

The Traditional State Side of Telecommunications Cost Allocations

Anthony G. Oettinger
with
Carol L. Weinhaus

Part 4 of
Basic Data on the Politics and
Economics of the Information Evolution:
Telecommunications Costs and Prices
in the United States

Program on Information Resources Policy

Harvard University

Cambridge, Massachusetts

Center for Information
Policy Research

A publication of the Program on Information Resources Policy.

BASIC DATA ON THE POLITICS AND ECONOMICS OF THE INFORMATION EVOLUTION:
TELECOMMUNICATIONS COSTS AND PRICES IN THE UNITED STATES

Part 4: The Traditional State Side of Telecommunications Cost Allocations
Anthony G. Oettinger with Carol L. Weinhaus
September 1980, Publication No. P-80-7

The Program on Information Resources Policy is jointly sponsored by
Harvard University and the Center for Information Policy Research.

Chairman: Anthony G. Oettinger

Director: John C. LeGates

Executive Director, Postal and Allied Arenas: John F. McLaughlin

Executive Director, Media and Allied Arenas: Benjamin M. Compaine

Executive Director, International and Allied Arenas: Oswald H. Ganley

Copyright © 1981 by the President and Fellows of Harvard College. Not
to be reproduced in any form without written consent from the Program on
Information Resources Policy, Harvard University, 200 Aiken, Cambridge,
MA 02138. (617) 495-4114. Printed in the United States of America.

PROGRAM ON INFORMATION RESOURCES POLICY

Harvard University

Center for Information Policy Research

Affiliates

Action for Children's Television
 American District Telegraph Co.
 American Management Systems, Inc.
 American Telephone & Telegraph Co.
 Arthur D. Little, Inc.
 Auerbach Publishers Inc.
 Automated Marketing Systems
 BellSouth Corporation
 Bell Atlantic
 Booz-Allen Hamilton
 Canada Post
 Cellular One
 CBS Broadcast Group
 Commission on European Communities (Belgium)
 Communications Workers of America
 Computer & Communications Industry Assoc.
 COMSAT
 Continental Cablevision, Inc.
 Copley Newspapers
 Cowles Media Co.
 Dai-Ichi Kangyo Bank, Ltd. (Japan)
 Databit Inc.
 Dialog Information Services, Inc.
 Digital Equipment Corp.
 Direction Generale
 des Telecommunications (France)
 Doubleday, Inc.
 Dow Jones & Co., Inc.
 Dun & Bradstreet
 Economics and Technology, Inc.
 EIC/Intelligence Inc.
 LM Ericsson (Sweden)
 Federal Reserve Bank of Boston
 Gannett Co., Inc.
 GTE Sprint Communications Corp.
 Hitachi Research Institute (Japan)
 Honeywell, Inc.
 Hughes Aircraft Co.
 E.F. Hutton and Co., Inc.
 IBM Corp.
 Information Gatekeepers, Inc.
 International Data Corp.
 International Resource Development, Inc.
 Invoco AB Gunnar Bergvall (Sweden)
 Knowledge Industry Publications, Inc.
 Kokusai Denshin Denwa Co., Ltd. (Japan)
 Lee Enterprises, Inc.
 John and Mary R. Markle Foundation
 MCI Telecommunications, Inc.
 McKinsey & Co., Inc.
 Mead Data Central
 MITRE Corp.
 Motorola, Inc.
 National Association of Letter Carriers
 National Telephone Cooperative Assoc.
 The New York Times Co.
 NEC Corp. (Japan)

Nippon Telegraph & Telephone Public
 Corp. (Japan)
 Northern Telecom Ltd. (Canada)
 Northrop Corp.
 NYNEX
 The Overseas Telecommunications
 Commission (Australia)
 Pacific Telesis Group
 Pitney Bowes, Inc.
 Public Agenda Foundation
 RCA Corporation
 Reader's Digest Association, Inc.
 Research Institute of Telecommunications
 and Economics (Japan)
 Royal Bank of Canada (Canada)
 Salomon Brothers
 Satellite Business Systems
 Scaife Family Charitable Trusts
 Seiden & de Cuevas, Inc.
 Southern New England Telephone
 State of Minnesota Funding
 State of Nebraska Telecommunications
 and Information Center
 Telecom Futures, Inc.
 Telecommunications Research
 Action Center (TRAC)
 Telecom Plus International, Inc.
 Times Mirror Co.
 Times Publishing Co.
 TRW Inc.
 United States Government:
 Central Intelligence Agency
 Department of Commerce:
 National Oceanographic and
 Atmospheric Administration
 National Telecommunications and
 Information Administration
 Department of Health and Human Services
 National Library of Medicine
 Department of State
 Office of Communications
 Federal Communications Commission
 Federal Emergency Management Agency
 Internal Revenue Service
 National Aeronautics and Space Admin.
 National Security Agency
 U.S. Army:
 Office of the Assistant Chief of
 Staff for Information Management
 United States Information Agency
 United States Postal Rate Commission
 United States Postal Service
 US West
 United Telecommunications, Inc.
 The Washington Post Co.
 Wolters Samsom Group (Holland)

ACKNOWLEDGMENTS

Brooke Barr, Laura Brody, David Goldsberry, Paul Gottlieb, Francesca Fry, Vivina Ree and John Sylla ably assisted in the laborious tasks of data gathering, sifting and organizing. Special thanks are due to Anne Hunt and Jeff Dutton of the Harvard Laboratory for Computer Graphics and Spatial Analysis, for their collaboration in developing effective presentations of the state-by-state and price/distance data.

Special thanks are also due to many people within the Program's affiliates and to many others, largely unknown to us, who responded to requests addressed to companies, trade associations, and government bodies. They reviewed the study plan, supplied data, or commented critically on drafts of this report. These persons and the Program's affiliates are not, however, responsible for or necessarily in agreement with the views expressed herein, nor should they be blamed for any errors of fact or interpretation.

Anthony G. Oettinger

Carol L. Weinhaus

EXECUTIVE SUMMARY

- Whatever the outcome of legislative proposals that come before the 96th Congress, the structure of the telecommunications industry and its computer, postal and other neighbors will continue to be debated in numerous regulatory proceedings, court cases, federal and state legislative initiatives and international negotiations.

- Central to these discussions are "proper costs" and their relationships not only to prices but also to other benefits or burdens. Costs have been allocated in the traditional telecommunications industry mainly by a two-stage process. First, explicit jurisdictional separations have allocated costs hence revenue requirements among the federal and all the state jurisdictions. Second, pricing rather than costing policy has determined the further incidence of benefits and burdens in the general absence of explicit sub-allocations of costs within the pools of costs assigned to the broad aggregates of interstate and state services. Part 3 describes the first stage. The second stage is detailed here.

- Over the last decade, the federal share of costs (hence the share of total revenues from interstate customers) has risen sharply, thus lowering the relative share of state customers. Such broad trends, however, tell only part of the story. There are significant state-by-state, service-by-service and industry-segment-by-industry-segment differentials reflecting the influence on cost allocation and price setting of the diverse compromises politically feasible in different jurisdictions under changing competitive conditions.

- At the start of the 1970s, toll price schedules rose appreciably over the whole range of calling distances. By the end of the decade rates for long distances had flattened out under pressure of competition for relatively long distance services.

- Concomitantly, the politically sensitive positive disparity between state toll rates generally higher--for equal distances--than interstate toll rates was reduced over the decade. Indeed, in many states the disparity changed sign.

- During the same period, continuing suburbanization continued the pressure evident since the end of World War II on the extension of local service into larger and not necessarily contiguous areas, formerly reached only through state toll calls. The Atlanta "local" calling area, for instance, is the size of Delaware and Rhode Island combined. Eighty percent to 90 percent of residences and about 50 percent of businesses are served at flat-rate (time and/or distance insensitive) basic local services prices generally held stable by state regulators.

- This stability of basic local pricing and the flattening of longer distance toll rates has been accompanied by unbundling and separate pricing of various elements of local service and also by sharp rises in medium-distance toll rates. Consequently the diminished toll rate disparity has been supplanted by a significant exchange/interexchange rate disparity manifested by an abrupt increase in the price of a call to a point just outside a local calling area relative to the price of a call to a point just inside a local calling area, just at a time when the 96th Congress contemplated shifting the federal/state jurisdictional boundary from the state border to the boundary between local (exchange)

and toll (interexchange) services.

- During the 1970s the dependence of all operating telephone companies, but especially of the independents, on toll as opposed to local revenues increased by virtue of an administrative linkage (the Ozark Plan) between the processes of jurisdictional cost separations and the (logically) independent processes for inter-company sharing of revenues for jointly provided services. In some instances, this would have reduced the share of costs to be recovered through local service pricing to zero or less, but for the interposition of an arbitrary floor on that share.

- Given current competitive pressures toward decreasing the federal share of costs, reducing their growth rate or imposing a share on all competitors and given continuing political pressures toward extending local calling areas, traditional costing and pricing processes are being destabilized. Indeed, the very distinction between exchange and interexchange services is of increasingly doubtful validity. The consequences of these findings of Part 4 are examined in Part 5.

- Borchardt, Kurt. *The Exchange Network Facilities for Interstate Access (ENFIA) Interim Settlement Agreement*, P-79-4, August 1979.
- Compaine, Benjamin M. *A New Framework for the Media Arena: Content, Process and Format*, P-80-3, February 1980.
- Ganley, Oswald H. *The Role of Communications and Information Resources in Canada*, P-79-1, June 1979.
- Ganley, Oswald H. *The United States-Canadian Communications and Information Resources Relationship and Its Possible Significance for Worldwide Diplomacy*, P-80-2, February 1980.
- Godbey, Robert D. *Revenue and Cost Allocations: Policy Means and Ends in the Railroad and Telecommunications Industries*, P-79-2, July 1979.
- Klie, Robert H. *Communications Network Management*, P-80-4, February 1980.
- Lipscomb, Greg. *Private and Public Defenses Against Soviet Interception of U.S. Telecommunications: Problems and Policy Points*, P-79-3, July 1979.
- Loeb, Guy H. *The Communications Act Policy Toward Competition: A Failure to Communicate*, P-77-3, October 1977.
- McLaughlin, John F., with Anne E. Birinyi, David Dominik and Eddie Muñoz-Perou, *Telephone-Letter Mail Competition: A First Look*, W-79-4, July 1979.
- McLaughlin, John F., with Anne E. Birinyi, *Mapping the Information Business*, P-80-5, July 1980.
- Oettinger, Anthony G., Berman, Paul J. and Read, William H. *High and Low Politics: Information Resources for the 80s* (Ballinger Publishing Company, Cambridge, Ma., 1977).
- Oettinger, Anthony G. and John C. LeGates. *Domestic and International Information Resources Policy--Congressional Testimony of Anthony G. Oettinger and John C. LeGates-1978-77*, WP-78-1, 1978.
- Oettinger, Anthony G. and Kurt Brochardt with Carol Weinhaus, *Basic Data on the Politics and Economics of the Information Evolution: Telecommunications Costs and Prices in the United States, Part 2: Stakes in Telecommunications Costs and Prices*, P-80-6, November 1980.
- Oettinger, Anthony G. with Carol Weinhaus. *Basic Data on the Politics and Economics of the Information Evolution, Part 3: The Federal Side of Traditional Telecommunications Cost Allocations*, P-80-1, January 1980.
- Oettinger, Anthony G. with Carol Weinhaus. *Basic Data on the Politics and Economics of the Information Evolution, Part 4: The Traditional State Side of Telecommunications Cost Allocations*, P-80-7, September 1980.
- Read, William H., *The First Amendment Meets the Second Revolution*, WP-79-2, March 1979.
- Seminar on Command, Control, Communications and Intelligence: Guest Presentations, I-80-6, December 1980.
- Seminar on Command, Control, Communications and Intelligence: Student Papers, I-81-1, January 1981.
- Seipp, David J., *Issues and Options in Telecommunications Competition: A Survey*, W-78-15, December 1978.
- Sichter, James W., *Separations Procedures in the Telephone Industry: The Historical Origins of a Public Policy*, P-77-2, January 1977.

TABLE A

ADDITIONAL BACKGROUND DOCUMENTS

1. PLAYERS, STAKES AND POLITICS OF REGULATED COMPETITION IN THE COMMUNICATIONS INFRASTRUCTURE OF THE INFORMATION INDUSTRIES
 - A. Politics and Policy in Cost and Price Setting
 1. Stakes in Communications Prices
 2. Costs and Prices
 - B. Strategic Control of Telecommunications Costs and Prices
 1. Cost and Price Relationships in Regulated Utilities
 2. Cost Pools: Jurisdiction and Control
 - C. The States' Role: Local Exchange "Costs" as a Residual
 1. The State Cost Pool
 2. The Residual Local Exchange Pool
 - D. Tactics of Cost Allocation and the Role of the Courts
 1. Separations and Settlements
 2. "Deterrent Effects" as Policy Instruments
 - E. Reawakening Competition: Challenges to Traditional Costing and Pricing Policies
 1. The New Competitors
 2. The Challenges of Competition
 3. Competition and Market Concentration

TABLE B

BASIC DATA ON THE POLITICS AND ECONOMICS OF THE INFORMATION EVOLUTION: TELECOMMUNICATIONS COSTS AND PRICES IN THE UNITED STATES, PARTS 1-5

- F. Predatory Pricing or Price Umbrella? Cost-Based Pricing or Subsidies
 - 1. Interplay of Costing and Pricing Decisions
 - 2. Interpreting Adversary Claims
- G. Potential Range of Fairness in Jurisdictional Cost Allocations
 - 1. Functional Cost Pools
 - 2. Latitude of Cost Allocation
 - 3. Implications for Consumers and Producers
- H. Far Out on the Cost Allocation Swing: Geopolitics and Industry Politics
 - 1. State-by-State Variations
 - 2. Variations within the Traditional Telecommunications Industry
 - 3. Implications of Variations
- I. Cost-Definition and Price Deaveraging Responses to Competition: Geopolitics and Consumer Pressures
 - 1. Costing and Pricing Responses to Competition
 - 2. High and Low Density: Pressures and Counterpressures
 - 3. Implications for Business and Residential Consumers
- J. Mounting Pressures on Traditional Pricing Policies: The Exchange/Interexchange Disparity
 - 1. The Limits of Responses to Pressures
 - 2. The Federal-State Toll Disparity
 - 3. The State Toll Bulge
 - 4. The Exchange-Interexchange Disparity
 - 5. The New Instabilities

TABLE B (CONTINUED)

2. STAKES IN TELECOMMUNICATIONS COSTS AND PRICES
 - A. Introduction
 - B. Consumers: Players and Stakes
 1. Business and Residential Geographic Concentration
 2. Principal Types and Stakes
 - a. Big Business
 - b. Small Business and Professional
 - c. Urban Householders
 - d. Rural Householders
 - e. Government
 3. Stakes in Growing Communications Competition
 4. Relative Consumption of Services and Contributions to Revenues
 - C. Traditional Services
 1. Traditional Services Definitions
 2. Traditional Service Differentiations: Time, Distance, Implementation
 3. Relative Service Revenues
 - D. Producers: Players and Stakes
 1. Principal Types and Stakes
 - a. Telecommunication Companies
 - b. International Carriers
 - c. Computer Companies
 - i. Hardware Suppliers
 - ii. Software Suppliers
 - iii. Communication Service Companies
 2. Telecommunications Companies
 - a. Bell System
 - b. Independents Reporting to USITA
 - c. Rural Telephone Borrowers
 - d. Competitors of the Traditional Telecommunications Industry
 - e. Geographical Coverage
 - E. Facilities
 - F. Labor
 - G. Capital
 - H. Jurisdictions
 - I. Prices, Revenues and Costs--The Loose Linkages
 1. Economics Review
 2. Relation of Regulated Telco Prices to Costs

TABLE B (CONTINUED)

3. THE TRADITIONAL FEDERAL SIDE OF TELECOMMUNICATIONS COST ALLOCATIONS
 - A. Separations - The Judicial "Actual Uses" Criterion
 1. Jurisdictions: Federal and State Costs
 2. Facilities: Categories of Plant and Expenses
 - B. Aggregate Costs: Main Elements
 1. Facilities: Local Dial Switching Equipment and Its Context
 2. Services: Directory Advertising
 3. Facilities: AT&T Long Lines and the Politics of Cost Averaging
 4. Private Line Services: Who Benefits from Economics of Scope?
 5. Jurisdictions: Incidence of Benefits and Burdens and the Choice of Cost Allocations
 6. Message Services
 - C. Jurisdictional Cost Allocations: Local Dial Switching Equipment
 - D. The Ozark SPF Formula
 1. From SLU to SPF: The Technicalities of 6% to 20%
 2. Deterrent Effects as Actual Use: Political Reality
 3. The Birth of 0.85: Residual as Actual Use
 4. The CSR Ratio: Weighted Deterrence and Averaging
 5. State-by-State Incidence of SPF-Based Interstate Allocations
 - E. Weighted Minutes of Use
 - F. State-by-State Incidence of Interstate Allocations

TABLE B (CONTINUED)

4. THE TRADITIONAL STATE SIDE OF TELECOMMUNICATIONS COST ALLOCATION
 - A. Relation of Federal to State Cost Pools
 - B. Federal/State Toll Revenue and Rate Disparities
 - C. The Geography of Toll Rate Structures 1971-1977
 - D. The Local Exchange in Historical Perspective
 - E. Contemporary Local Exchange Price Structures
 - F. Politico-Economic Linkages between Exchange and Toll Pricing
 - G. Outline of Division of Revenues and Settlements
 - H. Outcomes of Settlement Processes
 - I. Rationale for Separations and Settlements Processes

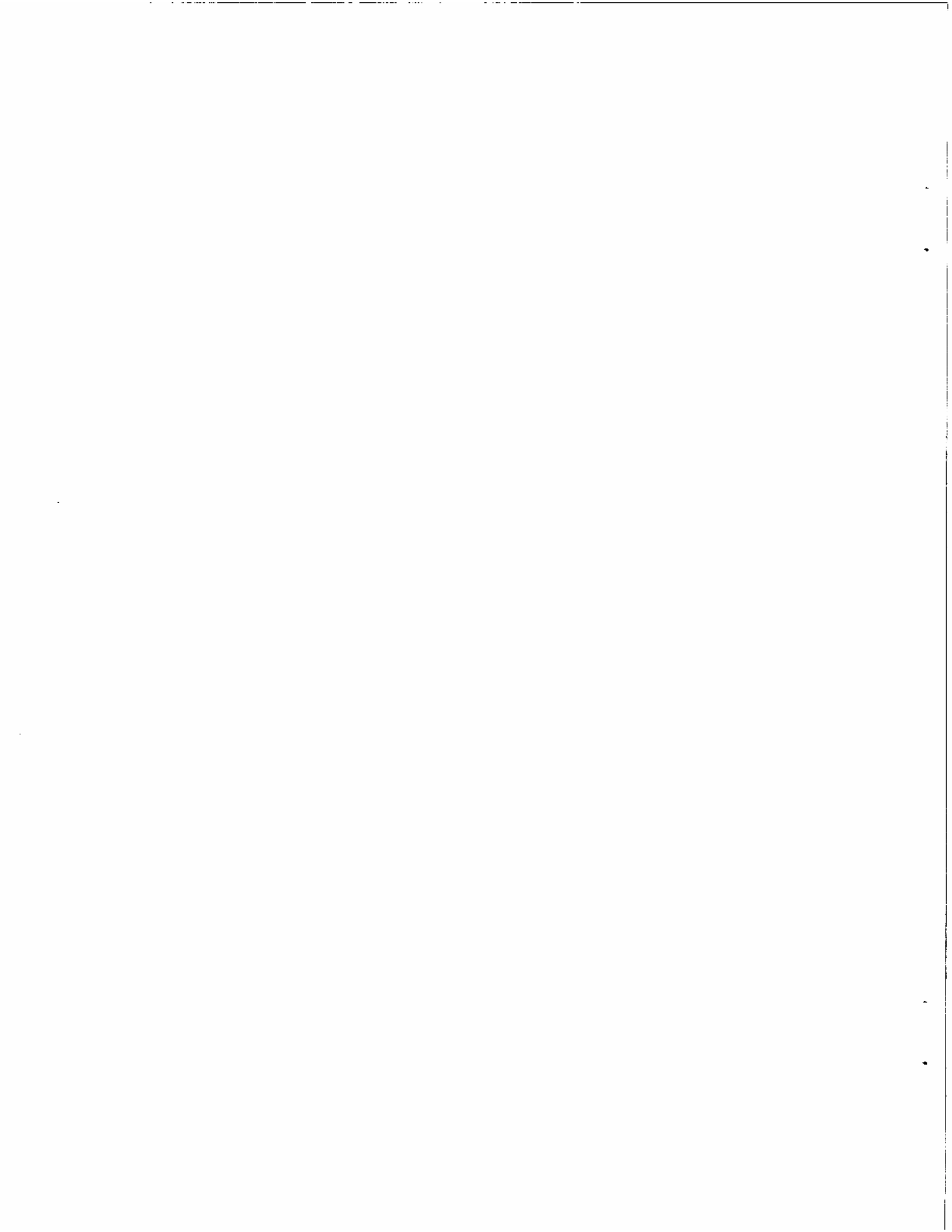
TABLE B (CONTINUED)

5. FEDERAL COMMUNICATIONS COMMISSION COMMON CARRIER POLICY APPROACHES TO SELECTIVE MARKET ENTRY AND ALTERNATIVE PIPELINES
 1. Background: Market Entry Options in a Changing Regulatory Environment
 2. Entry and Industry Structure Policy Integration
 - Resale and Shared Use (20097/80-54, and WATS 80-765)
 - Competitive Carrier (79-252)
 - MTS/WATS Market Structure Inquiry (78-72)
 - Computer Inquiry (20828)
 - CATV Cross Ownership Waiver (78-219)
 - Local Exchange Substitutes/Facilities and Services for Transmission and Switching and Alternative "Pipelines"
 - Cellular Communications Systems (79-318/18262)
 - Multi-Point Distribution Service (MDS) and Direct Broadcast Satellite (DBS)
 - Spectrum Utilization: Digital Electronic Message Services (DEMS)
 - Merger/Consolidation (GTE/TELENET 80-197)
 3. Tariffs: Rate Structure and Pricing Alternatives
 - Multi-Schedule Private Line Service (MPL/AT&T/20814)
 - Customer Premises Terminal Equipment (20981/20828)
 - Rate of Return/Earnings Interstate (AT&T Interstate and Foreign Services, 79-63/187)
 4. Accounting, Costing, and Jurisdictional Separations
 - Federal/State Joint Board (80-286)
 - Cost Allocation Manual (AT&T/79-245)
 - Exchange Network Facilities for Interstate Access (ENFIA) Access Charge (78-371)
 - Uniform System of Accounts (USOA 78-196)
 - Straight-Line Equal Life Group Depreciation (Capital Recovery and Remaining Life) (20188)
 - Station Connections, Customer Provided Equipment and Related Capital Costs (79-105)
 5. Depreciation Policy Directions for a New Regulatory Environment

TABLE OF CONTENTS

Part 4 -- The Traditional State Side of
Telecommunications Cost Allocations

<u>Section</u>	<u>Page</u>
A. Relation of Federal to State Cost Pools.....	1
B. Federal/State Toll Revenue and Rate Disparities.....	23
C. The Geography of Toll Rate Structures 1971-1977.....	43
D. The Local Exchange in Historical Perspective.....	55
E. Contemporary Local Exchange Price Structures.....	61
F. Politico-Economic Linkages between Exchange and Toll Pricing... 99	
G. Outline of Division of Revenues and Settlements.....	121
H. Outcomes of Settlement Processes.....	137
I. Rationale for Separations and Settlements Processes.....	158
APPENDIX.....	177



LIST OF FIGURES

	<u>Page</u>
4.1 Present and Proposed Jurisdictions.....	6
4.2 Bell System State-by-State Revenues, 1976.....	10
4.3 Message Toll Service (MTS) Rates for a Customer-Dialed, 3-Minute, 25 Mile State Telephone Call, 1976.....	24
4.4 Message Toll Service (MTS) Rates for a Customer-Dialed, 3-Minute 100 Mile State Telephone Call, 1976.....	26
4.5 State-by-State Toll Revenue Disparity, 1977.....	30
4.6 State-by-State Toll Revenue Disparity: 1970 Filed and 1971 Interim Rates.....	32
4.7 Missouri 1957 Toll Rate Disparity.....	35
4.8 1971 and 1977 Interstate and State Toll Rates for a Daytime, 3-Minute Telephone Call.....	36
4.9 1971 and 1977 Interstate and State Toll Rates.....	38
4.10 Interstate Toll Rate Changes: 1957, 1971, 1977.....	40
4.11 1971 and 1977 Interstate and South Dakota State Toll Rates.....	41
4.12 Missouri Holds the 10-Mile Fort and Missouri Toll Rate Disparity: 1957, 1971 and 1977.....	44
4.13 Geographic and Telephonic Missouri Viewed from St. Louis.....	47
4.14 Geographic and Telephonic New York Viewed from New York City.....	48
4.15 Geographic and Telephonic California Viewed from Los Angeles.....	49
4.16 Geographic and Telephonic California Viewed from San Francisco.....	50
4.17 Geographic, Telephonic and Travel Views of the United States.....	51
4.18 The Local Exchange Community circa 1880: New Haven, Connecticut.....	56
4.19 "Board-to-Board" Toll Linkages Among Local Exchanges (Central Offices).....	59

	<u>Page</u>
4.20	1977 Number of Exchanges or Zones and 1976 Number of Bell System Local Central Codes by State..... 64
4.21	New York Telephone Area Codes and Standard Metropolitan Statistical Areas..... 74
4.22	Manhattan-Centered (Zone 2) Local Area Service..... 76
4.23	The Boston Metropolitan Area..... 83
4.24	Boston Central Exchange and Reading: Residential Services, 1979..... 84
4.25	Denver Zone: Extended Area Service..... 96
4.26	Atlanta Exchange: Flat Rate Calling, 1979..... 98
4.27	Combined Interstate and State SPF Factor as a Function of Combined Interstate and State SLU Factor, 1976.....102
4.28	Historical Trends in Separations and Settlements Factors.....106
4.29	Schematic Form of Division of Revenues and Settlements.....125
4.30	Bell System State-by-State Values of State SLU, CSR Ratio and SPF, 1976.....130
4.31	Impact of CSR Ratio on Ranking of State Toll Usage Factors, 1976.....133
4.32	Data for Deriving "A" Schedule.....140
4.33	Type "A" Settlement Schedules, January 1974-September 1978.....141
4.34	Independent State-by-State Toll Settlements, 1976.....148
4.35	Total Toll Revenues as Percent of Total Service Revenues.....150
4.36	Toll Revenue as Percent of Total Service Revenues, 1977.....152
4.37	Ozark Plan Independent Company Toll Assignment of Non-Traffic-Sensitive Message Service Costs, 1976.....155

LIST OF TABLES

	<u>Page</u>
4.1. Impact of Changing Interstate Costs on State Cost Pool, 1976.....	2
4.2 1976 Alternate Interstate Cost Allocations (\$ million).....	3
4.3 Impact of Changing International Costs on Exchange Cost Pool, 1976.....	7
4.4 Bell System State-by-State Revenues, 1976.....	11
4.5 Message Toll Service (MTS) Rates for a Customer-Dialed 3-Minute, 25 Mile State Telephone Call, 1976.....	25
4.6 Message Toll Service (MTS) Rates for a Customer-Dialed 3-Minute 100 Mile State Telephone Call, 1976.....	27
4.7 State-by-State Toll Revenue Disparity, 1977.....	31
4.8 State-by-State Toll Revenue Disparity: 1970 Filed and 1971 Interim Rates.....	33
4.9 1977 Number of Exchanges or Zones and 1976 Number of Bell System Local Central Codes by State.....	65
4.10 Monthly Exchange Service Telephone Rates: New Hampshire, New England Telephone and Telegraph Company.....	68
4.11 Local Service Definitions.....	72
4.12 Message Unit Charges for the Initial Period for Manhattan, 1971.....	78
4.13 Overtime Charges for Manhattan, 1977.....	78
4.14 Instructions for Reading Manhattan Telephone Bills.....	79
4.15 The Manhattan Local/Toll Interface: 3-Minute, Customer-Dialed, Daytime Phone Call, 1977.....	81
4.16 Residential Rate Comparison at the Boundary of the Boston Metropolitan Area: Customer-Dialed Telephone Call from the Boston Central Exchange (338) to Lincoln (259) or Concord, 1979.....	93
4.17 Cost Allocation and Pricing Decisions.....	116
4.18 Bell System State-by-State Values of State SLU, CSR Ratio and SPF, 1976.....	131

	<u>Page</u>
4.19 Bell Rates of Return for Intrastate Independent Settlement Purposes, 1976 (Cost Study Companies).....	134
4.20 Definition of Settlement Schedules.....	138
4.21 Sample Settlement Calculation.....	142
4.22 Independent Telephone Companies Revenues and Settlements.....	144
4.23 Independent State-by-State Toll Settlements, 1976.....	149
4.24 Summary Ozark Plan Interstate Message Services Cost Allocations: Bell, Independents and Industry, 1976.....	154
4.25 Non-Traffic-Sensitive Portions of Plant-Related Costs, 1976 (Message Services).....	157

4. THE TRADITIONAL STATE SIDE OF TELECOMMUNICATIONS COST ALLOCATIONS

A. Relation of Federal to State Cost Pools

The costs that define revenue requirements under state control as of early 1980 are the residue left after interstate costs have been subtracted from nationwide total costs, the latter both as defined in Part 3. Net of miscellaneous costs, principally those of directory advertising (Sec 3-B2), nationwide total costs for 1976 were \$38.3 billion, of which \$11.4 billion (30%) were interstate costs and \$26.9 billion (70%) were state costs (Table 4.1(a)).

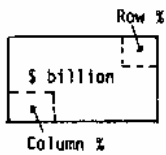
Table 4.1(a) also shows that the total state cost pool in effect translates into state toll revenue requirements of \$8.1 billion (30%) and local service revenue requirements of \$18.8 billion (70%) although, in general, no formal state/local separation is made (Section 4-F).

Table 4.1(b) shows how changing interstate cost definitions might influence the size of the state pool. That state-by-state variations in local/toll balances, described in Sections 4-E through 4-I, would make an estimate of local/toll breakdown rather questionable is indicated by the question marks in Table 4.1(b). Table 4.1(b) is based on Table 4.2, where interstate cost elements as separated under the Ozark Plan are presented along with hypothetical high and low alternates. The high assumption (Column 2) is an arbitrary 25% increment of interstate costs over the Ozark Plan. The low assumption, averaging out to a 49% decrement in interstate costs over the Ozark Plan, is compounded of a decrement from SPF-based allocations to SLU-based allocations where applicable, and an arbitrary decrement of 25% otherwise. Section B3 of Part 3 details the reasons why Table 4.2 presents alternative allocations for the costs of Long Lines even though it operates entirely as an interstate and foreign carrier.

These bracketing assumptions seem well within reason, given the flexibility of reasonable measures of actual uses demonstrated in Part 3, the wide range of rationalizations available to support heading either way, and the wide range of

	Local	Toll	
Interstate	--	11,406	11,406
		58.5	29.8
State	18,777	8,086	26,863
	100	41.5	70.2
	18,777	19,492	38,269
		49.1	50.9

(a)



	Local	Toll	
Interstate	--	5,778 ↔ 14,257	5,778 ↔ 14,257 - 5,628 ↔ + 2,851 - 49% ↔ + 25%
			15.1 ↔ 37.3
State	?	?	32,491 ↔ 24,012 + 5,638 ↔ - 2,851 + 21.0% ↔ - 10.6%
			84.9 ↔ 62.7
	?	?	38,269

(b)

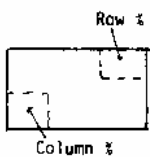


Table 4.1

Impact of Changing Interstate Costs on State Cost Pool, 1976

Source^{S1}

	① Ozark ^a Plan	② High ^b Assumption	③ Low Assumption
1. AT&T Long Lines Costs	2,441	3,051	1,831 ^c
2. I.S. Private Lines Costs	930	1,162	698 ^c
3. Non-traffic Sensitive Message Service Costs	3,746	4,682	1,126 ^d
4. Non-plant Related Message Service Costs	2,430	3,037	729 ^d
5. Other Message Service Costs	1,859	2,325	1,394 ^c
6. TOTAL	11,406	14,257	5,778
7. Average Change from Col. 1		+25%	-49%

Table 4.2
1976 Alternate Interstate Cost Allocations
(\$ million)

Source^{S2}

realized variation exhibited in Table 3.26. Indeed, there is ample historical precedent for large variations in cost allocations both within the telecommunications industry and in other regulated industries.

For example, variations in AT&T Long Lines costs like those in Table 4.2, line 1, have been achieved within the current legal framework, albeit in a different political climate, by means like the Modified Phoenix Plan described in Section 3-B3. In the thirties, the Bell Operating Company allocated essentially no costs of local plant to the interstate services under a "board-to-board" costing theory.¹ The sum of lines 1 and 2 of Table 4.2 (Column 1, \$3.4 billion) is a gross estimate of how low interstate costs would be under board-to-board theory. Were this approach taken, again under contemporary "access charge" justifications, interstate revenue requirements would decrease by \$8.0 billion or 70% resulting in a 30% increase in total state revenue requirements.

By way of comparison, between 1971 and 1978 the U.S. Postal Service's "institutional" or "non-attributable" costs--roughly parallel to non-traffic-sensitive telecommunications costs--were reduced from 51% to 25% through the invention of a category of "reasonably assignable costs" falling somewhere between institutional and attributable (the latter parallel to traffic sensitive) costs. The 51% level had been challenged by the Greeting Card Publishers' Association on the ground that it provided means for subsidizing 2d, 3rd and 4th class mail from 1st class revenues. But the USPS and, later, the Postal Rate Commission and the courts evolved a concept of "service related costs" for "reasonably assigning" much of the 26% differential to 1st class mail. This, together with a discount rate for pre-sorted 1st class mail backfired in creating relatively higher postage rates for greeting card users.

In the railroad world, a 1917 study reported variations from 20.6% to 60.7% in the proportion of expenses for maintenance of way and structures chargeable to passenger service according to measures ranging from revenue car miles (20.6%) to revenue train miles (60.7%) with fuel consumption of road and switch locomotives in between (40.6%).²

The constancy of total national costs assumed in Table 4.1(b) is another major assumption. Pricing changes consequent on cost reallocations might well increase or decrease the rates of return calculated to bring costs = revenue requirements into balance with income actually realized, hence increase or decrease total costs. The smoothness of the historical data of Part 2 in the face of major changes in both cost allocations and prices suggest that modest inferences may reasonably be made about proportionate changes only so long as either the structure of the separations/settlements process remains stable or transitional processes are invoked, as for example, by bills before the 96th Congress.

The inference we make from Table 4.1(b) is indeed modest. Given the 30/70 ratio of interstate to state costs, changes that are great relative to the whole interstate pool have attenuated effects on the larger whole state pool. Conversely, however, a lesser change relative to the state pool has an amplified effect on the smaller interstate pool. The shift of a given dollar amount from one pool to the other is therefore, on the whole, more influential on the stakes in the interstate realm than on those in the state realm.

Bills before the 96th Congress contemplated realigning jurisdictional boundaries as illustrated in Figure 4.1. The interexchange and exchange cost pools that would result under current cost definitions are shown in

<u>Present</u>		<u>Proposed</u>
Interstate Toll	}	Interexchange
<i>State Toll</i>		
<i>Exchange</i>		<i>Exchange</i>

State jurisdiction is in italics

Figure 4.1

Present and Proposed Jurisdictions

Source^{S3}

	\$ Billion	Percent
Interexchange	19.492	50.9
Exchange	18.777	49.1
Total	38.269	100

(a)

	\$ Billion	Percent
Interexchange	11.843 ↔ 24.364 -7.469 ↔ +4.872 -39% ↔ +25%	30.9% ↔ 63.7%
Exchange	26.426 ↔ 13.905 +7.649 ↔ -4.872 +41% ↔ -26%	69.1% ↔ 36.3%
Total	38.269	100%

(b)

Table 4.3

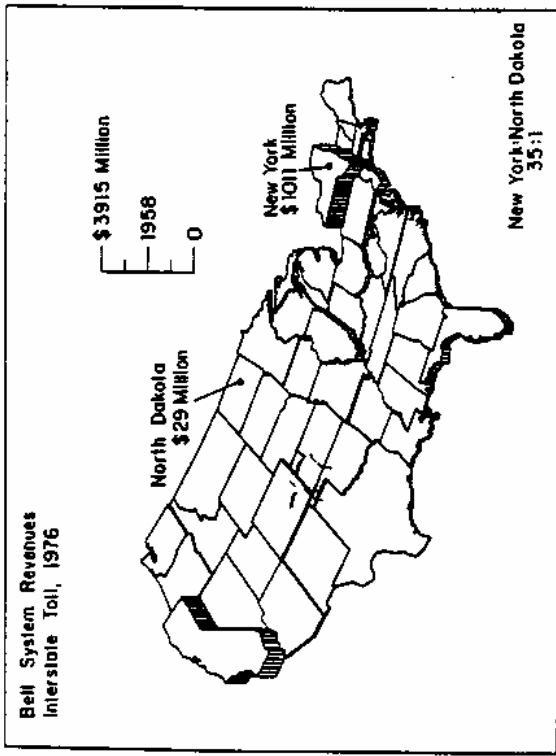
Impact of Changing International Costs
on Exchange Cost Pool, 1976

Table 4.3(a), where the interexchange amount is the sum of the toll column entries of Table 4.1(a) and the exchange amount is the local amount of Table 4.1(a).

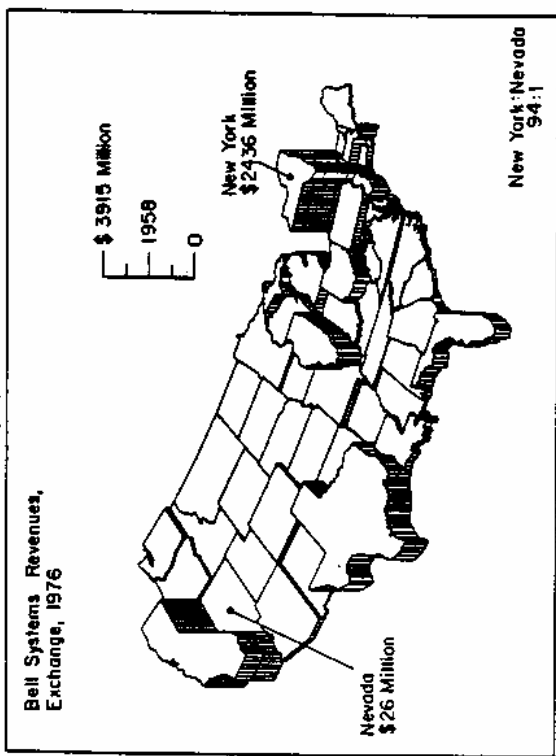
Under these conditions, the federal and state pools are initially of nearly equal size. The shift of a given dollar amount from one pool to the other would have to equal impact on the two jurisdictions. Assuming variations in interstate toll as bracketed in Table 4.2 and variations in state toll of $\pm 25\%$ yields interexchange variations as bracketed in Table 4.3(b). Consequently, under such a legislative proposal the size of the exchange pool could have been made to vary between a 41% increase and a 26% decrease and exchange/interexchange proportions between 70%:30% and 40%:60% (Table 4.3(b)).

Under the law as of early 1980, the states had the option of loading the maximum \$5,638 billion (21%) increase in state allocation (Table 4.1(b)) entirely onto a 30% increase over the \$18,777 billion of local costs or entirely onto a 70% increase over the \$8.086 billion of state toll costs, or somewhere in between. Likewise for an average 11% decrease (Table 4.1(b)). How the states might exercise their options is analyzed in Section 4-F.

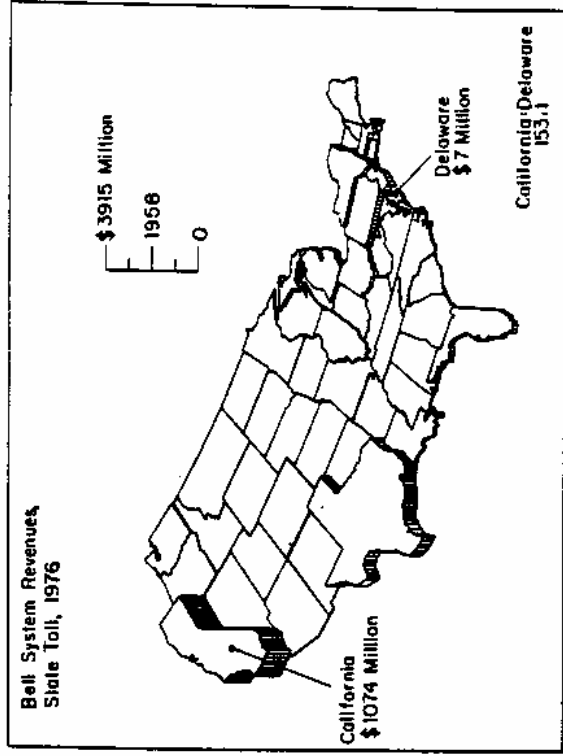
The foregoing reasoning from the whole oversimplifies effects arising from differential spreads of cost shifts both across particular services and also across particular states, as shown in Figure 4.2 and Table 4.4. Figures 4.2(a)-(o) (Tables 4.4(a)-(f)) show state by state Bell System revenues from interstate toll, state toll, exchange, total toll and total state services in 1976. Interstate revenues from New York



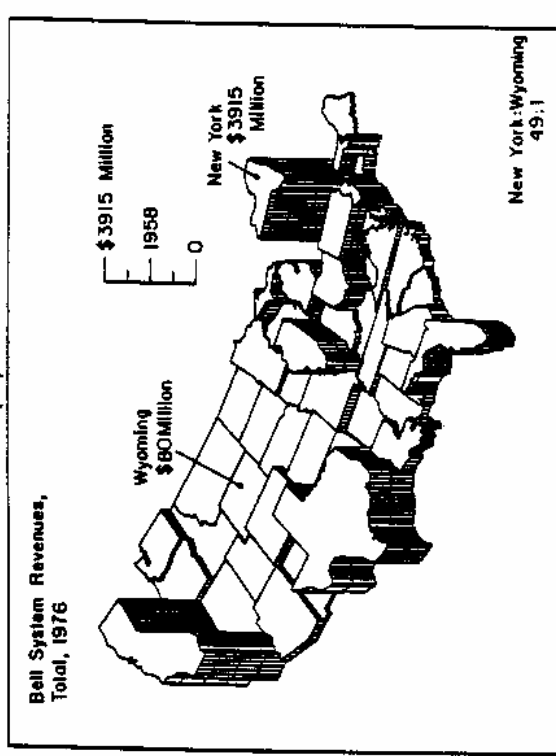
(a)



(c)



(b)



(d)

Interstate and State Toll, Exchange, and Total Revenues, 1976 (\$ million)

Figure 4.2

Bell System State-by-State Revenues, 1976

Ranked

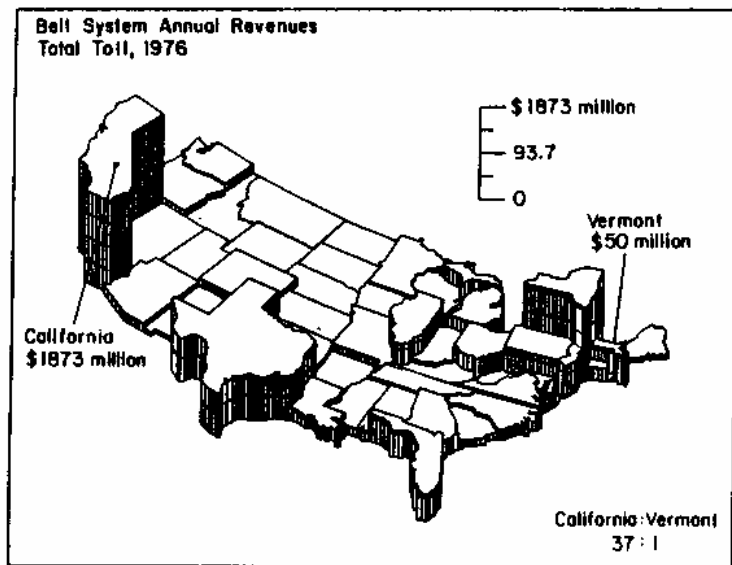
	Interstate Toll	State Toll	Exchange	Total	Interstate Toll	State Toll	Exchange	Total
AL	101.78	95.25	258.38	455.41	Bell System* NY 7814.86	6155.09	17319.89	31289.84
AZ	128.66	47.92	218.63	395.21	CA 1010.53	CA 512.34	2435.57	3915.32
AR	63.67	51.50	103.13	218.30	CA 798.82	TX 469.22	1751.78	3624.89
CA	798.82	1074.29	1751.78	3624.89	IL 397.80	NY 469.22	1164.45	1865.52
CO	159.31	83.04	263.67	506.02	IL 359.49	PA 313.23	994.76	1750.72
CT	149.64	114.52	269.32	533.48	FL 336.79	PA 283.53	766.10	1357.46
DC	34.47	6.95	59.29	100.71	MA 282.53	MI 261.74	734.15	1315.48
FL	336.79	204.03	651.44	1192.26	MA 256.98	MI 705.14	1197.37	1197.37
GA	216.30	112.82	391.53	720.65	OH 240.36	MA 672.46	1193.93	1193.93
IA	37.21	20.28	45.73	103.22	GA 216.30	FL 204.03	654.42	1192.26
IL	397.80	188.47	1164.45	1750.72	IL 208.63	IL 188.47	651.44	1175.51
IN	117.29	99.92	306.09	523.30	VA 170.22	LA 135.06	450.05	720.65
KS	87.96	59.54	170.56	323.06	MO 168.55	TN 115.45	391.53	667.43
KY	76.62	75.88	170.56	323.06	CO 159.31	CT 114.52	370.18	639.91
LA	125.30	135.06	305.54	565.90	CT 149.64	GA 112.82	363.51	637.46
ME	45.60	39.39	65.37	150.36	WA 149.45	WA 106.46	306.09	565.90
MD	149.45	67.93	450.05	667.43	AZ 128.66	VA 106.18	305.54	542.93
MA	282.53	256.98	654.42	1193.93	MM 126.06	NC 100.24	304.00	533.48
MI	208.63	261.74	705.14	1175.51	LA 125.30	IN 99.92	280.49	523.30
MN	126.06	91.84	280.49	500.39	WA 124.62	MO 98.73	269.32	506.02
MS	83.17	87.00	146.31	316.48	TN 117.29	MN 93.84	263.67	500.39
MO	168.55	98.73	370.18	637.46	NC 112.15	MS 87.00	258.38	454.41
MT	38.88	26.03	39.41	104.32	OK 109.26	OK 86.51	256.60	436.11
NE	52.64	29.38	78.40	160.42	OR 107.96	CO 83.04	218.63	427.75
NH	57.53	8.50	25.82	91.12	AL 101.78	IA 80.07	215.36	395.21
NJ	359.49	283.53	672.46	1315.48	WI 99.63	NC 79.88	183.99	379.76
NM	55.37	25.84	75.88	157.09	IA 91.82	OK 83.04	218.63	427.75
NY	1010.53	469.22	2435.57	3915.32	KS 87.96	IA 80.07	215.36	395.21
NC	112.15	100.24	215.36	427.75	MS 83.17	KS 59.54	159.51	316.48
ND	28.53	23.77	35.01	87.31	KY 76.62	SC 53.27	146.31	305.55
OH	240.36	222.86	734.15	1197.37	AR 63.67	AR 51.50	145.14	292.64
OK	109.26	86.51	183.99	379.76	AZ 47.92	WV 108.84	218.30	331.40
OR	107.96	73.38	165.98	347.32	WV 56.80	UT 41.32	103.13	204.02
PA	278.13	313.23	766.10	1357.46	ME 55.37	UT 87.56	84.09	169.70
RI	43.32	15.76	84.09	143.17	NE 53.86	RI 32.18	84.09	160.42
SC	87.23	53.27	165.05	305.55	NE 52.64	NE 29.38	78.40	157.09
SD	32.26	20.91	36.04	89.21	UT 49.96	NE 26.03	75.88	150.36
TN	123.48	115.45	304.00	542.93	ME 45.60	ME 25.84	65.37	144.46
TX	37.21	512.34	994.76	1865.52	RI 43.32	DE 23.77	64.16	143.17
UT	49.96	32.18	87.56	169.70	MT 38.88	DE 22.77	59.29	104.32
VT	33.52	16.64	33.96	84.12	WY 37.94	SD 20.91	45.73	103.22
VA	170.22	106.18	363.51	639.91	ID 37.21	SD 20.28	39.41	100.71
WA	124.62	106.46	263.46	494.59	TX 37.21	VT 16.64	36.04	91.12
WV	53.86	41.32	108.84	204.02	DE 34.47	RI 15.76	35.01	89.21
WI	99.63	79.88	256.60	436.11	VT 33.52	WY 14.29	33.96	87.31
WY	37.94	14.29	27.27	79.50	SD 32.26	NV 8.50	25.82	84.12
Bell System*	7814.86	6155.09	17319.89	31289.84	ND 28.53	DE 6.95	25.82	79.50

*includes Washington, D.C.

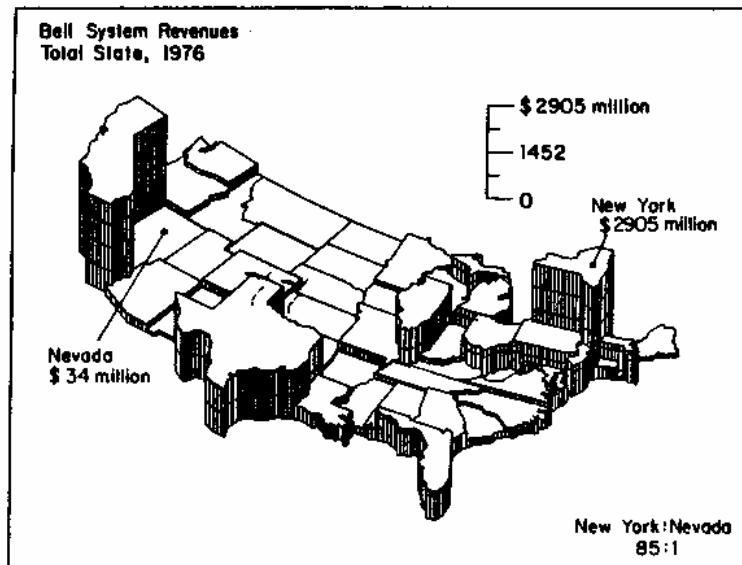
(a)

Interstate and State Toll; Exchange; and Total Revenues, 1976 (\$ million)

Table 4.4
Bell System State-by-State Revenues, 1976



(e)



(f)

Total Toll and Total State Revenues, 1976 (\$ million)

Figure 4.2 (continued)

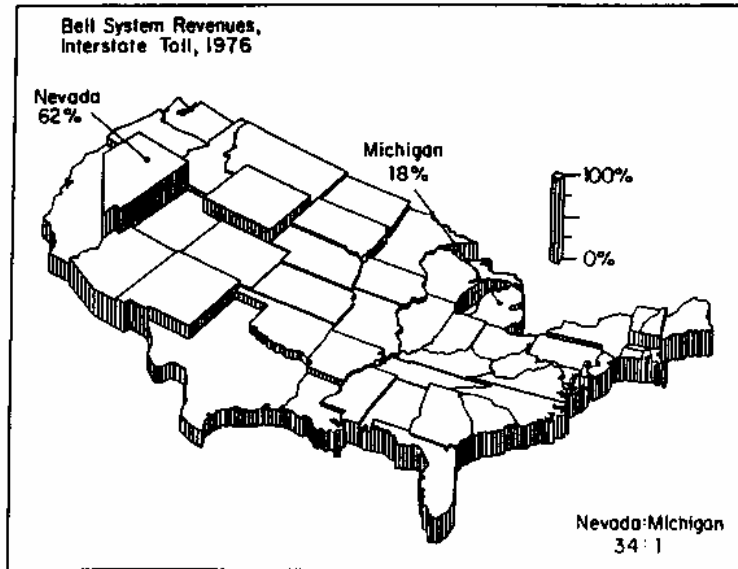
Ranked

	Total Toll (\$ Million)	Total State (\$ Million)		Total Toll (\$ Million)	Total State (\$ Million)	
AL	197.03	353.63	BELL SYS	13969.95	BELL SYS	23474.98
AZ	176.58	266.55	CA	1873.11	NY	2904.79
AR	115.17	154.63	NY	1479.75	CA	2826.07
CA	1873.11	2826.07	TX	870.76	TX	1507.10
CO	242.35	346.71	NJ	643.02	IL	1352.92
CT	264.16	383.84	PA	591.36	PA	1079.33
DE	103.97	66.24	IL	586.27	MI	966.88
FL	540.82	855.47	FL	540.82	OH	957.01
GA	329.12	504.35	MA	539.51	NJ	955.99
ID	57.49	66.01	MI	470.37	MA	911.40
IL	586.27	1352.92	OH	463.22	FL	855.47
IN	217.21	406.01	GA	329.12	MD	517.98
IA	171.89	239.58	VA	276.40	GA	504.35
KS	147.50	204.68	MO	267.28	VA	469.69
KY	152.50	246.44	CT	264.16	MO	468.91
LA	260.36	440.60	LA	260.36	LA	440.60
ME	84.99	104.76	CO	242.35	TN	419.45
MD	217.38	517.98	TN	238.93	IN	406.01
MA	539.51	911.40	WA	231.13	CT	383.84
MI	470.37	966.88	MN	219.90	MN	374.33
MN	219.90	374.33	MD	217.38	WA	369.92
MS	170.17	233.31	IN	217.21	AL	353.63
MO	267.28	468.91	NC	212.39	CO	346.71
MT	64.91	65.44	AL	197.03	WI	336.48
NE	82.02	107.78	OK	195.77	NC	315.60
NV	65.30	34.32	OR	181.34	OK	270.50
NH	80.30	86.93	WI	179.51	AZ	266.55
NJ	643.02	955.99	AZ	176.58	KY	246.44
NM	81.21	101.72	IA	171.89	IA	239.58
NY	1479.75	2904.79	MS	170.17	OR	239.36
NC	212.39	315.60	KY	152.50	MS	233.31
ND	52.30	58.78	KS	147.50	SC	218.32
OH	463.22	957.01	SC	140.50	KS	204.68
OK	195.77	270.50	AR	115.17	AR	154.63
OR	181.34	239.36	DE	103.97	WV	150.16
PA	591.36	1079.33	WV	95.18	UT	119.74
RI	59.08	99.85	ME	84.99	NE	107.78
SC	140.50	218.32	UT	82.14	ME	104.76
SD	53.17	56.95	NE	82.02	NM	101.72
TN	238.93	419.45	NM	81.21	RI	99.85
TX	870.76	1507.10	NH	80.30	NH	86.93
UT	82.14	119.74	NV	65.30	DE	66.24
VT	50.16	50.60	MT	64.91	ID	66.01
VA	276.40	469.69	RI	59.08	MT	65.44
WA	231.13	369.92	ID	57.49	ND	58.78
WV	95.18	150.16	SD	53.12	SD	56.95
WI	179.51	336.48	ND	52.30	VT	50.60
WY	52.23	41.56	WY	52.23	WY	41.56
BELL SYS	13969.95	23474.98	VT	50.16	NV	34.32

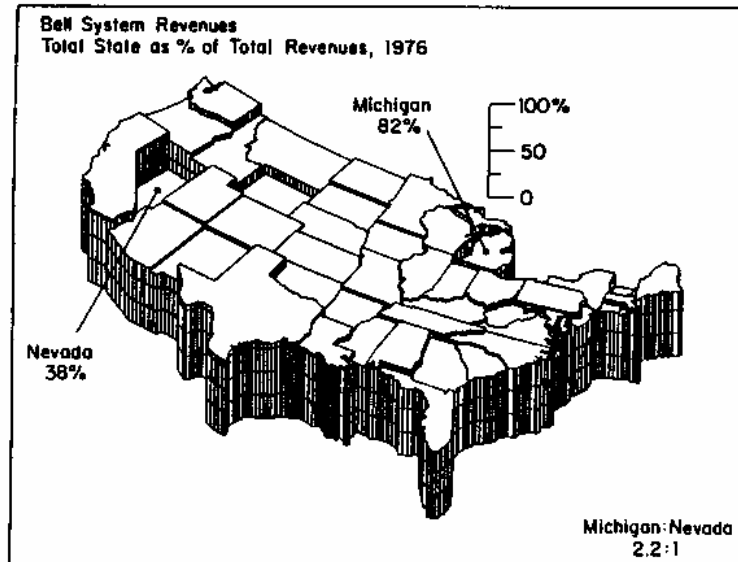
(b)

Total Toll and Total State Revenues, 1976 (\$ million)

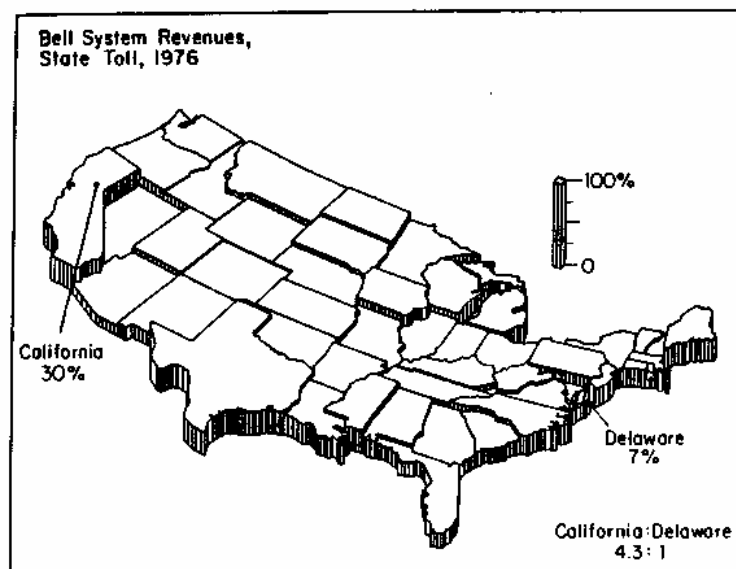
Table 4.4 (continued)



(g)



(h)



(i)

Interstate Toll, Total State and State Toll Revenues as Percent
of Total Revenues, 1976

Figure 4.2 (continued)

Ranked

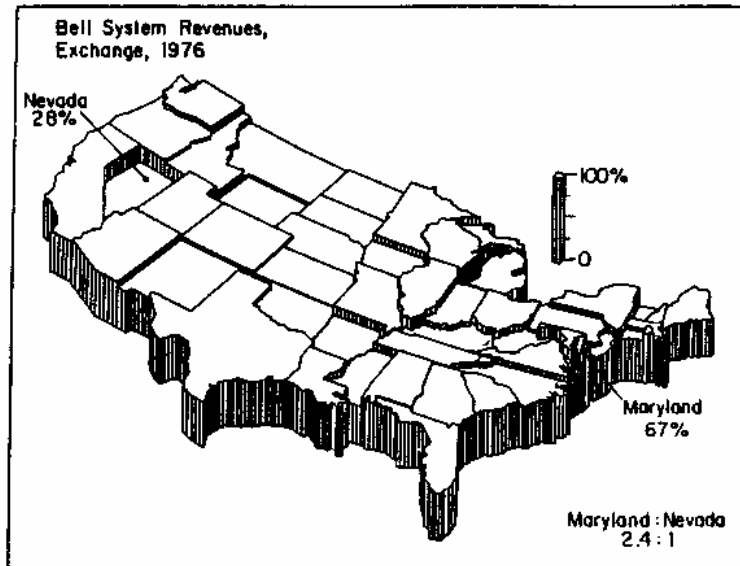
% of Total Revenues

	Interstate Toll	Total State	State Toll	Interstate Toll	Total State	State Toll	
AL	22.35	77.65	20.92	WV	62.34	CA	29.64
AZ	32.56	67.45	12.12	WY	47.72	MS	27.49
AR	29.17	70.83	23.59	VT	39.84	TX	27.46
CA	22.03	77.96	29.64	NH	39.83	ND	27.22
CO	31.48	68.52	16.41	MT	37.27	ME	26.19
CT	28.05	71.95	21.47	SD	36.16	MT	24.95
DE	34.23	65.77	6.90	ID	36.05	IA	24.16
FL	28.25	71.75	17.11	NM	35.24	LA	23.87
GA	30.01	69.99	15.66	DE	34.23	AR	23.59
ID	36.05	63.95	19.65	NE	32.81	KY	23.44
IL	22.72	77.28	10.77	ND	32.68	SD	23.44
IN	22.41	77.59	19.10	AZ	32.56	NC	23.43
IA	27.71	72.29	24.16	CO	31.48	PA	23.07
KS	30.06	69.94	20.34	OR	31.08	OK	22.78
KY	23.72	76.28	23.49	ME	30.33	KY	22.27
LA	22.14	77.86	23.87	RI	30.26	MI	22.27
ME	30.33	69.67	26.19	KS	30.06	NJ	21.55
MA	23.66	76.34	10.18	WA	30.06	MA	21.53
MI	17.75	82.25	21.53	CA	30.01	WA	21.52
MN	25.19	74.81	18.75	UT	29.44	CT	21.47
MS	26.28	73.72	27.49	AR	29.17	MS	21.27
MO	26.44	73.56	15.49	OK	28.77	OR	21.13
MT	37.27	62.73	24.95	SC	28.55	AL	20.92
NE	32.81	67.19	18.32	FL	28.25	KS	20.34
NV	62.34	37.66	9.33	CT	28.05	WV	20.25
NH	39.83	60.18	15.76	NJ	27.71	VT	19.79
NJ	27.33	72.67	21.55	VA	27.33	BELL SYS	19.67
NM	35.24	64.75	16.46	MD	26.44	ID	19.65
NY	25.81	74.19	11.98	WV	26.40	IN	19.10
NC	26.22	73.78	23.43	MS	26.28	UT	18.96
ND	32.68	67.32	27.22	NC	26.22	MN	18.75
OH	20.07	79.93	18.61	NY	25.81	OH	18.61
OK	28.77	71.23	22.78	WA	25.21	NE	18.32
OR	31.08	68.92	21.13	MN	25.19	WI	18.32
PA	20.49	79.51	23.07	BELL SYS	24.98	WY	17.97
RI	30.26	69.74	11.01	KY	23.72	SC	17.43
SC	28.55	71.45	17.43	MA	23.66	FL	17.11
SD	36.16	63.84	23.44	WI	22.84	VA	16.59
TN	22.74	77.26	21.27	TN	22.74	NM	16.46
TX	19.21	80.79	27.46	IL	22.72	CO	16.41
UT	29.44	70.56	18.96	IN	22.41	NE	15.76
VT	39.84	60.15	19.79	MD	22.39	GA	15.66
VA	26.60	73.40	16.59	AL	22.35	MO	15.49
WA	25.21	74.79	21.52	LA	22.14	AZ	12.12
WV	26.40	73.60	20.25	CA	22.03	NY	11.98
WI	22.84	77.15	18.32	PA	20.49	RI	11.01
WY	47.72	52.28	17.97	OH	20.07	IL	10.77
BELL SYS	24.98	75.02	19.67	TX	19.21	MD	10.18
				MI	17.75	WV	9.33
						DE	6.90

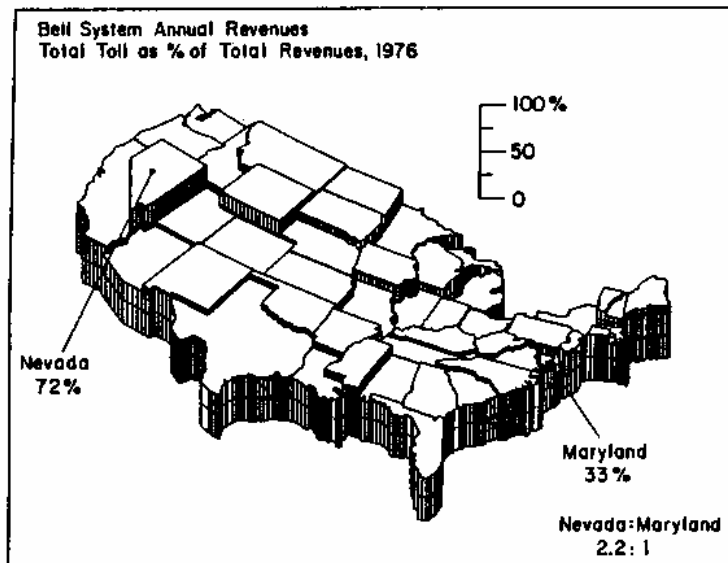
(c)

Interstate Toll, Total State and State Toll Revenues as Percent of Total Revenues, 1976

Table 4.4 (continued)



(j)



(k)

Exchange and Total Toll Revenues as Percent of Total Revenues, 1976

Figure 4.2 (continued)

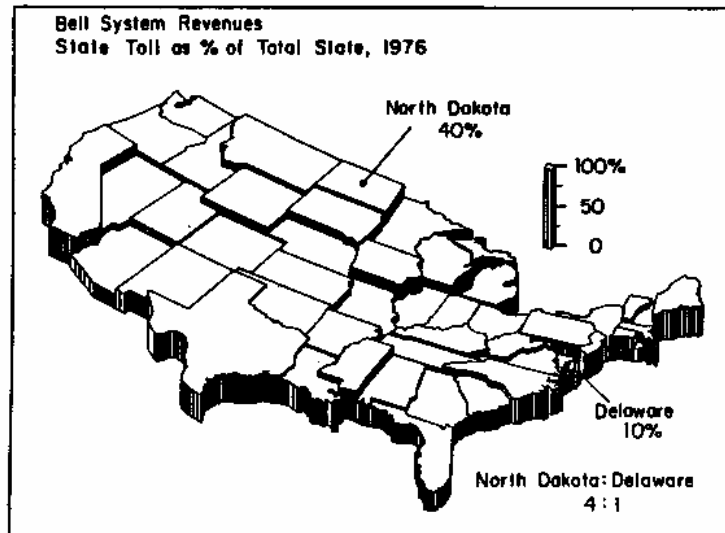
Ranked

% of Total Revenues		% of Total Revenues	
Exchange & Other	Total Toll	Exchange & Other	Total Toll
AL	56.73	AL	43.27
AZ	55.32	AZ	44.68
AR	47.24	AR	52.76
CA	48.33	CA	51.67
CO	52.11	CO	47.89
CT	50.48	CT	49.52
DE	58.87	DE	41.13
FL	54.64	FL	45.36
GA	54.33	GA	45.67
ID	44.30	ID	55.70
IL	66.51	IL	33.49
IN	58.49	IN	41.51
IA	48.13	IA	51.87
KS	49.60	KS	50.40
KY	52.80	KY	47.20
LA	53.99	LA	46.01
ME	43.48	ME	56.51
MD	67.43	MD	32.57
MA	54.81	MA	45.19
MI	59.98	MI	40.02
MN	56.06	MN	43.94
MS	46.23	MS	53.77
MO	58.07	MO	41.93
MT	37.78	MT	62.22
NE	48.87	NE	51.13
NV	28.33	NV	71.67
NH	44.41	NH	55.59
NJ	51.12	NJ	48.88
NM	48.30	NM	51.70
NY	62.21	NY	37.79
NC	50.35	NC	49.65
ND	40.10	ND	59.90
OH	61.31	OH	38.69
OK	48.45	OK	51.55
OR	47.79	OR	52.21
PA	56.44	PA	43.56
RI	58.73	RI	41.27
SC	54.02	SC	45.98
SD	40.40	SD	59.60
TN	55.99	TN	44.01
TX	53.32	TX	46.68
UT	51.60	UT	48.40
VT	40.37	VT	59.63
VA	56.81	VA	43.19
WA	53.27	WA	46.73
WV	53.35	WV	46.65
WI	58.84	WI	41.16
WY	34.31	WY	65.69
BELL SYS	55.35	BELL SYS	44.65
		MD	71.67
		WY	65.69
		MT	62.22
		ND	59.90
		VT	59.63
		SD	59.60
		ME	56.51
		ID	55.70
		NH	55.59
		MS	53.77
		AR	52.76
		OR	52.21
		IA	51.87
		NM	51.70
		CA	51.67
		OK	51.55
		NE	51.13
		KS	50.40
		NC	49.65
		CT	49.52
		NJ	48.88
		UT	48.40
		CO	47.89
		KY	47.20
		WA	46.73
		TX	46.68
		WV	46.65
		LA	46.01
		SC	45.98
		GA	45.67
		FL	45.36
		MA	45.19
		AZ	44.68
		BELL SYS	44.65
		TN	44.01
		MN	43.94
		PA	43.56
		AL	43.27
		VA	43.19
		MO	41.93
		IN	41.51
		RI	41.27
		WI	41.16
		DE	41.13
		MI	40.02
		OH	38.69
		NY	37.79
		IL	33.49
		MD	32.57

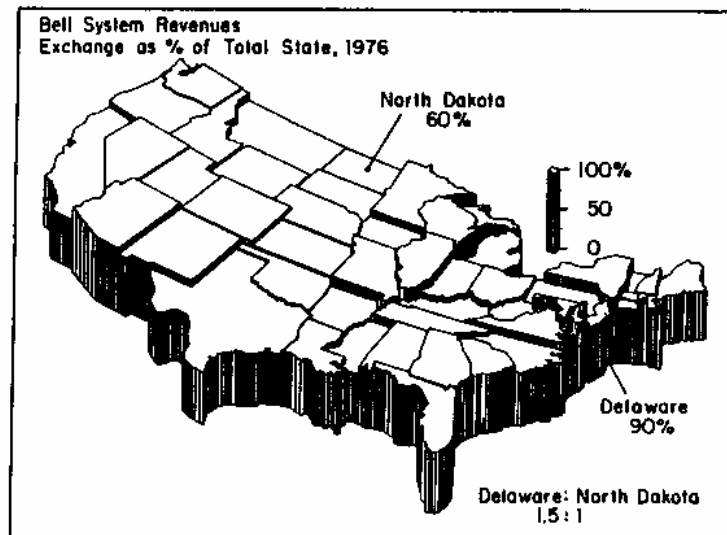
(d)

Exchange and Total Toll Revenues as Percent of Total Revenues, 1976

Table 4.4 (continued)



(1)



(m)

State Toll and Exchange Revenues as Percent of Total State Revenues, 1976

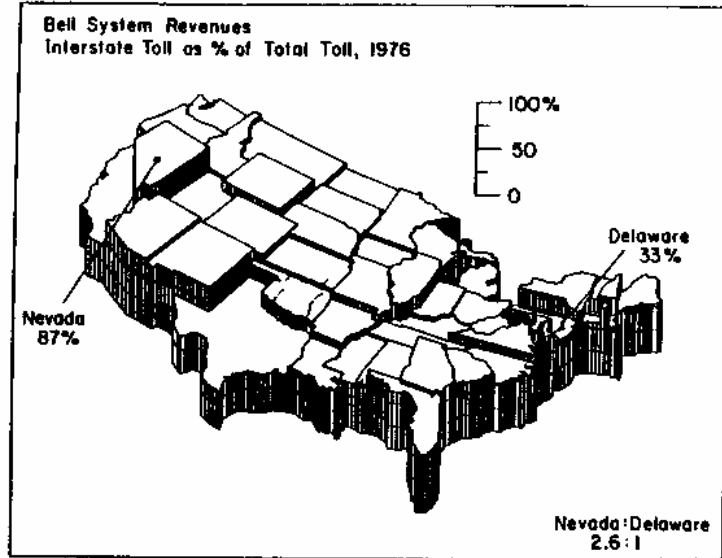
Figure 4.2 (continued)

Ranked						
	State Toll	Exchange and Other		State Toll	Exchange and Other	
AL	26.93	73.07	ND	40.44	DE	99.51
AZ	17.98	82.02	MT	39.78	MD	86.89
AR	33.31	66.69	CA	38.01	IL	95.07
CA	38.01	61.99	ME	37.60	RI	84.22
CO	23.95	76.05	MS	37.29	NY	83.85
CT	29.84	70.16	SD	36.72	AZ	82.02
DE	10.49	89.51	WY	34.38	MO	78.94
FL	23.85	76.15	TX	34.00	GA	77.63
GA	22.37	77.63	IA	33.42	VA	77.39
ID	30.72	69.28	AR	33.31	OH	76.71
IL	13.93	86.07	VT	32.89	WI	76.26
IN	24.61	75.39	OK	31.98	FL	76.15
IA	33.42	66.58	NC	31.76	CO	76.05
KS	29.09	70.91	KY	30.79	SC	75.60
KY	30.79	69.21	ID	30.72	IN	75.39
LA	30.65	69.35	OR	30.66	NV	75.23
ME	37.60	62.40	LA	30.65	MN	74.93
MD	13.11	86.89	CT	29.84	NM	74.60
MA	28.20	71.80	NJ	29.66	NH	73.81
MI	27.07	72.93	KS	29.09	UT	73.13
MN	25.07	74.93	PA	29.02	AL	73.07
MS	37.29	62.71	WA	28.78	MI	72.93
MO	21.06	78.94	MA	28.20	NE	72.74
MT	39.78	60.22	TN	27.52	TN	72.48
NE	27.26	72.74	WV	27.52	WV	72.48
NV	24.77	75.23	NE	27.26	MA	71.80
NH	26.19	73.81	MI	27.07	WA	71.22
NJ	29.66	70.34	AL	26.93	PA	70.98
NM	25.40	74.60	UT	26.87	KS	70.91
NY	16.15	83.85	NH	26.19	NJ	70.34
NC	31.76	68.24	NM	25.40	CT	70.16
ND	40.44	59.56	MN	25.07	LA	69.35
OH	23.29	76.71	NV	24.77	OR	69.34
OK	31.98	68.02	IN	24.61	ID	69.28
OR	30.66	69.34	SC	24.40	KY	69.21
PA	29.02	70.98	CO	23.95	NC	68.24
RI	15.78	84.22	FL	23.85	OK	68.02
SC	24.40	75.60	WI	23.74	VT	67.11
SD	36.72	63.28	OH	23.29	AR	66.69
TN	27.52	72.48	VA	22.61	IA	66.58
TX	34.00	66.00	GA	22.37	TX	66.00
UT	26.87	73.13	MO	21.06	WY	65.62
VT	32.89	67.11	AZ	17.98	SD	63.28
VA	22.61	77.39	NY	16.15	MS	62.71
WA	28.78	71.22	RI	15.78	ME	62.40
WV	27.52	72.48	IL	13.93	CA	61.99
WI	23.74	76.26	MD	13.11	MT	60.22
WY	34.38	65.62	DE	10.49	ND	59.56

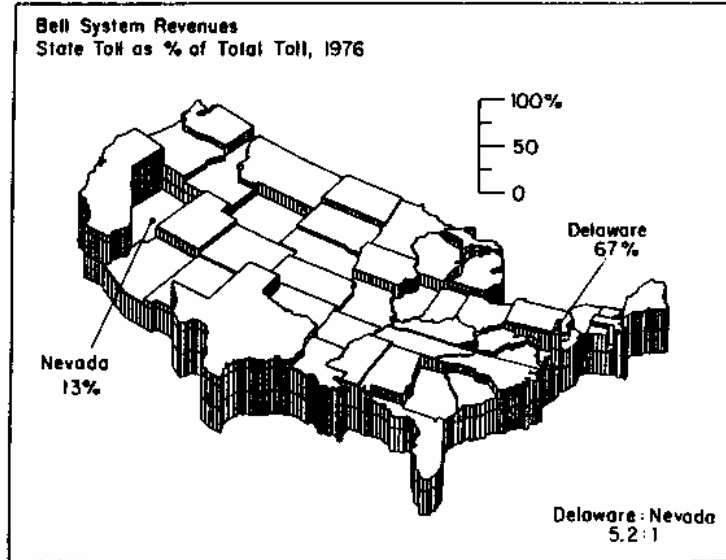
(e)

State Toll and Exchange Revenues as Percent of
Total State Revenues, 1976

Table 4.4 (continued)



(n)



(o)

Interstate Toll and State Toll Revenues as Percent
of Total Toll Revenues, 1976

Figure 4.2 (continued)

		Ranked				
% of Total Toll		% of Total Toll				
Interstate State		Interstate	State			
AL	51.66	48.34	NV	86.98	DE	66.85
AZ	72.86	27.14	RI	73.32	TX	58.84
AR	55.28	44.72	AZ	72.86	CA	57.35
CA	42.65	57.35	WY	72.64	MI	55.65
CO	65.74	34.26	NH	71.64	PA	52.97
CT	56.65	43.35	MD	68.75	LA	51.87
DE	33.15	66.85	NY	68.29	MS	51.13
FL	62.27	37.73	NM	68.18	KY	49.76
GA	65.72	34.28	IL	67.85	AL	48.34
ID	64.72	35.28	VT	66.83	TN	48.32
IL	67.85	32.15	CO	65.74	OH	48.11
IN	54.00	46.00	GA	65.72	MA	47.63
IA	53.42	46.58	ID	64.72	NC	47.20
KS	59.63	40.37	NE	64.18	IA	46.58
KY	50.24	49.76	MO	63.06	ME	46.35
LA	48.13	51.87	FL	62.27	WA	46.06
ME	53.65	46.35	SC	62.09	IN	46.00
MD	68.75	31.25	VA	61.58	ND	45.45
MA	52.37	47.63	UT	60.82	AR	44.72
MI	44.35	55.65	SD	60.67	WI	44.50
MN	57.33	42.67	MT	59.90	OK	44.19
MS	48.87	51.13	KS	59.63	NJ	44.09
MO	63.06	36.94	OR	59.53	BELL SYS	44.06
MT	59.90	40.10	MN	57.33	WV	43.41
NE	64.18	35.82	CT	56.65	CT	43.35
NV	86.98	13.02	WV	56.59	MN	42.67
NH	71.64	28.36	BELL SYS	55.94	OR	40.47
NJ	55.91	44.09	NJ	55.91	KS	40.37
NM	68.18	31.82	OK	55.81	MT	40.10
NY	68.29	31.71	WI	55.50	SD	39.33
NC	52.80	47.20	AR	55.28	UT	39.18
ND	54.55	45.45	ND	54.55	VA	38.42
OH	51.89	48.11	IN	54.00	SC	37.91
OK	55.81	44.19	WA	53.94	FL	37.73
OR	59.53	40.47	ME	53.65	MO	36.94
PA	47.03	52.97	IA	53.42	NE	35.82
RI	73.32	26.68	NC	52.80	ID	35.28
SC	62.09	37.91	MA	52.37	GA	34.28
SD	60.67	39.33	OH	51.89	CO	34.26
TN	51.68	48.32	TN	51.68	VT	33.17
TX	41.16	58.84	AL	51.66	IL	32.15
UT	60.82	39.18	KY	50.24	NM	31.82
VT	66.83	33.17	MS	48.87	NY	31.71
VA	61.58	38.42	LA	48.13	MD	31.25
WA	53.94	46.06	PA	47.03	NH	28.36
WY	56.59	43.41	MI	44.35	WY	27.36
WI	55.50	44.50	CA	42.65	AZ	27.14
WY	72.64	27.36	TX	41.16	RI	26.68
BELL SYS	55.94	44.06	DE	33.15	NV	13.02

(f)

Interstate Toll and State Toll Revenues as Percent of
Total Toll Revenues, 1976

Table 4.4 (continued)

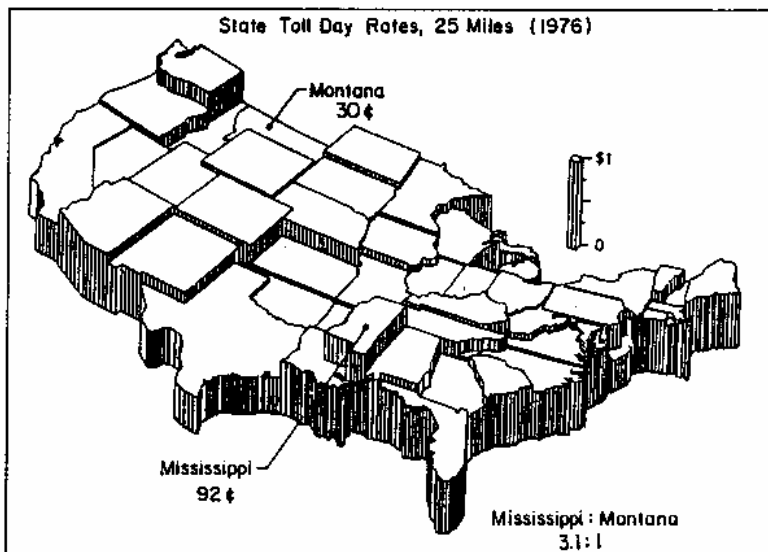
were 35 times those from North Dakota; California state toll revenues were 153 times those from Delaware; New York exchange revenues were nearly 100 times those from Nevada; California spent 37 times more on toll services than Vermont, and New York 85 times more on state services than Nevada; and New York yielded nearly 50 times as much total revenue as Wyoming. Proportions varied as well. Interstate/state revenue proportions ranged from 62:38 in Nevada to 18:82 in Michigan. 30% of California revenues came from state toll services, but only 7% of Delaware revenues. Only 28% of Nevada revenues came from exchange services in contrast to 67% in Maryland. Within the state revenue requirement pools, exchange/state toll proportions ranged from 60:40 in North Dakota to 90:10 in Delaware (Figure 4.2(l), (m); Table 4.4(e)). Within the toll (interexchange) services, interstate/state proportions ranged from 87:13 in Nevada to 33:67 in Delaware (Figure 4.2(n), (o); Table 4.4(f)).

Greater understanding of the details of incidence is therefore important in assessing the economic and political impact of any transition in federal/state/local cost allocation patterns and in associated prices.

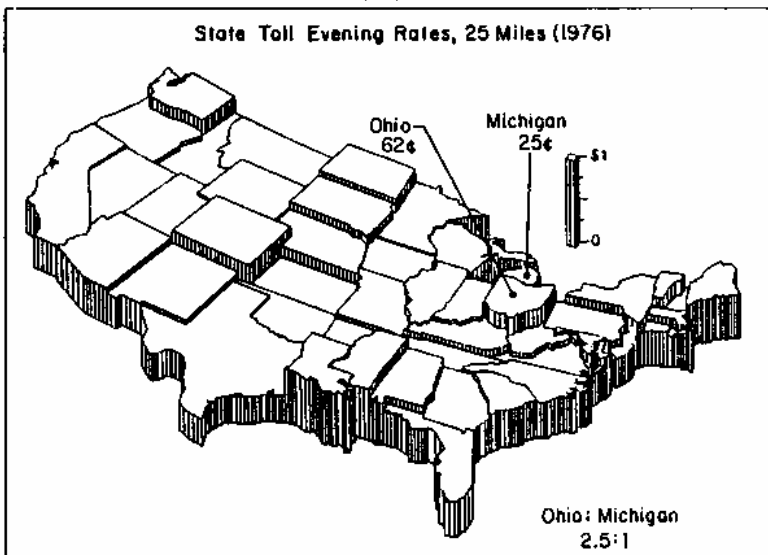
B. Federal/State Toll Revenue and Rate Disparities

As of 1976, revenues from message telecommunications service (MTS-the ordinary long distance call) accounted for over 80% of toll revenues (Figure 3.1, Box 16).

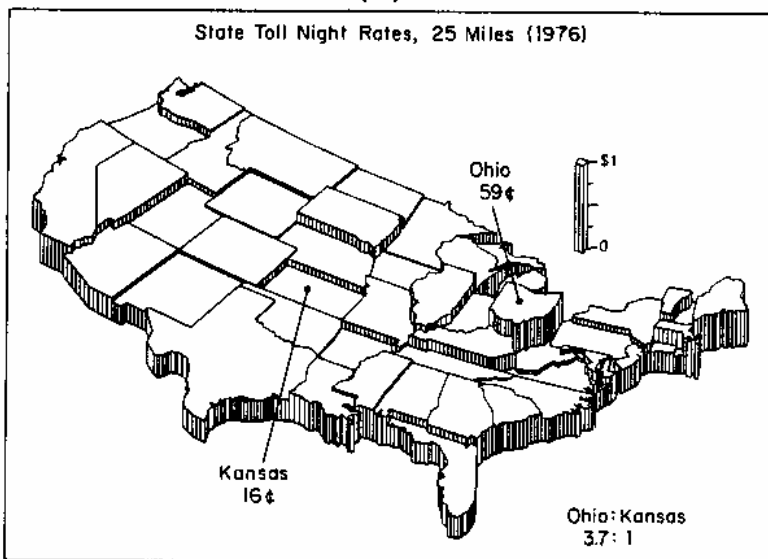
Figures 4.3 and 4.4 and their associated Tables 4.5 and 4.6 display wide variations in 1976 state MTS pricing. At the extremes, an Ohio customer paid almost four times as much as a Kansas resident for a 25-mile, customer-dialed, three minute night time state call. A 100-mile call was priced over three times higher in Louisiana than in Rhode Island. Comparison with



(a)



(b)



(c)

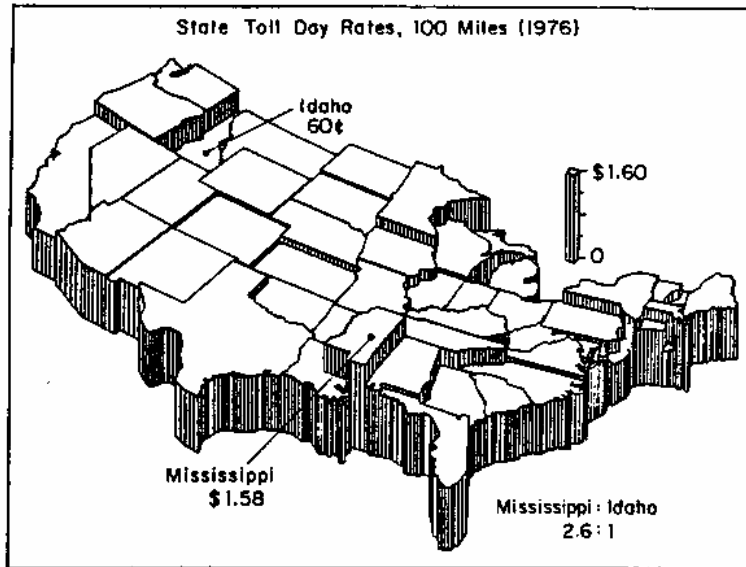
Figure 4.3
Message Toll Service (MTS) Rates for a Customer-Dialed,
3-Minute, 25 Mile State Telephone Call, 1976

(In Dollars)			Ranked						
Day	Evening	Night	Day	Evening	Night				
AL	0.69	0.48	0.33	MS	0.92	OH	0.62	OH	0.59
AZ	.65	.42	.26	VT	.75	LA	.61	VT	.50
AR	.44	.33	.22	KY	.74	VT	.60	IL	.47
CA	.43	.38	.35	TN	.69	MS	.59	ME	.42
CO	.62	.50	.25	AL	.69	ND	.54	MA	.41
CT	.61	.40	.24	ND	.67	NY	.52	KY	.40
DE	.65	.42	.25	OH	.67	ME	.50	MS	.36
FL	.60	.39	.24	NY	.66	CO	.50	SD	.36
GA	.51	.38	.33	WA	.65	IN	.49	IN	.36
ID	.30	.30	.30	WV	.65	AL	.48	NV	.35
IL	.49	.47	.47	WY	.65	WA	.48	NH	.35
IN	.63	.49	.36	AZ	.65	MA	.48	CA	.35
IA	.57	.37	.23	PA	.65	SD	.48	LA	.33
KS	.41	.26	.16	DE	.65	IL	.47	AL	.33
KY	.74	.45	.40	IN	.63	KY	.45	NY	.33
LA	.61	.61	.33	ME	.63	MD	.45	GA	.33
ME	.63	.50	.42	CO	.62	SC	.43	WA	.32
MD	.61	.45	.30	MA	.62	NH	.43	SC	.32
MA	.62	.48	.41	CT	.61	WV	.42	MO	.31
MI	.33	.25	.25	SC	.61	WY	.42	ID	.30
MN	.61	.39	.24	SD	.61	AZ	.42	MT	.30
MS	.92	.59	.36	LA	.61	PA	.42	MD	.30
MO	.48	.38	.31	MN	.61	DE	.42	TN	.28
MT	.30	.30	.30	NE	.61	NC	.41	ND	.27
NE	.61	.39	.24	MD	.61	CT	.40	NC	.27
NV	.41	.35	.35	FL	.60	MN	.39	NJ	.27
NH	.59	.43	.35	UT	.60	NE	.39	WV	.26
NJ	.36	.33	.27	NH	.59	FL	.39	WY	.26
NM	.55	.36	.22	VA	.58	UT	.39	AZ	.26
NY	.66	.52	.33	IA	.57	TN	.38	PA	.26
NC	.55	.41	.27	RI	.56	GA	.38	DE	.26
ND	.67	.54	.27	NC	.55	MO	.38	MI	.25
OH	.67	.62	.59	NM	.55	CA	.38	CO	.25
OK	.37	.28	.24	GA	.51	IA	.37	WI	.25
OR	.47	.35	.23	WI	.51	WI	.37	TX	.25
PA	.65	.42	.26	IL	.49	VA	.36	CT	.24
RI	.56	.36	.21	MO	.48	NM	.36	NE	.24
SC	.61	.43	.32	OR	.47	RI	.36	FL	.24
SD	.61	.48	.36	AR	.44	OR	.35	UT	.24
TN	.69	.38	.28	CA	.43	NV	.35	MN	.24
TX	.42	.31	.25	TX	.42	AR	.33	OK	.24
UT	.60	.39	.24	KS	.41	NJ	.33	IA	.23
VT	.75	.60	.50	NV	.41	TX	.31	OR	.23
VA	.58	.36	.22	OK	.37	ID	.30	VA	.22
WA	.65	.48	.32	NJ	.36	MT	.30	NM	.22
WV	.65	.42	.26	MI	.33	OK	.28	AR	.22
WI	.51	.37	.25	ID	.30	KS	.26	RI	.21
WY	.65	.42	.26	MT	.30	MI	.25	KS	.16

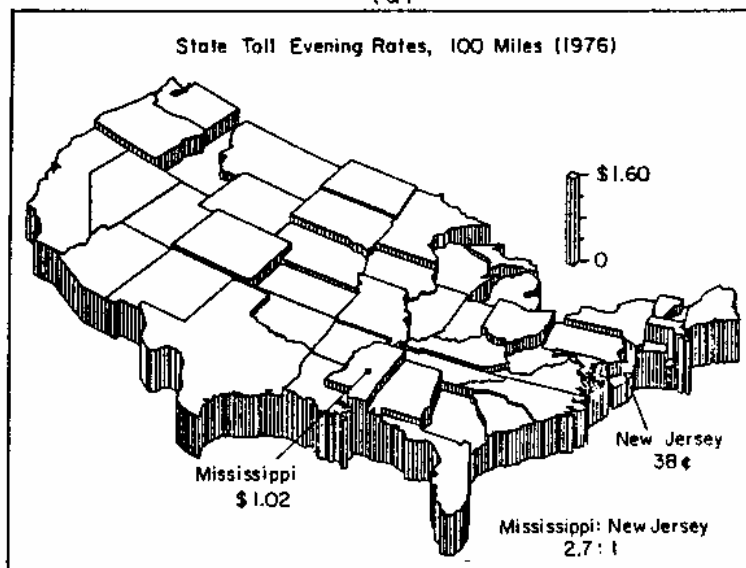
Table 4.5

Message Toll Service (MTS) Rates for a Customer-Dialed,
3-Minute, 25 Mile State Telephone Call, 1976

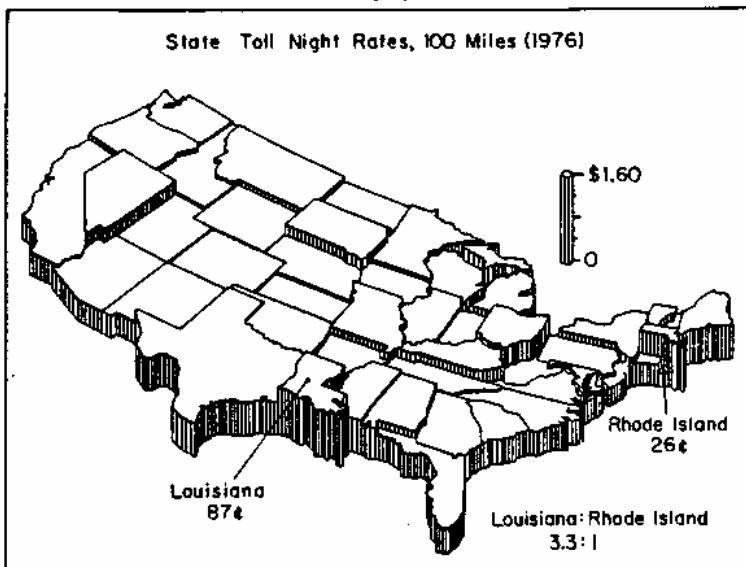
Source^{S7}



(a)



(b)



(c)

Figure 4.4

Message Toll Service (MTS) Rates for a Customer-Dialed, 3-Minute 100 Mile State Telephone Call, 1976

Source S8

(In Dollars)			Ranked						
Day	Evening	Night	Day	Evening	Night				
AL	1.21	.85	.58	MS	1.58	MS	1.02	LA	.87
AZ	.99	.64	.40	MA	1.25	MA	.99	MA	.83
AR	.98	.74	.49	KY	1.22	VT	.91	OH	.76
CA	.79	.65	.43	NY	1.22	LA	.88	VT	.72
CO	.92	.74	.37	AL	1.21	OH	.87	KY	.65
CT	1.03	.67	.41	TN	1.21	AL	.85	NV	.65
DE	.99	.64	.39	MN	1.19	ND	.82	ME	.64
FL	1.13	.73	.45	VT	1.15	OR	.78	MS	.63
GA	.89	.51	.46	FL	1.13	MO	.78	MO	.63
ID	.60	.45	.45	LA	1.06	NY	.77	TX	.61
IL	.80	.61	.54	OR	1.04	MN	.77	MI	.61
IN	.98	.70	.48	CT	1.03	ME	.77	AL	.58
IA	.99	.64	.40	ND	1.02	SD	.77	SD	.58
KS	.83	.53	.33	TX	1.02	TX	.76	NH	.58
KY	1.22	.74	.65	NV	1.00	KY	.74	OK	.58
LA	1.06	.88	.87	AZ	.99	WA	.74	IL	.54
ME	.97	.77	.64	DE	.99	AR	.74	OR	.52
MD	.91	.68	.45	IA	.99	CO	.74	NY	.52
MA	1.25	.99	.83	OH	.99	FL	.73	MT	.50
MI	.81	.61	.61	PA	.99	NH	.73	WA	.49
MN	1.19	.77	.47	UT	.99	IN	.70	AR	.49
MS	1.58	1.02	.63	VA	.99	MD	.68	IN	.48
MO	.97	.78	.63	WV	.99	NC	.68	TN	.48
MT	.70	.60	.50	WA	.99	TN	.67	MN	.47
NE	.96	.62	.38	WY	.99	CT	.67	SC	.46
NV	1.00	.65	.65	AR	.98	OK	.67	GA	.46
NH	.98	.73	.58	IN	.98	NM	.66	FL	.45
NJ	.75	.38	.33	NH	.98	NV	.65	NC	.45
NM	.96	.66	.41	ME	.97	CA	.65	MD	.45
NY	1.22	.77	.52	MO	.97	AZ	.64	ID	.45
NC	.91	.68	.45	SD	.97	IA	.64	CA	.43
ND	1.02	.82	.41	NE	.96	PA	.64	ND	.41
OH	.99	.87	.76	NM	.96	UT	.64	CT	.41
OK	.89	.67	.58	CO	.92	DE	.64	NM	.41
OR	1.04	.78	.52	MD	.91	WV	.64	AZ	.40
PA	.99	.64	.39	NC	.91	WY	.64	UT	.40
RI	.66	.42	.26	SC	.91	SC	.64	IA	.40
SC	.91	.64	.46	GA	.89	VA	.63	WY	.40
SD	.97	.77	.58	OK	.89	NE	.62	VA	.40
TN	1.21	.67	.48	WI	.87	MI	.61	PA	.39
TX	1.02	.76	.61	KS	.83	IL	.61	DE	.39
UT	.99	.64	.40	MI	.81	MT	.60	WV	.39
VT	1.15	.91	.72	IL	.80	KS	.53	NE	.38
VA	.99	.63	.40	CA	.79	WI	.52	CO	.37
WA	.99	.74	.49	NJ	.75	GA	.51	WI	.37
WV	.99	.64	.39	MT	.70	ID	.45	KS	.33
WI	.87	.52	.37	RI	.66	RI	.42	NJ	.33
WY	.99	.64	.40	ID	.60	NJ	.38	RI	.26

Table 4.6

Message Toll Service (MTS) Rates for a Customer-Dialed
3-Minute, 100 Mile State Telephone Call, 1976

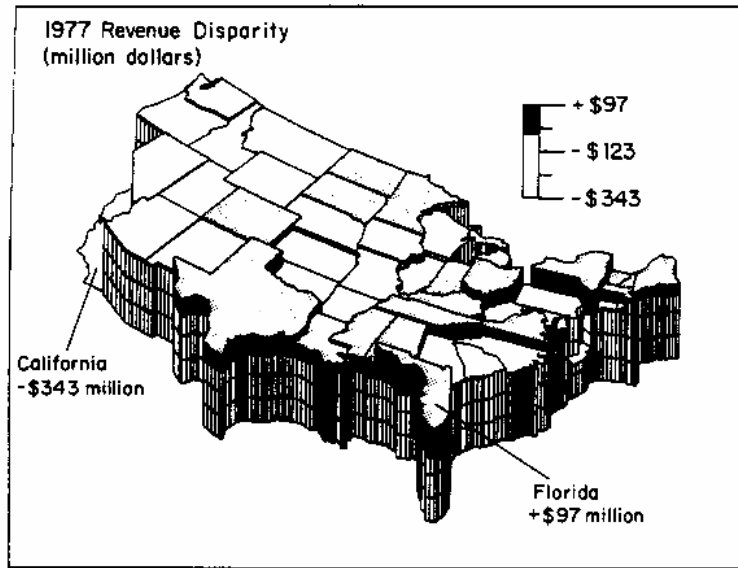
Source ^{S9}

Figures 3.12 and 3.13 (Tables 3.20, 3.21) shows little direct relation between these prices and state-by-state interexchange circuit plant costs.

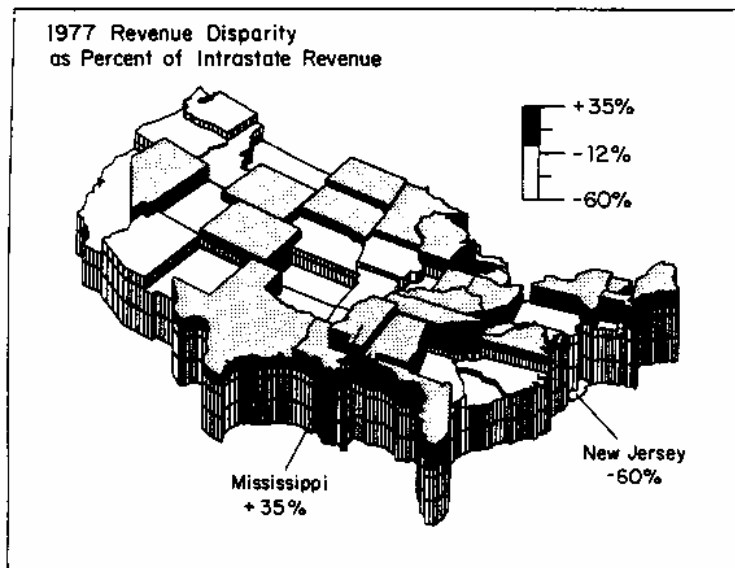
We have no evidence that these rate variations across states have been either widely perceived or controversial. Over the years, attention and debate have focused on widely perceived differences between state and interstate toll rates, especially evident to consumers near the borders. One manifestation of these differences is the revenue disparity illustrated for 1977 in Figure 4.5 (Table 4.7).

Revenue disparity is defined as the difference between revenues from state toll calls as priced according to state tariffs and what those revenues would have been had the same calls been priced at the corresponding interstate rates. At the extremes, in 1977, Floridians paid the most dollars for state toll calls over what they would have paid for similar interstate calls (New Yorkers had that honor in 1976); Californians paid the least in both years. Had the state toll calls been priced at interstate rates in 1977, people in Mississippi would have had to pay 35% less than they actually did for the aggregate of state toll calls, and Floridians 21% less. Conversely, New Jersey state toll users would have had to pay 60% more and Californians 20% more in 1977. Figure 4.6(a), (b) show revenue disparities under rates proposed by the Bell System in 1970 and under interim rates approved in 1971 (Figure 4.6(c), (d)). Between 1970-71 and 1977 California migrated from the position of highest revenue disparity to that of least.

Revenue disparity reflects the aggregate effect of rate disparities, deviations of state rates from interstate rates, with magnitudes



(a)



(b)

Figure 4.5

State-by-State Toll Revenue Disparity, 1977

Source^{S10}

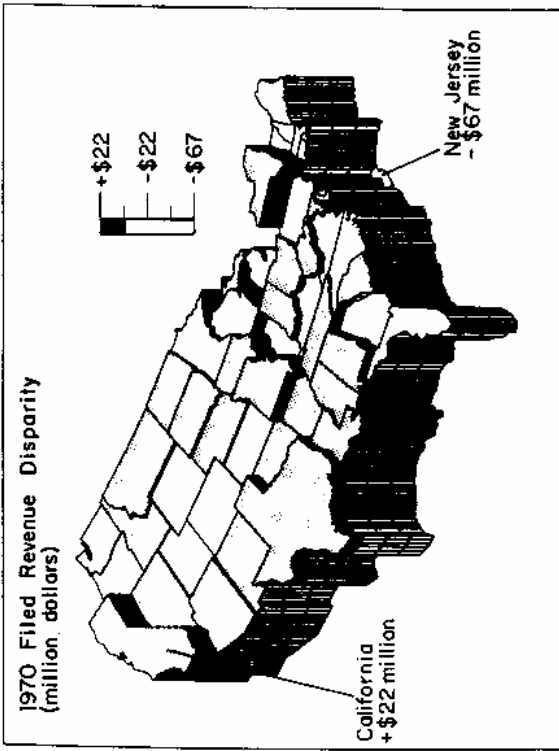
Ranked						
	Revenue Disparity \$Millions	Percent of of Intrastate Revenue		Revenue Disparity \$Millions	Percent of of Intrastate Revenue	
AL	33.9.	26.1	FL	96.6	MS	34.8
AZ	-0.8	-1.3	NY	76.5	TN	27.3
AR	-4.4	-5.9	OH	65.5	AL	26.1
CA	-342.9	-19.7	TX	53.4	KY	25.8
CO	4.0	4.2	MA	43.4	FL	21.0
CT	-5.8	-4.8	TN	41.1	MA	18.4
DE	-0.2	-2.9	MS	34.4	LA	15.7
FL	96.6	21.0	AL	33.9	NY	14.3
GA	-3.9	-2.4	KY	28.9	OH	12.7
ID	-1.6	-4.6	LA	25.5	IN	12.0
IL	-36.7	-11.4	IN	21.2	ME	10.7
IN	21.2	12.0	VA	14.0	NV	10.6
IA	-1.1	-0.9	WA	7.0	WI	10.2
KS	-23.2	-23.4	NM	7.0	VT	9.5
KY	28.9	25.8	ME	4.6	ND	8.3
LA	25.5	15.7	CO	4.0	TX	6.6
ME	4.6	10.7	ND	2.5	VA	6.3
MD	0.0	0.0	VT	1.8	MN	5.0
MA	43.4	18.4	NV	1.5	CO	4.2
MI	-62.8	-16.1	SD	0.7	WA	3.8
MN	7.0	5.0	NH	0.6	WY	3.5
MS	34.4	34.8	MD	0.0	SD	2.5
MO	-10.3	-5.7	DE	-0.2	NH	2.3
MT	-7.4	-19.1	WY	-0.7	MD	0.0
NE	-3.7	-6.1	AZ	-0.8	IA	-0.9
NV	1.5	10.6	IA	-1.1	AZ	-1.3
NH	0.6	2.3	RI	-1.3	GA	-2.4
NJ	-187.6	-59.5	ID	-1.6	OR	-2.8
NM	-4.8	-13.9	WV	-1.8	DE	-2.9
NY	76.5	14.3	UT	-2.0	PA	-3.5
NC	-26.5	-10.7	OR	-3.3	WV	-3.9
ND	2.5	8.3	NE	-3.7	ID	-4.6
OH	65.5	12.7	GA	-3.9	CT	-4.8
OK	-18.2	-13.9	AR	-4.4	UT	-5.4
OR	-3.3	-2.8	NM	-4.8	MO	-5.7
PA	-14.2	-3.5	CT	-5.8	AR	-5.9
RI	-1.3	-9.3	MT	-7.4	NE	-6.1
SC	-12.3	-15.0	MO	-10.3	RI	-9.3
SD	0.7	2.5	SC	-12.3	NC	-10.7
TN	41.1	27.3	PA	-14.2	IL	-11.4
TX	53.4	6.6	WI	-15.7	NM	-13.9
UT	-2.0	-5.4	OK	-18.2	OK	-13.9
VT	1.8	9.5	KS	-23.2	SC	-15.0
VA	14.0	6.3	NC	-26.5	MI	-16.1
WA	7.0	3.8	IL	-36.7	MT	-19.1
WV	-1.8	-3.9	MI	-62.8	CA	-19.7
WI	-15.7	10.2	NJ	-187.6	KS	-23.4
WY	-0.7	3.5	CA	-342.9	NJ	-59.5

Table 4.7

State-by-State Toll Revenue Disparity, 1977

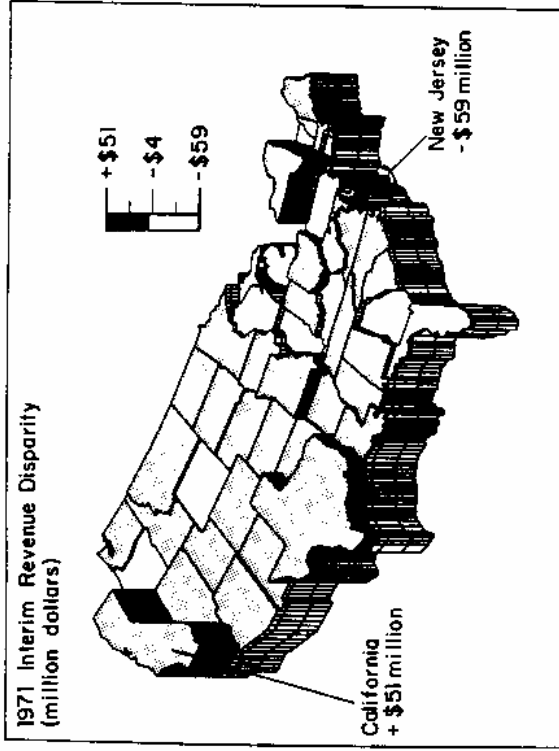
Source S11

1970 Filed



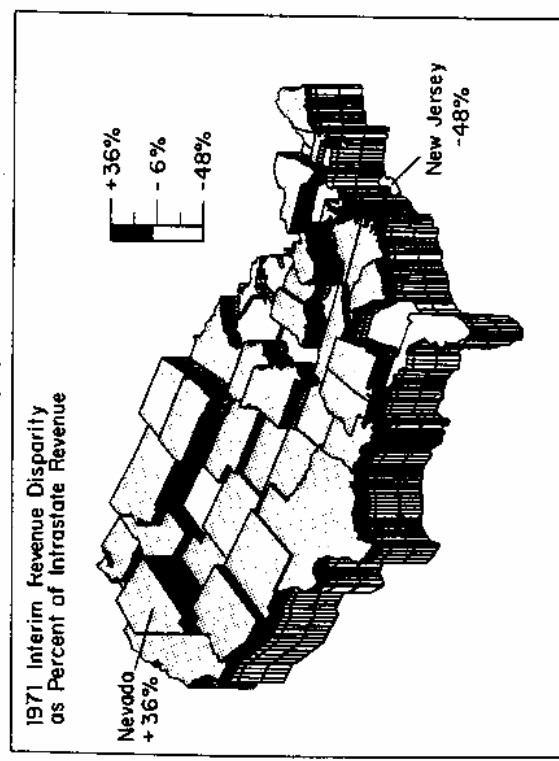
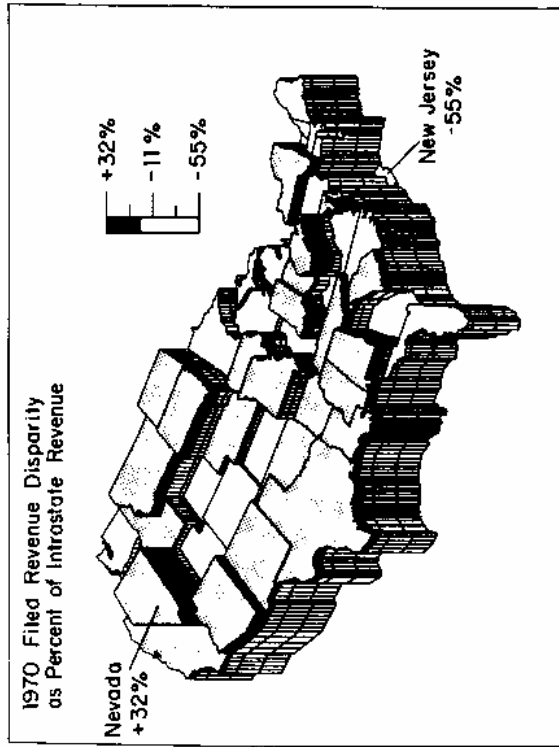
(a)

1971 Interim



(c)

(b)



(d)

Figure 4.6

State-by-State Toll Revenue Disparity: 1970 Filed and 1971 Interim Rates
Source S12

	1970 Filed				1971 Interim				Ranked							
	1970 Filed		1971 Interim		1970 Filed		1971 Interim		1970 Filed		1971 Interim		1970 Filed		1971 Interim	
	\$ mil.	percent	\$ mil.	percent	\$ mil.	percent	\$ mil.	percent	\$ mil.	percent	\$ mil.	percent	\$ mil.	percent	\$ mil.	percent
AL	2.7	9.7	4.4	15.7	CA	22.2	NV	31.9	CA	51.0	NV	36.1				
AZ	3.6	16.3	4.9	22.3	NY	21.6	SD	27.9	NY	34.4	SD	33.2				
AR	0.6	3.6	1.5	9.7	TX	12.3	ND	25.4	TX	25.0	ND	31.1				
CA	22.2	4.9	51.0	11.3	MO	11.3	WV	24.9	MO	14.3	WV	29.5				
CO	-0.1	-0.2	2.0	7.4	WV	4.2	MO	19.8	OH	10.1	MO	25.1				
*CT	0.0	0.0	0.0	0.0	LA	4.2	AZ	16.3	LA	7.1	AZ	22.3				
DE	0.0	0.0	0.0	0.0	OH	3.9	MT	11.8	IN	5.6	MT	17.9				
FL	-4.3	-6.8	-0.1	-0.1	AZ	3.6	NY	9.8	WV	5.0	AL	15.7				
GA	-8.9	-20.3	-5.0	-11.5	IN	3.2	AL	9.7	AZ	4.9	NY	15.6				
ID	0.2	2.5	0.8	9.0	AL	2.7	LA	9.2	MA	4.9	LA	15.3				
IL	-15.9	-16.5	-8.5	-8.9	SD	2.6	MS	8.7	AL	4.4	MS	15.2				
IN	3.2	8.6	5.6	15.1	MS	2.3	IN	8.6	MS	4.0	IN	15.1				
IA	1.9	6.5	3.7	12.9	ND	2.1	NM	7.4	OK	3.9	NM	14.0				
KS	-0.9	-3.3	1.2	4.5	IA	1.9	IA	6.5	IA	3.7	IA	12.9				
KY	-1.9	-10.5	-0.5	-2.7	OK	1.5	TX	6.2	TN	3.5	TX	12.6				
LA	4.2	9.2	7.1	15.3	MT	1.5	SC	5.3	MD	3.3	SC	11.8				
ME	-0.5	-3.9	0.5	3.7	TN	1.4	MD	5.0	SD	3.0	MD	11.7				
MD	1.4	5.0	3.3	11.7	MD	1.4	CA	4.9	ND	2.6	NE	11.5				
MA	0.0	0.0	4.9	5.1	SC	1.0	NE	4.8	MT	2.3	CA	11.3				
MI	-9.7	-8.4	-2.5	-2.2	NM	1.0	TN	4.5	SC	2.2	TN	10.9				
MN	-0.2	-0.7	2.1	5.7	NV	0.8	OH	4.1	MN	2.1	OH	10.7				
MS	2.3	8.7	4.0	15.2	AR	0.6	OK	3.9	CO	2.0	OK	10.3				
MO	11.3	19.8	14.3	25.1	NE	0.5	AR	3.6	NM	1.9	AR	9.7				
MT	1.5	11.8	2.3	17.9	ID	0.2	ID	2.5	NC	1.9	ID	9.0				
NE	0.5	4.8	1.3	11.5	*CT	0.0	*CT	0.0	AR	1.5	CO	7.4				
NV	0.8	31.9	0.9	36.1	DE	0.0	MA	0.0	NE	1.3	MN	5.7				
NH	-0.5	-5.8	0.0	0.1	MA	0.0	PA	0.0	VA	1.2	NC	5.6				
NJ	-66.7	-54.8	-58.8	-48.3	PA	0.0	DE	0.0	KS	1.2	MA	5.1				
NM	1.0	7.4	1.9	14.0	CO	-0.1	CO	-0.2	NV	0.9	KS	4.5				
NY	21.6	9.8	34.4	15.6	MN	-0.2	MN	-0.7	ID	0.8	ME	3.7				
NC	-0.5	-1.5	1.9	5.6	ME	-0.5	NC	-1.5	WA	0.6	VA	3.4				
ND	2.1	25.4	2.6	31.1	NH	-0.5	VA	-3.0	ME	0.5	WA	1.4				
OH	3.9	4.1	10.1	10.7	NC	-0.5	KS	-3.3	UT	0.1	UT	1.2				
OK	1.5	3.9	3.9	10.3	UT	-0.6	ME	-3.9	*CT	0.0	NH	0.1				
OR	-3.4	-12.8	-1.5	-5.5	VT	-0.7	UT	-5.1	DE	0.0	*CT	0.0				
PA	0.0	0.0	0.0	0.0	WY	-0.8	NH	-5.8	PA	0.0	PA	0.0				
RI	-0.9	-19.5	-0.6	-13.3	KS	-0.9	WA	-6.1	NH	0.0	DE	0.0				
SC	1.0	5.3	2.2	11.8	RI	-0.9	FL	-6.8	FL	-0.1	FL	-0.1				
SD	2.6	27.9	3.0	33.2	VA	-1.1	MI	-8.4	VT	-0.3	MI	-2.2				
TN	1.4	4.5	3.5	10.9	KY	-1.9	KY	-10.5	WY	-0.4	KY	-2.7				
TX	12.3	6.2	25.0	12.6	WA	-2.5	WI	-12.2	KY	-0.5	OR	-5.5				
UT	-0.6	-5.1	0.1	1.2	OR	-3.4	OR	-12.8	RI	-0.6	WI	-5.5				
VT	-0.7	-14.5	-0.3	-6.4	FL	-4.3	VT	-14.5	OR	-1.5	VT	-6.4				
VA	-1.1	-3.0	1.2	3.4	WI	-4.7	WY	-15.8	WI	-2.1	WY	-7.5				
WA	-2.5	-6.1	0.6	1.4	GA	-8.9	IL	-16.5	MI	-2.5	IL	-8.9				
WV	4.2	24.9	5.0	29.5	MI	-9.7	RI	-19.5	GA	-5.0	GA	-11.5				
WI	-4.7	-12.2	-2.1	-5.5	IL	-15.9	GA	-20.3	IL	-8.5	RI	-13.3				
WY	-0.8	-15.8	-0.4	-7.5	NJ	-66.7	NJ	-54.8	NJ	-58.8	NJ	-48.3				

* Figures not available for Connecticut

Table 4.8

State-by-State Toll Revenue Disparity:
1970 Filed and 1971 Interim Rates

Source ^{S13}

usually dependent on the distance called. Figure 4.7 illustrates rate disparities at the distances from Jefferson City, Missouri to the Missouri border. To call a place to the Missouri border from Jefferson City, you pay Missouri state toll rates. In 1957 these were higher than interstate rates. This is shown by the border of the shaded Missouri. With interstate rates, you could reach a point just outside the black (interstate) border of Missouri at less than what it cost to reach a point just inside the shaded border at state toll rates. This example thus illustrates positive toll rate disparity. That's especially noticeable to folks along the border, since it means they pay more to call, say, 25 miles into Missouri than 25 miles into the United States.

Figure 4.8 shows how the pattern of toll rate disparity changed between 1971 and 1977. In 1971, 10 states had toll rates higher than interstate rates for all distances; 2 had pegged state rates at precisely the interstate level; and only 6 had rates uniformly lower than interstate rates. By 1977, 11 states had lower-than-interstate rates, 6 had equal rates, and only 3 had uniformly higher rates.

The remaining states exhibited more complicated patterns, with relationships to interstate rates depending on distance. 1977 Iowa state toll rates, for example, were lower than interstate rates below about 25 miles calling distance, equal between about 25 and 100 miles, and higher above 100 or so miles (Figure 4.8(b)).

The qualitative picture of Figure 4.8 is made more precise in Figure 4.9, where state rates in the various mileage bands are compared explicitly with the corresponding interstate rates. The general downward migration of state rates relative to the interstate rate is evident,

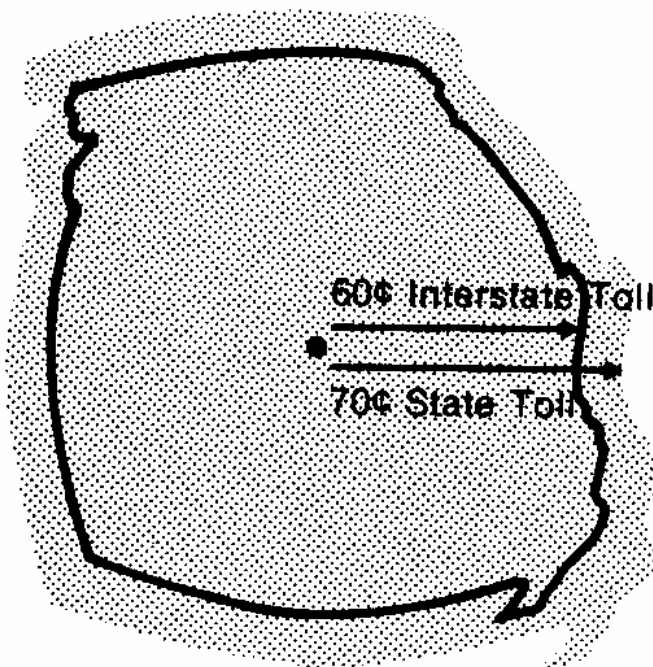
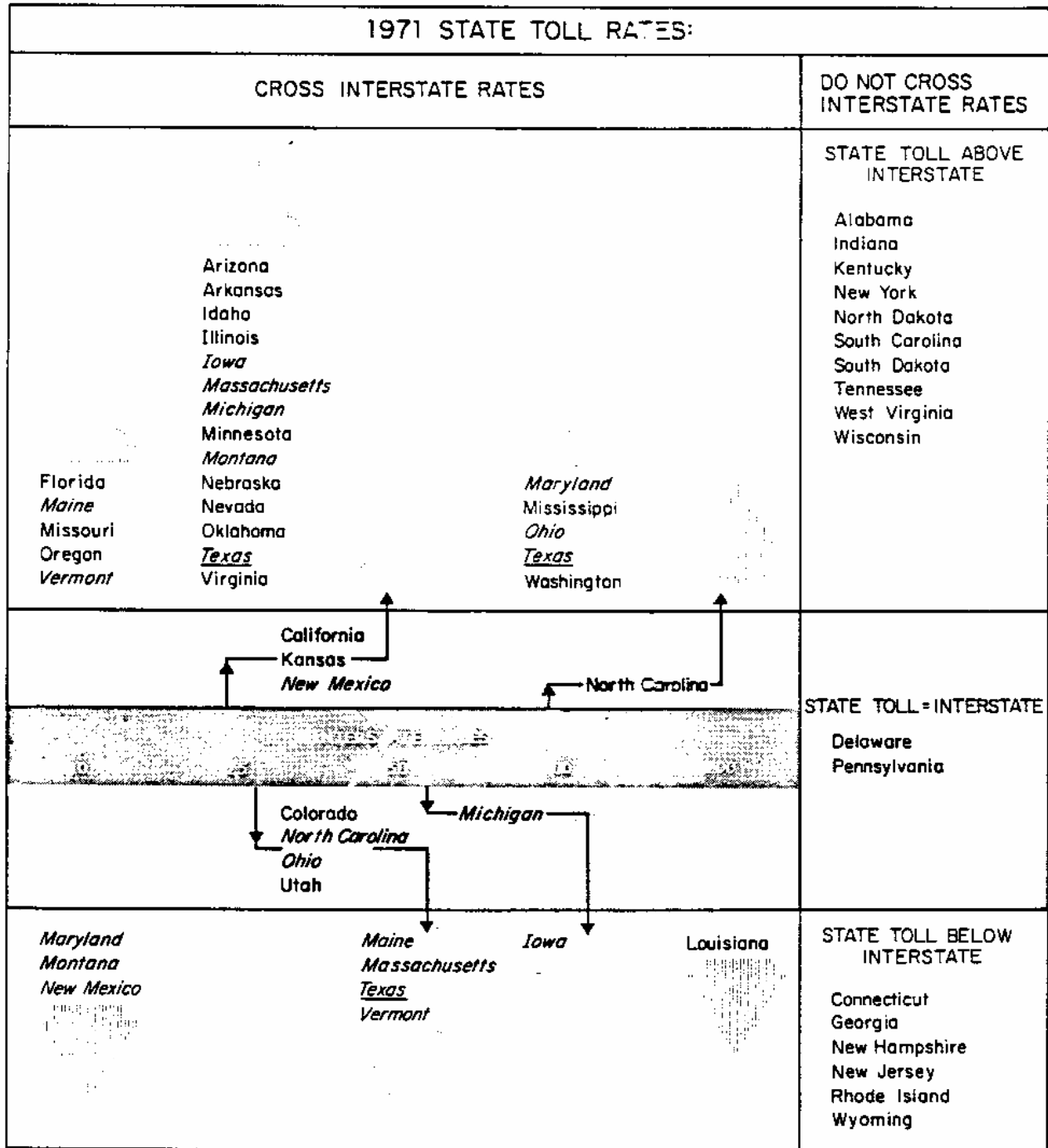


Figure 4.7

Missouri 1957 Toll Rate Disparity

Source^{S14}



Legend:

States in italics cross the interstate rate band twice.

States in underlined italics cross the interstate rate band three times.

□ State rates equal interstate rates.

▨ Interstate rate band.

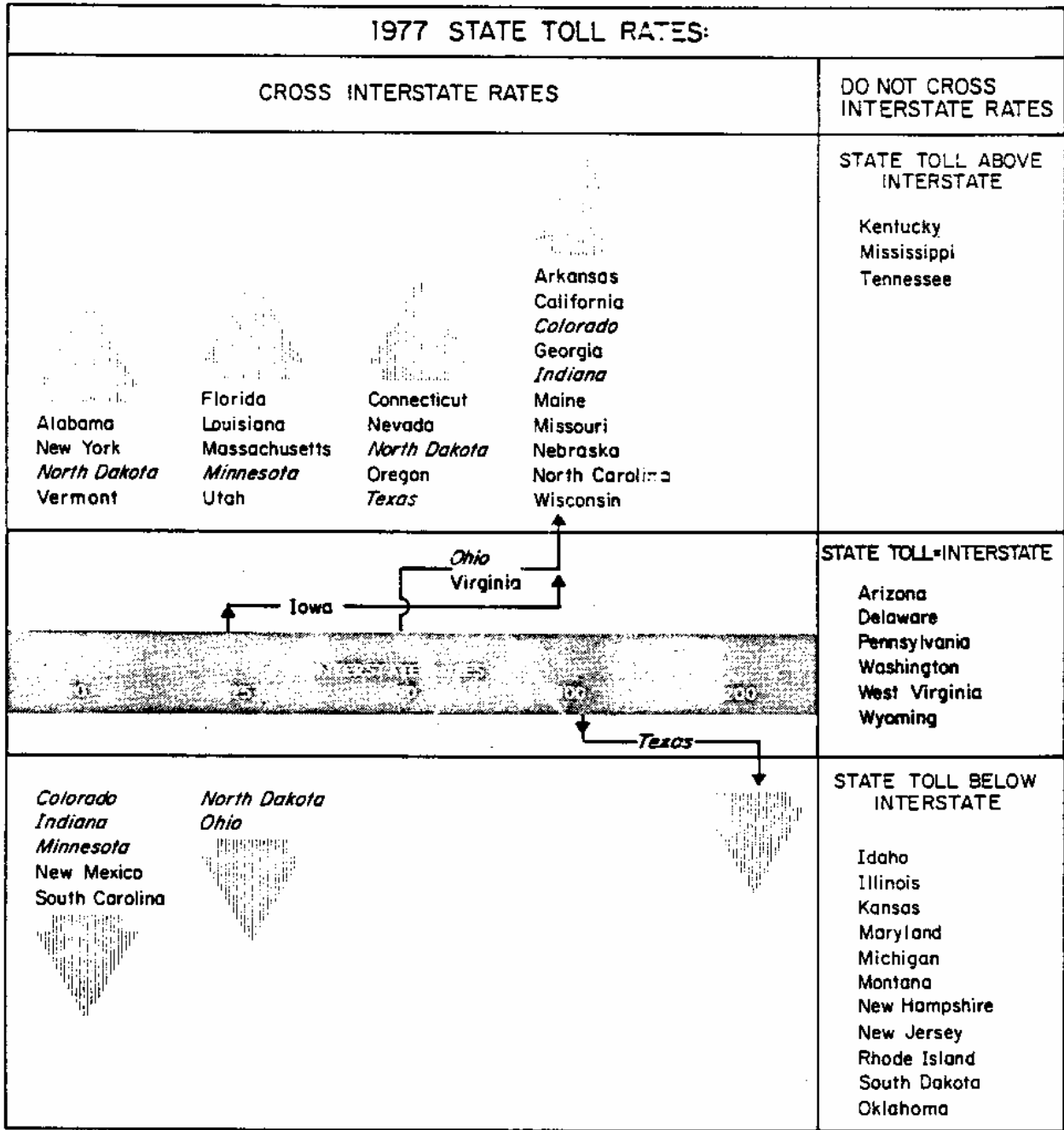
(a)

Figure 4.8

1971 and 1977 Interstate and State Toll Rates
for a Daytime, 3-Minute Telephone Call*

Source^{S15}

* 1971 rates are for customer-dialed calls in the 17 states where this option was available and for station-to-station calls in all others. All 1977 rates are for customer-dialed calls.



Legend:

States in italics cross the interstate rate band twice.

State rates equal interstate rates.

Interstate rate band.

(b)

Figure 4.8 (continued)

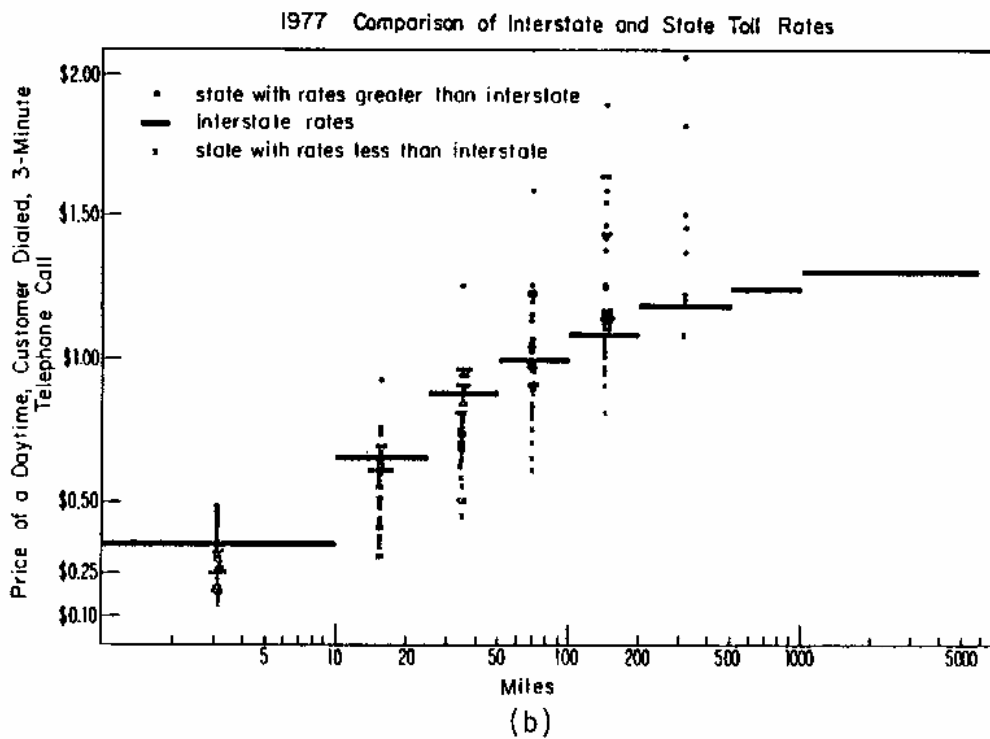
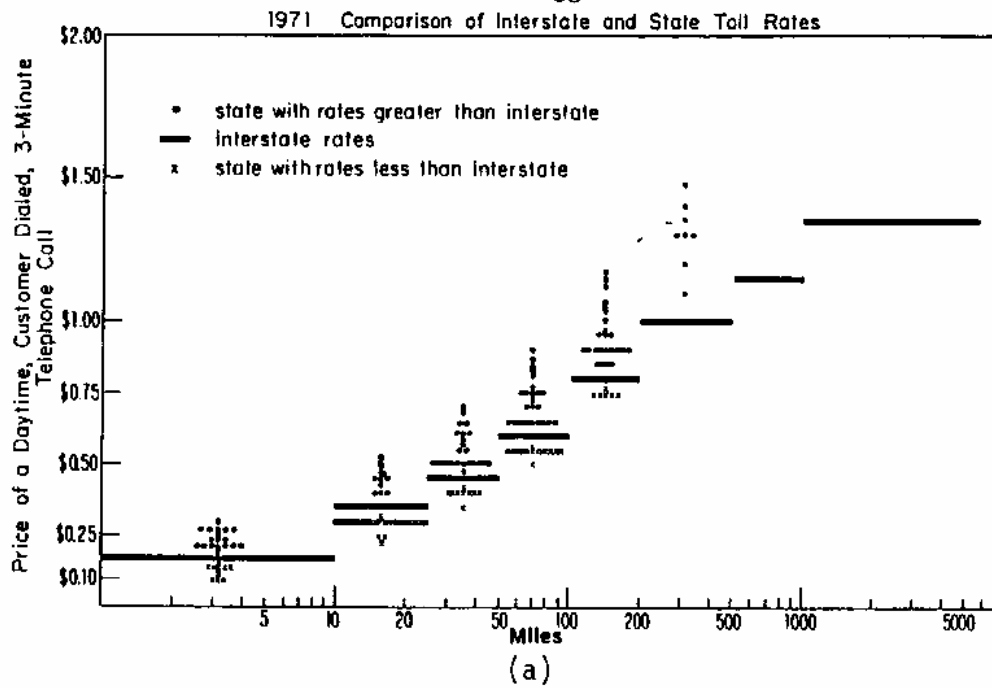


Figure 4.9

1971 and 1977 Interstate and State Toll Rates*

Source S16

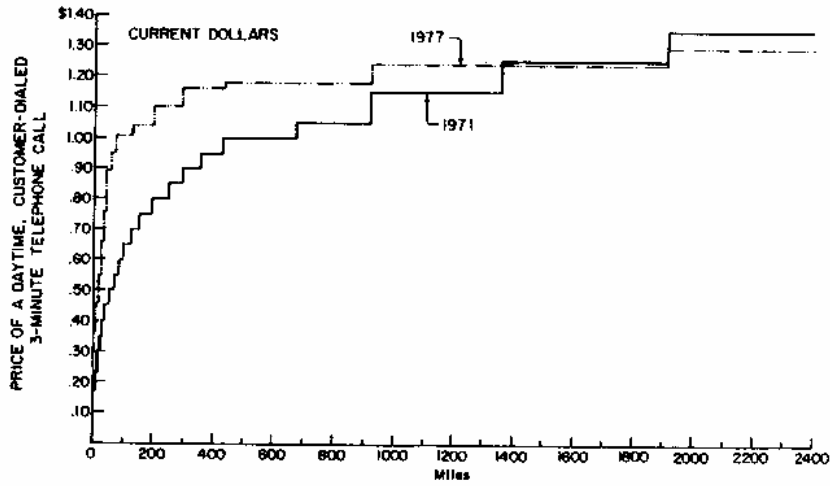
* 1971 rates are for customer-dialed calls in the 17 states where this option was available and for station-to-station calls in all others. All 1977 rates are for customer-dialed calls.

particularly at shorter distances, as is a wider spread in the deviations from the interstate rate.

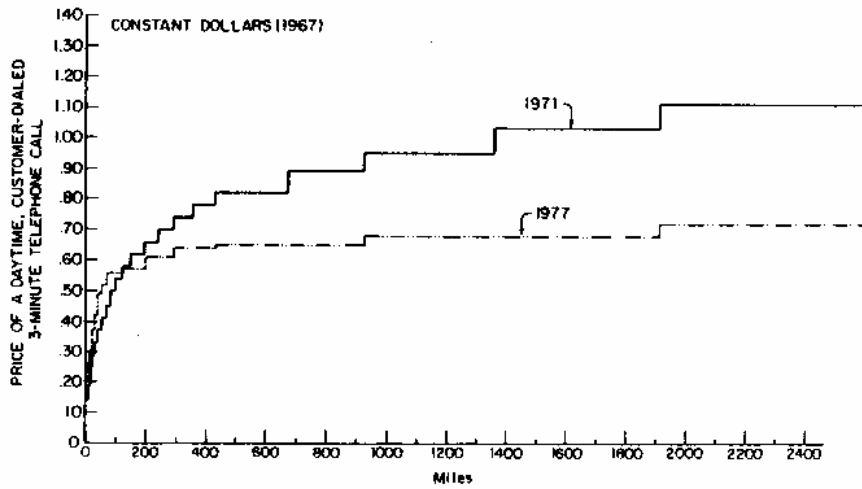
The shift of state toll rates relative to interstate rates illustrated in Figures 4.8 and 4.9 occurred in a period of significant change in interstate rates. Figure 4.10 (a) shows that interstate rates increased between 1971 and 1977 in all except the two highest mileage bands. More significantly, the shape of the interstate rate curve changed markedly, with a steeper rise at shorter distances and a pronounced flattening at longer distances in 1977 as compared to 1971. The flattening effect is especially pronounced in Figure 4.10 (b), where rates are expressed in constant (1967) dollars. Indeed, constant dollar rates decreased at long distances.

The pattern of change displayed in Figure 4.10 is consistent with the following interpretations. First, it is consistent with the traditional telecommunications companies meeting competition from the flattened rate structures of satellite carriers and others specializing in supplying long-haul facilities (see Part 2). Second, it is consistent with the lower unit costs associated with high-usage long-haul facilities (see Part 2). Finally, it is consistent with the continuing growth of total revenues (see Part 2), since Figure 4.10 suggests that any revenues lost at the higher rate bands can be recovered at the lower rate bands. Indeed, to the extent that long-haul demand is elastic and short-haul demand is inelastic, across-the-board revenue growth is not ruled out.

Figure 4.11 illustrates the impact of all these changes on South Dakota. State rates there increased at short distances and decreased at

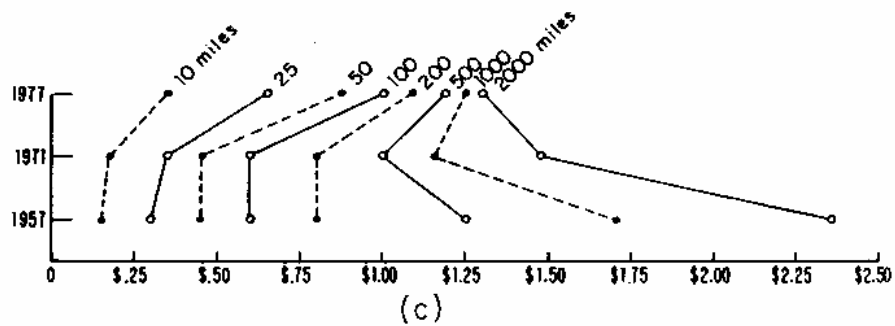


(a)



(b)

Interstate Toll Rates

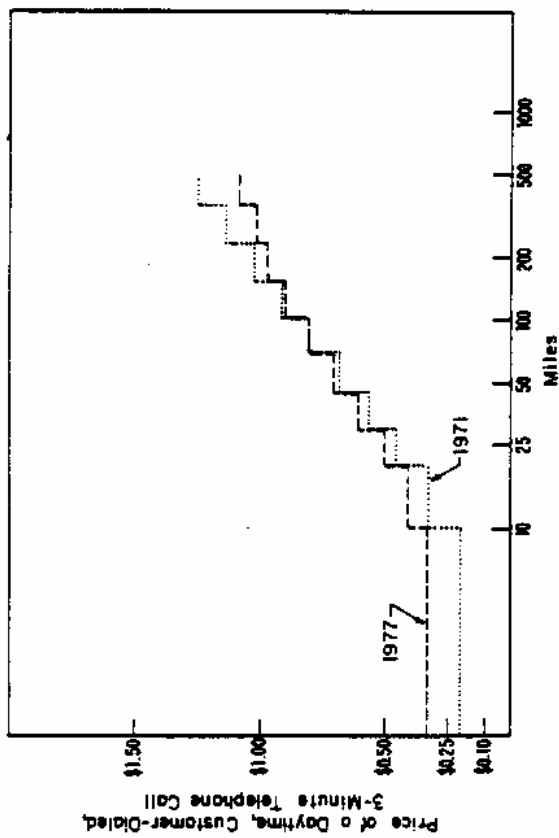


(c)

Figure 4.10

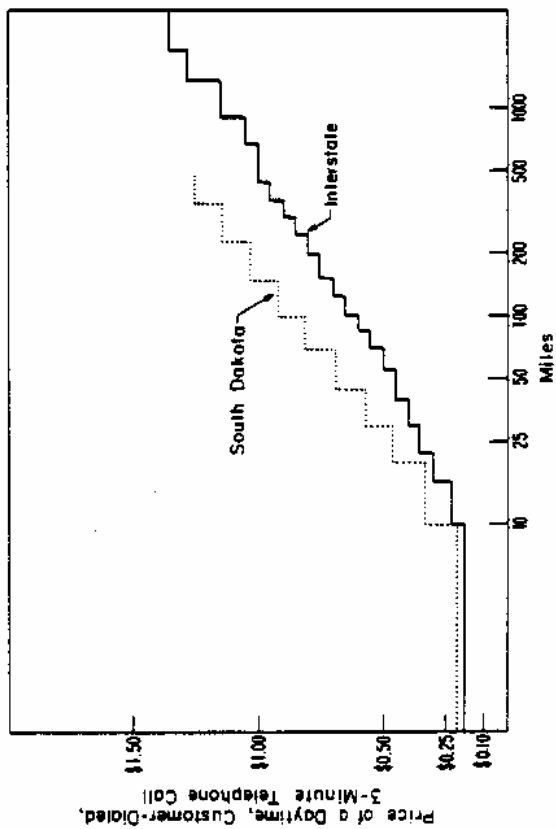
Interstate Toll Rate Changes 1957, 1971, 1977

Source S17



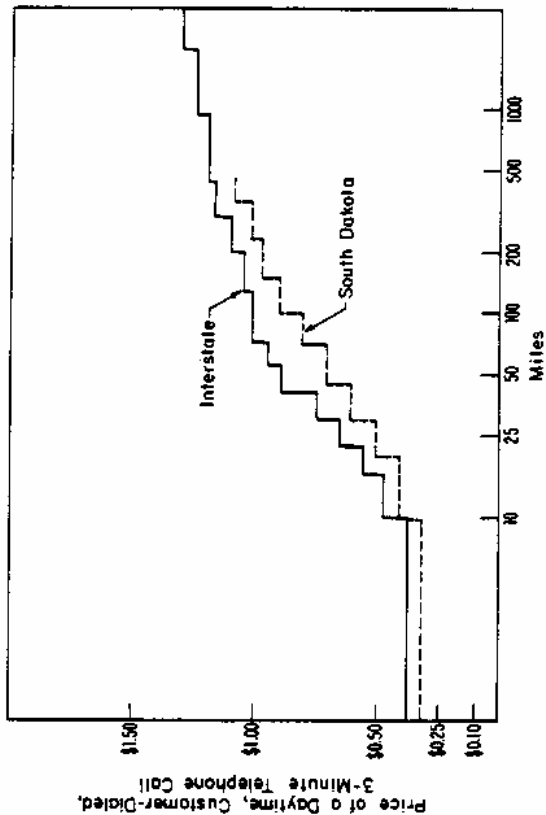
1971 and 1977 South Dakota State Toll Rates

(a)



1971 Interstate and South Dakota State Toll Rates

(b)



1977 Interstate and South Dakota State Toll Rates

(c)

Figure 4.11

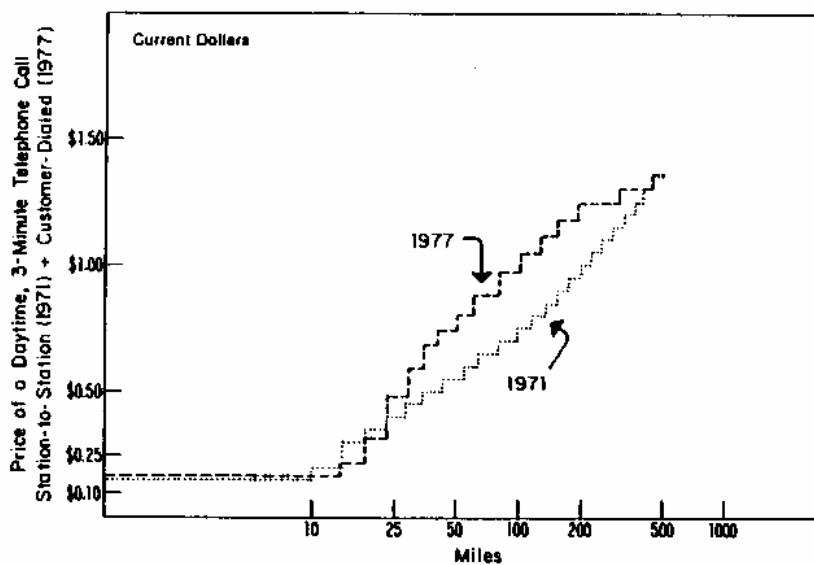
1971 and 1977 Interstate and South Dakota State Toll Rates

longer distances, with the most pronounced effects at the extremes, as shown in Figure 4.11(a). As interstate rates also shifted, South Dakota moved from a uniformly positive rate disparity (and hence a positive revenue disparity) in 1971 to uniformly negative rate and revenue disparities in 1977. Comparing Figure 4.8(a) with Figure 4.8(b) shows South Dakota to be the only state with so dramatic a rate shift in this period, although as previously noted (Figures 4.5 and 4.6), California had the most pronounced revenue shift.

In most states, as in Missouri (Figure 4.12), the moves were mixed. As Figure 4.12 shows, Missouri's state rates were raised everywhere but around the 10-25 mile band. The Missouri state rate curve exhibits the same pronounced shift in shape as the interstate rate curve (Figure 4.10). In 1971 Missouri's toll rate disparity was generally positive (Figure 4.12(c)); by 1977 it had turned negative below 100 miles and positive above. This shift was sufficient, however, to turn Missouri from the state with the fourth highest positive revenue disparity in 1971 (Figure 4.6) to one with a pronounced negative revenue disparity by 1977 (Figure 4.5). The significance of holding the line for 10-mile prices (Figure 4.12(b)) is examined in Section 4-E.

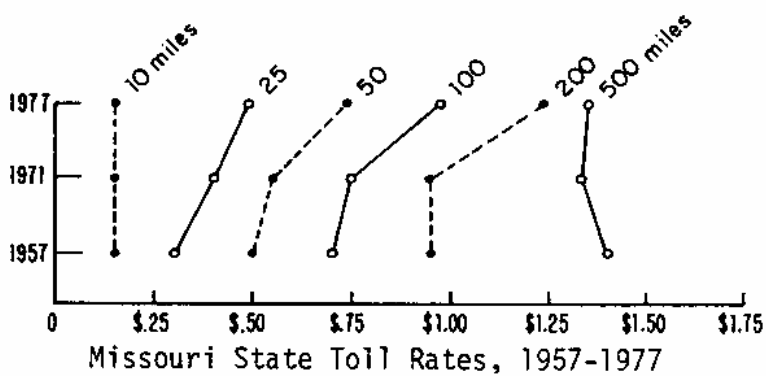
C. The Geography of Toll Rate Structures 1971-1977

Any disparity between state and interstate toll rates is noticeable principally along state borders. The effects of the shifting shape of rate curves described in Section 4-B reach everywhere. Figure 4.13(a) is a map of Missouri, with distances from Saint Louis. It's a familiar picture, which we may call the geographic map of Missouri.



1971 and 1977 Missouri State Toll Rates

(a)

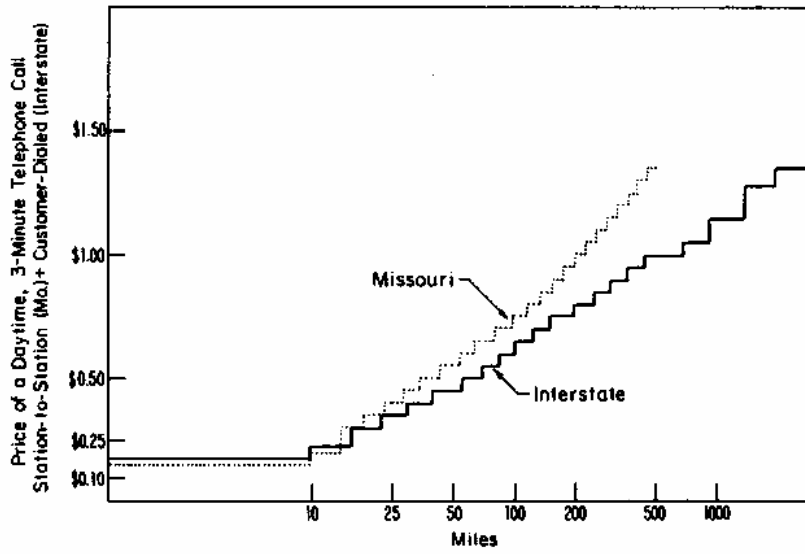


(b)

Figure 4.12

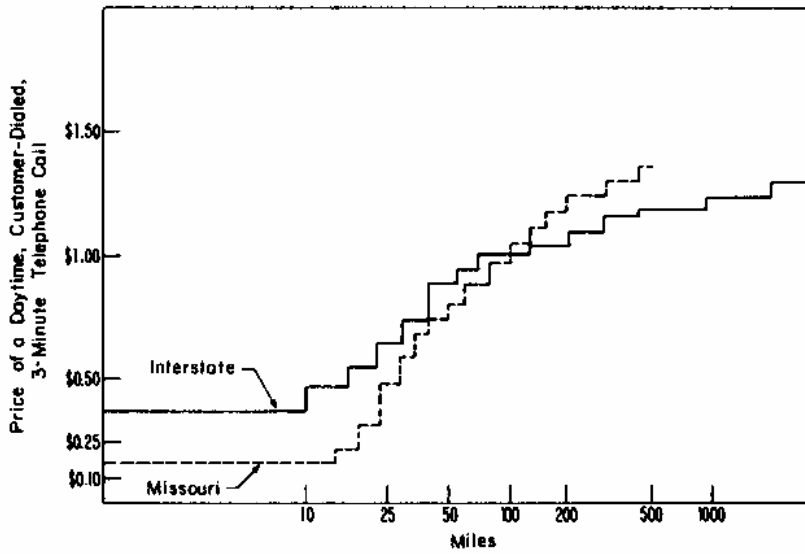
Missouri Holds the 10-Mile Fort and Missouri Toll Rate Disparity: 1957, 1971 and 1977

Source^{S19}



1971 Missouri Toll Rate Disparity

(c)



1977 Missouri Toll Rate Disparity

(d)

Figure 4.12 (continued)

Figures 4.13(b) and 4.13(c) are telephonic maps of Missouri. Whereas the geographic map shows actual shapes with the circles showing miles, the telephonic maps show costs, not distances, from Saint Louis.

The map of Figure 4.13(b) shows how much it cost in 1971 to call from Saint Louis to any place in Missouri during the day and talk for 3 minutes. This means that all places that cost the same to call from Saint Louis lie on a circle around Saint Louis. A telephonic map therefore looks distorted, since inches on the picture are proportional to the price of telephone calls, not to geographic distance. In 1971 it cost 75¢ to call 100 miles station-to-station through an operator. There was as yet no option to dial it yourself. In 1977 telephonic Missouri looked like Figure 4.13(c). It cost 97¢ to dial yourself to call 100 miles. It is clear that the region immediately around Saint Louis has grown substantially relative to more distant parts of the state.

Figures 4.14, 4.15, and 4.16 show similar maps for New York State as seen from New York City, and for California as seen from Los Angeles and from San Francisco. There is a similar ballooning of the region immediately surrounding each local area.

Figure 4.17 puts Missouri in the context of the United States, as seen from Jefferson City, Missouri. As in Figure 4.7, the black Missouri border shows how much it costs to reach a point just outside that border at interstate toll rates. The shaded Missouri border again illustrates toll rate disparity by indicating the cost of reaching a point just inside the Missouri border at state toll rates. In 1957 it cost \$1.70 to call (station-to-station) 1,000 miles (Figure 4.17(b)). In 1971 interstate direct dialing had become available in Missouri at \$1.15 for 1,000

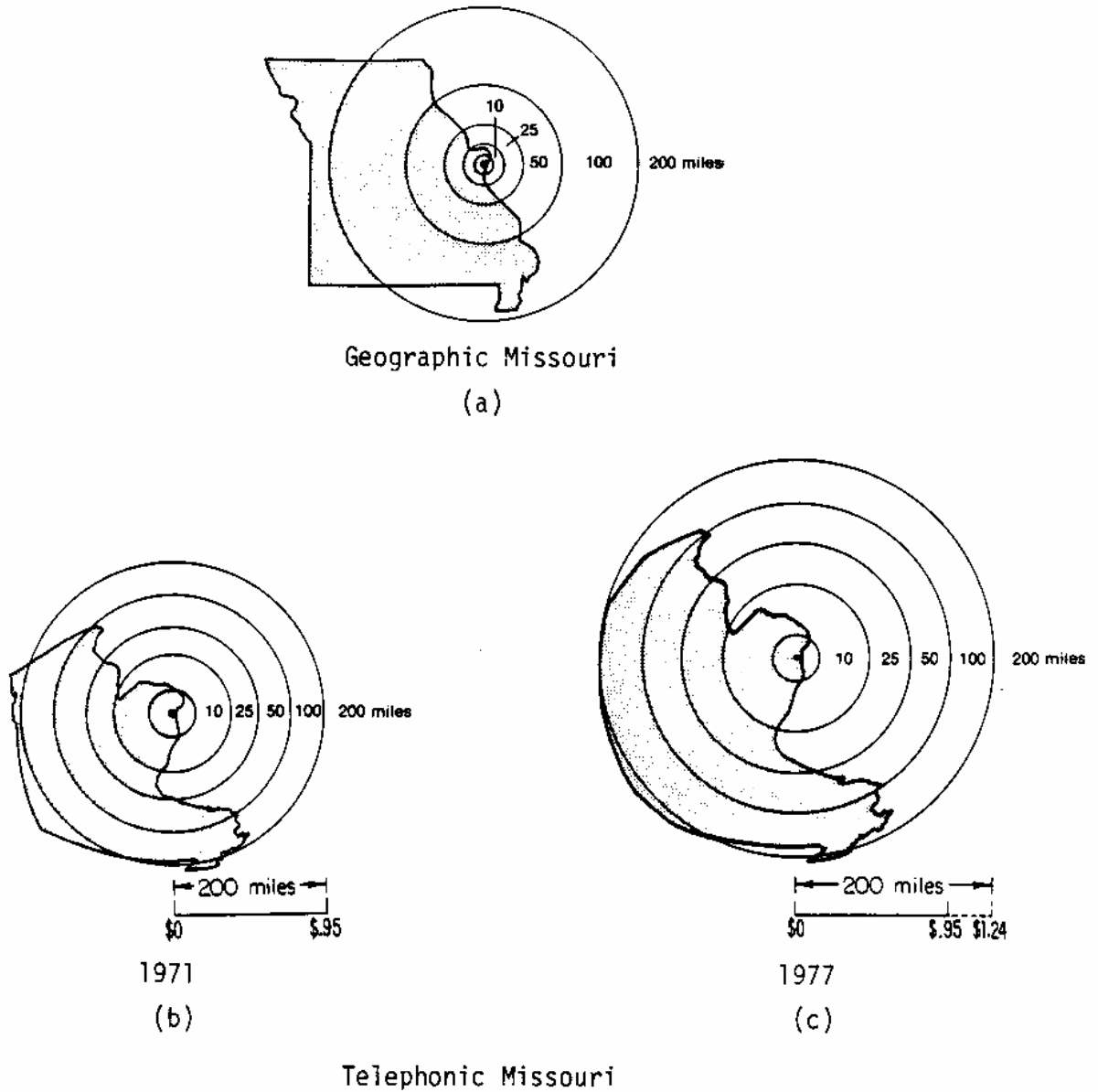
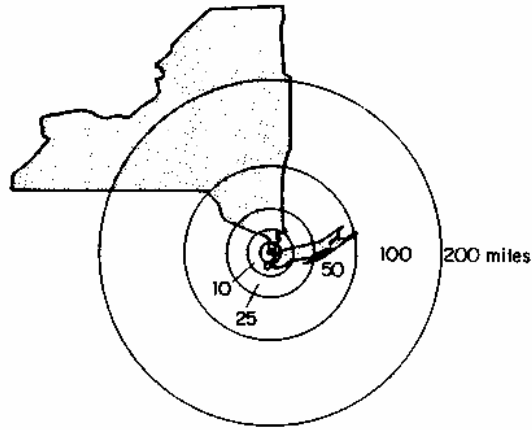


Figure 4.13

Geographic and Telephonic Missouri viewed from St. Louis

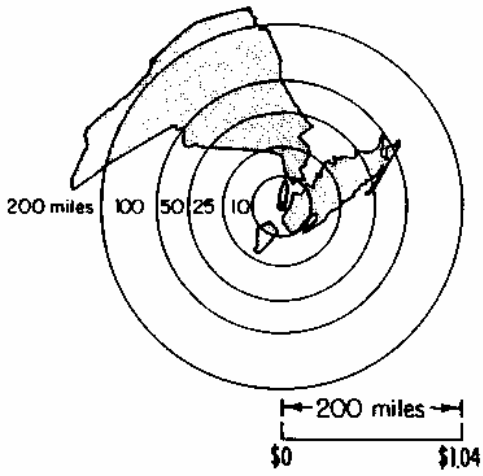
All telephone calls based on 3-minute, day rates. 1971 rates are station-to-station; 1977 rates are customer dialed.

Source^{S20}



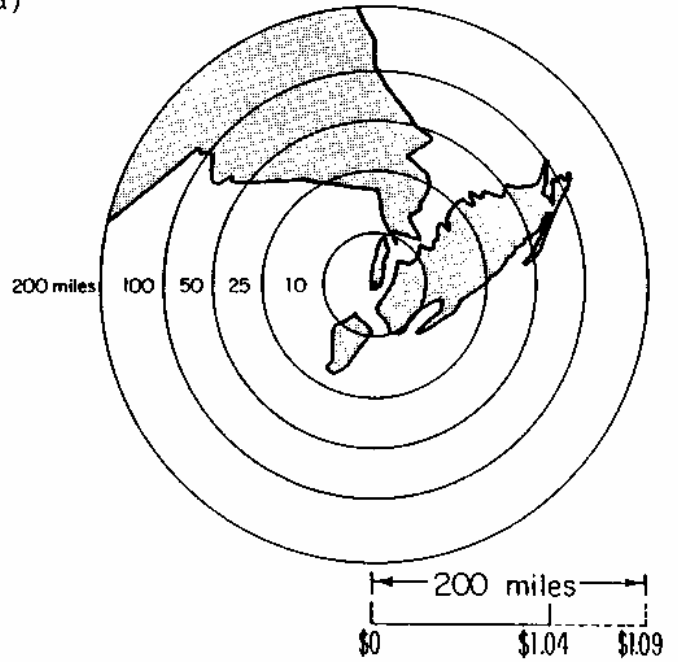
Geographic New York

(a)



1971

(b)



1977

(c)

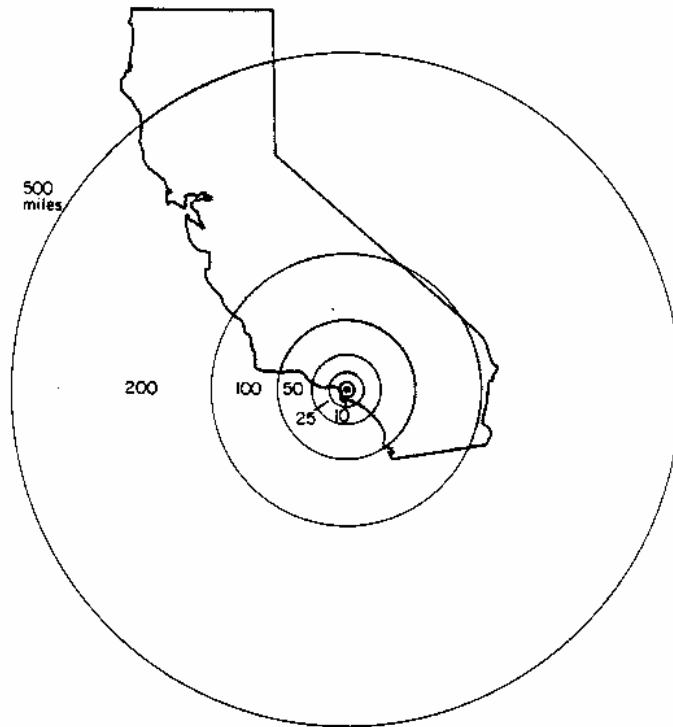
Telephonic New York

Figure 4.14

Geographic and Telephonic New York
Viewed from New York City

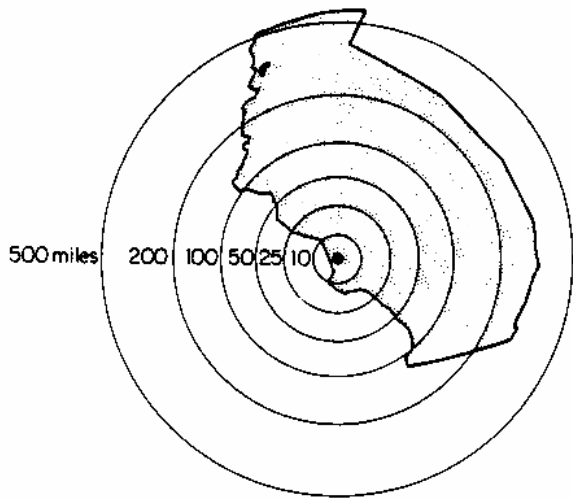
All telephone calls based on 3-minutes, customer-dialed, day rates.

Source^{S21}

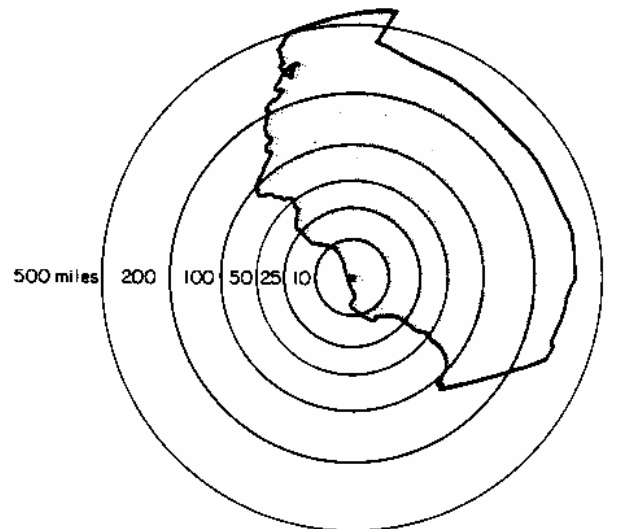


Geographic California, Los Angeles

(a)



1971
(b)



1977
(c)

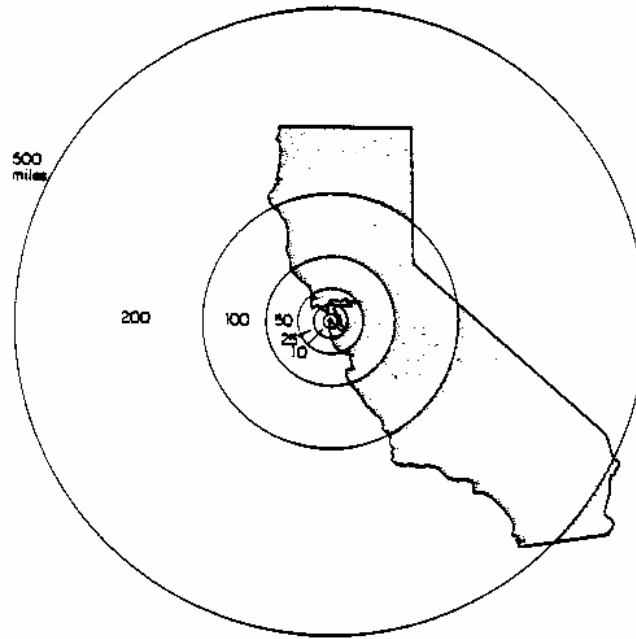
Telephonic California, Los Angeles

All telephone calls based on 3-minute, customer-dialed, day rates.

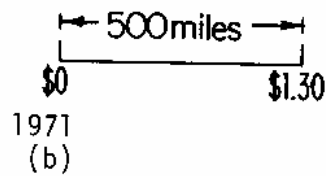
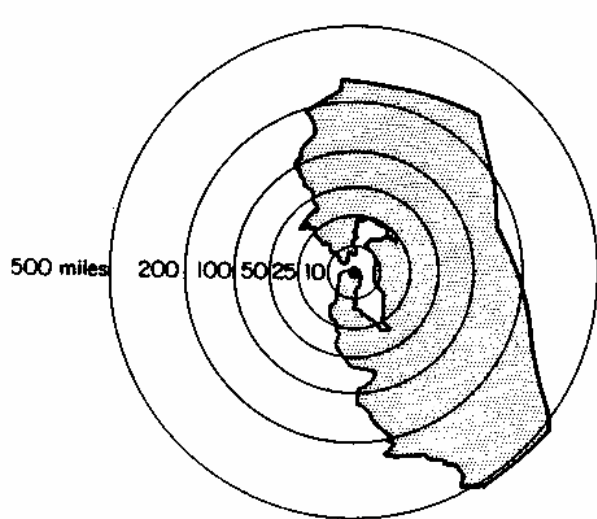
Figure 4.15

Geographic and Telephonic California
Viewed from Los Angeles

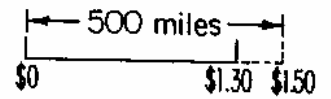
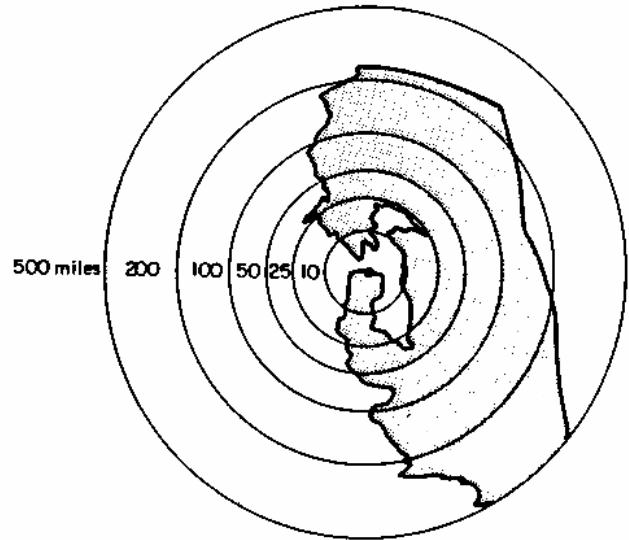
Source S22



Geographic, San Francisco
(a)



1971
(b)



1977
(c)

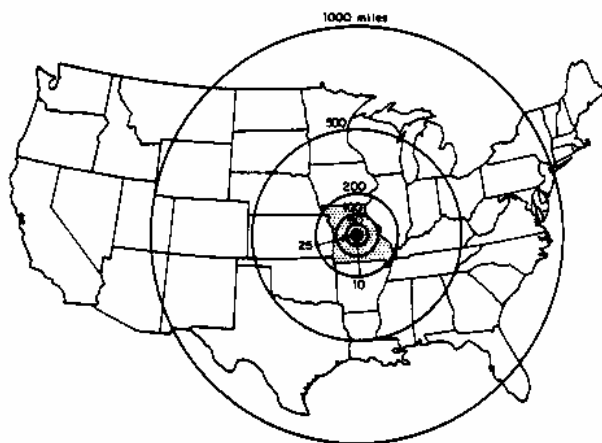
Telephonic California, San Francisco

All telephone calls based on 3-minute, customer-dialed, day rates.

Figure 4.16

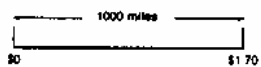
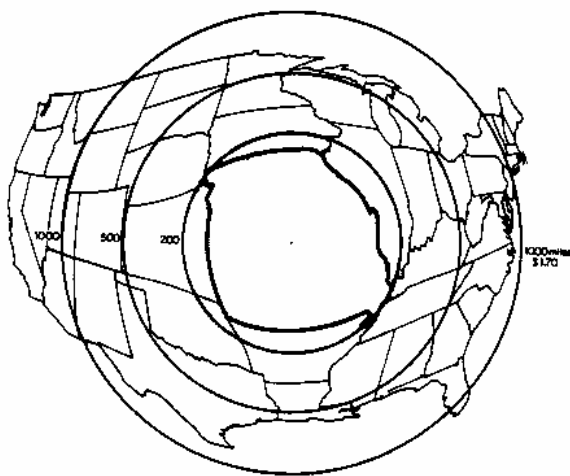
Geographic and Telephonic California
Viewed from San Francisco

Source S23



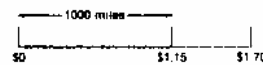
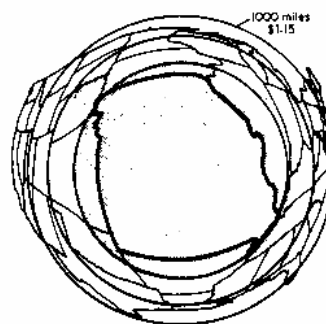
Geographic United States

(a)



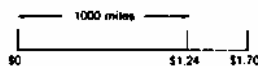
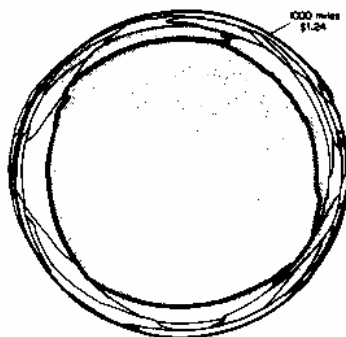
1957

(b)



1971

(c)



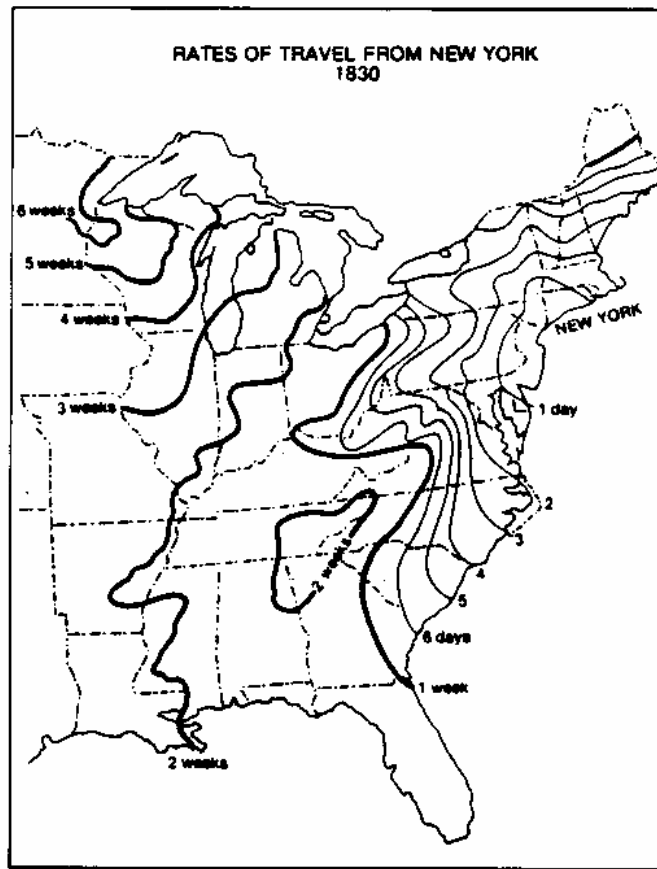
1977

(d)

Telephonic U.S. Viewed From Missouri

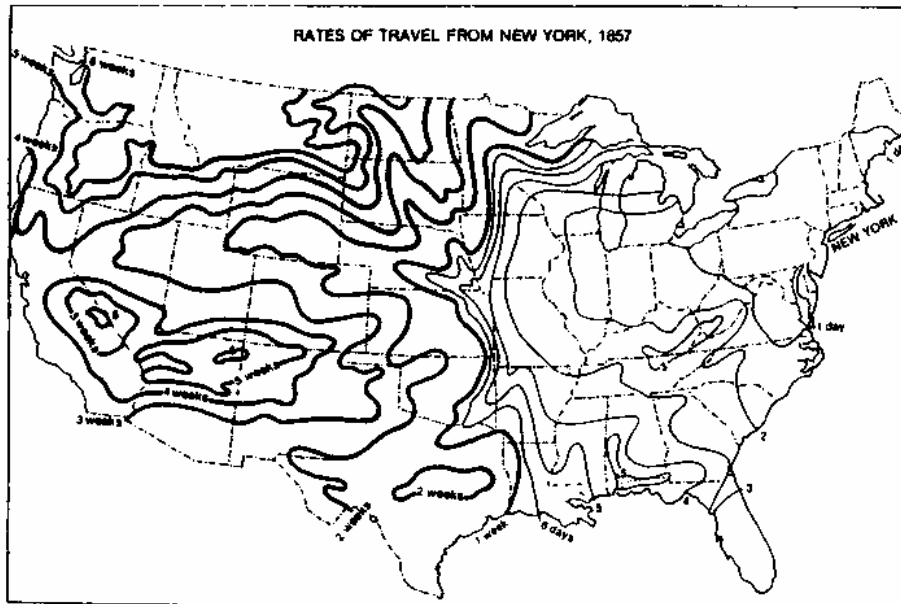
Figure 4.17

Geographic, Telephonic and Travel Views of the United States



1830 Rates of Travel
from New York City

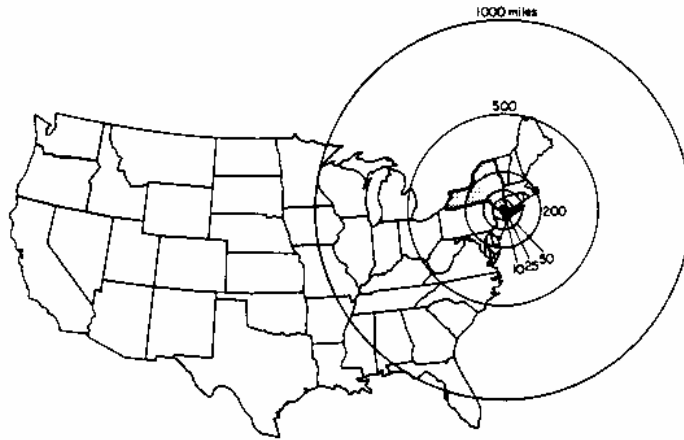
(e)



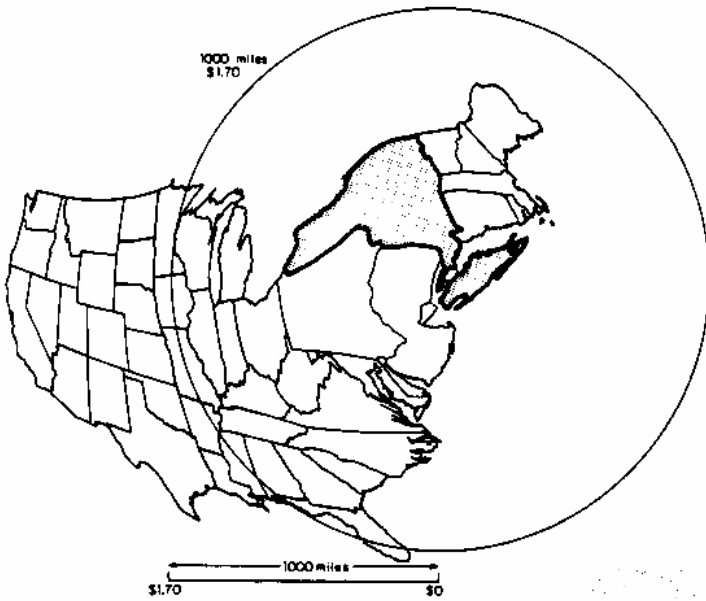
1857 Rates of Travel
from New York City

(f)

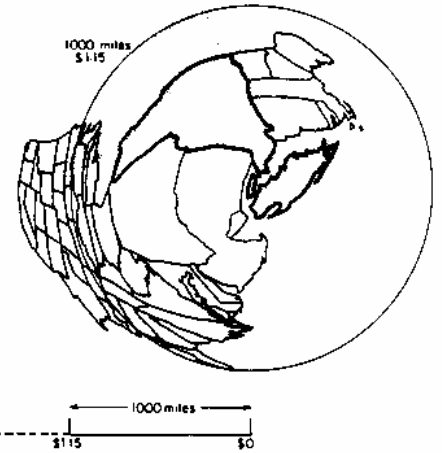
Figure 4.17 (continued)



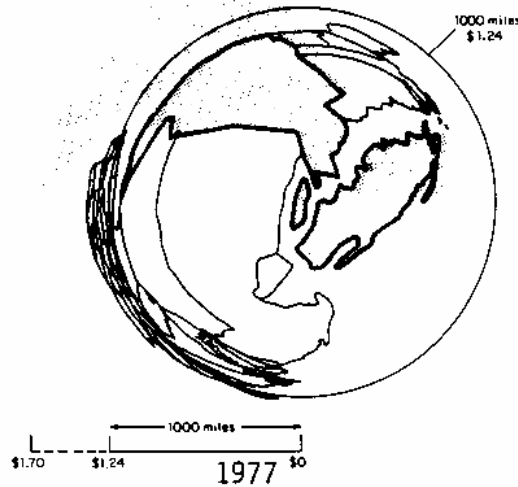
Geographic United States
(g)



1957
(h)



1971
(i)



1977
(j)

Telephonic U.S. Viewed from Manhattan

Figure 4.17 (continued)

miles, and it cost a good deal more to call New York City than to call Cleveland. By 1977 (Figure 4.17(d)) the telephonic Missouri had grown substantially relative to the telephonic United States. Also, it made little difference whether you were calling New York or Cleveland.

In summary, the rate changes between 1971 and 1977 have had the following effects:

1. Revenue disparities were generally reduced, although positive rate disparities remained, but mostly for the longer distances where distance from the state border made them less widely noticeable.

2. The relative reduction of very long distance interstate rates shrank the dimensions of the telephonic United States as compared with those of telephonic states.

3. The relative increase of short distance state rates ballooned the telephonic state area immediately surrounding any locality in the state relative to the rest of the state.

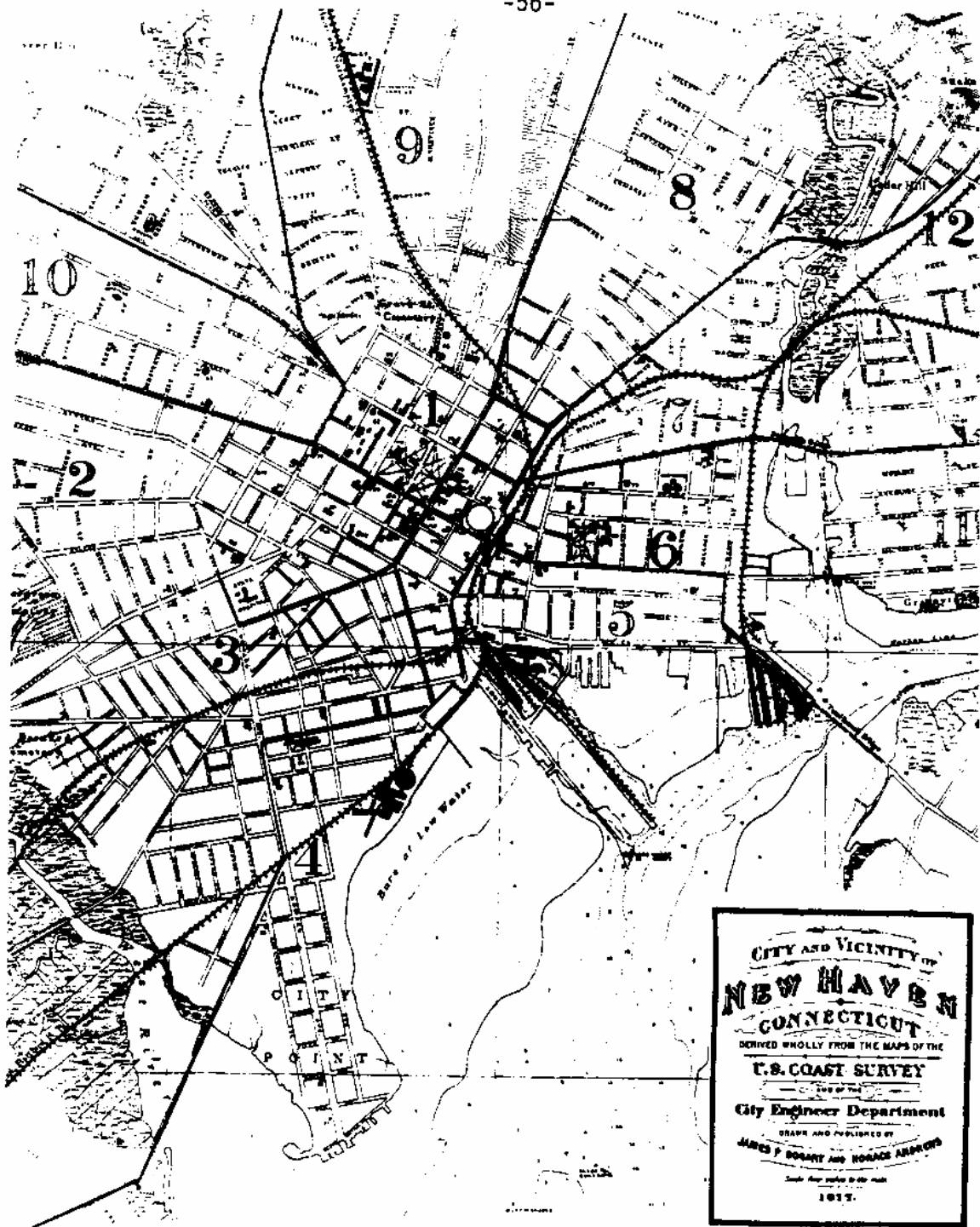
As will be made evident in the sequel, this last phenomenon is tantamount to having introduced a toll/local or interexchange/exchange disparity by the very time when legislation contemplated shifting the federal/state jurisdictional boundary from state borders to the borders of local exchange areas.

Along with other changes in information resources, changing patterns of prices for access to information, such as illustrated by Figures 4.13 to 4.17, are seen as likely to entail pervasive and profound social transformation, just as the advent of mechanized industry and the subsequent rise of the bourgeoisie transformed Western societies once before. Hence such contemporary labels as the "Information Revolution," the "Information Society," or the "Post-Industrial Society." It is generally recognized how significant

changing modes of transportation are in industrial or commercial terms of access to raw materials, energy, labor and markets or in terms of the projection of military power. Figures 4.17(e) and (f) contrast the United States in 1830, when railroad building had barely begun and it took three weeks to go from New York to Chicago, with the United States in 1857, when nearly 30,000 miles of railroads had linked the Eastern seaboard to Chicago and the Mississippi and when Chicago was less than two days' travel from New York. In a similar vein, as illustrated by Figures 4.17(g) to (j), between 1957 and 1977 the Midwest and the Pacific Coast had essentially collapsed together in terms of calling prices from New York City although New York State had ballooned. The 1977 telephonic picture from New York is not unlike the psychological perception depicted in Saul Steinberg's New Yorker cover drawing of the United States as imagined by a midtown-Manhattan dweller.

D. The Local Exchange in Historical Perspective

The beginnings of the telephone were local.³ The technology of 1876 could deliver little more, and entrepreneurs had difficulty enough persuading prospective clients of the usefulness of the new device. The very idea of an "exchange" or "central office" with wires radiating from it to subscribing homes or offices and an operator there to connect a patient's wire to his doctor's was a major innovation. Homes and workplaces were densely compacted around a river landing or railroad station or along the roads leading from these. Community of interest perforce meant geographic proximity for most members of the community. And the practical economics of locating an exchange centrally with wires following the natural routes to customer locations were not too difficult to discern (Figure 4.18). More often than not, all these natural arrangements also



- 1st Central Telephone Office
- ▭ RR Station
- *** RR Lines
- Trolley Lines

Figure 4.18

The Local Exchange Community circa 1880:
New Haven, Connecticut

Source ^{S25}

coincided with the political boundaries of towns, cities, or their subdivisions.

The primary objective of the 19th-century telephone entrepreneur, as of present-day cable television investors, was to get the greatest penetration possible into the densest markets. As is shown in Part 2, this objective retained some cogency even into the 1970's. The arbitrary approximate 2:1 ratio between basic business and basic residential prices (see Part 2) had its genesis at that time and for that marketing reason. The practice, also described in Part 2, of scaling basic service prices to the number of telephones reachable within the community was also principally grounded on a plausible relationship to value of service, rather than on costs. The investment costs per customer tend to be U-shaped, with higher costs at the low end of exchange size roughly related to relatively high fixed costs and to relatively low population densities and with higher costs at the high end of the exchange size scale roughly related to the problems of wiring up very dense central city areas. Differentials between multiple-party and single-party line services could be justified with both cost-based and value-of-service arguments.

Within the frailties of accounting, total local service costs were readily determinable since, present or absent any rate-of-return regulation, they were the only costs around. They were recovered, in total, through pricing decisions based principally on marketing (value-of-service) considerations reflecting managerial and regulatory decisions about what contribution to total cost recovery each service would bear without any service-by-service equating of revenue = price x quantity with the (undetermined) cost of providing individual service.

So long as all service in some area was local, none of the questions of cost allocation addressed in Part 3 could arise; arguments could be joined only when intercity connections began to be made. By the same token, what regulation there was at the beginning was incidental to such local questions as rights-of-way and to such state prerogatives as eminent domain. Thus, while 18th-century legislation established a federal primacy in postal services and post roads,⁴ the local and state roots of telephone service remain reflected in the Communications Act of 1934,⁵ which explicitly reserves regulatory authority for those states that choose to exercise it. The debates of the sixties and seventies over federal/state/local jurisdictions over cable television, like that over the exchange/interexchange, state/federal boundary envisaged in bills before the 96th Congress all reflect the unavoidable local incidences of telecommunications by ground-based technologies, hence the unavoidable de facto if not de jure presence of local political power in the policy-making processing.

Disputes over the fair and efficient incidence of benefits and burdens between exchange and interexchange services began as soon as local exchanges started to be interconnected. A detailed account of the luxuriant variety of historical schemes and arguments has been given by James Sichter in Separations Procedures in the Telephone Industry: The Historical Origins of a Public Policy.⁶ Among these schemes, the so-called board-to-board theory prevailed early in this century before fading away gradually from about 1930 to the mid-forties. The idea is sketched in Figure 4.19. A toll switchboard, connected to other toll switchboards in the toll or interexchange network, provided access to that long-distance network. Under board-to-board theory, all costs of toll boards and of facilities between toll boards were toll

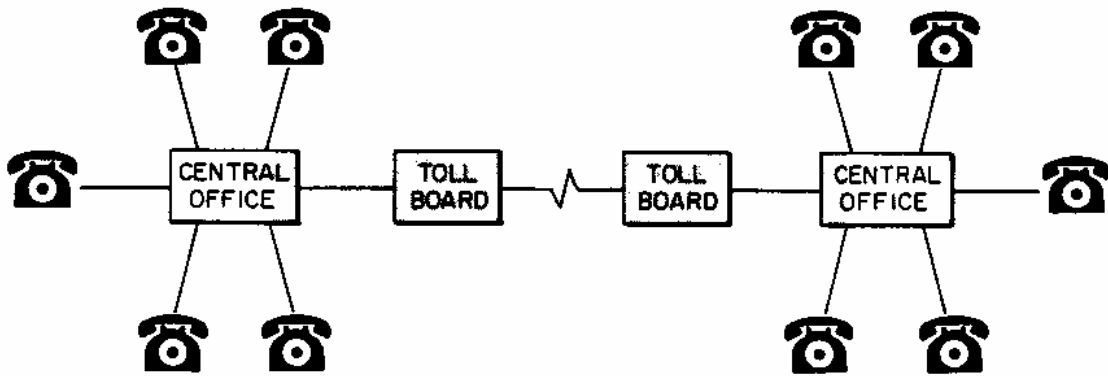


Figure 4.19

"Board-to-Board" Toll Linkages Among
Local Exchanges (Central Offices)

costs to be recovered through pricing of toll services along with a modest amount of connecting equipment at each local central office. The toll board itself was viewed as just another station connected to the local central office, to be reached by a local call as a prelude to having a toll operator establish a connection to a distant exchange.

A detailed history of the erosion of the board-to-board concept need not detain us here. As is evident from Part 3, from the forties to 1980 a station-to-station "principle" has prevailed, whereby common local facilities are seen as producing both local and long-distance services as two product lines. The Ozark Plan for allocating some local plant costs to the interstate cost pool was the latest of a series of plans aimed in part at responding to judicial demands for "proper" allocation of costs to the respective state (local and state toll) and federal (interstate toll) jurisdictions, while responsive also to the political and business climate of the times.

As Lee Benson has pointed out in his account of swings between laissez-faire and regulation in the railroad industry, such changes have "depended more upon the state of relations between railroads and their antagonists, and the balance of political power, than upon dogma."⁷

An ascendant contemporary view, reflected inter alia in legislation before the 96th Congress, harks back to board-to-board dogma in asserting that local costs, as transferred into the interstate toll cost pool by the Ozark Plan, have no place in the costing--or the pricing--of any interexchange (state or interstate) services per se. Instead, when warranted, an access charge should be paid for such local facilities as may be used at either end or both of an interexchange connection. Under

the historical board-to-board process, that access charge was the price of a local call to the toll board. In contemporary terms, the agreements on Exchange Network Facilities for Interstate Access (ENFIA) of 1979⁸ represent one concrete approach to the determination of pricing certain limited types of access from interexchange to exchange distribution facilities.

Whether couched in terms of pricing within pools of costs allocated by jurisdictional separations processes, or in terms of economically efficient pricing for access, the issue remains what it has been since exchanges began to be interconnected: how much is to be paid by which users of what exchange services and how much by which users of what interexchange services. Specifically, in terms of any transition from the Ozark Plan to any other separations plan, or from separations to recovery of local costs of interexchange services through access charges, what dislocation, if any, might be expected from changes? Alternatively, what advantages might be foregone by keeping the status quo? What compromises suggest themselves? These questions surrounded the legislative debates in the 96th Congress. In a rapidly changing social, economic and technological context, they are bound to remain unsettled and subject to continuing debate. So, indeed, is the very notion of a boundary between exchange and interexchange services.

E. Contemporary Local Exchange Price Structures

In Part 3 we traced the determination of the interstate toll cost pool, hence of the residual state cost pools. In Figure 4.2 we noted

considerable state-by-state variation, as from Nevada's 62% interstate toll costs/38% total state costs to Michigan's 18% interstate toll costs/82% total state cost proportions. In Section 4-A, we summarized the considerable definitional latitude inherent in the aggregate of these allocations.

We have also noted considerable state-by-state variation in how total state costs are recovered through diverse balances of state toll and local service revenues (Figure 4.2(1), (m)). These various balances are not, in the first instance, struck through the application of some costing formula. They are instead the contemporary manifestation of a continued application, by the traditional telecommunications industry and the state regulators, of the local service pricing principles outlined in Section 4-D in the context of the changing toll pricing patterns sketched in Sections 4-B and 4-C, and in the increasingly competitive interstate environment⁹ that no longer permits telephone company managements to accept with some equanimity the historic trend in increased interstate allocation of local costs (Figures 3.2, 3.3; Tables 3.8, 3.25).

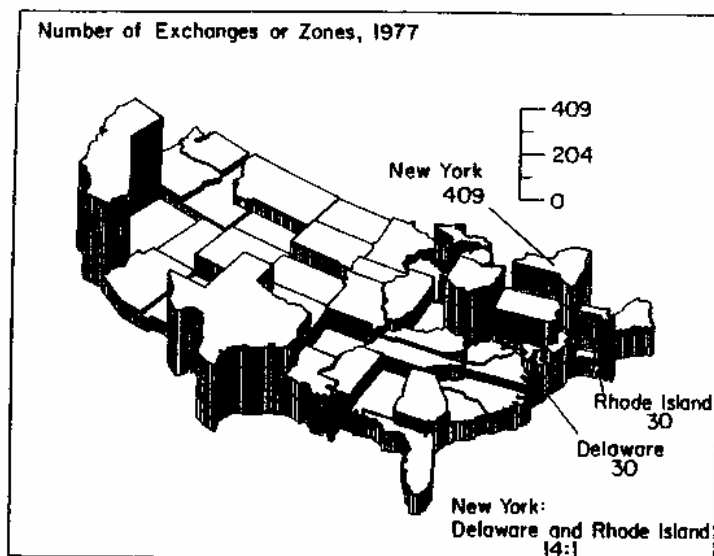
What is "local" nowadays is also subject to considerable state-by-state variation. That "local" is an ambiguous term would scarcely have occurred either to the New Haven District Telephone Company in 1878 or to the 50 subscribers to the New Haven exchange--11 residences, 3 physicians, 2 dentists, 20 "stores, factories, etc.," 4 meat and fish markets, 2 hack and boarding stables, and 8 miscellaneous locations including the police and the post office¹⁰--surrounding the obviously "central" office of Figure 4.18. Today, as we shall see, an "exchange" or "local service area" is an abstraction, still vaguely related if no longer

limited to contiguous geographic areas, but defined in terms of service and pricing more than in geographic terms. A central office may or may not be central or a distinct office: it is whatever serves all of the (less than 10,000) telephones whose 4-digit numbers are appended to a common 3-digit "central office code" to make up such familiar combinations as 555-1212, to pick an example whose association with any specific location is particularly tenuous.

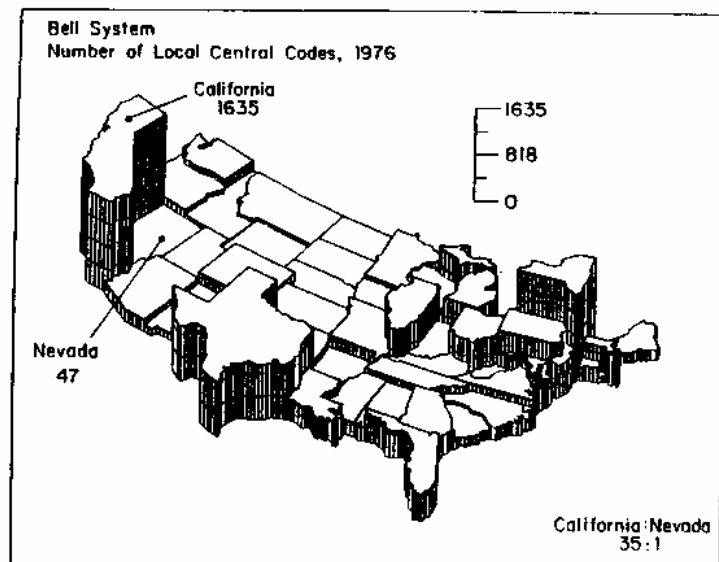
In early 1980, the Boston Central Exchange encompassed 38 distinct central office codes. As will be seen, there is wide state-by-state variability in the size and topology of central exchange areas and in the number of central office codes within them. As for total numbers, Figure 4.20 (Table 4.9) indicates that there are about 7,000 local exchanges or zones served by the Bell System in the contiguous United States, with over 17,000 "central offices" among them. There are, in addition, about 11,000 local exchanges served by the Independent companies.

Detailed exchange rate structures vary state-by-state. However, the basic principles outlined in Section 4-D and exemplified in the summary presentation of New Hampshire basic service rates shown in Table 4.10 applied in all states in 1976.

As early as 1900, two major patterns of basic local service pricing--flat rate and measured service--had been established. Flat rate service, offering an unlimited amount of untimed calling for a fixed monthly fee, generally applied to exchanges serving less than 50,000 telephones. In exchanges serving more than 50,000 telephones, measured service was provided for a basic monthly charge that might or might not include a message unit allowance (MUA) for calls without additional charges, and a unit charge



(a)



(b)

Figure 4.20

1977 Number of Exchanges or Zones and
1976 Number of Bell System Local Central Codes by State

Source^{S26}

		Ranked	
Exchanges or Zones	Local Central Codes	Exchanges or Zones	Local Central Codes
AL	91	NY 409	CA 1635
AZ	74	CA 395	NY 1552
AR	112	OH 385	TX 971
CA	395	TX 297	PA 828
CO	148	PA 285	IL 778
CT	86	MI 269	MI 742
DE	30	MA 259	OH 704
FL	87	IL 218	NJ 579
GA	143	MO 202	MA 542
ID	69	OK 189	FL 492
IL	218	NJ 181	MD 470
IN	142	KS 180	MO 382
IA	145	LA 176	LA 380
KS	180	KY 171	VA 353
KY	171	MD 165	GA 351
LA	176	MS 163	TN 349
ME	128	TN 156	CO 330
MD	165	CO 148	MN 319
MA	259	IA 145	IN 297
MI	269	GA 143	KY 294
MN	123	IN 142	OK 293
MS	163	WV 135	WA 283
MO	202	ME 128	KS 277
MT	112	VA 127	WI 275
NE	95	MN 123	CT 265
NV	31	NH 118	MS 260
NH	118	AR 112	IA 253
NJ	181	MT 112	AL 241
NM	57	SD 106	AZ 220
NY	409	ND 106	NC 220
NC	92	VT 102	WV 188
ND	106	WA 99	OR 187
OH	385	OR 92	ME 181
OK	189	NC 92	AR 177
OR	92	AL 91	SC 168
PA	285	FL 87	NE 159
RI	30	WI 87	MT 154
SC	85	CT 86	SD 152
SD	106	SC 85	NH 150
TN	156	AZ 74	ND 150
TX	297	ID 69	UT 131
UT	57	UT 57	NM 127
VT	102	NM 57	VT 116
VA	127	WY 52	ID 112
WA	99	NE 31	RI 97
WV	135	NV 31	WY 91
WI	87	DE 30	DE 61
WY	52	RI 30	NV 47
		Total 6997	Total 17383

Table 4.9

1977 Number of Exchanges or Zones and
1976 Number of Bell System Local Central Codes by State

Source^{S27}

for additional message units (AMU) beyond the allowance, i.e. usage sensitive pricing. These basic patterns are evident in the main headings of Tables 4.10(a) and 4.10(b).

There are wide variations in the extent to which these two forms of pricing are currently offered or not, optional or not. In New York, for example, flat rate business service is nowhere available, but it is available everywhere in New Hampshire and in California outside the largest metropolitan areas. As of 1975-7, 80-90% of residences and 55% of businesses were on flat rate basic service, the rest on usage sensitive pricing. Of 144 billion annual local messages (about 15 times the volume of toll calls), 85% were unmeasured in 1975, when basic annual exchange revenues were \$6.3 billion and only \$1.5 billion in additional message units.¹¹

Nationwide, on the average, the business/residence basic rate ratio for flat-rate service was 1.9 in 1950, 2.2 in 1955, 2.3 in 1962 and 2.3 in 1970.¹² Table 4.10 shows that in New Hampshire that historic 2:1 business/residence ratio applied in 1976 to the smallest exchanges, with a nearly 3:1 ratio applying to the largest. The historic scaling of rates to the number of reachable telephones is evident in the variation of rates across rate groups in Table 4.10.

Ad hoc marketing and regulatory judgments are implied by the differential treatment of Manchester and Nashua, the former left in its rate group, the latter treated like exchanges half its size, with a 9% reduction over the standard group rate.

Comparing Table 4.10(b) with Table 4.10(a) shows that New Hampshire's basic service rates remained unchanged between 1976 and 1978, a period with

an average annual inflation rate of 6.6%. This apparent stability is of considerable psychological hence political significance, since basic rates are the most visible to politicians, journalists and the general public. Assessment of its economic significance must be deferred. In 1976 businesses already widely availed themselves of a variety of services beyond basic services, including so-called "vertical services" such as key-sets with multiple lines, call holding and forwarding, etc., along with toll services. Even then, therefore, basic rates provided only a partial picture of business rates. Households are proportionately less significant clients for vertical services but, as will be detailed in Part 5, there is a growing tendency to "unbundle" service pricing, as evidenced by increasing installation charges and other elements of total service prices. As unbundling and usage-sensitive pricing responses to increasing competition and other changes become more prevalent, the economic, if not the psychological, significance of the basic prices will diminish. These matters are addressed in Part 5.

The use of the terms "local service area" and "zone" in Table 4.10 reflects the passing, with changing dwelling and industrial location patterns and changing technology, of the simple congruence of community of interest, municipality, and central office/exchange sketched in Section 4-D.

Where, at the turn of the century, a large city and a neighboring small town might each have fit the description of Section 4-D, by the 1970's the latter might have become a suburb of the former and share with it shopping and other communal facilities at some mall located near an

Telephone Rates in Effect June 30, 1976

Telephones in Local Service Area ^a			No. of ^{aa} Exch. C	Flat Rate Main Station Service								Message Rate Main Station Service							
Over A	Thru B	Business Service				Residence Service				Bus. Ind.			Res. Ind.			Res. 2-Pty.			
		Ind. D		2-Pty. E	4-Pty. F	Rural G	Ind. H	2-Pty. I	4-Pty. J	Rural K	Min. L	MJA M	AMU N	Min. O	MJA P	AMU Q	Min. R	MJA S	AMU T
1. 0	800	2	\$14.00	\$10.90	X	X	\$ 7.00	\$5.65	\$3.80	X	X	X	X	X	X				
2. 800	1,800	3	16.00	12.80	X	X	7.40	5.90	3.85	X	X	X	X	X	X				
3. 1,800	3,700	16	18.25	14.70	X	X	8.10	6.45	4.20	X	X	X	X	X	X				
4. 3,700	7,600	28	20.50	16.60	X	X	8.80	7.00	4.55	X	X	X	X	X	X				SERVICE NOT OFFERED
5. 7,600	19,000	34	23.00	X	X	X	9.50	7.55	4.90	X	\$13.25	85	10¢						
6. 19,000	60,000	21	25.50	X	X	X	10.20	8.10	5.25	X	14.00	85	10¢						
7. 60,000	200,000	6 [#]	28.00	X	X	X	10.90	8.65	5.60	X	14.75	85	10¢						
8.		110																	

Exchanges Serving Cities of 50,000 Population or More (1970 Census)

Exchanges	Tels. in L.S.A.#	Ind. D	2-Pty. E	4-Pty. F	Rural G	Ind. H	2-Pty. I	4-Pty. J	Rural K	Min. L	MJA M	AMU N	Min. O	MJA P	AMU Q	Min. R	MJA S	AMU T	
9. Concord	(a) 45,506	\$25.50	X	X	X	\$10.20	\$8.10	\$5.25	X	\$14.00	85	10¢							SERVICE NOT OFFERED
10. Manchester	112,666	28.00	X	X	X	10.90	8.65	5.60	X	14.75	85	10¢							
11. Nashua	115,180	25.50	X	X	X	10.20	8.10	5.25	X	14.00	85	10¢							

- X Service not offered.
- (a) Concord was less than 50,000 population but is the State capital.
- ^a Total terminals (main stations and P.B.X. trunks) as of June 30, 1976.
- ^{aa} Number of exchanges as of June 30, 1976.
- [#] Total telephones as of April 30, 1976.
- [#] In one exchange the monthly base rates include a premium charge for non-contiguous Extended Local Service.

- Note 1. In one or more groups there are exchanges in which one or more of the group rates are not offered.
- Note 2. The present Statewide grouping was designed as an objective of the Company and was accepted by the regulatory commission.
- Note 3. The Commission's order authorized regrouping of exchanges when through natural growth or loss of telephones, for two consecutive annual study periods, they move out of their established terminal range.

In Nashua even though the number of telephones is 115,180, the flat rate charges are the same as those for areas in the 19,000 - 60,000 telephone range.

Manchester, which has 112,666 telephones, is charged a higher flat rate than Nashua. Also in one of the Manchester exchanges "the monthly base rates include a premium charge for non-contiguous Extended Local Service."

(a)

Table 4.10

Monthly Exchange Service Telephone Rates:
New Hampshire, New England Telephone and Telegraph Company

Source^{S28}

Telephone Rates in Effect June 30, 1978

RATE GROUP	UPPER LIMIT OF STATIONS	NO OF EXCH OR ZONE ^a	FLAT RATE MAIN STATION SERVICE						MESSAGE RATE MAIN STATION SERVICE							
			BUSINESS SERVICE			RESIDENCE SERVICE			BUSINESS IND		RESIDENCE IND		RES 2-PTY			
			IND	2-PTY	4-PTY RURAL	IND	2-PTY	4-PTY RURAL	MIN	MIA	AMU	MIN	MIA	AMU	MIN	MIA
A	800	2	14.00	10.90			7.00	5.65	3.80							
B	1,800	2	16.00	12.80			7.40	5.90	3.85							
C	3,700	18	18.25	14.70			8.10	6.45	4.20							
D	7,600	30	20.50	16.60			8.80	7.00	4.55							
E	19,000	37	23.00				9.50	7.55	4.90	13.25	85	.1000				
F	60,000	22	25.50				10.20	8.10	5.25	14.00	85	.1000				
G	200,000	7	28.00				10.90	8.65	5.60	14.75	85	.1000				

Exchanges Serving Principal Cities

Exchange	Rate Group
Concord	F
Manchester	G
Nashua	F

(a) Number of exchanges as of December 31, 1977.

(b)

Table 4.10 (continued)

interstate highway, hence a focus also for other neighboring suburbs. What physical switching center any of these locations might now be served from depends on the economics of stringing wires and locating switches, while who might want to talk to whom depends on not necessarily related affinities.

Consequently, the technical concept of a central office, part of a switching center radiating wires to neighboring phones, has become divorced from the concept of exchange, by now an abstraction more closely related to concepts of telephone company price administration than to concrete physical plant and more and more vaguely correlated to concepts of community of interest. Thus, a contemporary "local" call may travel over a collection of facilities that, in 19th century terms, would have constituted a substantial interexchange or toll network. Parenthetically, we note that, along with other factors, such as the introduction of direct distance dialing, which requires "toll"-like facilities at the local central office level, this vanishing of the simplicities of Section 4-D contributes to the flexibility of ties between facility costs and costs of services.

That "local service area" denotes a pricing abstraction rather than concrete technology or geography is evident from its definition as "the area within which a patron may make telephone calls without a toll charge".¹³ This definition could encompass the whole planet and beyond if the price were right. Table 4.10(a) makes it plain, in addition, that local need not mean "contiguous." Table 4.11 presents some other definitions that will be illustrated as seen from Manhattan, whose usage-sensitive "extended area" service rates are categorized in the box of Table 4.11(c).

Figure 4.21 locates Manhattan in its geographical context. Calls to adjacent Connecticut and New Jersey locations are interstate toll calls.

Primary Calling Area

"Primary calling area" is a term used in metropolitan areas to designate the flat rate area for flat rate service and the one-message-unit area for message rate service.

Extended Area Service

Extended area service is telephone service which includes service beyond a subscriber's exchange or zone at exchange rates rather than toll rates. The term also applies to service applicable in the larger of two optional primary calling areas within a metropolitan service area. Extended area service is usually non-optional, but it may be optional in certain exchanges. In the great majority of exchanges non-optional extended area service is furnished at group rates and the primary calling area is identical with the local service area. In large metropolitan areas the primary calling area is frequently smaller than the local service area, and in these cases telephones in both the primary calling area and the local service area are given, as well as the rate for a call beyond the primary calling area.

Normal Area

The term "normal area" is used where the subscriber is offered an option of two local service areas or two primary calling areas. The smaller of the two is called the "normal area" and the larger the "extended area."

The term "extended area" is generally used, but different companies use different terms for the service in the smaller area, e.g. "normal area service," "local service," "local area service," and "normal local service." For purposes of uniformity the term "normal area" or "normal area service" is used herein.

(a)

Local Service Area

The area within which a patron may make telephone calls without a toll charge.

Exchange

The term "exchange" denotes a unit established by a telephone company for the administration of communication service in a specified area which usually embraces a city, town or village and its environs. It consists of one or more central office districts together with the associated plant used in furnishing communication service within that area. A call between any two points within the area is a local call without toll charges. A local tariff or section of a local tariff is usually filed for each exchange.

Large metropolitan areas are subdivided for rate purposes into exchanges or zones, or divisions known by other terms such as rate areas or central office districts. It is significant for certain rate purposes whether the subdivisions are designated exchanges instead of zones, areas, or districts because a call beyond the primary calling area to another zone, area, or district that is within the same exchange will always take exchange rates in the form of message unit charges or interzone message charges rather than toll rates. A call beyond the primary calling area to another exchange will take toll rates in some areas, but in other areas exchange rates in the form of message unit or interzone message charges apply.

Exchange Area

The term "exchange area" denotes the territory served by an exchange.

(b)

Extended Area Service Rates

There are several types of rates for extended area service. Some are cited below:

1. Optional rates which give an unlimited number of calls throughout a larger local service area. The optional flat and measured rates in the Chicago area of the Illinois Bell Telephone Company are examples.
2. A flat rate for an unlimited number of calls in the primary calling area and with message unit charges applying on all calls beyond this area to the balance of the local service area. The rates for flat rate service in Little Rock, Arkansas with interzone message charges applying on calls beyond the primary calling area are examples.
3. A rate for flat and measured service. For the minimum charge the subscriber has unlimited calls in his primary calling area and a message unit allowance on calls beyond this area to the balance of the local service area. Charges for message units in excess of the allowance apply on the latter calls in excess of the allowance. The rates for individual line residence service in the Philadelphia and Pittsburgh exchanges are examples.
4. A measured rate with the message unit allowance applying only to calls within the primary calling area. Interzone message charges apply on calls beyond this area to the balance of the local service area. The rates for measured service in Tulsa are examples.
5. A measured rate with the one message unit area (i.e. the primary calling area) being smaller than the local service area but with the message unit allowance and the additional message unit charge applicable throughout the local service area. The rates for measured service in the New York Metropolitan Exchange are examples.

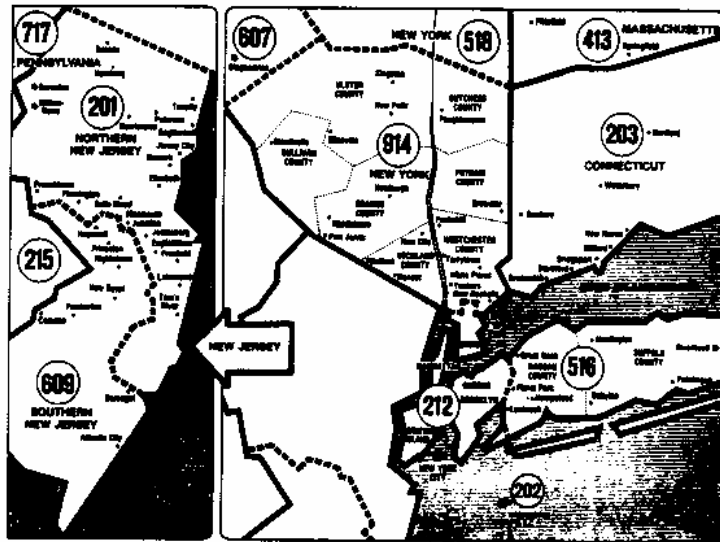
In some areas rates of two or more types may be offered.

(c)

Table 4.11 (continued)

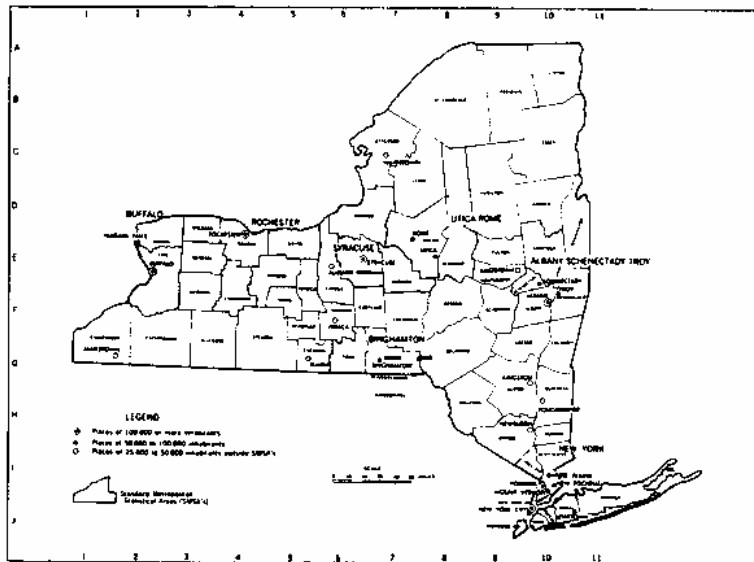
Local Service Definitions

Source^{S29}



Telephone Area Codes for
New York City and Adjacent Counties and States

(a)



New York Counties
Standard Metropolitan Statistical Areas

(b)

Figure 4.21

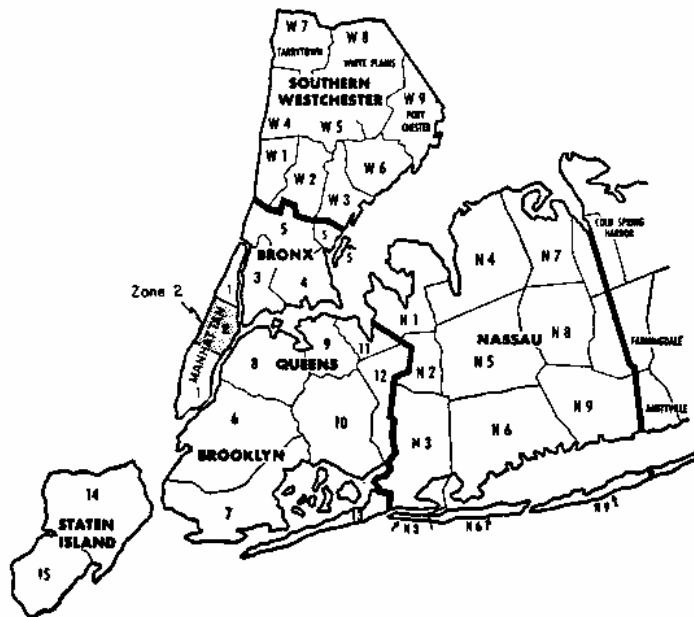
New York Telephone Area Codes and Standard Metropolitan Statistical Areas

Source^{S30}

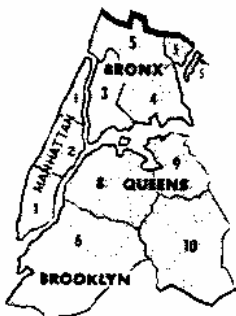
Some calls outside the 212 Area Code are local calls, others are state toll calls, depending on whether or not the called locations are within the local service area. The entire local service area seen from Manhattan in 1977-78 is depicted in Figure 4.22(a). Supposing your central office is BUTterfield-8 (288), you were in Zone 2, the zone shaded in Figure 4.22(a).

Flat rate service was not offered for either businesses or residences, but you could choose either timed or message-unit service (MUS). MUS rates for an initial period are shown in Table 4.12. Table 4.13 shows overtime rates applicable, under certain circumstances, even to MUS. For either timed or message-unit service, the primary calling area within the local service area was that shown in Figure 4.22(b). Figure 4.22(b) depicts those zones that are listed in Table 4.12 as within one message unit from Zone 2, namely the zones within the one-message-unit-area described in Table 4.11(c) as defining a primary calling area. The portions of Figure 4.22(a) not included in Figure 4.22(b) are where Extended Area Service applied. The local service area did not coincide with the New York (City) Standard Metropolitan Statistical Area (Figure 4.21(b)); nor did the latter coincide with the New York-Northern New Jersey Metropolitan concentration which crosses a state boundary.

Your basic monthly residential service charge of \$7.42 entitled you to 50 message units without additional charge. Any message units beyond that were priced at 8.2¢ each during the day, 6¢ in the evening and 4¢ at night. If you had opted for message unit service, any call from Manhattan Zone 2 to a point within the primary calling area of Figure 4.22(b) would use up one message unit, no matter what its actual duration. This differentiated the message unit service from timed service.

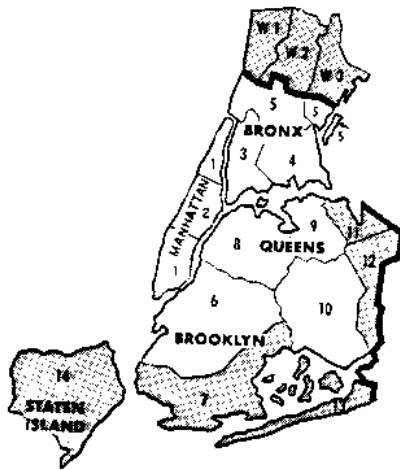


(a)



(b)

1 message unit;
no overtime charge
(unlimited duration)



(c)

2 message units for
initial 3 minutes;
1 message unit for
each additional 2 minutes



(d)

3 message units for
initial 3 minutes;
1 message unit for
each additional 1 minute

Figure 4.22

Manhattan-Centered (Zone 2) Local Area Service

Source^{S31}



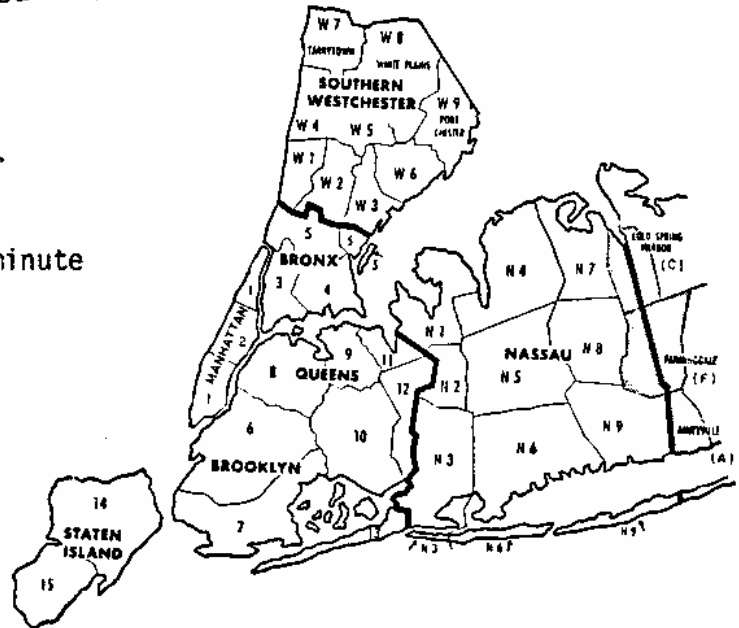
(e)

4 message units for
initial 3 minutes;
1 message unit for
each additional 1 minute



(f)

5 message units for
initial 3 minutes;
1 message unit for
each additional 1 minute



(g)

6 message units for
initial 3 minutes;
2 message units for
each additional 1 minute

Figure 4.22 (continued)

Find your zone here:	Find the zone you're calling here:																																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	N1	N2	N3	N4	N5	N6	N7	N8	N9	W1	W2	W3	W4	W5	W6	W7	W8	W9	A	C
1	1	1	1	1	2	1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	3	3	3	4	4	4	5	5	5	6	6	6
2	1	1	1	1	1	1	2	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	2	2	2	3	3	3	4	4	4	6	6	6
3	1	1	1	1	1	1	2	1	1	2	2	2	3	3	3	3	3	3	4	4	4	4	5	2	2	2	3	3	3	4	4	4	6	5	6

Table 4.12

Message Unit Charges for the Initial Period for Manhattan, 1977

Source^{S32}

If your initial message unit charge is:	Your initial period is:	If you talk longer than the initial period, the overtime charge is:
1 mess. unit	Unlimited	None
2 mess. units	3 min.	1 mess. unit for each additional 2 min. or fraction
3, 4 or 5 mess. units	3 min.	1 mess. unit for each additional 1 min. or fraction
6 mess. units	3 min.	2 mess. unit for each additional 1 min. or fraction

Table 4.13

Overtime Charges for Manhattan, 1977

Source^{S33}

This folder will help you read your Local Usage detail list.

At the top of your sheet there are a number of abbreviations. Reading left to right . . .

OCO LINE (Your telephone number). The first three digits are your central office. The last four numbers—your number.

MODY (Date of call). This is the month and day for each call. If, for instance, the call was placed on "0223" the date is February (the second "02" month) 23rd. If the call was placed on "1119" it means November 19th.

HR/M (Hours and Minutes). This is the time each call was connected. The 24 hour clock is used. For instance, "0854" is 8:54 A.M. A call starting at "1954" would be one that started at 7:54 P.M.

NPA CO LINE (The number you called). If the equipment in your central office is able to print the numbers you called they are shown here.

NPA. The area code, if it's other than your own.

CO LINE. The number you reached.

Note: The equipment cannot print single message unit or Primary Area Call numbers if the call is 5 minutes or less.

ELAPM/S (Elapsed time). This is the time your phone was in use on the call.

(M = minutes, S = seconds)

I (Initial Period Charge). This is the number of message units for the *initial period* for each call, not including any overtime.

MUS (Message units). These are total message units for a call including overtime. For single message unit calls (Primary Area calls), the figure shown here is the same as the one under the "I" column.

C (Class). The letters show the rate in effect when the call was placed — Day (D), Evening (E), or Night (N). See time periods on back cover.

\$ AMT (Cost of call). The dollar amounts for Primary Area calls over five minutes and all Extended Area calls are shown in this column. (If you have untimed service, refer to this column only for charges for Extended Area calls.)

OR (Type). For our office use, this indicates the type of equipment that recorded your call.

A summary appears below your list of calls. It shows your calls in each class (Day, Evening and Night) during your billing month. Reading from left to right, here is what you'll find:

PAC-NOVT (Primary Area or single message unit calls five minutes and less). These calls do not appear in the detail above. They are the number of calls five minutes or less in length that you made to telephones in your own exchange or nearby exchanges. To the right of the number of calls is the dollar amount.

PAC-WOVT (Primary Area or single message unit calls over five minutes). These calls appear in the detail above. They are the number of calls over five minutes that you made to telephones in your own exchange or nearby exchanges. To the right of the number of calls is the dollar amount.

EAC-NOVT (Extended Area calls without overtime). These calls appear in the detail above. They are calls made to exchanges outside your Primary Calling Area, but not toll calls. The number of calls appears on the left side and the number of message units on the right side.

EAC-WOVT (Extended Area calls with overtime). These calls appear in the detail above. They are calls made to exchanges outside your Primary Calling Area, but not toll calls. The number of calls appears on the left side and the number of message units on the right side.

TOT MUS (Total message units). The numbers show total message units by class (D, E, N) for Primary Area and Extended Area calls. In computing charges, this column applies only to customers with untimed service. The totals are the sum of the numbers on the left side under PAC-NOVT and PAC-WOVT columns and the numbers on the right side under EAC-NOVT and EAC-WOVT columns.

Untimed Service

To get the total cost of your Primary and Extended Area calls, multiply the number in the TOT MUS column for each class by the rate in effect.*

*See rate schedules on the following page.

Time periods (Class)

Day	8 AM to 9 PM* weekdays
Evening	9 PM to 11 PM* weekdays 8 AM to 11 PM* weekends
Night	11 PM to 8 AM* weekdays and weekends

*Up to but not including

Holidays: The Evening rate applies 8 AM to 11 PM on five major holidays: Christmas, New Year's Day, Independence Day, Labor Day and Thanksgiving. From 11 PM, the Night rate applies.

Rate Schedules

Untimed Service (charged in message units)

Day	8.2¢
Evening	6.0¢
Night	4.0¢

Directory Assistance. The abbreviations from left to right under "Directory Assistance" up to CO are the same as those for local calls, described above. Shown here are the Directory Assistance requests and credits covered by the Charge Plan.

(If the equipment in your central office is able to print the numbers you called, under NPA CO you'll find the Area Code — if it's different than your own — and central office number of the Directory Assistance Bureau you reached.)

Next to "Total Requests" is "Total Credits" which shows the number of Operator credits given for requests to Directory Assistance such as a credit for a request for an unlisted number. (See back of your phone bill). The Statement of Charges and Credits for Calls shows the amount of Directory Assistance credit you receive or the number of your billable requests.

Table 4.14

Instructions for Reading Manhattan Telephone Bills

Source S34

For calls from Zone 2 to points outside the primary calling area of Figure 4.22(b) but still within the local calling area of Figure 4.22(a) time nonetheless was a factor in MUS pricing. The pricing structure associated with such calls into the extended area is defined in Table 4.13 and depicted in Figure 4.22(c)-(g). How to decode a monthly bill for local service is described in Table 4.14.

What happens in this case at the interface between local area service and toll service is illustrated in Table 4.15.

In contrast to Manhattan, where no flat rate service was offered at all in 1977-78, Boston residents could choose, in 1978, between a basic usage-sensitive service, and a variety of flat rate services. Figure 4.23 shows the municipalities in the vicinity of Boston. Shaded are the Boston Central Exchange and the town of Reading, at the northern extreme of the Boston Metropolitan Local Service Area. Figure 4.24(a)-(c) shows the pricing patterns as they applied in 1978 to a residence within the Boston Central Exchange for calls to points within the primary calling area or the extended area within the Boston Metropolitan Area under the various types of available basic service. Figure 4.24(d)-(g) does the same for a residence in Reading.

To the west of Boston, the town of Lincoln lies just inside the Boston Metropolitan Area boundary. Concord lies just outside (Figure 4.23). Table 4.16 displays a rate disparity which, by analogy to the (interstate/state) toll rate disparity described in Section 4-B, we shall term the interexchange/exchange rate disparity. From a residence in the Boston Central Exchange calling a location just inside Concord, a toll call, cost at least 35% more during the day than calling a location just inside

Manhattan Zone 2 to:	3 min.	6 min.	Type of Call
Farmingdale	\$.49	\$.74	Local EAS
Deer Park	.95	1.82	v. Intrastate Toll
Zone 2	.08	.08	Contiguous: Local (PCA)
Jersey City, NJ	.28	.46	v. New Jersey Interstate
Zone W9	.33	.57	Non-Contiguous: Local EAS
Greenwich, CT	.57	.99	v. Interstate

Table 4.15

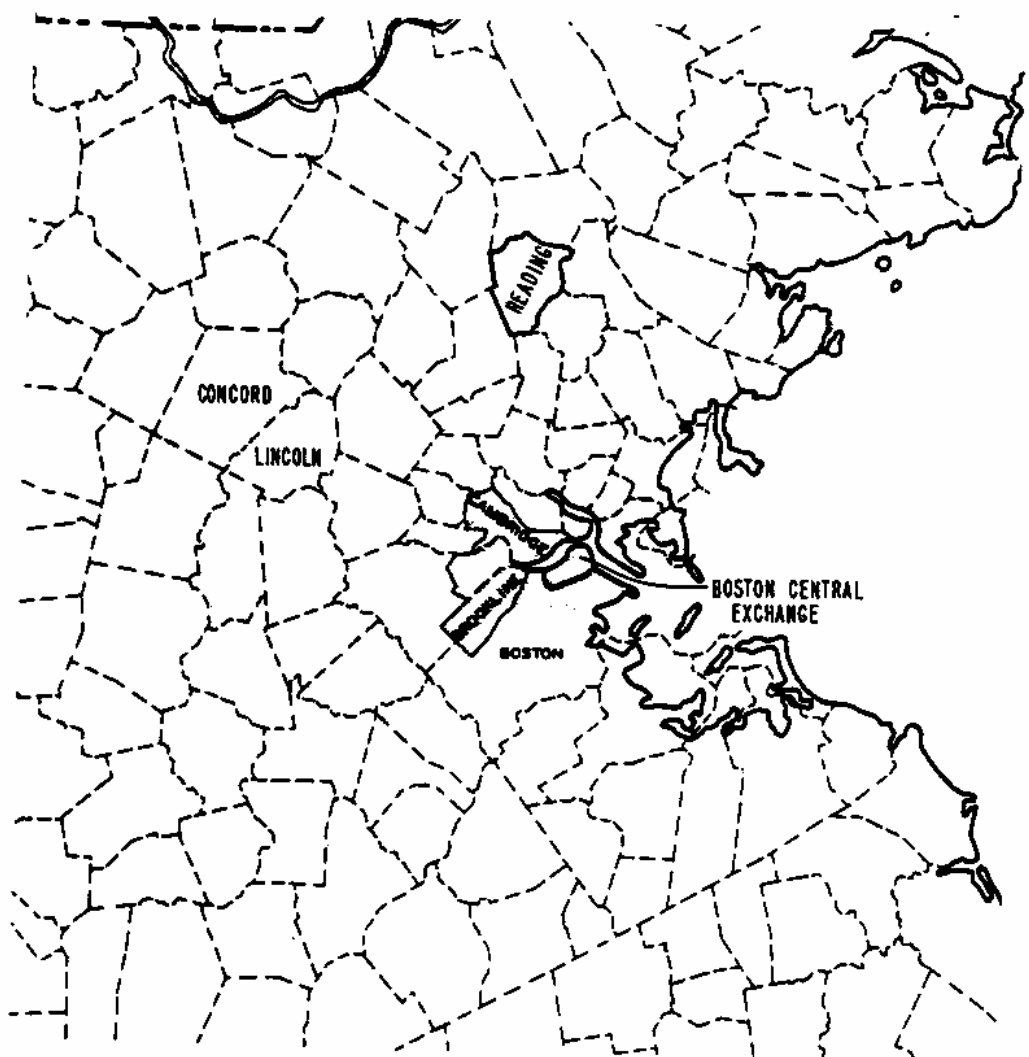
The Manhattan Local/Toll Interface:
3-Minute, Customer Dialed, Daytime Phone Call, 1977



Figure 4.23

The Boston Metropolitan Area

Source^{S35}



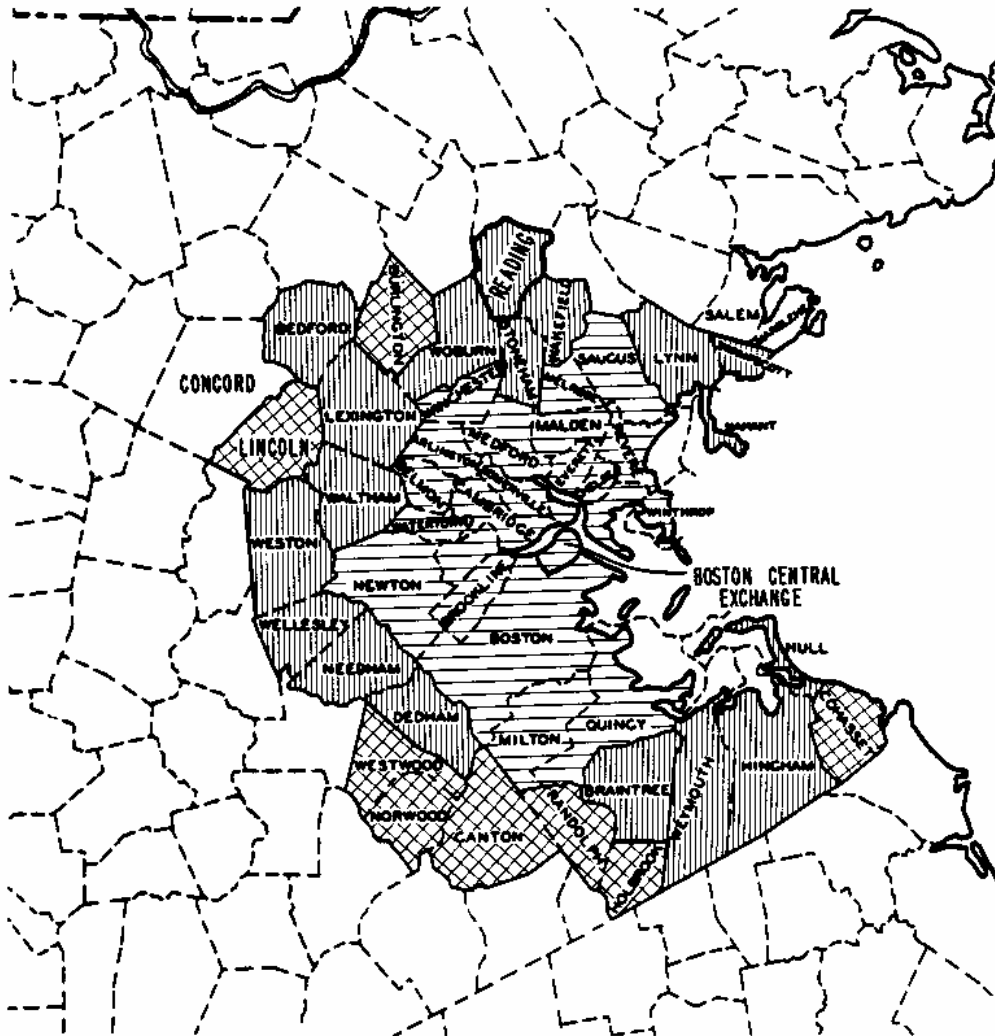
 Unlimited calling




Boston Central Exchange: Unlimited Local Service
(a)

Figure 4.24

Boston Central Exchange and Reading:
Residential Services, 1979

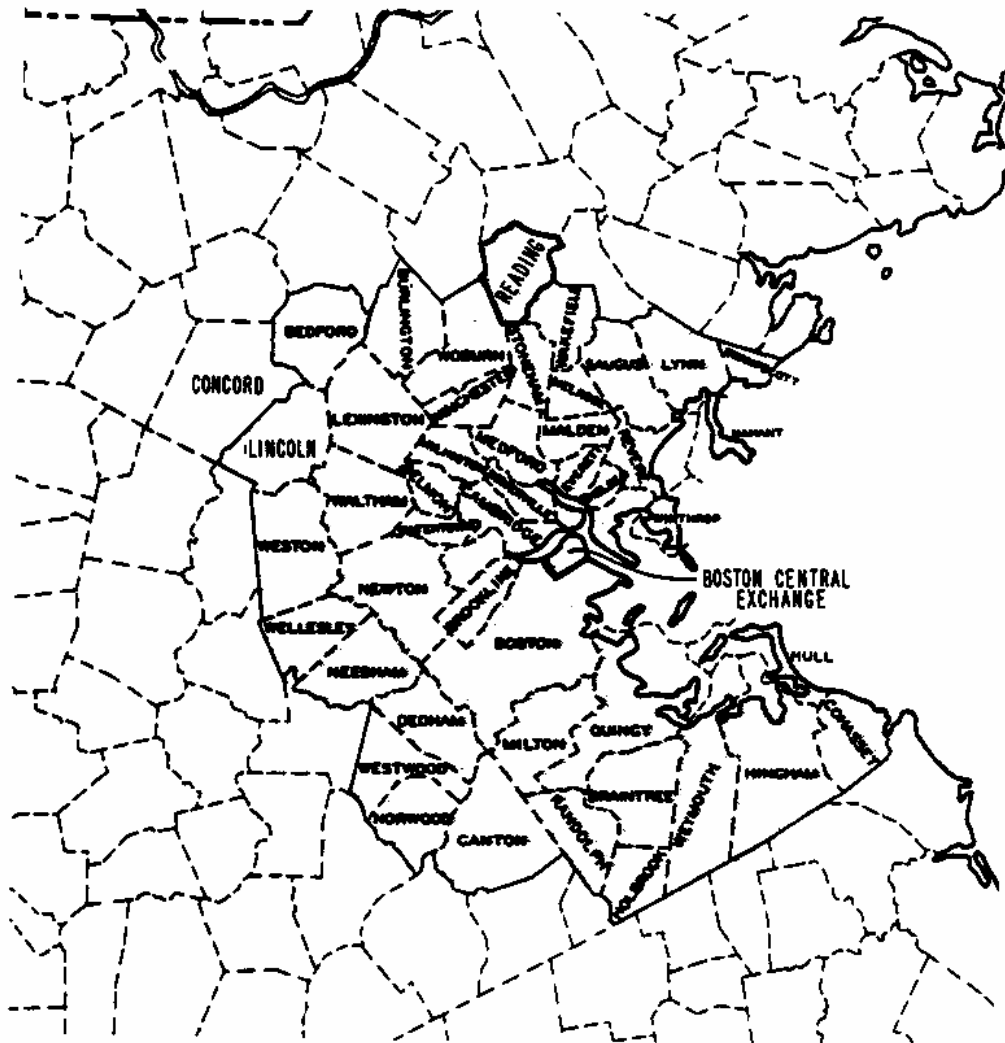
Source^{S36}



-  1 message unit for each 5 minutes
-  2 message units for initial 5 minutes;
1 message unit for each additional 3 minutes
-  3 message units for initial 3 minutes;
1 message unit for each additional minute

Boston Central Exchange: Measured Service
(b)

Figure 4.24 (continued)

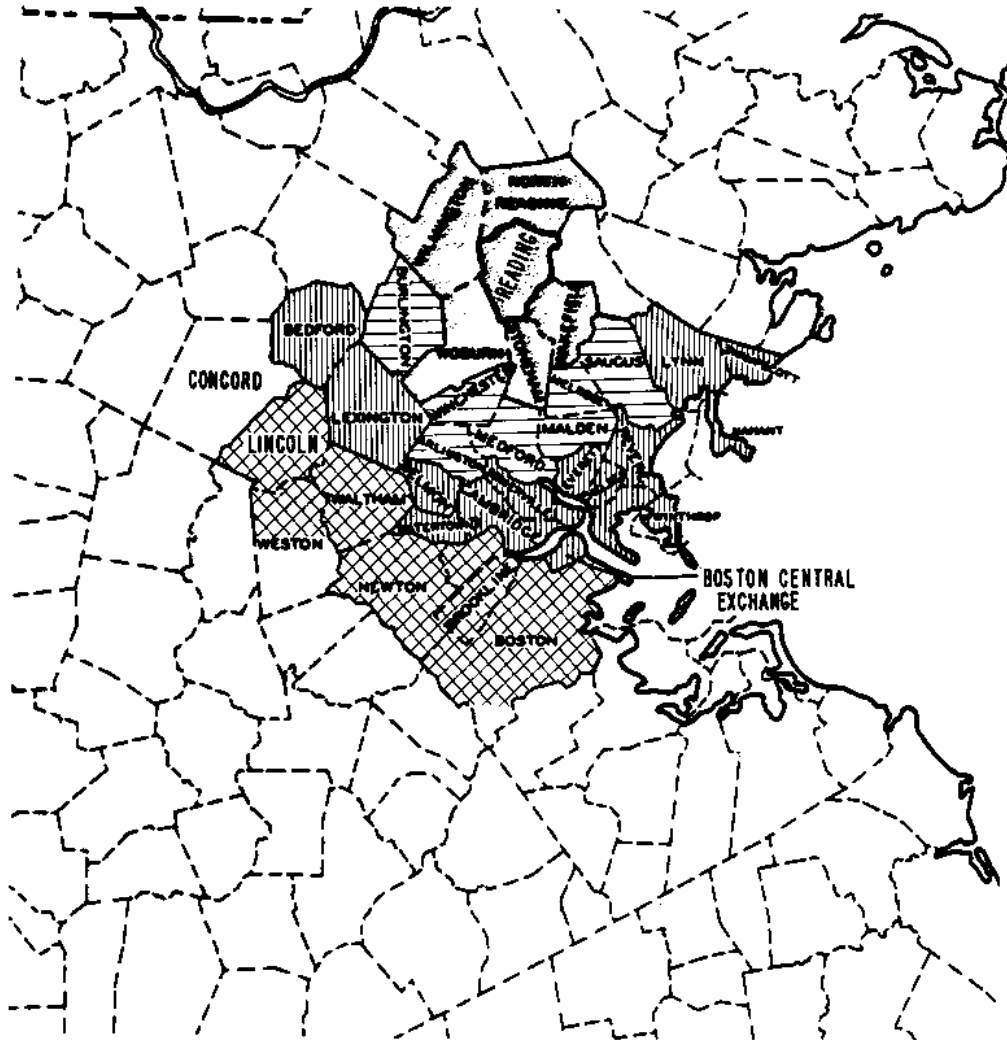






Unlimited calling

Boston metropolitan area in
square miles: 996

Boston Central Exchange: Metropolitan and
Bay State Service
(c)

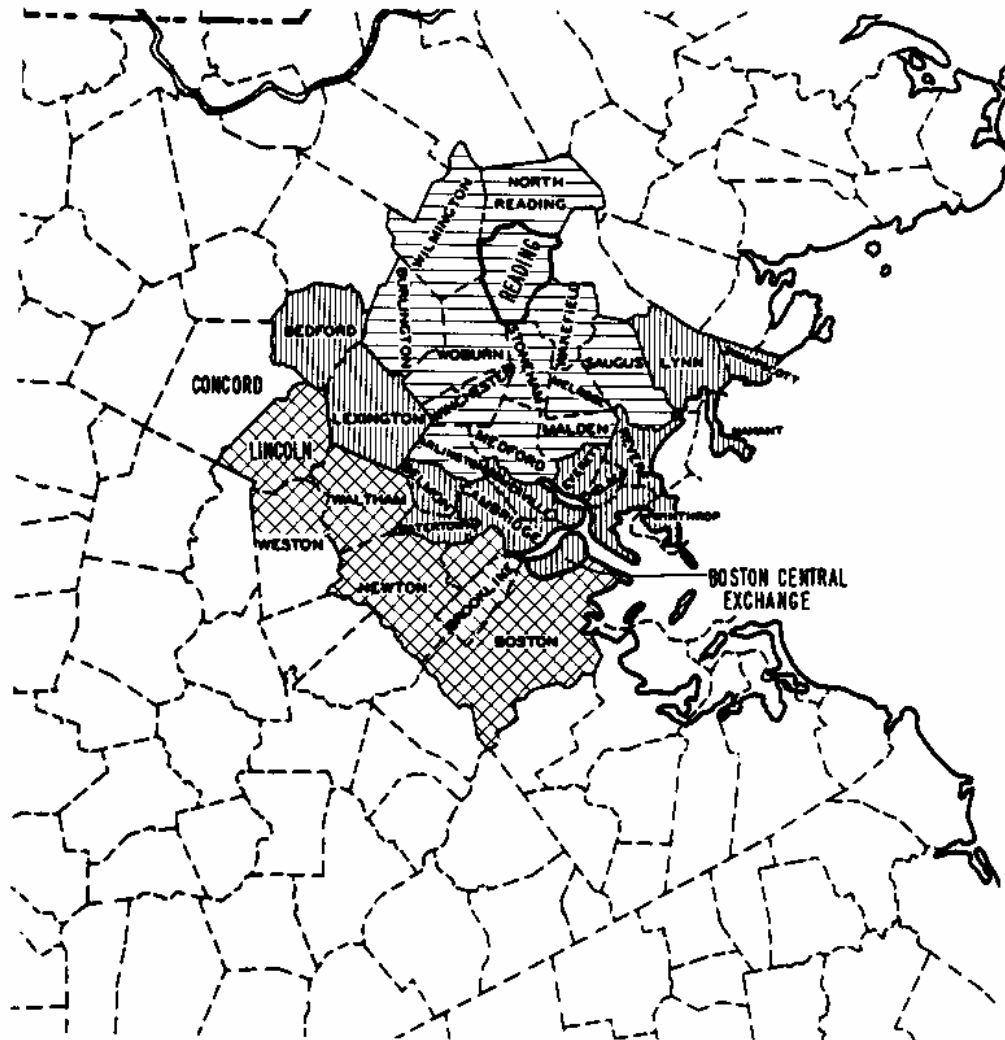
Figure 4.24 (continued)






-  Unlimited calling
-  1 message unit for each 5 minutes
-  2 message units for initial 5 minutes;
1 message unit for each additional 3 minutes
-  3 message units for initial 3 minutes;
1 message unit for each additional minute

Reading: Contiguous Service
(d)

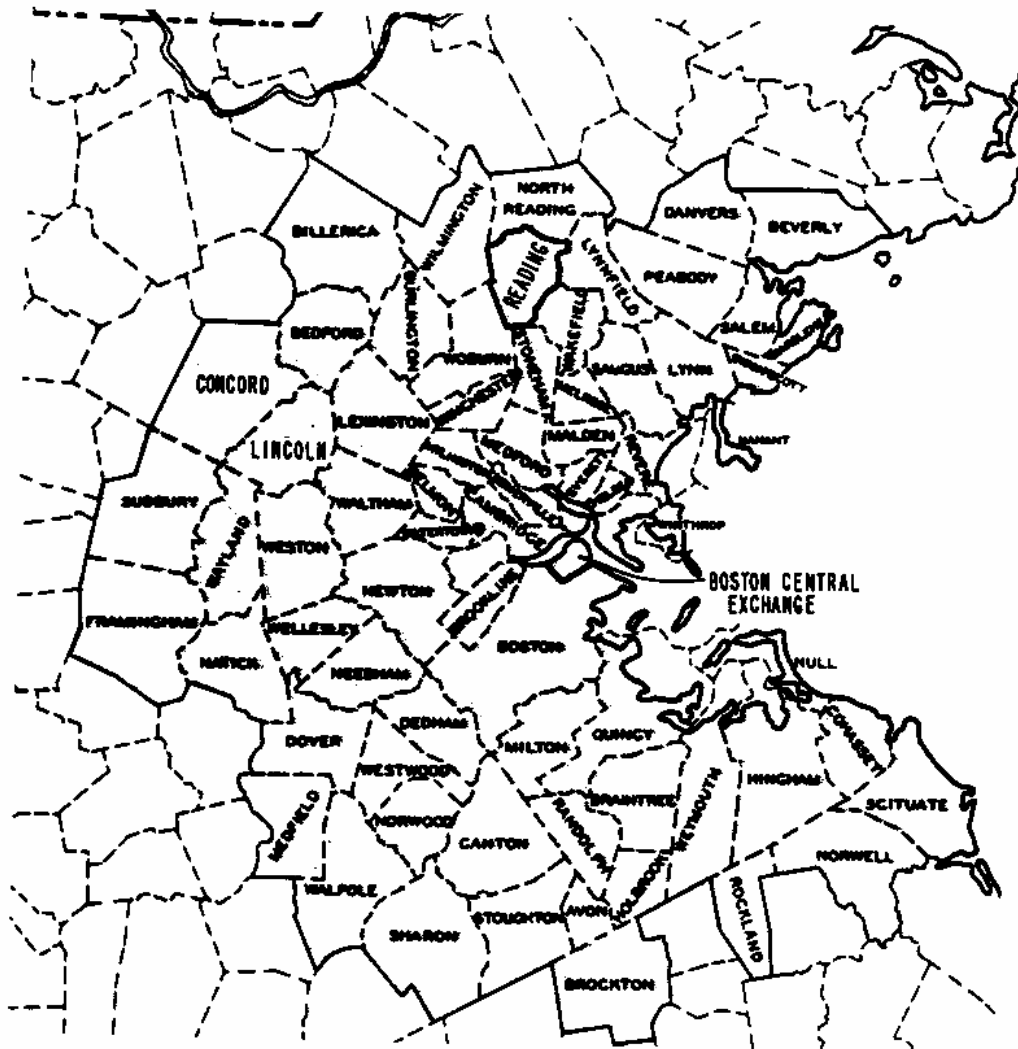
Figure 4.24 (continued)



-  1 message unit for each 5 minutes
-  2 message units for initial 5 minutes;
1 message unit for each additional 3 minutes
-  3 message units for initial 3 minutes;
1 message unit for each additional minute

Reading: Measured Service
(e)

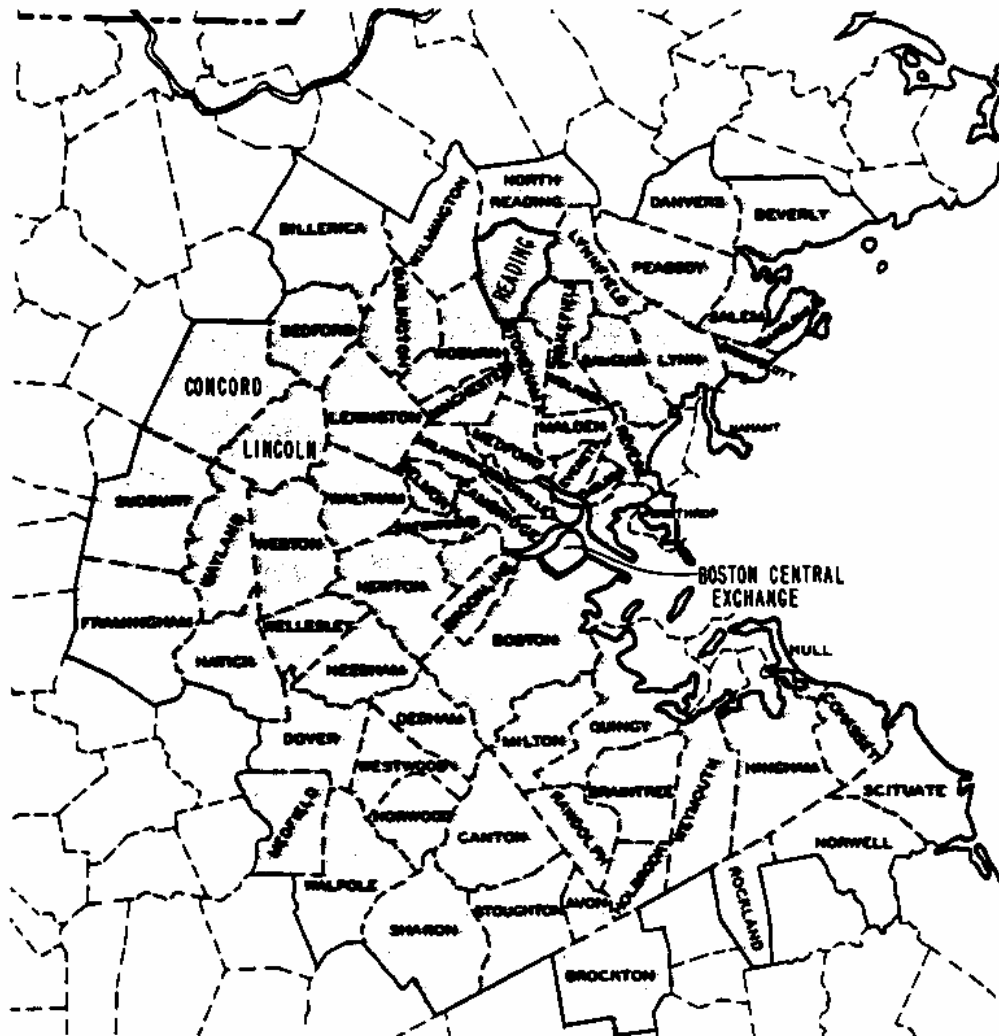
Figure 4.24 (continued)



Unlimited calling

Reading: Suburban Service
(f)

Figure 4.24 (continued)



 Unlimited calling

Reading: Metropolitan and Bay State Services
(g)

Figure 4.24 (continued)

Lincoln at local rates. Daytime calls of 3-10 minutes' duration exhibit an interexchange/exchange rate disparity range from 90% to 70%. These rate disparities are generally positive and over 10%, except for 1 or 2 minute calls between 11 p.m. and 7:00 a.m., when a 7% negative disparity obtains.

Since the 1971-1977 toll rate structure changes in general sharply increased short-distance toll rates--state and interstate--Missouri's clinging to a fixed 10-mile toll rate for two decades (Figure 4.12) and its swinging to a sharp reduction of short-distance state toll rates relative to interstate toll rates can be interpreted as an attempt to get out of the frying pan of interstate/state disparity so noticeable to residents of the border cities of St. Louis and Kansas City without falling into the fire of interexchange/exchange disparity. The continuing positive difference between state toll rates and interstate toll rates for distances above 150 miles or so (Figure 4.12) can be interpreted as an attempt to offset short-haul revenue losses through revenues from state/toll calls between St. Louis at the easternmost border of Missouri and Kansas City at the westernmost border.

The occasional Concord caller who takes measured or unlimited local service is clearly disadvantaged relative to an occasional Lincoln caller. More subtle comparisons are required under the alternative forms of local service, since the average price of a call can depend on the amount of calling.

For instance, Metropolitan service provides for unlimited calling from the Boston Central Exchange to Lincoln for a monthly price differential of $\$16.34 - \$10.96 = \$5.38$. At 9.3¢ per message unit, a subscriber

Daytime (7 AM to 7 PM):

Length of Call (in minutes)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25
Lincoln	\$.28	.28	.28	.37	.47	.56	.65	.74	.84	.93	1.02	1.12	1.21	1.30	1.40	1.86	2.33
Concord	\$.38	.38	.53	.68	.83	.98	1.13	1.28	1.43	1.58	1.73	1.88	2.03	2.18	2.33	3.08	3.83
Difference	\$.10	.10	.25	.31	.36	.42	.48	.54	.59	.65	.71	.76	.82	.88	.93	1.22	1.50
% Difference	35.7%	35.7	89.3	83.8	76.6	75.0	73.8	73.0	70.2	69.9	69.6	67.9	67.8	67.7	66.4	65.6	64.4

(a)

Late Night (11 PM to 7 AM):

Length of Call (in minutes)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25
Lincoln	\$.28	.28	.28	.37	.47	.56	.65	.74	.84	.93	1.02	1.12	1.21	1.30	1.40	1.86	2.33
Concord	\$.26	.26	.36	.46	.56	.66	.76	.86	.96	1.06	1.16	1.26	1.36	1.46	1.56	2.06	2.56
Difference	\$ -.02	-.02	.08	.09	.09	.10	.11	.12	.12	.13	.14	.14	.15	.16	.16	.20	.23
% Difference	-7.1%	-7.1	28.6	24.3	19.1	17.9	16.9	16.2	14.3	14.0	13.7	12.5	12.4	12.3	11.4	10.8	9.9

(b)

Night (7 PM to 11 PM):

Length of Call (in minutes)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25
Lincoln	\$.28	.28	.28	.37	.47	.56	.65	.74	.84	.93	1.02	1.12	1.21	1.30	1.40	1.86	2.33
Concord	\$.31	.31	.43	.55	.67	.79	.91	1.03	1.15	1.27	1.39	1.51	1.63	1.75	1.87	2.47	3.07
Difference	\$.03	.03	.15	.18	.20	.23	.26	.29	.31	.34	.37	.39	.42	.45	.47	.61	.74
% Difference	10.7%	10.7	53.6	48.6	42.6	41.1	40.0	39.2	36.9	36.6	36.3	34.8	34.7	34.6	33.6	32.8	31.8

(c)

Rates apply to measured service (assuming the 30 message unit credit is used up by other calls) or unlimited local service.

Table 4.16

Residential Rate Comparison at the Boundary of the
Boston Metropolitan Area:
Customer-Dialed Telephone Call from the
Boston Central Exchange (338) to Lincoln (259) or Concord, 1979

Source^{S37}

would have to make at least $\frac{\$5.38}{\$0.093} = 58$ message units' worth of calls outside the primary calling area but within the extended local area (including Lincoln) to warrant taking Metropolitan service. A 3-minute daytime call to Concord is priced at 53¢ under state toll rates. A Metropolitan service subscriber who has made at least the 58 units of calls necessary to justify taking the service would see the average price for a 3-minute call to Lincoln as $3 \times 9.3¢ = 28¢$ or less, hence an interexchange/exchange disparity of at least $\frac{53¢ - 28¢}{28¢} = 90\%$.

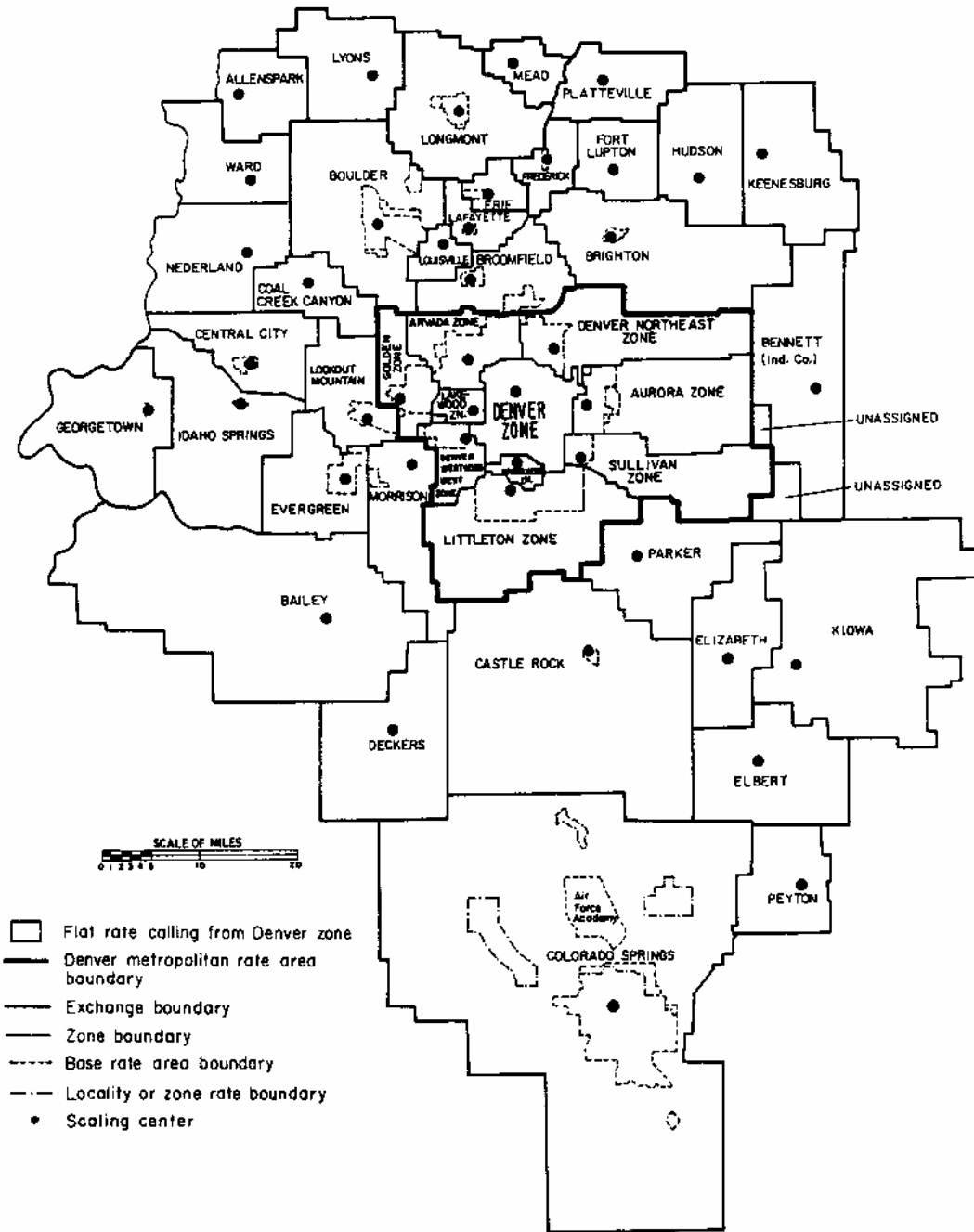
A heavy Concord caller would therefore find Bay State service advantageous since the entire state becomes his local calling area for a monthly differential of $\$25.31 - \$16.34 = \$8.97$, or $\frac{\$8.97}{120} = 7.475¢$ per minute for 2 hours of calls. At that level of usage, a 3-minute daytime call to Concord would cost 22¢ with an interexchange/exchange rate disparity of $\frac{53¢ - 22¢}{22¢} = 141\%$. At the overtime rates of 30¢ for each six minutes the disparity for a 3-minute call is $\frac{53¢ - 30¢}{30¢} = 52\%$ and, for a 6-minute call, it is $\frac{98¢ - 30¢}{30¢} = 227\%$.

One consequence of the interexchange/exchange rate disparity is therefore considerable pressure to keep extending local service areas. Parallel to services like the Metropolitan and Suburban services offered in communities like Boston and Reading (Figure 4.24), communities outside the Boston Metropolitan Area have access to such variants as "Expanded Community Calling" which, for an additional \$1 per month, provides "direct-dialed calls totalling one hour of conversation time to certain nearby exchanges formerly reached on a toll basis."¹⁴ In some Massachusetts areas, a "Circle Calling" service "allows unlimited calling on direct-dialed calls to

Massachusetts exchanges served by New England Telephone that are within a 20-mile radius.¹⁵ Similarly to the restriction on Bay State service, Expanded Community Calling originally did not apply between 9:00 a.m. and noon.

In November 1979 the Massachusetts Department of Public Utilities (DPU) ordered that the restriction period of 9:00 a.m. to noon be removed; that 2 hours of conversation time be allowed instead of one; and that Expanded Community Calling not be limited to contiguous towns or exchanges.¹⁶ This was the regulatory response to a petition filed by 100 subscribers from the town of Sudbury five years earlier in September of 1974. In response to telephone company arguments that the provision of expanded service in Sudbury was not possible at that "time due to the inability of the equipment handling the increased traffic and the cost of the equipment is much too high,"¹⁷ the DPU order provided that "if the elimination of this time restriction causes usage to increase to such an extent as to cause a serious deterioration in the quality of service, the Company may petition the Department for an emergency stay of this order." There were also elaborate provisions for tracking the cost and revenue consequences of the order.

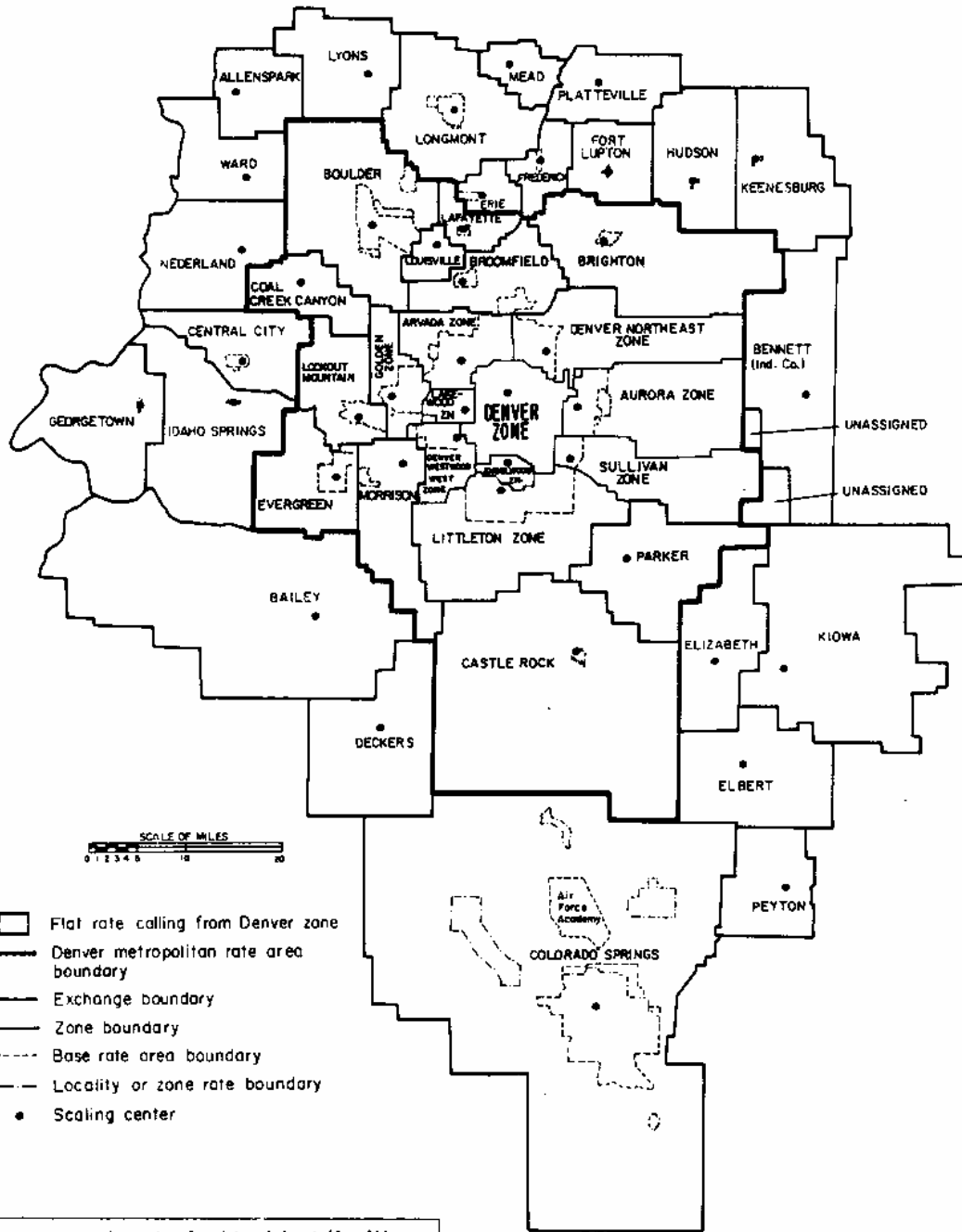
Figure 4.25 shows how the Denver "local" area expanded to its 2,500 square mile size as of 1979 in the two decades between 1947 and 1965. Figure 4.26 shows the Atlanta "local" area, covering about 3,400 square miles, the area of Delaware and Rhode Island combined. Atlanta and Denver are the largest of the flat-rate areas characterized by pronounced interexchange/exchange rate disparities. In localities like Chicago, Detroit and Phoenix which, like New York City, have distance and time-sensitive local rates, rate disparities are minimal.



1947
(a)

Figure 4.25
Denver Zone: Extended Area Service

Source S38



Exchange:	one rate center for determining toll calling rates
Zone:	subdivision of the exchange, usually a metropolitan area, for determining local calling rates (i.e. message units)
Base Rate Area:	flat rate calling within the area
Locality Rate Area:	has one uniform price increment over the base rate area within an exchange. When locality rate area boundaries form concentric circles around the base rate area, each successive band has a higher rate.
Scaling Center:	used to determine mileage charges within an exchange for calls made outside the base rate and locality rate areas

Denver metropolitan area in square miles: 2,493

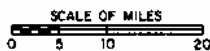
Note: Parker was an independent company before it became part of Mountain Bell in 1967. Before 1969, Parker was a toll call; after 1969, it was included in the local flat rate

1979
(b)

Figure 4.25 (continued)



- Flat rate calling from Atlanta exchange
- Atlanta metropolitan rate area boundary
- Exchange boundary
- Base rate area boundary
- - - Locality or zone rate boundary
- Scaling center



Exchange:	one rate center for determining toll calling rates
Zone:	subdivision of the exchange, usually a metropolitan area, for determining local calling rates (i.e. message units)
Base Rate Area:	flat rate calling within the area
Locality Rate Area:	has one uniform price increment over the base rate area within an exchange. When locality rate area boundaries form concentric circles around the base rate area, each successive band has a higher rate.
Scaling Center:	used to determine mileage charges within an exchange for calls made outside the base rate and locality rate areas

Area in square miles:	
Atlanta exchange	478
29 Suburban exchanges in the metropolitan rate area	2885
Total metropolitan rate area	3363

Figure 4.26

Atlanta Exchange: Flat Rate Calling, 1979

Source ⁵³⁹

F. Politico-Economic Linkages between Exchange and Toll Pricing.

The persisting distinction between local (exchange) and toll (inter-exchange) services is well-grounded in historical differences. The local character of the New Haven exchange in 1878 (Figure 4.18) was as clear and distinct as its congruence with the technical and geographic characteristics of the central office. When such clear and distinct entities began to be interconnected, describing the interconnected service as toll or interexchange aptly reflected its pricing or technical characteristics, respectively. The board-to-board concept illustrated in Figure 4.19 is equally cogent in that historical perspective.

It should be evident, however, from Sections 4-D and 4-E, that a distinction between local and toll services based on differences in the facilities used is no longer tenable in any absolute or even just a clear sense, whatever the size or importance of vestigial or nascent services or institutions so distinguished. The distinction can no longer rest even on any clear cut differences among types of service. With apparent exceptions, cited below, a dialing customer need neither know nor care about the physical location--near or far, geographically or institutionally contiguous or not--of any terminal being called. The National Telecommunication and Information Administration's attempt, in 1979, to distinguish between intradistrict (local) and interdistrict (toll) services¹⁸ likewise rests on no discernible underlying difference.

Whatever the distinguishing labels, the difference between local and toll services, to use the traditional labels, is at most one of pricing patterns. As of early 1980, flat rates generally characterized local calls and time-and-distance-sensitive pricing generally characterized aptly named

"toll" calls. That this difference is scarcely universal is evident from the time-and-distance-sensitive elements of Manhattan and Boston local service pricing as described in Section 4-E.

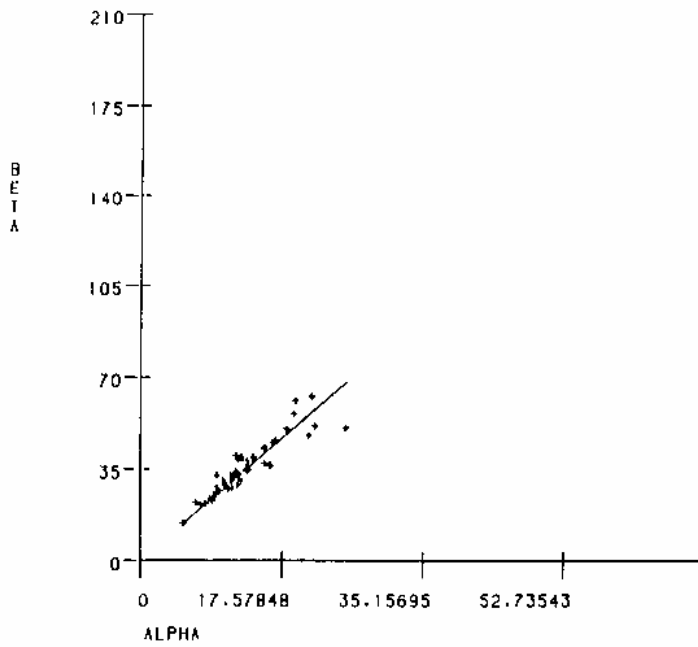
The apparent exceptions only confirm these observations. Dialing outside the local service area generally entails using a prefixed 1 or 0. But this service characteristic can be and is suppressed both for the contiguous or non-contiguous former toll parts of a local extended service area and for the interstate Foreign Exchange (FX) service which, at a price, transmutes out-of-state into "local" calls. Or the characteristic can be and is accentuated as in the interstate Execunet and Sprint services which require some additional digits to be dialed. With modern technology, the number of digits depends intrinsically only on the number of stations on a network. All the rest is accident of institutions, supply, demand and price.

Every facility--a terminal, a wire-pair, a satellite earth-station, a microwave tower, an orbiting satellite--is "local" to its physical location. But only in rare instances is such a facility used exclusively for either local (immediately surrounding, contiguous, short-distance) service or non-local (non-contiguous, long-distance) service. To the extent that either supply factors (cost, technology, etc.) or demand factors (desire for connectivity, interoperability, choice among services, etc.) remain conducive to the multi-purpose use of common facilities, any local/distant, exchange/interexchange distinction rests at most but not necessarily on pricing differences. If, in addition, pricing is to be related to costs, the problem of allocating common costs remains inherent and unavoidable. Only the process and the outcome of allocations can change.

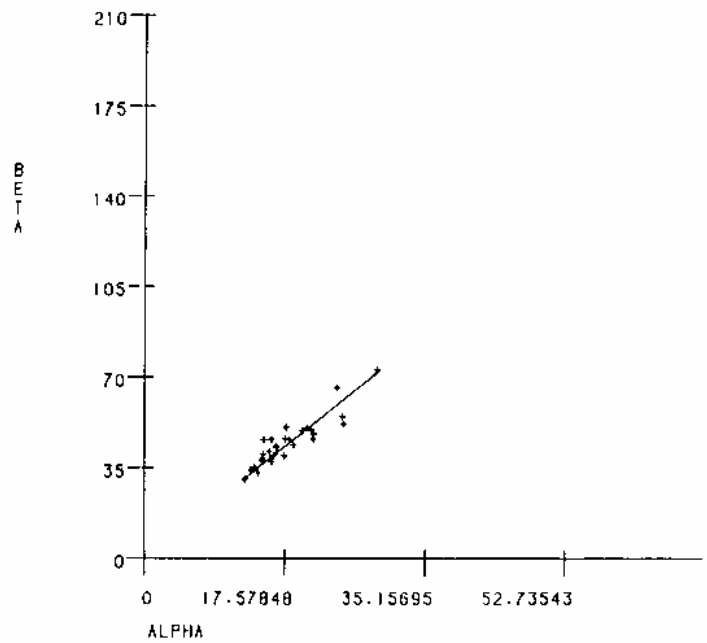
Before examining how state toll and exchange prices are set to recover the costs in a state's residual pool (Section 4-A), it may be helpful to summarize the definition of the aggregate state pool detailed in Part 3. For 1976, the aggregate Bell System message service revenue requirement (MTS, WATS, Exchange, etc.) amounted to \$28.447 billion, of which \$6.862 billion (24.1%) fell in the federal jurisdiction and \$21.585 billion (75.9%) in the state jurisdictions (Figure 3.1, Boxes 11 and 12). The spread of these totals across various categories of plant and types of expenses is detailed in Tables 3.4 and 3.6. Further detail is given for one category, Local Dial Switching Equipment, in Table 3.7.

Section 3-D describes how the federal/state revenue requirement proportions depend on an interstate Subscriber Plant Factor (SPF) of about 20% averaged over the Bell System and all states. Table 3.12 shows that the SPF ranges from about 56% in Montana to less than 10% in Texas. (See also Part 3, Source Note S14 for values beyond that range) More precisely, SPF values are specific to "study areas." For the Bell System these coincide with states with but a few exceptions which are not significant for the purposes of this analysis. For Independents, they often are smaller than states. The important consideration is that the nationwide uniformity of the jurisdictional cost separations process does not imply uniform state by state or study area by study area outcomes, as illustrated in Figure 4.27 and Figure 4.28. Indeed, all factors taken into account, the Bell System average 24:76 federal/state revenue requirement ratio lies within a range from 62:38 (Nevada) to 18:82 (Michigan), as detailed in Figure 4.2(g), (h) and Table 4.4(c).

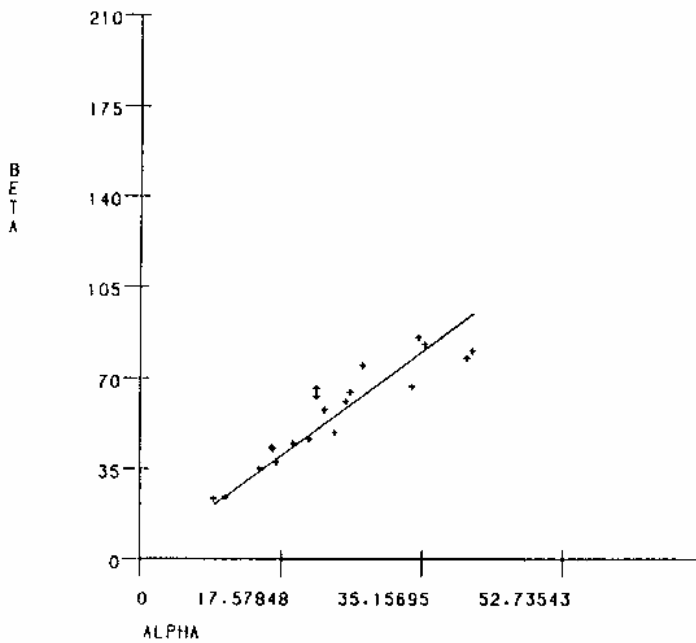
We have already noted in Section 4-A how, within this wide varia-



Bell System
(a)



General Telephone & Electronics
(b)



United Telecommunications
(c)

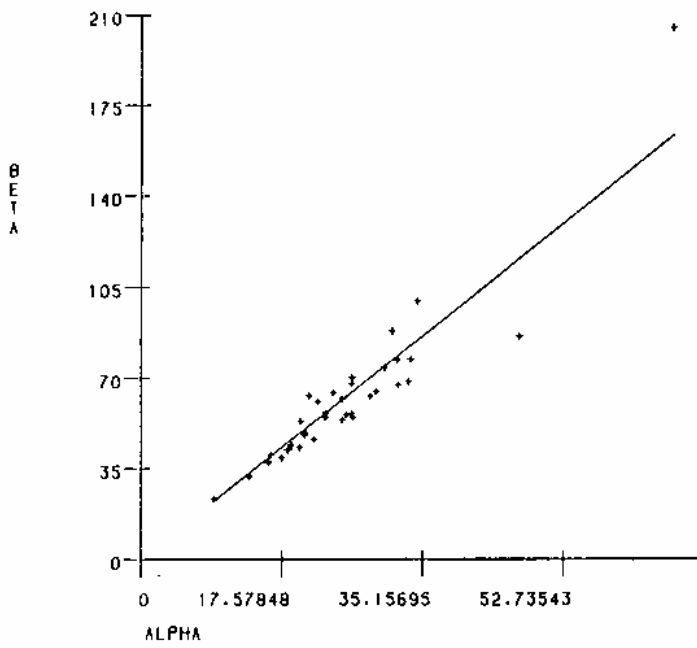
Legend:
 $SLU_I(CSR_I)$ = Interstate SLU(CSR) Factor
 $SLU_S(CSR_S)$ = State SLU(CSR) Factor
 $Alpha = SLU_I + SLU_S$
 $Beta = (.85 + 2CSR_I)SLU_I + (.85 + 2CSR_S)SLU_S$

Combined Interstate and State SPF Factor as a Function of
 Combined Interstate and State SLU Factor, 1976

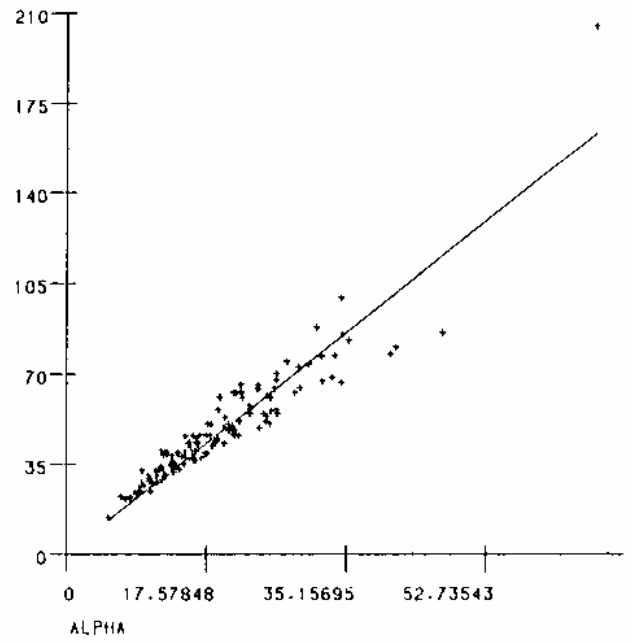
Figure 4.27

Separations and Settlements

Source^{S40}



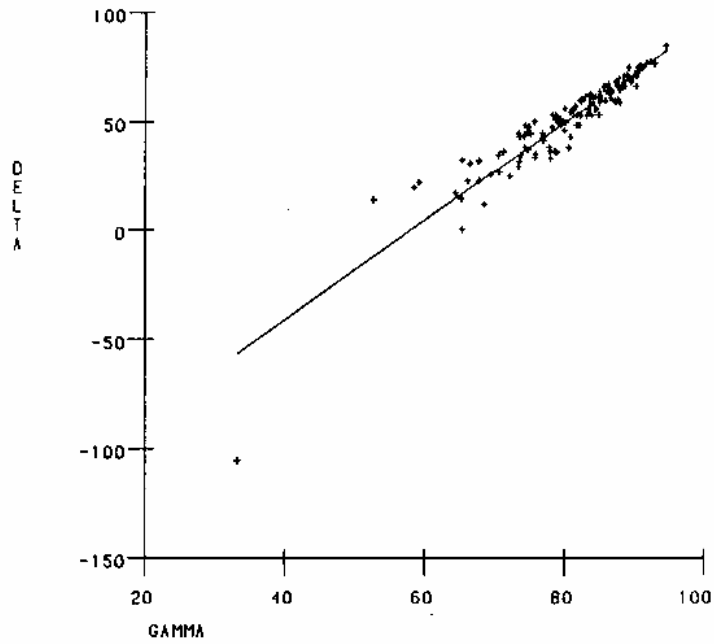
Continental Telephone
(d)



Combined (a, b, c, d)
(e)

Combined Interstate and State SPF Factor as a Function of
Combined Interstate and State SLU Factor, 1976

Figure 4.27 (continued)

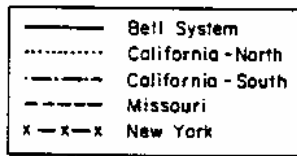
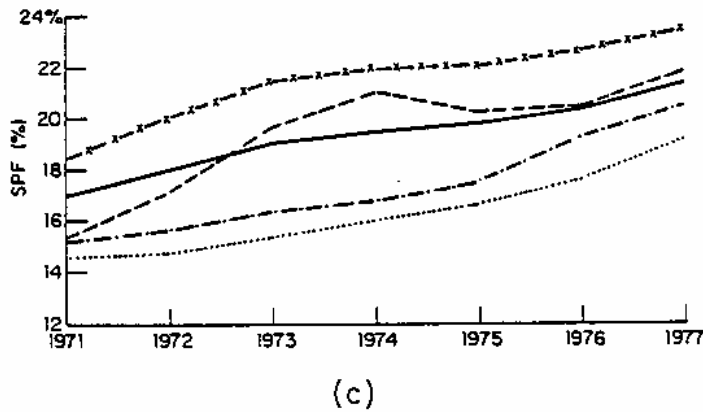
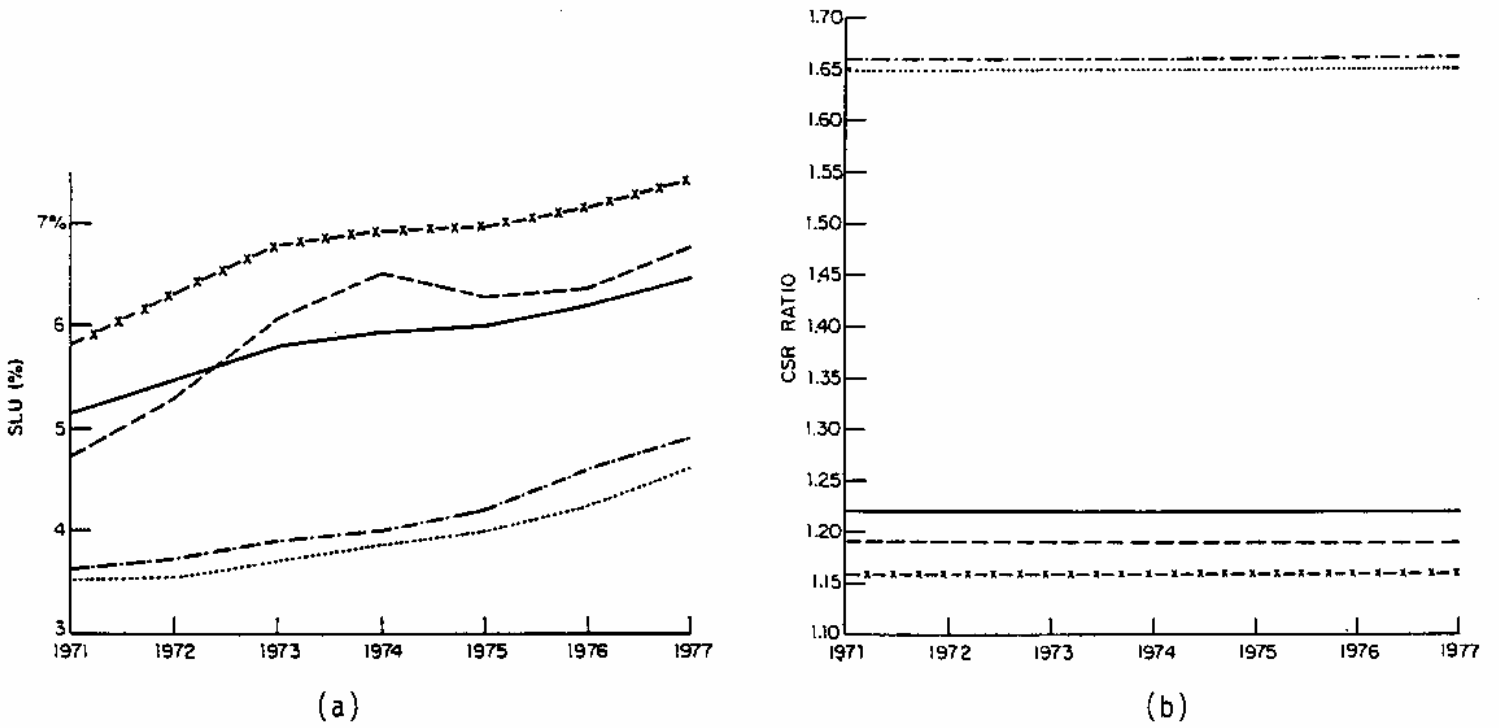


Legend:
Gamma = 100 minus Alpha (%)
Delta = 100 minus Beta (%)
Values of Alpha and Beta
from Figure 4.27(e)

(f)

Residual Local SPF-Defined Usage as a Function of
Residual Local SLU-Defined Usage, 1976

Figure 4.27 (continued)

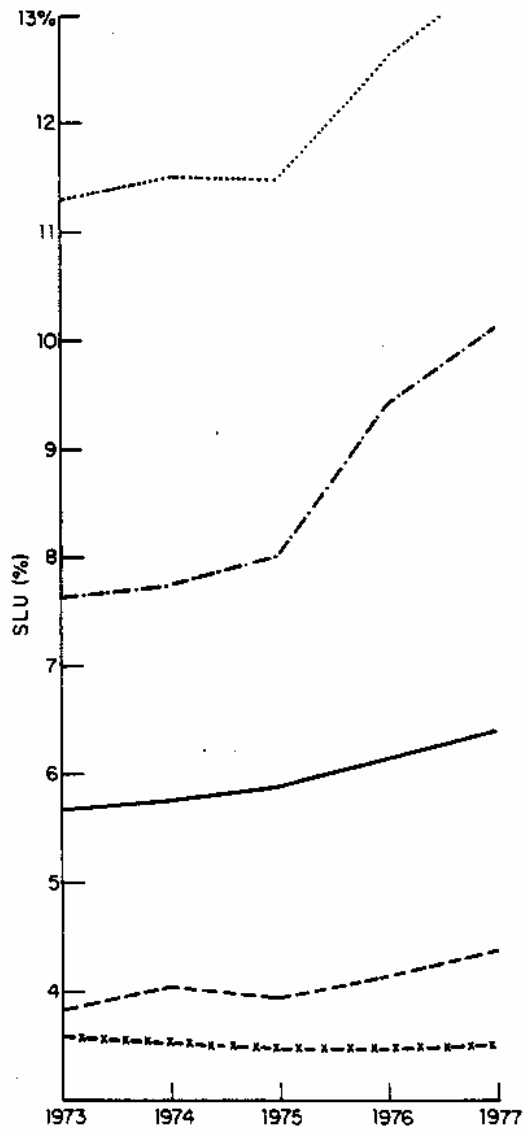


Bell System Interstate SLU, CSR Ratio, and SPF, 1971-1977

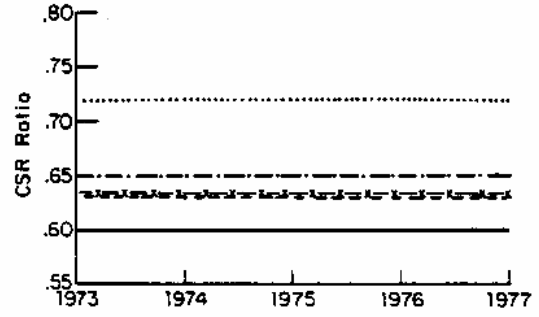
Figure 4.28

Historical Trends in Separations and Settlements Factors

Source^{S40}

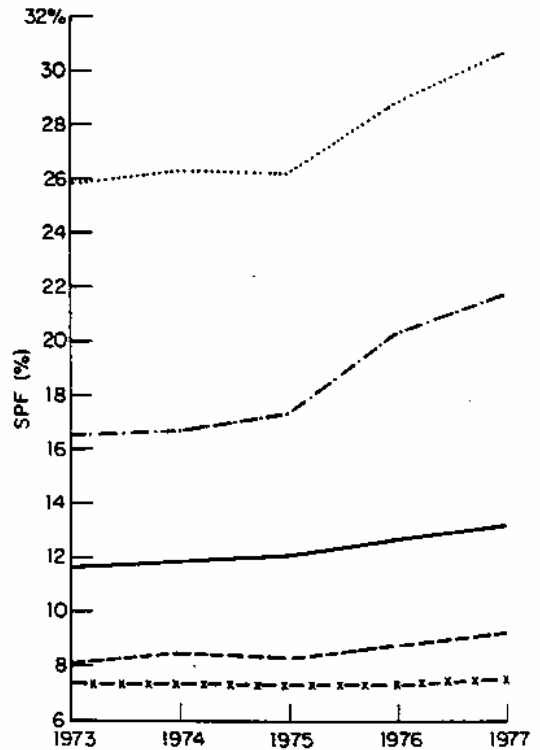


(d)



Missouri and New York
Have Identical CSR's of .63

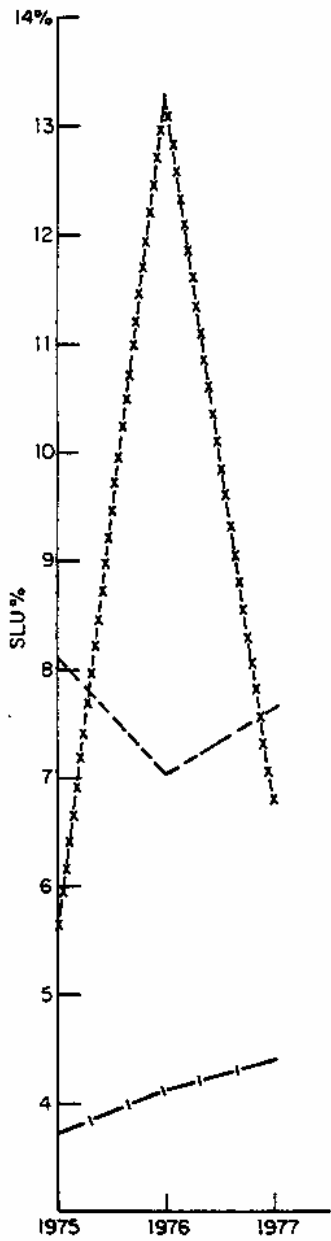
(e)



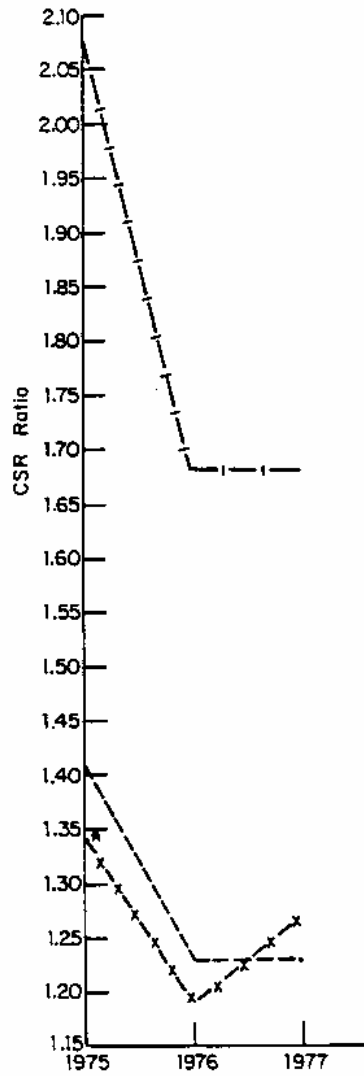
(f)

Bell System State SLU, CSR Ratio, and SPF 1973-1977

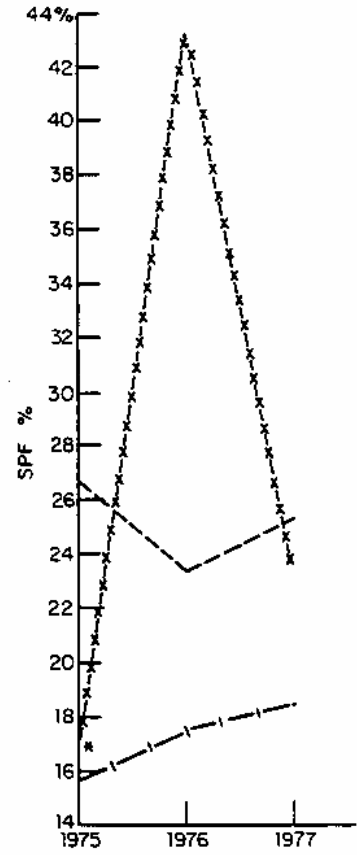
Figure 4.28 (continued)



(g)



(h)



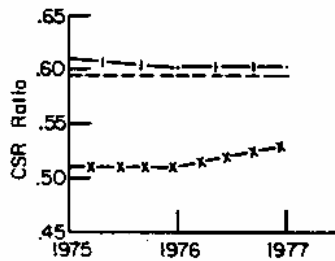
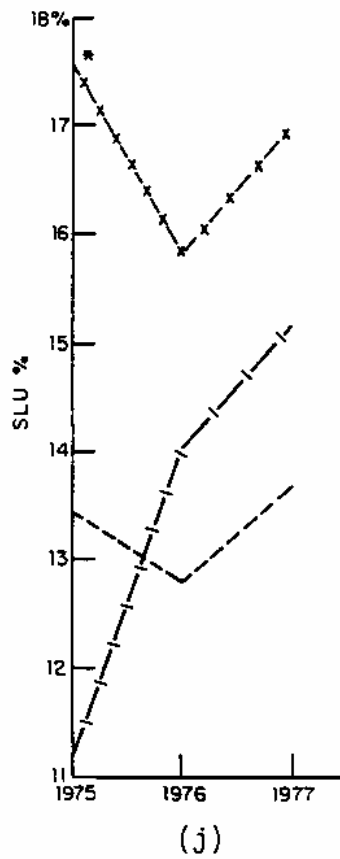
(i)

— California
- - - Missouri
x-x-x New York*

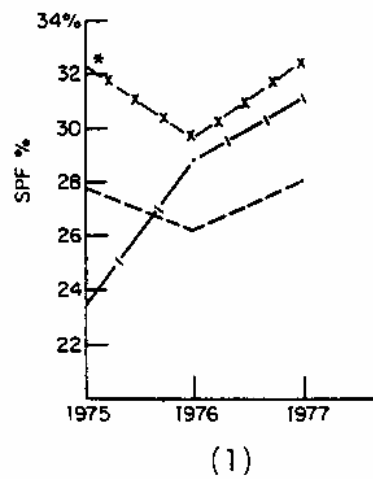
* 1975 Figure for New York is the mean of the values for the North & South Divisions

General Telephone & Electronics Interstate SLU, CSR Ratio, and SPF, 1975-1977

Figure 4.28 (continued)



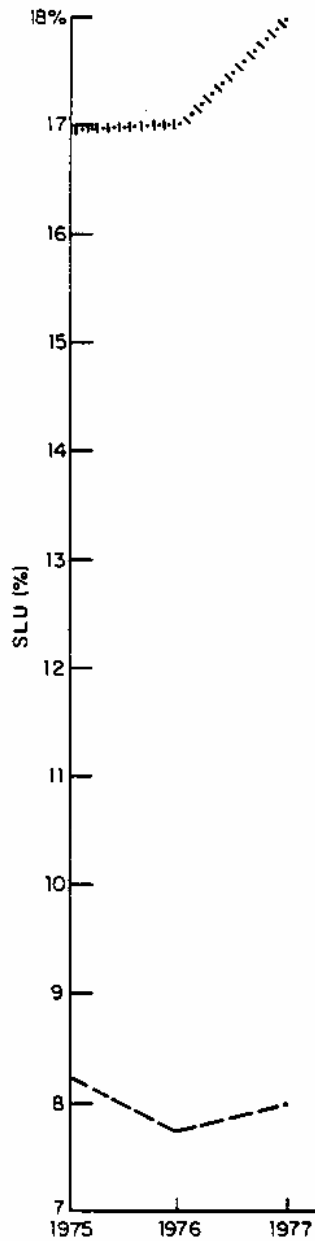
*California and Missouri have identical CSR's of .6 for 1976 & 1977



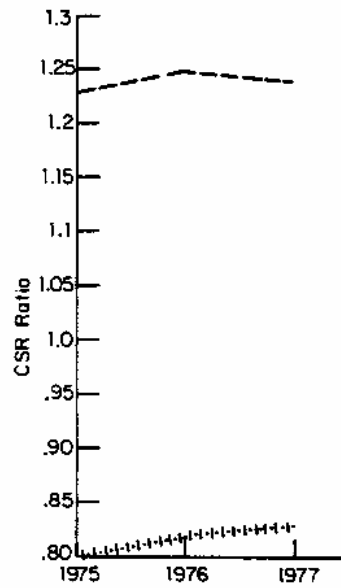
Note: The 1975 figure for New York is the mean of the values for the North & South Divisions

General Telephone & Electronics State
SLU, CSR Ratio, and SPF, 1975-1977

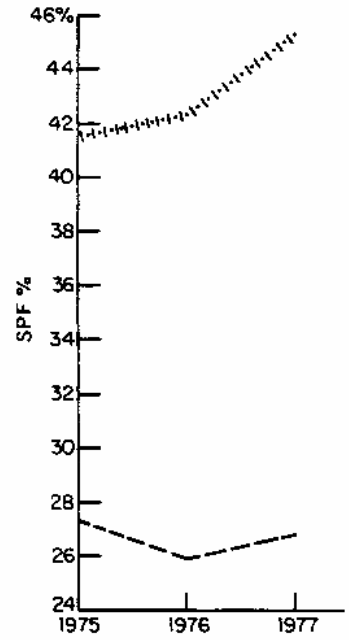
Figure 4.28 (continued)



(m)



(n)

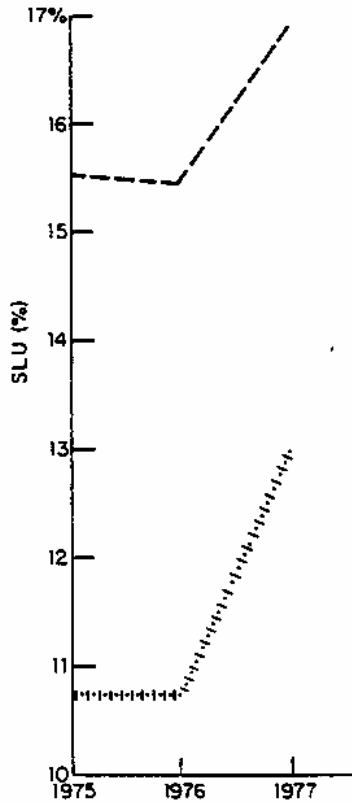


(o)

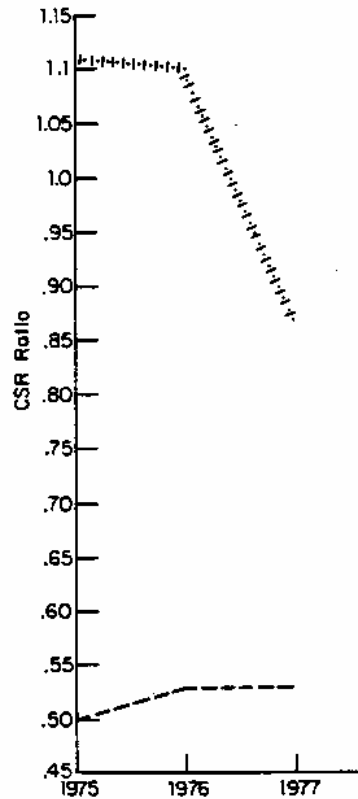
·-·-·-· California-Oregon
- - - - - Missouri

United Telecommunications Interstate
SLU, CSR Ratio, and SPF, 1975-1977

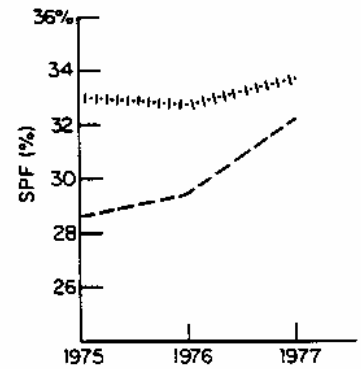
Figure 4.28 (continued)



(p)



(q)



(r)

United Telecommunications State
SLU, CSR Ratio, and SPF, 1975-1977

Figure 4.28 (continued)

tion in federal/state shares, there is further wide variation, within each state pool, in the ratio of local/state-toll revenues, which ranges from 60:40 in North Dakota to 90:10 in Delaware (Figure 4.2(1), (m); Table 4.4 (d)) around an industry average of 70:30. In Sections 4-B and 4-C we sketched the structure of changing state toll prices. In Sections 4-D and 4-E we sketched the structure of local service prices that are stable in appearance as service definitions change. It remains to sketch how these price structures are brought into harmony with dollar amounts that make it likely that Prices times Quantities for all state services add up to the state revenue requirement to within a judicially sanctioned zone of reasonableness of a regulated rate-of-return on investment.

Within the scheme of the Communications Act of 1934 as operative in early 1980, these matters are up to each state. For residual plant not allocated to the federal jurisdiction, each state is free to set what it sees as a reasonable state rate of return. For residual expenses not allocated to the interstate jurisdiction, the state is free to determine, within its own statutory and judicial limits, what expenses it will allow or not.¹⁹ These decisions determine the precise size of the state's revenue requirements = costs pool.

Except in Georgia, Idaho, Nevada, New York, North Carolina and South Carolina, there is, within each state's pool, no formal local exchange/state toll cost separations process like that between federal and state costs. Instead, there is a price-definition process wherein the state regulatory body and the Bell operating company within the state are the principal parties. This tariff-setting process determines the structure and level of uniform statewide toll prices (Sections 4-B, 4-C) and the structure, general level and exceptional treatments of local exchange

prices (Section 4-E), so as to achieve with reasonable probability a reasonable rate of return.

Costs enter into price-setting only at the level of total revenues = total costs. This leaves considerable latitude in the relationship of costs to prices, as illustrated by pricing for key telephones, private branch exchanges (switchboards or PBX's) and other terminal equipment, "vertical services" used principally by businesses. In the terms of Tables 3.1 and 3.6, this equipment falls mainly under the "Station Apparatus" and "Large PBX" subheadings under "Station Equipment - Other." As such, it is non-traffic-sensitive plant, jointly used for state and federal services and subject to jurisdictional cost separation according to the SPF factor. On the average, therefore, 20% of the cost of that equipment was assigned to the federal jurisdiction in 1976, to be recovered through the pricing of federally regulated services.²⁰

This cost allocation notwithstanding, "the terminals offered under state [emphasis added] tariffs include the vast majority of telephone instruments, key telephone systems, and PBX's installed throughout the nation. A considerably lesser number of devices is offered under interstate private line tariffs when these are to be used in conjunction with an interstate private line."²¹

Moreover, according to AT&T:

intrastate rates for telephone company provided terminal equipment are generally designed to recover costs without reduction to reflect the portion of such costs allocated to the interstate jurisdiction. Thus intrastate terminal equipment tariffs generate enough revenues to cover the full costs of providing the equipment. In addition to these intrastate revenues, allocation of a portion of these costs to the interstate jurisdiction provides interstate separations support. It should be noted that the

difference between the remainder of costs of terminal equipment after the allocation to interstate and the full costs recovered in intrastate tariffs, will generally be the same amount as the costs allocated to the interstate jurisdiction. ²²

According to an FCC staff report, we

have the anomalous condition whereby a portion of the terminal costs (approximately 20% in practice) has been made a part of the interstate revenue requirement--with no associated revenue from that source. Conversely, on the state side of the jurisdictional boundary, all revenues are attributable to state but they only have to cover 80% of the actual costs.

The net effect is to create a subsidy for the terminal user which is made up by an increase in the interstate revenue requirement which is equivalent to the costs absorbed from the state jurisdiction. In practice the subsidy is picked up by an increase in interstate MTS, WATS, and private line rates. ²³

Consider \$100 of terminal costs. It is agreed, as noted earlier, that \$20 goes to the federal jurisdiction to be recovered through the pricing of some or all federally regulated services. It is further agreed that \$80 remains in the state cost pool. If, as AT&T argues explicitly, state terminal pricing generates enough revenues to cover the full \$100, then \$20 of total state revenues (equal, indeed, to the costs allocated to the federal jurisdiction) need not be recovered from other services under state jurisdiction. For total state revenues to equal total state costs, this implies that these other services may, in the aggregate, be priced at less than cost defined as state pool total less state terminal costs. AT&T's argument then amounts to claiming, first, that interstate users unjustifiably pick up \$20 of state costs. Unjustifiably, because \$20 of costs of the same equipment seem to be covered by \$20 of revenues in each of the two jurisdictions. In fact they are not, since state revenues

collected for terminal services must be offset by revenues not collected for other services to keep total costs in balance with total revenues in each jurisdiction. AT&T's argument claims, second, that by paying the full \$100, thereby relieving other state users of the need to cough up \$20, the terminal users further subsidize other state users, within the scope of a total state pool as already reduced by the \$20 of costs transferred to the federal jurisdiction, for a total benefit of \$40 to these other users.

The FCC staff argument, on the other hand, implies that state terminal pricing merely covers the \$80 remaining in the state pool. Other state users cover whatever else is in the total state pool. Hence the terminal users get the benefit of the \$20 transfer to the interstate cost pool and the other state users get nothing at all.

Determining what happens in fact would require detailed checking of the practices of 50 states. For our purposes it is sufficient to summarize as follows:

(a) Justifiably or unjustifiably, the processes described in Part 3 allocate \$20 of total costs to the interstate pool, leaving a residual state pool \$20 smaller than it would otherwise be.

(b) How the residual state costs are recovered through pricing of state services was, as of early 1980, at a state regulatory discretion limited only by broad constitutional bounds and by judicial construction of the "just and reasonable" standard embodied in most statutes.

The foregoing illustration is only one possible outcome of the independent cost allocation and pricing decisions schematized more fully in Table 4.17. Table 4.17 traces the allocation and recovery of \$200 of costs isolated (without deeper inquiry into the rationale for this isolation) from a larger cost pool. It assumes--again without deeper inquiry

Jurisdictional Cost Separation Decisions:
State and Federal Cost Shares

		A		B	
		State	Federal	State	Federal
Cost Shares: Business Terminals (B.T.)/ Little Old Ladies (L.O.L.)	Total Costs				
		0-A \$200	\$0	0-B \$180	\$20
		100/100	0	80/100	20

Pricing Decisions: Business Terminal Prices	①	\$60	1-A 60/140	0	1-B 60/120	20
	②	\$80	2-A 80/120	0	2-B 80/100	20
	③	\$100	3-A 100/100	0	3-B 100/80	20
	④	\$120	4-A 120/80	0	4-B 120/60	20

Table 4.17

Cost Allocation and Pricing Decisions

into rationale--that \$100 of this \$200 is somehow associated with terminal equipment used by businesses (B.T.) and that the remaining \$100 is associated with plant devoted to serving little old ladies in tennis shoes (L.O.L.). The previous illustration was based on Column B of Table 4.17, i.e., on the allocation of \$180 of the \$200 to the state cost pool with \$20 of the \$200 going to the federal cost pool.

Columns A and B of Table 4.17 differ in their jurisdictional cost allocations, exemplifying but two points on the continuum of possible allocation decisions justifiable by rationales such as those described in detail in Part 3. It is further assumed here that the \$20 difference between the state (or federal) allocations in the two columns is ascribable wholly to B.T. cost allocations, all other things--the L.O.L. cost allocation in particular--being held equal.

The choice of cost allocation scheme A or B determines the size of the state cost pool to be recovered through revenue-determining pricing decisions, namely \$200 (Column A) or \$180 (Column B). (This itself reflects an assumption that cost allocations will affect pricing since, as described in Section 4-I; it ain't necessarily so). Rows 1-4 of Table 4.17 illustrate 4 points of the continuum of possible B.T. prices. Assuming, to keep things simple, that cost = revenue requirement and also = realizable revenue, the prices of L.O.L. services are now fully determined. Thus, given a decision to have a state cost pool of \$200 (Column A), the further decision to price B.T. at \$60 (Row 1) fixes the price for L.O.L.'s at \$140 (Cell 1-A).

Loose comparisons among the eight cells so defined provide a rich supply of rhetorical ammunition. For instance, on the shaky assumption, reflected in Cell 0-A and implicit in the previously cited AT&T argument, that \$100 is the "true" cost of B.T., that AT&T argument amounts to comparing

Cell 3-B with Cell 2-A. The previously cited FCC argument amounts to comparing Cell 2-B with Cell 3-A.

If Cells 0-A and 0-B reflect true costs, then only Cells 3-A and 2-B respectively reflect economically sound cost-based pricing. The cells above these in each column may be interpreted as predatory pricing in a competitive B.T. market at the expense of captive L.O.L.'s. Conversely, cells below these in each column may be interpreted as forcing an artificial price umbrella over B.T.'s for the sake of subsidizing L.O.L.'s while also sending specious price signals that induce inefficient producers to enter the B.T. market. Relative to Column A, all of Column B may be interpreted as either a fair recognition of proper costs or else a federal subsidy of state services with beneficiaries varying according to row positions.

As of early 1980, the Independents within a state always adhered to the statewide structure and level of toll prices as determined by the foregoing process. They mostly adhered to the statewide structure and level of local exchange price schedules like those of Table 4.10. What, then, their rate of return might be further depended on another linkage to the Bell System/State authority regulatory process described above. That linkage is the process of revenue settlements between the Independents and the Bell System. That settlements process is, in turn, linked to the Ozark Plan of Part 3 in the fashion sketched in Sections 4-G and 4-H.

Among the 50-state regulatory bodies--Public Service Commissions, Public Utility Commissions, Departments of Public Utilities or however styled--some are elective, as in South Carolina, others are appointive, as in Massachusetts. Either way, they are political institutions, though neither necessarily as demagogic or stupid as implied by a contemporary industry figure complaining about having to explain himself to "a fucking

cab driver"²⁴ on a state commission nor as corrupt as implied by the behavior of Abe Ruef, a San Francisco political boss who, in 1906, took a \$1,200 monthly retainer from the Bell company and a \$125,000 lump sum from a would-be Bell competitor.²⁵

The remarkable diffusion of U.S. telephone service since the end of World War II (See Part 2) reflects a consensus of regulator and regulated as to the desirability of this diffusion, with motives a blend of sincere dedication to the public service on both parts and of instincts for political survival on the part of the former and interests in market penetration on the part of the latter. The stability of basic local service pricing indicated by Table 4.10 in the face of the service area expansion described in Section 4-E has been an important means toward that "universal service" end. The near achievement of that end is due in part to the concomitant possibility of shifting--over three decades--increasing proportions of the costs of facilities used in common into the federal cost pool, according to the pattern--illustrated in Figures 3.2, 3.3 and Table 3.24--of growth in interstate use as defined for this purpose.²⁶

All states have shared in the benefits of this cost allocation in proportion to usage initially as measured by the interstate SLU factor (Section 3-D), and as weighted later by various other factors. Since 1969, the introduction of distance-sensitivity as described in Section 3-D4 has weighted the share of common costs to be moved to the federal jurisdiction more heavily in those states with a preponderance of very long distance interstate calls--California, Arizona, Florida--than in those states with a preponderance of very short distance interstate calls, namely Delaware, New Jersey and New Hampshire (Figure 3.7, Table 3.14). Since California has a relatively low interstate SLU factor and Delaware, New Jersey, and

New Hampshire have relatively high ones, the effect in these cases has been to equalize benefit shares over what they would have been under pure SLU-based interstate allocations (Figure 3.5, Table 3.13; Figure 3.6), in harmony with national geopolitical balances as interpreted by the Federal-State Joint Boards where these matters were negotiated as of early 1980.²⁷

Like all decisions as to what proportions of the state cost pool to recover from local versus state toll services, the decision as to how to allocate the benefits of cost transfers to the federal jurisdictions has been up to each state. Terminal equipment is just one example. The state-by-state variations shown in Figure 4.2 and Table 4.4 thus reflect differences in geography--relative urban concentrations, patterns of industry and commerce, size of state, etc.

They also reflect political and marketing judgments of regulator and regulated, respectively, sometimes in concert, sometimes in adversarial balance. These are judgments as to how much the voters or the traffic will bear in toll vs local service pricing; they are judgments as to normal or special treatment of various localities relative to the rate groups of Table 4.10; and they are judgments as to the very definition of the services, hence of the pricing structures, as in the inclusion of neighboring or non-contiguous areas into an extended local service area at flat local rates or their exclusion at measured toll rates, or as in the definition of what are "basic" and "vertical" services. Thus Louisiana politics favored holding local, pay-phone calls at 5¢ until December 1978. Pennsylvania, on the other hand, in 1937 pegged its intrastate toll rates to the federally-determined interstate toll price schedule, a decision upheld by the U. S. Supreme Court in 1940.²⁸

G. Outline of Division of Revenues and Settlements

Such factors as economies of scope or consumer convenience often make it desirable to use common facilities for more than one service, present or absent any economies of scale. If so, the problem of allocating a share of the costs of the common facilities to each distinct service that uses these facilities will arise whenever it is also deemed desirable, for such reasons as economic efficiency or response to competition, to relate the price of each service to the (appropriately defined) cost of that service. Until the late sixties, there were no significant pressures to relate telecommunications prices to costs other than at the aggregate regulatory level of setting Price times Quantity, summed over all services, equal to Costs = Revenue Requirements. Indeed, as indicated in the preceding sections, quite different service-by-service price-setting criteria generally prevailed.

The one significant exception, analyzed in detail in Part 3, has been the court-mandated explicit separation of costs attributable to the entire collection of services under federal jurisdiction from those attributable to all services under state jurisdictions according to "actual uses" of plant. The attempts, since the late sixties, to develop cost/price relationships for finer-grained service categories have been made essentially within the framework of the federal and state cost pools as defined by jurisdictional separations under, as of early 1980, the Ozark Plan.

The problem of explicitly allocating costs to services may or may not arise regardless of the actual number of service suppliers and of the relationships among them, although competitive conditions make it more likely that they will arise as indeed they have since 1968.

Wholly unrelated, at least logically, to any problem of tying prices of multiple services to the costs of these services, is the problem of sharing revenues among multiple suppliers for even a single service they provide in common. Just as there is no necessary relation between prices and costs, there is no necessary relation between shares of revenues from a single service provided in common and shares of the cost of providing that service. Contractual arrangements for revenue sharing can be and have been made for various considerations, some of them related to costs or to cost surrogates, others not. It follows that when multiple services are provided jointly there is no necessary relationship between service-by-service revenue shares and service-by-service cost shares.

The Communications Act of 1934 does set conditions for the common carriers in interstate service "to establish physical connections with other carriers, to establish through routes and charges applicable thereto and the divisions of such charges, and to establish and provide facilities and regulations for operating such through routes."²⁹ The standard for such charges and practices is that they be "just and reasonable," not necessarily cost-related. The competitive standards in legislation before the 96th Congress imply greater pressures toward cost-based pricing, therefore greater pressures toward addressing issues of cost definition and allocation.

In practice, as of early 1980, prices charged by the traditional telecommunications industry (Bell and the Independents) were uniform nationwide in the interstate services, uniform statewide for state toll services but with state-by-state variations as described in Sections 4-B and 4-C, and with essentially uniform statewide rate group schedules for

local services (Section 4-E) that vary state-by-state and, frequently, among Bell and Independents within a state.

In the terms current in early 1980, "division of revenues" normally refers to the allocation of revenues from jointly provided services among members of the Bell System. Instead of that generic term, the term "settlements" is used to refer to revenue sharing among the Bell System and the Independents. That the contractual arrangements for revenue settlements between Bell and the Independents happen, as we shall see, to draw on the cost allocation methods developed for jurisdictional cost separations is an artifact of recent vintage, neither a logical necessity nor a consequence of laws of nature. Adoption of the Ozark Plan for use in both jurisdictional cost separations and intercompany revenue settlements had obvious advantages of administrative simplicity--in terms of relations among the Bell System and the 1600 or so Independent companies within the traditional telecommunications industry--over individually negotiated contracts. Other characteristics of the Ozark Plan as applied to settlements are described in this section and Sections 4-H and 4-I.

In broad terms the telecommunications industry practice as of mid-1979 is to pool "billed" revenues, then divide them as "booked" revenues not according to the proportions billed and collected by the participants, but according to proportions of plant invested in the generation of revenues and of associated expenses. A descriptive phrase would be: from each according to his revenues, to each according to his investment and expenses. How alternative schemes might work is illustrated in Robert Godbey's Revenue and Cost Allocations: Policy Means and Ends in the Railroad and Telecommunications Industries.³⁰

The specific mechanisms of revenue division and settlement are geared, on the one hand, to the legal distinction between federal and state cost and revenue pools and, on the other hand, to the classical telecommunications industry's structural elements, namely AT&T's Long Lines Division, the associated Bell Operating Companies, and the Independents. Conceptually, the process is as diagrammed in Figure 4.29

Mechanically, the division of revenues and settlements process is two-tiered. Independents settle revenues for both interstate and state toll calls with the Bell Company operating in their state or nearest to their franchise area, in ways to be detailed further on. AT&T Long Lines and the Bell Operating Companies pool their interstate revenues and aggregate their Ozark-Plan-defined interstate plant investment book values and their operating expenses (including their own taxes and their total interstate settlement payments to Independents). Acting as the clearinghouse Long Lines credits each Operating Company with its operating expenses from the total revenue pool, then divides the balance (total income after taxes) by the total Bell interstate plant investment book value to obtain a "settlement ratio" of total after-tax income to total interstate book value. In addition to operating expenses, each Operating Company is then credited with a share of after-tax return on investment defined as the settlement ratio times its own interstate book value. Through this process every Bell Company and every Independent experiences essentially the same after-tax interstate rate of return on investment as every other.

Relative to the interstate price structure described in Section 4-B, the broad effects of this process may be summarized as follows. Customers see identical interstate toll prices wherever they might be located, whatever Bell or Independent Company might happen to serve them, and whatever

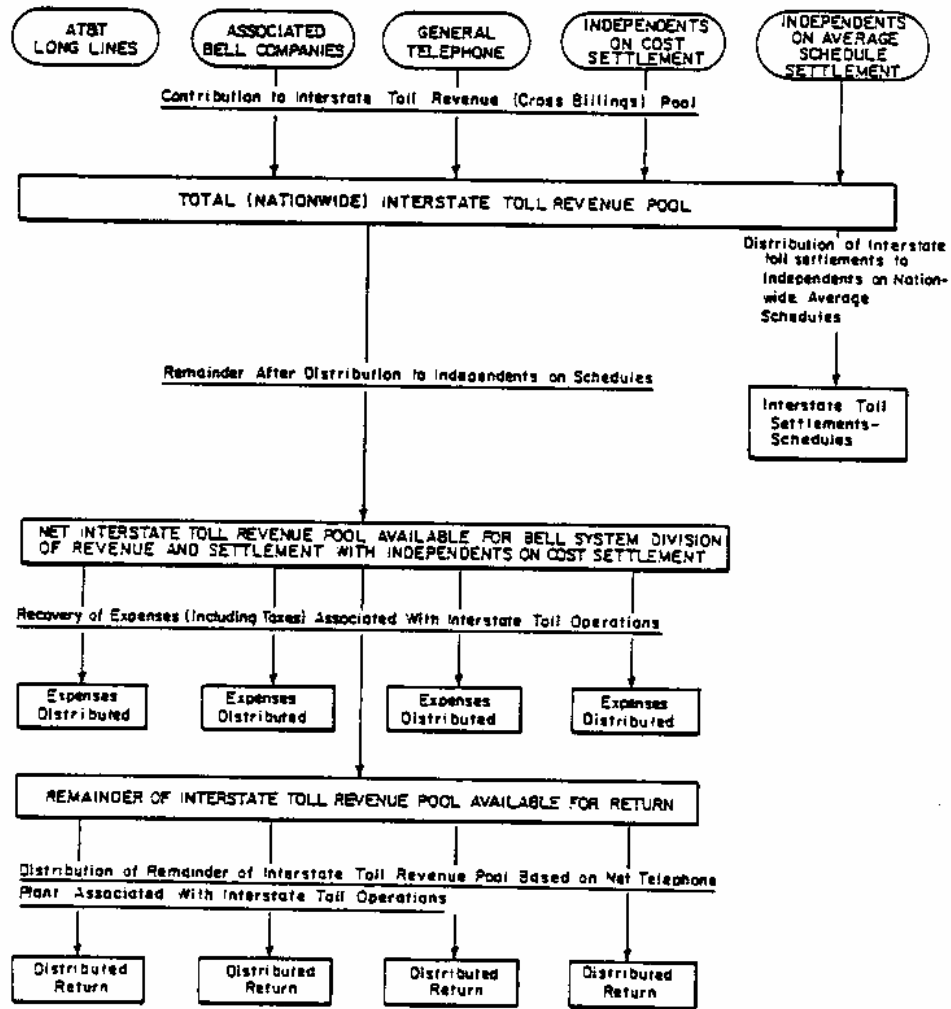


Figure 4.29

Schematic Form of Division of Revenues and Settlements

Source^{S41}

the costs might be of the particular facilities that might happen to serve them on any particular call. The company in whose territory a call originates may bill and collect revenues for that call if, for instance, the call is direct-dialed from home or office; or it may not if, for instance, the call is "collect" and billed and collected at the destination by some other company. The revenues actually booked by any company are not at all necessarily related to what it bills and collects, but rather to the costs it incurs in providing service. The Vista Telephone Company, an Independent whose franchise encompasses Disneyworld in Florida, notoriously bills less revenues than it books, since Disneyworld visitors tend to make collect calls or to charge their calls to their home telephone or their credit cards, or otherwise create billings at distant locations for calls ultimately booked by the Vista company.

That does not mean, however, that a company will book revenues totally independently of the volume of interstate calls originating or terminating in its territory. Under the Ozark Plan, as detailed in Part 3, the costs--operating and return--used to determine its share of pooled revenues as outlined in the preceding paragraphs, vary with the usage made of its facilities for interstate purposes. In theory, facilities solely dedicated to interstate services would claim a share of revenues even if idle. That is always true, in practice, of what some would call excess capacity and others prudent planning for peaks, growth, back-up for failure or other contingencies. It may also be true, in the short run, under rapidly changing demographic or business patterns. In the long run, it would be true only under systematic efforts to put the plant where the traffic isn't, an allegation sometimes labeled as the Averch-Johnson effect in regulated utilities.

In actuality the division of revenues and settlements process operates on a monthly cycle, with estimates and adjustments to provide smooth cash flows despite delays inherent in massive detailed accounting operations. The specifics of these clerical operations need not detain us.

The mechanics of both interstate and state toll settlements between Independents and the Bell Operating Companies are essentially like those of the interstate division of revenues (net of settlements) among Bell System Companies: whatever it may have billed, what an Independent books depends on its interstate or state toll costs as determined under the Ozark Plan, and net settlement cash adjustments flow one way or the other according to whether billings exceed calculated bookings or vice-versa. Once estimates have been corrected for the actual month-by-month revenue performance of all participants, an Independent generally gets the same interstate or state after-tax rate of return as the Bell System Companies. However, some important details vary state-by-state and also according to whether an Independent settles according to "cost" or according to "nationwide average schedules" (Figure 4.29).

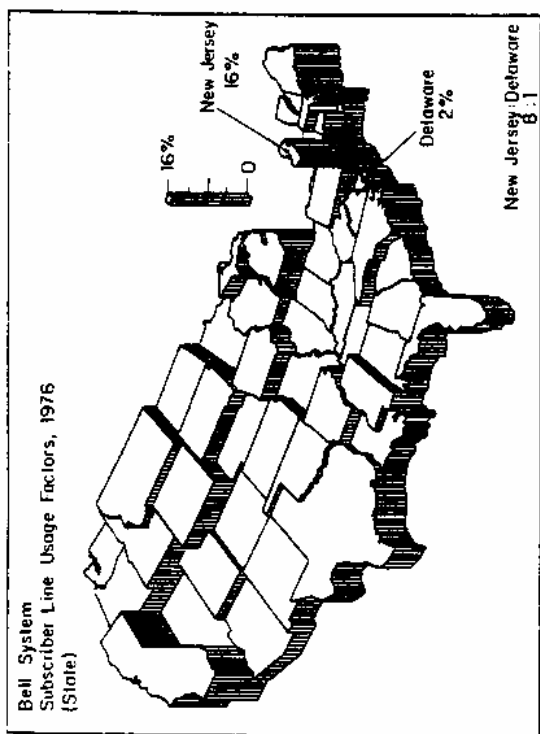
The expenses and the book value of plant that enter into Bell-Independent state toll settlement calculations are determined--by agreement among the carriers--according to the Ozark Plan, using mechanisms identical to those described for jurisdictional separations in Part 3. The substantive difference lies in that, in lieu of the interstate SLU, CSR, SPF and other factors described in Sections 3-D and 3-E, similarly defined state factors are used. The SLU factor used is the state toll factor as defined in Section 3-D3. The CSR factor is the state CSR Ratio as defined in Section 3-D4. And the SPF is computed precisely as defined in Section 3-D1, but using the state SLU and CSR Ratio values.

Values of these factors as of 1976 are shown in Figure 4.30, Table 4.18 and Figure 4.31

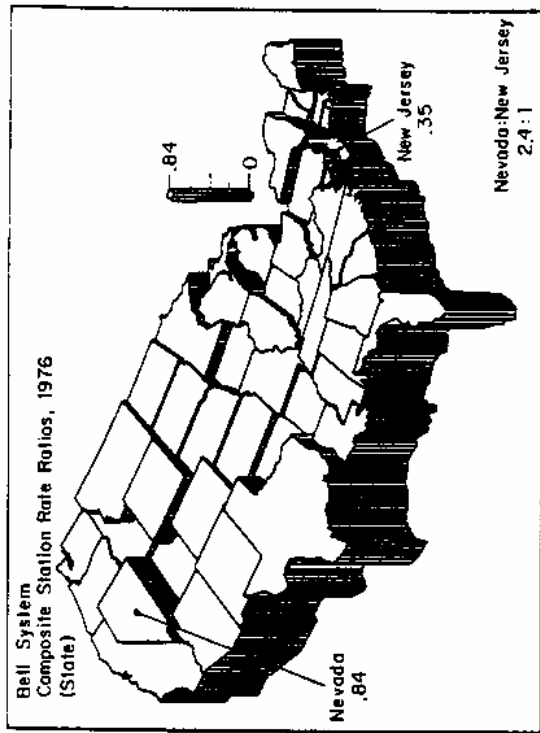
Expenses so determined, plus taxes, are one element of the Bell-Independent settlements. The other is the rate of return on plant investment--book costs--for state toll, as those costs are defined by the Ozark Plan. The three principal variants on the theme of rate of return determination are displayed in Table 4.19. In some states the Independent after-tax rate of return for settlement purposes (the "settlement ratio") is taken to be the related Bell Operating Company's total after-tax rate of return, i.e., its rate of return for all its operations, both under state and under federal jurisdiction (Table 4.19, Column 1). In other states the settlement rate of return (or settlement ratio) is defined, in the contracts (traffic agreements) where these matters are specified, to be the Bell Operating Company's rate of return for all its state operations, toll and local, without regard, however, for the interstate rate of return (Column 2). Finally, in states where the Ozark Plan is used to define distinct toll and local cost pools by "separating" state toll costs from the total state cost pool, the rate of return for settlements is that allowed for state toll services, without contamination by the rate of return measured on either the off-the-top interstate investments or the residual local service investments (Column 3). There are numerous further variants, as, for example, a distinctive treatment by New York State of terminal equipment.

For that residue of its revenue requirements not covered by interstate and state toll settlements, namely local service revenues, each Independent company funds for itself within the general framework of the statewide price guidelines (Table 4.10).

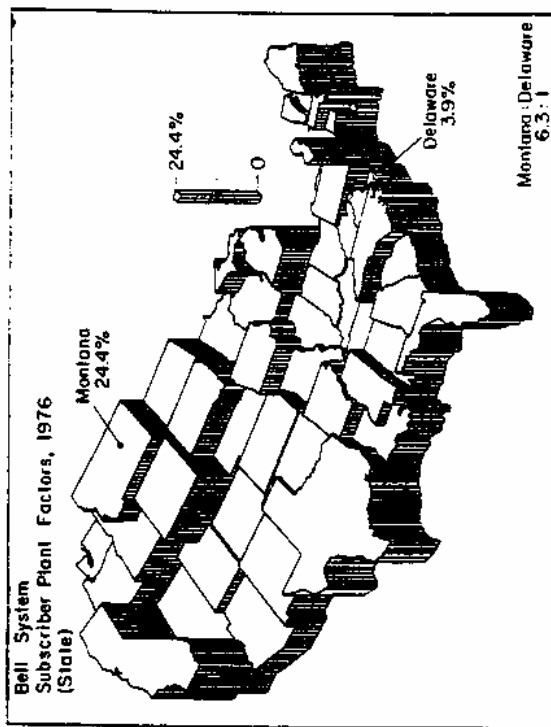
Among the 1600 or so Independents, about 400--accounting for



(a)



(b)



(c)

Figure 4.30

Bell System State-by-State Values of State SLU, CSR Ratio and SPF, 1976

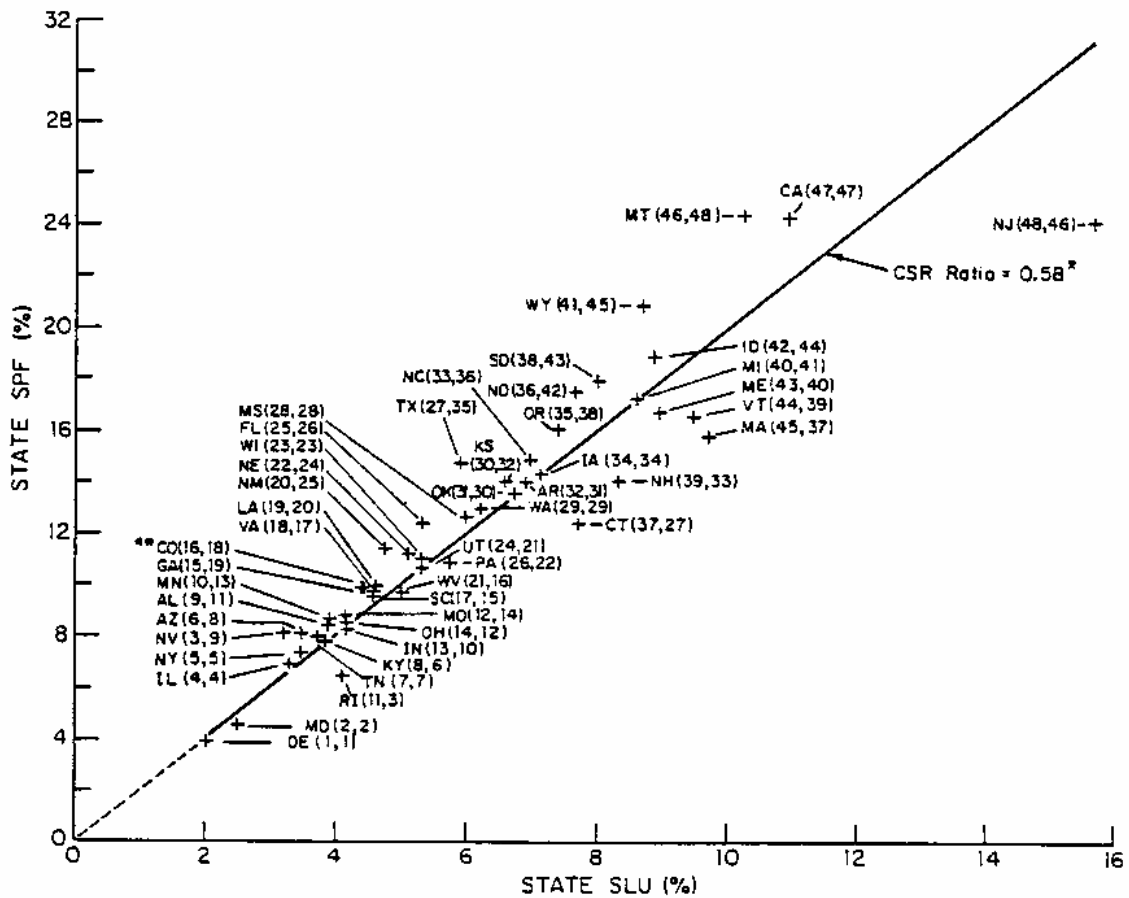
Source S42

SLU %		CSR Ratio		SPF %		SLU %		CSR Ratio		SPF %	
AL	3.88	0.66	8.42	NJ	15.60	NV	0.84	MT	24.40		
AZ	3.47	.74	8.09	CA	10.89	TX	.82	CA	24.28		
AR	6.88	.59	13.97	MT	10.21	NY	.78	NJ	24.18		
CA	10.89	.69	24.28	MA	9.69	MT	.77	WY	20.85		
CO	4.40	.69	9.81	VT	9.45	NM	.77	ID	18.85		
CT	7.69	.38	12.38	ME	8.93	AZ	.74	SD	17.91		
DE	2.04	.53	3.90	ID	8.85	FL	.74	ND	17.50		
GA	5.31	.74	12.37	WY	8.65	ND	.72	MI	17.23		
IA	4.37	.70	9.83	MI	8.57	SD	.70	ME	16.70		
ID	8.85	.64	18.85	NH	8.30	GA	.70	VT	16.54		
IL	3.29	.63	6.94	SD	7.96	CA	.69	DR	16.04		
IN	4.16	.57	8.28	CT	7.69	CO	.69	MA	15.79		
IA	7.10	.58	14.27	ND	7.64	NN	.68	NC	14.80		
KS	6.57	.64	13.99	OR	7.39	NE	.67	TX	14.67		
KY	3.84	.59	7.80	IA	7.10	AL	.66	IA	14.27		
LA	4.61	.65	9.91	NC	6.95	OR	.66	NH	14.03		
ME	8.93	.51	16.70	AR	6.88	LA	.65	KS	13.99		
MD	2.51	.49	4.59	OK	6.71	TA	.65	AR	13.97		
MA	9.69	.39	15.79	KS	6.57	ID	.64	OK	13.49		
MI	8.57	.58	17.23	WA	6.19	VA	.64	WA	12.94		
MN	3.92	.68	8.66	MS	5.98	NC	.64	MS	12.62		
MS	5.98	.63	12.62	TX	5.89	K5	.64	CT	12.38		
MO	4.14	.63	8.74	PA	5.73	MO	.63	FL	12.37		
MT	10.21	.77	24.40	FL	5.31	NY	.63	NM	11.33		
NE	5.09	.67	11.15	UT	5.31	IL	.63	NE	11.15		
NV	3.20	.84	8.10	MI	5.31	MS	.63	WI	10.99		
NH	8.30	.42	14.03	NE	5.09	SC	.62	PA	10.83		
NJ	15.60	.35	24.18	WV	5.01	WA	.62	UT	10.67		
NM	4.74	.77	11.33	NM	4.74	VI	.61	LA	9.91		
NY	3.47	.63	7.32	LA	4.61	OH	.59	GA	9.83		
NC	6.95	.64	14.80	VA	4.57	KY	.59	CO	9.81		
ND	7.64	.72	17.50	SC	4.55	AR	.59	VA	9.73		
OH	4.18	.59	8.49	CO	4.40	MI	.58	WV	9.67		
OK	6.71	.58	13.49	GA	4.37	IA	.58	SC	9.51		
OR	7.39	.66	16.04	OH	4.18	OK	.58	MO	8.74		
PA	5.73	.52	10.83	IN	4.16	UT	.58	MN	8.66		
RI	4.11	.36	6.45	MO	4.14	IN	.57	OH	8.49		
SC	4.55	.62	9.51	RI	4.11	WV	.54	AL	8.42		
SD	7.96	.70	17.91	MN	3.92	DE	.53	IN	8.28		
TN	3.72	.65	8.00	AL	3.88	PA	.52	NV	8.10		
TX	5.89	.82	14.67	KY	3.84	ME	.51	AZ	8.09		
UT	5.31	.58	10.67	TN	3.72	MD	.49	TN	8.00		
VT	9.45	.45	16.54	AZ	3.47	VT	.45	KY	7.80		
VA	4.57	.64	9.73	NY	3.47	NH	.42	NY	7.32		
WA	6.19	.62	12.94	IL	3.29	MA	.39	IL	6.94		
WV	5.01	.54	9.67	WV	3.20	RI	.38	RI	6.45		
WI	5.31	.61	10.99	MD	2.51	DE	.36	MD	4.59		
WY	8.65	.78	20.85	DE	2.04			DE	3.90		

Table 4.18

Bell System State-by-State Values of State
SLU, CSR Ratio and SPF, 1976

Source S43



*SPF = 2.01 SLU (Least-Squares Fit)
= (0.85 + 2*0.58) SLU

**CO (16,18) refers to rank and not coordinates. It means that Colorado (CO), which ranks sixteenth from the bottom among state SLU factors, ranks eighteenth from the bottom in state SPF.

Figure 4.3}

Impact of CSR Ratio on Ranking of
State Toll Usage Factors, 1976

Source S44

Bell Operating Company	① Statewide Total	② Intrastate	③ Intrastate* Toll
C & P			
Maryland		8.16%	
Virginia		9.00	
West Virginia		10.30	
Cincinnati			
Ohio		8.93	
Illinois	8.80%		
Indiana		10.03	
Michigan		7.17	
Mountain			
Arizona		9.14	
Colorado		7.97	
Idaho			4.97%
Montana		7.99	
New Mexico		7.79	
Texas		8.79	
Utah		8.50	
Wyoming		7.67	
New England			
Maine		7.75	
New Hampshire		9.59	
Vermont		9.05	
New Jersey		8.91	
New York			12.97
Northwestern			
Iowa	9.33 (2)	9.54 (2)	
Minnesota	7.94 (12)	7.68 (2)	
Nebraska	8.85 (1)	8.87 (4)	
North Dakota		9.58	
South Dakota	8.74 (4)	8.71 (1)	

Table 4.19

Bell Rates of Return for Intrastate Independent Settlement Purposes, 1976
(cost study companies)

Source S45

Bell Operating Company	① Statewide Total	② Intrastate	③ Intrastate* Total
Ohio		8.08%	
Pennsylvania		8.87	
Pacific Northwest			
Idaho			4.97%
Oregon	9.52% (1)	9.90 (26)	
Washington	9.04 (1)	9.31 (18)	
Pacific			
California		8.01	
Nevada		8.27 (5)	1.84 (2)
Southern			
Florida		8.28	
Georgia			8.12
North Carolina			7.47
South Carolina		8.85 (3)	8.54 (3)
South Central			
Alabama		10.98	
Kentucky		8.35	
Louisiana		6.73	
Mississippi		9.07	
Tennessee		8.74	
Southwestern			
Arkansas	8.81		
Kansas	8.61		
Missouri	8.95		
Oklahoma	8.71		
Texas	8.09		
Wisconsin		7.62	

* Based on Ozark Separations Methods. Numbers () indicate number of companies settling on that rate of return.

Table 4.19 (continued)

roughly 85% of settlement dollars--have elected to settle according to the "cost" method as described by Figure 4.29 and the foregoing sketch. The details of "cost" settlement differ somewhat from the schematic account. So called basic cost studies, done periodically, proceed essentially as sketched. The resulting expense and return estimates, plus estimates of traffic volume, yield an estimated Average Settlement per Message (ASPM) from the Bell System's viewpoint, an Average Revenue per Message (ARPM) as seen by an Independent. Monthly studies of actual settlement message volumes, multiplied by ARPM, yield monthly booked toll revenue figures for the Independents. The difference between these and billed revenues determines the size and direction of actual settlement cash flow. Here again, booked revenues are not decoupled from actual performance, which enters into the studies of monthly message volumes, hence into the multiplier for ARPM. As a further variant, GTE and, in Florida, the United System do cost studies each month, rather than relying on the periodic basic studies and the monthly ARPM multiplication.

Finally, about three-fourths of the Independents, the small ones accounting for roughly 15% of aggregate settlement dollars, elect to settle on Nationwide Average Schedules. As indicated on Figure 4.29, their interstate settlements have first claim on the total nationwide interstate revenue pool. Independents may choose to switch from the nationwide average schedule approach to the cost basis, but normally not vice-versa. They do not conduct their own cost studies.

The schedules used for schedule settlements are developed by AT&T and the United States Independent Telephone Association (USITA) based on cost studies of a sample of small exchanges belonging to Independents. Unlike the mostly statewide Bell System study areas, these are therefore

small study areas exhibiting greater variability than company-wide or statewide averages (See Figure 4.28). The cost definitions, accounting methods and study procedures are the same Ozark Plan procedures that apply to the individual cost studies of the larger Independents.

Separate schedules are developed for the various functions defined in Table 4.20. The A-functions incorporate the non-traffic-sensitive costs at issue in the account of Part 3. The average costs per message (ACPM) plotted in Figure 4.31 are derived from expenses (including taxes) and plant investment as sampled in each study area, applying to plant investment the Bell System rate of return applicable at the time of the study to the study area and the particular Independent according to Table 4.19. The average revenues per message (ARPM) plotted in Figure 4.31 are based on study area volume data and on nationwide (Figure 4.32(a)) and statewide (Figure 4.32(b)) price schedules applicable at the time of the study.

The curves fitted to the points plotted in Figure 4.32 then become the settlement schedules of Figure 4.33(a) and 4.33(c) which finally serve to calculate actual settlements as illustrated in Table 4.20. Revenues used in this calculation are revenues based on prices at settlement time. For small exchanges with less than 3000 total toll messages in a month the settlement per message obtained by entering Figure 4.33(a) or 4.33(c) with the average revenue per message is multiplied by a Small Exchange Factor selected, as appropriate, from the schedules in Figures 4.33(b) or 4.33(d) to get an actual settlement per message.

Comparable procedures apply to the other schedules.

H. Outcomes of Settlement Processes

Superficially, divisions of revenues within the Bell System have little impact per se on the Bell System as a whole or on its customers. They

A Function Schedules:

The A function schedules compensate the Independents for costs of subscriber plant; Engineering, Plant, Commercial, and Accounting operations; Public Relations; etc., in handling Bell-Independent (B-I) and Independent-Independent (I-I) message toll traffic. (Actually, the A function schedules cover all costs other than those explicitly covered by the B and C functions.) There are three A schedules:

- A-1 for "dial" exchanges (that is, exchanges served by central offices with dial switching equipment which completes connections between calling and called parties.)
- A-3 for "manual" exchanges (that is, exchanges served by central offices with manual switchboards and traffic operators who complete the connections between calling and called parties.)
- A-5 for special toll trunk equipment (located in a local "dial" central office) which handles customer-dialed traffic where special assistance is required from a toll center operator at a traffic service position; for example, person-to-person, collect, and special calls, such as credit card calls, etc. These trunks are called PPCS trunks.

Table 4.20

Definition of Settlement Schedules

Source^{S46}

B Function Schedules:

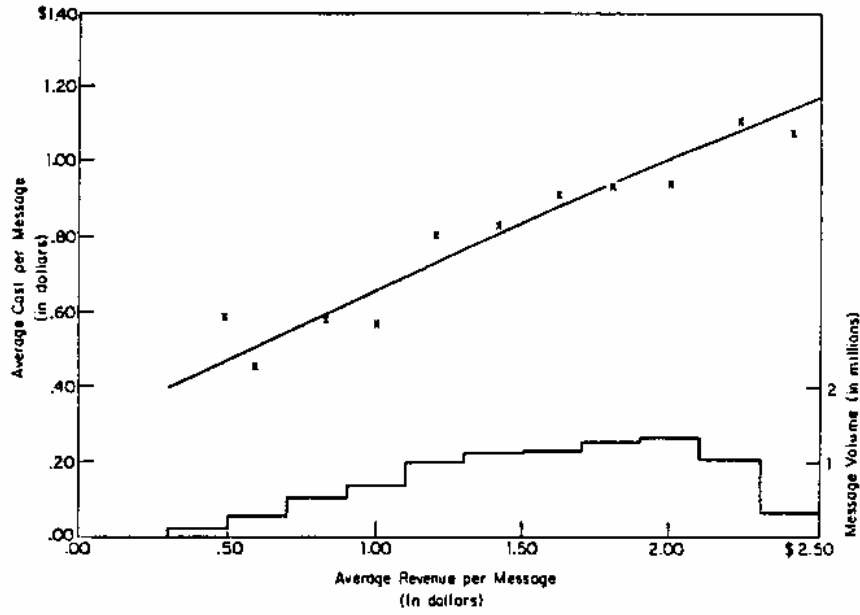
- 8-1 for "operator-handled" toll (that is, where traffic operators handles the toll calls and record the information necessary for billing; the calling number, the called number, the date, the time the completed connection was made, the time of disconnect, and whether it was station-to-station, person-to-person, collect, etc.)
- 8-2a for automatic recording (or "ticketing") of toll calls at a toll center (that is, where equipment located at a toll center automatically records the necessary billing information for all customer-dialed toll calls originated in that toll center area, including tributary or "end" central offices. This schedule also includes the costs of operator number identification (ONI) and assistance on "direct distance dialing" (DDD) calls.)
- 8-2b for automatic recording (or "ticketing") of toll calls at a toll location (that is, where equipment located at a tributary or "end" office automatically records the necessary billing information for all customer-dialed toll calls originated in that central office area.)
- 8-5 for automatic number identification (ANI) (that is, where equipment located at a toll center's local central office or at a tributary or "end" office automatically identifies the calling number of toll calls originated in their areas.)
- 8-6 for intertoll dial trunks (that is, for the special terminal equipment located in the toll center switching office and associated with the trunk circuits interconnecting that toll center with other toll centers.)

C Function Schedule:

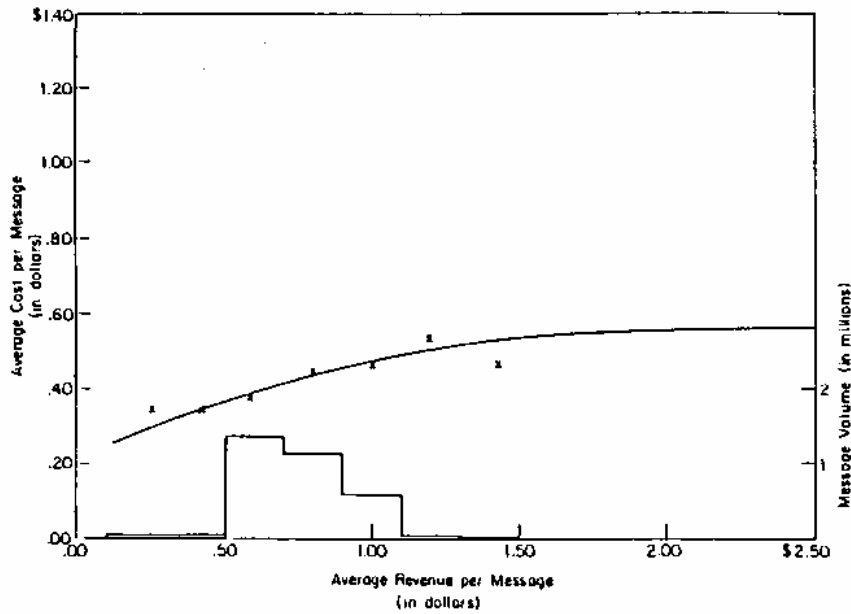
C - Line Haul

This schedule compensates the Independents for trunking facilities that they may furnish to Bell System toll centers (that is, for physical circuits and any associated equipment for deriving multiple channels, such as phantom, simplex and carrier channels.)

Table 4.20 (continued)



A1 Interstate Cost Curve
(a)

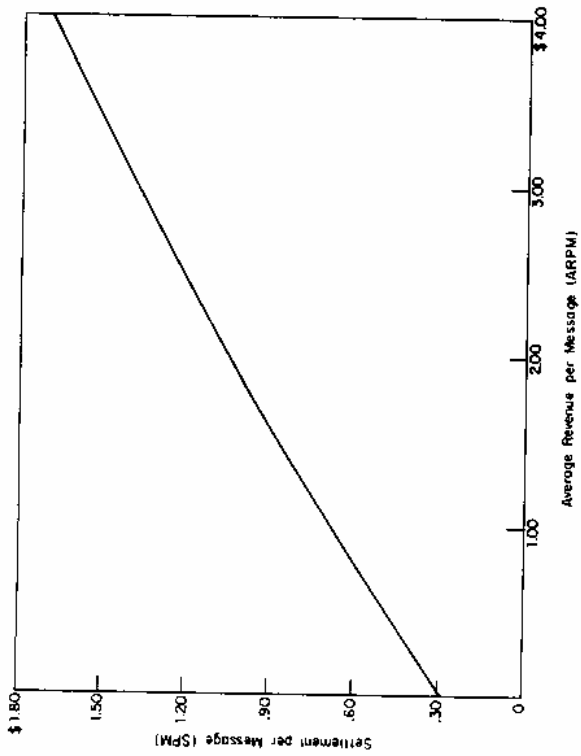


A1 State Cost Curve
(b)

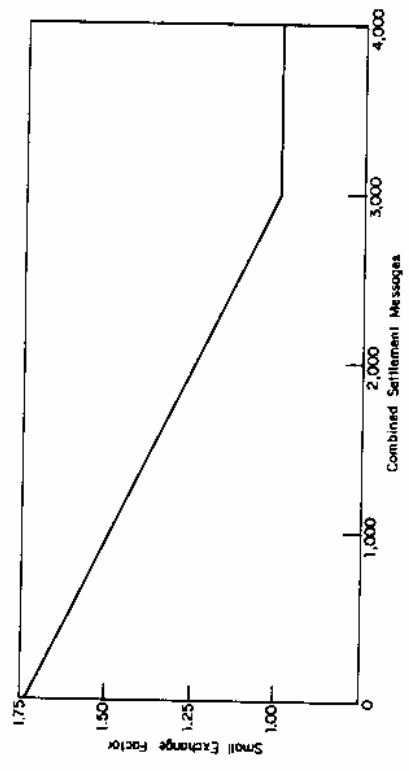
Figure 4.32

Data for Deriving "A" Schedule

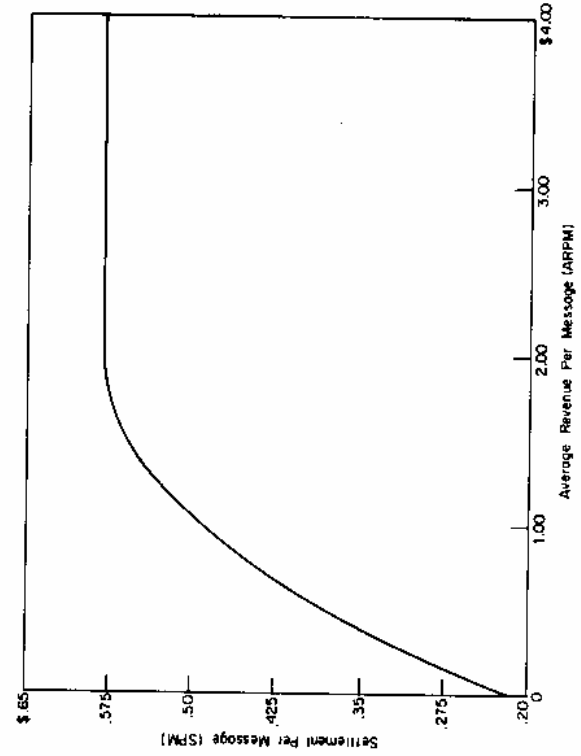
Source^{S47}



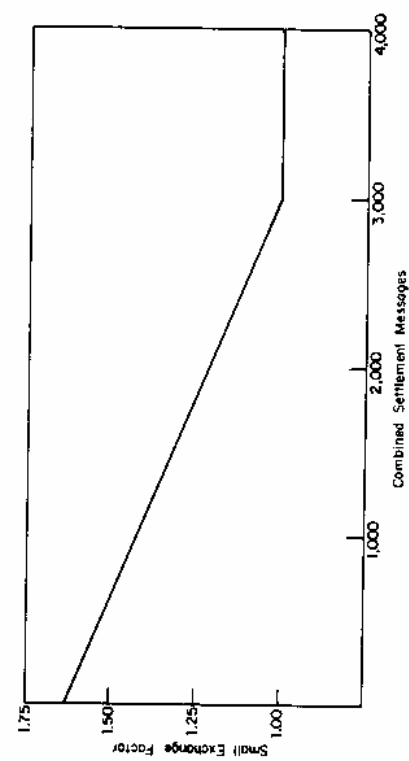
A-1 Interstate Settlement Schedule (a)



A-1 Interstate Settlement Schedule: Small Exchange Factor (b)



A-1 State Settlement Schedule (c)



A-1 State Settlement Schedule: Small Exchange Factor (d)

Figure 4.33

Type "A" Settlement Schedules, January 1974-September 1978

Source S48

Assume an Independent Company Exchange with the following characteristics:

"A" Function

	Messages			Revenues		
	State	Interstate	Total	State	Interstate	Total
SP + RC	1265	1100	2365	\$1195	\$1725	\$2920
1/2 (SC + RC) + SP	1255	1090	2345			

Monthly settlement would be calculated as follows:

$$\begin{aligned} \text{State ARPM} &= \frac{\text{SP} + \text{RC State Revenues}}{\text{SP} + \text{RC State Messages}} = \frac{\$1195}{1265} = \$0.945 \\ \text{Interstate ARPM} &= \frac{\text{SP} + \text{RC Interstate Revenues}}{\text{SP} + \text{RC Interstate Messages}} = \frac{\$1725}{1100} = \$1.568 \\ \text{State SPM} &= .2172802 + (.3712713 \times .945) - (.0956700 \times .945^2) \\ \text{State SPM} &= .2172802 + .3508514 - .0854357 = .483 \\ \text{Interstate SPM} &= .2887857 + (.4042755 \times 1.568) - (.0143060 \times 1.568^2) \\ \text{Interstate SPM} &= .2887857 + .6339040 - .0351731 = .888 \end{aligned}$$

Since total State and Interstate settlement messages are less than 3000, a Small Exchange Factor applies:

$$\begin{aligned} \text{State SEF} &= 1.636458 - (.0002121530 \times 1255) = 1.370 \\ \text{Interstate SEF} &= 1.731650 - (.0002438836 \times 1090) = 1.466 \\ \text{Monthly State Settlement} &= \text{SPM} \times \text{SEF} \times \text{State settlement messages} \\ &= .483 \times 1.370 \times 1255 = \$830 \\ \text{Monthly Interstate Settlement} &= \text{SPM} \times \text{SEF} \times \text{Interstate settlement messages} \\ &= .888 \times 1.466 \times 1090 = \$1419 \\ \text{Total Monthly Settlement} &= \$830 + \$1419 = \$2249 \end{aligned}$$

Table 4.21

Sample Settlement Calculation

Source^{S49}

amount to transfers among internal accounts ultimately added back up on the AT&T balance sheet, although who bills or books what can be of internal significance to the managements of Bell Operating Companies vis-a-vis AT&T Long Lines and corporate managements.

However, insofar as divisions of revenues are linked to jurisdictional cost pools or otherwise influence the pricing and marketing of diverse services, divisions of revenues do have significant external manifestations. In addition settlements between Bell and the Independents are "real" income transfers. As indicated in Table 4.22(a), (b), booked toll revenues resulting from settlements have risen from about 42% of the total booked revenues of Independents reporting to USITA (see also Figure 3.1, Box 18) in 1971 to about 50% in 1977.

The differentials between billed and booked revenues (Table 4.22 (c), (d)) are not intrinsically significant, but serve as indicators of the dependence of bookings on negotiated definitions of the bases for settlements. That billed revenues for MTS generally exceed bookings and vice-versa for WATS is, as noted in Section 4-G, not a direct indicator of equity or inequity among either suppliers or consumers.

Overall, as indicated by Table 4.22(c), (d), patterns of calling (See Part 2) and the rules for sampling calls for settlement purposes generally lead to MTS bookings by Independents of about 90% of billings, while WATS bookings have increased from about 70% of billings in 1971 to nearly 130% in 1978.

In 1976 there were 1,568 Independent companies.³¹ Of these, 404 (26%) of the largest settled on the basis of individual cost studies, booking about \$2.6 billion (84%) of total settlements of \$3.1 billion. The remaining 1164 (74%) companies, principally smaller ones, settled

Year	Total Booked Operating Revenue (Ind.)	MTS Booked Revenue	MTS Booked Rev. as % of Total Booked Revenue	WATS Booked Revenue	WATS Booked Rev. as % of Total Booked Revenue	Special Services Settlements Rev.	S.S.S. Rev. as % of Total
1971	3,322,679	1,381,723	41.6	29,222	.9		
1972	3,788,699	1,598,274	42.2	60,217	1.6		
1973	4,316,990	1,873,468	43.4	93,727	2.2	76,852	1.8
1974	4,920,000	2,127,917	43.3	124,357	2.5	90,002	1.8
1975	5,500,000	2,385,994	43.4	164,852	3.0	99,786	1.8
1976	6,300,000	2,807,035	44.6	215,499	3.4	109,235	1.7
1977	7,115,600	3,185,761	44.8	279,197	3.9	129,328	1.8

Booked and Billed Revenues of Independent Telephone Companies

(a)

Year	Total Booked Toll Revenue as % of Total Booked Revenue
1971	42.5
1972	43.8
1973	47.4
1974	47.6
1975	48.2
1976	49.7
1977	50.5

Booked Toll Revenues as Percent of Total Booked Revenue

(b)

Table 4.22

Independent Telephone Companies Revenues and Settlements

Source S50

Year	Billed Revenue	Booked Revenue	Booked Revenue as % Billed Revenue
1970	1,247,797		
1971	1,523,090	1,381,723	90.7
1972	1,780,541	1,598,274	89.8
1973	2,083,178	1,873,468	89.9
1974	2,338,345	2,127,917	91.0
1975	2,622,599	2,385,994	91.0
1976	3,074,292	2,807,035	91.3
1977	3,490,544	3,185,761	91.3
1978	4,050,386	3,717,364	91.8

MTS Settlements
(c)

Year	Billed Revenue	Booked Revenue	Booked Revenue as % of Billed Revenue
1970	37,373		
1971	42,764	29,222	68.3
1972	64,105	60,217	93.9
1973	86,244	93,727	108.7
1974	109,665	124,357	113.4
1975	134,175	163,852	122.1
1976	176,769	215,499	121.9
1977	225,177	279,197	124.0
1978	279,538	356,266	127.4

WATS Settlements
(d)

	Interstate	State	Total
Schedules:			
Average Revenue per Message	\$1.98	\$.73	\$1.00
Average Settlement per Message	1.30	.56	.72
Percent Retention	66%	77%	72%
Cost Study:			
Average Revenue per Message	\$2.30	\$.86	\$1.19
Average Settlement per Message	2.04	.88	1.15
Percent Retention	89%	102%	97%

Independent Company Message Toll Business, 1976
(e)

Table 4.22 (continued)

using the average schedules, booking about \$0.5 billion (16%) of the total toll settlements.³²

Table 4.22(e) illustrates, for MTS settlements, relationships--averaged over all Independents--between average revenue per message, an index of price and traffic patterns, and average settlement per message, an index of cost per message as derived by applying Ozark Plan costing methods in the individual cost study or average settlement schedule determination processes. The "percent retention" figures break down the average 91.3% retention figure for MTS (Table 4.22(c)) across jurisdictions and across settlement methods, i.e., across sizes of Independent companies.

As indicated earlier, little absolute significance attaches to these percentages, since they reflect high variability in billing and traffic patterns. Thus, for example, the Vista Company's 1976 percentage retention is about 130%.³³ The generally higher retention percentages for cost-study companies reflect the tendency of these larger companies, with larger than average SLU factors and CSR ratios, to elect this method. The higher retention percentages for state toll reflect the absence of an AT&T Long Lines share of costs hence of revenues in the state toll services as contrasted to the interstate services. Another element may be a higher cost structure, both in terms of intrinsic characteristics of Independent franchise territories and plant, and in terms of more recent, hence less depreciated Independent plant as compared to Bell System plant. The generally higher ARPM's for the larger, cost-study companies may reflect state by state rate differentials for state toll and different calling patterns for interstate toll.

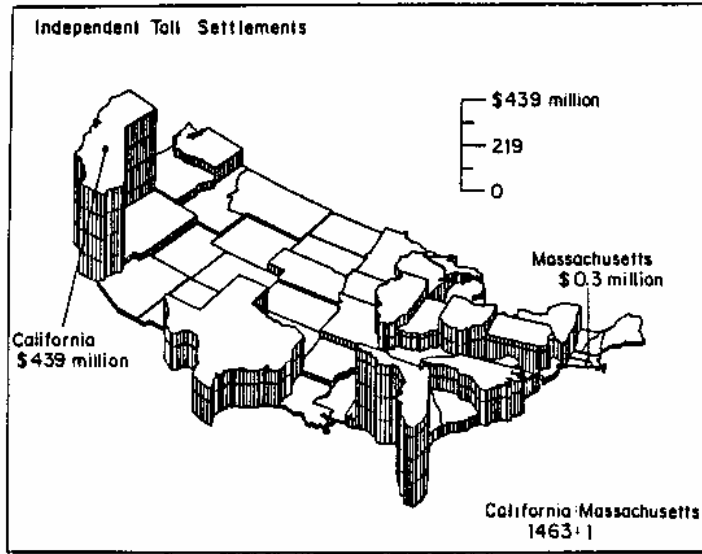
The differential between billed and booked revenues creates a net float in favor of the Independents. The annual difference (Table 4.22

(c) for 1976 was under \$300 million which, assuming billings spread across each month and settlements once a month, amounts to a float of under \$150 million, or less than \$100,000 per Independent, on the average. Unless the incidence of float is above average for the smaller companies, this does not appear to be a significant factor in the Bell-Independent relationship.

As Figure 4.34 and Table 4.23 indicate, the magnitude of Independent settlement revenues varies greatly across states. Within states, the proportions of settlements for interstate and state services also vary sharply from state to state. Comparison with Figure 4.2(n), (o) and Table 4.4(f) indicates different rankings of these proportions as between the Bell System and the Independents, with the Independents exhibiting a dependence for their toll revenues on state toll settlements noticeably greater than the Bell System's dependence on state toll revenues. The \$3.1 billion aggregate toll settlements may be seen in context in Figure 3.1, Box 16.

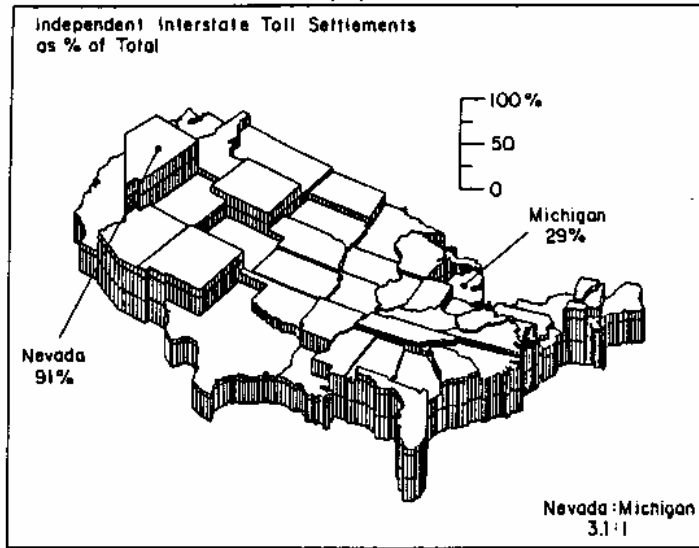
An increasing proportion of service revenues, of both Bell and Independent companies, comes from toll calls--state and interstate--as shown in Figure 4.35. In part this growing proportion indicates the effects of diverse and changing price and demand patterns as reflected in the growth of the SLU factor as shown in Figures 3.2, 3.3 and Table 3.24. In part, it indicates the effects of the Ozark Plan as reflected by the more rapid growth of the SPF factor as shown in those same figures and the table. The result is increasing sensitivity to the fate of toll traffic hence to any vulnerability to change in toll traffic patterns and revenues.

The sensitivity and whatever vulnerability to change may exist is only partially indicated by industry averages like those in Figure 4.35.



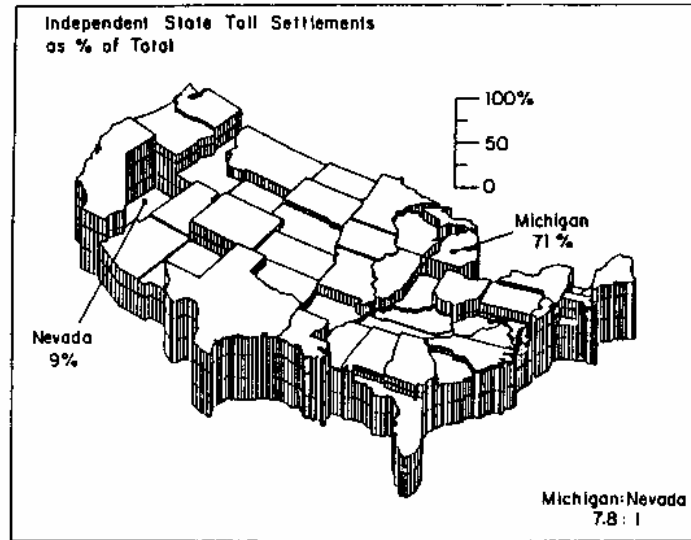
Rhode Island and Delaware have no independent companies

(a)



Rhode Island and Delaware have no independent companies

(b)



Rhode Island and Delaware have no independent companies

(c)

Figure 4.34

Independent State-by-State Toll Settlements, 1976

Source^{S57}

Ranked	Total Toll Settlements (\$ thousand)			Interstate Toll Settlements as % of Total			State Toll Settlements as % of Total		
	Total Toll Settlements (\$ thousand)	Interstate Toll Settlements as % of Total	State Toll Settlements as % of Total	Total Toll Settlements (\$ thousand)	Interstate Toll Settlements as % of Total	State Toll Settlements as % of Total	Total Toll Settlements (\$ thousand)	Interstate Toll Settlements as % of Total	State Toll Settlements as % of Total
AL	38195.026	45.96	54.04	CA	438964.478	91.22	70.93		
AZ	19781.616	57.56	42.44	FL	375903.233	62.82	69.96		
AR	35338.769	49.61	50.39	OH	180599.381	62.30	69.37		
CA	438964.478	31.86	68.14	IL	180144.265	60.89	68.14		
CO	5547.208	37.70	62.30	TX	176474.085	59.83	65.79		
CT	1445.862	60.89	39.11	NC	167396.960	57.56	65.15		
DE	0.000	0.00	0.00	PA	136356.097	56.79	64.48		
FL	375903.233	56.25	43.75	IN	131066.180	55.22	64.16		
GA	48306.652	41.86	58.14	NY	117224.548	55.82	64.24		
ID	20181.089	62.30	37.70	VA	95786.193	54.56	63.09		
IL	180144.265	36.94	63.06	MI	94843.046	53.84	63.06		
IN	131066.180	49.59	50.41	WI	89184.641	53.54	62.17		
IA	53912.730	35.76	64.24	MO	80707.695	52.66	60.72		
KS	31299.706	41.64	58.36	OR	57794.763	52.13	60.72		
KY	50469.142	52.66	47.34	SC	48306.652	51.18	60.53		
LA	12569.774	30.63	69.37	TX	47231.145	49.61	60.18		
ME	10105.028	35.84	64.16	NE	46682.815	48.03	59.64		
MD	626.481	52.13	47.87	NC	45811.468	46.22	58.36		
MA	264.979	39.47	60.53	ND	38195.026	46.22	55.67		
MI	94843.046	29.07	70.93	OH	35338.769	44.33	54.04		
MN	43711.468	34.21	65.79	AR	31257.257	41.64	53.78		
MS	4942.513	48.03	51.97	GA	31257.257	40.39	52.44		
MO	67960.428	37.83	62.17	SC	45811.468	40.36	51.97		
MT	18407.576	50.69	49.31	AL	38195.026	39.82	50.41		
NE	46682.815	44.33	55.67	AR	35338.769	39.78	50.39		
NH	4002.701	91.22	8.78	TX	33107.732	39.47	49.31		
NJ	22585.978	51.18	48.82	KS	31299.706	39.28	48.82		
NY	117224.548	34.85	65.15	OK	14994.932	37.83	47.87		
NC	17224.548	35.52	64.48	NM	13760.584	37.70	46.46		
ND	167396.960	47.56	52.44	LA	12569.774	36.94	46.16		
OH	180599.381	46.22	53.78	ME	11560.518	36.91	45.44		
OK	31257.257	40.39	59.61	SD	9913.034	36.18	45.44		
OR	57794.763	40.36	59.64	UT	6886.624	35.84	44.78		
PA	136356.097	39.78	60.22	CO	5647.208	35.76	44.18		
RI	0.000	0.00	0.00	VT	5413.996	35.52	43.75		
SC	45811.468	54.56	45.44	MS	4942.513	34.85	42.44		
SD	9913.034	39.28	60.72	NH	4002.701	34.21	40.17		
TN	33107.732	53.54	46.46	WY	3787.550	31.86	39.11		
TX	176474.085	30.04	69.96	CT	1445.862	30.63	37.70		
UT	6886.624	55.22	44.78	MD	626.481	30.04	37.18		
VA	5413.996	56.79	43.21	MA	264.979	29.07	8.78		
VT	5413.996	56.79	43.21	DE	0.000	0.00	0.00		
WA	80707.695	53.84	46.16	RI	0.000	0.00	0.00		
WI	14994.932	36.91	63.09						
WV	95786.193	55.82	44.18						
WY	89184.641	39.82	60.18						
	3787.550	62.82	37.18						
TOTAL	3081026.133	42.43	57.57	TOTAL	3081026.133	42.43	57.57		

Table 4.23

Independent State-by-State Toll Settlements, 1976

Source S52

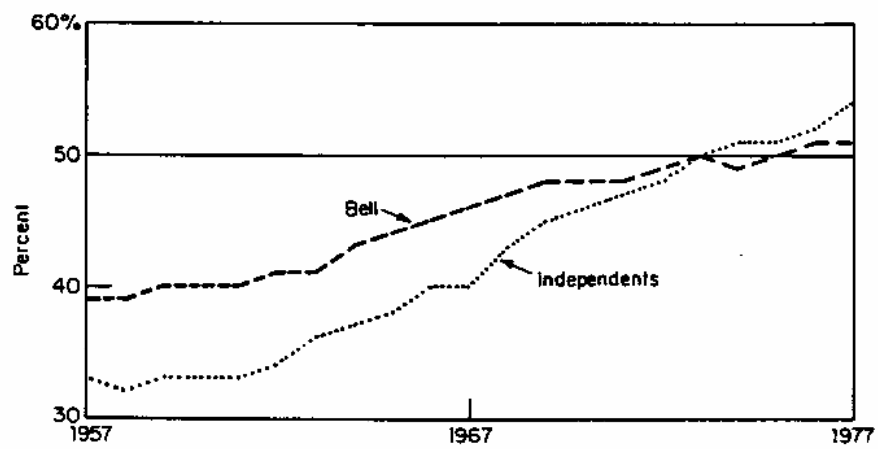


Figure 4.35

Total Toll Revenues as Percent of
Total Service Revenues

Source^{S53}

As shown by Figure 4.36 the proportions of total toll revenues to total service revenues range from 20 to 80 percent, although over 90% of the total toll settlement dollars go to Independents within $\pm 5\%$ of the Independents' average dependence on toll income.³⁴ As indicated in Figure 3.1, Box 16, about 58% of industry-wide 1976 toll revenues were for interstate toll and 42% for state toll, but these proportions range from 74%/26% for the Vista company to 35%/65% for the Continental System.³⁵ State-by-state variability for the Bell System (net of AT&T Long Lines revenues) is as shown in Figure 4.2(g),(i),(r),(o) and Table 4.4(c),(f); for Independents it is as shown in Figure 4.34 and Table 4.23.

Overall dependence on toll revenues has become somewhat smaller for the Bell System than for the Independents (Figure 4.35). Net of AT&T Long Lines revenues (compare total toll in Table 4.4(b) with Figure 3.1, Boxes 8 and 16), Bell depends on interstate toll revenues for 56% of its total toll revenues (Table 4.4(f)). The Independents on the average depend on interstate toll revenues for only 42% of their total toll revenues (Table 4.22).

Any sensitivity or vulnerability of the Independents to changes in toll revenues is therefore mediated through the Ozark Plan in two distinct ways: revenues derived from interstate services through jurisdictional separations and, in particular, from non-traffic-sensitive portions of local plant so separated, affect the lesser, though nonetheless significant portion of their toll revenues. The larger portion of their toll revenues depends on the structure of the Ozark Plan through its use in state toll settlements. The linkage is through the use of the same convenient administrative structure for the two logically distinct purposes of cost allocation and revenue sharing described in Section 4-G. Evidently, particular jurisdictions or companies remote from the average are more sensitive to change and either much less or much more vulnerable to it than

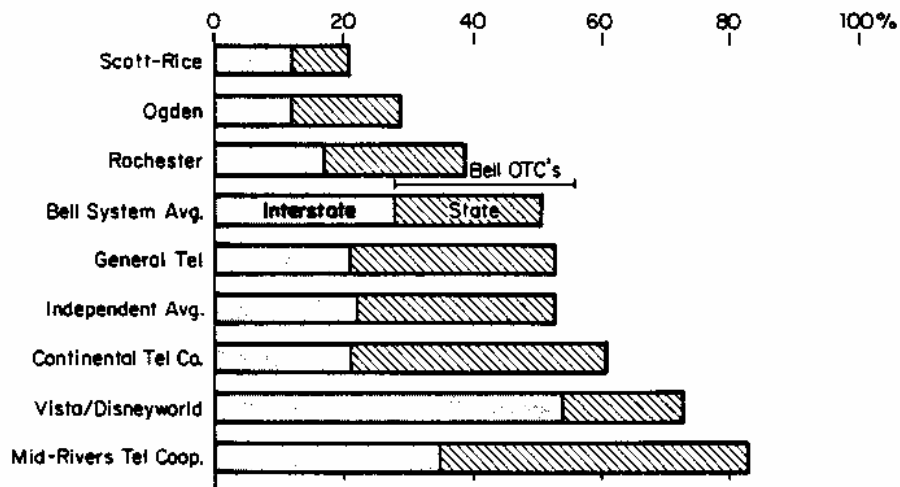


Figure 4.36

Toll Revenue as Percent of Total Service Revenues, 1977

Source^{S54}

those near the average.

Table 4.24 summarizes Ozark Plan interstate message cost allocations for the Bell System and the Independents in 1976. The totals correspond to Figure 3.1, Boxes 10 and 11. Different inferences may be drawn from looking at different fragments of these data. The fact that the Ozark Plan assigns only 21.1% of Independent total costs to interstate services in contrast to Bell's 24.3% would support an argument that the Independents get 13% $(24.3 - 21.1/24.3)$ less than Bell companies. But 21.5% of the Independents' 54.2% level of non-traffic-sensitive costs or 11.7% of their total costs get assigned to interstate services, in contrast to Bell's 20.8% of 47.7% or 9.9% of total costs. This would support an argument that the Independents get 18% $(11.7-9.9/9.9)$ more than the Bell companies.

Reconciliation comes from the following interpretation. The Independents' greater proportionate investment in local plant accounts for their greater proportionate level of non-traffic-sensitive costs. By contrast, the Bell System's greater proportionate responsibility for interexchange traffic (including traffic within extended "local" areas) accounts for their greater share of non-plant-related and of traffic sensitive costs, hence their greater interstate share of total costs.

Figure 4.37 shows the spread of Independent assignment of non-traffic-sensitive costs to both interstate and state toll services. As Table 4.24 shows, the average industry assignment to interstate costs is about 20%. Table 4.18 gives us a Bell System median estimate of assignment to state toll costs of 11%, yielding an estimate of 30% for average industry assignment of non-traffic-sensitive costs to combined interstate and state toll

	Costs						Ozark Plan I.S. Allocation or Assignment																				
	①		②		③		④		⑤		⑥		⑦		⑧		⑨		⑩		⑪		⑫				
	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Indep.	Bell	Industry		
1. NON-TRAFFIC SENSITIVE PLANT-RELATED COSTS	3.179	13.722	16.901	54.2	47.7	48.8	0.684	2.858	3.542	21.5	20.8	21.0															
2. Subscriber Line OSP	1.397	4.685	6.082	23.8	16.3	17.6	0.296	0.970	1.266	21.2	20.7	20.8															
3. Local Dial	0.292 ^b	1.153 ^a	1.445	5.0	4.0	4.2	0.062	0.240	0.302	21.2	20.8	20.9															
4. Subscriber Line Ckt. Equip.	0.083	0.992	1.075	1.4	3.4	3.1	0.018	0.205	0.223	21.2	20.7	20.7															
5. Station Apparatus	0.566	2.701	3.267	9.6	9.4	9.4	0.123	0.562	0.685	21.8	20.8	21.0															
6. Station Connections	0.671	3.317	3.988	11.4	11.5	11.5	0.147	0.697	0.844	21.9	21.0	21.2															
7. Large PBX	0.170	0.874	1.044	2.9	3.0	3.0	0.038	0.184	0.222	22.4	21.1	21.3															
8. OPERATING COSTS (Not Plant-Related)	1.150	7.253	8.403	19.6	25.2	24.3	0.238	2.036	2.274	20.7	28.1	27.1															
9. Traffic Expense	0.487	3.067	3.554	8.3	10.7	10.3	0.137	1.046	1.183	28.1	34.1	33.3															
10. Commercial Expense	0.495	3.438	3.933	8.4	12.0	11.4	0.074	0.787	0.861	15.0	22.9	21.9															
11. Revenue Acc'tg Expense	0.168	0.748	0.916	2.9	2.6	2.6	0.027	0.203	0.230	16.3	27.2	25.1															
12. SUBTOTAL	4.329	20.975	25.304	73.8	72.9	73.1	0.922	4.894	5.816	21.3	23.3	23.0															
13. Traffic-Sensitive and Other Plant-Related Costs	1.539	7.788	9.327	26.2	27.1	27.0	0.319 ^c	2.082 ^c	2.401 ^c	20.7	25.7	25.7															
14. TOTAL COSTS	5.868	28.763	34.631	100.0	100.0	100.0	1.241	6.976	8.217	21.1	24.3	23.7															

a. Total = \$4.350 billion of which \$1.153 billion is NTS and remainder in line 13.

b. Total = \$0.973 billion of which \$0.292 billion is NTS and remainder in line 13.

c. Line 14 - Line 12.

Table 4.24

Summary Ozark Plan Interstate Message Services Cost Allocations:
Bell, Independents and Industry, 1976

Source S55

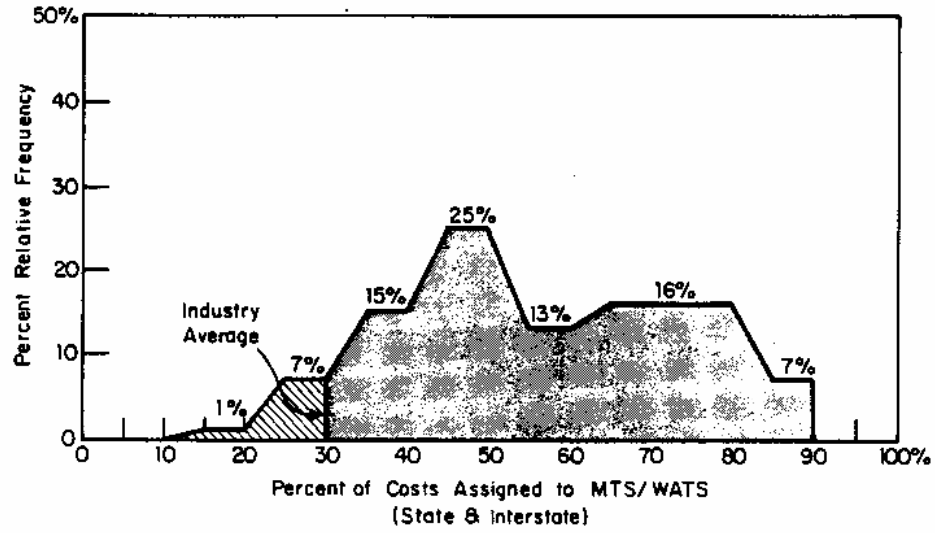


Figure 4.37

Ozark Plan Independent Company Toll Assignment of Non-Traffic-Sensitive Message Service Costs, 1976

Source^{S56}

services. Figure 4.37 is derived from a sample of 240 Independents representing about 80% of settlement dollars. Clearly most of them have toll assignments significantly above the industry average, consistent with the prior observation of Independent dependence on state toll revenues greater than the Bell System's and with the spread of SLU, CSR and SPF values shown in Figure 4.27 and Figure 4.28.

That the spread is no more extreme than indicated in Figure 4.37 is due to certain self-limiting features of the Ozark Plan. For example, in Continental's Western Colorado region application of the Ozark Plan's formula to an interstate SLU value of 37% and a state SLU value of 29%, or 66% SLU-measured toll usage, yields SPF values of 135% and 71% respectively, for a total of 206% toll usage, leaving -106% for local exchange usage. This the Ozark Plan adjusts for settlement purposes to 85% interstate, 0% state and a 15% local residual (Part 3, Source Note S14).

Within these wide variations, the general customer and industry sensitivity to the allocation of non-traffic sensitive plant related costs is accounted for by the data in Table 4.25, summarizing data drawn from lines 1 and 13 of Table 4.24: industrywide, about 60% of plant-related costs are categorized as non-traffic-sensitive under the Ozark Plan, hence subject to the politically determined SLU/SPF allocation system.

Sensitivities extend, in varying degrees, to all facets of cost definitions and allocations, from depreciation charges to tax calculations and to cost of capital. For example, in 1978 the Bell System's debt to equity ratio was 51:49,³⁶ the Independents' 57:43.³⁷ Section 4-G describes how total income after taxes is divided by plant investment book value to obtain a settlement ratio equal to the realized after tax rate of return on investment. For interstate purposes this rate

	Total					
	Independent		Bell		Industry	
	\$ billion	%	\$ billion	%	\$ billion	%
NTS	3.179	67.4	13.722	63.8	16.901	64.4
Other	1.539	32.6	7.788	36.2	9.327	35.6
Total	4.718	100.0	21.510	100.0	26.228	100.0

(a)

	Interstate					
	Independent		Bell		Industry	
	\$ billion	%	\$ billion	%	\$ billion	%
NTS	0.684	68.2	2.858	57.9	3.542	59.6
Other	0.319	31.8	2.082	42.1	2.401	40.4
Total	1.003	100.0	4.940	100.0	5.943	100.0

(b)

Table 4.25

Non-Traffic-Sensitive Portions of
Plant-Related Costs, 1976
(Message Services)

Source^{S57}

of return was about 9% in 1976. The settlement ratio or rate of return so calculated is applied to all settlements, whatever the capital structure of any particular Independent Company might be.

The Bell System position on this process is that the cost of capital is a matter--involving all operations not just joint operations subject to settlements based on the book value of plant, however financed--to be dealt with between the Independent and the appropriate regulatory authority. Some Independents take the position that this fails to recognize properly their higher cost of capital. For other Independents, notably these financed by low cost loans from the Rural Electrification Administration, the failure to recognize their lower cost of capital is advantageous.

I. Rationales for Separations and Settlements Processes

There is no necessary connection between a need to allocate costs and any of the endless variety of possible processes for doing so. However, custom, precedent, theory, administrative convenience or muscle may make this or that method more or less attractive or fashionable for this or that interest group, constituency or profession. Understanding the relationship between rationales and satisfaction or discontent with the particular processes described in Part 3 and the preceding sections of this part may therefore help illuminate the likely consequences of shifts to other methods on satisfying these rationales or, alternatively, of shifts in rationales on satisfaction with these methods.

That jurisdictional cost separations processes are needed at all is rooted in judicial decisions, most notably in the 1930 Smith v. Illinois Bell decision described in Section 3-A. However, the record makes

it plain that this decision has served more as a rationalization for the specifics of evolving separations processes than as a mandate.³⁸

For instance, while the subsequent 1934 Lindheimer v. Illinois Bell decision gave the "use" criterion greater logical weight than the prior decision, it also foreclosed any practical price impact of Smith v. Illinois Bell by agreeing that revenues derived from charges for local service could be allocated to the federal jurisdiction along with the costs whose allocation was mandated by the prior decision. What this meant was that all customers paid exactly what they paid before the decision, but that a portion of what exchange customers paid for exchange service was colored federal along with an equal amount of exchange costs. By the mid-forties, when the separations process as practiced in the late seventies began to take shape, the courts had explicitly adopted the pragmatic result-oriented stance enunciated in Federal Power Commission v. Hope National Gas Co. (Part 3, p. 25) in preference to reliance on doctrine or method. The persisting reliance on the "use" criterion in separations processes can hardly be pinned on the courts.

Nor is the "use" criterion necessarily consonant with any widely accepted body of theory. It is not necessarily identical with cost causation, a respectable concept in many accounting circles. Nor is it necessarily identical with the value-of-service procedures for transmuted prices into costs that have gained renewed popularity among economists under such labels as Ramsey pricing, inverse-elasticity rule and the like.

The jurisdictional separations processes as practiced in mid-1979 do allocate monetary costs between the federal and state jurisdictions.

Since the Lindheimer-sanctioned concomitant allocation of revenues has long been abandoned, one practical function of the processes has been to adjust the total revenues permitted to be drawn from consumers using services classified as belonging to one of these jurisdictions or another in keeping with evolving perceptions of equity. On the evidence of Part 2-B4 (esp. Table 2.3, 2.4 for business; Fig. 2.13 for Residences), large businesses and affluent households are the principal consumers of services whose costs are allocated to the federal pool. All the traditional pros and cons of economic efficiency versus equity debates--monetary, ideological, etc.; quantitative or qualitative; significant or insignificant--thus underlie the superficially legalistic and economic technicalities of the definition of relative federal and state shares of the total telecommunications cost pool and the choice of that instrument of income transfer in preference to such alternatives as taxation or subsidy.

Widespread perceptions of toll rate disparities as inequitable³⁹ were among the rationales for pushing increasing shares of costs into the federal cost-and-revenue pool. But it is evident from Section 4-B that, after nearly 30 years of formal separations processes, rate and revenue disparities still remained widespread. The findings of Section 4-F suggest why: a few states, like Pennsylvania, responded to pressures for toll price equalization by pegging state toll prices to federal prices and letting exchange service pricing and/or telephone company rates of return absorb the consequences within limits set by political and judicial constraints. The majority preferred stabler local price structures and levels, and letting state toll service prices and/or telephone company rates of return absorb the consequences. Thus, as of 1971, toll rate equalization was not, in fact, an actual function of jurisdictional cost

separations processes. By 1977, following major changes in toll price structures, toll price level disparities remained as pronounced as ever, just with, in many cases, the opposite sign (Figures 4.8, 4.9).

What linkage there is between jurisdictional separations processes and political balances regarding toll and exchange pricing in each of the states is a consequence of the adoption, at the inception of the Ozark Plan, of the structure of separations processes to administer the otherwise logically distinct process of division of toll revenues among carriers, especially those between the Bell System and Independents.

As Figure 2.43 indicates, the emergence of formal separations processes coincided with a sharp rise in the toll revenues of Independents. Figure 2.44(d),(h), together with Figures 3.2, 3.3 and Table 3.24, establish an evident correlation between changes in "use" definitions and a steadily increasing toll service share of industry operating costs and revenues, with a concomitantly decreasing local service share, in a period when "local areas" were also expanding in size.

Setting aside aggregate economic and political consequences of alternative price structures and levels, including the growing regulatory scrutiny of service-by-service rates of return, the Bell System is, as a whole, less affected by relative shares of service revenues than Independents. What, for the former, is ultimately a transfer among elements of the AT&T parent's account books, is, for the latter, an influx of real dollars in proportions of widely varying importance, as described in Section 4-H.

Unlike the fundamentally governmental jurisdictional separations process and unlike the government-supervised division of revenues in the railroad industry, the traditional telecommunications industry's settlements process is basically a private contractual matter. The contracts, traffic

agreements, between Bell operating companies and adjacent Independents specify division of revenues through toll settlements processes along with technical interconnections, toll operating and other necessary arrangements. Given 1600 Independents to deal with, some measure of uniformity is of evident administrative value to the Bell System, while the wide territorial, capital structure and other variations among Independents (Part 2-D2) make each of the latter prone to regarding uniformity as unfair. Manageable uniformity with maneuvering room to accommodate various, changing and conflicting claims to equity by all contracting parties is therefore essential to any division of revenues process under these circumstances.

As an approach to division of revenues, the settlements process as practiced as of early 1980 and described in Section 4-G had the following uniform yet adaptive features. Settlements are paid only for services provided under uniform statewide price schedules derived as described in Section 4-F. Settlements are paid to compensate for expenses and taxes as actually incurred by an Independent in furnishing toll services, not according to some normative specification of allowable expense levels. And, for plant allocated to toll services, the rate of return used to determine that portion of settlement revenues is the rate of return authorized by regulators for the Bell System operations in the particular state.

The linkage between otherwise unrelated jurisdictional separations processes and contractual division of revenues thus is the arbitrary adoption of the cost definitions accepted for the former to serve also to determine pro-rata shares in the latter, as described in Section

4-G. The administrative simplicity of this coupling of methods is evident.

Insofar as equating booked-revenue requirements subject to settlement for interstate toll calls with costs as defined for jurisdictional separations is concerned, an Independent, the Bell operating company in a state, the state regulators and all consumers of state (toll or local) services have an evident commonality of interest vis-a-vis AT&T's Long Lines Division, federal regulators, and the federal constituency comprising consumers of interstate services: the greater the proportion of costs hence of revenue requirements that can be ascribed to whatever interstate toll traffic there is in the franchise area and claimed as booked revenues under settlement or division of revenues, the less the share that has to be exacted from users of local and state toll services within the franchise territory.

That the first grouping of interests generally prevailed as of early 1980 is evident from the cost allocation structure for the non-traffic-sensitive message service costs (Tables 4.24 and 4.25) subject to SPF-ing under the Ozark Plan. On this score, the adoption of the Ozark Plan for both separations and settlements purposes followed the trends described in Part 3, consistent with uniform nationwide interstate toll prices and the sharing by Bell companies and Independents alike in revenues from interstate services. The principal procedural novelty of the Ozark Plan was the introduction of distance sensitivity into cost allocations, hence into revenue shares, through the CSR ratio. The CSR ratio lends greater weight to numerically less significant calls to longer distances. In-state interests could agree on putting a greater absolute revenue burden on out-of-staters and on in-staters dealing with out-of-staters, the further away, the better. Relative impacts on the states

differ. As Table 3.13 and Figure 3.6 indicate, California's share of interstate revenues is sharply improved relative to other states while New Jersey's is sharply diminished by the interstate CSR ratio as applied in 1976 (Section 3-D5) compared to what it would have been under unalloyed-SLU-based allocations.

Although formally described in judicially-targeted terms of deterrence to usage, the CSR ratio (Section 3-D4) clearly injects proportionality to prices into the definition of costs. By linking settlements through distance to price, the Bell System transferred to Independents incentives to promote long-distance calling, at precisely the time when Independents--as well as Bell--would have to make investments in changing switching plant to enable full realization of then incipient nationwide direct distance dialing.

The combined interstate separations/settlements process thus functioned also as an administrative tool for keeping relative peace in dividing revenues among the 1600 or so suppliers of traditional telecommunications services, with distance (price) sensitivity among the sticks and carrots available for keeping these multiple suppliers in technical and operational harmony.

The adoption of the Ozark framework for state revenue settlements is also consonant with intrastate balances of interests. By providing a common framework, it relieved the parties from individual Bell-Independent settlement negotiations that, according to accounts of a "19-year war" over fair shares from 1952 to 1971, had become burdensome for all concerned. As the first plan tied to a uniform statewide toll price schedules in every state, it relieved state regulators of the burden of

reviewing multiple toll tariffs and of the embarrassment of accepting higher toll tariffs from Independents than Bell, as well as some, but far from total relief from higher Independent local rates.

Under the Ozark Plan, Independents not adjacent to Bell companies were brought into the revenue-sharing fold on terms similar to terms of settlements among adjacent companies under pre-Ozark separations/settlements methods, again with usage-sensitivity responsive to Bell concerns over excessive largesse to Independents: the distance hence price sensitive state CSR ratio can be interpreted as building in some positive incentive for Independent development of toll traffic to and from Bell territory, since an Independent study area with low average length of haul (ALOH) for its state toll calls, would have claim on a lesser share of the state revenue pool than one with high ALOH (Section 3-D4). Alternatively, the effect may be couched in terms of cost-cutting incentives: perhaps, said a 1969 Bell study, the factor "should be practically zero for short haul toll messages in order to stimulate both Bell and Independent telephone companies to find ways of providing better service at lower system cost for such traffic."⁴⁰

Although there is, in most states, no actual regulatory cost separation between state toll and local services (Table 4.19, Column 3), overall average state revenues derived from the two categories in 1976 amounted to roughly 30% for toll and 70% for local services (Figure 3.1, Box 15) consistent with average cost estimates (Tables 3.4, 3.11). To the extent that total costs less interstate and state toll settlement revenues leave an Independent with an imbalance between the residual costs and the revenues derivable from local services, the Independent retains only options such as

dealing with the state regulators on rate-of-return for local services, with REA on reduced cost of capital or with customers on reduced service. Before the Ozark Plan, Independent local rates tended to be higher than those of comparable Bell System franchises. Devices like the Small Exchange Factor (Figure 4.33) relieved pressure by decreasing residual costs, hence more readily permitting adherence to statewide schedules such as illustrated in Table 4.10.

Finally, price sensitivity contributed toward resolving problems, evident already in 1969, arising from public demands for expansion of local service into Extended Area Service. Extending local service replaced what would otherwise have been short haul toll service revenues with lower exchange revenues and, sometimes, added costs for facilities to meet increased calling. Shifting a greater portion of costs through higher usage factors to statewide toll revenue settlements alleviated that pressure.

Since further expansion or contraction of EAS remains of prospective importance the following excerpt from a 1969 Bell System report remains timely:⁴¹

One of the major problems in EAS considerations relates to service in metropolitan areas wherein the majority of telephone users are located. Many of these locations have Independent exchanges which have become a part of the area and, since the customer recognizes no distinction in responsibility between serving telephone companies, there is a demand for an over-all serving arrangement. Where an EAS arrangement is offered by Bell, pressure on Independents to provide the same service is generally overpowering.

In considering the establishment of EAS in any given situation, or the type to be established, examination is made of: (1) the community of interest; (2) probable customer satisfaction with the proposed calling arrangement; (3) the cost of new circuit facilities required to meet the stimulated calling volumes; (4) toll revenue loss or operating savings; and, (5) exchange rates needed to meet

revenue requirements. These are of major importance to both Bell and any Independent involved, but the result of the Independent's economic study of the latter three may differ substantially from that of Bell in a like situation.

As a result of the structuring of toll settlements between Bell and Independents, interchanged short-haul toll, which may represent a large portion of an Independent's total toll business, should be compensatory for the Independent. However, when EAS replaces short-haul toll, what could be a saving for Bell may become a substantial loss to the Independent. Any added facilities required for furnishing the EAS further increases its exchange revenue requirements.

As stated earlier, most Independent Company exchange rates are already higher than Bell rates in exchanges of comparable size. Since an Independent involved in a potential EAS situation often starts out with a higher exchange rate than its Bell neighbor, customer attitude often makes it difficult for it to raise its exchange rates enough to offset the increase in exchange revenue requirements caused by possible toll revenue loss and added EAS facilities.

...

In reviewing the EAS situation a number of conclusions are evident:

1. Customer demand for wider calling areas continues and must be satisfied by both the Bell and Independent segments of the industry.
2. Revenue requirements (as reflected in settlements) attributed to short-haul toll by current separations procedures make it difficult for an Independent to replace short-haul toll with EAS.
3. Independents feel that Bell's use of statewide exchange rate schedules contribute to the problem of rate disparity.
4. Independents feel that, when a savings to Bell results from the elimination of joint short-haul toll, the savings should be shared with them.

Recognizing the problems confronting the industry relating to EAS, some recommendations appear in order:

- a. We should seek establishment of a method which will assign a greater value to a minute of long-haul toll usage than to a minute of short-haul toll usage. This would diminish the revenue requirement currently

attributed to short-haul toll in current settlements.

- b. Our methods of settlement for jointly provided EAS need to be studied...

The writing of those words happened to coincide with the awakening of fifty-year dormant competition within the telecommunications industry and between that industry and other communications industries. Thus, the politico-economic-technical balances underlying the Ozark Plan began to shift just as the Ozark Plan was put in place to reflect them. The consequences are addressed in Part 5.

NOTES

1. Sichter, James W. Separations Procedures in the Telephone Industry: The Historical Origins of a Public Policy. Program on Information Resources Policy, Harvard University, Cambridge, Ma. 02138, Publication P-77-2, 1977.
2. Cunningham, William J. "The Separation of Railroad Operating Expenses Between Freight and Passenger Services," Quarterly Journal of Economics, Vol. XXXI, 1917, p. 238.
3. Walsh, J. Leigh. Connecticut Pioneers in Telephony, Morris F. Tyler Chapter, Telephone Pioneers of America, New Haven, 1950.
4. Walker, Edward. Addresses and Messages of the Presidents of the United States, New York, 1842, p. 29.
5. 47 U.S.C.A. §153(e); 47 U.S.C.A. §221(b).
6. Sichter, op. cit.
7. Benson, Lee. Merchants, Farmers & Railroads: Railroad Regulation and New York Politics 1850-1887, Harvard University Press, Cambridge, Ma. 02138, 1955, p.6.
8. Borchardt, Kurt. The Exchange Network Facilities for Interstate Access (ENFIA) Interim Settlement Agreement. Program on Information Resources Policy, Harvard University, Cambridge, Ma. 02138, Publication P-79-4, 1979.
9. Seipp, David J. The Right to Privacy in American History. Program on Information Resources Policy, Harvard University, Cambridge, Ma. 02138, Publication P-78-3, 1978.
10. Walsh, op. cit., page facing 54.
11. AT&T.
12. AT&T.
13. National Association of Regulatory Utility Commissioners. Exchange Service Telephone Rates in Effect June 30, 1976. NARUC, Washington, D.C., 1976, p. 12. The statutory definitions in the Communications Act of 1934 read as follows:

'Telephone exchange service' means service within a telephone exchange, or within a connected system of telephone exchanges within the same exchange area operated to furnish to subscribers intercommunicating service of the character ordinarily furnished by a single exchange, and which is covered by the exchange service charge.

'Telephone toll service' means telephone service between stations in different exchange areas for which there is made a separate charge not included in contracts with subscribers for exchange service.

(47 U.S.C. §153(r)(s))

14. New England Telephone Company. Cape Cod Directory, July 1979.
15. Ibid.
16. Massachusetts Department of Public Utilities. D.P.U. 18153 - Sudbury.
17. New England Telephone Company.
18. National Telecommunications and Information Administration. Common Carrier Legislation Comments and Recommendations, November 1979.
19. For an analytical exposition of this relationship see: Lavey, Warren G. A Framework for the Analysis of the Regulatory Problems of Telephone Separations/Settlements Procedures. Program on Information Resources Policy, Harvard University, Cambridge, Ma. 02138, Working Paper W-78-13, 1978.
20. This account and what follows may be inferred from the following sources:
 - a) 43 Fed. Reg. 58204 (1978). Federal Communications Commission Docket No. 20981, Proposed Rulemaking and Creation of Federal-State Joint Board, with appended reports.
 - b) AT&T. Comments (on FCC, op. cit., 20(a)), March 1, 1979.
 - c) Federal Communications Commission. FCC Comments on AT&T Legislation, Section VII B-F, 1976.
21. FCC, Ibid., 20(c).
22. AT&T, Comments, 20(b).
23. FCC, op. cit., 20(c).
24. Personal communication.
25. Goulden, Joseph C. Monopoly, Pocket Book Editions, Simon & Schuster, New York, N.Y., 1970, pp. 62-64.
26. For historical details, see Gabel, Richard. Development of Separations Principles in the Telephone Industry. Institute of Public Utilities, Graduate School of Business Administration, Michigan State University, East Lansing, Michigan, 1967. Also see Sichter, op. cit.

27. 47 U.S.C.A. §410.
28. 309 U.S. 30 (1939).
29. 47 U.S.C. §201, 47 U.S.C.A. §87-88.
30. Godbey, Robert Carson. Revenue and Cost Allocations: Policy Means and Ends in the Railroad and Telecommunications Industries. Program on Information Resources Policy, Harvard University, Cambridge, Ma. 02138, Publication P-79-2, 1979.
31. USITA.
32. Table 4.21, Figure 3.1 (Box 16) and USITA.
33. USITA.
34. AT&T.
35. AT&T.
36. AT&T.
37. USITA.
38. Sichter, op. cit., pp. 65-88.
39. Section 4-B; Sichter, op. cit., pp. 99-110.
40. Bell System Committee on Regulatory Objectives and Procedures, Separations Background Material: History of Separations Approaches and Bases for Change, March 1969, p. 25.
41. Bell System Committee on Regulatory Objectives and Procedures, Settlements Background Material: Bell-Independent Business Relations, December 1969, pp. 19-20.

SOURCE NOTES

- S1. Figure 3.1, Box 16.
- S2. a. Table 3.26, Column 1.
b. Column 1 +25%.
c. Column 1 -25%.
d. Table 3.26, Column 2.
- S3. H.R. 3333; S.611, S.622: 96th Congress, 1st Session.
- S4. AT&T. Federal-State Joint Board, Request No. JB-37, July 5, 1977.
- S5. Ibid.
- S6. AT&T. Federal-State Joint Board, Request No. JB-50, April 1, 1977.
- S7. Ibid.
- S8. Ibid.
- S9. Ibid.
- S10. AT&T. Updating Federal-State Joint Board, Request No. JB-51, October 4, 1977.
- S11. Ibid.
- S12. AT&T.
- S13. Ibid.
- S14. Ibid.
- S15. National Association of Regulatory Utility Commissioners (NARUC). Long Distance Message Toll Telephone Rates, Washington, D.C., December 31, 1977 and June 30, 1971.
- S16. Ibid.

The rate bands are simplified in these graphs. The true rates have more mileage bands and the states differ in number and length of these bands. The graphs show only those states which fall entirely above or entirely below each interstate rate band. When a state rate crosses or coincides with an interstate band, it does not appear on the graph. For each simplified rate band in the graph, the highest rate falling within this band was used to determine the state plot points and the interstate levels.

- S17. AT&T. Federal-State Joint Board, Request No. JB-50, April 1, 1977, and update.

NARUC. Long Distance Message Toll Telephone Rates, Washington, D.C., December 31, 1977, Table 51, and June 30, 1971, Table 52, p. 80.

U.S. Department of Labor, Bureau of Labor Statistics. Personal communication, January 1979.

S18. NARUC. Long Distance Message Toll Telephone Rates, Washington, D.C., December 31, 1977, Tables 41 and 51, and June 30, 1971, Table 41, p. 75 and Table 51, p. 80.

S19. AT&T. Federal-State Joint Board, Request No. JB-50, April 1, 1977 and update.

NARUC. Long Distance Message Toll Telephone Rates, Washington, D.C., December 31, 1977, Table 51, and June 30, 1971, Table 52, p. 80.

U.S. Department of Labor, Bureau of Labor Statistics. Personal communication, January 1979.

S20. NARUC. Long Distance Message Toll Telephone Rates, Washington, D.C., June 30, 1971, Table 25, p. 66.

AT&T. Federal-State Joint Board, Request No. JB-50, April 1, 1977.

S21. NARUC. Long Distance Message Toll Telephone Rates, Washington, D.C., June 30, 1971, Table 32, p. 70.

AT&T. Federal-State Joint Board, Request No. JB-50, April 1, 1977.

S22. NARUC. Long Distance Message Toll Telephone Rates, Washington, D.C., June 30, 1971, Table 4, p. 56.

AT&T. Federal-State Joint Board, Request No. JB-50, April 1, 1977.

S23. NARUC. Long Distance Message Toll Telephone Rates, Washington, D.C., June 30, 1971, Table 4, p. 56.

AT&T. Federal-State Joint Board, Request No. JB-50, April 1, 1977.

S24. NARUC. Long Distance Message Toll Telephone Rates, Washington, D.C., June 30, 1971, Table 25, p. 66 and Table 51, p. 79.

AT&T, December 1978 and AT&T, Federal-State Joint Board, Request No. JB-50, April 1, 1977.

Alfred D. Chandler, Jr. The Visible Hand: The Managerial Revolution in American Business, The Belknap Press of Harvard University Press, Cambridge, Massachusetts and London, England, 1977, p. 84.

Charles O. Paullin, Atlas of the Historical Geography of the United States, Washington, D.C., Carnegie Institution and American Geographical Society, 1932, plate 138A, B, C.

- S25. Through the courtesy of the Map Collection of the Sterling Memorial Library of Yale University.
- S26. NARUC. Exchange Service Telephone Rates, Washington, D.C., December 31, 1977.
AT&T. Federal-State Joint Board, Request No. JB-36, January 10, 1977.
- S27. Ibid.
- S28. NARUC. Exchange Service Telephone Rates, Washington, D.C., June 30, 1976, Table 33, and June 30, 1978, Table 34.
- S29. NARUC. Exchange Service Telephone Rates, Washington, D.C., June 30, 1976, pp. 10-13.
- S30. New York Telephone Company. Manhattan Telephone Directory, 1977-78, New York, New York, June 30, 1977, p. 12.
U.S. Bureau of the Census. 1970 Census of Population: General Population Characteristics, New York, U.S. Government Printing Office, Washington, D.C., November 1971.
- S31. New York Telephone Company. Manhattan Telephone Directory 1977-78, New York, N.Y., June 30, 1977, p. 13.
- S32. New York Telephone Company. Manhattan Telephone Directory, 1977-78, New York, N.Y., June 30, 1977, Table 4, p. 15.
- S33. New York Telephone Company. Manhattan Telephone Directory, 1977-78, New York, N.Y., June 30, 1977, Table 5, p. 15.
- S34. New York Telephone Company. How to Read Your Local Usage Detail List, New York, N.Y., January 1978.
- S35. Commonwealth of Massachusetts, Department of Community Affairs. Form 151, TM-8-77-142383.
- S36. New England Telephone and Telegraph Company. Boston White Pages Telephone Directory, 1978, pp. 8, 14-15.
- S37. New England Telephone and Telegraph Company. Boston White Pages Telephone Directory, 1978, pp. 8, 14-15.
Economics and Technology, Inc. Telephone Rate Reports, Northeast Region, Boston, Mass., p. MA-248(0) 4.5.1.
- S38. AT&T.
- S39. Ibid.
- S40. NARUC. "Report of the Committee on Communications," Proceedings, Washington, D.C., 1978, Exhibits I-VII, pp. 481-488, and earlier editions.

- S41. Federal Communications Commission, FCC Comments on American Telephone and Telegraph Legislation, Section VII-B-2, between pp. 9 and 10.
- S42. AT&T. Federal-State Joint Board, Request No. JB-41, March 22, 1977.
- S43. Ibid.
- S44. Ibid.
- S45. AT&T. Federal-State Joint Board, Request No. JB-38, January 10, 1977.
- S46. Brousseau, Robert J. On a Statistical Procedure for Determining a Division of Telephone Toll Revenues Predicated on Average Costs, Doctoral Thesis, Graduate School of Business Administration, New York University, 1976, pp. 222-223.
- S47. Ibid., pp. 202, 205.
- S48. Joint Report by USITA Settlements and Separations Committee and Bell System Representatives, January 21, 1974, as cited in Brousseau, Robert J. On a Statistical Procedure for Determining a Division of Telephone Toll Revenues Predicated on Average Costs, Doctoral Thesis, Graduate School of Business Administration, New York University, 1976, pp. 231-232, 234-235.
- S49. Ibid., p. 230.
- S50. United States Independent Telephone Association (USITA).
USITA. Independent Telephone Statistics, Vol. 1, Washington, D.C., July 1978, p. 5.
- S51. AT&T.
- S52. Program on Information Resources Policy.
- S53. AT&T.
- S54. Ibid.
- S55. Ibid.
- S56. Ibid.
- S57. Table 4.24, Lines 1 and 13.

Appendix

Abbreviations of State Names used in Tables

AL	Alabama	NE	Nebraska
AZ	Arizona	NV	Nevada
AR	Arkansas	NH	New Hampshire
CA	California	NJ	New Jersey
CO	Colorado	NM	New Mexico
CT	Connecticut	NY	New York
DE	Delaware	NC	North Carolina
FL	Florida	ND	North Dakota
GA	Georgia	OH	Ohio
ID	Idaho	OK	Oklahoma
IL	Illinois	OR	Oregon
IN	Indiana	PA	Pennsylvania
IA	Iowa	RI	Rhode Island
KS	Kansas	SC	South Carolina
KY	Kentucky	SD	South Dakota
LA	Louisiana	TN	Tennessee
ME	Maine	TX	Texas
MD	Maryland	UT	Utah
MA	Massachusetts	VT	Vermont
MI	Michigan	VA	Virginia
MN	Minnesota	WA	Washington
MS	Mississippi	WV	West Virginia
MO	Missouri	WI	Wisconsin
MT	Montana	WY	Wyoming

