphasize the desirability of unbundling access services to ESPs and pricing these access services at cost. Unbundling, which does not depend on structural separation, prevents the BOCs from restricting entry into enhanced services and facilitates competition. Pricing access services at cost promotes long run efficiency. These non-structural remedies are key components of the existing policy of Open Network Architecture (ONA). Their continued vigorous enforcement is a proper policy action.

Section V looks at the issue of structural separation from the broader perspective of what determines efficient firm structure--the extent of vertical integration, joint production, and corporate governance. Examples from banking, pipelines, and airlines show that regulations have often

inhibited the evolution of efficient industry structure. These examples provide strong reasons why regulatory fiat should not replace that of the market in determining firm and industry structure

II. Costs of Structural Separation

A. One-Time Separation Costs

Structural separation, imposed after its relaxation in Computer III, would lead to substantial costs that would ultimately be borne by the consumer. U S WEST staff has determined that a return to the requirement of structural separation would cost between \$58.7 million and \$90.6 million.¹ This does not take into account perhaps even greater costs attributed to dislocation, structural duplication, and management inefficiencies. On the consumer side, the one-time separation actions could impose inconvenience and economic loss upon consumers as services are temporarily interrupted during the transfer.

1. Direct Expenses of Building and Equipment

The U S WEST study of separation costs include an estimated \$11.979 million for equipment and software to support the anticipated 2,500 member subsidiary staff. Another \$1.024 million must be spent on installation and \$2.086 million on support personnel. The PBX, internal cabling, data and voice circuits, and uninterruptable power supply will cost another \$3.165 million. Administrative support is expected to cost \$1.049 million. Related taxes are estimated to be \$.655 million. The total equipment, support personnel, software, and taxes, therefore total \$20.961 million.

The study presents two alternatives to housing the subsidiary: an owned facility and a leased facility. The owned option would cost \$69.600 million and the lease option would cost \$37.717

¹See "Structural Separation of Enhanced Service Offerings," US West Management Information Services, March 29, 1995.

million. The lease cost is an annual reoccurring expense. Overall, the estimated costs of separation is reported to be \$90.561 million (owned facility) or \$58.677 million (leased facility). At any reasonable discount rate, the owned facility option produces the least present value cost.

2. Disruption Costs

The process of transferring operations into a separate facility requires significant downtime for affected staff. Those being transferred into the new subsidiary must prepare their work-environment for the physical relocation. During the transport of the materials, staff cannot function effectively. Unpacking materials takes additional time. For a realistic estimate, one must expect that some materials will be mis-routed, requiring extra days to locate and transfer.

New hires require time to become as productive as those being replaced. Teams of personnel must be united and operating procedures defined. For the less skilled, this transition may require days. For skilled personnel, this transition may require months. During this time, productivity will suffer, resulting either in added costs or reduced levels of service to the customer base.

3. Excess Capacity Costs

With the transfer of personnel and equipment to the subsidiary, the existing offices of U S WEST would be underutilized. At least 45,000 square feet of office space would be vacated, and an extensive amount of computer equipment, telephone equipment, and cabling would remain in the vacated premises. If these facilities being vacated were leased, the option for renewal would be rejected, but the equipment would have to be stored or discarded. If the space were owned, U S WEST would presumably lease the space to outside firms, also necessitating the removal of equipment, furniture, etc. These costs have not been included in the estimates.

B. On-Going Cost Complementarities in Operations and Marketing

Cost complementarity is a simple but important concept. Strictly defined, a firm experiences cost complementarity when the production of one product leads to reduced costs of producing another product. A simple example of cost complementarity can be borrowed from the agricultural sector. Apples and honey are jointly produced. The bees pollinate the apple blossoms, increasing apple production. The nectar from the apple blossoms increases honey production. Therefore, it is not surprising that the two activities are performed jointly. The average cost of production is reduced if production is joint.

1. Cost Complementarities in Operations

Cost complementarity is a primary reason for integrated personnel, equipment, and facilities in the provision of enhanced services. This cost complementarity largely stems from the nature of the production processes for both basic services and enhanced services. Both are substantially computer dependent, and development and improvement of these services entail changes in and extensions of computer software. It is this production environment that partly establishes the interdependence of the two production processes.

As new software designs are considered in basic services, there are always multiple paths to the same destination. However, there is often one path that is particularly conducive to the unbundling of a basic service that is valuable in the provision of a marketable enhanced service. Consider a hypothetical example. New software techniques become available that will speed the reset of a dialtone when a customer wants to make a second call. Two methods are possible to incorporate the new software technique into existing systems. One replaces an existing module that “remembers” the customer’s previous call numbers. The other method utilizes the existing module but inserts a “call” to a new subroutine, leaving the structure of the old module intact. An enhanced product could be developed wherein the customer, making a series of calls, can retrieve previous call numbers. The new service allows the customer to “scroll” through the previous numbers and re-enter any on the existing list.

Without the knowledge of the planned enhanced service, the programmer is just as likely to insert the new module as utilize the call to the subroutine. If the call to the subroutine is selected, the costs of extracting the previous customer-dialed numbers is relatively inexpensive. If the new module is inserted, the previous numbers are not retained and new software must be built to capture those numbers. Only with the joint realization of enhanced products possibilities and the routine upgrading of system software can the cost complementarities be captured. Structural separation eliminates this cost complementarity.

The industry has already experienced the effects that structural separation has on the provision of enhanced services. The earliest provision of Voice Messaging Services (VMS) by AT&T was cancelled due to the structural separation requirement.² Within U S West, numerous enhanced services to be deployed will be scrapped with structural separation because the ongoing costs of providing these services will increase significantly.

A number of other examples of the loss of cost complementarities through structural separation is available from U S WEST and other BOCS. U S WEST's experience in the provision of ESI (an enhanced fax facility) is one example. U S WEST introduced ESI through its U S WEST subsidiary. The election to provide ESI through a subsidiary was not imposed by CI-II but was an internal decision based upon the need for additional space and the failure to realize full cost complementarities. The formal report from an interview with the head of ESI includes the following comments:³

“Separation made this situation harder...

Customer must separately buy ‘call forward busy/no answer’ (which is not ONA) and be billed separately for it, ...

Also harmful in the channel: i.e., inability to use U S WEST channels, ...

Under CI-II rules could/would have integrated marketing, ...

Part 64 gave separate sub a bad deal on using parent resources, ...

²See Hausman, Jerry A. and Timothy J. Tardiff, Costs and Benefits of Vertical Integration of Basic and Enhanced Telecommunications Services, March 29, 1995.

³Interview with Jeri Korshak, former head of ESI.

Systems costs very high due to separate facilities, ...
Didn't realize potential of integrated messaging.”

In the end, U S WEST pulled the product from the market, booking a \$100 million operating loss (before taxes) over a three year period. The post-mortem evaluation illustrates the importance of integrated personnel and facilities.

Structural separation would eliminate the existence of cost complementarities in the provision of enhanced services. Substantial losses would be felt in at least two additional areas: marketing and R&D. The ensuing higher costs would result in either higher prices of those services that are brought to market or the exclusion of services whose expected returns fail to meet corporate standards. In either situation, consumer welfare would be reduced.

2. Cost Complementarities in Marketing

U S WEST currently utilizes marketing resources jointly employed in the sales of basic services and enhanced services. This reduces the need to duplicate marketing efforts and enables U S WEST to offer lower prices for both basic and enhanced services. Not only does joint marketing save resources in the production of these marketing services, customers value the convenience of being able to order a variety of services through a single source.⁴ This is a complementarity that would be eliminated with required facility separation since the subsidiary offering enhanced services could not make use of marketing personnel involved in marketing of local exchange carrier (LEC) base services. The additional costs of separate marketing necessarily must be borne by the consumer.

⁴Evidence from the market for long distance services suggests that competitors do not substantially suffer from joint marketing. Long distance competitors to the “default” long distance carrier achieved growing market shares. The inconvenience of placing a call to the competitor proved to be insignificant. Price was the determining factor in long distance markets, and price should be the determining factor in the provision of enhanced services.

C. R&D Cost Complementarities

1. Technical Aspects Creating Cost Complementarities

U S WEST utilizes innovation complementarities in the development of enhanced services. Technical personnel in basic services, when combined with new-product designers for enhanced services, form a research team that more efficiently travels from an idea to an innovation. This combination reduces R&D efforts and brings products to the market more quickly and less expensively. These innovation efficiencies are common when product innovation requires multiple sets of expertise. To maintain strict separation is to eliminate much of the engine of invention. NERA shows that structural limitations delayed the development of numerous enhanced services and computed the welfare losses totalling over \$100 billion per year.⁵ The simple point is that new products confer large benefits to consumers--far more than the prices they pay. When a product never reaches the market or is delayed, society is worse off.

Other evidence that an integrated system provides innovation advantages over an imposed subsidiary structure stems from the modern organization and conduct of research in areas outside telecommunications. This examination proves that there is a risk of loss of research efficiency in forcing a separation between the provision of basic and enhanced services among BOCs. Structural separation also reduces the overall level of research activity if complementarity exists. When operations are structurally separate, benefits of research in a single structure that spillover to the other structure are ignored in evaluating the profitability of the research. In effect, structural separation results in the introduction of externalities that yield an inefficient level of research activity. In a free market, when significant externalities exist, firm structure is altered to internalize the externalities. Forced structural separation entails a loss of efficiency by not allowing the internalization of research externalities.

Consider the treatment of joint research by legislatures. The antitrust laws of the United States are designed to prevent collusive activity among firms. Yet, the one area of cooperation among firms that is universally viewed as advantageous is joint research because such joint research

⁵See Hausman and Tardiff (1995).

internalizes any spillover benefits. Many have advocated that antitrust policies should be changed to encourage joint research.⁶ The advantages of research cooperation are viewed as potentially great, and the risk of collusive action for purposes of monopolization arising from this activity is viewed as small. This is an important consideration, as the opponents of the integrated approach claim risk of monopolization by BOCs as a reason for separating the people most knowledgeable about the basic service network from those concerned with enhanced services. What the proponents of separate subsidiaries are trying to accomplish is complete separation of the BOCs into separate companies along lines of the type service offered. This is a backwards move from the standpoint of innovation in the technology used to access the local service distribution system, long run competition, and consumer welfare.

Joint research has been encouraged through legislation, such as the 1984 National Cooperative Research Act, which encourages joint research by exempting the involved companies from punitive damages or the trebling of damages should they be convicted of violating antitrust laws. Such cooperation is not evidence of violation of antitrust laws, and 111 cooperative joint research endeavors were undertaken between January 1985 and June 1988.⁷ Also, "major research consortia have been established in recent years in such diverse areas as glass bottles, computers and semiconductors, and boiler pumps for power plants. In December 1988 a Presidential commission urged the creation of several consortia comprised of industry, government, and university laboratories

⁶ See Ordoover, Janusz A. and Robert D. Willig, "Antitrust For High-Technology Industries: Assessing Research Joint Ventures and Mergers", *Journal of Law and Economics*, 1985, 28: 311-33; Grossman, Gene and Carl Shapiro, "Research Joint Ventures: An Antitrust Analysis", *Journal of Law, Economics, and Organization*, 1986, 2:315-37; Brodley, Joseph F., "Antitrust Law and Innovation Cooperation", *Journal of Economic Perspectives*, 1990, 4:97-112; Jorde, Thomas M. and David J. Teece, "Innovation and Cooperation: Implications for Competition and Antitrust", *Journal of Economic Perspectives*, 1990, 4: 75-96; Shapiro, Carl and Robert D. Willig, "On The Antitrust Treatment of Production Joint Ventures", *Journal of Economic Perspectives*, 1990, 4: 113-30.

⁷Jorde, Thomas M., and David J. Teece, Innovation, Cooperation, and Antitrust, Berkeley, 1988.

for research in superconductivity..."⁸ Even international joint ventures in research are becoming increasingly common.⁹

The concern of non-BOC ESPs is that the offering of LEC basic services and enhanced services within one firm will lead to anticompetitive behavior. The typical concern in other industries is that the joint research effort will also result in a collusive setting of the prices of the developed products. This concern is not transferable to telecommunications.

The need for coordinated development in LEC basic services and enhanced services is increasing with time. Technological changes occur very rapidly in the provision of LEC basic services, and most of these technological changes occur in the form of computer software changes. The industry has been on a continual move in the direction of computer-controlled switching from mechanical switching. Unlike mechanical switching devices of the 1980s, computer software opens vast expanses of possible paths to the same destination. Unless the path taken is the ideal path that interfaces best with the production of a particular enhanced service, there are inefficiencies generated that were unintended but unavoidable without a close interrelationship between the two operations.

2. The CEI Plan Safeguard

The rate of flow of new products introduced in the market is restricted whenever the potential profitability of an innovation is reduced. One safeguard, CEI plans, has the potential of restricting this rate of flow. Current implementation of CEI plans as a safeguard appear to have had little impact upon innovation. Appendix A lists enhanced services which have moved through U S WEST's innovation pipeline. However, disclosures of new product plans before their release can destroy the critical time protection that innovators capture in pioneer products.

The time between the deployment of a new product and the replication of the product by competitors gives the pioneer firm time to capture profits that justify the investment in R&D. The importance of this protection has been recognized by legislatures who have enabled firms to use

⁸Bolter, Walter G., McConnaughey, James W., and Fred J. Kelsey, Telecommunications Policy for the 1990s and Beyond, M.E. Sharpe, Inc., 1990, page 61.

⁹Carleton, Dennis W. and Jeffrey M. Perloff, Modern Industrial Organization, Harper Collins, 1994, page 685.