

Alternative Telecommunications
Costing Methods

**Fundamentals and Discretion:
A Fixed Allocator
Separations Model**

Jay L. Silberberg

Program on Information Resources Policy

Harvard University

Center for Information
Policy Research

Cambridge, Massachusetts

A publication of the Program on Information Resources Policy.

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Jay L. Silberberg

November 1989, P-89-6

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 National Aeronautics and Space
 Administration
 National Security Agency
 U.S. General Accounting Office
 United States Postal Rate Commission
 United Telecommunications, Inc.
 US West
 Wolters Kluwer

Acknowledgments

Thanks go to the following persons who reviewed and commented critically on drafts of this report:

Raymond M. Alden	James L. Macher
Roy A. Billinghamurst	Herbert E. Marks
Gerald W. Brock	James A. McCullough
Martin Clift	John H. McGarrity
Samuel M. Epstein	George D. Morlan
Robin A. Hamilton Harding	Bernard Y. Schultz
Takashi Hatchoji	M. Whiting Thayer
Mark Lemler	Randall D. Young

Special thanks to Rob Granberry, Bell South Services, for his assistance in handling the mechanized data transmission and to Pat McCracken, US West Communications, for developing the system to process the data.

These reviewers and the Program's affiliates are not, however, responsible for or necessarily in agreement with the views expressed herein, now should they be blamed for any errors of fact or interpretation.

Personal thanks go to my wife, Langdon, for her support during this research. To her I dedicate this report.

Executive Summary

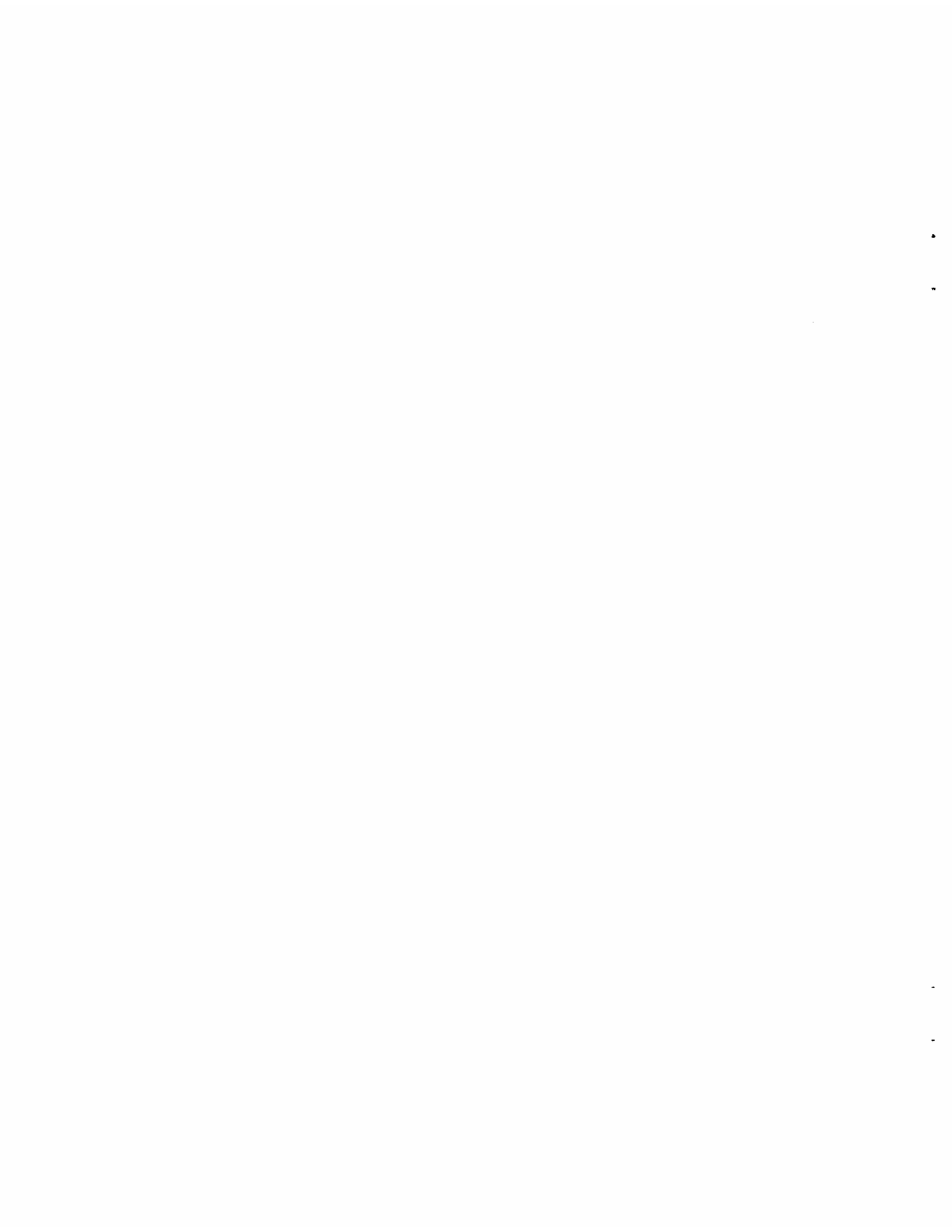
- This report initiates an examination of alternative telecommunications costing methods. It gives the results of replacing current United States Jurisdictional Separations rules with a single fixed nationwide interstate allocator. It does not advocate or propose this or any other change to current Separations rules, but it does model the fixed allocator approach to suggest the stakeholder implications of what may be an extreme example of an alternative regulatory costing method and of the discretion that is possible in regulatory costing.
- Using a single fixed allocator of 23% to assign costs to the interstate jurisdiction may have an impact on local exchange carrier (LEC) cost-based pressures to deaverage interstate toll prices. More importantly, this pressure seems to be particularly strong in study areas with the highest or the lowest interstate use per loop. These study areas may offer interexchange carriers (IXCs) their own cost incentives to move existing interstate toll prices away from the average. This alternative may therefore amplify existing IXC cost-based pressures to deaverage toll prices.
- Central to all the findings is the fact that wide dispersion of data for individual study areas makes national averages poor predictors of the effects of any change on stakeholders.
- These findings were based on data for 83 study areas provided by all seven regional holding companies, GTE, United Telecommunications, Cincinnati Bell, Inc., and Southern New England Telecommunications.
- Costing issues among stakeholders are often clouded by mistaken perceptions of objective accuracy. Issues get lost in mechanical allocation considerations portrayed as means to discover "true costs." The allocation of joint or common costs is an example of the pitfalls of focusing on objective accuracy. A large portion of the industry's costs can be considered common, and common costs associated with any service, product, jurisdiction, or market are defined, not discovered, by the prevailing costing method. One method may be appropriate for one purpose but not another, and different stakeholders may disagree about the appropriateness of any method. "Correct" decisions cannot be made simply by gathering the facts. Instead, policy goals must be taken into account.

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PREFACE

This report initiates an examination of alternative telecommunications costing methods.

It focuses on the prevalent regulatory costing methods, not because these costing methods are correct or desirable, but because they are the ones in use in the late 1980s. In this way it provides a basis for comparing other costing methods, one of which -- a single, fixed nationwide interstate allocator method -- is explored in detail.

The report does not recommend, advocate, propose, or support the adoption of a single, fixed nationwide interstate allocator. It merely offers this method as one admittedly extreme example of the discretion that is possible in regulatory costing. The report also does not advocate that there are or should be any specific set of principles that should underlie Separations rules or changes in these rules. The development of any fundamental principles is a political process.¹

The report deals with costing methods and only suggests impacts on prices due to the link between costs and prices as it was in the late 1980s. It does not investigate this linkage or suggest possible changes to the cost-price relationship. Neither does it suggest that impacts on prices or anything else are good or bad, but only that these impacts affect different stakeholders differently.

The report provides background on costing methods in general and sets the context of disputes over telecommunications costing methods. This background is in Chapters 1 through 3. Readers familiar with the background may start with Chapter 4, the beginning of the model description.

The report is current as of March 1, 1989. It uses both public and private data. Many of the figures rely partially or wholly on the Monitoring Report, CC Docket No. 87-339, June 1988, prepared by the staff of the Federal-State Joint Board in CC Docket No. 80-286. All the

¹For a description of how this political process has operated in the past, see The Formula is Everything: Costing and Pricing in the Telecommunications Industry, Anthony G. Oettinger, Program on Information Resources Policy, Harvard Univ., Cambridge, MA, Publication P-88-2, 1988.

cost-per-minute, cost-per-loop, and minute-per-loop calculations rely on this source for minute and loop counts.

However, the costs come from local exchange carrier data provided to the Program on Information Resources Policy under agreements, negotiated with each company, under which *aggregate* data can be made public.

Two appendices to Chapter 3 appear at the end of this volume. Appendix 1 provides the derivation of the analytical cost categories from the USOA accounts and separations categories. Appendix 2 further details the data sourcing and analysis process.

A list of acronyms also appears at the end of the volume.

CHAPTER ONE

BACKGROUND AND CONTEXT

As the 1980s draw to a close, the telecommunications industry is well into a period of instability in both its regulatory and marketing dimensions. As a result, regulators, companies, and other stakeholders are making new regulatory proposals with an unprecedented and often confusing frequency. Similarly, many companies are making and revising business plans far more often than in the past. This latter effect can be seen in the entry and exit of regional holding companies (RHCs) from various markets and ventures and in the frequent structural reorganization some Bell Operating Companies (BOCs) and RHCs are undergoing.

What these various alternatives and changes will lead to depends on many factors, including the regulatory, political, and economic climates, individual companies' strategies, missions, and goals, and further advances in technology. One very important complex of such influences involves costing the products and services companies offer their customers.

This chapter sets the context for the research into alternative costing methods. It first explores industry instability and national telecommunications policy changes. While this instability may be traced back to the Hush-A-Phone, Above 890, and Carterfone decisions of the 1950s and 1960s,² it accelerated in the 1970s and 1980s with technological advances, the introduction of competition in the long-distance, customer premises equipment (CPE), and enhanced services markets, and the 1984 AT&T divestiture of the Bell operating companies.

² Hush-A-Phone Corp. v. AT&T et al., FCC Docket No. 9189, Decision and Order, December 21, 1955; Decision and Order on Remand, 22 FCC 112 (1957). The FCC's decision not to override AT&T's prohibition on foreign attachments on telephones was overturned in federal court, Hush-A-Phone Corp. v. United States, 238 F. 2d 266, (D.C. Cir. 1956). Allocation of Frequencies in the Band Above 890 Mc., FCC Docket No. 11866, Report and Order, 27 FCC 359 (1959); Memorandum Opinion and Order, 29 FCC 825 (1960). In the Matter of Use of the Carterfone Device in Message Toll Telephone Service, FCC Docket Nos. 16942, 177073, Decision, 13 FCC 2d 420 (1968); Reconsideration Denied, Memorandum Opinion and Order, 14 FCC 2d 571 (1968).

Other changes include establishing access charges to compensate local exchange carriers (LECs) for use of their network to carry calls for interexchange carriers (IXCs), changing regulatory patterns at the state and federal level (in the late 1980s the FCC's push toward replacing rate base rate of return (RBROR) regulation for AT&T and LECs with price caps),³ changing the Jurisdictional Separations rules to halt and then reverse the decades-old trend toward increased assignment of the network costs to the interstate jurisdiction, and some easing of the line-of-business restrictions imposed on the RHCs by the Modified Final Judgment (MFJ) as RHCs desire to expand the scope of their business.⁴

These changes are considered here within a framework of tactical disputes and strategic outcomes. Because the research focuses on Jurisdictional Separations changes, a brief history and explanation of Separations and the link between costs and prices is presented. Finally types and effects of Separations changes are discussed.

Figure 1-1 lists various FCC rules ("Parts" of Title 47 of the Code of Federal Regulations) related to costing methods, their effective dates, and relevant FCC dockets in the late 1980s. For simplicity, these rules will usually be referred to by their Part number, e.g. Part 36, instead of their longer title or subject. Their relationship to each other and to prices is discussed in section II.B.3 below.

³In the Matter of Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313: Notice of Proposed Rulemaking, 2 FCC Rcd 5208 (1987); Further Notice of Proposed Rulemaking, 3 FCC Rcd 3195 (1988).

⁴For a more detailed discussion of policy changes contributing to this instability, see Behind the Telephone Debates, Carol L. Weinhaus and Anthony G. Oettinger, Ablex Publishing Corp., Norwood, NJ, 1988.

47 CFR, FCC Part No.	Title	Subject	Effective Dates	Relevant Dockets in Late 1980s
Part 31	USOA (Uniform System of Accounts)	Financial accounting rules	1933 - 1987	—
Part 32	USOAR (Uniform System of Accounts, revised)	Financial accounting rules	1988 -	CC Docket 78-196
Part 67	Jurisdictional Separations (Separations Manual)	Assignment of costs to inter- and intra-state jurisdictions	1947 - 1987	CC Dockets 78-72 and 80-286
Part 36	Jurisdictional Separations (Conformed to Part 32 USOAR)	Assignment of costs to inter- and intra-state jurisdictions	1988 -	CC Dockets 78-72, 80-286 and 86-297
Part 64	Nonregulated Accounting — "Part X"	Accounting for non-regulated activities by dominant carriers	1987 -	CC Docket 86-111
Part 65	Net Income and Rate Base Prescription	Interstate rate-making adjustments	1988 - *	CC Docket 86-497
Part 69	Access Charges	Allocation of interstate costs to access elements, definition of access elements	1984 -	CC Dockets 78-72 and 87-113

* Previously covered by CC Docket 19129, Final Decision and Order, adopted February 23, 1977. In the Matter of American Telephone and Telegraph Company, the Associated Bell System Companies, Charges for Interstate Telephone Service, AT&T Transmittal Nos. 10989, 11027, 11657.

Figure 1-1

FCC Costing Rules

I. Telecommunications Policy Shifts and Industry Instability

The Communications Act of 1934 has as its stated purpose:

regulating interstate and foreign commerce in communications . . . so as to make available . . . to all the people of the United States a rapid, efficient, nation-wide, and world-wide . . .

communications service with adequate facilities at reasonable charges⁵

The Act does not define the specifics of this purpose, nor what constitutes nationwide service, efficient service, adequate facilities, nor reasonable charges. Thus the Act has sufficient flexibility to be used as the guiding principle for telecommunications policy from the monopolistic period of its inception to today's more competitive environment.

The main thrust of telecommunications policy under the Act until the last decade or so was "universal service" -- making telephone service available and affordable to virtually everyone in the country. This orientation was rooted in an era of lower technology when the percentage of households with telephone service, the penetration level, was less than half.⁶

This policy was implemented in a number of ways, one of which relates to costing methods. Pursuant to Smith v. Illinois Bell,⁷ part of the costs of the telephone network had to be assigned to the interstate jurisdiction. The specific process by which this was done came to be known as Jurisdictional Separations and was eventually codified as FCC Part 67. Through a long and involved political process, these rules were written so that a significant portion of the cost of connecting a subscriber to the central office was assigned to the interstate jurisdiction, thus keeping costs under state jurisdiction lower than they would otherwise have been. Most if not all states translated these lower costs into more affordable prices for local phone service.⁸

⁵Communications Act of 1934, 48 Stat 1064, Pub. L. No. 417 (1934), Section 1, p. 1064. (Codified at 47 USC Section 151 et seq.)

⁶In 1940 36.9% of all households had telephone service. This figure increased to 61.8% in 1950 and 78.3% in 1960. Historical Statistics of the United States, Colonial Times to 1970, Part 2, Bicentennial Edition, U.S. Department of Commerce, Bureau of the Census, 1975, p. 783.

⁷282 US 133 (1930).

⁸Behind the Telephone Debates, chs. 8-10.

This costing method coupled with increasing economic prosperity and increased use of interstate services led to what could be considered the virtual achievement of universal service by the 1970s.⁹ In March 1988, 92.9% of all households had telephone service.¹⁰ By this time, attempts to increase penetration levels focused on what could be considered "telephone welfare." The various FCC Lifeline plans target low-income households without telephone service. There are two basic plans. One offers qualifying households reduced Subscriber Line Charges (SLC) in an amount equal to reduced local service rates.¹¹ The other plan, known as Link Up America, offers reduced installation charges and special financing to qualifying households who may be able to afford monthly service but not the initial charges to get service.¹² In addition, there are a number of state plans.

At the same time that universal service was largely being achieved, the industry was changing structure from monopoly to increasing competition. Ironically, this shift is a return to early days of telephone service, when, following expiration of the original

⁹The percentage of households with telephones topped 90% of the total by 1970. By one measurement, 90.0% of all households had a telephone by 1969. Bell System Statistical Manual, 1950-1980, AT&T Comptroller's Accounting Division, July 1981, p. 504. By another measurement, 1970 was the first year in which penetration topped 90%. Historical Statistics of the United States, Colonial Times to 1970, Part 2, 1975, p. 783.

¹⁰Monitoring Report CC Docket No. 87-339, June 1988, Prepared by the Staff of the Federal-State Joint Board In CC Docket 80-286, Table 1.1, p. 16. This figure is derived using a different method than those cited in footnote 9 where multiple lines in one household tended to skew the results upwards. For example, the Bell System Statistical Manual calculated residence main telephones per 100 households in 1980 at 96.3. The Monitoring Report method is based on the answer to the question "Is there a telephone in this house/apartment?" This question is asked every four months as part of the Census Bureau's Current Population Survey.

¹¹Originally ordered In the Matter of MTS and WATS Market Structure, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, Decision and Order, 50 Fed Reg 939 (1985).

¹²In the Matter of MTS and WATS Market Structure, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, Report and Order, 2 FCC Rcd 2953 (1987).

telephone patents, competition arose among local phone companies within a single serving area.¹³ Modern competition arose on a number of fronts, beginning with telephone equipment and private microwave systems.¹⁴ The most visible of this competition for many customers arose from the Above 890 decision.¹⁵ This decision opened the door for companies to compete for long-haul traffic, which in turn led to long deliberations by the FCC on how to charge for the interconnections between these carriers and local telephone companies.¹⁶ These deliberations culminated in the adoption of FCC Part 69, Access Charges, and the creation of SLC.¹⁷

As competition increased, the FCC gradually adopted a policy of supporting, if not outright encouraging, that competition. As a result, the FCC wanted to have jurisdictional costs and prices more closely linked than in the past.¹⁸ This stance has led to a reorienting of the role of Separations from providing cost support for a universal service policy to providing cost support for a competitive policy.

¹³Behind the Telephone Debates, pp. 6-11, describes the swings between monopoly and competition from the advent of telephone service until the 1930s.

¹⁴For a more detailed look at this phenomenon, see Behind the Telephone Debates, pp. 11-14.

¹⁵Allocation of Frequencies in the Band Above 890 Mc., FCC Docket No. 11866, Report and Order, 27 FCC 359 (1959); Memorandum Opinion and Order, 29 FCC 825 (1960).

¹⁶For details on these deliberations, see The FCC Access Charge Plan: The Debates Continue, Mark L. Lemler, Program on Information Resources Policy, Harvard University, Cambridge, MA, Publication P-87-8, October 1987, and Implementing Access Charges: Stakeholders and Options, John McGarrity, Program on Information Resources Policy, Harvard University, Cambridge, MA, Publication No. P-83-2, March 1983.

¹⁷SLC is described in more detail in section II.B.2 below.

¹⁸For a brief history of this linkage, and how it has varied over time, see Oettinger, The Formula is Everything. In 1988 the desire to link costs and prices was restated in In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, Memorandum Opinion and Order on Reconsideration and Order Inviting Comments, 3 FCC Rcd 4560 (1988), fn. 107.

Another result of the FCC's increasingly pro-competitive stance is its rules regarding deregulated activities of the carriers. The FCC replaced structural separations with accounting separations¹⁹ and adopted in Part 64 cost accounting rules designed to ensure that deregulated services bore their full share of costs and that regulated services did not subsidize deregulated services.²⁰

While the FCC was dealing with interstate competition and deregulated services, state commissions were dealing with increasing competition for intrastate toll and local services. Intrastate toll service competition generally followed the same pattern as that for interstate. States developed their own interconnection charges and often allowed IXCs to compete with the former BOCs within the local access and transport areas (LATAs) designated by the MFJ for BOC (as opposed to AT&T) toll.²¹

Local competition has taken many forms. Of perhaps greatest concern to the LECs is bypass. Bypass happens whenever someone other than the LEC handles traffic from a customer to an IXC's point of presence (POP). The other carrier may be the IXC, a private network, or the end user itself. This type of bypass is frequently referred to as "facilities bypass" because the other carrier is bypassing the LECs facilities to carry traffic to a POP. Another type of bypass occurs when a high-volume customer buys special access, a private line link to

¹⁹In the Matters of Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry); and Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Thereof; Communications Protocols Under Sections 64.702 of the Commission's Rules and Regulations, CC Docket No. 85-229, Phase I Report and Order, 51 Fed. Reg. 24350 (July 3, 1986) eliminated the separate subsidiary responsibility for AT&T and the RHCs.

²⁰In the Matter of Separation of costs of regulated telephone service from costs of nonregulated activities and Amendment of Part 31, the Uniform system of Accounts for Class A and Class B Telephone companies to provide for nonregulated activities and to provide for transactions between telephone companies and their affiliates, CC Docket No. 86-111: Notice of Proposed Rulemaking, 104 FCC 2d 59 (1986); Report and Order, 2 FCC Rcd 1298 (1987).

²¹The MFJ established "exchange areas" in which BOCs could offer all services. The AT&T Plan of Reorganization gave these areas the name "LATAs".

the POP, rather than using MTS or WATS. This type of bypass is called "service bypass" because the customer is replacing one LEC service with another. Unlike what happens with facilities bypass, LECs still get revenues when there is service bypass.

To the extent that the customer chooses bypass because prices appear to exceed costs of the service, however those costs are defined, the bypass is sometimes referred to as "uneconomic" and undesirable. Others have argued that all bypass is desirable: "from the standpoint of economic efficiency, by-pass -- all by-pass -- is good because it is a competitive reaction to the distortions [of price from "economic costs"] in the toll markets caused by the toll-to-local subsidy."²²

Other forms of local competition include local area networks and shared tenant services. While there is some debate over how extensive this competition really is, there is no doubt that it exists at some level and few would doubt that there are pressures for it to increase.

II. Tactical Disputes, Elements of Change and Strategic Outcomes

Each tactical dispute marking this era of increasing instability may affect various strategic outcomes. Both the disputes and outcomes can occur in a number of not-always-discrete areas. A few examples of outcomes and related disputes follow. These examples are not intended to be all-encompassing, but merely to suggest relationships and to set the context for the alternative costing methods.

²²"Costing as an Irrelevant and Anti-Competitive Process," John T. Wenders, Bell Communications Research, Economic Cost Modelling Forum, September 11-13, 1985, Atlantic City, NJ, draft, p. 17.

	DISPUTES	CHANGE IN RELATIVE GROWTH RATE	
		LEC (%)	IXC (%)
Historical Influences	MFJ transfer of state toll operations to interLATA	-	+
	Increased interexchange usage	-	+
	Proliferation of private networks	+	-
	Increased local service prices (ca. divestiture)	+	-
	Bypass	-	+
	Interstate pricing: SLC, special priced access surcharge and CCLC	+	-
	Interstate costing changes (Separations and access charges)	+/-	+/-
	Computer Inquiries I and II	-	+
	IntraLATA interexchange competition	-	+
	Directory advertising and sales moved to non-traditional industry	-	+
	25% interstate cost allocation	+/-	0
	Potential Influences	ONA (Computer Inquiry III)	
Complete deregulation			
Price caps and other alternatives to rate base ROR			
Interstate pricing of leaky PBXs			
Optional CCL pool			
	NET	-	+

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Traditional telephone: includes LECs, retail IXCs.
 Non-traditional telephone: includes resale IXCs, alternative directories.

Figure 1-2

Tactical Disputes, Elements of Change, and Strategic Outcomes: 1980-1986 Traditional Telephone LEC and IXC Market Shares of Kept Revenues

One way to view these disputes and outcomes is in terms of their effect on relative growth of LEC and IXC market shares.²³ Figure 1-2

²³For more detail, see Telecommunications Industry: Tactical Disputes, Elements of Change, and Strategic Outcomes, Carol L. Weinhaus and Jay L. Silberberg, Program on Information Resources Policy, Harvard University, Draft, March 1989 (hereafter Tactical Disputes).

summarizes this link. The net results on the bottom row are the strategic outcomes, which are the result of many interrelated political, economic, and technological battles. The plus sign in this row indicates that the IXC share of the total traditional industry revenues grew; the minus sign indicates a decrease in the LEC share. Within each row, the columns are a zero sum game. If the share in one column increases, the share in the other column has to decrease. A "+/-" symbol indicates that further subdivision may be necessary to look at the effect of a dispute. Either sign may represent an increase or a decrease in revenues; what is portrayed here is differential revenue growth rates.

Each row in the left-hand column of this figure is an example of a historical event or of a current proposal that affects market share. The MFJ shift of some BOC state toll operations to IXC interLATA services had the greatest single effect on the net result.²⁴ This shift accounts for approximately 30% of the growth in IXC revenues net of access payments to LECs.²⁵ In addition, the MFJ prohibited the RHCs from providing interLATA services (with a few exceptions).²⁶ During this same time frame, CPE and inside wiring were being removed from the LEC rate base.

The remaining items in Figure 1-2 become significant only in comparisons among post-divestiture years. For example, "Increased Interexchange Usage" influenced the growth of interexchange market share. This increased usage, in turn, relates to a number of other issues, such as interstate pricing or bypass of the local plant.

The rest of this section explores in more detail these and other stakes and their potential effects on stakeholders. Again, these

²⁴The Modification of Final Judgment, which broke up AT&T, created new service areas (LATAs) and assigned BOC interLATA state toll to the IXCs.

²⁵Tactical Disputes, Draft, p. 15, and Appendix C, Table 12, p. 71.

²⁶Most notably, the corridor exemptions for some New York-New Jersey and Pennsylvania-New Jersey traffic. RHCs also were allowed interstate intraLATA traffic, some of which had previously been carried by IXCs. This traffic is quite small compared to interstate interLATA traffic that is the domain of the IXCs.

examples are intended to set the stage for the research, not to be all-encompassing.

II.A. Strategic Stakes and Stakeholder Interest

Different types of strategic outcomes are important to different stakeholders. For carriers they frequently revolve around financial concerns. Under RBROR regulation carriers tend to have more direct and immediate control over their costs than over their revenues because revenues are based on prices set in regulatory proceedings and are fixed until the next round of regulatory price-setting is completed. Consequently outcomes associated with national disputes affecting revenues may be crucial and will certainly cause carriers to attempt to affect these outcomes. Carriers' revenue concerns include size, absolute growth, growth rate and hence market share, and sources (toll, access, local, or other including non- or deregulated). Simply put, carriers are interested in getting, keeping, and growing their revenues. As will be discussed below, different resolutions of disputes may affect these outcomes differently and differentially by company or industry segment.

For residential customers, strategic outcomes may well focus on availability and affordability of phone services, especially local service. Different prices will affect the ability of the marginal customer to get or keep basic telephone service. Since universal service is still a goal of national telecommunications policy, regulatory bodies at all levels are interested in local service prices, as are residential customers.

For business customers, strategic outcomes may focus on who provides telephone service, which services are provided, at what price, and of what quality. These outcomes are strongly affected by the resolution of pricing disputes. Prices that seem too high for the quality of service or compared to alternative services may lead businesses to turn to alternative providers -- bypassers -- or to create their own network. If these customers, who typically account for much of the LECs' revenues, abandon their use of some or all the LEC network, some of the plant may become stranded (not used). If the LEC is to

recover the costs of the stranded investment, other prices must be raised or expenses reduced. If the LEC does not recover these costs, shareholder returns will suffer and stock price may decline. Either way, someone must "pay" for stranded investment. Any of these actions will clearly affect strategic outcomes of other stakeholders.

For employees, especially those in unions, strategic outcomes may center on job-related issues such as wage levels, benefits, job protection, and retraining to ameliorate the effects of changing technology.

Strategic outcomes for regulators include universal service, quality of service, financial viability of carriers, and competition. For the government other than regulators, strategic outcomes may tie to the quality and cost of telephone service as part of the economic infrastructure.

These outcomes may be linked to each other by the resolution of tactical disputes. For example, local service pricing decisions will directly affect revenue size and growth and universal service. These decisions may also affect employees' outcomes if changes in revenues lead to changes in wages or benefits. This link is explored in more detail in the next section.

II.B. Arenas of Tactical Dispute

Tactical disputes arise in many different arenas, including among others:

- Pricing
- Costing methods
- Alternative types of regulation
- Industry structure

These arenas and their relationship to strategic outcomes are discussed briefly below. Again, this discussion is not intended to be all encompassing, but only to suggest relationships and to set the context for analysis of the impact of alternative costing methods in Chapters 4 and 5 below.

II.B.1. Context: LEC Cost-Revenue Structure

In order to understand the costing and pricing arenas, it is helpful to understand the relationship between costs and revenues in the late 1980s, when the most common form of LEC regulation was traditional RBROR regulation. Figure 1-3 shows the basic structure connecting LEC accounting and jurisdictional costs and revenues.²⁷ In the broadest terms, the chart shows that accounting costs are collected, separated into inter- and intrastate jurisdictions, and used in some way to set prices and determine revenues for various services used by different types of customers. This diagram can be viewed as portraying two of the arenas where tactical disputes are played out, costing and pricing. These arenas are quite large; revenues kept by LECs in 1986 totalled \$80.7 billion²⁸ and 1985 LEC costs exceeded \$75 billion.²⁹

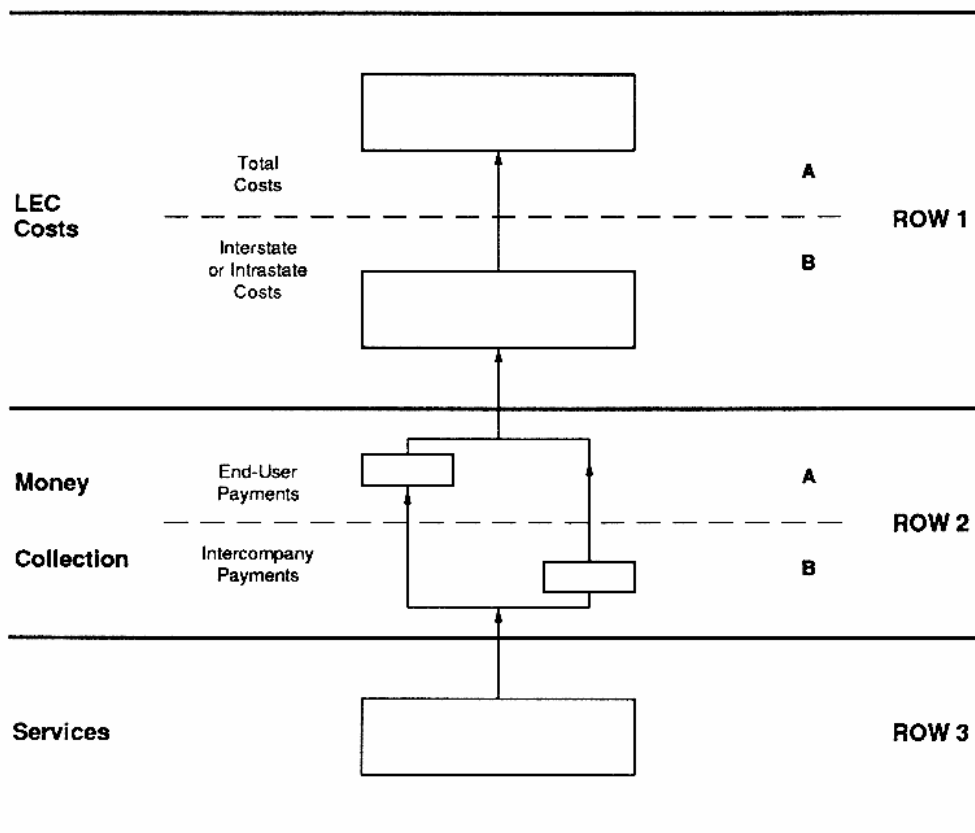
The diagram is divided into three rows. Row one represents LEC costs. These and all costs should be read to include a return on rate base and are really revenue requirements. Row 1A represents total LEC unseparated costs as defined by Part 31 prior to 1988 and Part 32 beginning in 1988. Row 1B shows separated costs for the inter- or intrastate jurisdiction after the application of Part 67 to Part 31 and Part 36 to Part 32. These costs are used to begin the actual rate-making process depicted in the bottom row.

The money collection row (row two) depicts the link between costs and revenues -- who pays the revenues and what they are paid for. Direct payments to LECs represent revenues paid by end user customers to the LECs. Indirect payments to LECs represent revenues paid by customers of LECs' customers. These revenues are primarily the portion

²⁷This structure is discussed in more detail in section IV below.

²⁸Tactical Disputes, Draft, Figure 5, p. 10.

²⁹1985 LEC costs for the study areas used in this research totalled \$71.4 billion. These study areas were from 11 holding companies -- all seven RHCs, Cincinnati Bell, Inc. (CBI), Southern New England Telephone (SNET), General Telephone and Electronics (GTE), and United Telephone -- and comprised about 90% of the industry. In 1985 these companies in total made up 91% of the access lines and 93.8% of the operating revenues of the LEC industry. Telephone Statistics 1986, United States Telephone Association, Washington, D. C., 1986, pp. 2-3, 8.



Note: Arrows indicate direction of cost recovery.

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Figure 1-3

Basic Cost-Revenue Structure: Local Exchange Carriers

of toll prices end users pay to IXCs which the IXCs then pay to the LEC for access to the LEC network.³⁰ This presentation shows that, although LECs collect revenues from other carriers, the other carriers can be viewed as merely collecting these revenues for the LECs from their own customers. This "redirection" of revenues is substantial. In 1986 IXCs

³⁰In some cases these revenues may be collected by other LECs if an access arrangement exists between LECs. This can happen when the traditional BOC-Independent settlement process is replaced by some sort of access arrangement similar to that between LECs and IXCs. It can also happen when LATAs cross state and BOC boundaries so that a BOC handles a toll call that originates or terminates in another BOC's territory.

paid over \$25 billion to LECs for access to their networks, an amount slightly more than half of all IXC revenues.³¹

Finally, row three, Services, refers to the service the customer is paying for: MTS, WATS, private line, local, access, etc.

This diagram refers only to LEC costs and the revenues based on these costs. IXC revenues and costs other than those for access to the LEC network are not included.³² The amounts associated with end user indirect payments to LECs do not include revenues IXCs keep to cover their costs other than access. In 1986 the IXCs kept \$24.3 billion in revenues.³³

With this basic structure in mind, we can now consider the four tactical dispute arenas. The discussion below suggests relationships between disputes in each arena and strategic outcomes to set the context for this report.

II.B.2. Pricing

Perhaps the most obvious arena of tactical dispute is pricing. The entire lengthy debate over access charges and SLC, including ending mandatory Common Line pooling, can be viewed as a tactical pricing dispute. SLC is the method by which LECs recover all or part of the interstate portion of the local loop cost from the end user rather than from the interexchange carrier.

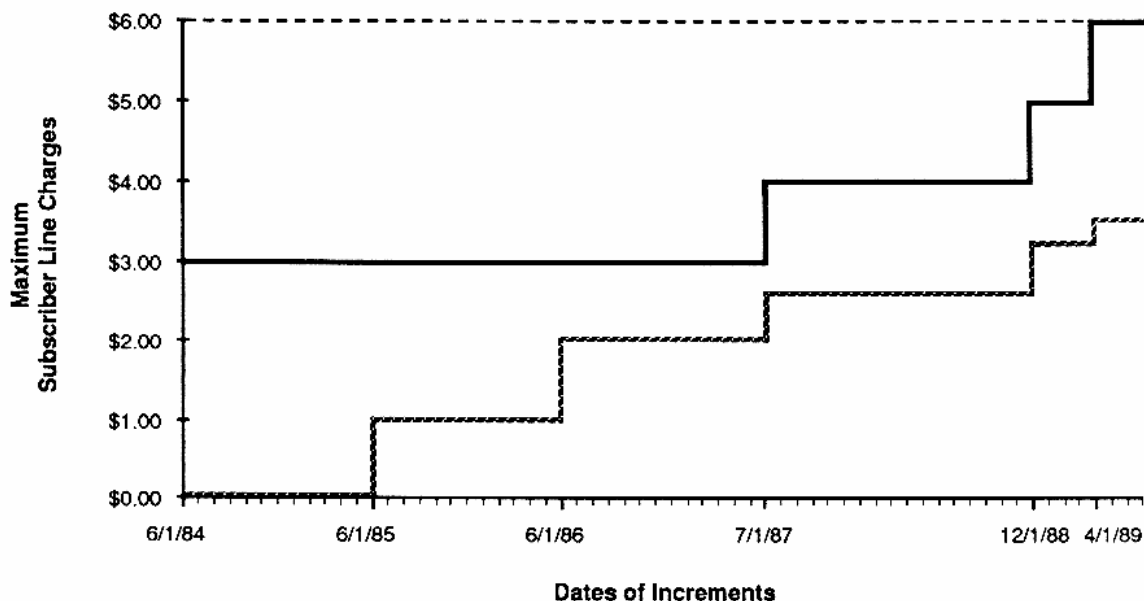
Figure 1-4 shows changes in SLC levels and their effective dates. At all times SLC is set at the lesser of the stated rates or at the monthly interstate cost per loop.³⁴ The increases beginning in July

³¹Tactical Disputes, Draft, Figures 20, 21, pp. 38-39.

³²For greater detail on the relationship between LEC and IXC costs and prices, see Tactical Disputes, Draft, pp. 16-27.

³³Ibid., Figure 5, p. 10.

³⁴In study areas with sufficiently low annual interstate loop costs, less than \$42 (12*3.5), SLC will not reach \$3.50 in April 1989. In other study areas the multi-line business SLC is less than \$6.00 because the annual interstate cost per loop is less than \$72 (12*6). These study areas may be those with low interstate loop assignments, low total loop costs, or both.



- - - Multi-line business
- Centrex lines installed on or before July 28, 1983
- · - Residence and single-line business

Source: FCC

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Figure 1-4

Interstate Subscriber Line Charges:
Effective Dates and Maximum Monthly Rates

1987, were mandated as part of the "Unity 1A" order.³⁵ As an example of the leverage of SLC on other forms of cost recovery, the July 1987 increase led to a reduction of the Carrier Common Line Charge from 1.55 cents per minute to 0.69. SLC, because it recovers costs from end users regardless of their usage of interstate toll, has played a significant

³⁵In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, Report and Order, 2 FCC Rcd 2953 (1987). These increases were implemented in Part 69, paragraph 69.104.

role in the FCC-mandated reduction of AT&T's interstate toll prices from 1984 to 1987.³⁶

One outcome of this pricing dispute affects revenue sources. From 1984 to 1986, SLC helped increase interstate as a source of LEC revenues relative to intrastate because it led to reduced interstate toll and access prices and increased interstate toll and access revenues.³⁷ SLC requires all subscribers to pay interstate revenues, regardless of whether they made or received interstate calls. Previously, only interstate customers paid interstate revenues.

Another outcome of this dispute affects revenue and perhaps ultimately profitability growth. SLC shifts revenue away from a usage-sensitive basis (minutes of interstate toll usage) to a flat, per line basis. On April 1, 1989, residential SLC reached its cap of \$3.50 per line.³⁸ After that date differential growth rates in access lines, access minutes, and access minutes per line will lead to different overall revenue growth rates because different proportions of revenues are associated with lines and minutes across companies. If revenue or revenue growth decreases, LEC expenditure levels will have to be reduced to parallel the revenue slowdown and maintain or increase profitability. Reduced expenditures (or reduction in rate of cost increase) necessary to mirror low revenue growth and maintain profitability could have outcomes affecting service quality and employees as suggested in section II.A above.

³⁶AT&T's interstate toll prices dropped 34% from 1984 to 1987. Trends in Telephone Service, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, January 1988, p. 11.

³⁷Interstate toll prices fell in nominal (not adjusted for inflation) dollars each year from 1984, the first year of SLC, through 1988. Monitoring Report, CC Docket No. 87-339, June 1988, Prepared by the Staff of the Federal-State Joint Board in CC Docket No. 80-286, Table 5.4, p. 208. Interstate toll revenues collected from end users increased at a compound annual growth of 11.2% from 1980 to 1986, and some of this increase may be attributable to SLC. See Tactical Disputes, Draft, Figure 2, p. 5.

³⁸In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286: Report and Order, 2 FCC Rcd 2953 (1987); Memorandum Opinion and Order on Reconsideration and Order Inviting Comments, 3 FCC Rcd 4543 (1988).

II.B.3. Costing Methods

Another arena of tactical disputes, and the one that is the focus of this report, is that of costing methods, specifically those defined by regulators. Regulatory costing methods usually fall into one of five categories:

- Total Accounting Costing -- FCC Part 32 (prior to 1988, Part 31)
- Nonregulated Services Costing -- FCC Part 64
- Interstate Access Costing -- FCC Part 69
- Product/Service Costing -- FCC Part 69 and various state rules and policies
- Jurisdictional Separations -- FCC Part 36 (Prior to 1988, Part 67)

These categories and their related disputes and possible outcomes will first be briefly described. Next their relationship to each other and to the derivation of prices and revenues will be explored. Then Jurisdictional Separations, which is the focus of this report, will be discussed in more detail.

Accounting rules may be viewed as a costing method. For example, capitalization rules define costs as being associated with the current period (expense) or with future periods (asset). Consequently the definition of expenses and assets affects a firm's profitability. Under RBROR regulation this definition also affects prices. Shifts from expense to asset tend to reduce current rates, because expenses are recovered in full while assets are recovered over many years through depreciation expense and at the authorized rate of return. Shifts in the other direction will increase current rates. The connection between expenses, assets, and prices is discussed more fully in Chapter 2.

The adoption of Part 32,³⁹ known as the Revised Uniform System of Accounts (USOAR), changed some of the definitions of assets and expenses compared to its predecessor, Part 31. These changes did indeed redefine costs and ultimately affected revenues. To the extent that these shifts affected LECs differently, and affected AT&T but not other IXCs who are not governed by FCC accounting rules, revenue size and growth may differ.

Nonregulated services costing is a fully distributed costing method codified in FCC Part 64.⁴⁰ This fully distributed costing (FDC) method assigns a portion of all costs to nonregulated services based on projected use of equipment and resources. FDC methods are explained in more detail in Chapter 2. The nonregulated services are only those whose prices are not regulated by the FCC and include protocol conversion, inside wiring, and CPE as well as others. Prices for interstate Billing and Collection services are also not regulated by the FCC, but their costs are defined by Parts 36 and 69.

The disputes over nonregulated service costing centered on what costing method should be used and how it should be applied. Some stakeholders argued for fully distributed costs so that the deregulated service would bear its appropriate burden of all costs. Others argued for incremental costs as being more appropriate for economic efficiency.⁴¹

³⁹In the Matter of Revision of the Uniform System of Accounts and Financial Reporting Requirements of Class A and Class B Telephone Companies (Parts 31, 33, 42, and 43 of FCC's Rules), CC Docket 78-196, FCC 86-221, Report and Order, Released May 15, 1986, 51 Fed. Reg. 42, 493 (December 2, 1986).

⁴⁰In the Matter of Separation of costs of regulated telephone service from costs of nonregulated activities and Amendment of Part 31, the Uniform system of Accounts for Class A and Class B Telephone companies to provide for nonregulated activities and to provide for transactions between telephone companies and their affiliates, CC Docket No. 86-111, Report and Order, 2 FCC Rcd 1298 (1987). Part 64 is often referred to as "Part X," from the time the rules were being debated but prior to their codification.

⁴¹For example, see In the Matter of Separation of Costs of Regulated Telephone Service from Costs of Nonregulated Activities, Amendment of Part 31, the Uniform System of Accounts for Class A and Class B Telephone Companies, and to Provide for Nonregulated

The resolution of this dispute in favor of FDC affects strategic outcomes related to revenues, profitability, and industry structure.⁴² Economic analysis suggests that adopting fully distributed costing for nonregulated services may serve to make them too unprofitable to introduce. Shifting fully distributed costs from regulated to nonregulated services will, under RBROR regulation, eventually reduce the prices of at least some regulated services. If the additional revenues for the nonregulated services do not cover their own incremental costs and offset revenues lost from the regulated services whose prices have been reduced, profitability will decrease. As a result, these services may not be introduced. If these nonregulated products are introduced, as they might be for marketing considerations, profitability may decrease, increasing pressure to control costs, including wages, benefits, and employment. Over time these cost controls can lead to further price reductions under RBROR regulation.

Interstate access costing, Part 69, is another FDC method that links the results of Jurisdictional Separations to access elements. These access element costs are ultimately the basis for rate element prices for access services used by IXCs. Disputes over the details of Part 69 tend to involve the FCC, LECs, and IXCs only; state commissions and local service customers are by and large not affected. However,

Transactions between Telephone Companies and their Affiliates, CC Docket 86-111, Comments of US WEST, Inc., Arthur Anderson & Co., and MCI Telecommunications Corporation, June 30, 1986. US West, consistent with their strong strategic orientation toward market considerations, argued for regulated core services and stated that "fully distributed costing should not be used for the setting of prices," p. v. Arthur Anderson argued, from a more theoretical viewpoint, that long-run incremental costing should be used. MCI, probably worried about subsidizing competitors in the access charges they must pay LECs, argued strongly for fully distributed costing methods and asserted that the fundamental presumption that accounting safeguards were sufficient to prevent cross subsidization was incorrect.

⁴²In a different resolution to questions about service costing methods, the Canadian Radio-Television and Telecommunications Commission adopted the use of incremental rather than fully distributed costs and rejected the allocation of any fixed common cost. Inquiry into Telecommunications Carriers' Costing and Accounting Procedures, Phase III, Telecom Decision, June 25, 1985.

since Part 69 operates on the interstate results of Separations, disputes over Part 36 impact Part 69.

Outcomes of these disputes most frequently affect revenues and profitability of the carriers. For example, the detariffing of interstate Billing and Collection effective January 1, 1987,⁴³ reduced the regulated rate base. However, when Part 36 was adopted to conform Separations to Part 32, the categories of investment that previously comprised Billing and Collection were eliminated.⁴⁴ The resulting Part 69 rules assigned all switching Central Office Equipment or COE (including the former message recording equipment) to the Local Switching access element.⁴⁵ This change actually increased costs and, absent other changes, rates for local switching. IXCs who used local switching but not Billing and Collection found their access expenses increased by this change. Their increased cost put pressure on their profitability and possibly on market share. Market share effects could especially be felt compared to AT&T and other IXCs who paid LECs to bill and collect for them, since their total access costs, including billing and collection, may have been little changed.

Individual product costing rules are most often used to set prices for services within the context of total costs. These rules vary among states and between states and the FCC. They often specify how costs are

⁴³In the Matter of Detariffing of Billing and Collection Services, CC Docket No. 85-88, Report and Order, 102 FCC 2d 1150 (1986).

⁴⁴In the Matter of MTS and WATS Market Structure and Amendments of Part 67 (New Part 36) of the Commission's Rules and Establishment of a Federal-State Joint Board, CC Docket Nos. 78-72, 80-286, and 86-297, Report and Order, 2 FCC Rcd 2639 (1987). Paragraph 36.125 eliminates the separate category for Automated Message Recording Equipment (Part 67 COE Category 4) that had been the basis for Billing and Collection investment.

⁴⁵In the Matter of Amendment of Part 69 of the Commission's Rules and Regulations, Access Charges, To Conform It with Part 36, Jurisdictional Separations Procedures, CC Docket No. 87-113, Report and Order, 2 FCC Rcd 6447 (1987), Attachment B, p. 13. This order modified Part 69, paragraph 69.306 on the assignment of COE to the access elements. Previously, Part 69, paragraph 69.306(e), had assigned part of Part 67 COE Category 4 (Automatic Message Recording Equipment) to the Billing and Collection element. When Part 67 was replaced with Part 36 in 1988, the old COE Category 4 became part of the new COE Category 3. See footnote 43 above.

defined for products and which products' prices are set to recover the residual costs. The most often-cited example of residual pricing is the traditional method of pricing local service to recover all intrastate costs that are not recovered by other services (toll, vertical, billing, etc.).⁴⁶ However, residual pricing may also be used to set interstate special access recurring rates. These charges are set to recover total special access costs less inside wire, message station, nonrecurring (installation and removal), individual case basis, packet switching and video costs.

Resolution of disputes over these costing methods clearly affect the price of services. In turn prices affect revenue size and growth. As described above, prices may also affect outcomes for universal service, bypass, alternative service providers and industry structure, stranded investment, wages, benefits, and employment.

Jurisdictional Separations is perhaps the costing method that can have the most significant impact on virtually all strategic outcomes. It assigns costs to the inter- and intrastate jurisdictions, and these costs are used to set prices in various ways. Disputes over the assignment of costs to jurisdictions consequently affect prices, revenues, and revenue growth. Residually priced services may be the most affected, especially if prices for other services are constrained by costing methods or competition. Thus disputes can affect universal service and bypass. Bypass, if it leads to stranded investment, can further affect prices, wages, benefits, and employment. Separations results also affect access costs for IXCs (via Part 69) and hence interstate toll prices. These prices in turn may affect industry structure through the use of bypass and private networks as described in section II.B.5 below.

Alternative Separations costing methods were chosen for this research because Separations can play such an important role in these various strategic outcomes. Section III below discusses Separations in greater detail to make clearer its importance and relationship to disputes, policies, and outcomes.

⁴⁶For more detail on residual pricing for local service, see Behind the Telephone Debates, pp. 64-66.

II.B.4. Alternative Types of Regulation

Implicit in the basic LEC cost-revenue structure shown in Figure 1-3 above is rate base rate of return regulation. However, in the late 1980s there have been many proposals for alternatives to RBROR regulation.⁴⁷ A number of states have departed from traditional RBROR regulation. Some have adopted "social contract" regulation or some form of banded regulation in which services are typically identified as monopoly, emerging competitive, or fully competitive. Monopoly services tend to remain fully regulated, and the fully competitive services are deregulated. Some form of relaxed regulation may be ordered for emerging competitive services. Other states have adopted a "profit sharing" alternative in which LECs are allowed to keep a portion of earnings over the authorized rate of return. Some alternatives may be modifications of traditional RBROR regulation, while others may represent a more fundamental change.

Outcomes affected by state-level disputes may affect profitability, universal service, and employee concerns. Rules limiting increases in local service prices can foster universal service by protecting customers from rate increases associated with stranded investment or inflation. Relaxed regulation of other services may encourage carriers to market new services. Cost pressures may result from these new services if the competition is based on price, impacting employee outcomes.

The FCC's proposal to replace RBROR regulation of the interstate services of AT&T and all LECs with price caps,⁴⁸ widely publicized in 1988 and early 1989, has aroused strong sentiment on both sides. As happened in the access charge deliberations, strong reaction to this

⁴⁷This arena is explored in greater detail in Alternatives to Rate Base/Rate of Return Regulation: An Analysis of Stakeholder Positions, Jeffrey A. Masoner, Program on Information Resources Policy, Harvard University, Cambridge, MA, Draft, March 1989 (hereafter Alternatives).

⁴⁸In the Matter of Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313; Notice of Proposed Rulemaking, 2 FCC Rcd 5208 (1987); Further Notice of Proposed Rulemaking, 3 FCC Rcd 3195 (1988).

proposal has been expressed in Congress as well as from the usual participants in FCC proceedings.

The outcomes of this dispute will affect many stakeholders. The actual price cap formula will clearly affect price levels and hence revenues and profitability. To the degree that different carriers have different cost characteristics, due to technology, geographic concentration of customers, or other considerations, the use of a single nationwide productivity factor will have differential effects on profitability. Under price caps there is more incentive than under RBROR regulation to reduce wages, benefits, and employment levels. Any reduction in these areas could adversely affect quality of service, which may drive away businesses who have alternative sources of telephone service, resulting in stranded investment. This statement is not intended to assert that price caps will lead to reduced quality of service. Rather, it is meant to suggest that if enough costs are driven out of the business, quality of service could suffer because there would be fewer employees to maintain service or respond to service disruptions. This movement of businesses away from the LEC network would naturally depress LEC revenues in the short run. If the revenue loss associated with the stranded investment was recovered in local service rate increases, universal service could be adversely impacted. However, alternative carriers could benefit from the increased business of disaffected LEC customers.

II.B.5. Industry Structure

Another area of tactical disputes might be termed industry structure. These disputes include MFJ prohibitions on RHC interLATA toll business, MFJ RHC line-of-business restrictions, the proliferation of private networks (including but not limited to bypass), Computer Inquiries I, II, and III (Open Network Architecture or ONA), de facto as well as de jure intraLATA competition, and the proliferation of competition in the telephone directory, especially yellow page, business.

Outcomes of these disputes clearly affect revenue sources and growth since they relate to the businesses in which companies can

compete and who may compete with them in those businesses. Competition, in the form of bypass, the proliferation of private networks and POPs, and intraLATA toll competition may create stranded investment if LEC plant is no longer required to connect customers to POPs or to each other. If that happens, local service prices may rise to cover at least some of these stranded costs and universal service may be adversely affected. Alternatively, wages, benefits, and jobs may be cut to reduce costs to the level of revenues that can be achieved, or profitability may decrease.

Industry structure outcomes may also affect the very definition of universal service. Under ONA there may be eventually a move to expand the concept of universal service beyond dial or touch-tone telephone service to include more advanced enhanced service features.

Industry structure disputes also affect the very definition of the telecommunications industry. A familiar example is that of Yellow Pages, electronic directories, and print advertising. All of these are part of the information industry,⁴⁹ but which if any of these is part of the telecommunications industry is not necessarily clear. Even corporate structure does not provide a uniform clue. Most RHCs have removed Yellow Pages from their regulated phone companies, but Bell Atlantic has not.

III. Jurisdictional Separations: A Brief Background

This section briefly describes the history of Separations, how it is used, and why it is used. Greater detail on this subject can be found in a number of sources.⁵⁰ This section will provide the reader

⁴⁹These businesses are similar in that all are high in substance, as opposed to form, although electronic directories are more service (rather than product) oriented. Mapping the Information Business, John F. McLaughlin with Anne Louise Antonoff, Program on Information Resources Policy, Harvard University, Cambridge, MA, Publication No. P-86-9, September 1986.

⁵⁰For example, Separations Procedures in the Telephone Industry: The Historical Origins of a Public Policy, James W. Sichter, Program on Information Resources Policy, Harvard University, Cambridge, MA Publication P-77-2, January 1977; Behind the Telephone Debates, Carol L. Weinhaus and Anthony G. Oettinger, Ablex Publishing Corp., Norwood, NJ,

with the conceptual background necessary to understand Separations uses, disputes, and outcomes.

III.A. History

Jurisdictional Separations arose from the Supreme Court decision in Smith v. Illinois Bell.⁵¹ This decision required, for setting rates, that some portion of the cost of plant that could be used for both interstate and intrastate calls be assigned to the interstate jurisdiction, based on actual use. Prior to that time none of the costs associated with connecting subscribers to the network had been assigned interstate. Only some of the costs of toll boards and the plant to connect those boards had been assigned interstate, hence the term "board-to-board" costing. Smith v. Illinois Bell eventually replaced board-to-board with "station-to-station" costing, since a portion of the station (telephone) and its connection to the phone network (local loop) were now assigned interstate.

The court recognized the concept of joint use plant -- that the same plant was used to place local and toll calls. Consequently, it stated that, although difficult to do, the "actual uses to which the property is put" cannot be ignored when apportioning costs between federal and state jurisdictions.⁵² This actual use concept has been interpreted over the years to be "relative use;" that is, if the plant is used 20% for interstate services then 20% of the cost of the plant

1988, chs. 7-10; Cost Separations Formulae in Telecommunications: The Development of the "Relative Use" Standard, Nancy A. Welsh, Program on Information Resources Policy, Harvard University, Cambridge, MA, Publication P-83-8, September 1983; Judicial Requirements for the Apportionment of Joint Costs, Ellen S. Friedenber, Program on Information Resources Policy, Harvard University, Cambridge, MA, Incidental Paper I-81-3, June 1981; Development of Separations Principles in the Telephone Industry, Richard Gabel, Michigan State University Graduate School of Business Administration Division of Research, East Lansing, MI, 1967.

⁵¹282 US 133 (1930).

⁵²Smith v. Illinois Bell, 282 US 133 (1930), pp 150-151.

should be assigned to the interstate jurisdiction.⁵³ It is important to realize that relative use is an interpretation of the court's actual uses language. It has never been recognized as the only legal interpretation. Subsequent court decisions have stated that the precise costing method used is not important as long as "reasonable measures" are employed and just and reasonable rates result.⁵⁴

The Separations process was eventually codified as FCC Part 67. Over the years there have been a host of changes to many sections of Part 67. These changes arose because of changes in industry structure, policy goals, technology and network usage. Rather than reviewing or even listing these changes, the point to be understood is that Separations is a flexible practice. On January 1, 1988, Part 67 was replaced by Part 36 in order to conform Separations with Part 32, the revised USOA.⁵⁵

III.B. Why Separations?

Beyond the Supreme Court requirement, one might wonder why Separations is done and particularly why it has changed so often. The simple answer is that Separations is a costing tool to achieve telecommunications policy. As such it is one tool that the FCC can exercise with discretion to achieve its goals. It is important to realize that there is nothing sacrosanct about Separations, or about any other policy tool. It is only a tool, and its use changes as that discretion is exercised.⁵⁶

⁵³For a more detailed look at the development of the relative use standard, see Cost Separations Formulae in Telecommunications.

⁵⁴MGI v. FCC, 750 F.2d at 141; Federal Power Commission v. Hope Natural Gas, 320 US 591 (1944).

⁵⁵In the Matter of MTS and WATS Market Structure and Amendments of Part 67 (New Part 36) of the Commission's Rules and Establishment of a Federal-State Joint Board, CC Docket Nos. 78-72, 80-286, and 86-297, Report and Order, 2 FCC Rcd 2639 (1987).

⁵⁶For a more complete description of the exercise of discretion, see The Formula is Everything.

An abbreviated example of the discretionary use of Separations to achieve policy goals follows.

The foremost example of the use of Separations to achieve telecommunications policy is in the interstate assignment of the costs of telephone equipment and connections to the network. This assignment factor evolved from a pure Subscriber Line Usage (SLU) ratio through various weighting factors to the Subscriber Plant Factor (SPF). SPF weighted SLU for length of haul and for a supposed deterrent factor. The deterrent arose because longer-haul calls had higher rates, and these rates presumably deterred interstate usage. SPF also provided a smooth transition from the previous factor (which was SLU with a different weighting than used for SPF) and it could be used for state toll settlements as well as for interstate cost assignment. The weighting also had the effect of keeping intrastate costs low in areas with either high interstate usage or longer length of haul. By keeping intrastate costs down, state regulators were able to keep local service rates low in order to achieve universal service. Thus when SPF was adopted in 1970 as part of the Ozark Plan⁵⁷ it met a number of policy goals simultaneously.

However, by the 1980s a number of factors created a situation in which SPF was either no longer producing the desired result or the desired result had changed. Interstate usage as measured by SLU continued to climb; this increase, together with the multiplier effect in the SPF calculation, caused SPF to increase from 17.5% in 1972 to 26.9% in 1982.⁵⁸ This increase in SPF prevented the reduction in interstate toll rates. As a result, large volume users started bypassing the public network and establishing their own networks or relying on carriers other than AT&T. These users took these actions because they had lower-cost alternatives, so that using AT&T meant that they were paying for more than what they saw as a reasonable share of the costs. The SPF solution had not worked because, as the FCC stated,

⁵⁷In the Matter Prescription of Procedures for Separating and Allocating Plant Investment, Operating Expenses, Taxes and Reserves Between the Intrastate and Interstate Operations of Telephone Companies, Docket No. 18866, Report and Order, 26 FCC 2d 247 (1970).

⁵⁸Behind the Telephone Debates, Figure 9.10, p. 81.

"SPF has apparently not performed in the way that was anticipated or intended when it was adopted in 1970."⁵⁹

Great strides had been made toward one of the goals of SPF. Universal service had largely been achieved, with the percentage of households reporting a telephone, the penetration level, reaching almost 93% by 1980.⁶⁰ As a result, the need to keep intrastate costs low to bring people onto the network had been reduced.

Because of these changes the FCC in 1982 froze SPF pending further investigation⁶¹ and then in 1984 ordered it replaced with a 25% allocation to interstate of the local loop costs.⁶² Because of the large jurisdictional cost shifts that could result, the 25% allocator is being phased in (from frozen SPF) over an eight-year period beginning in 1986.⁶³

Although SPF was based on SLU as a way to tie it to the "actual use" requirement, the 25% allocator has very little connection to any relative use measurement. Only in the sense that 25% is close to the 1982 national average SPF of 26.9% can it be considered tied to relative use. Thus it can be argued that the FCC has at least partially moved away from relative use as an interpretation of actual uses. Not only

⁵⁹In the Matter of Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket No. 80-286, Decision and Order, 89 FCC 2d 1 (1982), p. 4.

⁶⁰"Telephone Penetration and Household Characteristics for 1986," Alexander Belinfante, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, Washington, D. C., March 26, 1987, p. 6.

⁶¹In the Matter of Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket No. 80-286, Decision and Order, 89 FCC 2d 1 (1982), p. 2.

⁶²In the Matter of Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket No. 80-286, Decision and Order, 96 FCC 2d 781 (1984), p. 781.

⁶³The amount of the change in the factor, including the effects of the additional interstate cost assignment (Universal Service Fund, FCC Part 67, paragraphs 67.631 and 67.641) was capped at 5 points a year. FCC Part 67, paragraph 67.124 (d) (7). For study areas with very high SPFs (the maximum was 85%), the transition to 25% could take up to 12 years.

did the FCC change its costing method to reflect new policies and situations, it even changed, or at least challenged, the underlying interpretation for the method.

III.C. Uses of Separations

Jurisdictional Separations is used to assign portions of all expenses, investment, reserves, and taxes to inter- and intrastate jurisdictions. These costs, together with whatever modifications commissions may desire, are used to establish the total costs to be recovered by the total revenues derived from sales of all services. Total costs as referred to here are defined to include a return on capital necessary to repay investors for the risk they incur. This return on capital also includes the concept underlying the economists' idea of "normal economic profits," although there may be some differences in the finer points of what may be included in each.

This definition of cost is the "revenue requirement" approach that will be familiar to most associated with the telephone industry. A revenue requirement is calculated by adding all relevant expenses, taxes (including income taxes), and a return on rate base or net investment that is conceptually equivalent to profit.⁶⁴ The return on rate base is determined by multiplying the rate base for the period by the authorized rate of return. The makeup of the expenses, taxes, and rate base, as well as the authorized rate of return, is defined by the regulator and varies in different jurisdictions.⁶⁵

In the context of alternative costing methods, Separations is a fully distributed costing method. It assigns part of all costs to both

⁶⁴More accurately, the return on rate base is equivalent to operating income after taxes since rates are set based on operating costs only. Nonoperating costs are those not associated with the regular operations of the company and include such items as dividend and interest income. FCC Part 32, paragraph 32.7299.

⁶⁵For the interstate jurisdiction in 1989, components of the revenue requirement are defined by FCC in 47 CFR Parts 36 (Jurisdictional Separations), 64 (Deregulated Accounting), 65 (Rate Making Adjustments and Rate of Return Prescription), and 69 (Access Charges).

jurisdictions, either through an allocation factor or by direct assignment. FDC methods are discussed more fully in Chapter 2.

Separations is applied to each LEC study area. A study area is the operations of a LEC within a single state. A LEC may contain one or more study areas, and almost all states are served by more than one LEC,⁶⁶ but Separations is always done by LEC study area.

Separations is not a pricing mechanism. Once the costs are assigned to the jurisdictions, each commission can set prices in any method it sees fit. The only requirements are that the aggregate revenues based on these prices cover (or are expected to cover) the jurisdictional revenue requirement and that the rates are just and reasonable and not unreasonably discriminatory. Another way of looking at the first requirement is that the achieved rate of return must equal or be reasonably close to the authorized rate of return. An achieved rate of return that is lower than that authorized will probably prompt a carrier to file for higher rates. An achieved return higher than that authorized may prompt a commission to reduce rates, order refunds, or take other action to handle the overearnings.

Although Separations is not a pricing mechanism, it is closely linked to pricing decisions. The next section explains this structure for both inter- and intrastate jurisdictions. The connection is important because it is primarily through this mechanism that the tactical disputes over Separations costing methods will affect various strategic outcomes.

IV. Detailed LEC Cost-Revenue Structure

Total accounting costs are linked to prices in a number of ways. These ways differ by jurisdiction and have differed over time within jurisdictions.⁶⁷ This section expands the discussion in section II.B,

⁶⁶Telephone Areas Serviced by Bell and Independent Companies in the United States, B.A. Hart, A.M. Nave, A.W. Raskob, Jr., and J.C. Thomason, National Telecommunications Information Administration, U.S. Department of Commerce, NTIA Report 82-97, February 1982, Appendix A.

⁶⁷For a further look at the discretion exercised in linking costs and prices, see The Formula is Everything.

"Arenas of Tactical Disputes," above, and presents more detail on the interstate and intrastate structures. Finally it discusses the impact of price caps on this linkage.

IV.A. Interstate Structure

Figure 1-3 is very generalized and really only shows the conceptual structure. Figure 1-5 shows the 1980 interstate cost-revenue structure. It reflects the pre-divestiture era when much of the industry, both LEC and IXC, was part of AT&T and there was an "independent-AT&T partnership" for sharing interstate revenues.⁶⁸

Figure 1-6 shows the same structure in detail for interstate LEC services in 1985. 1985 is shown because the cost data for the research is from 1985. Changes to this structure since 1985 have not significantly altered its complexity. The interstate arena is large; 1986 interstate LEC revenues totaled approximately \$22 billion⁶⁹ and 1985 interstate costs were about \$20 billion.⁷⁰

The 1985 structure is much more complex than that for 1980. This greater complexity is a result of the various tactical disputes over costing and pricing discussed above, primarily the implementation of access charges (Part 69). Clearly an explanation of this complexity is in order.

First, however, it is important to realize that this structure is fairly rigid and formalized. It is codified in FCC Parts 65, 67, and 69. Part 64, defining deregulated costs, took effect in 1987. Tariffs are filed approximately annually on a schedule established by the FCC, although interim tariffs may be filed by LECs. The link between costs and prices is very strong in the late 1980s. Earnings are monitored on a two-year basis, and earnings that exceed the maximum allowed rate of

⁶⁸For more detail on this arrangement, known as Division of Revenues and Interstate Settlements, see Behind the Telephone Debates, pp. 66-69.

⁶⁹Tactical Disputes, Draft, Appendix A, Table 7, p. 54.

⁷⁰1985 LEC interstate costs for the study areas used in this research totalled \$18.7 billion. As noted above, they comprise over 90% of the industry.

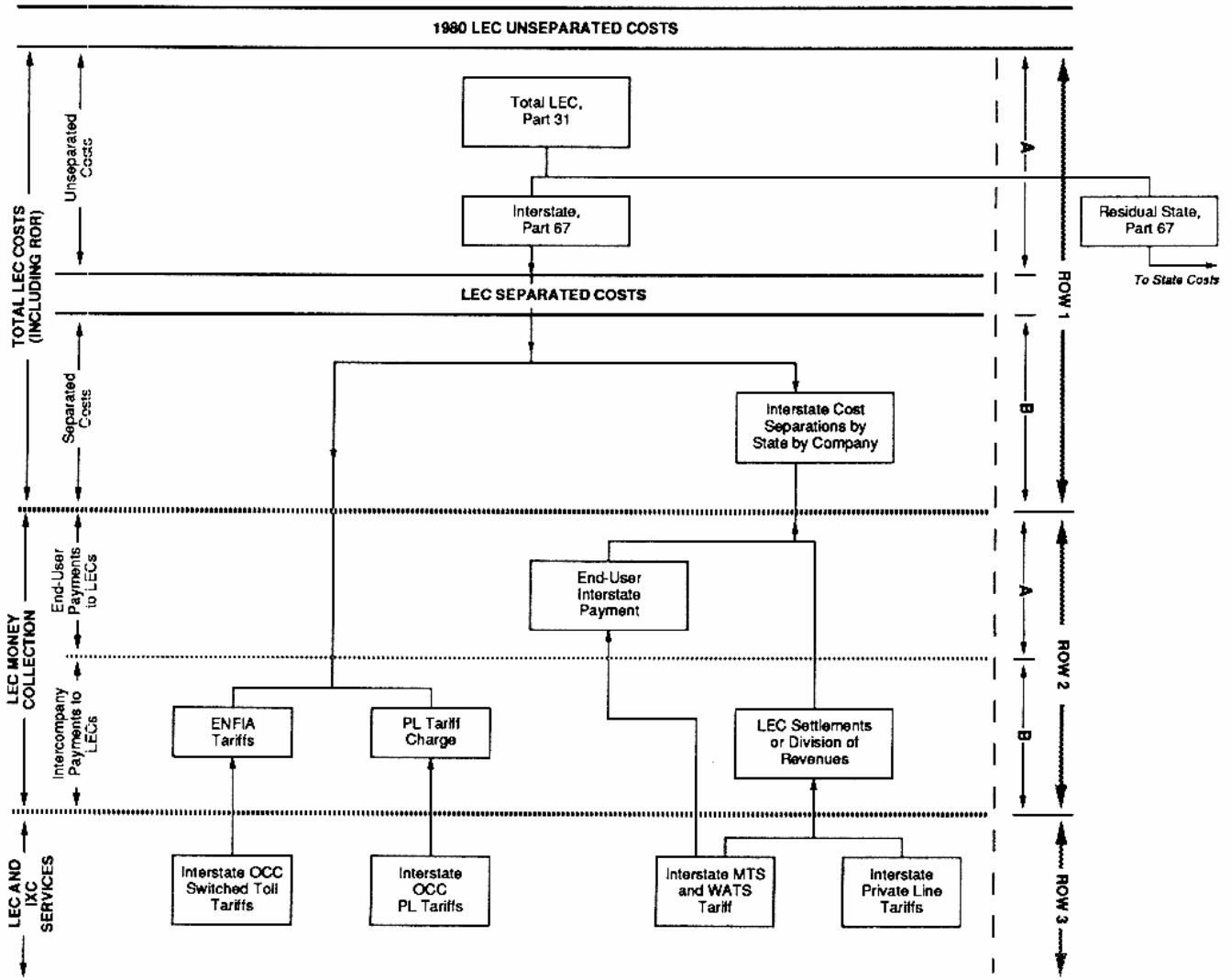
return are subject to refund to IXCs.⁷¹ This formality does not reduce the number of tactical disputes; on the contrary, it may increase them because exceptions or waivers must go through a formal commission process to be accepted.

The top row in Figure 1-6 includes the accounting costs shown in the simplified diagram, unseparated local loop costs used in the calculation of the Universal Service Fund, and additional costs associated with Lifeline services to reduce the price of phone service for low income households without telephones. These costs are actually included in the Part 31 costs but are used in addition to accounting costs to develop interstate access prices.

The second row shows how total costs (less Part 64 deregulated costs beginning in 1987) are separated by Part 67 into interstate costs. Part 67 results are then adjusted by Part 65 rules to determine what is allowable for ratemaking purposes. The next level of boxes within this row shows the Part 69 access elements that are developed from the Parts 65 and 67 results. These costs then either flow into the various pools where costs and demand are aggregated to produce one set of rates for all pool participants or are used with individual study area demand to generate rates.⁷²

⁷¹In the Matter of Authorized Rates of Return for the Interstate Services of AT&T Communications and Exchange Telephone Carriers, Report and Order, CC Docket No. 84-800, FCC 85-527, Phase I, adopted September 27, 1985, released September 30, 1985, prescribes the refund rules. In the Matter of Amendment of Part 65, Interstate Rate of Return Prescription: Procedures and Methodologies to Establish Reporting Requirement, CC Docket No. 86-127, Report and Order (Proceeding Terminated), 1 FCC Rcd 952 (1986), prescribes the reporting mechanism and defines FCC Form 492 on which the data is to be reported. The refunding mechanism is temporarily in limbo, having been modified by the United States Court of Appeals for the District of Columbia Circuit in AT&T v. FCC and U.S.A., No. 85-1778, Decided January 22, 1988. American Tel. & Tel. Co. v. FCC (1988) 267 App DC 38, 836 F2d 1386, 1988 US App. A conditional suggestion for rehearing was denied by the court en banc on November 2, 1988. However, it is expected that the FCC will ultimately create some refund mechanism that will be acceptable to the court.

⁷²Some LECs aggregate interstate costs and demand at the operating or holding company level. This is conceptually similar to the operation of a pool for setting rates, although pooling of actual costs and redistribution of revenues is not typically done within a company as it is done in multi-company pools.



Notes:

- Part 31:** USOA, basic accounting
- Part 67:** Jurisdictional Separations

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Figure 1-5

1980 Interstate Cost-Revenue Structure: Local Exchange Carriers

The Common Line pool is mandatory for all LECs until April 1989, and its workings will be described in the next paragraph. The Billing and Collection (B&C) and Traffic Sensitive (TS) pools are optional. No RHCs ever participated in the B&C pool and by October 1985 no RHCs were participating in the TS pool. The costs in these pools are used with forecasted demand to determine rates for services in each of the access elements. Individual LECs which do not participate in the pools use the same general procedure to develop their own rates.

The Common Line pool is used to set the Carrier Common Line Charge (CCLC) based on Common Line costs less SLC and Special Access Surcharge (SAS). SAS is charged for private lines identified by their owners as terminating in PBXs with access to the switched network. The FCC sets SLC and SAS rates, which are multiplied by the forecasted demand to estimate their revenues. These revenues are then subtracted from the total Common Line costs to calculate the CCL costs. CCL costs are then divided by forecasted CCL demand to establish the single nationwide CCLC.

The various switched access rates are actually bifurcated according to the level or quality of service provided to the IXCs. As a result of a long process,⁷³ a discount of 55% is provided to IXCs other than AT&T, for service in end offices that are not equipped to provide service equal is to that provided by AT&T. From a customer's perspective, this "equal access" service means that long-distance calls can be made with 1+ dialing not requiring calling a local number or entering a code number. Initially this discount played a major role in the ability of OCCs to undercut AT&T's rates. However, as equal access has been extended to much of the country,⁷⁴ this cost advantage has largely disappeared. In some cases, the admitted result of this tactical dispute and its resolution has been reduced profitability for IXCs.⁷⁵

⁷³The FCC Access Plan: The Debates Continue, pp. 57-59.

⁷⁴By the end of 1987 87.0% of all telephone lines had been converted to equal access, up from 3.4% at the end of 1984. "Trends in Telephone Service," January 1988, p. 14.

⁷⁵1986 Advanced Telecommunications Corporation Annual Report, p. 8.

The money collection row links types of service and direct and indirect sources of LEC revenue to costs. Direct payers to LECs include both end users and IXCs. End users pay SLC and SAS and may buy special access and switched access for foreign exchange services directly from the LEC. End users also pay any interstate local and LEC-handled interstate toll. LECs can carry interstate traffic where LATA boundaries established by the MFJ cross state boundaries. IXCs pay the CCL, TS, special access, and B&C charges. Indirect payers to LECs are end users whose IXC charges include an amount the IXCs pay LECs for access. The type of service includes IXC services -- MTS, WATS, and private line -- and LEC services -- SLC, SAS, special access, and toll and local. As the chart shows, it may take many different access elements to provide the final service type the end user buys.

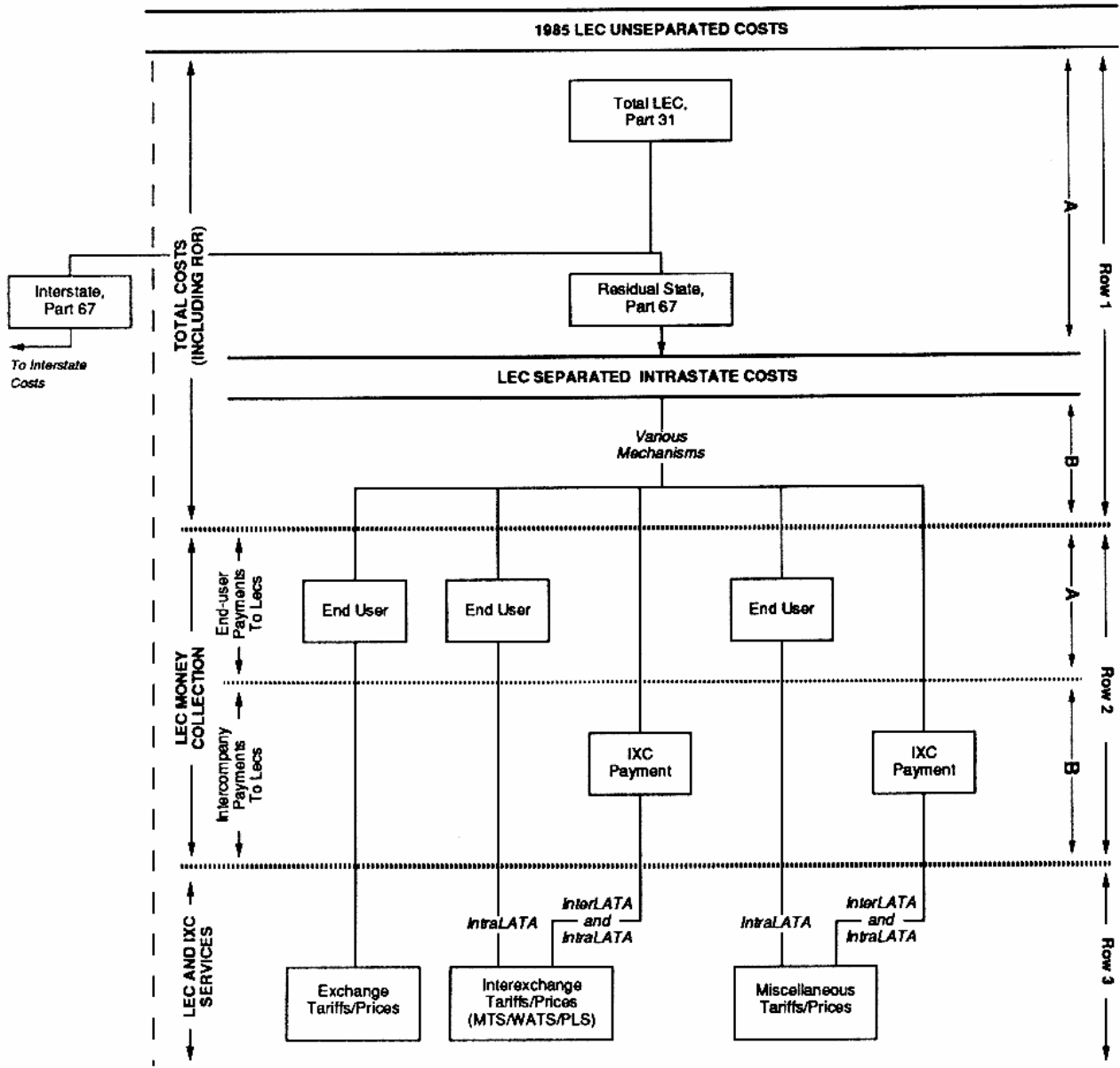
IV.B. Intrastate Structure

Figure 1-7 shows the cost-revenue structure for the intrastate jurisdiction. This arrangement varies among the states and the chart is intended to show only a generalized view. It tends to be less formalized than the interstate structure. Most states do not have a formal costing method equivalent to Part 69, and refund mechanisms are not generally automatic. This arena is more than twice as large as the interstate arena. 1986 LEC intrastate revenues were about \$60 billion⁷⁶ and 1985 LEC intrastate costs exceeded \$55 billion.⁷⁷

The top row of this figure is the same as that for interstate excluding the local loop and lifeline costs. The intrastate costs are defined by Part 67 plus any state-specific adjustments paralleling Part 65. States use various costing methods to assign costs to services, most of which are bought by end users making direct payments to LECs. These mechanisms may include formal rules and pooling arrangements. IXCs purchase intrastate access directly from LECs and pass these costs

⁷⁶Tactical Disputes, Draft, Appendix A, Table 7, p. 54.

⁷⁷1985 LEC intrastate costs for the study areas used in this research totalled \$52.6 billion. As noted above, they comprise over 90% of the industry.



Notes:
 Part 31: USOA, basic accounting
 Part 67: Jurisdictional Separations

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Figure 1-7

1985 Intrastate Cost-Revenue Structure: Local Exchange Carriers

to their customers, who make indirect payments to LECs in the same manner described above for interstate. End users buy local, vertical, MTS, WATS, exchange private line, and miscellaneous services from LECs and MTS, WATS, and interexchange private line from IXC's.

IV.C. Price Caps and the Cost-Revenue Structure

Perhaps the hottest issue at the FCC in the late 1980s was its proposal to replace rate of return regulation with price caps for interstate services of dominant carriers (LECs and AT&T).⁷⁸ Given this, it is worthwhile to address the potential effect of price caps on the interstate cost-revenue structure.

Price caps are a pricing proposal which would not affect most of the cost rows in Figure 1-6. Parts 32, 36, 64, and 65 would still apply.⁷⁹ However, the Part 69 cost allocation rules would be eliminated for price cap carriers and the Commission would impose a procedure for allocating changes due to exogenous factors such as accounting or separations changes to the relevant price cap indices.⁸⁰ These exogenous changes would be reflected in the so-called "Y" factor used to adjust the price cap.⁸¹ Separations costing disputes will continue

⁷⁸In the Matter of Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313: Notice of Proposed Rulemaking, 2 FCC Rcd 5208 (1987); Further Notice of Proposed Rulemaking, 3 FCC Rcd 3195 (1988).

⁷⁹Figure 1-6 applies to 1985 and refers to Parts 31 and 67. These rules were replaced by Parts 32 and 36 in 1988. Part 64 became effective in 1987. The price cap proposal would change some Part 65 rules, but under the proposal LECs who adopt price caps will be required to report interstate rates of return annually using the rate base defined in Part 65. CC Docket 87-313, Further Notice of Proposed Rulemaking, 3 FCC Rcd 3467 (1988), paragraph 510.

⁸⁰CC Docket 87-313, Further Notice of Proposed Rulemaking, 3 FCC Rcd 3469 (1988), paragraph 515.

⁸¹The CC Docket 87-313 Further Notice of Proposed Rulemaking, 3 FCC Rcd 3195 (1988), proposed a price cap formula of $GNPPI - X - Y$, where GNPPI is the Gross National Product Productivity Index, X is 3 (a 2.5 historical productivity rate plus a 0.5 Consumer Productivity Dividend), and Y is the effect of known exogenous changes arising from accounting and Separations rules (paragraphs 424-474).

under price caps because these costing methods impact intrastate costs and prices as well as interstate.

Price caps address the pricing mechanism inside the direct payment to LEC boxes labelled IXC and Special Access End User. Under price caps, there would be pricing flexibility within "baskets" of services, but the total revenues of each basket are limited by the price cap formula and are tied to current RBROR-determined prices. Price caps also replace the automatic overearnings refunding mechanism with a vague mention of considering excessive earnings in setting future prices.

What price caps would do is blur the connection between costs and individual service prices. What they will would not do is sever that connection. Exogenous changes to costs, those defined or accepted by the FCC, would still be reflected in prices via the "Y" factor. These changes include not only Separations changes but also tax and accounting changes incorporated into Part 32.

V. Separations Changes

The cost-revenue structure outlined above can serve as background for investigating how changes in Jurisdictional Separations methods can have differing outcomes for different stakeholders. This discussion assumes full RBROR regulation in both jurisdictions. To the extent that this assumption does not hold, the strength of the relationships described will probably be lessened.

V.A. Types of Separations Changes

Separations changes can be looked at in two ways. They may either shift costs in the same direction for all study areas or they may shift costs in different directions in different study areas depending on various characteristics of the study areas. Changes which shift costs in the same direction for all or most study areas tend to impact outcomes for all stakeholders. Changes which shift costs in different directions may result in a smaller nationwide shift as study area changes offset each other. Stakeholders with a national perspective, especially the major IXCs, may be less impacted by this type of changes.

In the 1980s cost shifts have been used to reduce all study areas' interstate assignment in recognition of increasing interexchange competition and the reduced use of Separations to achieve universal service. One example of this type of change is the adoption of new Separations rules for COE.⁸² These rules eliminated the non-traffic sensitive (NTS) portion of the central office switch and assigned the entire switch on measured DEM. This change is to be phased in, with completion scheduled for 1993. Measured DEM is closely related to SLU and is less than the SPF used to separate the NTS part of the switch. As a result, the interstate assignment of the central office is decreasing for all LECs.

Other Separations changes have had a mixed effect on study areas. Changes with mixed effects tend to be ordered to make cost definition more closely related to cost causation.⁸³ The stated rationale for doing so is that the industry is becoming more competitive, and in a competitive industry prices will reflect real costs. The replacement of Message Minute Miles (MMM) with Conversation Minutes (CM) for the assignment of interexchange circuit equipment is an example of this type of change.⁸⁴ This change was ordered because technology has reduced the importance of mileage in the cost of circuits;⁸⁵ in other words, distance is no longer a significant cost causer.

The development of the 25% allocator for local loop costs is a hybrid of these two types. It reduces the nationwide interstate assignment only slightly, from 26.9% to 25%. Its major impact occurs because the change moves all study areas to a single allocator, causing some areas to experience an increase and some a decrease in interstate assignment. However, the rationale for this change is more associated

⁸²In the Matter of MTS and WATS Market Structure and Amendments of Part 67 (New Part 36) of the Commission's Rules and Establishment of a Federal-State Joint Board, CC Dockets No. 78-72, 80-286, and 86-297, Report and Order, 2 FCC Rcd 2639 (1987).

⁸³Cost causation is covered more fully in Chapter 2.

⁸⁴FCC Part 36, paragraph 36.126(e)(3)(i). This change was one of the COE changes adopted April 16, 1987; see footnote 82.

⁸⁵Behind the Telephone Debates, pp. 138-139.

with reducing interstate costs than with cost causation usually associated with changes that work in different directions for different study areas.

V.B. Effects of Separations Changes

The effect of a Separations change is explored in more detail here. This discussion suggests only some potential outcomes on LECs and their customers. A more detailed analysis related to a modelled Separations change is presented in Chapter 5.

For ease of explanation, assume a cost shift that reduces interstate and increases intrastate costs. (A cost shift in the opposite direction would reverse all the outcomes described below.) Most of the consequences described here are directly related to prices, revenues, and profitability because of the cost-revenue structure of the industry. However, profitability may in turn affect industry structure and employee outcomes. This discussion assumes that any pricing changes are only those necessary to recover the cost shift. The consequences of pricing changes not associated with costs shifts, such as those to reduce bypass, are outside the scope of this research.

One of the first consequences of a Separations change may be on LEC profitability. Because the interstate cost-revenue structure is fairly formalized and tariffs are filed approximately annually, this cost shift will reduce LEC interstate access rates fairly quickly. In turn, IXC interstate prices charged end users may be reduced as the reduced access charges are passed through to the end user.⁸⁶ Demand for LEC interstate access depends on demand for IXC end-user services. Depending on the end-user demand response to the lower IXC prices, LEC revenues collected from IXCs and IXC end-user revenues may decrease. This would be the case if any additional demand generated by lower

⁸⁶Because in the late 1980s AT&T is subject to RBROR regulation in the interstate jurisdiction, any LEC interstate access price reductions must be passed on to AT&T's customers. The other IXCs tend to set their prices based on AT&T's, so that their prices usually fall with LEC interstate access price reductions. Under the proposed price cap regulation for AT&T, LEC access price reductions would still be passed on to customers.

prices did not offset the revenue reduction associated with lower prices. If there was a large enough demand increase, revenues would increase.

However, the intrastate cost-revenue structure is typically much less formalized and tariffs are not filed regularly.⁸⁷ As a result, the increased intrastate costs tend not to be reflected in prices and revenues, at least not as rapidly, and LEC profitability will suffer. If a LEC is in an overearning situation in the intrastate jurisdiction, the cost increase may stave off a rate reduction or refund. In this situation the LEC's profitability may suffer less than if it were not overearning in the state jurisdiction. In effect, the loss of interstate revenues may be offset by not losing intrastate revenues.

Another outcome of a Separations change may be a change in which customers the costs are recovered from. One important distinction between inter- and intrastate jurisdictions is the services that are offered. Interstate services are interexchange (toll and access) while intrastate services include local and miscellaneous non-toll as well as interexchange. One consequence of this service distinction is that telecommunications users may see a net increase or decrease in their total bill, depending on how much of which services of both LECs and IXCs they use. This consequence arises because LECs have different customers in the two jurisdictions, and all LEC customers are not IXC customers.

Most LEC interstate revenues come from IXCs. End users must pay SLC and SAS, but these prices are not based on costs so these customers are not affected by Separations changes.⁸⁸ On the other hand, most intrastate revenues tend to come from end users. IXCs do pay intrastate access, but these revenues are typically less than half the total intrastate revenues. As a result the cost shift will reduce IXCs' bills

⁸⁷The phenomenon of less frequent tariff filings in the intrastate jurisdiction than in the interstate is known as differential regulatory lag because of the different lengths of time in each jurisdiction between cost changes and associated price changes.

⁸⁸Strictly speaking, SLC is capped at the interstate cost per loop. In study areas with sufficiently low costs per loops, the full \$6.00 business and (on April 1, 1989) \$3.50 residence SLC may not be charged. These study areas are a minority of all study areas. See footnote 34.

and may, depending on which prices are increased, increase end-user bills. Any increase to end-user bills may vary between different classes of users. For example, business local service rates may increase more than residential rates.

As noted above, under RBROR regulation changes in IXC costs associated with LEC access charges are passed on to IXC end users, either directly for AT&T's customers or indirectly to the extent that other IXCs reflect AT&T price changes in their prices. Thus some end users' bills from IXCs will also be reduced. This flow-through may also vary between different classes of users. As an example, WATS prices could be decreased more than MTS, benefitting high-volume WATS users more than other customers. Furthermore, not all LEC customers are IXC customers. Those that are not may face higher LEC intrastate prices while receiving no benefit from reduced IXC prices.

To further complicate the matter, businesses with private networks may bypass LECs for local services as well as for access to IXCs. These customers would then be less affected by LEC prices and possibly more affected by IXC prices than customers who are totally dependent on the LEC network. As a result, customers with private networks may benefit more from reduced IXC prices than they suffer from increased LEC prices.

These rate changes may have strategic outcomes. Increases to residential local service rates may threaten universal service goals. Increases to business rates may affect industry structure by encouraging businesses to turn to alternative service providers or to develop the service themselves. To the extent that businesses leave the public network, stranded investment may result, potentially further increasing local service prices.

Another consequence of this jurisdictional service distinction relates to historical revenue growth patterns. Shifting costs between jurisdictions may not only change from whom the costs are recovered, but it may also change the nature of the revenues. To the extent that the additional intrastate costs are recovered from basic, vertical, or miscellaneous services, a shift from toll to other revenues has taken place. Indeed, the pressure may be high to recover these costs from non-interexchange services to prevent large price disparities between inter- and intrastate toll.

The potential change in the nature of revenues is important because in the 1980s interexchange revenues are growing faster than other types of revenues. This growth has occurred during a period marked by falling nominal interstate toll prices and stable to slightly rising local service prices.⁸⁹ Compound growth rates from 1980 to 1986 for total, interexchange, and other revenues paid by end users are presented below.

Total Revenues	8.7%
Interexchange Revenues	12.7%
Other Revenues	3.8% ⁹⁰

Considering the SLC increases in July 1987, December 1988, and April 1989, and the ongoing Separations changes which are reducing interstate cost assignment, it is likely that interstate toll rates will continue to fall for some time. These further reductions will probably continue to stimulate increased interstate revenues. Intrastate revenue growth may continue to lag behind interstate if increased costs must be recovered in services whose growth, whether access lines or minutes, is slower than that of interstate minutes.

The outcome of this cost shift and its associated revenue recovery may serve to move LECs out of the fastest growing segment of the traditional telephone industry. This effect will vary by LEC and study area depending on the size of the cost shift, its intrastate recovery, and inter- and intrastate growth rates. This change will not only affect profitability, but may also have a subtle effect on industry structure. From the RHCs' perspective, it might provide further support for and urgency to their argument for entering the interstate interLATA market currently denied them in the MFJ.

⁸⁹"Trends in Telephone Service," Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, January 1988, pp. 5-8.

⁹⁰Some of the growth in interexchange revenues is related to SLC. However, as noted above, during this period interstate toll revenues grew at a compound annual growth rate of 11.2%, still well above the average for all revenues. Tactical Disputes, Draft, 1989, Figure 2, p. 5.

The strength of these responses is affected by the price elasticity of demand for the various services. At some point further reductions in interstate toll prices may not generate additional revenues. Local service revenues are probably less sensitive to price, since customers probably consider local service more of a necessity. If this is the case, increases in local rates will continue to increase local service revenues even absent any growth in access lines coincident with population growth. If these two conditions coincide, the growth rate differential could be reduced or even reversed. Thus the outcome suggested above may not apply in the long run, although when that long run would be (much less if it would happen) is only a guess.

CHAPTER TWO
COST ACCOUNTING PRIMER

A working knowledge of cost accounting concepts and terminology is needed to understand various alternative costing methods and their implications. This understanding may help answer such questions as:

- What are the various types of costing methods and alternatives?
- What is being costed?
- Why is it being costed?
- Who benefits and who loses using the various methods?

The intent here is not to provide a definitive or exhaustive survey of costing methods. Rather, it is to enable the reader to understand the theoretical context of the debates on costing methods.

I. Purposes of Cost Accounting Methods

Cost accounting provides information for three major purposes:

- planning and controlling routine operations
- nonroutine decisions, policy making, and long range planning [emphasis added]
- inventory valuation and income determination.⁹¹

The usual uses of costing methods⁹² fall under these major purposes. Budgeting, inventory planning and valuation, process control, transfer pricing, and managerial motivation are all ways in which cost accounting data are used.

While accountants suggest rules and guidelines for cost accounting for any given purpose, no single rule applies for all purposes. One author says that "the major theme [of cost accounting] is 'different costs for different purposes.'"⁹³

⁹¹Cost Accounting: A Managerial Emphasis, 5th ed., Charles A. Horngren, Prentice Hall, Inc., p. xxi.

⁹²Costing methods can be considered shorthand for cost accounting methods; the terms will be used interchangeably.

⁹³Cost Accounting, p. xxi.

This report focuses on the use of costing methods for policy making, specifically Separations (FCC Part 36). Separations itself is a costing method that serves a policy. The nature of RBROR regulation is that cost accounting is used to determine allowed income, as discussed in Chapter 1.

The theme of different costs for different purposes is related to an important point that should be remembered concerning alternative costing methods: telecommunications costing is an exercise in discretion. Separations is merely a costing method used to achieve policy goals. If this method does not serve these goals well, or if the goals change, the method may change. A brief discussion of changing Separations to match changing goals can be found in Chapter 1, section III.B.⁹⁴

To understand the discretion being exercised -- its concepts, theoretical limitations, and alternatives -- one must understand the basics of cost accounting. This chapter provides that background.

II. Cost Accounting: Terms, Definitions and Issues

II.A. Definitions

A few key terms appear repeatedly in discussions about telecommunications costing methods. As is common in writings on regulated utilities, costs are defined to include a return on capital necessary to repay investors for the risk they incur. This return on capital also includes the concept underlying the economists' idea of "normal economic profits," although there may be some differences in the finer points of what may be included in each.

This definition of cost is the "revenue requirement" approach that will be familiar to most associated with the telephone industry. A revenue requirement is calculated by adding all relevant expenses, taxes (including income taxes), and a return on rate base or capital that is conceptually equivalent to profit. (More accurately, it is equivalent to operating income after taxes since rates are set based on operating

⁹⁴For a more detailed discussion, see The Formula is Everything.

costs only.) The return on rate base is determined by multiplying the rate base for the period by the authorized rate of return. The makeup of the expenses, taxes, and rate base, as well as the authorized rate of return, are defined by regulatory bodies and vary in different jurisdictions.⁹⁵

Allocation and assignment are used synonymously here. Accountants sometimes use "assign" to identify expenditures that are directly and solely related to one output. That meaning is not used here because the distinction is not universally made or understood.

Monetary outlays will be referred to as expenditures and include both capitalized and expensed items. Expenditures can be measured accurately, assuming no misrepresentation or fraud. In order to avoid confusion, "costs" as used here will usually refer to allocated expenditures. Context will make it clear when this is not the case; a common example which refers to costs that are to be allocated, rather than allocated expenditures, is the phrase "overhead and common costs."

Allocation is not solely the province of cost accounting. The financial accounting distinction between expense and capital may be considered to be a method of allocating expenditures between current and future periods based generally on their relationship to revenue-generating potential. This distinction has changed over time and the rules may be different for different rulemakers. The IRS recognizes different capitalization rules than does the FCC, and the IRS rules themselves underwent a major change in January 1987. The FCC changed its capitalization rules in 1988, increasing the lower limit for capitalizing certain expenditures from \$200 to \$500.⁹⁶

⁹⁵For the interstate jurisdiction in the late 1980s, components of the revenue requirement are defined by FCC Parts 36 (Jurisdictional Separations), 64 (Nonregulated Accounting), 65 (Rate Making Adjustments and Rate of Return Prescription, and 69 (Access Charges). Figure 1-1 and Chapter 1, section IV.A, discuss this process in more detail.

⁹⁶In the Matter of Revision to amend Part 31, Uniform System of Accounts for Class A and Class B Telephone Companies as it relates to the treatment of certain individual items of furniture and equipment costing \$500 or less, CC Docket No. 87-135, Report and Order, 3 FCC Rcd 4464 (1988).

II.B. Costs as Benchmarks for Prices

Another purpose of costing methods is to aid in pricing decisions. The importance of costs for pricing decisions varies across industries. Economists argue that, in the long run, total revenues must meet total costs for a firm to remain in business. However, individual cost-price relationships can and will vary considerably as prices are determined by the market or other forces. Costs may even be irrelevant to pricing decisions if the costs have been, or will be, incurred regardless of whether the product is produced.

The relationship between costs and prices is somewhat different in the telecommunications industry than in most other less regulated industries. Costs are defined in ways that serve public policy goals, and prices are tied to costs to achieve similar goals. The definition of these goals, the costing and pricing methods to achieve them, and the link between costing and pricing is discretionary and has changed many times in the past.⁹⁷

Thus costs are important in the telecommunications industry because they are often used as benchmarks for prices which are set to achieve policy goals. The relationship between prices and costs varies considerably with differing regulatory situations (which may exist at the same time in different jurisdictions), including regulatory forbearance and deregulation, and may change given trends in the current unstable environment. In the interstate access arena in the late 1980s, the FCC treats costs as a major determinant of prices for dominant carriers,⁹⁸ and it allows non-dominant carriers (all IXCs except AT&T) to set prices regardless of their costs. However, the FCC is considering moving away from strict reliance on costs for setting AT&T's interstate toll prices.⁹⁹

⁹⁷For a more detailed look at this phenomenon, see The Formula is Everything.

⁹⁸See Chapter 1, section IV.A.

⁹⁹In the Matter of Policy and Rules Concerning Rates for Dominant Carriers, CC Docket 87-313: Notice of Proposed Rulemaking, 2 FCC Rcd 5208 (1987); Further Notice of Proposed Rulemaking, 3 FCC Rcd 3195

In the regulated intrastate arena, aggregate costs based on Part 36 Separations results are generally used in the price-setting process. Prices are set so that the total of all expected revenues equals the intrastate revenue requirement. However, for specific services, costs may be less central in setting prices, depending on the orientation of the state commission and carrier policy decisions. For example, state commissions tend to follow residual pricing for local service, whereby local service prices are set at a level to recover what is left of the intrastate revenue requirement after all other services are priced. Other regulated services may be priced based on long-run incremental cost (LRIC), leaving any difference between that service's fully distributed cost and LRIC to be recovered by other services. As another example, carrier nonregulated (Part 64) service costs are an input into the pricing decision which may serve to set price floors (due to antitrust as well as economic considerations) and which economists argue will determine entry and exit into a market over the long run. Even the relationship between these costs and prices is discretionary, although the discretion is exercised less by the regulatory bodies and more by management in light of tax, antitrust, and stockholder considerations.

As these different situations suggest, one costing method will not be appropriate for all purposes. Similarly, because costing methods reflect objectives of the players, the same method will not be seen as appropriate by every stakeholder. Furthermore, the appropriateness of any method may change over time as regulatory policies and corporate strategies change.

II.C. Cost Pools -- The Objects of Cost Allocation

In cost accounting, what is desired is the cost of "something," be it a service, product, microwave tower, or buried cable. This "something" is called a cost objective or cost pool. The cost of the pool may be desired for any of the reasons listed above: planning and controlling routine operations; nonroutine decisions, policymaking, and

(1988). For an analysis of this and other alternatives to RBROR regulation, see Alternatives.

long-range planning; and inventory valuation and income determination. The cost may vary depending on the reason for the costing. Again, the theme is "different costs for different purposes."

Within the telecommunications industry, cost pools can be identified along jurisdictional lines (Part 36), along individual service lines (as in cost of service studies or Part 69), along market lines (a market may be defined by perceptions of consumer wants and needs), or even along network component lines (as for exchange and toll plant). In addition, time of day or season can enter into the definition of these pools since capacity may be used only at certain times.

Costs for all types of pools are calculated for specific purposes and to achieve specific goals. If these purposes and goals change, the costing rules and methods may change. Allocation methods that may be appropriate for one set of pools will be inappropriate for others. Company or regulatory strategy may suggest one approach over another, as may industry changes. Understanding the debate over which methods should be used to achieve given goals requires understanding the concepts underlying various costing methods.

II.D. Common Cost Issues

II.D.1. Most Costs Can Be Seen as Common

The majority of costs in the industry can be seen as common costs. Common costs can be defined as those expenditures incurred in producing different services in varying proportions when the expenditures do not fluctuate with changes in the output of any one product. In the telecommunications industry, network usage can be considered output.

Many of the costs of the telephone network can be considered common costs because the same network is used for most of the services offered customers. For example, much of the same equipment is used for local as well as toll calls, custom calling features such as call waiting and three-way calling, and advanced features such as Centrex, which provides PBX-like services out of a central office. This equipment also provides a service that could be called "readiness to

serve," or the ability to make and receive calls.¹⁰⁰ One consequence of this service is that costs can be incurred where there is little or no usage of the network. These services all use virtually the same outside plant and central office facilities, although they may use them in different ways. Related expenses such as maintenance and depreciation on these facilities can be included in the common costs of the network.

In addition to network-related common costs, the industry incurs a lot of what may be considered fixed overheads. These expenditures relate to general department operations -- such as treasury, legal, corporate accounting -- that are required for the existence of the company. They usually cannot be directly related to specific services or products sold to customers, and their level does not vary with the level of services provided. Hence, fixed overheads behave similarly to network-related common costs.

It may also be argued that depreciation expense behaves like fixed overheads. Much of the network investment does not "wear out" with use but with time or technological advances, so the level of depreciation expense does not vary with the level of services provided. Thus, whether viewed as a fixed overhead or network-related expense, depreciation may be considered a common cost.

Because so many costs can be considered common or fixed and so few product-specific or variable, it is often asserted that there are declining unit costs within the relevant operating range as common costs are spread among increasing units of output (minutes, lines, etc.). To the extent that this is the case, there is a fundamental tension between costs considered in pricing to earn a desired return (i.e., cover all costs) and costs considered in pricing to use the network more efficiently. This tension normally arises in the regulated arena in which fully distributed costs are required to set prices that will generate sufficient revenues to compensate investors but marginal costs are deemed appropriate for more efficient use of the plant. However,

¹⁰⁰This service is sometimes called access, although that term should not be confused with interstate access for which the FCC sets rates. Access charged interexchange carriers pays for actual use of the network. However, the SLC charged end users is a payment for readiness to serve; one must pay it for the ability to make and receive calls whether or not one ever does.

this conflict also arises in the costing of enhanced services under Computer Inquiry III. The same tension can also arise whenever unit costs are declining even if prices are not regulated, because marginal costs will not exceed average variable costs. In this instance, prices at marginal cost will not cover all fixed costs. (The meaning of marginal and fully distributed costs is discussed more fully in section III below.)

II.D.2. Product-Specific Common Costs are Defined, not Discovered

Because of the nature of common costs, any costing method, including Jurisdictional Separations and Access Allocation, is arbitrary when used to allocate common costs to specific products or services. To be more straightforward, there is no such thing as objectively verifiable or inherently correct common cost allocation.¹⁰¹ Common costs associated with any service, product, or market are defined, not discovered, by the allocation method. Different methods will serve different purposes and affect stakeholders differently; the same method applied for the same purpose will affect stakeholders differently. The definition of common costs is one area in which discretion is exercised.

Discussions on any costing method center on determining which method is perceived to be most appropriate in the particular situation, given explicit and implicit goals and strategies of the involved stakeholders. As might be expected, stakeholders often look out for their own perceived self interest, so that issues involving fairness, such as cross-subsidization between regulated and nonregulated services, can engender widely varying responses.¹⁰²

Accountants and economists suggest only general rules for allocating common costs. These rules are aimed at motivating managerial

¹⁰¹For early comments on the arbitrariness of common cost allocations in the railroad industry, see William J. Cunningham, "The Separation of Railroad Operating Expenses Between Freight and Passenger Services," The Quarterly Journal of Economics, Vol. XXXI, No. 2, February, 1917, pp. 209-240.

¹⁰²See Chapter 1, footnote 41.

performance to maximize profit and to use resources more efficiently. They focus on cost causation and cost benefit. However, precise definitions and measurement techniques for these methods are debatable. For example, both input and output have been suggested as indicators of cost causation, and the measurement of cost benefit is even less clear. The choice ultimately depends on the objectives of the allocation process and the interest and relative power of the affected stakeholders.

In this context it should be noted that "correct" decisions cannot be made simply by gathering the "facts." While data can be, and are, gathered, their arbitrariness means that they alone cannot provide answers. Instead, policy goals must be taken into account. The decision process does not flow from data to decision to policy, but more nearly from policy to data to decision to revised data (via rule changes). This is discretion at work.

III. Types of Costing Methods

There are a number of types of costing methods employed for various purposes both inside and outside the telecommunications industry. The concepts of the major methods will be discussed below. The intent is to provide a background for debate on policy and tactics, not to cover in detail the minor variations between similar methods or rehash theoretical issues.

Common, at least in some degree, to all costing methods is the principle of cost causation. This principle says that costs should be assigned to the cost pools that are the major factor in causing the costs to be incurred.¹⁰³ Cost causation can take on either of two forms. Costs can be directly caused by the cost pool, such as the costs of the raw materials necessary to manufacture a product. Other costs, primarily variable overheads, may be considered caused by the cost pool because they vary with output even though they cannot be directly associated with the cost objective.

¹⁰³Cost Accounting, p. 477.

As the telecommunications industry has become more competitive, and as the FCC has decided to foster that competition, the principle of cost causation has become more important. The FCC has a long-standing goal of encouraging cost-based rates,¹⁰⁴ and cost causation is a fundamental underpinning of its cost allocation rules. Under these rules, direct assignment of costs to jurisdictions (normally based on causation) is the first step in allocating costs between jurisdictions. Only when all directly assignable costs have been assigned to their jurisdiction are the remaining costs assigned by use of appropriate factors.¹⁰⁵ Some of the current allocation methods in Part 36 rely on cost-causation concepts,¹⁰⁶ and a cost causative approach is being proposed to separate other expenses.¹⁰⁷

One of the questions that must be answered when developing a cost-causative basis for cost allocation is how to measure causality. The following section discusses output, or use, as a measure of causality. It then discusses two different methods for measuring that use and suggests implications for stakeholders of each method. A discussion of six different costing methods follows that section.

¹⁰⁴Reiterated, for instance, In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket No. 78-72 and 80-286, Memorandum Opinion and Order on Reconsideration and Order Inviting Comments, 3 FCC Rcd 4560 (1988), fn. 107.

¹⁰⁵FCC Part 36, paragraph 36.1 (c).

¹⁰⁶For example, the Separation of account 6620, Customer Operations Services category 3.1, Local Business Office Expense, identifies costs by the service that causes them or to which they are closely related. These costs are then separated based on the nature of that service. Part 36, paragraph 36.373 (d) (2).

¹⁰⁷In the Matter of MTS and WATS Market Structure, Amendment of Part 67 (New Part 36) of the Commission's Rules and Establishment of a Federal-State Joint Board, CC Docket Nos. 78-72, 80-286, and 86-297, Order on Reconsideration and Supplemental Notice of Proposed Rulemaking, 3 FCC Rcd 5518 (1988). For example, the United States Telephone Association (USTA) in its Reply Comments (October 5, 1988) on this proceeding states that using jurisdictional users as defined in the then-current Part 36 rules to separate the Other Billing and Collection category of revenue accounting expense in account 6620 (except the End User portion) "will best reflect a cost-causative procedure" (p. 3).

III.A. Output as Measure of Causality

As noted above, cost causality is one method frequently used to allocate costs to cost pools. This method assigns costs to products that cause the costs to be incurred. One way to specify cost causality is through some measure of output. For example, various types of minutes of use are used in Separations. The industry often uses two general approaches to measuring use or output, actual or historical use (as in Separations) and projected use (or unit of service costing). Choices common to both methods include defining appropriate measures of use which are, of course, dependent on the purposes of the cost method. Each approach has different implications.

Historical use can be used to establish percentages to allocate actual expenditures to different cost pools. This historical relative use method will reallocate costs among all pools if the level of use of only one changes. It ensures that all expenditures will be completely allocated to all relevant pools and that allocated costs do not exceed actual expenditures.

Projected use allocates expenditures to cost pools based on forecast use and expenditures. A common example of this is fixed overhead loading rates. If used to allocate fixed or common costs, projected use will assign more or less than the actual expenditures to cost pools if actual usage differs from estimated usage even if actual and projected expenditures match.

Historical usage may be easier to record and document precisely. However, the degree of accuracy may always be questioned because the rules involved may be arbitrary. Forecasts are always prone to error, so they may be less precise than "actual" usage. Of course, the accuracy of forecasts is also dependent on the rules involved. Service costing may be more costly for a company to implement, especially if it has to develop its own methods and identify and allocate common costs. It is not inherently any more accurate than historical usage, since service costing methods may also be arbitrary. The different implications of these methods for peak period or capacity costs are discussed in section III.D below.

Regulatory or company policies can be affected differently depending on which method is used. For example, the two methods have different implications for avoiding cross-subsidization of regulated and nonregulated services (Part 64). These implications relate to over- or under-allocation of common costs and shifts in all costs if the usage of only one service changes. The use of either method has different consequences for companies whose usage fluctuates in the short run than for those with more stable usage, even if both usage levels are the same in the long run. The historical cost method may shift costs (or subsidies) back and forth if usage fluctuates but assign a more even level of costs if usage is stable. The projected use method would probably allocate a more stable level of costs in the long run in both instances. The former method might make tracking these subsidies, however defined, more difficult than the latter because of their short-term variation.

III.B. Marginal Costing

Marginal costing is considered by economists as the optimum method for setting prices because in a competitive industry prices will be driven toward the marginal costs of the marginal firm. The "invisible hand" rations resources most efficiently through the entry and exit of firms in an industry. Economists traditionally define marginal costs as those that are incurred by the production of one additional (or one fewer) unit;¹⁰⁸ which costs are included depend on the time frame involved. In the past, cost accountants and economists have usually suggested that the most appropriate time frame for the telephone industry is the long run, in which plant capacity can be changed. The long-run approach also helped meet a common regulatory goal of maintaining stable rates over time. Marginal costing may require the explicit calculation of peak-period or capacity costs while full costing usually implicitly allocates these costs. These costs are discussed in more detail in section III.D below.

¹⁰⁸For example, see Economics, 11th ed., Paul A. Samuelson, McGraw-Hill Book Co., New York, 1980, p. 428.

The economic assumption that is usually made when prices are connected with marginal costs is that marginal cost is rising and is greater than average total cost.¹⁰⁹ In this case, setting prices at marginal cost means prices exceed average total cost and the firm is profitable. A frequent objection to marginal costing in the telecommunications industry is that the industry does not have a rising cost curve. If this is the case, the marginal cost is equal to or less than the average cost, and setting all prices based on marginal cost eliminates profits.

This research will not investigate the cost curves of the industry to determine if they are rising or falling. However, it is important to realize the objections to the use of marginal costing and the pitfalls that may accompany it.

III.C. Variable Costing

Variable costs are those that vary with the level of output.¹¹⁰ Some costs vary in the short run, while others vary over a longer time frame. Some authors make a distinction between these time frames, calling the short run variable costs "direct" and the long-run costs "attributable."¹¹¹ Variable costing, especially short run, is a cost accounting tool usually used for internal purposes such as making production and pricing decisions for special orders.

¹⁰⁹This description is of perfect competition at long run equilibrium in which average total cost excludes profit. Rising marginal cost means a rising average cost curve eventually, and marginal costs will exceed average costs above some level of output. If one defines average cost to include normal profit, as economists often do, price at marginal cost is also at minimum average cost and no excess profits are being made. See Economics, p. 444.

¹¹⁰Economics, p. 431.

¹¹¹Cost Accounting, John J. Neuner and Edward B. Deakin III, Richard D. Irwin, Inc., Homewood, Illinois, 1977, and Managerial Cost Accounting, Gordon Shillinglaw, Richard D. Irwin, Inc., Homewood, Illinois, 1982. Both cited in Cost of Service Methods for Intrastate Jurisdictional Telephone Services, William Pollard, J. Stephen Henderson, Mohammad Harunuzaaman, and Ross C. Hemphill, The National Regulatory Research Institute, Columbus, Ohio, 1985, p. 25.

Marginal costs are a subset of variable costs in that costs added with the production of another unit of output must vary with the level of output. In terms of exercising discretion in costing methods to achieve policy goals, marginal and variable costing considerations are similar enough to be considered equivalent.

III.D. Capacity or Peak-Period Costing

As usage approaches capacity in peak periods, costs can be defined so that they increase to include the expenditures required to build a network to handle that capacity. Cost accountants sometimes refer to these costs as attributable costs, the longer term variable costs. They argue that capacity costs should be assigned to products based on the necessity of these costs for producing the product.

Capacity costing requires defining telecommunications cost pools as services by time of day or by season or by whatever determines the peak period. This method suggests assigning the capacity costs to the cost pools for which the capacity was engineered.

Capacity or peak-period costing can be important as a tool to achieve policy goals related to more efficient use of the network. Traditional economics suggests that in a competitive market, prices at marginal cost will lead to optimal utilization of resources. One goal of capacity costing may be to set prices based on costs that, by reflecting what might be considered the marginal cost of capacity, will promote more efficient use of the network. The most familiar manifestation of this is in the evening and night toll rate discounts, although this costing method may be applicable to all services.¹¹²

Of course, peak periods vary by service within a company, by season, and between companies. They may be affected by company and

¹¹²For a description of an attempt to apply peak-period costing to intrastate toll and exchange prices, see Stanford Levin, "Making Divestiture and Deregulation Work: The Illinois Experience," paper presented at the Sixth International Conference on Forecasting and Analysis for Business Planning in the Information Age, Tokyo, Japan, November 30 - December 3, 1986, and at the American Economics Association meeting, New Orleans, Louisiana, December 28-30, 1986, pp. 18-19.

regulatory policies on network configuration, universal service, and local service pricing. They may even be affected by other companies' pricing policies, such as IXC time-of-day discounts. Criteria on holding times and blocking serve to establish capacity constraints. Reducing chances of not being able to switch a call means increasing capacity costs. Price structure can affect usage patterns and hence capacity considerations. A flat local price is indifferent to use patterns but a time-of-day price structure might encourage off-peak consumption. One economic "cost" of flat-rate local service may be less efficient use of the network than under time-of-day pricing. The benefits of flat-rate pricing may include universal service for those who would not be able to afford telephone service at cost-based prices, increased convenience and reduced transactions costs for customers, and possibly lower costs for providers if they cannot currently record local messages by time of day.

Most costing methods except direct or short-run variable costing assign peak period costs, but they do so in widely divergent ways. These differences reflect different objectives and implicit assumptions concerning the reasons for the capacity and hence offer varying perceptions and degrees of cost-causality in the assignment.

An actual-usage based costing method, like Separations, implicitly assumes that capacity is provided for proportional growth in existing services. A projected-use method such as the FCC adopted in Part 64 assumes capacity is provided for specific services as reflected in the demand forecasts for these services. Marginal costing will assign capacity costs only to those services (frequently at only certain times) which use the capacity, while fully distributed costing allocates some capacity costs to all relevant services.

The different approaches to capacity costing reflect the tension between viewing capacity costs primarily as engineered for specific services (or times of day) and as available equally to all services at any given time. This tension can manifest itself in debates over who should pay for unused capacity. If a company installs capacity that is not used, consumers may feel that shareowners might pay via reduced rates of return and dividends. The owners may feel that the capacity exists to benefit all users, especially if it is installed to meet

commission-ordered performance standards, so that the users should pay for the capacity.

III.E. Absorption Costing

Absorption costing includes fixed production overheads as well as variable costs when it assigns costs to a pool.¹¹³ These fixed costs are often allocated to products based on whether the cost is necessary to production of the product. Absorption costing is used to value inventories for financial and tax reporting. One of its problems is that it may lead to over- or under-assignment of overhead if the assumptions used to develop the assignment rate or allocation procedure do not match actual results.

Absorption costing would appear to have fewer applications for common carriers for whom the concept of manufacturing overhead appears less applicable. Concerns with the assignment of fixed costs to cost pools is discussed more fully in the next section.

III.F. Fully Distributed Costing

Fully distributed costing (FDC) is the allocation of all costs to all services except in those cases in which no causal or beneficial relation is perceived between them. The key concept is that all costs are allocated among all services. Fully distributed, or reimbursement, costs include not only all costs (including overhead) necessary to produce the product but also those needed to ensure continuity of the organization.

The purpose of FDC is usually to set prices which guarantee recovery of all costs. It often involves complicated methods to allocate common costs and overheads. FDC is used outside the telecommunications industry to set prices for insurance company and government reimbursement of health care costs and for defense contracts.¹¹⁴ Most fully distributed costing methods exemplify the idea

¹¹³Cost Accounting, p. 52.

¹¹⁴"Cost of Service Methods," p. 33.

that common costs are defined and not discovered by the allocation method.

Within the telecommunications industry, strong causal relationships may be perceived between some services and costs, but many others can be viewed as having weak causal relationships. Services can also have no causal relationships with some costs and can merely be said to benefit from them. Because of the size of common and overhead costs in the telecommunications industry, FDC allocation methods are important and can differentially affect stakeholders. At the risk of being redundant, *any common cost allocation method is arbitrary*. No one method is more "accurate" than another; it will only have different effects and implications. The SPF used to separate non-traffic-sensitive costs is an obvious example of an arbitrary allocator which was developed to serve specific goals.¹¹⁵

Full costing affects companies differently than does marginal costing. The difference between these methods depends on how much growth and excess capacity exists and to what extent unit costs are actually declining with increased usage over the chosen time period. Marginal costs may be close to full (or average) costs in low-growth companies or companies with smooth usage patterns and little excess capacity. Rural areas, especially those served by independents, may fit this description. Carrier and regulatory policies on pricing and network design can also affect the difference between full and marginal costing through their effect on capacity costs. For example, reducing the possibility of blocked calls may improve the quality of service but will probably increase fully distributed costs by increasing capacity. However, under marginal or capacity costing methods, most of these costs could be assigned to what would probably be a smaller cost pool comprised only of marginal users or those who actually use the capacity.

The difference between marginal and full costing will be more extreme for companies with higher fixed overheads relative to usage. These differences may be affected by carrier and regulatory decisions on

¹¹⁵For a brief description of the development of SPF in the context of meeting specific policy goals, see Chapter 1, section III.B. For a more detailed discussion, see Behind the Telephone Debates, chs. 9 and 10, especially pp. 92-96.

a wide range of issues including frequency of rate cases, policy on force reductions, negotiating skills for union contracts, and managerial skill which may vary between departments. There may even be different efficiencies of other expenditures such as maintenance. A carrier with longer average loop length may have greater maintenance costs per loop than one with shorter loops. While this situation especially suggests rural companies, urban carriers' costs may be differentially affected by weather and geography. Service level requirements, either internal or commission mandated, may affect the number of service representatives or operators a company employs.

The choice between full and marginal costing reflects the tension noted above between financial health of a carrier and efficient use of the network. To the extent that full costing is required by regulators, it might be argued that their primary goal is financial viability. Efficient allocation of resources is then a secondary goal which may be less important than universal service. Universal service may be promoted by averaged costs and prices, among other policies, and may not always promote more efficient use of the network. If efficient resource allocation becomes the primary goal, someone other than customers might have to make up any reduction in financial strength. While shareholders are one obvious candidate, economists have suggested a flat "tax" on users or on the entire population or even government subsidy (which would of course be borne by taxpayers eventually) as other options.

III.G. Market-Oriented Costing

As more telecommunications services become deregulated, some carriers are becoming more interested in a market-oriented business strategy. This change suggests a market-oriented costing method might be appropriate. As discussed in section II.C above, a market could be defined as a group of consumers with similar wants and needs for services. US West comments on Docket 86-111 suggested that services

should be deregulated on a market basis and that costs should be assigned similarly.¹¹⁶

It may be very difficult to agree on market costs, but it is clear that any such method has differential impacts on carriers. Companies' market structures can vary significantly, even when defined by the same frequently used criteria. The rural-urban mix is one example. Others include the business-residence mix and the geographic concentration of business customers. Large sophisticated businesses may have different needs and purchasing power than small business and residential customers, and the relative size of this submarket will vary. Different players may perceive the nature of customers' needs differently, and thereby segment the same market differently. Courts relying on antitrust considerations may define a market quite differently than would a carrier seeking new revenue sources.

Carrier and regulatory policy can also affect market structure. The size of the local calling area defines the relative importance of local and toll markets and may be determined by both the company and the regulator. Local or toll service may be priced on either a measured or essentially flat-rate basis. Consequently, pricing decisions on local and toll services may also define the market.¹¹⁷ Toll calling patterns will help define markets since toll traffic may be dispersed or may center on a few routes. Socio-cultural considerations may even affect the toll market.

¹¹⁶In the Matter of Separation of Costs of Regulated Telephone Service from Costs of Nonregulated Activities, Amendment of Part 31, the Uniform System of Accounts for Class A and Class B Telephone Companies, and to Provide for Nonregulated Transactions between Telephone Companies and their Affiliates, CC Docket No. 86-111, Comments of US WEST, Inc., June 30, 1986, pp. iii-iv.

¹¹⁷They may even eliminate the distinction between these markets. "Making Divestiture and Deregulation Work," p. 18.

CHAPTER THREE

ANALYTICAL ACCOUNT AND DATA PROCESS DESCRIPTION

This chapter provides a transition from theory and background to an account of an alternative costing method. It does so by explaining the analytical account framework with which the alternative method is modelled. The functional view of the network to which the analytical accounts are tied is discussed first. Then the derivation of the analytical accounts from accounting and Separations data is explained. Finally uses for the analytical account data are suggested.

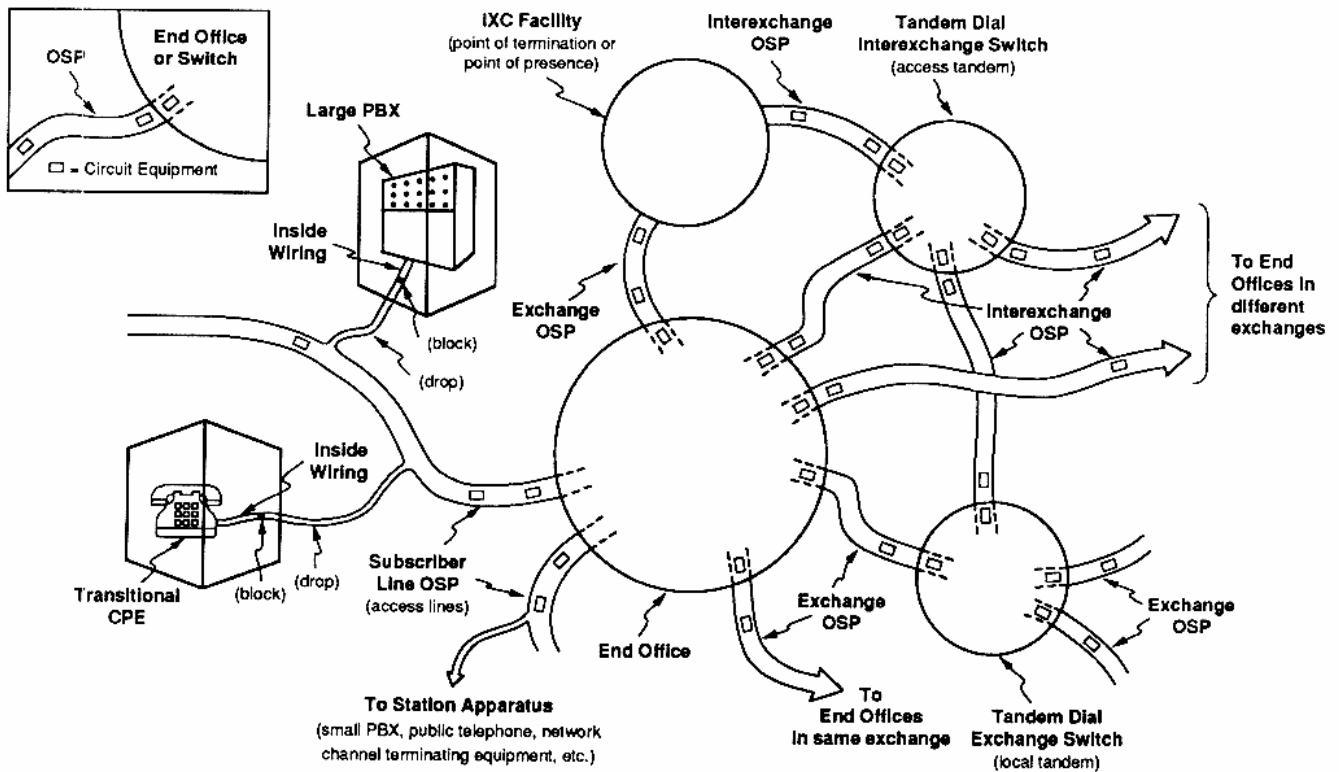
I. A Functional View of the Network

One aspect of the telecommunications system that has remained fairly constant amidst the changes of competition, technology, regulation, and ownership is the functions of the physical plant. Thus the network provides a background against which the effects of alternative costing methods can be played.

Figure 3-1 depicts a functional view of the LEC network. The labels in this figure represent the functions of the physical plant, not specific equipment or buildings. For example, "end office" represents a type of switching function, not a specific piece of equipment. In reality, one physical switch may serve all three LEC switching functions.

Some of the labels reflect the traditional industry accounting system, Parts 31 or 32. Others reflect categories defined in Separations for the purpose of allocating costs. Both accounting and cost category definitions have been changed as a result of competition and divestiture.¹¹⁸ The figure shows not only the network "hardware" but also the accounting and cost treatment of that network.

¹¹⁸For example, Outside Plant is renamed Cable and Wire Facilities (C&WF) in Part 32, and the Part 67 distinction between NTS and TS central office equipment was eliminated in Part 36.



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Figure 3-1

The Post-Divestiture Traditional LEC Network

The figure shows the most common equipment connected to the network, the home or office (PBX) phone.¹¹⁹ This equipment is known as customer premise equipment, or CPE. It is connected to the network through wiring inside the premise, known as inside wire (ISW), and wires connecting the premise to the switch. The connection between these two sets of wires is called the block, and the portion of the wire from the block to the telephone poll is called the drop. The drop and block were formerly accounted for as Station Connections but in 1984 were

¹¹⁹A much more detailed explanation of Fig. 3-1, including debates and issues related to it, can be found in Behind the Telephone Debates, Ch. 3, pp. 16-22.

reclassified to be accounted for as outside plant (OSP).¹²⁰ From the drop to the switch, the wire is called subscriber line OSP.

The large circle represents the end or serving office switch. This switch routes calls of three basic types, intraoffice, interoffice exchange, and interexchange. Intraoffice calls travel back along subscriber lines connected to the same switch to the called party. Interoffice exchange calls travel along exchange OSP to either another end office or to a tandem dial exchange switch which then routes the call to another end office. Interexchange calls may travel over exchange OSP routed directly to an IXC, or over interexchange OSP to a tandem dial interexchange switch, or LATA tandem. This tandem routes the call over interexchange OSP either to an IXC switch,¹²¹ known as a point of presence (POP) or point of termination (POT), or to the LEC end office, depending on who carries the call. The IXC then carries the call to its terminating POP (POT), where the process is reversed to reach the dialed party.

While the various OSP are depicted as wires, they may actually be fiber optic cable or microwave. The small rectangles inside the OSP represent circuit equipment. Circuit equipment operates along the route to enhance or modify the signal. For example, signals weaken over

¹²⁰In the Matter of Amendment of Part 31 Uniform System of Accounts for Class A and Class B Telephone Companies, of the Commission's Rules and Regulations to Change the Basis of Depreciation and Retirement Procedures for the "Station Connection-Other" Subclass of Account 232, and to Reclassify Network Channel Terminating Equipment, Including Subscriber Pair Gain Equipment, Located on the Customer's Premises, to Account 221, "Central Office Equipment," CC Docket No. 82-679, Report and Order, 48 Fed. Reg. 49843 (1983). This is an example of redefining the cost categories.

¹²¹The type and quality of this connection for OCCs and its price relative to AT&T's connection was the source of much debate in the formulation of access charges. The outcome of this debate was that access that was not equal to AT&T's would be charged only 45% of the price charged AT&T. The MFJ established a schedule by which end offices would convert to equal access so that most of the nation would have equal access by 1987. For details, see The FCC Access Charge Plan: The Debates Continue, Mark L. Lemler, Program on Information Resources Policy, Harvard University, Cambridge, MA, publication P-87-8, October 1987, and Implementing Access Charges: Stakeholders and Options, John McGarrity, Program on Information Resources Policy, Harvard University, Cambridge, MA, publication P-83-2, March 1983.

distance, and circuit equipment includes amplifiers that strengthen it. Circuit equipment may also be resident in switches.

Given this functional view of the network, costs associated with these functions and certain non-plant related functions are derived. The next section discusses the development of these costs.

II. Derivation of Analytical Cost Accounts

Costs associated with these categories for 1976 were originally reported by AT&T to the FCC for its investigation into the Separations impact of customer provision of CPE.¹²² Figure 3-2 lists all the LEC analytical accounts for 1976 based on this AT&T filing, and for 1985 adjusted for divestiture and other post-1976 changes. Costs for each account are actually revenue requirements and include a return on investment as explained in Chapter 2.

The 1976 LEC costs are presented in Figure 3-3. The total LEC costs were \$37.1 billion. Of this, \$6.3 billion or 16.9% is associated with independent telephone companies, and \$30.8 billion or 83.1% is associated with the BOCs.¹²³

The areas of the rectangles represent dollars much as the slices of a pie chart can represent dollars. Each rectangle represents one of the analytical accounts corresponding to the functional costs identified in Figure 3-1. There are also three expense categories representing non-plant related costs. Commercial expense (category r) includes costs for advertising, Yellow Pages, and employees who receive service orders from customers. Traffic Expense (category q) includes costs for operators and supervision of the network. Revenue accounting (category p) includes costs for billing and collecting revenues. Costs for independent phone companies were not submitted by analytical account.

¹²²Impact of Customer Provision of Terminal Equipment on Jurisdictional Separations, FCC Docket No. 20981, Notice of Inquiry, Proposed Rulemaking, and Creation of Federal-State Joint Board, 63 FCC 2d 202 (1976), Request No. JB-40 of the Federal-State Joint Board (January 10, 1977). AT&T Submission, August 4, 1978.

¹²³The BOCs include Cincinnati Bell and Southern New England Telephone in which AT&T held a minority interest until after divestiture.

Analytical Account Letter	1976 Analytical Account Name	1985 Analytical Account Name
p	Revenue Accounting Expense	Revenue Accounting Expense
q	Traffic Expense	Traffic Expense
r	Commercial Expense	Commercial Expense
sfr	*	Shared Facilities Rental
cpe	**	Transitional CPE
o	Station Apparatus	Station Apparatus
n	Large PBX	Large PBX
m	Station Connections Inside Wire	Station Connections Inside Wire
l	Station Connections Drops and Blocks	***
k	Subscriber Line OSP	Subscriber Line OSP
j	Subscriber Line Circuit Equipment	Subscriber Line Circuit Equipment
i	Local Dial NTS	Local Dial NTS
h	Local Dial TS	Local Dial TS
g	Exchange Circuit Equipment	Exchange Circuit Equipment
f	Exchange OSP	Exchange OSP
e	Manual Switching Equipment	Manual Switching Equipment
d	Toll Dial Switch Equipment	Toll Dial Switch Equipment
c	Interexchange Circuit Equipment	Interexchange Circuit Equipment
b	Interexchange OSP	Interexchange OSP

* New analytical account created as a result of the MFJ. These costs are those incurred by BOCs for facilities leased to AT&T.

** Transitional CPE costs are those associated with Customer Premise Equipment detariffed in Computer Inquiry II. These interstate costs were reduced to zero over five years beginning in 1983.

*** Station Connection Drops and Blocks were reclassified as OSP in 1984. These costs appear in Subscriber Line OSP in 1985.

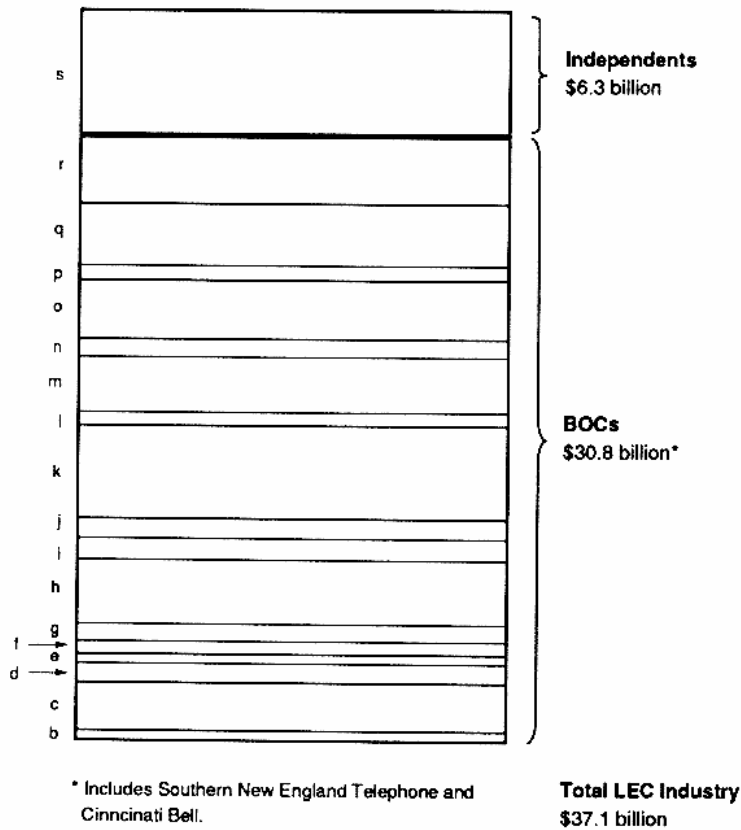
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Figure 3-2

Analytical Accounts

These costs are useful not because they are "correct" but because the industry and regulators have relied on them. They are defined by the USOA and the Separations Manual. Their definitions have changed in the past and are continuing to change.¹²⁴ However, because the functions of the network are relatively stable over time, the adjustments to the cost definitions do not significantly change the overall picture that develops.

¹²⁴For a more detailed look at the changes in USOA, see Behind the Telephone Debates, pp. 37-39. For a similar look at Separations changes 1947-1982, see Ibid, pp. 77-82.



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Figure 3-3

Pre-Divestiture LEC Costs, 1976

A simple example might help make clear the derivation of the analytical accounts.¹²⁵ Figure 3-4 shows the derivation of the Subscriber Line OSP category. Row A shows the expense accounts on the left and the investment accounts on the right. The definition of expense and investment is itself discretionary, as discussed in Chapter 2.

¹²⁵This explanation is simplified from a more complete description in Behind the Telephone Debates, pp. 37, 41.

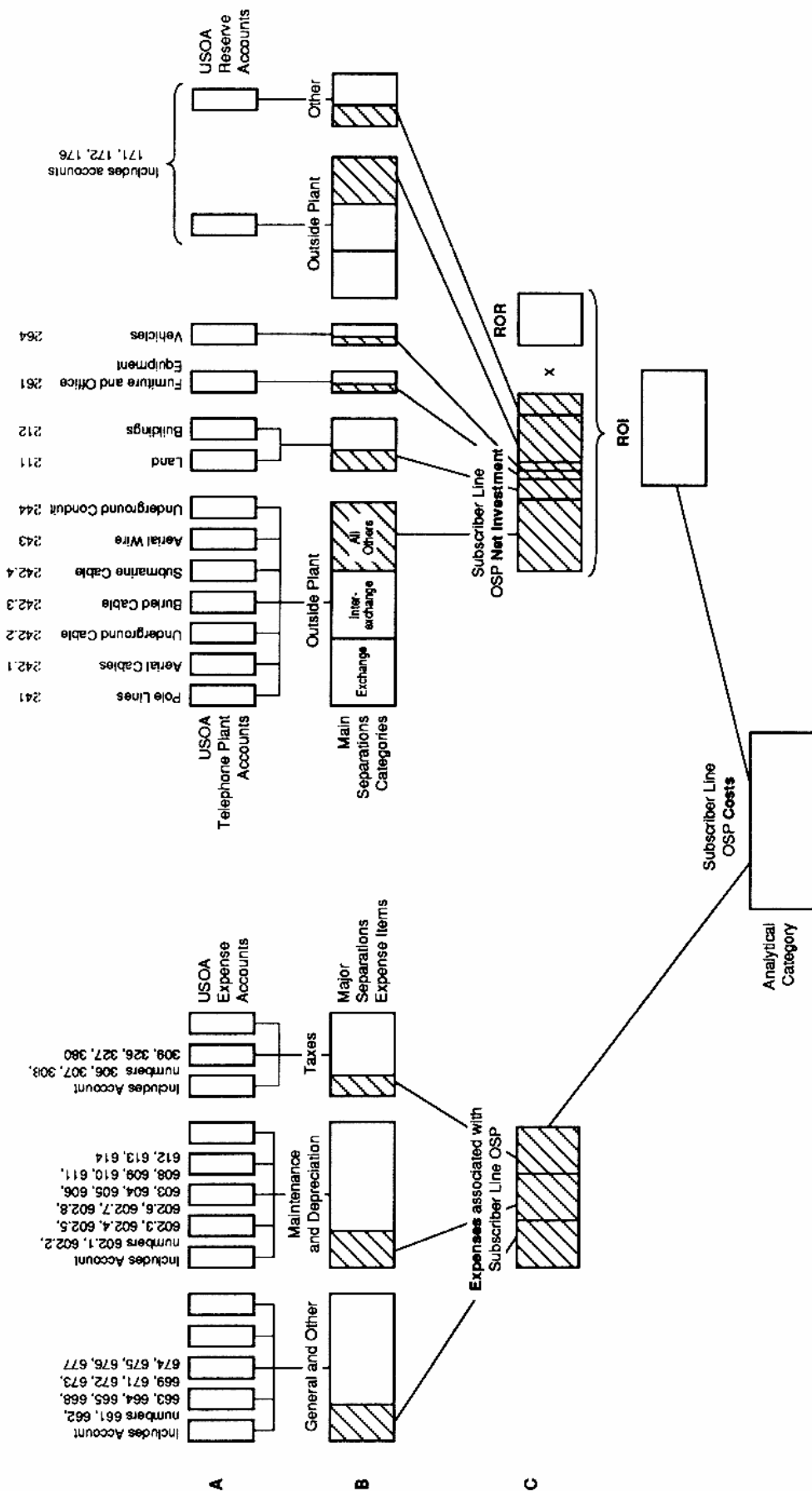


Figure 3-4
Derivation of an Analytical Account: Subscriber Line OSP

Row B shows the assignment of USOA accounts into separations categories and items. The plant accounts form separations categories¹²⁶ and the expense accounts form separations items. Only a portion of the plant accounts go to subscriber line outside plant. Separations assigns the plant to exchange and interexchange categories, and further subcategorizes exchange into subscriber line and other.¹²⁷

Some plant accounts do not correspond to the analytical accounts. However, these accounts may include costs related to analytical accounts. For example, accounts 211 and 212, Land and Buildings, include costs that may be related to subscriber line OSP. Consequently the appropriate portion of these costs are allocated to the analytical accounts. Expenses and taxes are treated similarly.

Row C shows the summing of the subscriber line OSP portions of the investment and expenses, both those directly assigned to the analytical account and those allocated to it. The net investment is then multiplied by the rate of return and added to the expenses to generate the analytical account revenue requirement cost.

Conceptually, the derivation of the analytical account data is the same for 1985 as it was for 1976. Some of the details of both USOA and Separations have changed. For example, in 1984 account 232 Station Connections drops and blocks was reclassified in USOA to OSP account 242.¹²⁸ These costs were then categorized in Separations as subscriber line OSP and were separated on SPF, which was the same factor used to separate the costs when they were recorded in account 232. However,

¹²⁶"Category" is a Separations term for costs related to specific network functions such as toll, exchange, local switching, and others. COE and OSP are categorized in Separations before being assigned to jurisdictions.

¹²⁷For the derivation of the analytical cost categories from the USOA accounts and separations categories, see Appendix 1 at the end of this volume. An IBM PC-compatible 5 1/4-inch disk with the LOTUS 123 spreadsheet which calculated the analytical account data presented in this report may be ordered from the Program on Information Resources Policy, Order Department, Aiken 200, Harvard University, 33 Oxford Street, Cambridge, MA 02138 (617) 495-4114. Telex: 888 737 PIRP UD; Fax: 617 495-3338.

¹²⁸CC Docket No. 82-679, Report and Order, 48 Fed. Reg. 49843 (1983).

because of the allocation procedure used in Separations to assign expenses, there may have been some minor jurisdictional shift associated with this reclassification.

These costs were derived for 1985 based on data provided to the Program on Information Resources Policy by all seven RHCs, Cincinnati Bell (CBI), Southern New England Telephone (SNET), General Telephone and Electronics (GTE), and United Telephone. Data was provided for 83 study areas. More than 1200 data points for each month were provided by the RHCs, CBI, and SNET. These were then aggregated into the analytical account revenue requirements. GTE and United Telephone provided 295 annual data points which were also aggregated into the analytical accounts.¹²⁹

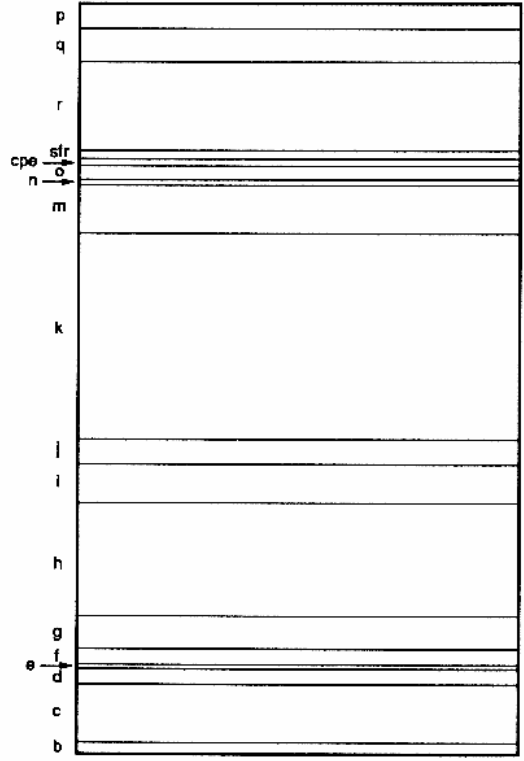
Figure 3-5 shows the 1985 costs in the same manner as Figure 3-3 showed the 1976 costs. The 1985 costs are for the 83 study areas that submitted data and represent about 90% of the industry, as noted in Chapter 1, section II.B.1. These costs totalled \$71.4 billion, a 92.5% increase from 1976. This increase is somewhat understated since Figure 3-5 includes only 31 independent LEC study areas¹³⁰, while Figure 3-3 includes all independents. These 31 study areas' costs are in the top band of Figure 3-3 while they are spread throughout the bands of Figure 3-5.

Because the height of these figures is the same, comparisons between them can most easily be made in terms of the percentage of total costs associated with each analytical account, represented by the height of each individual band. The most striking difference between 1976 and 1985 is that the percentage of Subscriber Line (j and k), Local Dial COE (h and i) and Commercial Expense (r) analytical accounts increased greatly over these nine years. Offsetting these increases are decreases in Traffic Expense (q) and Station Apparatus (o). A small part of the increase in Subscriber Line OSP (k) is caused by the reclassification of

¹²⁹See Appendix 2 at the end of this volume for details on the data and its aggregation.

¹³⁰A study area comprises the operations of a company within one state. Almost all states have multiple study areas since they are served by both Bell and Independent companies. In the late 1980s there are about 1400 study areas.

Station Connections: Drops and Blocks (1) to Subscriber Line OSP described above.



LEC Industry
\$71.4 billion*

*7 Regionals, 4 Independents (83 Study Areas)

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Figure 3-5

Post-Divestiture LEC Costs, 1985

III. Uses of Analytical Account Costs

The analytical account costs can be used in at least two ways. First, they can be used to compare 1976 and 1985 LEC cost structures. This comparison could address questions in at least two areas:

Cost structure. How has the cost structure of the LEC industry changed? As noted above, the percentage of LEC costs associated with

loop plant increased. The transfer of interexchange investment from the BOCs to AT&T at divestiture would cause a change in the percentage of LEC plant that is loop-related because it reduces total investment without reducing loop investment.¹³¹ To what extent has loop (and all other) plant increased because of the removal of CPE from the rate base? How has this change varied across companies and study areas? What might be underlying causes for this variation, and what might its consequences be?

Jurisdictional assignment. How has the jurisdictional assignment of LEC costs changed? If the loop plant (separated on SPF) percentage of total plant increases, the overall interstate assignment will increase because SPF is usually a higher interstate percentage than other separations factors (SLU, DEM, etc).¹³² However, the removal from the rate base of CPE,¹³³ which is also separated on SPF, will reduce the overall assignment. Increased interstate usage will tend to increase assignment in virtually all categories by increasing the separations factors derived from relative use (SLU, DEM and others). How strong have these effects been? How have they varied across companies and study areas, and why? What are the consequences of these changes and variations?

Second, the analytical account data can be used as a baseline to model alternative costing methods. These costs are used not because

¹³¹This is an arithmetic result. If pre-divestiture total investment is 10 and loop investment is 3, then 30% of the investment is loop plant. If total investment decreases to 9 when interexchange plant is transferred to AT&T, loop investment remains at 3, and 33% of the investment is loop plant.

¹³²Monitoring Report, CC Docket No. 87-339, June 1988, Prepared by the Staff of the Federal-State Joint Board in CC Docket 80-286, Tables 4.20, 4.21, 4.22 and 4.23, Interstate SLU, SPF, DEM and weighted DEM factors, respectively. This relationship will generally remain the case even after SPF has completed its transition to 25% for all study areas, per FCC Part 36, paragraph 36.154, although increasing interstate use without a proportional intrastate increase will reduce the differences.

¹³³FCC Part 36, paragraph 36.142 assigns all CPE detariffed under Computer Inquiry II to the intrastate jurisdiction effective in 1988. Part 67, paragraph 67.153 phased out the interstate assignment of this investment over five years, ending in 1987.

they are "real" but because they represent accounting and Separations rules which have a large impact on many stakeholders.

This report uses the analytical account information to model a change in jurisdictional separations, the adoption of a single, fixed nationwide interstate allocator. Chapter 4 describes the development and results of this model. Chapter 5 analyzes effects that adopting a single fixed allocator might have on various stakeholders.

CHAPTER FOUR

THE FIXED ALLOCATOR MODEL AND ITS RESULTS

Jurisdictional Separations is one very important arena in which tactical disputes are resolved, as noted in Chapter 1. The results of the Jurisdictional Separations process have a major impact on strategic outcomes of many stakeholders.

The current process is very complicated; developing expertise in it can take years. This complexity has led many LECs to argue for simplifying the rules.¹³⁴ The modelled costing method eliminates this complexity by assigning 23% of all costs to the interstate jurisdiction. The 23% figure is derived from a benchmark national average interstate assignment which reflects modelled ongoing Separations changes of the 1980s. The derivation of the benchmark costs is based on the analytical account process described in Chapter 3 and is discussed in detail in section II below.

This chapter begins with an explanation of technological and legal considerations surrounding the adoption of the fixed allocator. It then describes the model in some detail. The benchmark model is explained, including what changes were and were not modelled. Next the results of modelling the fixed allocator are analyzed and compared to the benchmark results. Chapter 5 examines the implications that adopting a 23% nationwide fixed allocator would have for various stakeholders. Chapter

¹³⁴In the Matter of MTS and WATS Market Structure, Amendments of Part 67 (New Part 36) of the Commissions's Rules and Establishment of a Federal-State Joint Board, CC Dockets 78-72, 80-286, and 86-297, Report and Order, 2 FCC Rcd 2639 (1987). The Federal-State Joint Board, in seeking comment on various allocators for Part 36 COE Category 3 (Local Switching Equipment), offered "simplicity in implementation and administration" as one criterion for evaluating alternative allocators. In the Matter of Amendment of Part 67 of the Commissions's Rules and Establishment of a Federal-State Joint Board, CC Dockets 80-286, Order Inviting Comments and Request for Data, 2 FCC Rcd 3788 (1987), paragraph 10, by the Federal-State Joint Board, paragraph 10. In mid-1988 LECs criticized the Federal State Joint Board's proposal for account 6610 (marketing expense) Separations as being too complex. "LECs Lambaste Joint Board Marketing Expense Allocation Proposal as Too Burdensome," Telecommunications Reports, July 11, 1988, pp. 3-5.

5 also examines in more detail the impact that a fixed allocator would have on pressures to deaverage interstate toll prices.

I. Considerations For Evaluating Whether or Not to Adopt the Fixed Allocator

Considerations for deciding whether or not to adopt the fixed allocator fall into two broad categories, one technological and the other legal and practical. The current Separations rules are based on old technology and old services. Some argue that the old rules are therefore becoming less relevant given new technology and new services. Second, implementing this change would involve legal and practical considerations. It is not the purpose of this paper, or the Program, to advocate, recommend, propose, or support replacing current Separations rules with a single fixed allocator, or any other method for that matter. Instead, the paper models the fixed allocator approach in order to suggest the stakeholder implications of what some may consider to be an extreme example of an alternative regulatory costing method.

I.A. Technological Considerations

The Separations Manual was developed in an era of manual and electromechanical switches and an analog, hierarchical network. In the late 1980s, the network is becoming increasingly electronic, digital, and "geodesic." Thus it can be argued that the evolution of the network has outpaced changes in Separations. In fact, a number of USTA committees are involved in brainstorming alternatives to Separations to reflect this and other changes.

One example of the evolution of Separations is the elimination of the non-traffic sensitive part of Local Dial COE.¹³⁵ An argument in favor of this change was that the distinction between the NTS and TS part of the switch is less important in electronic switches operating under stored program control than it was in electromechanical switching. In fact, the equipment that connects loops to the switch itself remains

¹³⁵Part 36, paragraph 36.125 (b).

largely unchanged. Under the previous rules, the technology served as justification for both identifying and allocating the NTS portion of the switch differently than the TS portion. Newer technology, coupled with shifts in policy emphasis, led to elimination of the distinction between NTS and TS parts of the switch for Separations purposes.

A clearer example of how new technology is difficult to deal with under current Separations procedures can be found in the treatment of packet switched services. Two implications for traditional Separations from packet switching are apparent. First, information delivered over a packet-switched network is not sensitive to minutes of use, which is the most common usage measurement in Separations. Second, the jurisdictional destination of the packets cannot be determined in all cases. Once they are passed to the packet switch, which is not LEC equipment, there is no way to trace their destination. As a result, any minutes recorded in the end office associated with a packet switching service uniformly will look like local or intrastate minutes when the ultimate destination could be interstate as well.

Another example is Integrated Services Digital Network, or ISDN.¹³⁶ Under the Primary Rate Access Interface, one loop carries 24 channels and can become the equivalent of 23 64 kbps voice or data loops plus one 16 or 64 kbps data channel that can be used for signalling. Within this single loop, some channels can be jointly used (inter- and intrastate) while others can be dedicated inter- or intrastate. To complicate the matter further, this configuration can easily be changed whenever the need arises. This situation raises questions concerning the proper cost per loop and jurisdictional loop allocation. If one loop can be either message or private line, and in varying proportions on any day, assigning its cost to the appropriate cable and wire subcategory is problematic. Whether these costs are deemed message or private line affects jurisdictional results, interstate access prices through Part 69, and Universal Service Fund additional interstate

¹³⁶ISDN can be defined as a new digital network architecture which will provide customers with digital end to end connectivity to support simultaneous voice and non-voice services.

assignment based on a study area's cost per message loop compared to the national average.¹³⁷

The problems raised by these and other applications of newer technologies are not insurmountable in the current Separations rules. However, they do serve to suggest the potential shortcoming of the current Separations rules in the face of new technologies and services and the need to reexamine these rules and suggest alternatives.

I.B. Legal and Practical Considerations

Before results and implications of applying a fixed allocator are looked at, it is worthwhile to determine whether such a costing method could be instituted. That is, might the FCC have the authority to replace Part 36 with a flat allocator? The answer to this question lies at least in part in the application of various Supreme Court decisions regarding costs and rate-making.

In Smith v. Illinois Bell,¹³⁸ the Supreme Court ruled that some costs associated with components of the network that could be used for inter- and intrastate services had to be assigned to the interstate jurisdiction. Specifically, the court said that, even though it was difficult to make an exact apportionment of costs, "it is quite another matter to ignore altogether the actual uses to which the property is put."¹³⁹ The court has never stated what costing method was to be used to reflect "actual uses" in Separations.

Other court decisions suggest that there may be many appropriate costing methods. Fourteen years after Smith v. Illinois Bell, in FPC v. Hope Natural Gas,¹⁴⁰ the court downplayed the importance of any one particular costing method for the natural gas industry. It stated that "under the statutory standard of 'just and reasonable' it is the result

¹³⁷FCC Part 36, paragraphs 36.631 and 36.641.

¹³⁸282 US 133 (1930).

¹³⁹Smith v. Illinois Bell, pp. 150-151.

¹⁴⁰320 US 591 (1944).

reached not the method employed which is controlling."¹⁴¹ This case overturned the fair value standard for rate-making established in Smyth v. Ames¹⁴² as being circular. The court's rationale in Hope was that fair value depends in part on market value of stocks and bonds, which is a function of anticipated revenues that depend on the very rates to be set using fair value.

The courts have specifically addressed Separations in a few cases. In MCI v. FCC the court ruled that "Smith does not constitutionally compel use of a particular formula. Smith compels 'only reasonable measures.'"¹⁴³ In Rural Telephone Coalition v. F.C.C., the Court viewed the 25% SPF as a "reasonable measure" acceptable under Smith as part of the transition toward an access charge environment.¹⁴⁴

Separations is based on the concepts of direct assignment and relative use. These concepts have been accepted in practice but, as noted above, never legally determined to be the only acceptable method.¹⁴⁵ The MCI and Rural Telephone Coalition opinions at least suggest that the FCC might have the authority to replace Part 36 with a flat allocator if that allocator were determined to meet the "reasonable measure" criterion.

Those who argue that direct assignment or relative use is or should be legally required in the Separations process may be overlooking two points. First, most telecommunications costs are seen as common to almost all products and jurisdictions, and the allocation of common costs is inherently discretionary. Thus the FCC could exercise its

¹⁴¹Ibid, p. 602.

¹⁴²169 US 466 (1898).

¹⁴³MCI v. FCC, 750 F.2d at 141.

¹⁴⁴Rural Telephone Coalition v. F.C.C., 838 F.2d 1307 (D.C. Cir. 1988).

¹⁴⁵For a detailed discussion of the development of relative use as the accepted interpretation of Smith v. Illinois Bell, see Cost Separations Formulae in Telecommunications: The Development of the "Relative Use" Standard, Nancy A. Welsh, Program on Information Resources Policy, Harvard University, Cambridge, MA, September 1983, Publication P-83-8.

discretion for setting just and reasonable rates by assigning a fixed percentage of costs to interstate.

Second, the eventual assignment of 25% of the local loop to interstate¹⁴⁶ foreshadows the model of a fixed allocator for all interstate costs. This loop assignment reflects the use of discretion in cost allocation as telecommunications policy goals expanded beyond universal service towards encouraging competition, especially in the interexchange arena.

II. The Model

A simple model was used for the fixed allocator assignment to interstate. It was based on the 1985 Analytical Account revenue requirements for 83 study areas comprising all RHCs and four independent companies. These data were then adjusted for known Separations changes since 1985 to produce benchmark costs against which the effects of the fixed allocator could be compared.

II.A. Modelling Benchmark Costs

There have been a number of Separations changes since 1985.¹⁴⁷

¹⁴⁶Part 36, Paragraph 36.154 (d) will eventually assign 25% of Cable & Wire Facilities Cat 1.3, message subscriber loops to interstate after a transition period.

¹⁴⁷These changes included both an ongoing change that was in place in 1985 and changes that took effect after 1985. The ongoing change was the gradual phasedown of transitional CPE, Part 67, paragraph 67.153. Changes beginning after 1985 included the phasedown of the Subscriber Plant Factor, Part 67, paragraph 67.124(d)(4-7) and, beginning in 1988, Part 36, paragraph 36.154(c-f), and various changes ordered after 1985 including:

- Defining the "closed end" of WATS access lines as private lines, effective June 1986. In the Matter of MTS and WATS Market Structure, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, FCC 85-655, Decision and Order, 51 Fed Reg 3176 (January 24, 1986). This order also changed the separations of Centrex/CO service, coinless public telephones, and terminal equipment account 262 used by telephone companies and expanded the CPE phase-out to include additional CPE-related costs.

Consequently, to model the change associated with a single fixed interstate allocator, these Separations changes had to be modelled first to provide a future base case. Three major changes are reflected in the fixed allocator model developed here:

- 1) the transition of SPF to 25%;
- 2) the elimination of transitional CPE; and
- 3) the shift to measured DEM for the assignment of Local Switching COE (Part 36 COE category 3).

The benchmark costs can be seen as representing a projection to 1993, when both the SPF phasedown and the shift to measured DEM will be complete for most study areas.¹⁴⁸ The elimination of transitional CPE was effective January 1, 1988.¹⁴⁹ However, it is the costs themselves

• Ordering permanent rules for separating Commercial Office Expense account 645, effective June 1986. In the Matter of MTS and WATS Market Structure, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, Decision and Order, released January 7, 1986, 51 Fed Reg 3176 (January 24, 1986).

• Collapsing of COE categories and phasing in of measured DEM allocator, replacing message minute miles (MMM) with conversation minutes (CM) for assigning interexchange circuit equipment, changing the separation of revenue accounting expense, and the numerous Part 36 simplification changes. In the Matter of MTS and WATS Market Structure, CC Docket 78-72, Amendments of Part 67 (New Part 36) of the Commission's Rules and Establishment of a Federal-State Joint Board, CC Dockets 80-286 and 86-297, Report and Order, 2 FCC Rcd 2639 (1987).

¹⁴⁸The SPF phasedown schedule is found in FCC Part 36, paragraph 36.154(d). A few very high SPF study areas will take longer to reach the 25% allocator since there is a five percentage-point limit on the amount of the change, Part 36, paragraph 36.154(f). Calculation of this limit is based on the frozen SPF, Part 36, paragraph 36.154(e) and on the amount of Transitional Additional Interstate Expense Allocation, better known as the Universal Service Fund, Part 36, paragraphs 36.631 and 36.641. The use of phased in measured DEM is required by FCC Part 36, paragraph 36.125(b). This calculation of measured DEM applies to study areas with more than 50,000 access lines, excluding WATS, special access, and Private Lines. Smaller study areas have a weighting factor which will increase their interstate assignment, with the weighting being higher the fewer the access lines, Part 36, paragraph 36.125(f).

¹⁴⁹FCC Part 67, paragraph 67.153(b), which assigns all CPE to the intrastate jurisdiction. This CPE was detariffed in the Second Computer Inquiry decision, In the Matter of Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), FCC Docket No. 20828.

that are important -- both their total and their jurisdictional assignment -- not the year that they may represent.

Jurisdiction Over Costs	Description of Change Modelled	Benchmark Modelling Process		Benchmark Effects
		Subtract	Replace with	
Interstate	Removal of CPE costs	1985 interstate CPE costs	—	Reduces interstate costs Reduces interstate percentage
	Frozen SPF transition to 25%	1985 interstate Subscriber Line OSP and Circuit COE costs (separated on Frozen SPF)	Total 1985 Subscriber Line OSP and Circuit COE costs times 25%	Reduces total LEC interstate percentage Generally reduces, in a few cases increases, individual study area interstate percentage
	Different Local Dial COE allocator: • Non-traffic sensitive • Traffic sensitive	1985 interstate NTS Local Dial COE costs (separated on frozen SPF) 1985 interstate TS Local Dial COE costs (separated on weighted DEM)	1985 total NTS Local Dial COE costs times 1985 measured DEM 1985 total TS Local Dial COE costs times 1985 measured DEM	Reduces interstate costs Reduces interstate percentage Reduces interstate costs slightly Reduces interstate percentage slightly
Total	Removal of CPE costs	1985 Total CPE costs	—	Reduces total costs

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Figure 4-1

The Benchmark Scenario Model

Figure 4-1 describes how these three changes were modelled. In general, the interstate assignment of the analytical accounts most

affected by the changes was adjusted to reflect the change.¹⁵⁰ The model focuses on Subscriber Line and Local Dial COE analytical accounts because together they make up about half of the 1985 LEC costs. The two Subscriber Line accounts comprised 30.3% of the total LEC costs in 1985, while the two Local Dial COE accounts made up 19.8%. Figure 3-5 shows the relative size of these cost categories.

The model includes two simplifying assumptions about the analytical accounts that are affected by the Separations changes. The first assumption concerns which analytical accounts are affected by the SPF phasedown. The phasedown actually affects portions of Large PBX, Station Apparatus and Station Connection analytical accounts,¹⁵¹ which make up 9.1% of the total LEC 1985 costs. The model does not reflect the effect of the SPF phasedown on these accounts because the phasedown causes relatively little change in the benchmark costs interstate assignment compared to its effect on the Subscriber Line accounts.

The second assumption concerns which COE accounts are affected by the changed allocator for Local Dial COE. Local Dial TS and Local Dial NTS COE accounts include Part 67 COE categories 6 and 7E, Local Dial Switch and Private Line Switchboard. The new allocator, measured DEM, will be used to separate the Part 36 COE category 3, which includes Part 67 categories 4, 5, 6, and 7,¹⁵² and eliminates the distinction between NTS and TS local dial switching equipment. Consequently, the model will not reflect the full impact of the shift to measured DEM because it does not model the impact on Part 67 categories 4, 5, and most of 7. However, these categories make up only 2.3% of the total 1985 LEC costs, so changes in the interstate assignment of these costs will have very little impact on the benchmark costs.

¹⁵⁰For the application of SPF to Subscriber Line Outside Plant and Circuit equipment in 1985, see Part 67, paragraphs 67.124(d)(5), (6), and (7) for Outside Plant and paragraph 67.140(c)(3) for circuit equipment. Beginning in 1988, the applicable paragraphs were 36.154(c), (d), and (e) for Cable and Wire Facilities and 36.126(c)(3) for circuit equipment.

¹⁵¹Part 67, paragraph 67.152 (f).

¹⁵²Automatic Message Recording Equipment, Other Toll Dial Switching Equipment, Local Dial Switching Equipment, and Special Services Switching Equipment, respectively.

The effect of the second simplifying assumption on the interstate assignment of these specific categories is minimal because relatively little change in their assignment is due to the rule change. Part 67 categories 4, 5, and 7 were already being separated on a relative-usage basis,¹⁵³ and the substitution of a different relative usage basis has little effect on their interstate assignment. The main reason for the transition to measured DEM was that Part 36 eliminated by definition the NTS portion of category 6 which had been separated on SPF. Because SPF exceeded weighted DEM, and by large amounts in some study areas, the FCC adopted a transition period. The model captures the major effect of the transition by assigning both the TS and NTS accounts on measured DEM.

II.B. Modelling Benchmark Costs -- Separations Changes not Modelled

A number of Separations changes were not modelled. For the most part these changes either had a relatively minor impact on the overall interstate assignment or were difficult to model using the available data. This simplification does not have a significant impact on the usefulness of the model's results for highlighting implications and outcomes for various stakeholders.

The Separations changes associated with conforming Part 36 to Part 32¹⁵⁴ (known as Conformance) were designed primarily to simplify the process while minimizing jurisdictional shifts. Consequently, modelling them with the analytical account data would be difficult and time consuming, and it should not significantly change the base case.

One of these Separations changes involves replacing MMM with CM for the assignment of interexchange circuit equipment. This change was

¹⁵³Part 67, paragraphs 67.136 (Category 4, separated on messages), 67.137 (Category 5, separated on minutes of use), and 67.139 (category 7, separated on minutes of use or weighted standard work seconds).

¹⁵⁴In the Matter of MTS and WATS Market Structure and Amendments of Part 67 (New Part 36) of the Commission's Rules and Establishment of a Federal-State Joint Board, CC Dockets No. 78-72, 80-286, and 86-297, Report and Order, 2 FCC Rcd 2639 (1987).

effective January 1, 1988, with the adoption of Part 36.¹⁵⁵ The stated rationale underlying this change was to make the separation of interexchange plant better reflect cost causation. Costs per circuit mile have plummeted with newer transmission technologies, making mileage a much less important factor in the cost of the equipment.¹⁵⁶ The Federal State Joint Board is considering applying the same factor to interexchange Cable and Wire Facilities.¹⁵⁷

This Separations change was not modelled because interexchange circuit equipment comprises only 7.8% of 1985 total LEC costs. Thus any Separations changes affecting these costs would have a relatively minor effect on the overall interstate assignment, particularly compared to the effect of SPF and measured DEM on Subscriber Line and Local Dial COE costs.

Another change not modelled is the separation of Commercial Expense Part 31 account 645.¹⁵⁸ This change came about because AT&T took back from the BOCs the handling of inquiries on AT&T toll calls. This change tended to reduce the overall interstate allocation. The nature of the model and available data makes it difficult to estimate the impact of this change.

With the adoption of Part 36, Revenue Accounting expense Separations rules were changed.¹⁵⁹ This change was implemented to reflect changes in jurisdictional costs associated with AT&T's doing their own billing rather than letting LECs bill for them. This change

¹⁵⁵FCC Part 36, paragraph 36.126(e)(3)(i).

¹⁵⁶Behind the Telephone Debates, pp. 138-139.

¹⁵⁷In the Matter of Amendment of Part 36 of the Commissions Rules and Establishment of a Joint Board, CC Docket 80-286, Order Inviting Comments and Request for Data on Category 4 Central Office Circuit Equipment and Category 3 Cable and Wire Facilities, by the Federal-State Joint Board, released October 15, 1987, 2 FCC Rcd 6333 (1987).

¹⁵⁸In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, Decision and Order, released January 7, 1986, 51 Fed Reg 3176 (January 24, 1986).

¹⁵⁹Part 36, paragraph 36.373(d)(3). Compare to Part 67, paragraph 67.381 through 67.386.

would also have been difficult to model, given the available data. In a good example of the discretionary nature of Separations, this change has been overturned and replaced with the 1987 method pending development of a final method.¹⁶⁰ The FCC issued this reversal because the results of the new method were not as expected. In hindsight, the decision not to model this change was fortunate because the change was changed back to the rules used to develop the 1985 costs.

Separations changes being considered by the FCC or the Federal-State Joint Board in 1988 but not adopted in early 1989 are also not modelled. These changes include the allocation of Marketing Expense account 6610, replacing DEM with Switched Minutes of Use (SMOU) or some other allocator for assignment of Dial Switching COE, using CM for separating interexchange C&WF, and collapsing COE and OSP exchange and interexchange categories and separating the collapsed categories using a new factor.

II.C. Modelling Benchmark Costs -- Other Changes not Modelled

In addition to Separations changes, there are a number of other changes that could affect the model's effects. The adoption of Part 32, the revised Uniform System of Accounts,¹⁶¹ redefined some costs and created a whole new accounting structure. The effect of USOAR is not particularly germane to the issues that this alternative costing method will address because Separations changes are modelled. However, USOAR is noteworthy in that the adoption of Part 32 is itself an exercise of discretion in cost accounting, since financial accounting is a method to define costs.

¹⁶⁰In the Matter of MTS and WATS Market Structure, Amendment of Part 67 (New Part 36) of the Commission's Rules and Establishment of a Federal-State Joint Board, CC Docket Nos. 78-72, 80-286, 86-297, Order on Reconsideration and Supplemental Notice of Proposed Rulemaking, FCC 88-216, 3 FCC Rcd 5518 (1988).

¹⁶¹In the Matter of Revision of the Uniform System of Accounts and Financial Reporting Requirements for Class A and Class B Telephone Companies (Parts 31, 33, 42, and 43 of the FCC's Rules), CC Docket 78-196, Memorandum Opinion and Order, 2 FCC Rcd 1086 (1987).

Interstate network usage, measured by switched access minutes of use, has grown significantly since divestiture. The FCC reported that AT&T's interstate minutes of use grew at a 7.3% compound rate from the third quarter of 1984 through the second quarter of 1988. Other carriers experienced a 35.8% growth rate during this period, and the total interexchange carrier industry had a 13.2% growth rate.¹⁶²

According to the FCC, this growth has resulted from IXC price reductions, a growing economy, and extensive advertising.¹⁶³ These price reductions have stemmed from LEC interstate cost reductions caused by Separations changes, and FCC-ordered LEC pricing changes, notably the introduction of the SLC. SLC is discussed more fully in Chapter 1, section II.B.2.

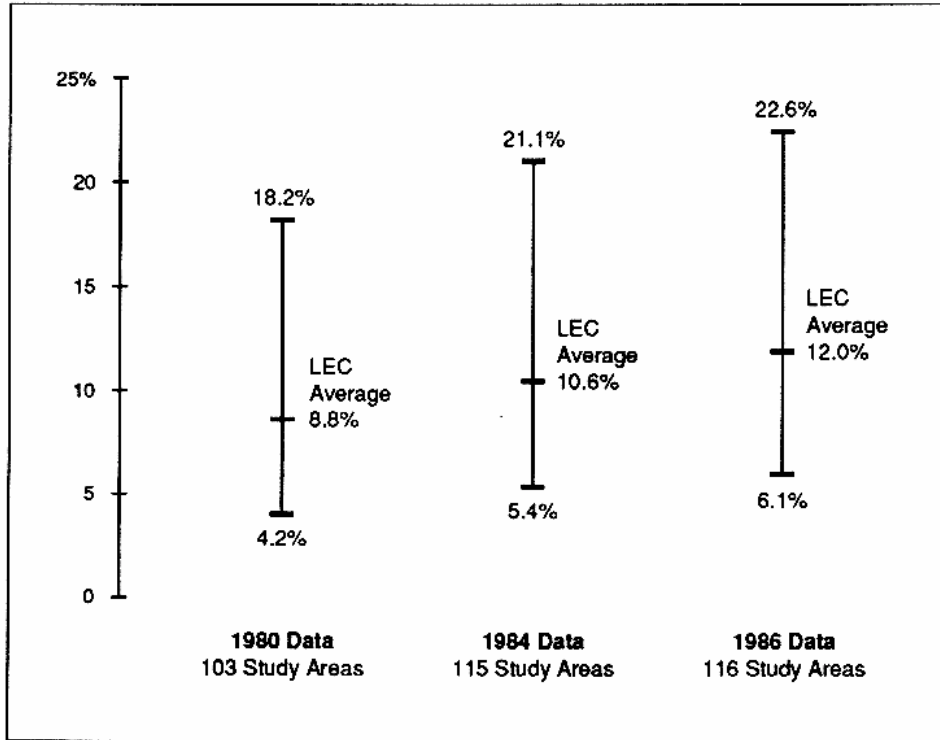
This growth in interstate usage has not been paralleled by growth in other usage. Figure 4-2 indicates that the interstate SLU ratio increased from 1980 to 1986. A similar pattern holds for interstate weighted and measured DEM factors.¹⁶⁴ For the reasons noted above, these ratios will probably continue to increase at least until all Separations and pricing changes are complete. This increase in interstate absolute and relative usage may slow once the final SLC increase takes effect, although a continued strong economy and advertising may still lead to increased interstate relative usage. The interstate SLU factor is currently less than both 25% (the phased-down SPF value) and 23% (the modelled benchmark cost LEC interstate assignment) in all study areas, and the interstate DEM factors are less than these values for almost all study areas.

Increase in these usage factors was not modelled for two reasons. First, it is difficult to estimate how these factors might change for 83

¹⁶²"AT&T's Share of the Interstate Switched Market: Second Quarter, 1988," Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, September 16, 1988, p. 5.

¹⁶³Ibid., p. 2.

¹⁶⁴Monitoring Report, CC Docket 87-339, June 1988, Prepared by the Staff of The Federal-State Joint Board in CC Docket No. 80-286, Table 4.20, pp. 192-194 (Interstate SLU Factors,) Table 4.22, pp. 198-200 (Interstate DEM Factors), and Table 4.23, pp. 201-203 (Interstate Weighted DEM Factors).



Source: *Monitoring Report*, June 1988.
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Figure 4-2

**Range of Interstate Subscriber Line Use
Percentage: Individual Study Areas**

study areas. Second, and most important, the model is intended to be used to analyze the effects of a change in costing rules. This analysis can best be done by holding other variables, such as increased interstate usage, constant.

III. Modelling Benchmark Costs -- Results of the Model

In analyzing the results of the model and suggesting implications for stakeholders, one must remember that data for small independent LECs were not available. Had these data been available, there might have been a greater jurisdictional shift in total, or more study areas with extreme changes.

III.A. Study Area Results

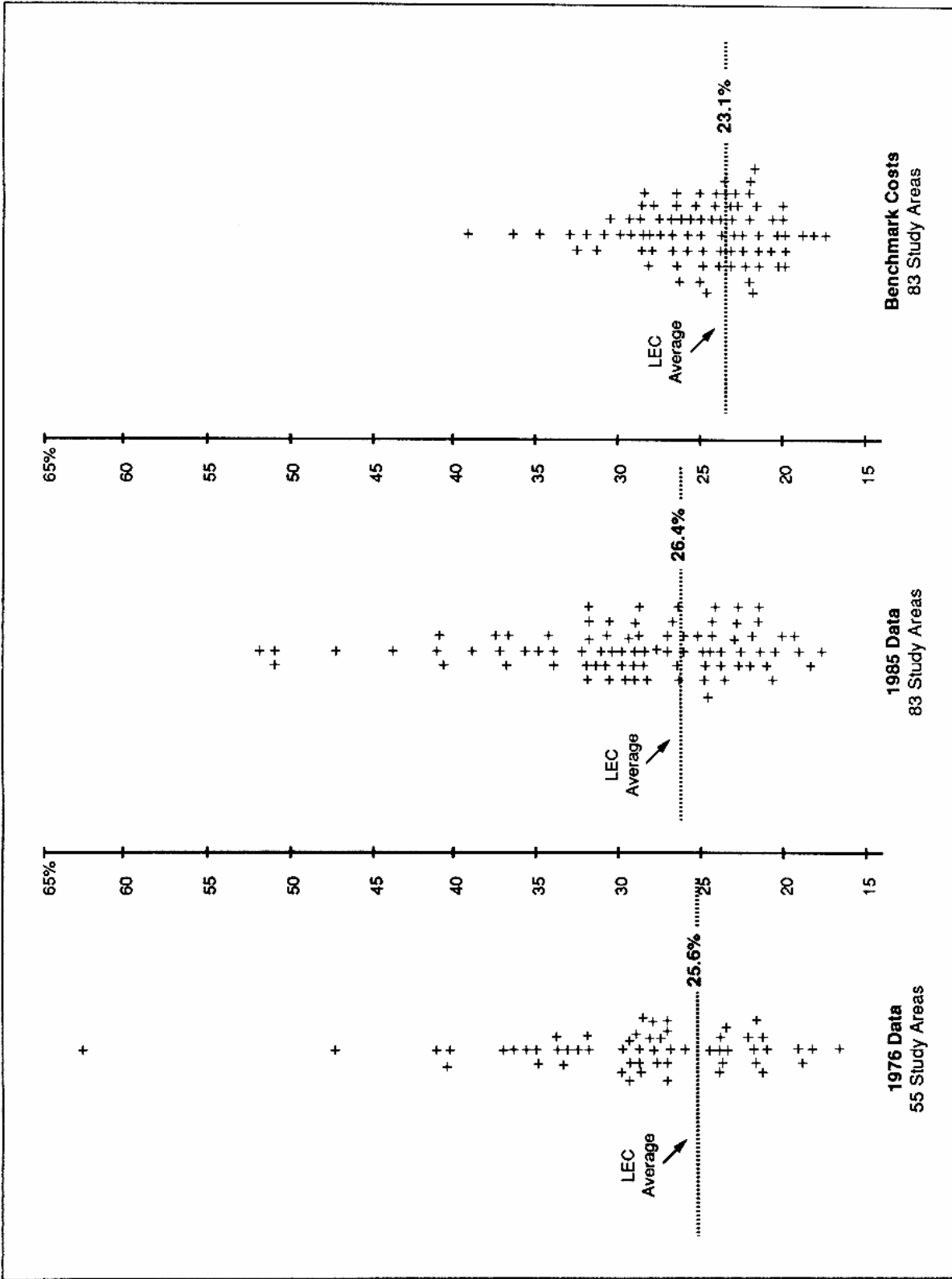
Figure 4-3 depicts the result of modelling the benchmark costs compared to 1976 and 1985 costs. Each plus sign represents one study area. The symbols are spread horizontally for clarity of presentation; this format has no other significance.

The figure indicates that the benchmark cost LEC average interstate assignment is 23.1%, a decrease of 3.3 points from 1985. This result is to be expected, since the overall thrust of the Separations changes modelled is to reduce the interstate assignment. What is not apparent in the figure is that this reduction applied to almost all study areas; only five study areas show an increase in interstate assignment. These five study areas are among the lowest in interstate assignment in 1985, and all had a frozen SPF less than 25%, so the assignment of 25% of loop costs to interstate actually increased their overall interstate assignment.

In addition to lowering the LEC composite interstate percentage (total LEC interstate costs divided by total LEC costs), modelling the benchmark costs significantly reduced the range of interstate assignment. The maximum interstate assignment dropped from 51.55% in 1985 to 39.23%. The figure also shows that the study areas' benchmark cost assignments are more closely clustered about the LEC average than in 1985. This narrowing is also to be expected because of the nature of the Separations changes that were modelled.

Figure 4-4 helps explain both the reduced interstate percentages and this increased clustering. Replacing frozen SPF with a 25% allocator for NTS costs and with measured DEM for part of Local Dial COE costs significantly reduces the variation in interstate percentages for these analytical accounts which together comprise about half the total LEC costs. Replacing weighted DEM with measured DEM for the separation of most Local Dial COE costs reduces the interstate assignment of these costs and only slightly increases the variation in this assignment across study areas.

Figure 4-5 indicates the effect of the three modelled changes on the LEC average interstate assignment. The changed Separations rules for Local Dial COE has the largest effect on the average and accounted

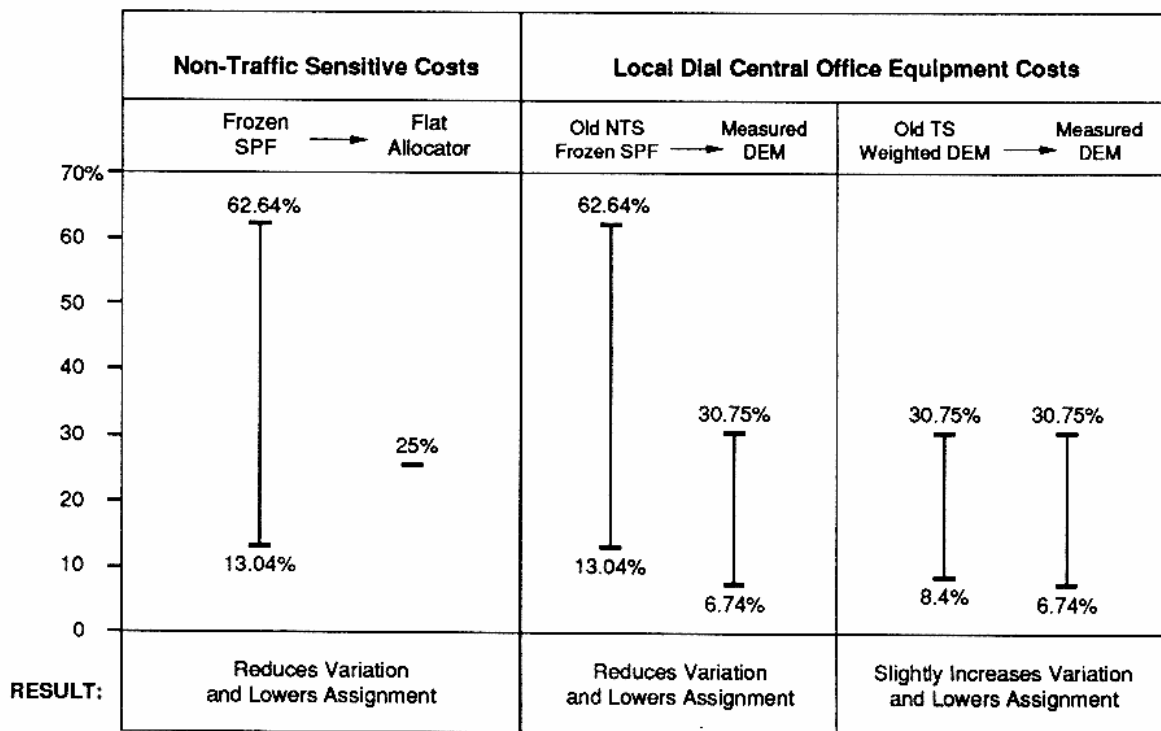


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Figure 4-3

Percent Interstate Cost Assignment: Individual Study Areas

for almost half the 3.3 percentage point reduction. This change has the largest effect because it reduces this assignment for virtually all study areas. The use of the 25% allocator for NTS costs also reduces the average, but not as much because study areas whose frozen SPF is less than 25% experience an increased interstate assignment of NTS costs. Removing equal transitional CPE amounts from both the total and interstate costs arithmetically must reduce the composite interstate assignment.



Source: Data from *Monitoring Report*, June 1988.
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Figure 4-4

Effect of Modelled Separations Changes on Interstate Cost Assignment Percentage: 83 Study Areas

Figure 4-6 shows the progressive reduction in the range of study area interstate percentages associated with the three modelled changes. CPE removal left the range of interstate percentages virtually unchanged although it reduced the LEC average percentage. The 25% interstate assignment of NTS costs had the greatest effect on narrowing the range

	Average LEC Interstate Assignments	Incremental Effect
Original 1985 Data	26.4%	—
Modeled changes:		
• CPE removal	25.6%	- 0.8%
• CPE removal + 25% SPF	24.7%	- 0.9%
• CPE removal + 25% SPF + Local Dial COE Allocator	23.1%	- 1.6%
Total Changes:	—	- 3.3%

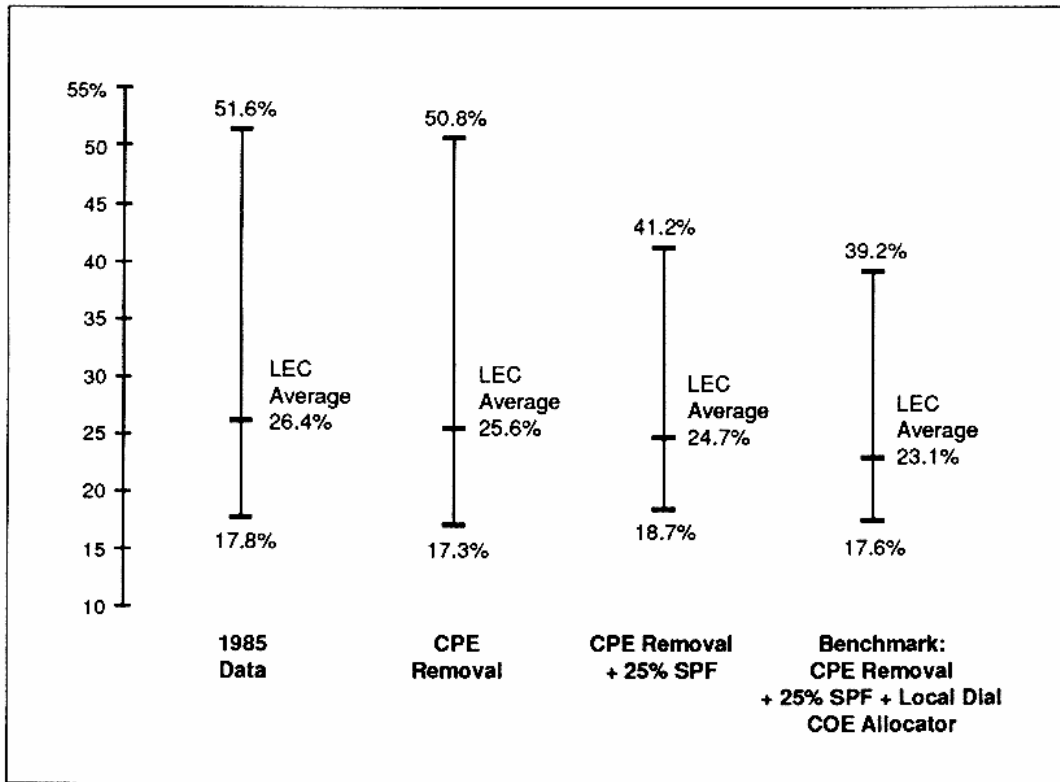
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Figure 4-5

**Effect of Modelled Separations Changes on
Average LEC Interstate Assignment Percentage**

of interstate percentages even though it reduced the average only slightly more than did the removal of CPE. These effects are consistent with the change, which only slightly lowered the LEC average SPF while in some cases significantly lowering SPF for specific study areas. The new Local Dial COE allocator reduced the range only slightly more than it lowered the LEC average. This pattern is consistent with this Separations change, which generally lowered all study areas' interstate assignment of these costs.

Simply looking at the range of interstate assignments masks changes in individual study areas. Figure 4-7 shows that there is a great variation in the change in interstate assignment between study areas associated with the three modelled changes in Separations rules. The most striking variation is associated with modelling the 25%



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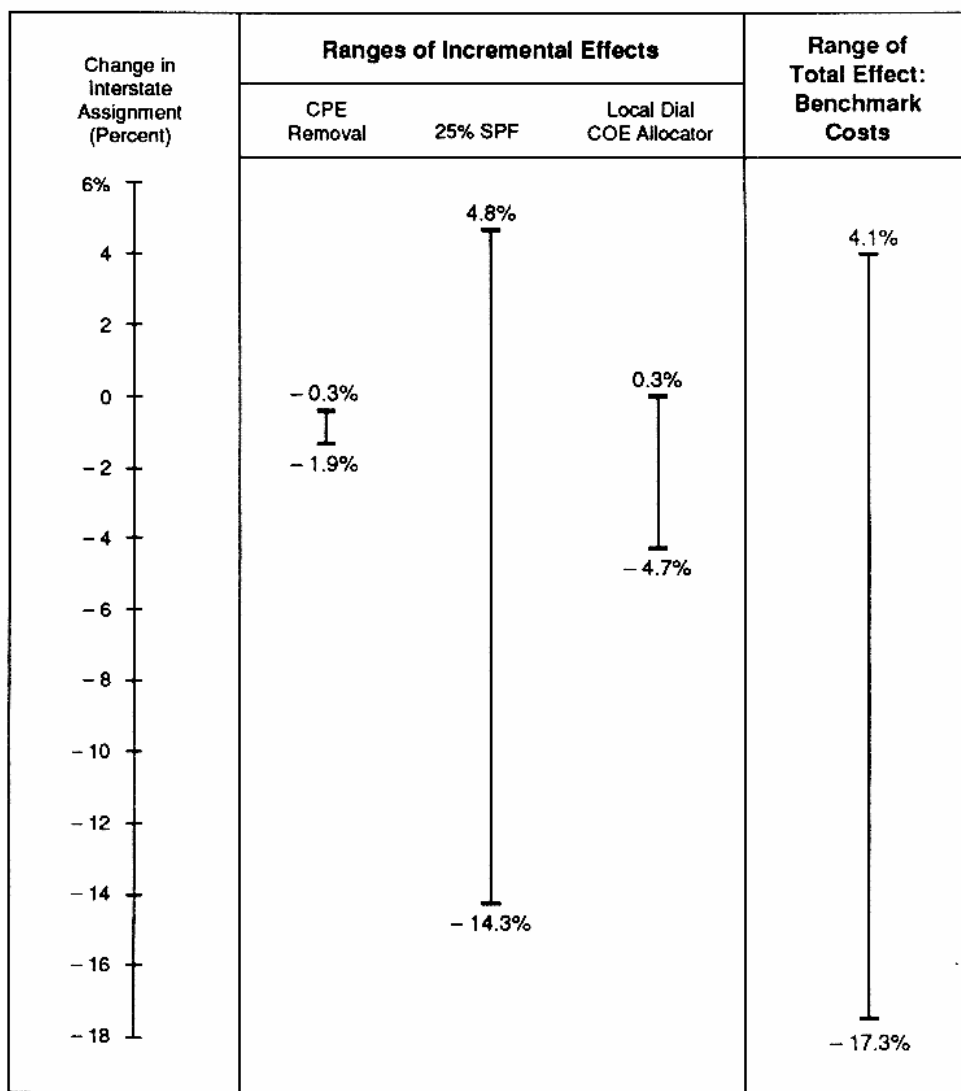
Figure 4-6

Effect of Modelled Separations Changes on Range of Interstate Cost Assignment Percentages: 83 Study Areas

allocation of NTS costs. Depending on the level of frozen SPF and the relative size of a study area's NTS costs, the 25% allocation can increase overall interstate assignment by almost 5% or reduce it by over 14%. In total, modelling the benchmark costs can increase study area interstate assignment by as much as 4% or reduce it by over 17%.

III.B. Holding Company Results

Increasingly the linkage between interstate costs and access prices charged by LECs is being made at an operating company or holding company rather than study area level. Making the linkage at this more aggregated level means that it is regional costs and demand that underlay the rates which apply in all study areas in the region. In the



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Figure 4-7

Range of Incremental Effect of Modelled Separations Changes: 83 Study Areas

late 1980s at least five holding companies had filed interstate access tariffs aggregated to operating or holding company level.¹⁶⁵

¹⁶⁵Bell Atlantic, US West, Bell South, and GTE. Southwestern Bell had filed tariffs aggregated for all their states except Kansas.

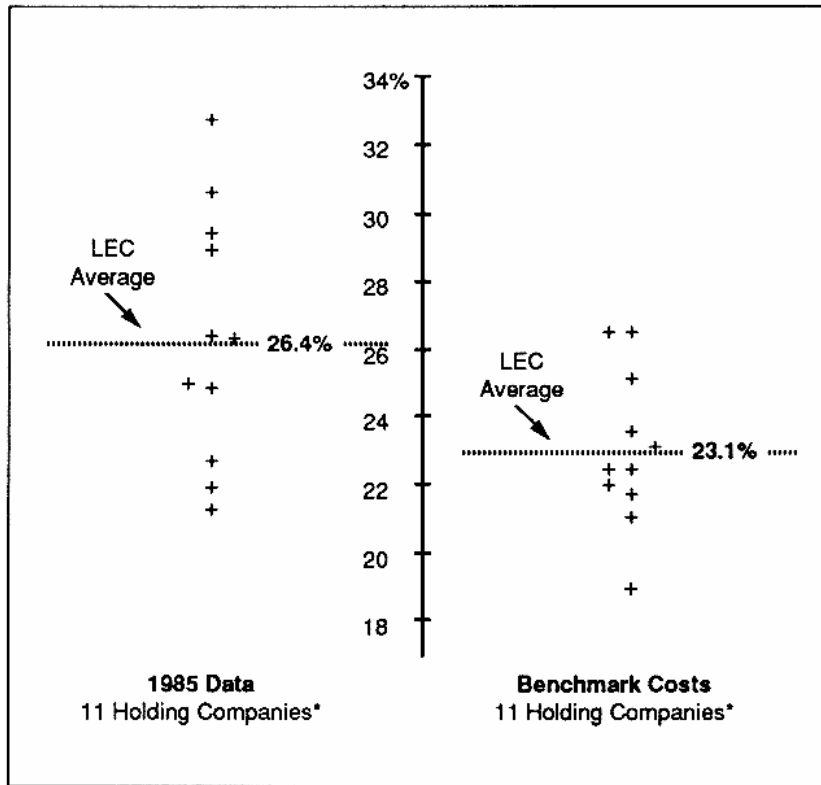
Advantages of making this linkage at a company or regional level include reducing the number of access rates to be billed, reducing the work involved in preparing the tariff (since there are fewer tariffs and rates), reducing risk of bypass in high cost areas, sharing the risks and rewards if actual results vary from those forecast in the rate development process, and improving relationships with major IXCs who have fewer rates to deal with for any one region. US West offers an example of these advantages. When rates were filed on a study area basis, an IXC who did business in all US West states had to contend with 15 different rates for the same service or rate element.¹⁶⁶ Relations with these IXCs were much simplified by filing LEC-specific tariffs, reducing the number of rates for any one rate element from 15 to three.¹⁶⁷ Obviously, regional rates further reduce the number of rates to one per rate element.

The possible advantages of regional tariffs suggest that the RHCs and at least the larger independents may be interested in the result at the regional level of a 23% interstate cost allocation because it is regional costs that affect the rates.

Figure 4-8 shows that the range of interstate percentages decreased significantly at the holding company level compared to the range at the study area level, as indicated in Figure 4-3. (Figure 4-8, and all figures showing holding company data, reflect all seven RHCs, CBI, SNET, GTE, and United.) In addition, the holding companies are more closely grouped within the range, making their interstate cost characteristics even more similar. In general, the effect of the changes used in modelling the benchmark costs is less at the holding company level than by study area. This result can be expected because the averaging process inherent in computing holding company costs

¹⁶⁶Although US West serves 14 states, Idaho is served by both Mountain and Pacific Northwest Bell. Consequently, it has two study areas and had two separate rate structures. The Carrier Common Line rate is set based on national costs, and demand and is the same in every study area.

¹⁶⁷US West has three LECs, Mountain Bell, Pacific Northwest Bell, and Northwestern Bell.



*7 Regionals and 4 Independents.

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Figure 4-8

Percent Interstate Cost Assignment: Holding Companies

reduces the impact of study areas with extreme cost assignment percentages.

Figures 4-3, 4-6, and 4-7 indicate that, while the benchmark cost model shows a great reduction in the range and greater clustering of study area interstate percentages compared to 1985, these two effects reflect greatly differing changes for different study areas. This point can serve as a reminder that there can be great study area turmoil below the surface of total LEC changes. Even at the regional level there are differences that are masked when one looks only at the total LEC picture. As was discussed in Chapter 1, section V.A, different

stakeholders may be affected by outcomes at these different levels, so changes at both levels are important.

Once the base case has been modelled, the single fixed Separations factor must be chosen. The choice was made to minimize changes in the composite LEC interstate assignment. Because the base case showed a 23.1% composite LEC interstate assignment, a 23% factor was used. This factor was applied to 1985 total costs less CPE, since the CPE phaseout was completed by 1988, well before the completion of the other modelled Separations changes.

IV. Fixed Allocator Impacts

Before analyzing the results of modelling the fixed allocator, it may be useful to discuss some potential impacts of the radical simplification of the Separations process. Some of these impacts will be explored in greater detail as part of the analysis of the model's result.

One effect of this extreme simplification is the reduction of costs associated with regulation. LECs (and AT&T) employ thousands of employees and spend millions of dollars performing Separations. Many of these jobs could be eliminated and costs saved by adopting a single nationwide fixed interstate allocator. Under RBROR regulation, as well as under the proposed price caps, this cost savings could be translated into lower prices.

The impact of using the fixed allocator extends far beyond this potential cost and price reduction. There is currently a wide range of interstate cost allocation percentages among study areas. As noted above, this range, although narrowing because of the Separations changes used in modelling benchmark costs, will remain large after these changes are completed (Figure 4-3). Because of the nature of RBROR regulation, the elimination of these differences by using a single fixed allocator will affect various customers differently. The effect on intrastate customers will depend on their state commission's policy on intrastate cost recovery. Will a state commission want to change prices at the same time as the cost change, or will there be a regulatory lag? Will the cost change affect prices for all or only some services? Answers to

these and other related questions directly affect telephone consumers. These answers also may affect the business climate of the state. As the economy becomes more information-intensive, different responses to a Separations change may affect companies' investment location decisions as some states become disadvantaged relative to others in terms of telecommunications prices to businesses.

On the other hand, interstate toll prices may be little affected by the use of a single fixed allocator. This minimal impact is the result of nationwide average toll pricing. This pricing method aggregates all study areas' costs and develops AT&T's prices under RBROR regulation. As noted above, the 23% allocator is very close to the LEC benchmark cost composite interstate percentage. Consequently, the flat allocator as modelled would lead to little change in total LEC costs used as an input into AT&T's prices. While OCCs are not under RBROR regulation, their pricing tends to follow AT&T's.

The key component of this minimal impact is the FCC's policy of nationwide average toll pricing. In the late 1980s this policy is beginning to be challenged in light of a number of changes affecting the telecommunications industry. Various considerations affecting pressures to deaverage interstate toll prices are discussed in more detail in Chapter 5 section II.A. The use of a single 23% interstate allocator tends to increase the cost-based pressures in some situations, as is discussed in Chapter 5, section II.B. The effect of this extreme simplification suggests that the advantages of Separations simplification, such as reducing the cost of regulatory compliance, may run afoul of the FCC's policy of maintaining national average interstate toll prices.

V. Fixed Allocator -- Results

Modelling a fixed 23% interstate allocation factor has different effects on different jurisdictions, study areas, holding companies, and other stakeholders. Before examining these differences, this section describes the effects of the model. These effects focus on jurisdictional impacts, beginning with interstate. The impacts are discussed first in terms of changes in the range and distribution of the

resulting cost allocations to see what the high-level effects are. Then changes by study area or holding company are presented. Implications for stakeholders are explored in Chapter 5.

Figure 4-9 presents a list of criteria that could be used to evaluate the impact of alternative costing methods on various stakeholders. This list is not intended to be all inclusive, but only to suggest possible criteria. The list is also not intended to suggest that these criteria, or any particular impact on any of them, are good or bad. It merely shows some criteria that might be useful for evaluating the impact of alternative costing methods on various stakeholders.¹⁶⁸ Not all of these criteria are addressed in this report.

V.A. Interstate Effects

V.A.1. Total LEC Effects

In the aggregate, the use of the 23% allocator changes interstate cost assignment very little relative to the benchmark case. This was intent of choosing that particular allocator, since the benchmark costs indicated a total LEC composite interstate factor of 23.1%. Assigning 23% of all costs to interstate reduces total LEC interstate costs by about \$67.9 million. While \$67.9 million may seem to be a large number, it is quite small in the scale of nationwide costs and usage. It is only 0.1% of total LEC 1985 costs of \$73.06 billion and only 0.4% of total LEC benchmark interstate costs of \$16.7 billion.

Another way to put this shift in perspective is by considering its effect on costs per minute. Since it is often asserted that many costs are related to usage levels, changes in costs per minute can help determine the relative magnitude of change. No argument for directly linking costs to prices is being made here. However, the linkage currently exists in the interstate arena, in which interstate LEC access and AT&T toll tariffs based on estimated costs and usage are filed

¹⁶⁸For more discussion of the first criterion, the goals of the FCC access proceedings, see The FCC Access Charge Plan: The Debates Continue, Mark L. Lemler, pp. 50-52.

1. Consistency with the goals of the FCC access proceedings:*
 - Preserve universal service
 - Deter uneconomic bypass
 - Promote economic efficiency
 - Eliminate interstate service pricing discrimination
2. Consistency with goals of state commissions
 - Local rate stability
 - Social contracts
 - Other alternatives to RBROR regulation
 - Deterrence of bypass
 - Other goals
3. Impact on small LECs
 - Capital investment and recovery decisions
 - Assistance programs (Lifeline, Universal Service Fund, and others)
4. Impact on IXCs
5. Responsiveness to changes in technology
6. Impact on cost recovery in both jurisdictions:
 - Toll and access price disparity
 - Synchronized costing and pricing methods
 - Market-based pricing for competitive services
7. Effect on pressures to deaverage interstate toll prices
8. Effect on location of intelligence in or outside the network
9. Effect on regulatory costs
10. Flexibility to deal with changing types of uses
11. Effect on owners and debtholders
 - Preservation of stock value
 - Impact on dividend level and interest coverage
12. Impact on competitors
13. Impact on employees
 - Wage or benefit adjustments
 - Employment levels
14. Impact on business climate through service offerings and prices
15. Effect on development and offering of new services
16. Other

* In the Matter of MTS and WATS Market Structure Phase I, CC Docket No. 78-72, Memorandum Opinion and Order, 97 FCC 2d 682 (1983), at Para. 3.

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Figure 4-9

Criteria for Evaluating Alternative Costing Methods

approximately annually. The sampled companies reported 206.9 billion interstate minutes of use in 1985.¹⁶⁹ The \$67.9 million cost shift calculates to about a .03 cent reduction in LEC interstate costs per minute.

V.A.2. Study Area and Holding Company Results

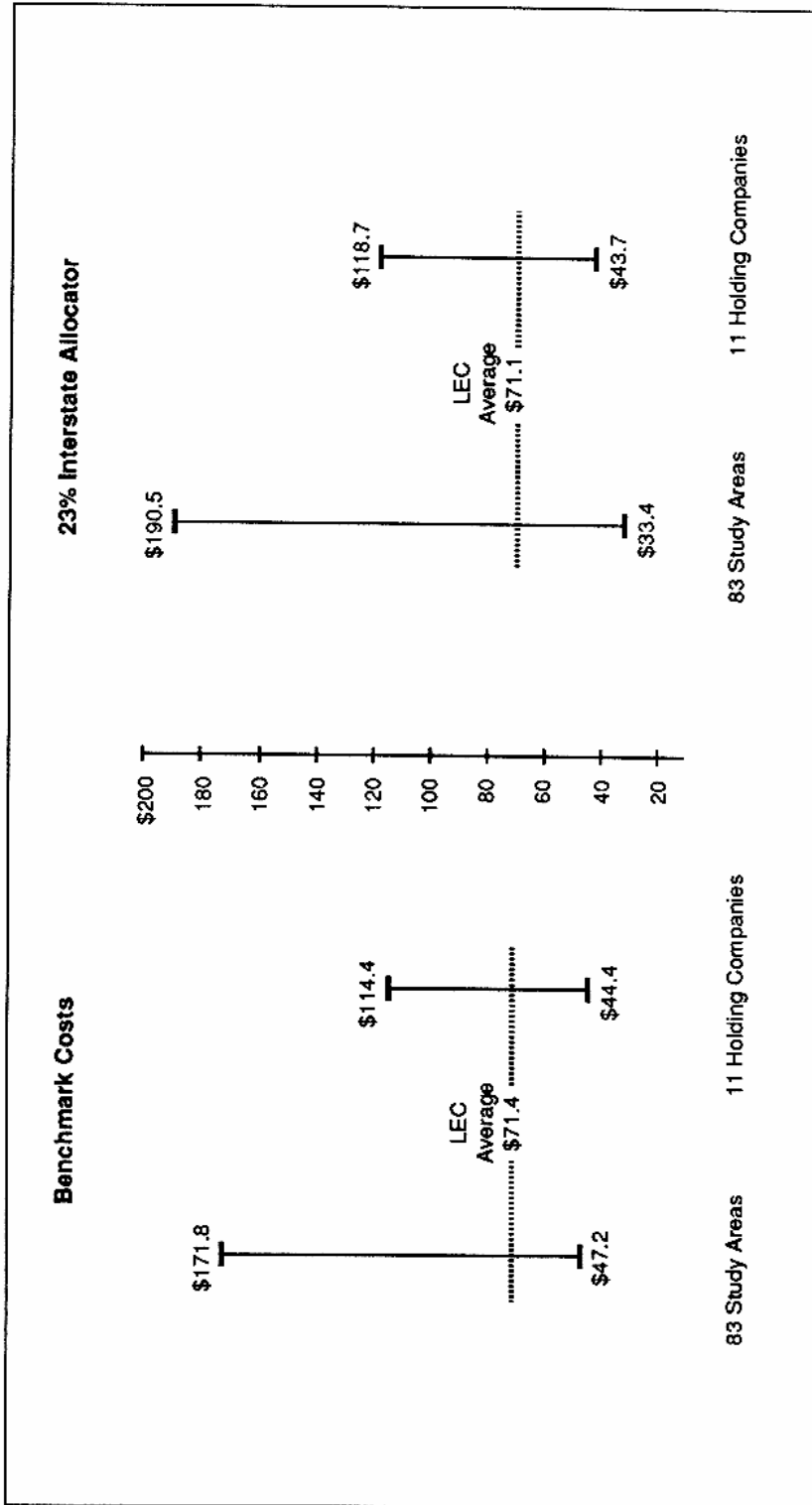
This minor change at the aggregate LEC level hides some large cost shifts at the study area and holding company level. While the range of interstate percentages is reduced to zero by using the same allocator for all study areas, interstate cost shifts by study area vary from a reduction of \$141.7 million to an increase of \$346.1 million. At the holding company level, interstate cost shifts range from a \$270.1 million reduction to a \$326.9 million increase.

These cost shifts can be put into perspective in terms of both cost per minute and cost per loop. This perspective converts these dollar amounts to useful numbers and will be helpful in discussing implications of the fixed allocator. Figure 4-10 shows that, although the average cost per minute with the 23% allocator decreased slightly compared to benchmark costs, the range of costs per minute increased for both study areas and holding companies. As could be expected given the averaging effect of calculating holding company costs, the increase in the holding company range is smaller than that for the study areas.

Figure 4-11 shows a slight decrease in the average interstate cost per loop and a large decrease in the range of study area cost per loop from benchmark costs to the 23% allocator. However, the range of holding company cost per loop increases slightly.

To find the important underlying factors, the following section looks in detail at these changes. First changes in cost per minute are analyzed, then changes in cost per loop.

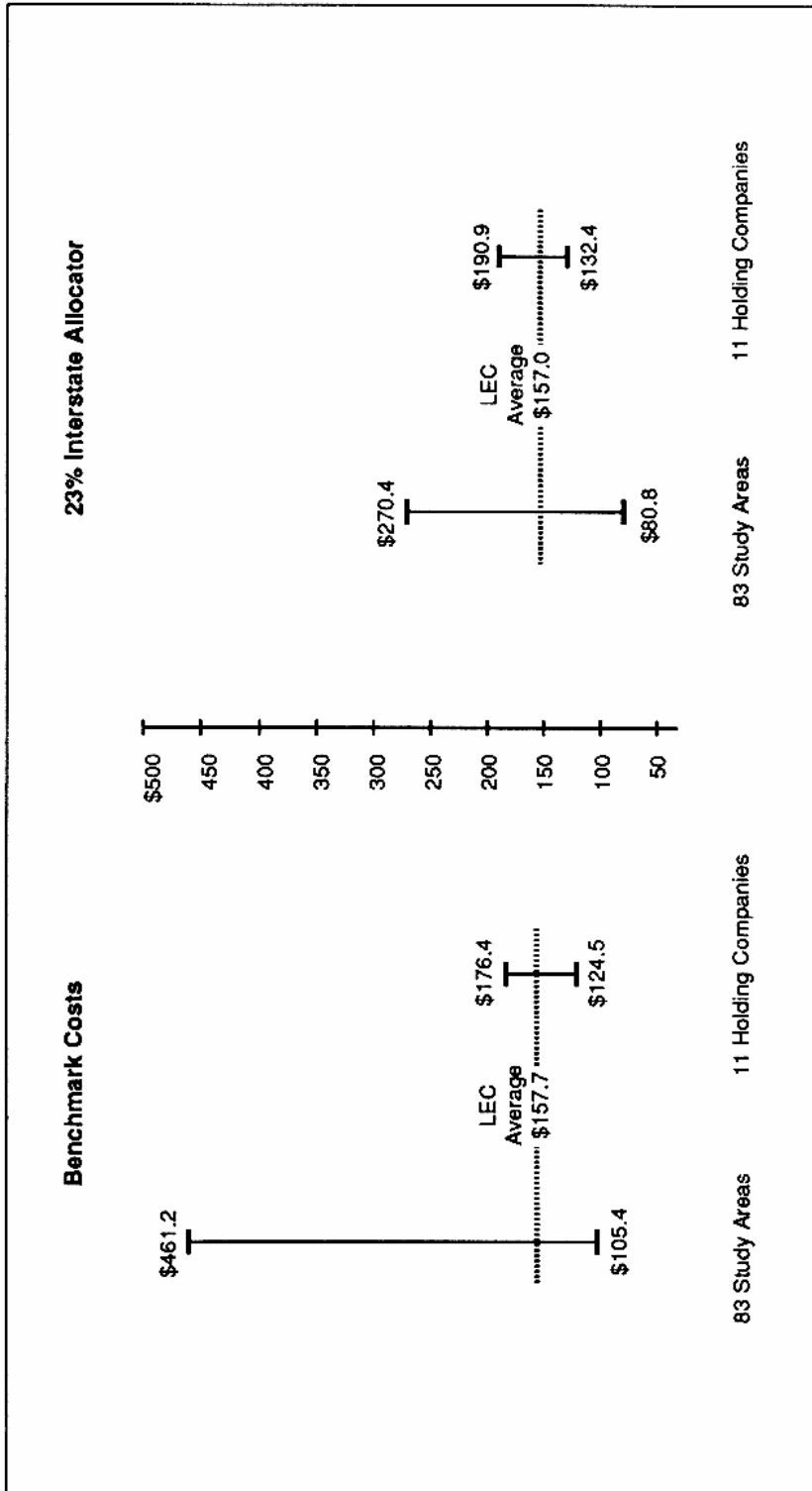
¹⁶⁹Monitoring Report, CC Docket No. 87-339, June 1988, Prepared by the Staff of the Federal-State Joint Board in CC Docket No. 80-286, Table 4.11, pp. 165-167.



Source: Minutes from Monitoring Report, June 1988.
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Figure 4-10

Range of Interstate Cost per Thousand Interstate Minutes



Source: Loops from *Monitoring Report*, June 1988.
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Figure 4-11

Range of Interstate Cost per Loop

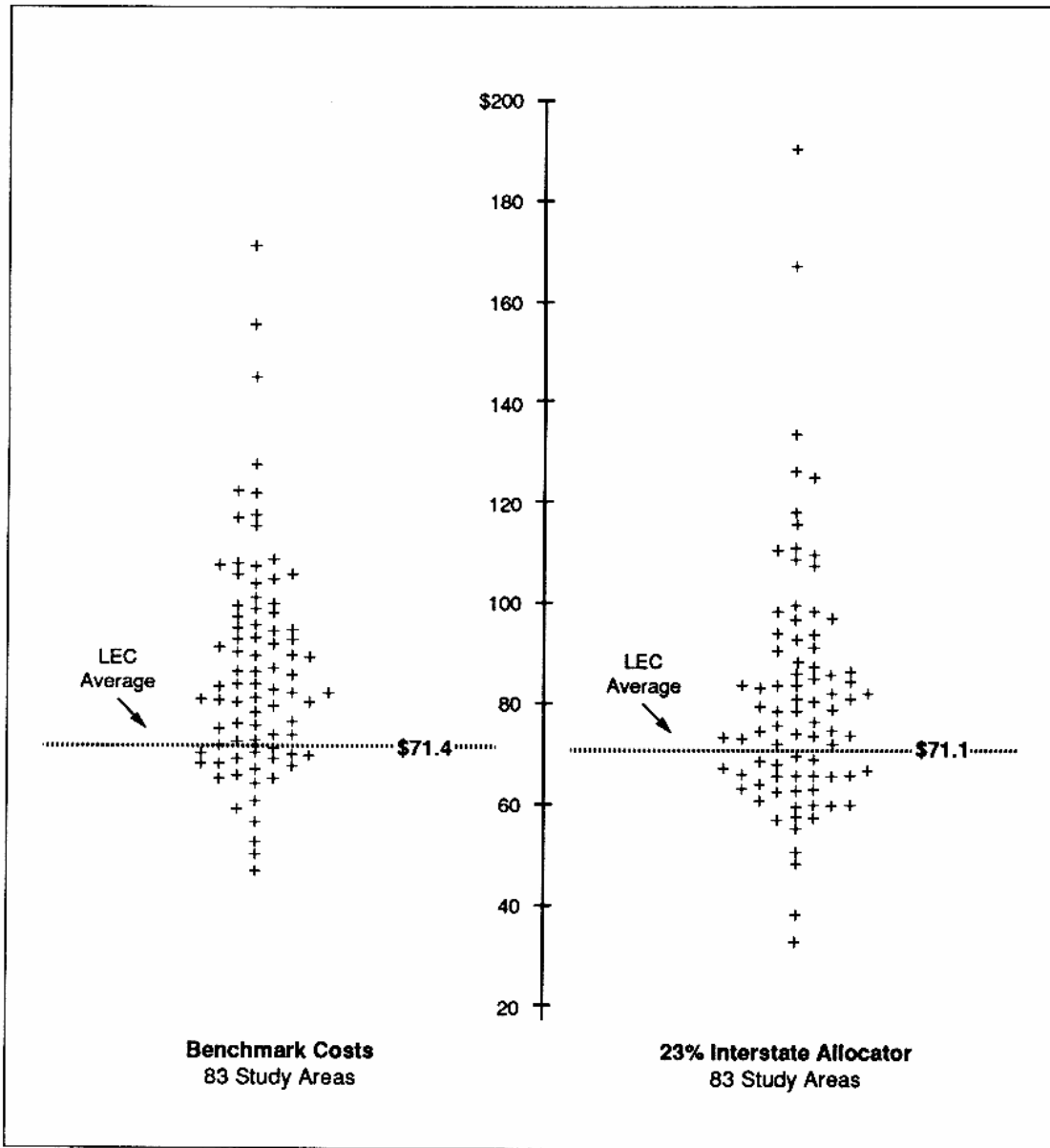
V.A.2.a. Cost per Minute Results

An increase in the range of interstate cost per minute could be due to an increase in one outlier. Figure 4-12 plots the interstate cost per thousand minutes, calculated by dividing the interstate costs by interstate SLU minutes, for each of the 83 study areas under the benchmark cost and 23% flat allocator models. This figure shows that not only has the range of cost per minute increased but that the distribution of the study areas has changed. In Figure 4-12, the 23% allocator scenario shows that more study areas are grouped close to the average and that fewer appear at the extremes than is the case in the benchmark scenario. This result suggests that using the fixed allocator tends to pull cost per minute towards the average for most study areas while pushing a few study areas farther away from the average. As mentioned at the beginning of this chapter, implications of this and other results are explored in Chapter 5.

Figure 4-13 presents interstate cost per thousand interstate minutes calculated at the holding company level. This figure indicates that, by holding company, the spread of costs per minute is significantly changed by the use of the fixed allocator since fewer companies are close to the average than with benchmark costs.

When the actual study area values for the benchmark and fixed allocator cost per thousand interstate minutes are compared, one can see that differences between the two scenarios can be quite large for a given study area. The change in interstate cost per thousand interstate minutes ranges from an increase of about \$45 to a decrease of about \$65. Figure 4-14 shows that, with a few exceptions, low-interstate-use-per-loop study areas experience an increase in interstate cost per interstate minute in moving from benchmark to fixed allocator scenarios, while high-use-per-loop study areas experience a decrease. Most study areas with increased cost per minute have relatively low usage, and most study areas with decreased cost per minute have relatively high usage.

The relationship between interstate cost per minute and interstate use per minute is present in the fixed allocator but not in the benchmark scenario. Figure 4-15 shows that there is little association between benchmark cost per minute and interstate use per loop. Figure



Source: Minutes from *Monitoring Report*, June 1988.
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Figure 4-12

Interstate Cost per Thousand Interstate Minutes: Individual Study Areas

4-15 shows no values for cost per minute, to protect the confidential cost data.¹⁷⁰ However, Figure 4-16 shows that, in the fixed allocator scenario, low interstate use per loop study areas generally have higher interstate cost per minute than high use per loop study areas.

The strong relationship between interstate use per loop and change in interstate cost per minute is derived from the interaction of a number of factors.

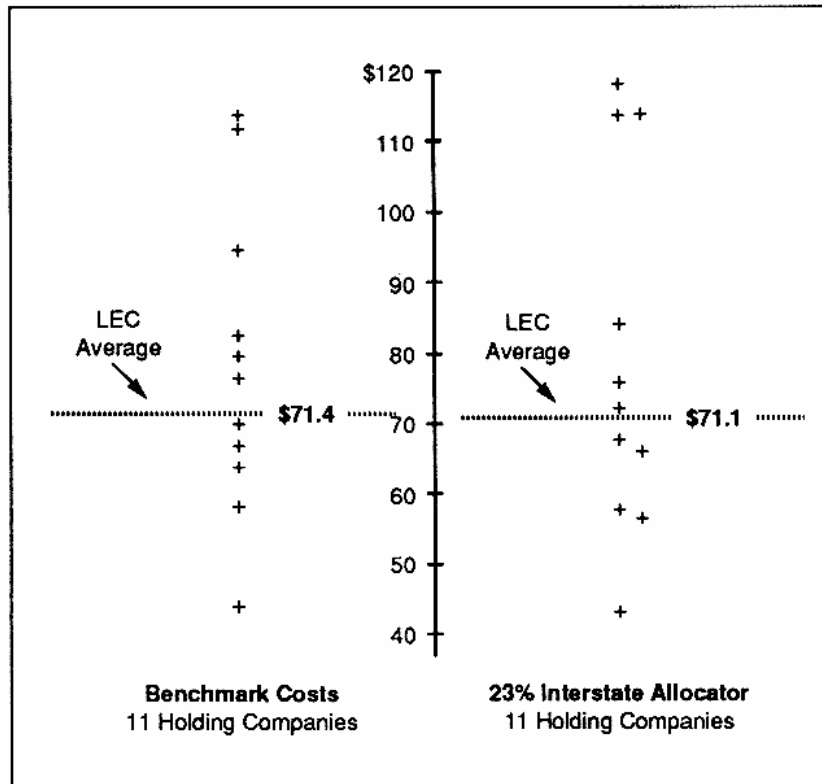
First, the same number of interstate minutes is used to calculate the benchmark and fixed allocator cost per minute. Also, there is no difference between scenarios in the total cost that is separated into inter- and intrastate. As a result, any change in the cost per minute is due solely to a change in the interstate cost assignment.

Second, as Figure 4-3 showed, there is a great variation in the benchmark study area interstate percentage. Since the benchmark case reflects SPF at 25% for all study areas, this variation must largely be a function of variation in the various relative use percentages. Figures 4-2 and 4-4 show that there are indeed large differences in SLU and DEM among study areas. Many other relative use percentages are related (directly or indirectly) to SLU, and they also vary significantly between study areas.

Third, there is also great variation in the benchmark study area interstate cost per interstate minute, Figure 4-12. This variation is due to the study area differences in benchmark interstate percentages, and therefore the study area variation in relative use percentages, as well as the variation in interstate use among study areas.

Fourth, in the fixed allocator scenario, there is clearly no difference in the interstate percentage among study areas. The change

¹⁷⁰The interstate minutes and loop counts were taken from public data in Monitoring Report, CC Docket 87-339, June 1988, Prepared by the Federal-State Joint Board in CC Docket No. 80-286, tables 4.11 and 4.20 respectively. Because this is public information, one could reconstruct the study areas along the horizontal axis. If the cost scale were presented on the vertical axis, given the identification of each study area and its interstate minutes, one could calculate the interstate cost for each study area. These costs were provided under the condition that values for any study area would not be made available to anyone outside the relevant company. Scales are also omitted for any other figures to protect the confidential information.



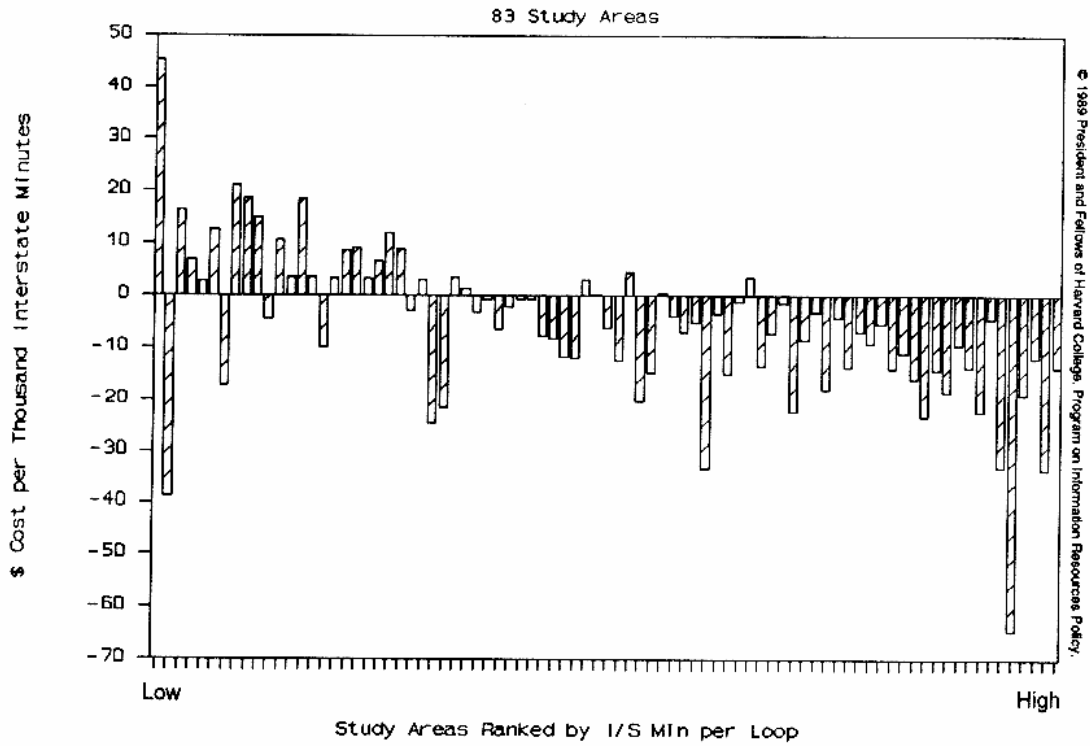
Source: *Minutes from Monitoring Report*, June 1988.
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Figure 4-13

Interstate Cost per Thousand Interstate Minutes: Holding Companies

in interstate assignment from benchmark to fixed allocator is due primarily to the change from the various relative use percentages to 23%. Most benchmark costs are separated on the basis of relative usage, and relative usage varies significantly across study areas whereas SPF is uniformly 25%. Roughly speaking, about 30% of all modelled costs are loop costs assigned at 25% in the benchmark case. For the average to be 23% with 30% of the costs assigned at 25%, the remaining 70%, which are assigned on relative usage measures such as SLU and DEM, must average about 22% interstate assignment nationally.¹⁷¹ In modelling the fixed allocator, relative to the benchmark case, SPF in effect drops two

¹⁷¹Arithmetically, $22.14\% \times 70\% + 25\% \times 30\% = 23\%$.

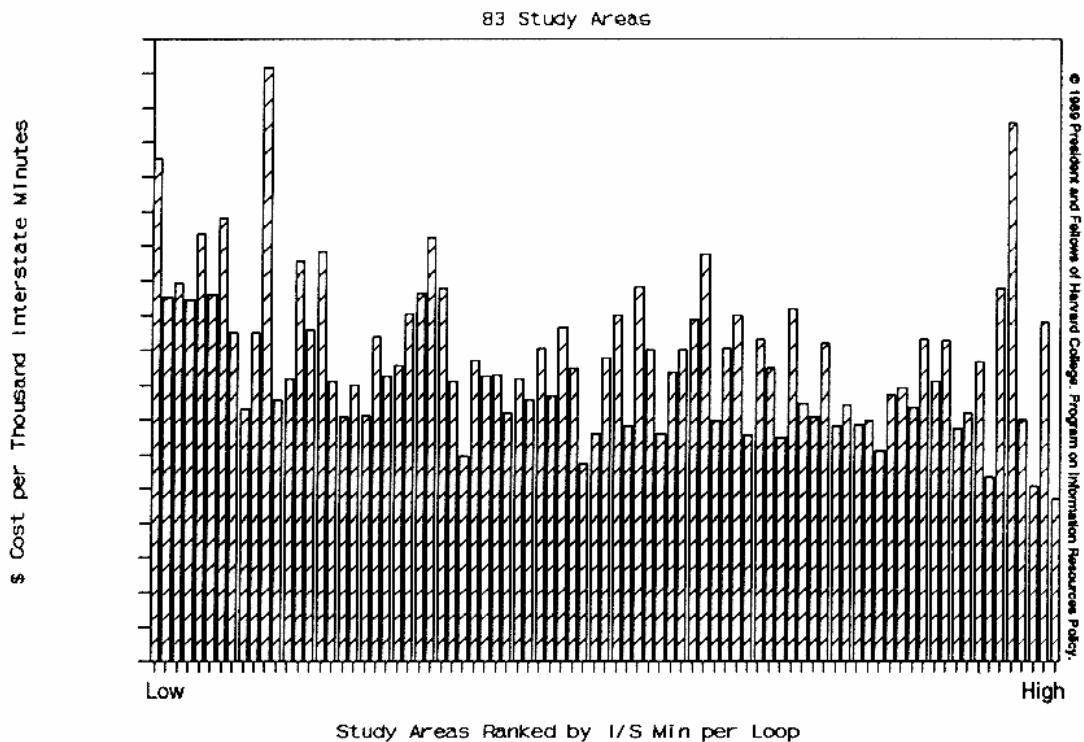


Source: Minutes from *Monitoring Report*, June 1988.

Figure 4-14

Change in Interstate Cost per Minute Related to Interstate Use per Loop

percentage points for each study area and the average of the relative use factors rises less than one percentage point. However, those study areas with the highest relative use factors must experience the greatest decrease in composite interstate assignment. For example, the study area with the highest benchmark composite interstate assignment must reduce its interstate percentage by about 16 percentage points to reach 23% (see Figure 4-3). Since SPF decreases only two points, the relative use factors must decrease a lot. Even if that study area had loop costs amounting to only 20% of its total costs, which would reduce the size of any necessary decrease in the relative use factors, those factors would



Source: Minutes from *Monitoring Report*, June 1988.

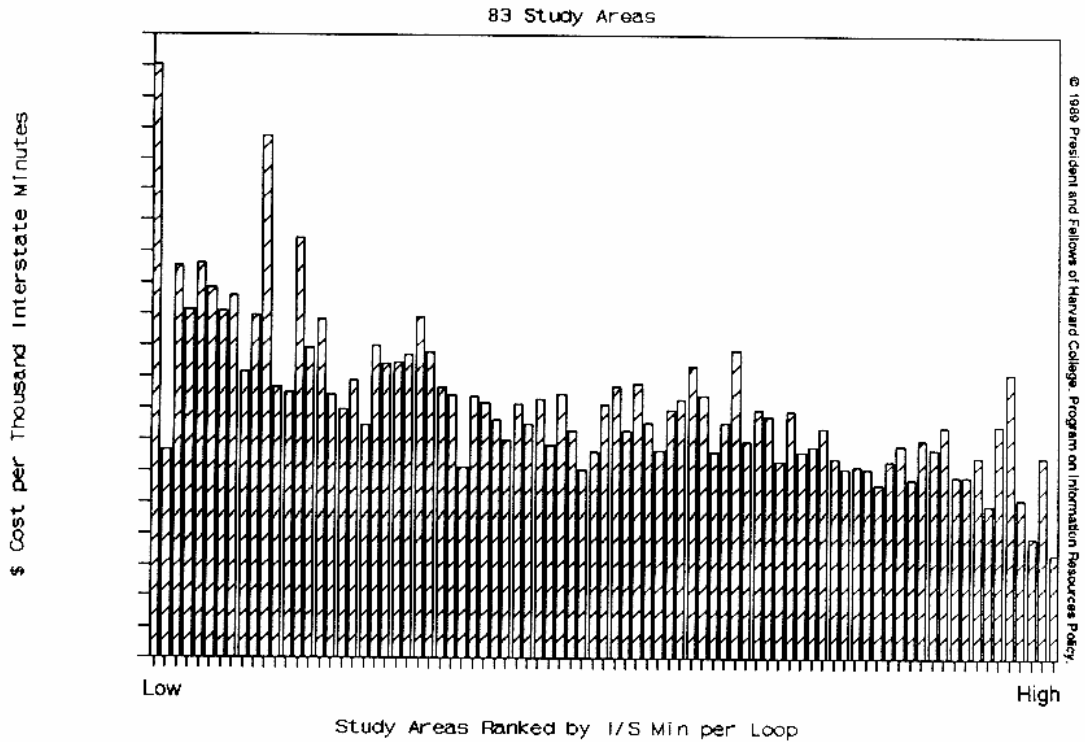
Figure 4-15

Interstate Cost per Minute: Benchmark Costs

still have to decrease from an average of about 42.5%¹⁷² to 23% to reach the 23% composite interstate factor.

Fifth, Figure 4-17 shows that higher interstate relative use is generally associated with higher absolute interstate use per loop. Simply put, greater interstate use by each subscriber (on average) is not accompanied by greater intrastate use, so the interstate percentage increases. This relationship is the result of a number of factors, including community of interest, number of subscribers in the local exchange area, size and types of businesses, and others which combine to influence calling patterns.

¹⁷²Arithmetically, $42.5\% \times 80\% + 25\% \times 20\% = 39\%$, the approximate value on Figure 4-3.



Source: Minutes and Loops from *Monitoring Report*, June 1988.

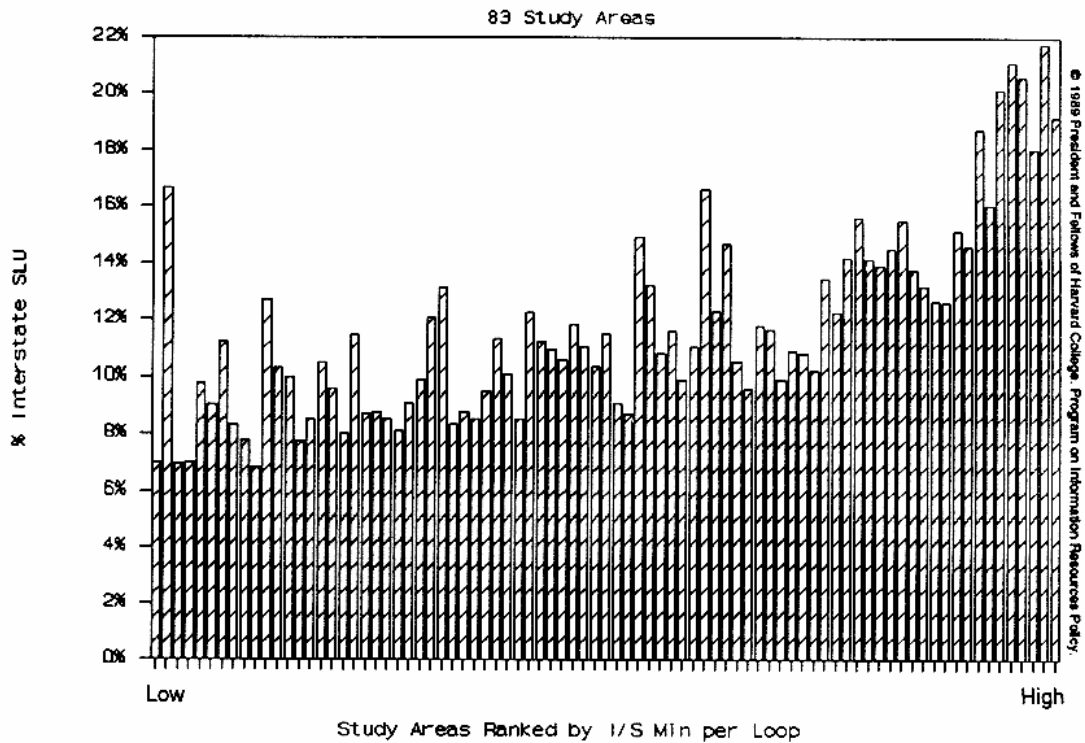
Figure 4-16

Interstate Cost per Minute: Fixed Allocator Costs

In summary, those study areas that exhibit the greatest decrease in interstate cost per interstate minute must be those that show large decreases in their composite interstate percentage, high benchmark relative use factors, and consequently high interstate use per loop. The opposite relationship generally holds for the lower benchmark relative use study areas which tend to have lower interstate use per loop.

V.A.2.b. Cost per Loop Results

Figure 4-18 plots benchmark cost and fixed allocator interstate cost per loop, calculated by dividing each study area's interstate cost by its 1985 loops. This figure shows that not only does the range of



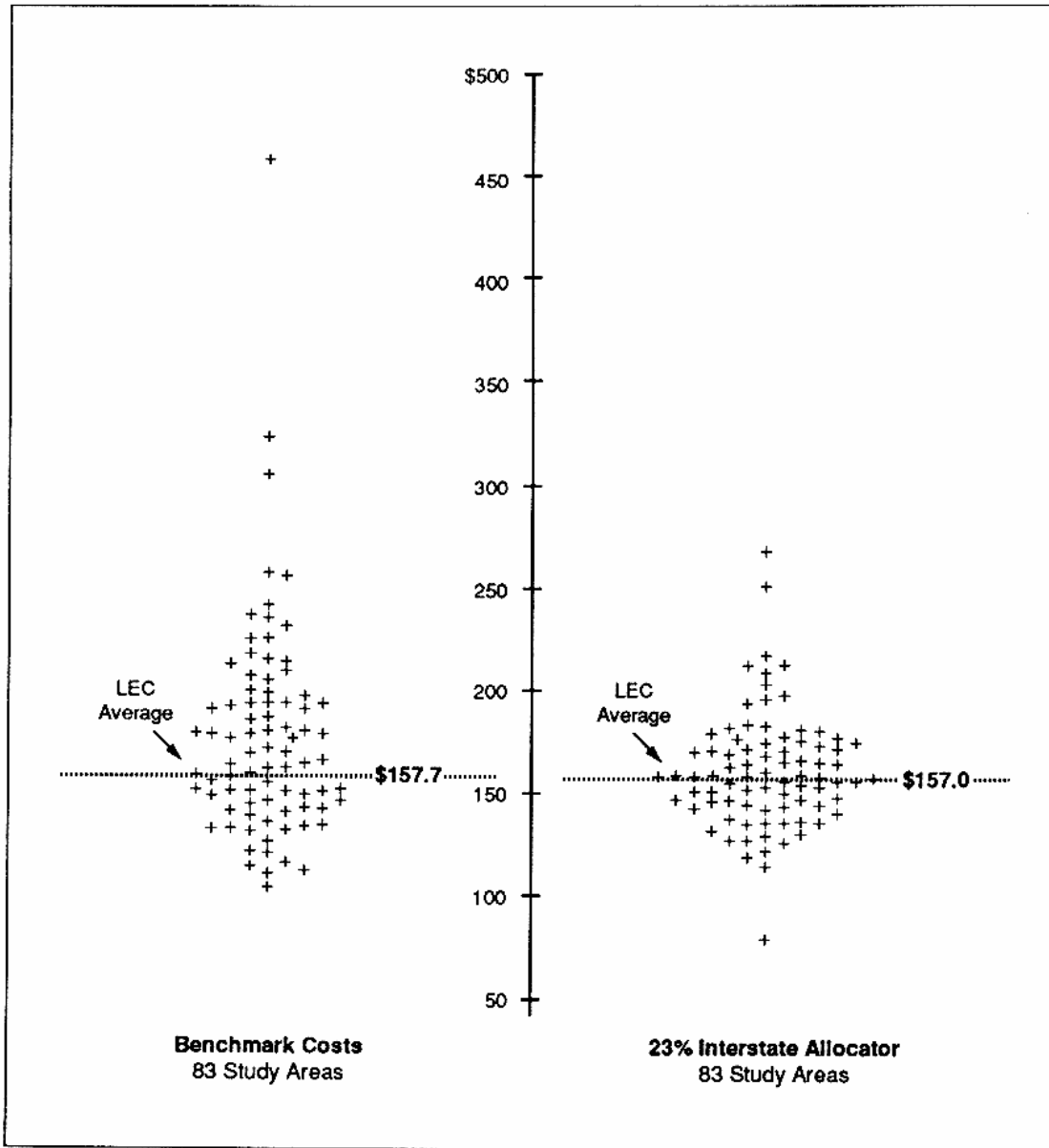
Source: *Monitoring Report*, June 1988.

Figure 4-17

Interstate SLU Percentages, 1985

cost per loop narrow a lot compared to the benchmark when applying the fixed allocator, but the distribution also changes, with most study areas being more closely grouped around the average. This effect could be anticipated because modelling benchmark costs eliminated variation in loop cost assignment but continued large variations in non-loop cost assignment (Figure 4-4). These remaining differences contribute to the large spread in benchmark total interstate cost per loop among study areas. Modelling the fixed allocator eliminates all variation in non-loop cost assignment factors. As a result, interstate cost per loop differences are greatly reduced.

The effect of the fixed allocator on holding company cost per loop is much less striking than on study areas. Figure 4-19 shows only a small increase in the number of holding companies near the average.

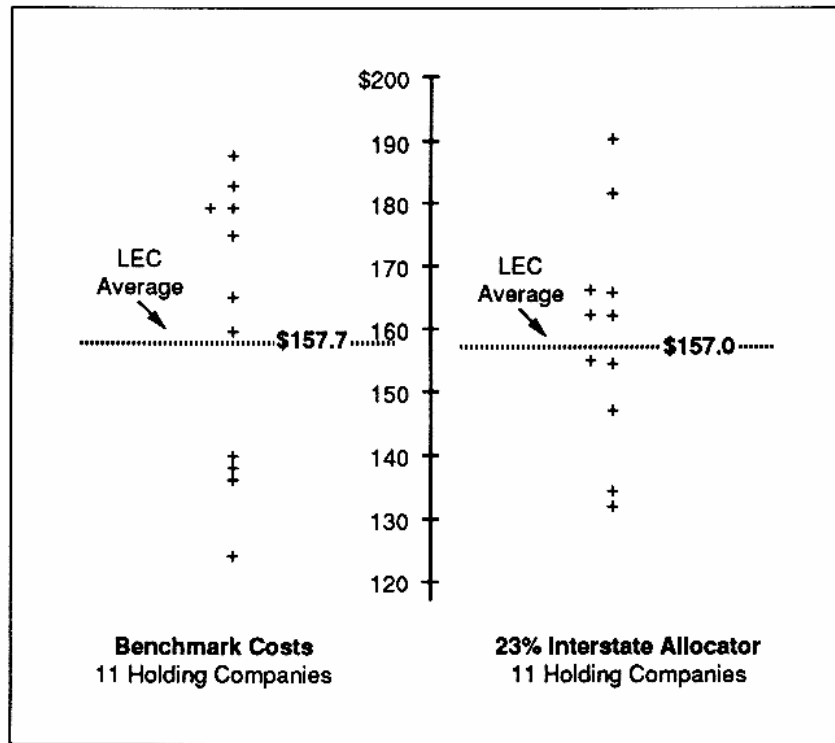


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Figure 4-18

Interstate Cost per Loop: Individual Study Areas

This smaller change is the result of the averaging inherent in developing holding company costs per loop in which the impact of the extreme cost study areas is muted when combined with the other study areas in the holding company.



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Figure 4-19

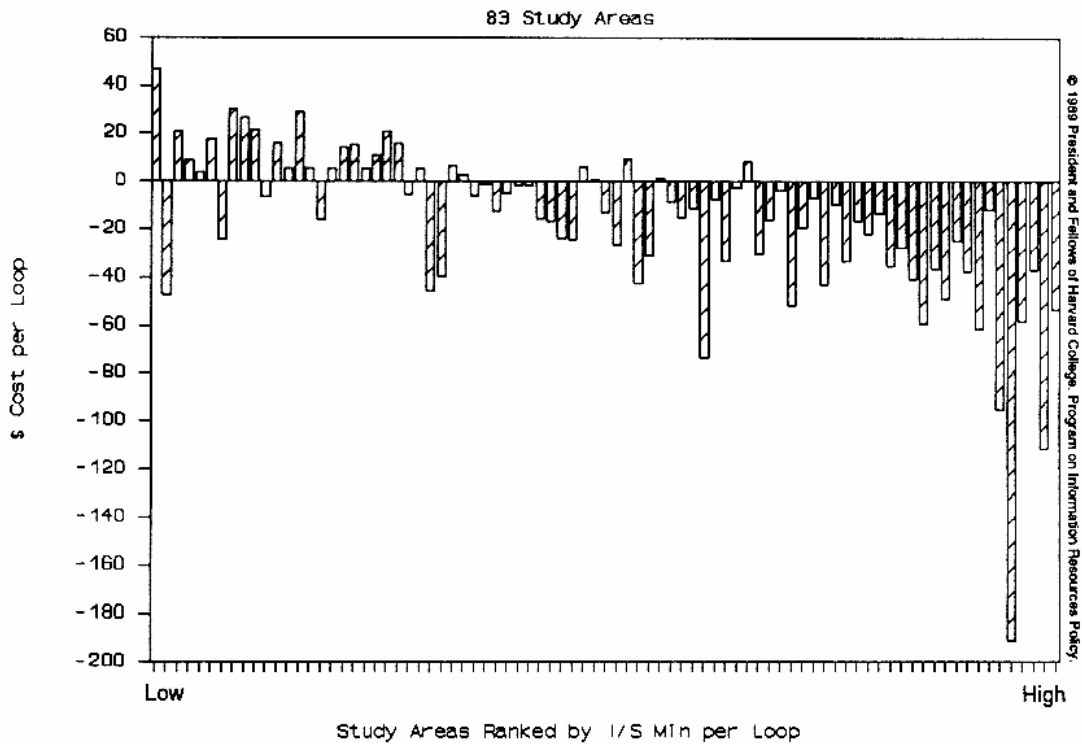
Interstate Cost per Loop: Holding Companies

Looking at individual study area change in interstate cost per loop shows a pattern very similar to that for change in interstate cost per minute. As Figure 4-20 indicates, low-interstate-use-per-loop study areas generally experience an increase in interstate cost per loop in moving from benchmark to fixed allocator scenarios, while high use per loop study areas generally experience a decrease. This same pattern appeared for interstate cost per minute, Figure 4-14.

Figure 4-21 shows that study areas with a lower change in interstate cost per minute experience a decrease in interstate cost per loop in moving from benchmark to fixed allocator scenarios, while those with a higher change in cost per minute experience an increase. Because of this correlation between change in interstate cost per loop and change in interstate cost per minute, the factors discussed above as

explanations for the strong relationship between interstate use per loop and change in interstate cost per minute also apply for changes in interstate cost per loop.

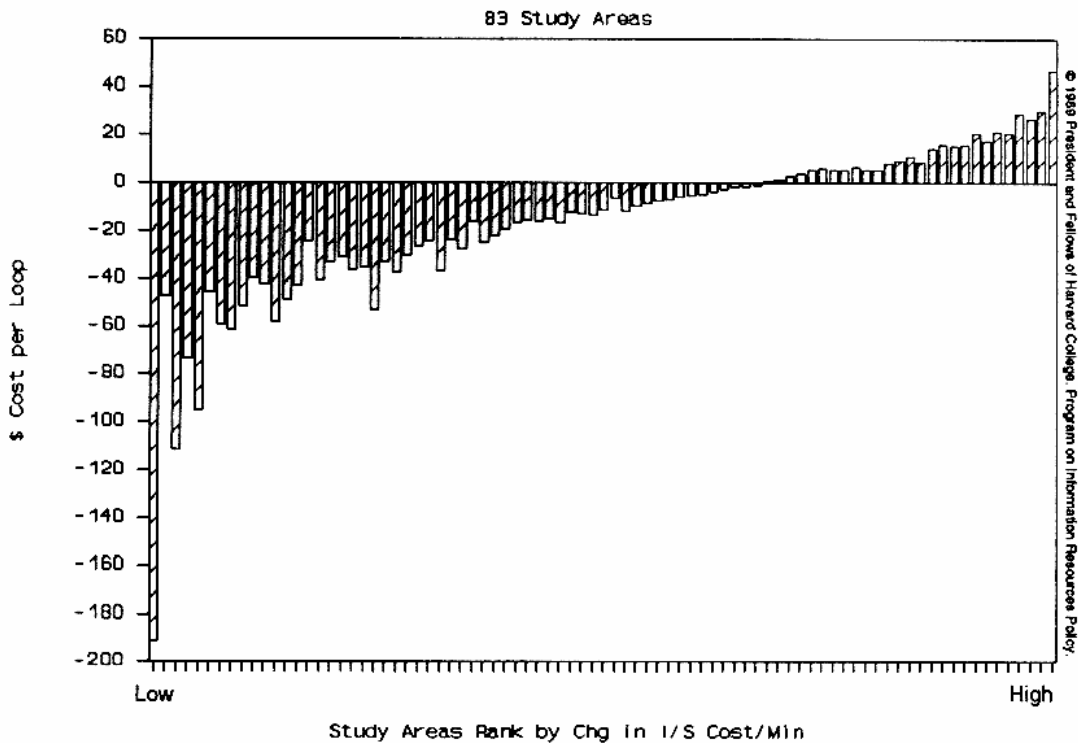
In summary, the effect of using a single fixed interstate allocator is to strengthen the relationship between interstate use per loop and interstate cost per interstate minute and per loop. As a result, much of the change in these costs from benchmark to fixed allocator scenarios is associated with interstate use per loop. Implications of this result for various stakeholders are discussed in Chapter 5.



Source: Minutes and Loops from *Monitoring Report*, June 1988.

Figure 4-20

Change in Interstate Cost per Loop Related to Interstate Use per Loop: Fixed Allocator Minus Benchmark Costs



Source: Minutes and Loops from *Monitoring Report*, June 1988.

Figure 4-21

**Change in Interstate Cost per Loop Related to Cost per Minute:
Fixed Allocator Minus Benchmark Costs**

V.B. Intrastate Effects

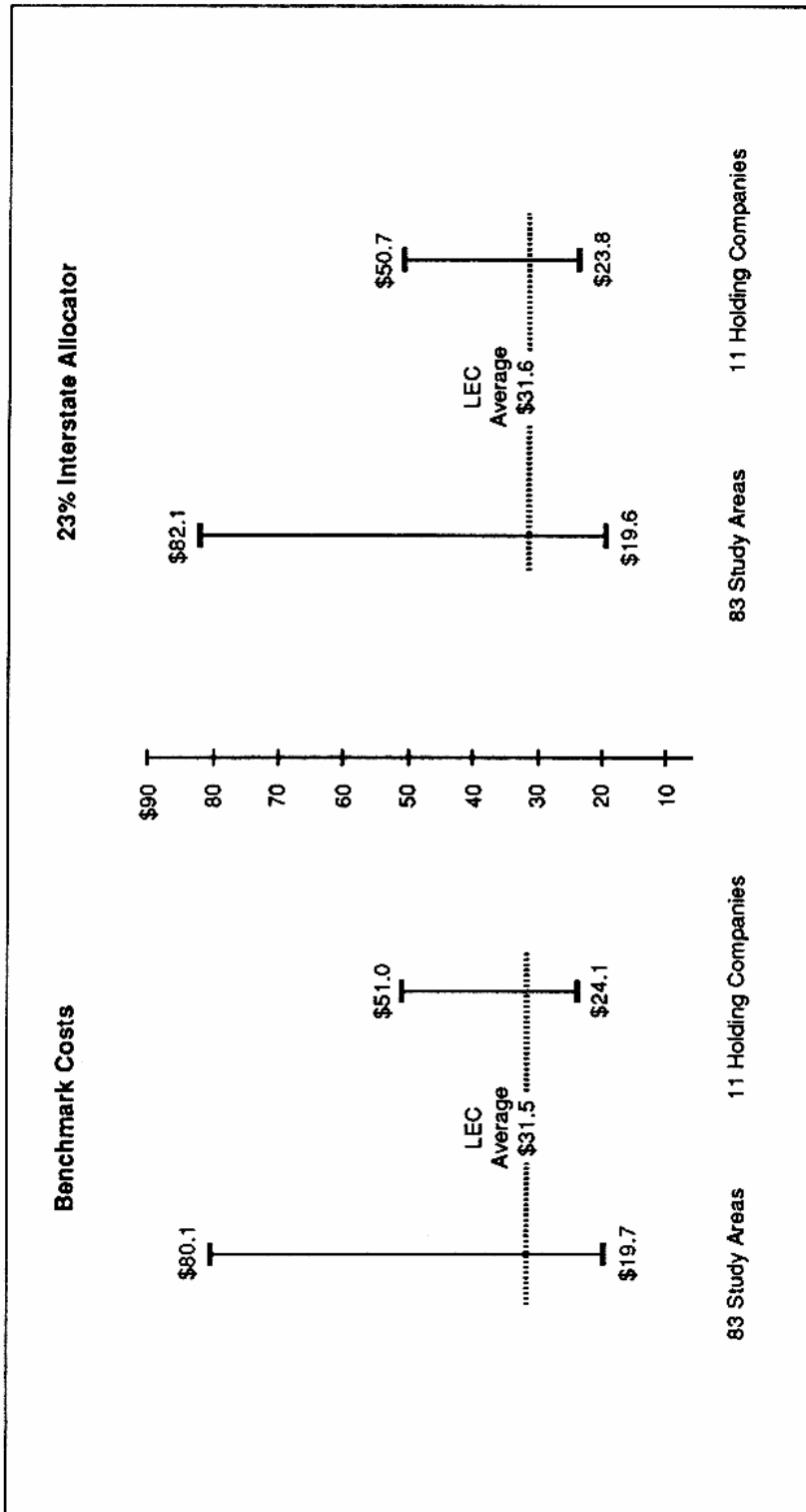
Because all costs are assigned to either the inter- or intrastate jurisdiction, intrastate dollar cost shifts associated with using the fixed allocator are just the opposite of the interstate shifts. For example, the \$67.9 million reduction in total LEC interstate costs is a \$67.9 million increase in total LEC intrastate costs. However, changes in intrastate cost per intrastate minute will differ from the interstate changes because, although the cost change is the same, the number of minutes used in the ratio changes from interstate to intrastate. The effect on intrastate cost per minute and per loop are discussed in the following sections.

Although some holding companies are linking interstate costs and access prices at the regional level, this linkage is not made in the intrastate jurisdiction in the late 1980s. One regulatory body, the FCC, has authority over the interstate jurisdiction and allows holding companies to aggregate costs and demand to file regional rates. There are 51 regulatory bodies in the intrastate jurisdiction (including Washington, D.C.), each of which currently regulates carriers only within its jurisdiction. However, holding company intrastate results are presented to provide analysis parallel to that for interstate and to suggest possible pressures on cost-based pricing in the intrastate arena. It is conceivable that state commissions could form regional compacts and set rates based on an aggregation of cost and demand from a number of states; aggregating intrastate results by holding company may suggest results from forming such compacts. Implications for stakeholders are explored in Chapter 5.

V.B.1. Cost per Minute Results

Figure 4-22 shows the range of intrastate cost per thousand intrastate minutes between the benchmark cost and the fixed allocator models, calculated by dividing intrastate costs by each study area's 1985 intrastate SLU minutes. Unlike the interstate effect shown in Figure 4-10, Figure 4-22 shows very little change between benchmark and fixed allocator scenarios. This situation arises because there are many more intrastate than interstate minutes to be used in the denominator in the calculation of values. As Figure 4-2 showed, study area interstate SLU percentages range from about 6% to over 20%. This means that there are anywhere from 5 to 16 times as many intrastate as interstate minutes. Consequently, not only is the intrastate cost per minute less than the interstate, but also any per-minute cost shift is reduced when calculated for intrastate minutes compared to interstate because it is spread over more minutes.

As mentioned in the discussion of interstate cost per minute (section V.A.2.a, above) associated with Figure 4-12, change, or lack of change, in the range of cost per minute may be caused by one or a few outliers. Figure 4-23 details a small increase in the spread of study



Source: Minutes from Monitoring Report, June, 1988.
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Figure 4-22

Range of Intrastate Cost per Thousand Intrastate Minutes

area costs per thousand intrastate minutes. The main point of this figure is that there is little change in the distribution of cost per intrastate minutes between the two models.

Figure 4-24 presents the same data and similar results for holding companies. Given the averaging process, it is not surprising that there is little change for holding companies since there is little change by study areas.

When the study area values for the benchmark and fixed allocator cost per thousand intrastate minutes are compared, one can see that even the greatest differences between the two scenarios are fairly small for any study area. Figure 4-25 shows that the change in intrastate cost per thousand intrastate minutes ranges from an increase of \$17 to a decrease of \$3. In comparison, the change in interstate cost per thousand interstate minutes ranged between +\$44 and -\$65 (Figure 4-14, which has a different vertical axis scale). Figure 4-25 also indicates that low intrastate use per loop study areas experience increased intrastate costs per minute in moving from the benchmark to the fixed allocator scenarios, while high-use-per-loop study areas experience decreased costs. This pattern is strongest for the study areas at the extremes, and is similar to that found for interstate.

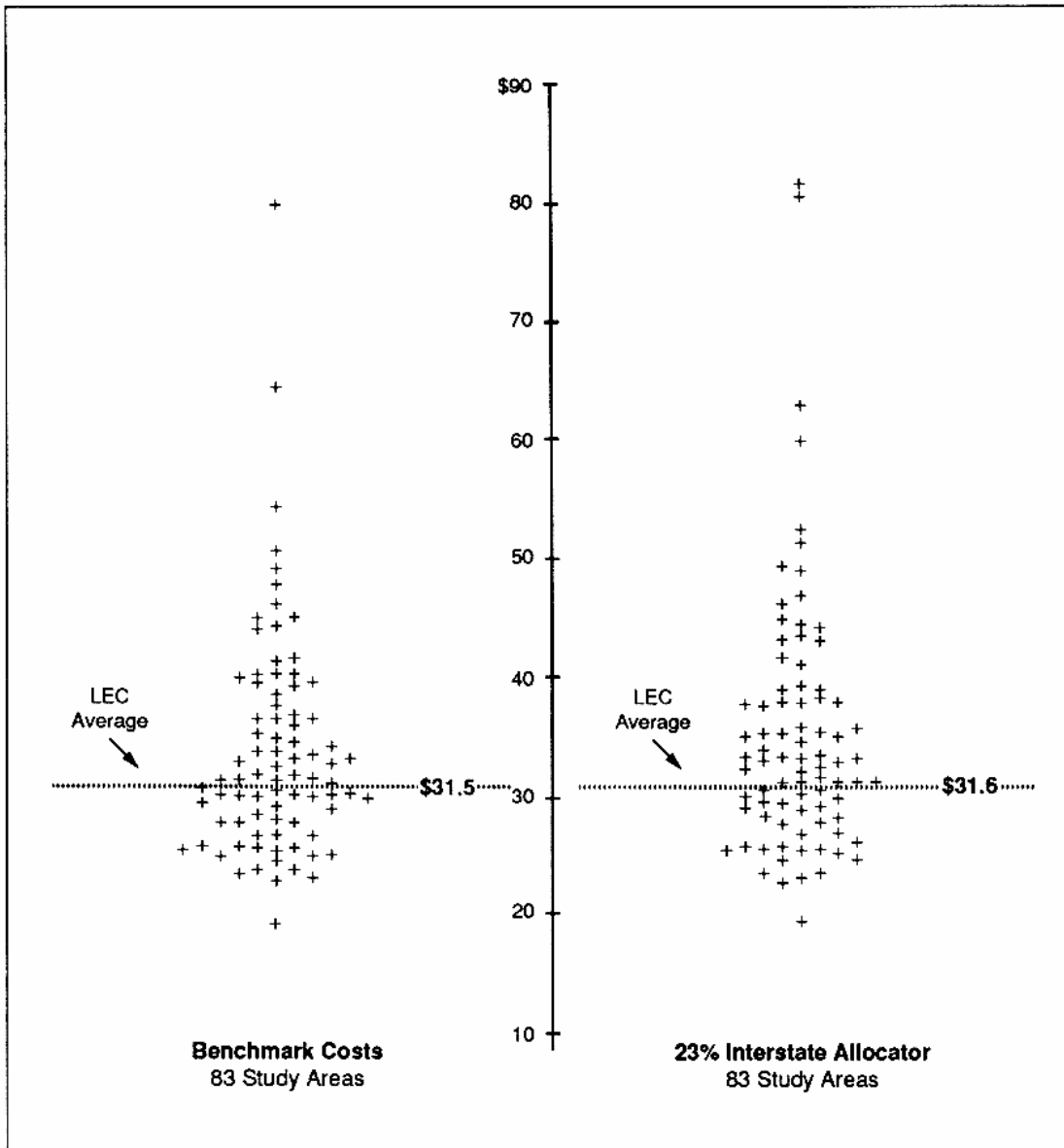
This relationship derives from the same five factors as outlined in section V.A.2.a, above, for interstate.

First, as was the case for interstate, the same numbers of minutes and total cost are used for both benchmark and fixed allocator scenarios. Therefore, any change in cost per minute is solely due to a change in cost assignment.

Second, the variation in benchmark study area composite interstate assignment and in interstate SLU and DEM (Figures 4-2 through 4-4) are mirrored for intrastate, where the percentages are simply one minus the interstate percentages.

Third, Figure 4-23 shows that there is significant variation in the benchmark intrastate cost per intrastate minute, just as was the case for interstate (Figure 4-12).

Fourth, in the fixed allocator scenario, there is clearly no difference in the composite intrastate percentage among study areas. The change in intrastate assignment from benchmark to fixed allocator is

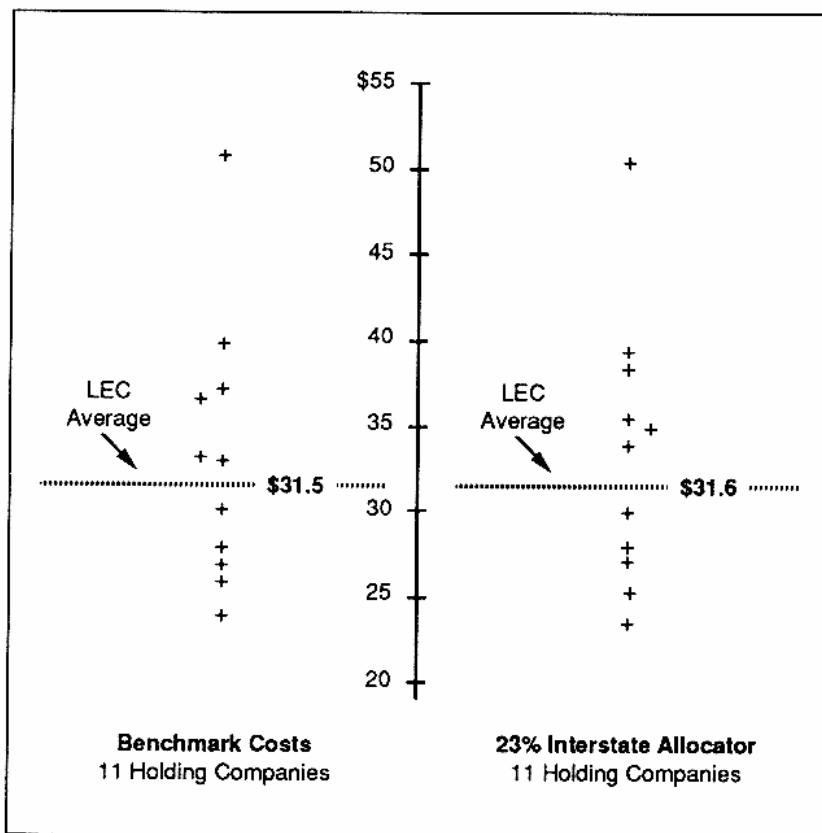


Source: Minutes from *Monitoring Report*, June 1988.
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Figure 4-23

**Intrastate Cost per Thousand Intrastate
Minutes: Individual Study Areas**

due primarily to the change from the various relative use percentages to 77%. As stated in section V.A.2.a above, most benchmark costs are separated on relative usage, and relative usage varies significantly



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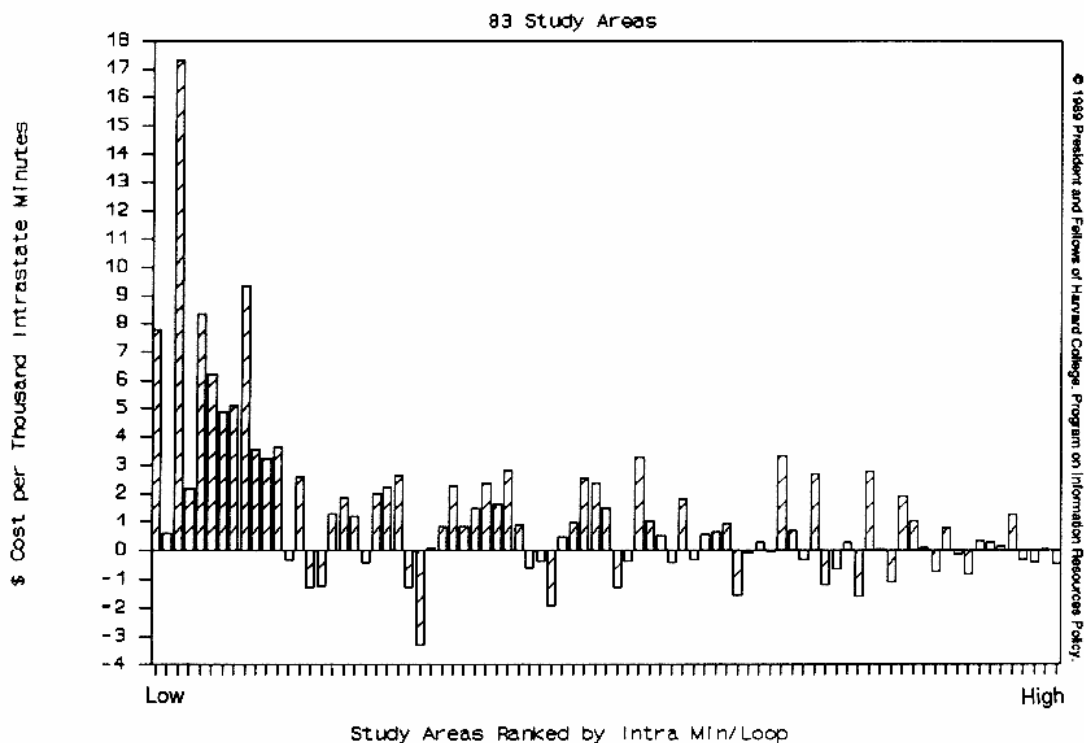
Figure 4-24

Intrastate Cost per Thousand Intrastate Minutes: Holding Companies

across study areas while SPF is the same. Roughly speaking, about 30% of all modelled costs are loop costs assigned intrastate at 75% in the benchmark case. For the average to be 77% with 30% of the costs assigned at 75%, the remaining 70% of the costs, which are assigned on relative usage measures such as SLU and DEM, must average about 78% intrastate assignment nationally.¹⁷³ In modelling the fixed allocator, relative to the benchmark case, SPF in effect increases two percentage points for each study area and the average of the relative use factors decreases less than one percentage point. However, those study areas

¹⁷³Arithmetically, $75\% \times 30\% + 77.9\% \times 70\% = 77\%$.

with the lowest intrastate relative use factors must experience the greatest increase in composite intrastate assignment. In the complement of the relationship explained above (section V.A.2.a) because intrastate SPF increases only two points, the relative use factors must increase a lot to raise the intrastate assignment to 77%.



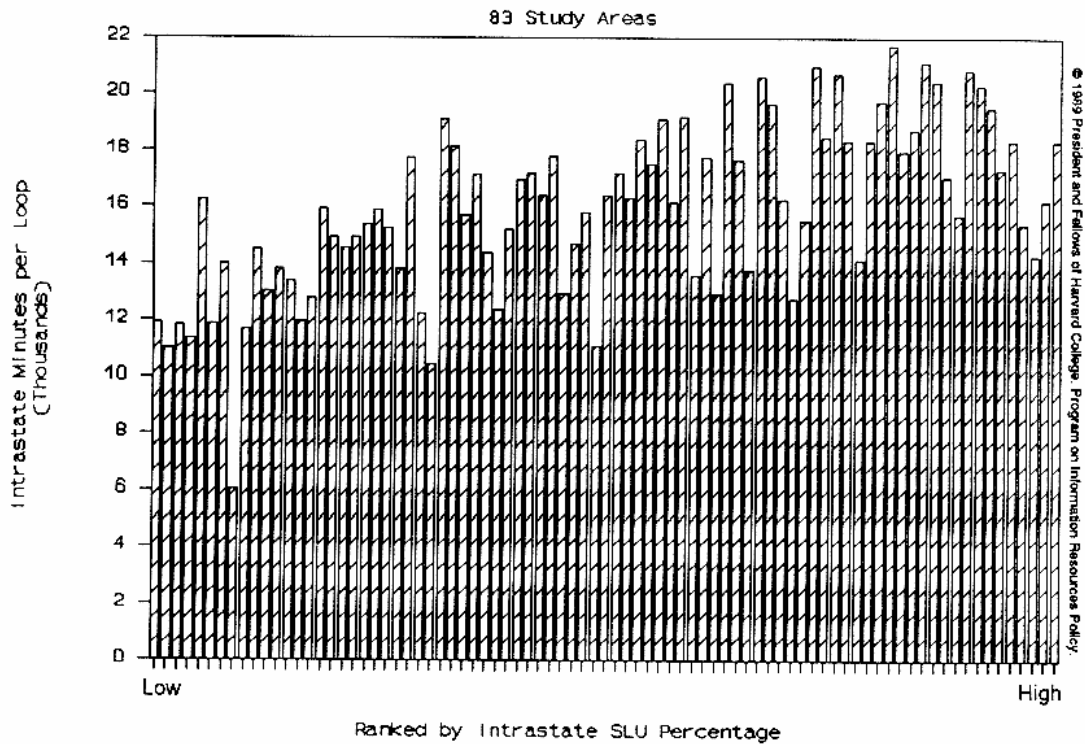
Source: Minutes from *Monitoring Report*, June 1988.

Figure 4-25

Change in Intrastate Cost per Minute Related to Intrastate Use per Loop: Fixed Allocator Minus Benchmark Costs

Fifth, Figure 4-26 shows that higher intrastate relative use is usually associated with higher absolute intrastate use per loop, although this relationship is not so marked as for interstate (Figure 4-17). This weaker relationship arises partly because of the higher number of intrastate minutes in the denominator of the cost per minute change, as noted above. More importantly, it may be that an important factor in this relationship is the use of minutes as the primary pricing unit for interstate but not for intrastate services. Most intrastate

minutes are local rather than toll,¹⁷⁴ and in most areas local service is still predominantly priced by line, not by use. While it may be very difficult to quantify the impact of these differences, it is easy to imagine that this fundamental pricing difference could have some effect on the relative importance of inter- and intrastate use per loop in explaining jurisdictional cost per minute changes associated with the fixed allocator.



Source: Data from *Monitoring Report*, June 1988.

Figure 4-26

Intrastate Minutes per Loop, 1985

¹⁷⁴*Monitoring Report*, CC Docket 87-339, June 1988, Prepared by the Staff of The Federal-State Joint Board in CC Docket No. 80-286, Tables 4.9 (Local Subscriber Line Usage Minutes) and 4.10 (State [Toll] Subscriber Line Usage Minutes), pp. 159-164.

V.B.2. Cost per Loop Results

Figure 4-27 shows the range of intrastate cost per loop for study areas and holding companies, calculated by dividing intrastate costs by each study area's 1985 loops. Because the range of study area interstate cost per loop decreases from benchmark to fixed allocator models, that for intrastate must increase. This relationship holds because the denominator, loops, is the same for both figures, and the decreased interstate numerator causes the intrastate numerator to increase in order to reflect the cost shift.¹⁷⁵ Similarly, the small increase in the interstate range for holding companies causes a small decrease in the intrastate holding company range.

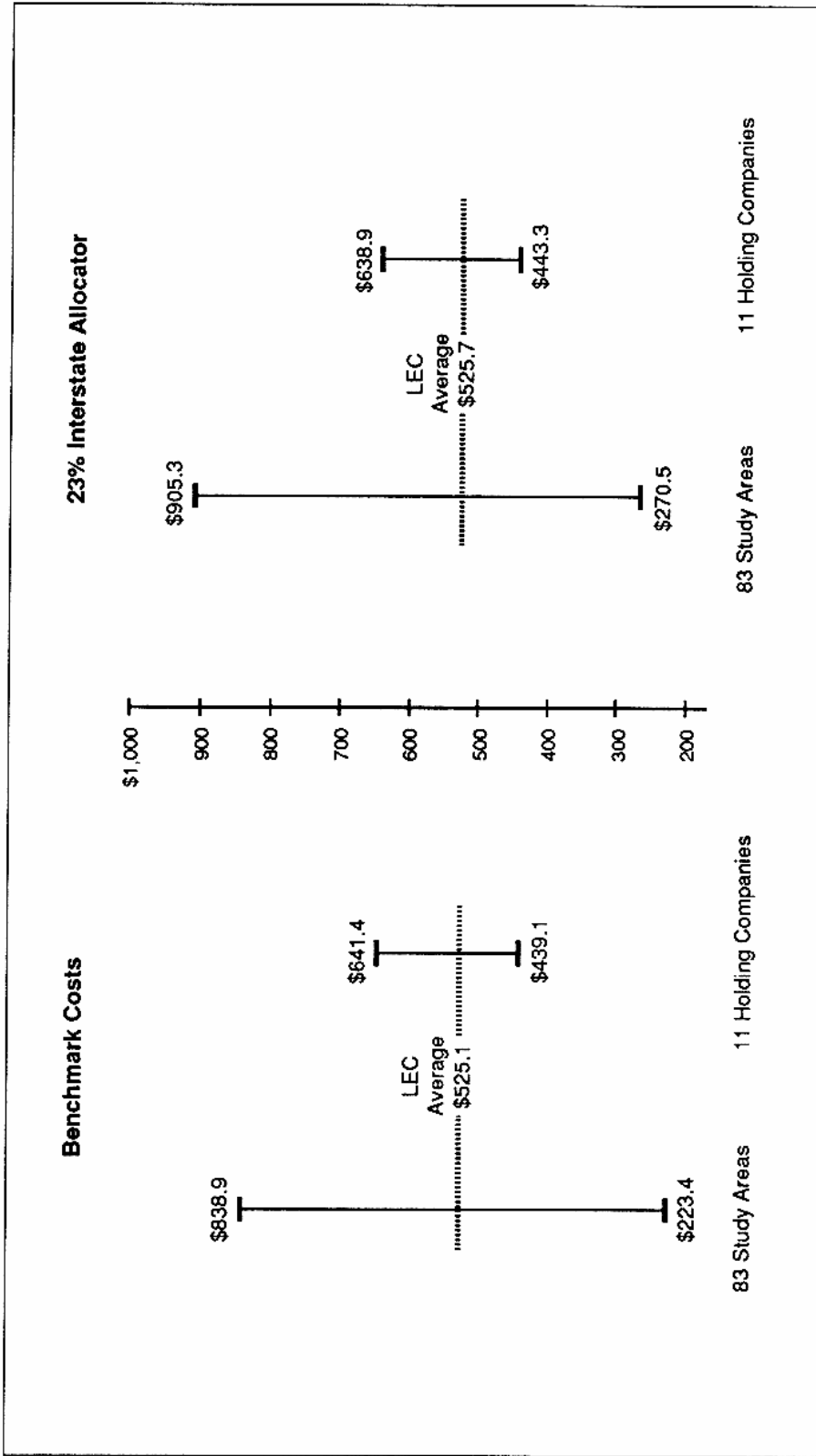
Looking beyond the range to the study area values shows a distribution similar to that for intrastate cost per minute. Figure 4-28 shows a slight increase in the spread of study area intrastate cost per loop. Figure 4-29 shows a slight decrease in the number of holding companies near the average. The slightly increased study area spread is the reverse of the decreased spread for interstate cost per loop, as is the minor holding company charge. These results are to be expected because the denominator is unchanged and the cost shift causes a decrease in the interstate numerator which is exactly offset by an increase in the intrastate numerator.

When the study area intrastate cost per loop values for the benchmark and fixed allocator models are compared, one can see that what appears to be a relatively minor difference in the distribution of cost

¹⁷⁵A simple example may make this relationship clearer. Assume:
Total costs = \$200
Benchmark interstate costs = \$80
Therefore benchmark intrastate costs = \$120 (\$200 - \$80)
Fixed allocator interstate costs = \$46 (23% of \$200)
Therefore benchmark intrastate costs = \$154 (\$200 - \$46)

<u>Percentages</u>	<u>Benchmark</u>	<u>Fixed Allocator</u>
Interstate	80/200 = 40%	46/200 = 23%
Intrastate	120/200 = 60%	154/200 = 77%
Total	200/200 = 100%	154/200 = 100%

Note that as the interstate percentage decreases from benchmark to fixed allocator scenarios, the intrastate percentage increases.



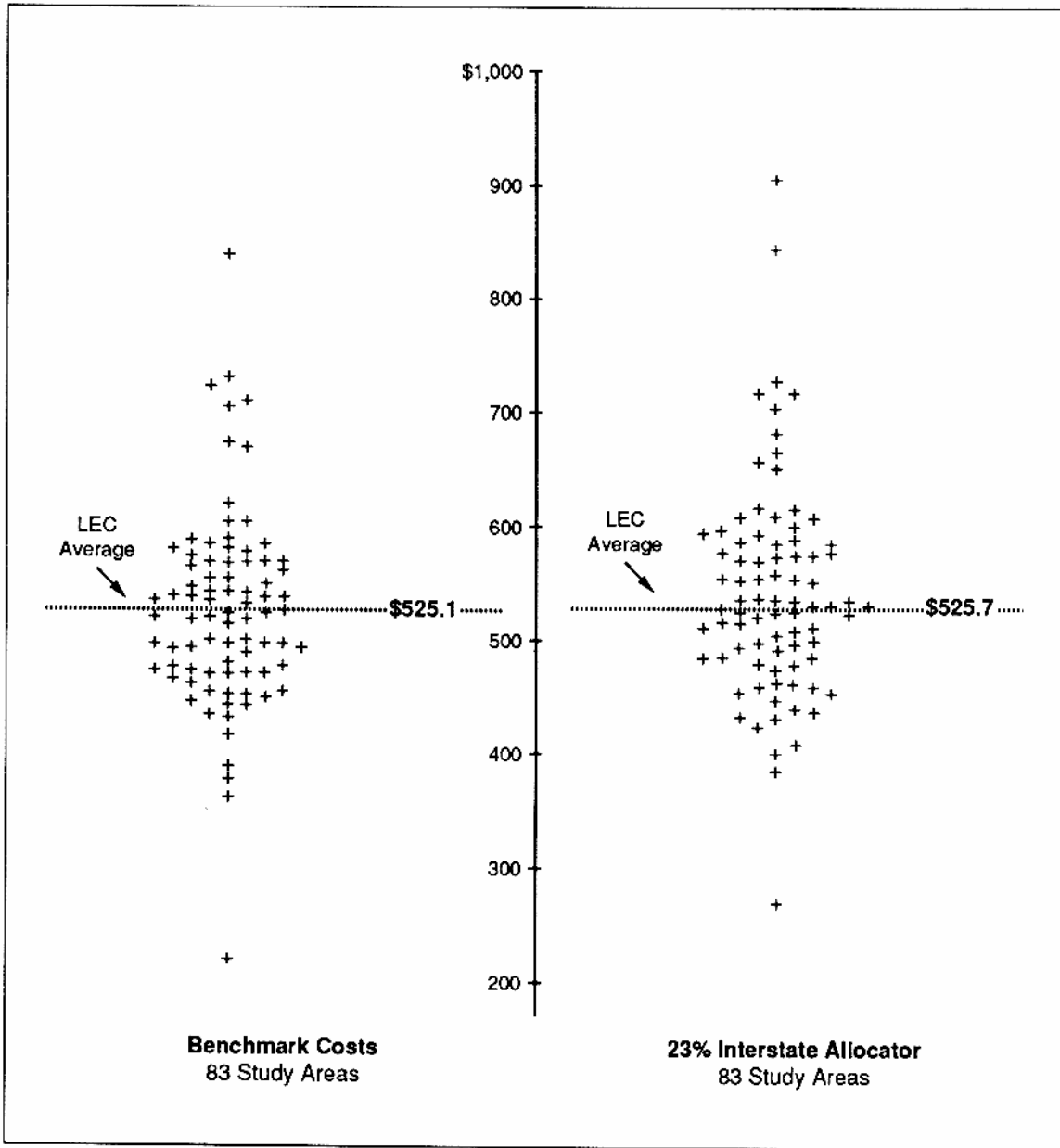
Source: Loops from *Monitoring Report*, June 1988.
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Figure 4-27

Range of Intrastate Cost per Loop

per loop (Figure 4-28) between the two models can be quite large for a given study area (Figure 4-30). Figure 4-30 shows little relationship between change in intrastate cost per loop and intrastate usage per loop. Only the lowest-use-per-loop study areas show a consistent relationship with changed cost per loop, with these study areas being among those with the greatest increase in cost per loop. This relationship arises from the interaction of the five factors discussed in the preceding section for intrastate cost per minute, with the same limitation on the strength of the relationship as was stated for the change in intrastate cost per minute. In fact, the relationship is even weaker than for intrastate cost per minute, primarily because of the fairly weak relationship between intrastate minutes per loop and total intrastate usage shown in Figure 4-26.

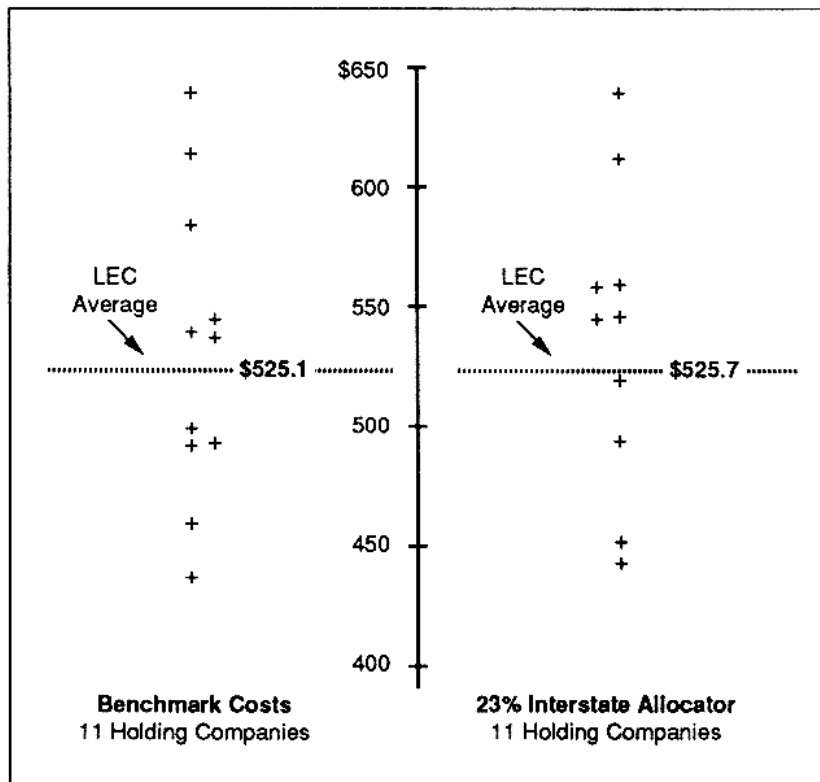
In summary, moving from the benchmark to a 23% interstate allocator has relatively little effect on the total range or distribution of intrastate costs per intrastate minute or per loop, especially compared to its effect on interstate costs. There can be substantially different effects on individual study areas, although the change in intrastate cost per minute is small for all study areas. These effects are related to intrastate use per loop, although the relationship is weaker than is the case for interstate.



Source: Loops from *Monitoring Report*, June 1988.
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Figure 4-28

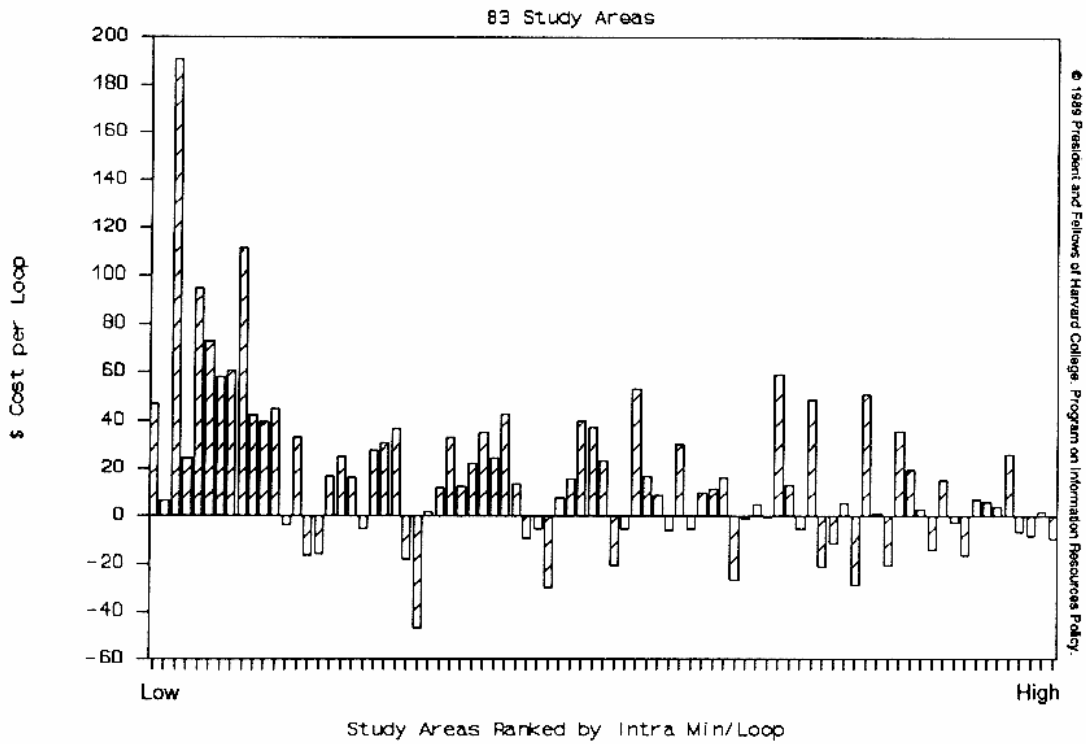
Intrastate Cost per Loop: Individual Study Areas



Source: Loops from *Monitoring Report*, June 1988.
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Figure 4-29

Intrastate Cost per Loop Related to Interstate
 Use per Loop: Holding Companies



Source: Minutes and Loops from *Monitoring Report*, June 1988.

Figure 4-30

Change in Intrastate Cost per Loop:
Fixed Allocator Minus Benchmark Costs

CHAPTER FIVE

STAKEHOLDER IMPLICATIONS

I. Effects that a Move from Benchmark to Fixed Allocator Would Have on Stakeholders

The changes described in Chapter 4 would affect different stakeholders in different ways. This chapter first discusses impacts on carriers, both LEC and IXC, and then considers impacts on other stakeholders. Section I expands the LEC-oriented discussion of the effects of a Separations change in Chapter 1, section V.B. It is worthwhile reiterating that this report only explores some of the implications of adopting a single fixed interstate allocator; it does not advocate this or any other Separations method.

I.A. Local Exchange Carrier Impacts

Study areas within holding companies and holding companies themselves experience both increased and reduced interstate assignment in changing from benchmark costs to the fixed allocator. Consequently, assigning 23% of costs to interstate affects different LECs differently. Under the rules applicable in 1988, the greatest effect of the changed cost allocation on LECs is on revenues because of the connection between costs and revenues under RBROR regulation.

The impact that adopting a fixed allocator would have on LEC revenues depends on a number of factors besides the direction and magnitude of the cost shift. Figure 5-1 shows some of these factors and how they affect LEC revenues under RBROR regulation. Figure 5-1 assumes a reduction in the interstate factor (and costs) from the benchmark to fixed allocator and the consequent intrastate cost increase. It also assumes some mechanism to monitor interstate rates of return and refund

Factors	Scenarios	Impact on Revenue
Earnings position Interstate* Intrastate	Overearning	Reduces interstate revenues by increasing overearnings. Reductions may be immediate if overearnings accruals are made in anticipation of future refunds. There may be future reductions if future rates are reduced.
	Underearning	Reduces interstate underearnings. No changes on current revenue. Reduces future revenues because of cost reduction.
	Overearning	Reduces intrastate overearnings. Potentially increases future revenues if potential rate reductions or refunds do not have to be made.
	Underearning	Increases intrastate underearnings. No changes on current revenues. Potentially increases future revenues because of cost increase.
State regulatory lag	Short lag	Impact of effects felt next year.
	Long lag	Impact of effects felt in subsequent years.
Intrastate pricing policy	Local service prices absorb most jurisdictional cost shifts	State commission may be reluctant to grant rates to recover the full cost shift if the burden must fall on local service users.
	All service prices affected by jurisdictional cost shifts	State commission may be more willing to grant rates to recover the full cost shift if the burden must be shared by users of all service users.
LEC interstate pricing policy	Study area rates	Reduces future revenues when cost decrease is reflected in next rate filing.
	Holding company rates	Less effect on revenues if cost shift is offset by shifts in other study areas.

*Assumes some mechanism for refunding overearnings.

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Figure 5-1

Factors Affecting LEC Revenues: Intrastate Cost Increase and Interstate Cost Reduction

excess overearnings¹⁷⁶ and that LECs may reflect any potential refund liabilities by reducing current revenues.¹⁷⁷ The revenue impact of adopting the fixed allocator varies with the size of the jurisdictional cost shift and the strength of the various scenarios associated with each factor.

Clearly these changes could have major impact on interstate access revenues under RBROR regulation. Under the price cap formula under consideration by the FCC in early 1989, Separations rule changes affect the price through the "Y" factor.¹⁷⁸ However, changed interstate cost allocation results absent rule changes would not affect price caps. Some opponents of applying price caps to LECs have argued that, under price caps, LECs have an incentive to interpret Part 36 in such a way as to shift costs from the interstate to the intrastate jurisdiction.¹⁷⁹ This incentive arises if the intrastate services are regulated under RBROR while interstate services are regulated under price caps. In this environment, intrastate cost increases would eventually be reflected in

¹⁷⁶Although the FCC has established rules requiring automatic refunds of excess earnings, the DC Court of Appeals in 1988 modified those rules and remanded them to the FCC. See Chapter 1, footnote 71 for details on the status of interstate rate of return monitoring and refund rules.

¹⁷⁷Generally Accepted Accounting Principles (GAAP) define liabilities as "probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events," Statement of Financial Accounting Concepts No. 3, "Elements of Financial Statements of Business Enterprises," FASB, Stamford, CT, 1980, p. xi. In order to record a liability, the transaction must be both measurable and related to past events, Intermediate Accounting, A. N. Mosich and E. John Larsen, McGraw-Hill Book Company, New York, 1982, 5th ed., p. 397. Because the amount of overearnings can be measured by comparing actual achieved rate of return with the maximum allowed rate of return, and overearnings are related to past billings, GAAP can be interpreted to required booking a liability to reduce revenues associated with potential overearnings refunds.

¹⁷⁸In the Matter of Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313: Notice of Proposed Rulemaking, 2 FCC Rcd 5208 (1987); Further Notice of Proposed Rulemaking, 3 FCC Rcd 3195 (1988).

¹⁷⁹"Rebuttal: The Problem with Price Caps," Ronald J. Binz, Telephony, September 26, 1988, p. 62.

price increases for some intrastate services, while the corresponding interstate cost decrease would not decrease interstate prices. These cost shifts could increase earnings by increasing intrastate prices and possibly revenues (depending on the demand response to the changed prices) with no offsetting decrease in interstate prices or revenues. However, the extent to which there is leeway in the interpretation of Part 36 that would allow a carrier to shift costs to the intrastate jurisdiction absent a rule change is a matter of debate. To state that this can be done "merely by classifying telephone plant or expense as intrastate"¹⁸⁰ may be an oversimplification of the Separations process.

	Growth Rate (percent)
Tier 1 LEC Usage	
Minutes of Use	3.9%
Interstate	10.6
Intrastate Toll	8.2
Local	2.8
Loops	2.9
End-User Payments	
Interstate Services	12.8%
Interstate Toll (excluding SLC)	11.2
Intrastate Services	6.7
Intrastate Toll	9.8
Local and Other	3.8

Source: Minutes and Loops from *Monitoring Report*, revenue growth rates from *Tactical Disputes*, Draft, March 1989.

Figure 5-2

Compound Annual Growth Rates: 1980 - 1986

Under either of these connections between costs and prices, cost shifts associated with a change to a fixed allocator would affect various companies' interstate revenues differently. A major impact is

¹⁸⁰Ibid.

on revenue growth patterns. LEC interstate costs are recovered from interexchange (access, toll, and billing and collection) revenues, while LEC intrastate costs may be recovered from either interexchange, exchange, or other revenues. Generally, interstate and intrastate toll costs are recovered on a per-minute basis (although SLC is on a per-line basis) and exchange costs are recovered on a per-line basis, although local service prices in some areas are based on usage. Figure 5-2 shows that 1980-1986 growth rates for toll minutes (inter- and intrastate) are much higher than for exchange minutes or loops, with interstate toll exceeding intrastate toll. It also indicates similar growth patterns for revenues from 1980 to 1986.

The cost shift that would be caused by moving to a fixed allocator would shift revenue recovery to services whose most common pricing units are experiencing different growth rates. Which areas are affected, and by how much, depends on individual state pricing policy as noted in Figure 5-1 above. To the extent that the Separations change shifts costs between interstate and intrastate, and the intrastate cost shift affects local service prices, some companies may be moved into what is, in the 1980s, the fastest growing segment of the industry while others may be moved out of it. Even cost shifts between inter- and intrastate recovered in toll prices have implications for revenue growth because of their different growth rates. These impacts would vary between companies, depending on their individual growth rates. If companies being moved out of the interexchange segment were experiencing little or no growth in access lines, their overall revenue growth would lag behind that of other companies. Conversely, a company moved into the interexchange segment which is experiencing little or no access line growth might have overall revenue growth exceeding that of other companies

Under RBROR regulation, this revenue growth would lead eventually to price reductions and ultimately slower growth, with the speed of this connection dependent on regulatory lag, among other considerations. Under various forms of "profit-sharing" regulation, including price caps, some or all of these increased revenues would be retained by the company with little or no price reductions to follow.

I.B. LEC Customer Impacts

The modelled Separations change would directly affect LEC costs and ultimately, less directly, prices. The connection between costs and prices is different in different jurisdictions, but whether under RBROR regulation or the proposed price caps, some connection exists in the late 1980s. Consequently, the major impact on LEC customers, both IXCs and end users, will be felt in the impact on the prices they pay for services. These prices may, in turn, have secondary impacts on profitability, market share, universal service, and attractiveness of a location for businesses, for example. The impact on IXCs as LEC customers is discussed first, followed by impacts on other customers.

I.B.1. Interexchange Carrier Impacts

This analysis of IXC impact focuses on changes in LEC interstate costs and access prices associated with moving from the benchmark to a fixed allocator. Interstate is the focus here for two reasons. First, the link between LEC interstate costs and LEC access prices and eventually with IXC interstate toll prices is fairly strong in the late 1980s. The intrastate link is weaker and the regulatory lag is longer in the states than for interstate, and it varies between the states. Second, most IXC revenue is interstate,¹⁸¹ so IXCs probably have a larger stake in the outcome of interstate costs and access prices. As a result, the points made about interstate will generally apply to intrastate, although the strength of the impact will usually be less than for interstate and will vary across states.

I.B.1.a. Access Cost Effects

One might suspect that the nationwide IXCs, specifically AT&T, MCI, and US Sprint, might be little affected by a Separations change that would affect total nationwide LEC interstate costs insignificantly

¹⁸¹For example, in 1986 about 3/4 of AT&T's toll revenues were interstate. AT&T 1986 Form M, Table 34.

because they have nationally averaged prices. Under RBROR regulation, LEC interstate costs are an important input into AT&T's interstate prices. Even under the price caps under consideration in 1989, Separations changes affect prices. MCI and US Sprint have set prices to be below AT&T's. A LEC Separations change that did not affect AT&T's prices probably would not affect MCI's or Sprint's.

Regional IXCs would have a larger stake in the effect of a fixed allocator. Unlike the nationwide carriers, they lack the ability to offset LEC cost increases in one region with decreases in another. Consequently, regional IXCs would benefit or lose depending on the direction the cost shift takes in their region. A LEC interstate cost reduction in their area would reduce their access costs and thereby increase net income, allow the carrier to reduce rates and gain market share at the expense of national IXCs, or both. These outcomes would be reversed under an interstate cost increase. To the extent that regional IXCs would gain or lose from this Separations change, national carriers would lose or gain market share and revenues in those regions. Thus AT&T, MCI, and US Sprint actually do have a stake in a LEC Separations change that will have little direct effect on their access costs.

In addition to the impact of LEC cost-based access price changes described above, IXCs may be impacted by demand-based changes in LEC access prices. These demand-based changes may arise from end users' response to economic growth, promotion of IXC services, FCC-mandated pricing changes such as SLC, and other factors. Under Parts 36 and 69 and RBROR regulation in the late 1980s, increased IXC demand for LEC access has two conflicting impacts on LEC access prices.¹⁸² First, because Separations is a relative-use allocation system, the increased interstate demand increases interstate assignment factors and therefore LEC interstate costs. This cost increase puts upward pressure on prices. Second, the demand increase will raise the number of units (usually minutes) the cost must be recovered from, consequently putting downward pressure on prices. Reduced demand for interstate access would have the opposite effects. The resolution of these conflicting

¹⁸²Conceptually, LEC access prices are derived by dividing the cost by the number of units demanded. The actual implementation of this concept is much more complicated.

pressures depends on a number of factors, including the speed with which customers respond to price changes and the extent to which intrastate demand changes.

Moving to a fixed allocator eliminates the first of these conflicting impacts because interstate cost assignment is no longer directly tied to relative use. Hence any increase in relative use associated with increased IXC demand has no effect on LEC interstate costs. However, the second impact remains under RBROR regulation, because increased demand still increases the number of units the cost must be recovered from. The result of this change is that IXC demand increases will put downward pressure on LEC interstate access prices with no offsetting upwards pressure that, under Parts 36 and 69, would be generated by an increase in LEC interstate assignment. Under RBROR regulation or price caps, this downward pressure would in turn, put downward pressure on AT&T's interstate toll prices. This pressure would affect prices charged by MCI, Sprint, and other smaller IXCs to the extent that their prices reflect changes in AT&T's prices.

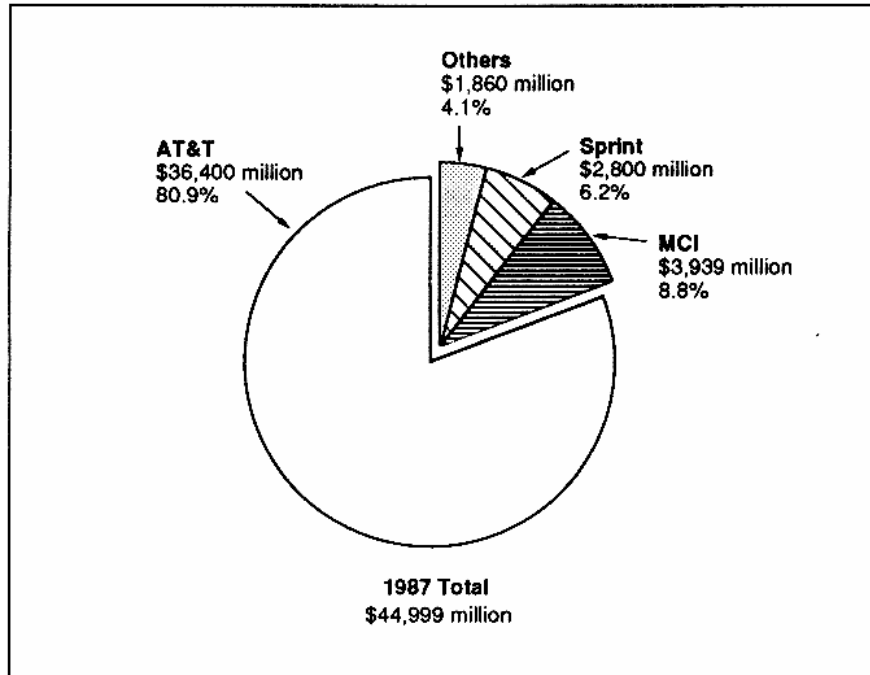
I.B.1.b. IXC Industry Structure Effects

The IXC industry structure could play a major role in shaping the effect on IXCs of moving from the benchmark to a fixed interstate allocator and the stake that both regional and national carriers have in this potential Separations change. At least three characteristics of the industry affect the impact of a fixed allocator: the large number of firms, the concentration of market share, and the consolidation of second-tier companies.

The number of IXCs has mushroomed, growing from about 13 in mid-1982 to about 550 at the end of 1987.¹⁸³ Most of these carriers serve only part of the country, so that many firms could be affected by shifts

¹⁸³In June 1982, 13 IXCs received identification codes for routing traffic over "trunk side" connections. This number had increased to 451 by the end of 1987. In November 1987, 552 long distance carriers purchased switched access (both "line side" and "trunk side" connections) from the RHCs. "Trends in Telephone Service," Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, January 1988, pp. 15-16.

in LEC interstate assignment, as described in section I.B.1.a, above. Many of these firms may be small with low overhead, and access costs may be by far their major cost. If this is the case, these carriers may be particularly vulnerable to changes in access prices. A small percentage change could eliminate or double their profit margin.



Source: Data from *Telephony*, March 14, 1988, pp. 22-27, and April 4, 1988, p. 34.
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Figure 5-3

1987 End-User Revenues: Interexchange Carriers

Figure 5-3 shows that in 1987 the IXC industry revenues from end users (before payment of access charges to LECs) were quite concentrated by carrier. The three largest carriers have over 95% of the market, and the largest 10 or 12 have 98%. Most of the other firms are quite small with little economic or political power, and their response to changes in the price of access may have little if any significant impact on the major carriers' market share or profitability.

In the late 1980s there has been some consolidation among the second-tier carriers. This consolidation has taken the form of

mergers¹⁸⁴ and the formation of joint ventures which allow regional carriers to offer nationwide services.¹⁸⁵ Consolidation among regional carriers may, depending on the regions they serve, reduce the impact of a fixed interstate allocator by combining areas with positive and negative interstate cost shifts associated with adopting the fixed allocator. To the extent that this happens, the impact on national carriers of lost market share due to the Separations change will be ameliorated.

Overall, the use of a nationwide 23% interstate factor would probably have little effect on national IXCs except in specific niches where regional carriers could benefit from access cost reductions to reduce prices and gain market share. Of course, whether the smaller carriers would reduce prices depends on their marketing and pricing strategies.

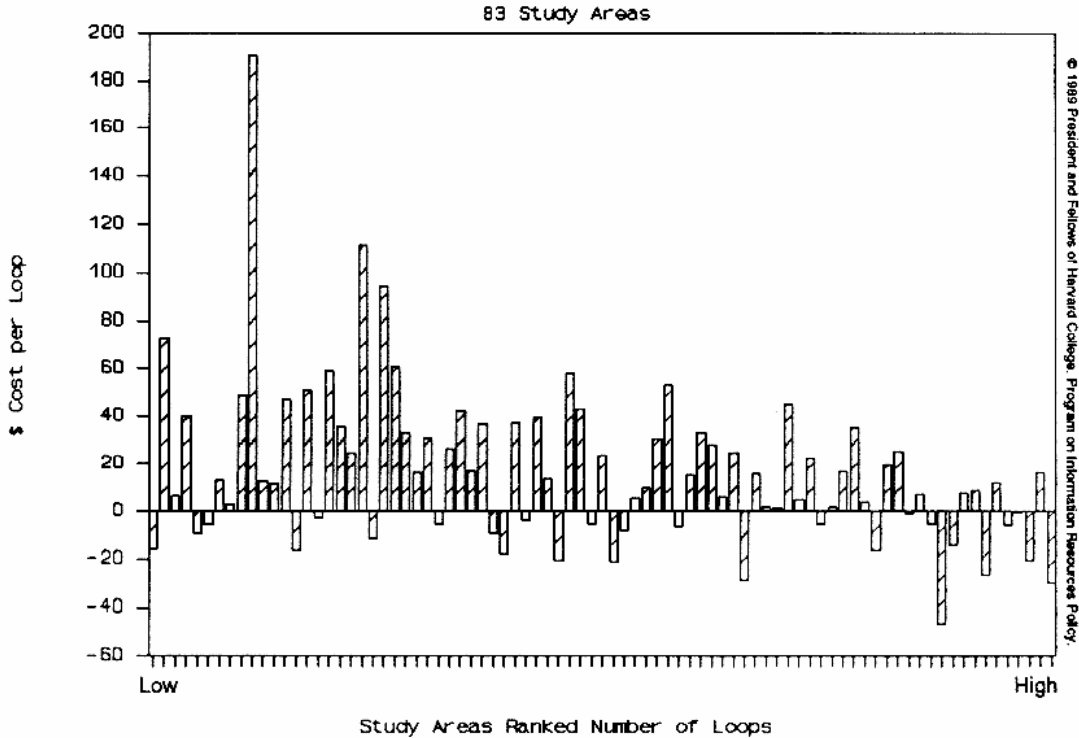
I.B.2. Intrastate Customer Impacts

As noted in Chapter 1, section IV.B, in the intrastate arena there is no semi-automatic mechanism for cost recovery like that for interstate. Thus any cost shift is not guaranteed to affect prices although it can lead to changed prices or profitability. The chance of significant change in either price or profits is directly related to the

¹⁸⁴MicroTel and Advanced Telecommunications Corporation made merger plans in 1988, as did American Network Inc. and United States Transmission Systems, Inc., an ITT subsidiary. "Latest Two Mergers," Telephony, March 14, 1988, p. 27. Southernnet and Teleconnect are proposing a merger which will make them the fourth largest long-distance carrier. "Southernnet, Teleconnect Join Forces," Telephony, August 1, 1988, p. 3. All these mergers are between regional carriers or very small national carriers whose combination will not create a major national carrier.

¹⁸⁵In early 1989 four regional long-distance carriers formed a joint venture to carry traffic nationwide. This venture is patterned after, and will cooperate with the National Telecommunications Network, which is a consortium of regional carriers offering nationwide private line services and fiber optic capacity. These carriers are Telecom*USA, the Teleconnect-SouthernNet holding company; Advanced Telecommunications Corp., the merged ATC-Microtel operations; RCI Corp., the Rochester Telephone long-distance unit; and LiTel, a privately held Ohio-based carrier. Telephony, January 16, 1989, pp. 11-12.

size of the cost shift. Other factors were described in Figure 5-1 above.



Source: Data from *Monitoring Report*, June 1988.

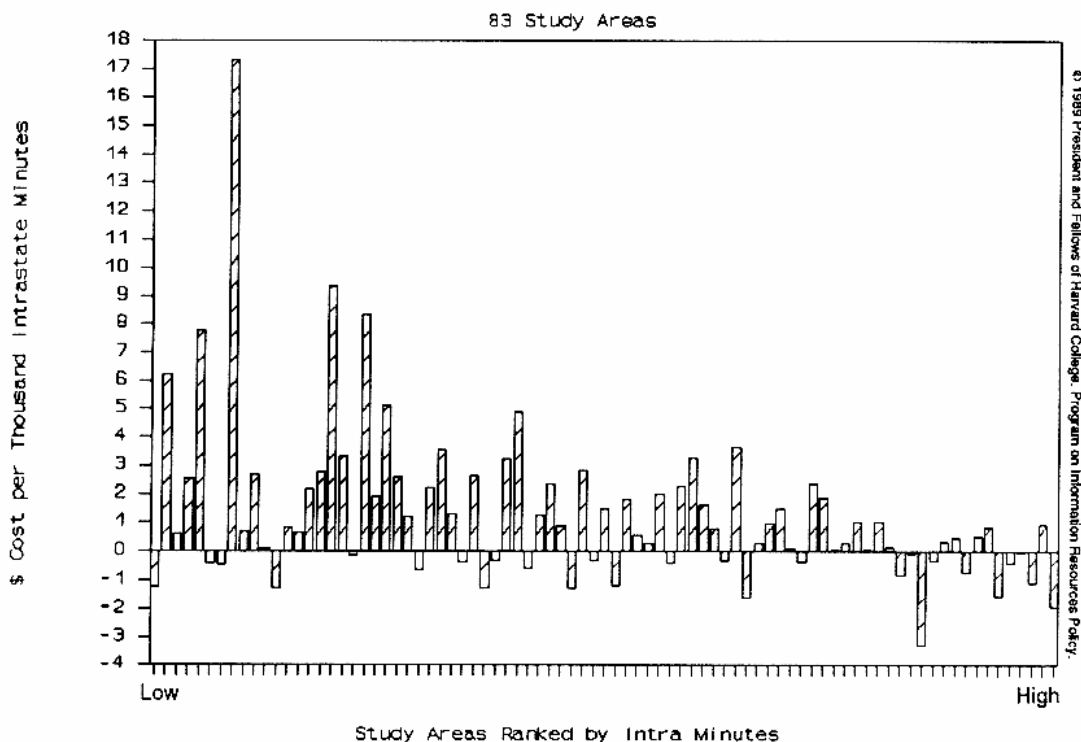
Figure 5-4

**Change in Intrastate Cost per Loop Related to Number of Loops:
Fixed Allocator Minus Benchmark Costs**

As Figures 5-4 and 5-5 show, the larger intrastate cost shifts, both per minute and per loop, tend to occur in study areas with fewer minutes or fewer loops. Two ramifications appear significant concerning these relationships.

First, the smaller study areas may lack political or economic power and may not be able to influence a decision about a fixed allocator even if it were to adversely affect their intrastate customers. Telecommunications prices in these areas are clearly important to those who live and work there. However, a LEC serving a smaller area with greater cost shifts that also serves other larger areas may be less interested in the effect of the fixed allocator on

costs and ultimately prices in the smaller area. This may especially be the case if that LEC files regional interstate access rates. Small independents may not be in this situation and may, through the various small independent telephone company organizations, be able to exercise some power.



Source: Minutes from *Monitoring Report*, June 1988.

Figure 5-5

Change in Intrastate Cost per Minute Related to Number of Minutes: Fixed Allocator Minus Benchmark Costs

Second, to the extent that these small study areas experience lower than average penetration rates (percentage of households with phone service), increased intrastate costs may increase local service prices and erode universal service. With universal service at least a stated goal of the national telecommunications policy, such erosion,

although arguably at the edge of what is already almost universal service,¹⁸⁶ might generate concern among regulators.

It may be, however, that the biggest impact on intrastate costs, and potentially on local service prices, in these areas arises from the Separations changes modelled in developing the benchmark scenario, specifically the phasedown of SPF to 25%. Along with the high-cost area subsidy which assigns additional cost to interstate based on a study area's total loop cost relative to the national average,¹⁸⁷ this phasedown could be a precedent for additional similar cost shifts. The phasedown may also suggest other ameliorating techniques associated with any introduction of a fixed allocator.

I.C. Other Stakeholder Impacts

Two other stakeholder impacts are discussed here. This section first discusses the impact of the LEC cost shifts on interstate toll users who are primarily IXC customers. This impact is expanded in section II below. Second, a potential impact on business investment decisions and industry structure is noted.

Interstate toll users would be affected by moving to a fixed allocator through its impact on IXC prices. Customers of national IXCs would probably see little impact, since the national average interstate percentage is little changed. The effect on customers of regional IXCs would be dependent on the pricing decisions these IXCs take given the cost shift. The pricing alternatives are described above. Of course, if a cost shift rendered a regional IXC incapable of competing

¹⁸⁶The national penetration rate was 92.9% as of March 1988. Monitoring Report, CC Docket 87-339, Prepared by the Federal-State Joint Board in CC No. Docket 80-286, p. 16. Farm areas, which may be a surrogate for rural areas, actually experienced higher penetration rates, 96.0% in March 1986 compared to a national total of 92.2%. However, at the same time areas not in standard metropolitan statistical areas, which includes rural areas and cities smaller than 50,000, had a penetration rate of 89.0%. Telephone Penetration and Household Characteristics, Alexander Belinfante, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, Washington, DC, March 26, 1987, Table 20, p. 45, and Table 16, p. 43.

¹⁸⁷FCC Part 36, paragraphs 36.631 and 36.641.

successfully, its customers could be forced to turn to other IXCs at what might or might not be a higher price.

A more important impact on interstate toll users could arise from any pressure a costing change would create for deaveraging nationwide toll prices. This impact is discussed in greater detail in section II below.

The potential impact on intrastate prices of shifting to a fixed allocator does more than affect current customers. Price changes could make some states more attractive than others to information-intensive firms. Some states may be advantaged over others when it comes to attracting new as well as keeping existing businesses. Which states win and which lose depend on whether inter- or intrastate prices are more important to the firms. Which set of prices is more important will depend on the nature of the business (national, regional, local), the firm's size and expertise in telecommunications (ability to establish its own network), and of course the overall importance of telecommunications costs to the firm.

Intrastate price changes may also affect telecommunications industry structure by encouraging or discouraging firms from installing their own networks. Rising intrastate rates may encourage the development of private networks, which may lead to stranded investment and even higher prices for those remaining on the network. This private network could include partial or complete bypass of the LEC's network or even a private interstate network. Of course, other factors figure into any decision to implement a private network. These factors include the firm's desire to control its telecommunications system, which may be motivated by a desire for data transmission security, and the availability of or willingness to acquire the expertise necessary to manage the network.

II. Pressures Toward Deaveraged Nationwide Interstate Toll Prices

In general terms, it is clear that a shift to using a 23% nationwide interstate factor would benefit some carriers at the expense of others. It is also clear that some intrastate customers may benefit

although arguably at the edge of what is already almost universal service,¹⁸⁶ might generate concern among regulators.

It may be, however, that the biggest impact on intrastate costs, and potentially on local service prices, in these areas arises from the Separations changes modelled in developing the benchmark scenario, specifically the phasedown of SPF to 25%. Along with the high-cost area subsidy which assigns additional cost to interstate based on a study area's total loop cost relative to the national average,¹⁸⁷ this phasedown could be a precedent for additional similar cost shifts. The phasedown may also suggest other ameliorating techniques associated with any introduction of a fixed allocator.

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¹⁸⁶The national penetration rate was 92.9% as of March 1988. Monitoring Report, CC Docket 87-339, Prepared by the Federal-State Joint Board in CC No. Docket 80-286, p. 16. Farm areas, which may be a surrogate for rural areas, actually experienced higher penetration rates, 96.0% in March 1986 compared to a national total of 92.2%. However, at the same time areas not in standard metropolitan statistical areas, which includes rural areas and cities smaller than 50,000, had a penetration rate of 89.0%. Telephone Penetration and Household Characteristics, Alexander Belinfante, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, Washington, DC, March 26, 1987, Table 20, p. 45, and Table 16, p. 43.

¹⁸⁷FCC Part 36, paragraphs 36.631 and 36.641.

Categories	Considerations
<p>Cost-Based Regulatory</p> <p>LEC</p> <p>IXC</p>	<p>Changes in rules and procedures: Separations Access costs Accounting Nonregulated costs Etc.</p> <p>Subscriber density Age of plant Central Office Equipment technology Cost per loop Network design Etc.</p> <p>Corporate overhead Central Office Equipment technology Owned vs. leased capacity Network design Etc.</p>
<p>Price-Based Regulatory</p> <p>LEC</p> <p>IXC</p>	<p>Alternatives to RBROR profit regulation Differing degrees of price regulation Changes in access pricing: SLC Strategic pricing Optional Common Line Pool Etc.</p> <p>Geographic tariff aggregation Strategic pricing Services offered Etc.</p> <p>Strategic pricing Services offered Etc.</p>
<p>Industry Structure</p>	<p>Niche and regional carriers Bypass Private networks Etc.</p>

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Figure 5-6

Some Considerations Affecting Deaveraging of Interstate Toll Prices

defined through Separations, interstate access costs, FCC nonregulated costs, and even product-specific costs designed to support specific service pricing rules.

and others may lose from the cost shifts. It may be useful to focus on one specific policy in more detail to see who may win and who may lose.

With the ending of the mandatory Common Line pool on April 1, 1989,¹⁸⁸ there is no longer any one access rate charged by all LECs. The initial decision to establish a mandatory Common Line pool "was driven in large measure by concerns that LEC-specific CCL charges might result in the deaveraging of interstate long distance rates."¹⁸⁹ Eliminating the mandatory nature of the pool was acceptable to the FCC because the Federal-State Joint Board found that an optional pool, coupled with increased SLC, would not result in interstate long distance rate deaveraging.¹⁹⁰ However, IXCs may soon try to change this pricing practice. As noted above, regional carriers may benefit if their region has lower than average interstate costs and hence access prices, and national carriers may wish to compete on prices on a regional basis to avoid losing market share.

II.A. Considerations Affecting Deaveraging of Interstate Toll Prices

Figure 5-6 lists three categories of considerations affecting pressures to deaverage nationwide interstate toll rates. These categories are cost-based, price-based, and industry structure.

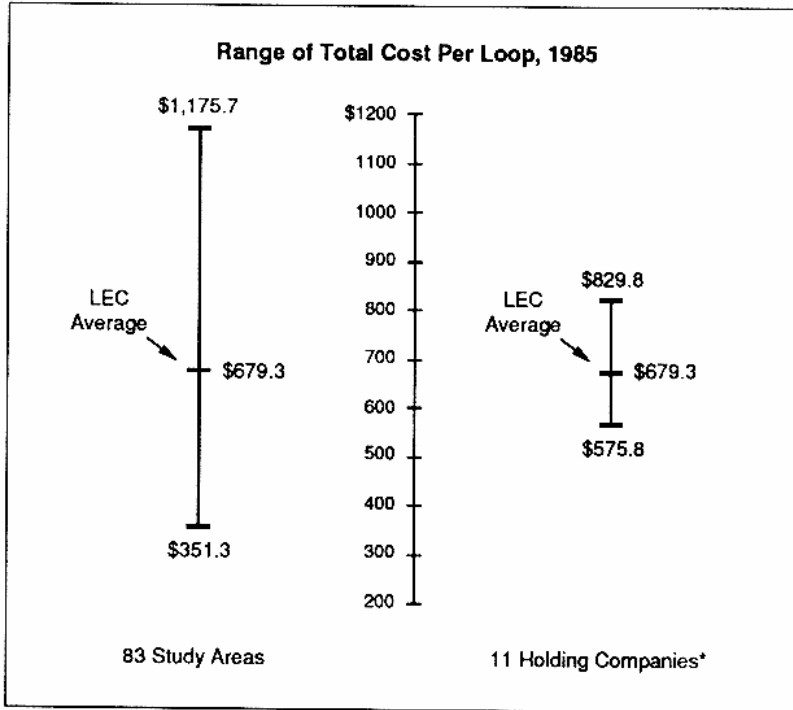
II.A.1. Cost-Based Considerations

Cost-based considerations can be associated with regulatory changes and with LEC and IXC cost structures. Regulators have, and often exercise, the ability to change rules and procedures associated with cost definitions. As Figure 1-1 shows, these rules govern financial costs recorded on the carrier's books, jurisdictional costs

¹⁸⁸In the Matter of MTS and WATS Market Structure, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Dockets No. 78-72 and 80-286, Report and Order, 2 FCC Rcd 2953 (1987).

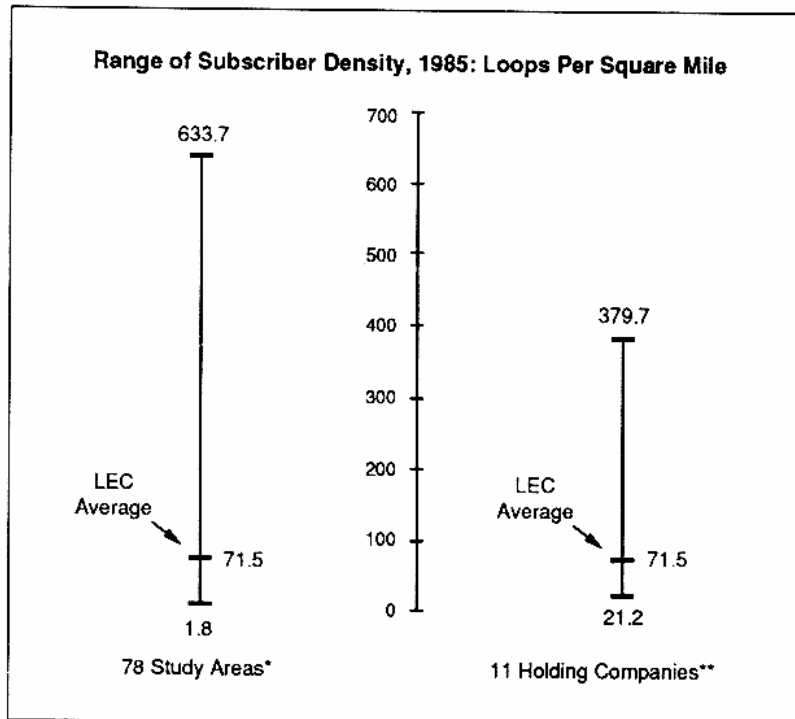
¹⁸⁹Ibid., paragraph 23.

¹⁹⁰Ibid.



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*Data reflect combining former BOC holding companies in states where more than one holding company has a franchise.



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*Data reflect combining BOCs in states where more than one BOC has a franchise.
 **Data reflect combining former BOC holding companies in states where more than one holding company has a franchise.

Sources: *Monitoring Report*, June 1988, and B.A. Hart et al., NTIA Report 82-97.

Figure 5-7

Some LEC Cost Differences Affecting
 Deaveraging of Interstate Toll Prices

There are LEC cost differences that affect costs before Separations. These differences can be associated with subscriber density (the number of subscribers per square mile), the age of the network and its technology, loop costs which may be related to subscriber density and placement of central offices, other network design issues, the size of corporate staffs, cost of labor and maintenance, and other factors. A few of these differences are discussed below.

Subscriber density is often argued to affect cost per loop. The contention is that study areas with fewer subscribers per square mile have higher unseparated costs per loop than those with higher subscriber density. Figure 5-7 shows that there is a large range of both cost per loop and subscriber density by study area.¹⁹¹ Not surprisingly, given the averaging effect of aggregating data by holding company, these ranges are less when calculated for holding companies. These ranges suggest the importance of both these factors in determining LEC cost structure.

The FCC has recognized cost per loop differentials by assigning extra "Universal Service Fund" (USF) costs to study areas whose unseparated loop costs are higher than the national average.¹⁹² This extra assignment generally goes to smaller and more rural study areas¹⁹³ and is designed to support universal service by reducing the intrastate costs that must be recovered from local service customers.

The cost of labor and maintenance can also impact cost-based pressures. These costs may vary across companies and study areas.

¹⁹¹Monitoring Report, June 1988; "Telephone Areas Serviced by Bell and Independent Companies in the United States," B.A. Hart, A.M. Nave, A.W. Raskob, Jr., and J.C. Thomason, NTIA Report 82-97, National Telecommunications and Information Administration, U.S. Department of Commerce, February 1982.

¹⁹²FCC Part 36, paragraph 36.631.

¹⁹³A review of state-specific USF amounts indicates that the states with higher USF payments are those that one would identify as having significant amounts of rural area. (Due to the confidential nature of the data, LEC-specific amounts are not available.) Monitoring Reports for CC Docket No. 87-339, submitted by the National Exchange Carriers Association, September 30, 1988.

The FCC has stated numerous times that there are four fundamental goals of its interstate pricing policy: preserving universal service, promoting economic efficiency, eliminating pricing discrimination, and deterring bypass.¹⁹⁵ In pursuit of these goals the commission has also stated that cost-based pricing is "well worth achieving . . . [and] would produce significant, tangible benefits for large and small telecommunications customers and for the nation as a whole."¹⁹⁶ One possible extension of this policy would be to set different interstate toll prices between areas with different access costs. Such differential pricing might disadvantage some states relative to others in their interstate prices but could advantage them in terms of their intrastate prices. Implications of this situation are discussed more fully in section II.B below.

Other FCC actions may already be exerting pressure to deaverage interstate toll prices. Ending the mandatory Common Line Pool April 1, 1989 will eliminate the last of the nationally averaged LEC interstate access prices. At that time all RHCs and many of the largest independents will withdraw from the pool and set their own carrier common line prices. Although nationwide average interstate toll prices are a component of both the Unity 1-A agreement¹⁹⁷ that underlies the

¹⁹⁵Originally stated In the Matter of MTS and WATS Market Structure, Third Report and Order, 93 FCC 2d 241 (1983), these policy goals were restated in 1988 In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, Memorandum Opinion and Order on Reconsideration and Order Inviting Comments, 3 FCC Rcd 4543 (1988), paragraph 4.

¹⁹⁶In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Docket Nos. 78-72 and 80-286, Report and Order, 2 FCC Rcd 2953 (1987), paragraphs 28 and 29. The commission's support of cost-based pricing was originally stated In the Matter of MTS and WATS Market Structure, CC Docket No. 78-72, Third Report and Order, 93 FCC 2d 241 (1983).

¹⁹⁷Unity 1-A Agreement, June 12, 1986 (released June 24, 1986), paragraph IIA. In early 1989 further industry negotiations on local franchise and various MFJ issues produced a draft "Unity 1-B" position paper which continued the call for nationwide average interstate toll rates. The paper stated that "RBOC entry into interexchange services should be permitted so long as it is accomplished in a manner that enhances continuation of nationwide average toll rates" Quoted

Variations arise from weather, geography, age and technology of plant, the relative strength of union and management, and other factors.

The other source of cost-based pressure is IXC cost differences. These differences can be the result of technology, network design, cost of labor and maintenance, and corporate overhead policies. Cost per circuit mile decreases not only with technology but with the number of circuits.¹⁹⁴ Thus higher-volume routes that require more circuits probably have lower cost per minute than low-volume routes. Carriers that serve higher volume routes may have a cost advantage over carriers serving lower volume routes. This advantage could manifest itself in lower overall prices and increased market share for these carriers as they leverage that cost savings across all routes. The extent to which a carrier owns or leases its capacity will also affect its costs and ultimately its prices, profitability, and market share.

The relative size of corporate staffs and overheads probably also varies among LECs. For example, it is often asserted that regulation creates a cost burden by requiring carriers to provide information and establish policies that they would not otherwise need to do. If this is the case, one would expect AT&T to carry a higher overhead than other IXCs because it is the only one subject to RBROR regulation.

II.A.2. Price-Based Considerations

As was the case for costs, pricing decisions can be a regulatory, LEC, or IXC consideration. Regulators are involved with decisions on alternatives to RBROR regulation as well as differing degrees of price regulation. As well, the FCC is concerned with changes in access pricing, including SLC, optional pooling, whether to require LECs to charge for originating as well as for terminating CCL use, cross-over points between services, and various strategic pricing issues. As stated above, any connection between costing and pricing is discretionary. This section merely suggests that changes in LEC access prices mean changes in access costs for IXCs, and variability in access costs suggests variability in toll prices.

¹⁹⁴Behind the Telephone Debates, pp. 138-139.

substantially. This difference might distort traffic flows between the areas, which in turn could lead to greater variation in CCL rates and increased pressure to deaverage interstate toll rates.

LEC pricing decisions also affect pressures to deaverage interstate toll prices. For an extreme example, consider what could happen if the FCC had allowed each LEC to decide whether they would charge for originating or terminating CCL and what the relative prices of these services would be.²⁰¹ These decisions could strongly affect access costs for IXCs. For example, if one LEC charged originating prices only, and another charged terminating rates only, an IXC would pay access for calls in one direction only. Calls from the terminating-only LEC to the originating-only LEC would have no access charges. Since IXCs frequently state that access costs are about half their total costs, this pricing arrangement leads to very different costs for the IXC depending on the direction of the call.

Another extreme example can be seen if a LEC were to charge access on a per line basis rather than per minute. Of course, this pricing arrangement, like any other for interstate access, is subject to FCC

²⁰¹The FCC evaluated various originating and terminating CCLC pricing plans for the post-NECA pool environment. Effective April 1, 1989, LECs are required to charge one cent per minute for originating CCL access, with the remaining Common Line costs (those not recovered by SLC and Special Access Surcharge) to be recovered through the terminating CCL rate. In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, Report and Order, 65 Rad. Reg. 2d (P&F) 1078, released December 12, 1988. Effective June 1, 1986, the FCC had required all Common Line cost decreases to reduce originating NECA nationwide CCL rates until those rates reached zero. In the Matter of WATS Related and Other Amendments of Part 69 of the Commission's Rules, CC Docket No. 86-1, Report and Order, 59 Rad. Reg. 2d (P&F) 1418, released March 21, 1986, which modified FCC Part 69, paragraph 69.207. This pricing policy was originally set to expire December 31, 1987, but the FCC extended the expiration date until November 30, 1988. In the Matter of MTS and WATS Market Structure, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, Report and Order, 2 FCC Rcd 2953 (1987). In 1988 the expiration date was again extended until March 31, 1989. In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, Memorandum Opinion and Order and Order on Reconsideration and Order Inviting Comments, 3 FCC Rcd 4549 (1988), paragraph 43, which modified FCC Part 69, paragraph 69.207. The zero CCL originating rate became effective January 1, 1988.

FCC order and the order itself,¹⁹⁸ it is clear that access costs to IXCs will vary even more than in the past, at least for those LECs that withdraw from the pool. These differences will probably decrease as the Separations changes modelled in the benchmark case are completed. For example, the regulatory cost component of these differences associated with SPF will disappear once SPF for every study area is 25%. However, as discussed in section II.A.1 above, different LEC cost structures will still affect access prices, assuming some linkage between costs and prices remains.

In spite of the increased variation in LEC access rates, the FCC does not expect ending the mandatory Common Line pool to lead to deaveraged interstate toll prices. In ordering modification of the pooling arrangement and increased SLC charges, the commission accepted the Federal-State Joint Board's finding that these modifications, coupled with the SLC increase to a maximum monthly level of \$3.50 per residential line, would "substantially alleviate the possibility that pooling modifications would result in interstate long distance rate deaveraging."¹⁹⁹ Whether this action will increase pressures to deaverage interstate toll prices will depend on the magnitude of the resulting differences between LEC access rates, among other things.

The FCC also recognized that its CCL pricing decisions could affect pressures to deaverage nationwide interstate toll rates.²⁰⁰ The commission was concerned that LECs who leave the Common Line pool might establish rates that are bifurcated (i.e. different for originating and terminating service). In this situation access charges associated with a call between two areas with different NTS costs could vary, perhaps

in Telecommunications Reports, January 23, 1989, p. 4.

¹⁹⁸In the Matter of MTS and WATS Market Structure, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, CC Dockets No. 78-72 and 80-286, Report and Order, 2 FCC Rcd 2953 (1987), paragraph 23.

¹⁹⁹Ibid.

²⁰⁰In the Matter of MTS and WATS Market Structure and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, Memorandum Opinion and Order and Order on Reconsideration and Order Inviting Comments, 3 FCC Rcd 4549 (1988), paragraph 45.

Small regional IXCs may set prices in a way that could increase pressures to deaverage interstate toll. If they operate in areas with lower interstate costs, these IXCs may be able to set prices enough lower than national IXCs to gain market share in their region. One response of national IXCs would be to try to deaverage their prices and compete with the regional carriers on price. This scenario would probably significantly increase pressures if regional carriers, currently quite small, were to capture important large-volume business customers as a result of access-cost-based price reductions.

The current proliferation of private networks offers large-volume business customers the opportunity to reduce their telecommunications costs, either by establishing their own networks or using some other firm's. One way IXCs can combat losses in this area is to reduce prices, and deaveraging toll is one way to accomplish this, at least in areas with lower-than-average LEC access prices.

Because this paper focuses on LEC costing methods, and specifically models one of many possible Separations changes, the other considerations affecting pressures to deaverage toll rates are not investigated in any further detail. This is not to imply that these considerations are not important; rather, they were outside the scope of this research.

II.B. Fixed Allocator Impact on Interstate Cost per Minute for Specific Routes

The focus of this paper is the impact that adopting a fixed allocator would have on LEC interstate costs per minute. This focus was chosen because most LEC interstate access costs are recovered in per-minute charges in the late 1980s, a relationship that seems unlikely to change in the near future.²⁰³ It was not chosen to advocate any particular link between costs and prices, but merely to suggest implications of a Separations change given a certain cost-price relationship. It should be noted that not all interstate costs are

²⁰³The closeness of the relationship between costs and prices has varied over time and across jurisdictions. For more detail on this variation, see The Formula is Everything.

approval. To the extent that two LECs have different interstate usage per line, pricing access on a per-line basis by one and a per-minute basis by the other might create significant access cost differentials for IXCs.

Another impact of LEC pricing in the post-pool environment arises from SLC and its relationship to LEC Common Line costs. All LECs will recover differing percentages of their Common Line costs from IXCs, depending basically on their unseparated cost per loop. In fact, some LECs will eventually recover almost their entire Common Line costs from SLC. To the extent that Common Line cost recovery from IXCs varies, access charges and therefore IXC access costs will vary. At the extreme, calls between two LECs whose Common Line costs are recovered wholly by SLC would have a much lower access price (Traffic Sensitive only) than calls between two LECs whose Common Line costs exceed SLC. To the extent that LECs with low loop costs may be those with high interstate traffic, the cost of access between those LECs could be much less than between other LECs.

IXC pricing decisions may also affect pressures to deaverage interstate toll. While deaveraging is itself a pricing decision, decisions on strategic pricing and services being offered may affect pressures to allow deaveraged interstate toll prices. One example of this situation is AT&T's offering, and the FCC's allowing, lower rates for Holiday Inn in 1988 in order to compete with lower prices offered by other IXCs.²⁰² While this tariff raised many issues not germane to this paper, it does suggest at least one arena in which AT&T is deaveraging its national prices or, with comparable effects, increasing the number of differentiated service categories.

II.A.3. Industry Structure-Based Consideration

In this discussion, industry structure refers to the presence of small regional IXCs, bypass, and the proliferation of private networks.

²⁰²In the Matter of AT&T Communications Tariff F.C.C. No. 15 Competitive Pricing Plans - Holiday Rate Plan, Transmittal No. 1215, CC Docket No. 88-471, Memorandum Opinion and Order, 65 Rad. Reg. 2d (P&F) 433, adopted September 16, 1988, released September 20, 1988.

may be those areas in which there is highly concentrated usage. Highly concentrated traffic patterns may allow more efficient use of the network and greater profit margins as excess capacity is reduced. Yet, if classical economic theories hold true in this case, high profitability will lead to entry of new firms and resulting declining prices. The point here is not to debate the nature of the IXC market in these states. As discussed in section I.B.1.b in this chapter and portrayed in Figure 5-3 above, the market is highly concentrated, with the three largest IXCs holding the lion's share of the market. The point is that on these routes carriers may prefer to lower their prices to maintain market share and discourage entry of new carriers, including private networks.

Given the data available for this study, interstate usage can only be measured at the study area level. High usage is evaluated both from the perspective of high total use and use per loop to see if there are differing impacts based on these criteria.

To model the impact that moving to a fixed allocator would have on cost-based pressures to deaverage interstate toll prices, four groups of study areas were identified based on interstate minutes of use. Figure 5-8 charts these four groups: those with the highest, lowest, and middle use per loop, and a group of study areas with high total use regardless of use per loop. These groups are identified because of the potential importance of interstate use to pressures to deaverage interstate toll prices discussed above.

In the model, these study areas were paired and their costs per minute were added to calculate a total LEC interstate cost per interstate minute for calls between the study areas. This approach simplifies the current pricing system by ignoring the distinction between originating and terminating traffic and by ignoring the fact that in the late 1980s some costs are not recovered with a per-minute charge, yet it is still useful to illustrate changes. This analysis assumes that changes in opposite directions in paired study area interstate cost per minute may lead to increased LEC cost-based pressures to deaverage interstate toll prices. The increased pressure could arise because differences in interstate cost per minute among

recovered on a per minute basis. Some costs, most notably those for special access or private line services and SLC, are recovered on a per line charge. However, special access costs comprise only about 10% of total interstate costs, and ignoring this pricing difference does not significantly impact the results of the research. The amount of interstate costs recovered by SLC varies among study areas, and this variation affects interstate costs recovered on a per-minute basis. Again, it is unlikely that this variation significantly impacts the results of the research.

The cost-per-minute impact is analyzed from the perspective of individual study areas and holding companies in Chapter 4, sections V.A.2.a and V.B.1. In this section, differences between benchmark and fixed allocator costs per minute are modelled for specific routes. Both approaches are limited to study area or more aggregated data. This limitation is inherent in the data available and is unfortunate because it may be that deaveraged interstate toll prices could be based on a metropolitan area basis.²⁰⁴ However, the results still suggest the implications of this Separations change.

As Figures 4-12 and 4-13 showed, using the same interstate allocator for all study areas does not mean they each have the same cost per minute. The change in interstate cost per minute is strongly related to interstate use per loop, and that change is less when calculated by holding company than by study area.

The importance of interstate use per loop for determining the change in cost per minute parallels what could well be its importance in terms of deaveraging toll prices. It is probable that the specific routes on which there could be the greatest pressure to deaverage toll prices are those with the highest interstate usage. A high volume of interstate usage may be related to a high number of subscribers or a few subscribers with very high usage. The best candidates for deaveraging

²⁰⁴This basis might be especially attractive in study areas with relatively low population density but with population significantly concentrated in one or a few urban areas. For more detail on the implications of this situation, see Forces, Trends and Glitches in the World of Communications. John C. LeGates and John F. McLaughlin, Program on Information Resources Policy, Harvard University, Cambridge, MA, 1989.

Figure 5-9 shows the change in cost per minute for combinations of those study areas with the highest interstate use per loop. Each symbol on this figure represents the sum of the cost per minute for two of the high interstate use per loop study areas. In this case, not only do cost for all combinations decrease, the range of the costs decreased. This figure shows that there would be LEC cost-based pressures to lower interstate toll prices for these study area combinations if a fixed allocator were to be adopted.

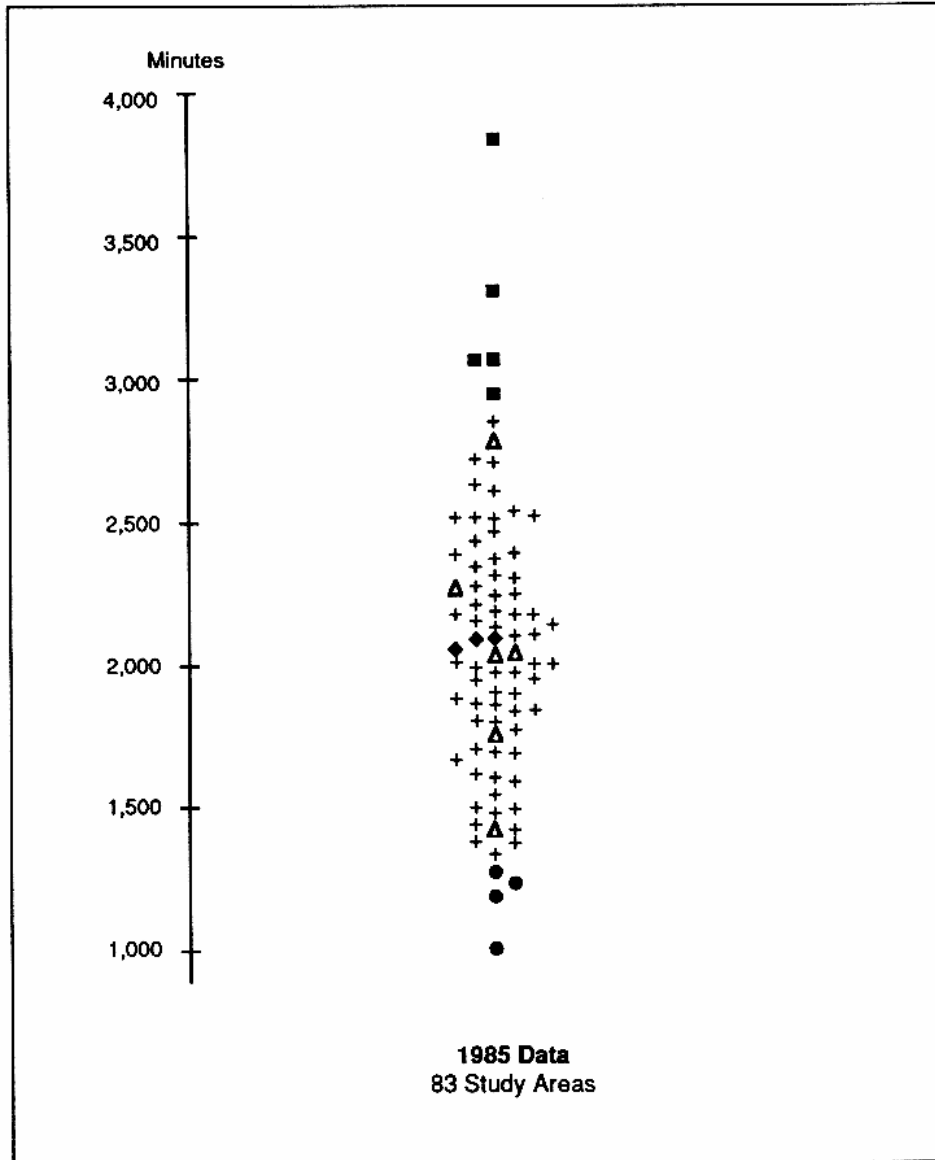
However, Figure 5-10 presents a different picture. Each symbol on this figure represents the sum of the cost per minute for two of the low interstate use per loop study areas. In this case there is a significant increase in the range of cost per minute for those study areas with the lowest interstate use per loop, and some combinations experience increased costs and some decreased. This figure shows that there would be LEC cost-based pressures to raise interstate toll prices for some of these study area combinations and to lower them for other combinations if a fixed allocator were to be adopted.

These figures show the importance of interstate use per loop as a determinant of the effect by study area of a change to a fixed allocator. Given the averaging process inherent in filing regional rates, this impact would be reduced were cost per minute to be calculated on a regional basis.

To investigate this phenomenon in greater detail, interstate cost per minute from one study area in the high total use group was added to the interstate cost per minute of every other study area. Figure 5-11 shows these combinations under the benchmark and fixed allocator scenarios; each symbol represents the sum of the chosen study area plus every other study area. This chart shows that, while there are clearly some big changes and some small changes -- both increases and decreases -- the change varies greatly depending on which study area is involved. Also, the range of interstate cost per-minute increases in the fixed allocator scenario. This is the pattern that suggests increased LEC cost-based pressures to deaverage interstate toll prices.

Figure 5-12 takes these combinations and separately charts them for the four categories of study areas noted in Figure 5-8. This chart shows that the impact on interstate cost per minute of shifting to a

study areas would be greater under the fixed allocator scenario than in the benchmark case.



- High use per loop
- ▲ Selected high total use
- ◆ Medium use per loop
- Low use per loop

Source: Data from *Monitoring Report*, June 1988.
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Figure 5-8

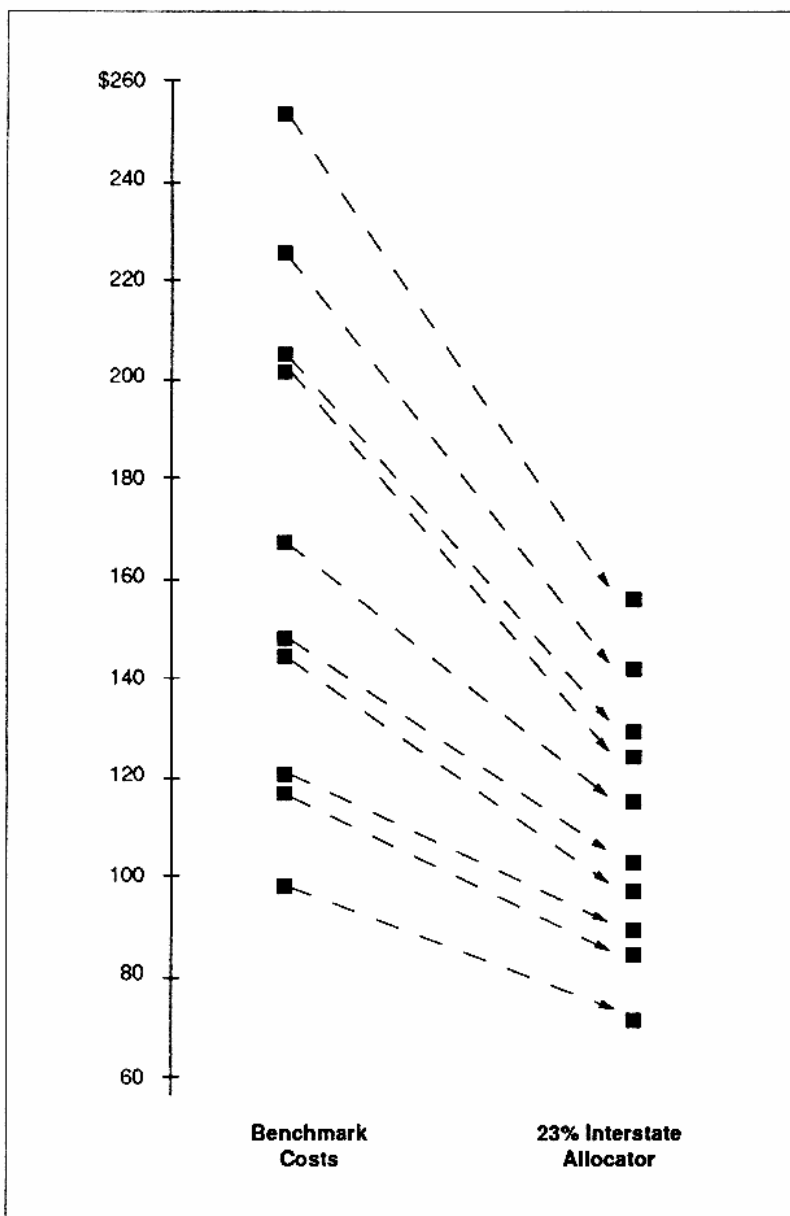
Interstate Use per Loop: Individual Study Areas

fixed allocator varies depending on the study area interstate use and use per loop, as was suggested by Figures 5-9 and 5-10. Figures 5-12A and 5-12B show a pattern similar to that on Figures 5-9 and 5-10, respectively. When the selected high total use study area is combined with high-use-per-loop study areas, the effect of adopting the fixed allocator is to reduce each combination's cost per minute and to reduce significantly the range of cost per minute. When the chosen study area is combined with low-use-per-loop study areas, some combinations' costs increase and some decrease, and the range greatly increases. When the study area is combined with middle-use-per-loop (Figure 5-12C) and high-total-use (Figure 5-12D) study areas, adopting the fixed allocator has relatively little effect on cost per minute.

III. Concluding Observations

This report has not advocated the adoption of a single, fixed nationwide interstate allocator. Neither has it suggested that there are fundamental principles that should be used in setting rules for Jurisdictional Separations. These principles, like the rules themselves, are the product of a political process.

A conclusion that can be drawn from this research, however, is that using a single fixed allocator of 23% to assign costs to the interstate jurisdiction, while having little impact on total LEC interstate costs, may have an impact on LEC cost-based pressures to deaverage interstate toll prices. More importantly, this impact seems to be particularly strong in study areas with high or low interstate use per loop. If the study areas with high use per loop do offer IXCs cost advantages as suggested above, this Separations change could increase already existing IXC cost-based pressures to reduce the toll prices on what could be high density, low-cost routes. Conversely, if the low-use-per-loop study areas represent areas with high costs for IXCs, using the fixed allocator could increase already existing IXC cost-based pressures to increase toll prices on at least some of these routes. If the low-use-per-loop study areas are small, as some of them are, and lack political power, they may be less able to resist these pressures to deaverage interstate toll and increase their toll prices.



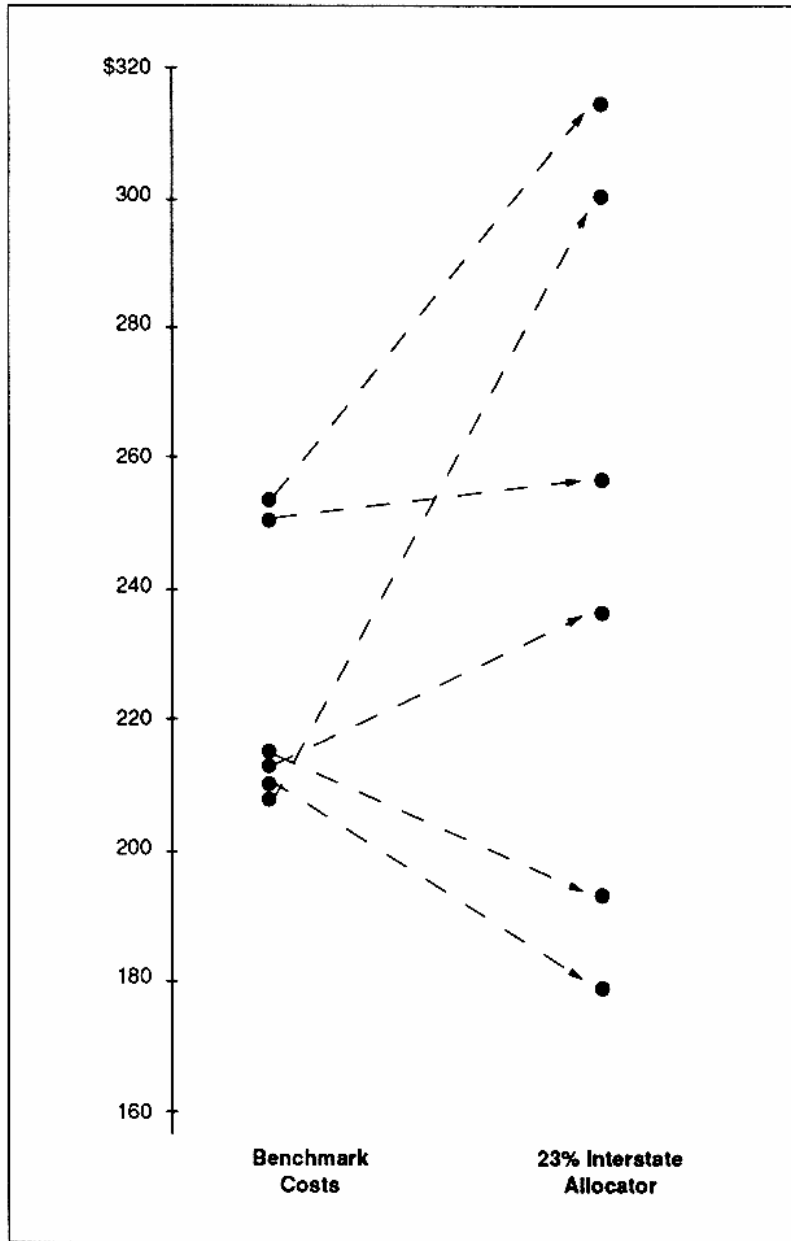
■ = sum of interstate cost per minute:
paired high use per loop study areas.

Source: Minutes from *Monitoring Report*, June 1988.
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Figure 5-9

Interstate Cost per Thousand Interstate Minutes:
Pairs of High Use per Loop Study Areas

The combination of LEC cost-based pressures to reduce interstate toll prices in high use per loop areas and increase them in some low-use-per-loop areas, because it may match IXC cost-based pressures, could greatly increase pressures to deaverage interstate toll prices. As discussed in section I.C above, deaveraged interstate toll prices may give some states an advantage as a location for telecommunications-intensive industries if their toll prices decrease for routes important to those industries. However, this impact may be lessened if LEC prices are set at the holding company level and the effect of these extreme costs on LEC prices is reduced. Of course, any significant change in the linkage between LEC costs and access prices could have a large impact on this conclusion.

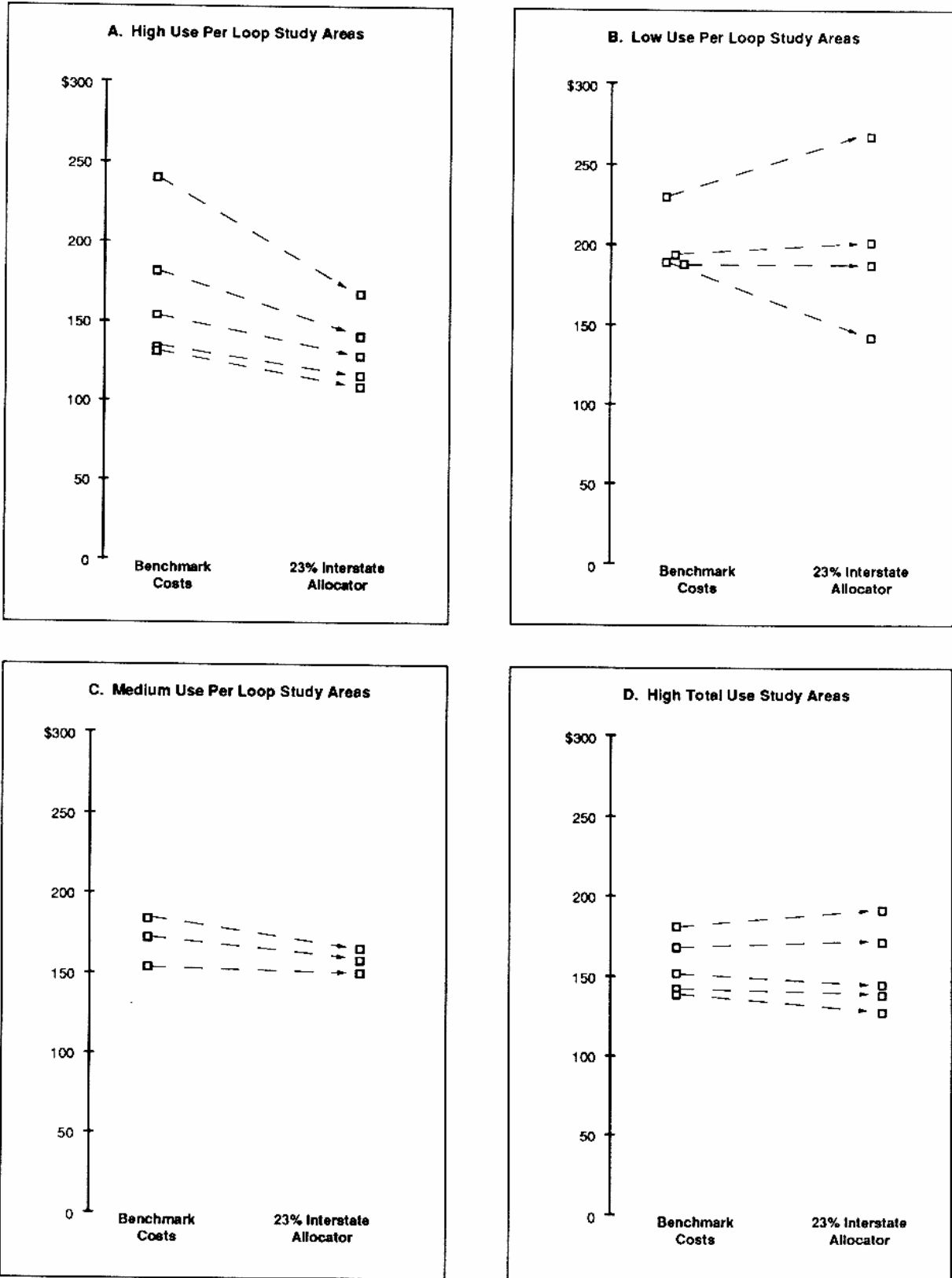


● = sum of interstate cost per minute:
paired low use per loop study areas.

Source: Minutes from *Monitoring Report*, June 1988.
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Figure 5-10

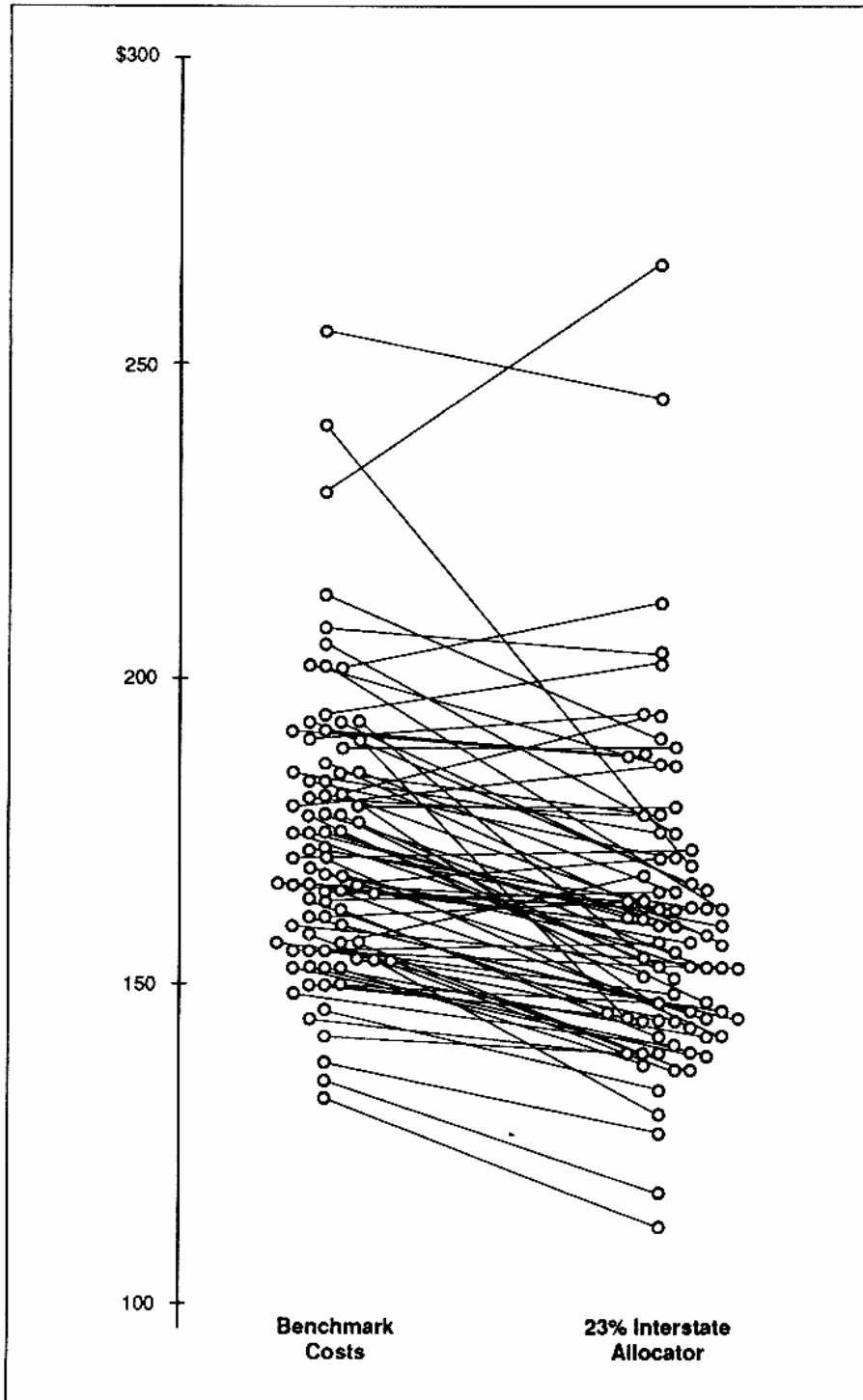
Interstate Cost per Thousand Interstate Minutes:
Pairs of Low Use per Loop Study Areas



Source: Minutes from *Monitoring Report*, June 1988.
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Figure 5-12

Interstate Cost per Thousand Interstate Minutes: High Total Use Study Area Paired with Selected Study Areas



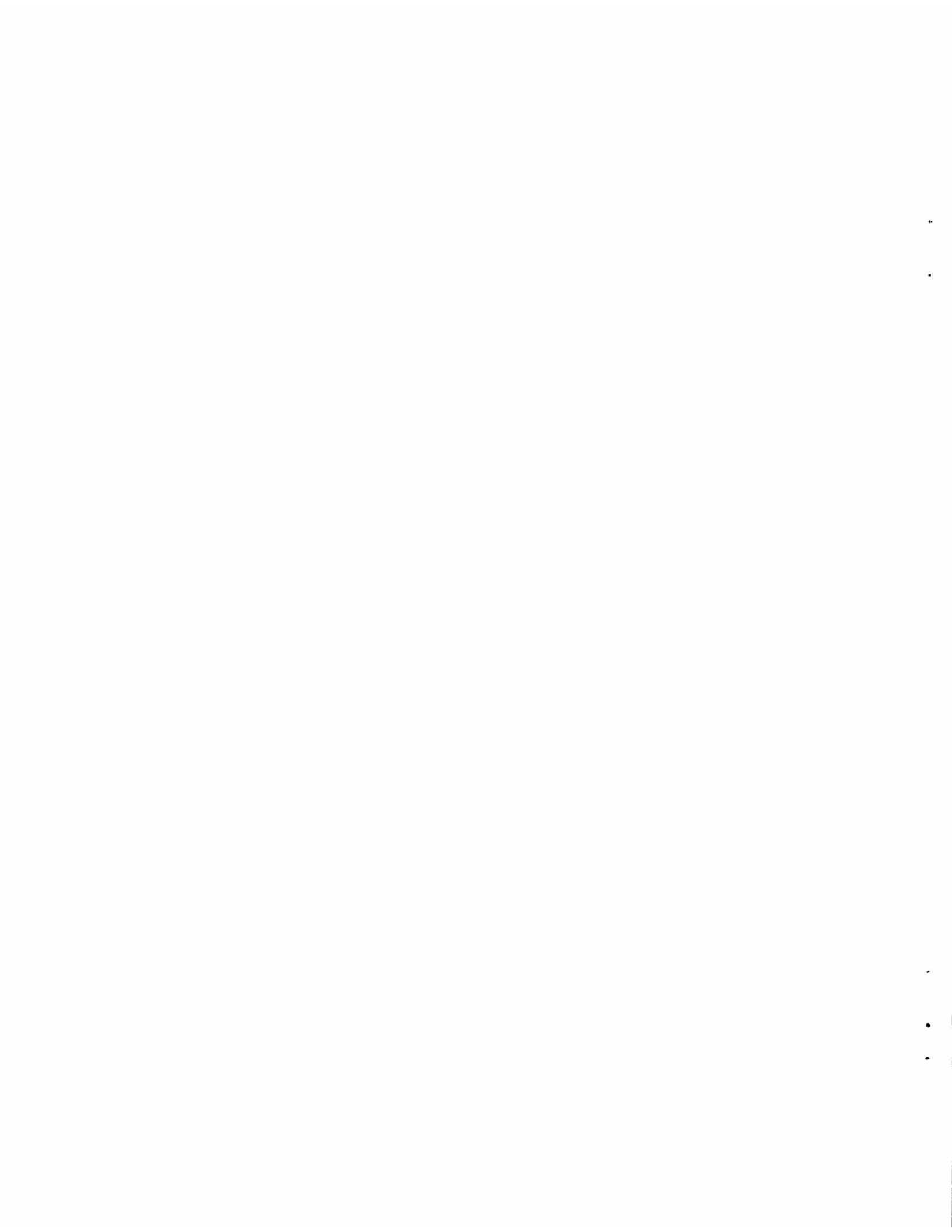
○ = sum of interstate cost per minute: one high total use study area paired with all other study areas.

Source: Minutes from *Monitoring Report*, June 1988.

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Figure 5-11

Interstate Cost per Thousand Interstate Minutes:
High Total Use Study Area Paired with All Study Areas



APPENDIX 1

DERIVATION OF ANALYTICAL COST CATEGORIES

Table B

Derivation of Analytical Cost Categories: Distribution of Separations Costs for Land and Buildings, Furniture and Office Equipment, and Vehicles and Other Work Equipment

USOA Telephone Plant Accounts	Major Separations Categories	Analytical Categories: Plant
Land 211 Buildings 212	LAND AND BUILDINGS Operating Room and Central Office Equipment Space Operators' Quarters Office Space (a) General Traffic Supervision (b) Commercial (c) Revenue Accounting (d) General office Space Used by another Company for Interstate Operations Garages, Storerooms, Warehouses and Pole Yards Space Constructed for another Company for Interstate Operations Space Rented to Others Antenna Supporting Structures	(The Separations Categories are distributed among the appropriate analytical plant categories)
Furniture and Office Equipment 261 Other Communications Equipment 262	FURNITURE AND OFFICE EQUIPMENT Data Processing Equipment Other	(The Separations Categories are distributed among the appropriate analytical plant categories)
Vehicles and Other Work Equipment 264	VEHICLES AND OTHER WORK EQUIPMENT	(The Separations Categories are distributed among the Appropriate analytical plant categories)

Source: Weinhaus and Oettinger, *Behind the Telephone Debates*, 1988, Appendix C.

Table A

Derivation of Analytical Cost Categories:
Terminal Equipment (CPE), Station Connections Equipment,
OSP Equipment, and Central Office Equipment

USOA Telephone Plant Accounts	Major Separations Categories	Analytical Categories: Plant
Station Apparatus 231 Large PBXs 234 Station Connections 232 Public Telephones 235	STATION EQUIPMENT Customer Premise Equipment Station Connections TWX Equipment Private Line Equipment Station Identification Equipment Wideband Coinless Public Telephone Equipment Other	Station Apparatus (o) Large PBX (n) Station Connections: Inside Wiring (n) Transitional CPE (cpe)
Pole Lines 241 Aerial Cable 242.1 Underground Cable 242.2 Buried Cable 242.3 Submarine Cable 242.4 Aerial Wire 243 Underground Conduit 244	OUTSIDE PLANT Exchange Wideband Exchange Trunk and Loop Exchange Trunk Excluding Wideband Host/Remote Message	Exchange OSP (f)
	Interexchange Plant Furnished to another Company for Interstate Use Wideband Services Other	Interexchange OSP (b)
	Subscriber Subscriber Line Excluding Wideband All Other	Subscriber Line OSP (k)
Central Office Equipment 221	CENTRAL OFFICE EQUIPMENT Local Dial Switching Equipment Equal Access Equipment	Local Dial: NTS (i) Local Dial: TS (h)
	Manual Switching Equipment	Manual Switching Equipment (e)
	Dial Tandem Switching Equipment Intertoll Dial Switching Equipment Automatic Message Recording Equipment Other Toll Dial Switching Equipment Special Services Switching Equipment	Tandem Dial (d)
	Circuit Equipment	Subscriber Line Circuit Equipment (j) Exchange Circuit Equipment (g) Interexchange Circuit Equipment (c)

Table D

Derivation of Analytical Cost Categories: Depreciation and Amortization Reserve and Accumulated Deferred Income Taxes

USOA Telephone Reserve Accounts	Major Separations Categories	Analytical Categories: Reserves
Depreciation Reserve 171 Amortization Reserve 172	DEPRECIATION RESERVE AMORTIZATION RESERVE	(The Separations Categories are distributed among the appropriate analytical plant categories)
Accumulated Deferred Income Taxes 176	ACCUMULATED DEFERRED INCOME TAXES	(The Separations Categories are distributed among the appropriate analytical plant categories)

Source: Weinhaus and Oettinger, *Behind the Telephone Debates*, 1988, Appendix C.

Table C

Derivation of Analytical Cost Categories: Telephone Plant Under Construction, Plant Held for Future Use, and Materials and Supplies

USOA Telephone Plant Accounts	Major Separations Categories	Analytical Categories: Other Investment
Telephone Plant Under Construction 100.2	TELEPHONE PLANT UNDER CONSTRUCTION	(The Separations Categories are distributed among the appropriate analytical plant categories)
Plant Held for Future Use 100.3	PLANT HELD FOR FUTURE USE	(The Separations Categories are distributed among the appropriate analytical plant categories)
Materials and Supplies 122	MATERIALS AND SUPPLIES	Exchange OSP (f) Interexchange OSP (b) Subscriber Line OSP (k)

Source: Weinhaus and Cettinger, *Behind the Telephone Debates*, 1988, Appendix C.

Table F

Derivation of Analytical Cost Categories: Distribution of Separations Items for General Expenses and for Maintenance and Depreciation

USOA Expense Accounts	Major Separations Expense Items	Analytical Categories: Expenses
<p>General expenses are included in the following accounts:</p> <p>Executive Department 661 Accounting Department 662* Treasury Department 663 Law Department 664 Other General Office Salaries and Expenses 665 Insurance 668 Accidents and Damages 669 Other Expenses 675 Expenses Charged Construction-Credit 677</p>	<p>GENERAL EXPENSES</p>	<p>(The Separations Categories are distributed among the appropriate analytical plant categories)</p>
<p>Maintenance Expenses are included in the following accounts:</p> <p>Repairs of Pole Lines 602.1 Repairs of Aerial Cable 602.2 Repairs of Underground Cable 602.3 Repairs of Buried Cable 602.4 Repairs of Submarine Cable 602.5 Repairs of Aerial Wire 602.6 Repairs of Underground Conduit 602.7 Shop Repairs and Salvage Adjustment 602.8 Test Desk Work 603 Repairs of Central Office Equipment 604 Repairs of Station Equipment 605 Repairs of Buildings and Grounds 606 Maintaining Transmission Power 610 Employment Stabilization 611 Other Maintenance Expenses 612</p>	<p>MAINTENANCE AND DEPRECIATION</p>	<p>(The Separations Categories are distributed among the appropriate analytical plant categories)</p>
<p>Depreciation and amortization expenses are included in the following accounts:</p> <p>Depreciation 608 Extraordinary Retirements 609 Amortization of Intangible Property 613 Amortization of Telephone Plant Acquisition Adjustment 614</p>		

*Excluding Revenue Accounting Expenses

Table E

Derivation of Analytical Cost Categories: Separations Items for Commercial Expense, Traffic Expense, and Revenue Accounting Expense

USOA Expense Accounts	Major Separations Expense Items	Analytical Categories: Expenses
<p>Commercial expenses are included in the following accounts:</p> <p>General Commercial</p> <p>Administration 640</p> <p>Advertising 642</p> <p>Sales Expense 643</p> <p>Connecting Company Relations 644</p> <p>Local Commercial Operations 645</p> <p>Interstate Billing and Collection 646</p> <p>Intrastate Billing and Collection 647</p> <p>Public Telephone Commissions 648</p> <p>Directory Expenses 649</p> <p>Other Commercial Expenses 650</p> <p>Interstate Carrier Access Charge 657</p> <p>Intrastate Carrier Access Charge 658</p>	<p>COMMERCIAL</p> <p>(a) Advertising, Sales and Connecting Company Relations</p> <p>(b) Local Operations</p> <p>(c) Public Telephone Commissions</p> <p>(d) Directory Expenses</p> <p>(e) General Administration</p> <p>(f) Other</p>	<p>Commercial Expense (r)</p>
<p>Traffic Expenses are included in the following accounts:</p> <p>General Traffic Supervision 621</p> <p>Service Inspection and Customer Instruction 622</p> <p>Operators' Wages 624</p> <p>Rest and Lunch Rooms 626</p> <p>Operators' Employment and Training 627</p> <p>Central Office Stationery and Printing 629</p> <p>Central Office House Service 630</p> <p>Miscellaneous Central Office Expenses 631</p> <p>Public Telephone Expenses 632</p> <p>Other Traffic Expenses 633</p> <p>Joint Traffic Expenses-Debit 634</p> <p>Joint Traffic Expenses-Credit 635</p>	<p>TRAFFIC</p> <p>(a) General Traffic Supervision—Engineering</p> <p>(b) Service Inspection and Customer Instruction</p> <p>(1) PBX</p> <p>(2) Customer Instruction and Miscellaneous</p> <p>(c) All Other</p>	<p>Traffic Expenses (q)</p>
<p>Revenue accounting expenses comprise the salaries and other expenses in Account 662 (Accounting Department) directly assignable or allocable to the billing of customers and the accounting for revenues, including the supervision of such work</p>	<p>REVENUE ACCOUNTING</p>	<p>Revenue Accounting Expenses (p)</p>



Table G

**Derivation of Analytical Cost Categories:
Distribution of Separations Items for Other Expenses and Taxes**

USOA Expense Accounts	Major Separations Expense Items	Analytical Categories: Expenses
<p>Other operating expenses are included in the following accounts:</p> <p>Operating Rents 671 Relief and Pensions 672 Telephone Franchise Requirements 673 General Services and Licenses 674 Telephone Franchise Requirements-Credit 676</p>	<p>OTHER OPERATING EXPENSES Relief and Pensions and Social Security Taxes Property and Miscellaneous Taxes Gross Earning Taxes Income Taxes Other Expenses Shared Network Facilities Rents</p>	<p>(The Separations Categories are distributed among the appropriate analytical plant categories)</p>
<p>Tax Calculations use the following accounts:</p> <p>Other Operating Taxes; 307 State and Local Income Taxes Property and Miscellaneous Taxes Fixed Charges 335 336 338 339 340 Interest During Construction 313 Amortization of Investment Tax Credit 304</p>		

Source: Weinhaus and Oettinger, *Behind the Telephone Debates*, 1988, Appendix C.

APPENDIX 2

DATA SOURCING AND ANALYSIS PROCESS

APPENDIX 2

DATA SOURCING AND ANALYSIS PROCESS

The data used to generate the 1985 analytical account revenue requirements came from all seven RHCs, CBI, SNET, GTE, and United Telephone. The data were provided under agreements, negotiated with each company, under which only *aggregate* data can be made public. These companies submitted data for 83 study areas.

Data for the RHCs, CBI, and SNET came from the Bell Operating Company Separations Information System, known as BOC-SIS or simply SIS. This computer system is maintained by Bell Communications Research (BCR) under contract with these companies. Bell South Services operates the system, which is based in Atlanta. In 1988, many companies replaced this system with their own separations system which is or will be maintained by the individual companies rather than by BCR. Data for GTE and United were provided by their Separations organizations.

Figure A-1 shows the process used to generate the analytical account data. In order to use the SIS data to calculate the analytical accounts, approximately 1200 monthly data points were required (Level 1). This large number was necessary because SIS is run monthly and aggregates costs differently than the analytical accounts. In general, cost detail in SIS is much more disaggregated than what is required for the analytical accounts.

The 1200 "raw data" points were downloaded from SIS and formatted into files that could be handled by Lotus 1-2-3 version 2.01. These files were then processed in a number of spreadsheets that aggregated the data into 295 annual "input data" points (Level 2). They consist of expense, investment, reserve and tax amounts for interstate and intrastate jurisdictions. This is the level of data that was provided by GTE and United.

The input data for all study areas were then processed through a final spreadsheet to generate the analytical account revenue requirements (Level 3). There are 18 analytical accounts for three jurisdictions: interstate, intrastate, and total. In total there are 54 analytical account data points. The final spreadsheet also calculates various ratios based on these data and generates graphs.



The analytical account data have been loaded into a database at the Program. In addition to the cost data, SLU, measured DEM, and loop counts are used to model the fixed allocator costing method and investigate the effects that adopting it might have. These data are taken from public documents.²⁰⁵

²⁰⁵Monitoring Report, CC Docket No. 87-339, June 1988, Prepared by the Staff of the Federal-State Joint Board in CC Docket No. 80-286.

ACRONYMS

B&C	Billing and Collection
BCR	Bell Communications Research
BOC	Bell Operating Company
CBI	Cincinnati Bell, Inc.
CCLC	Carrier Common Line Charge
CM	Conversation Minutes of Use
COE	Central Office Equipment
CPE	Customer Premises Equipment
C&WF	Cable and Wire Facilities
DEM	Dial Equipment Minutes of Use
FCC	Federal Communications Commission
FDC	Fully Distributed Costing
GAAP	Generally Accepted Accounting Principles
GNPPI	Gross National Product Productivity Index
GTE	General Telephone and Electronics
ISDN	Integrated Services Digital Network
ISW	Inside Wire
IXC	Interexchange Carrier
LATA	Local Access and Transport Area
LEC	Local Exchange Carrier
LRIC	Long Run Incremental Cost
MFJ	Modified Final Judgment
MMM	Message Minute Miles
MTS	Message Telecommunications Services
NTS	Non-Traffic Sensitive
OCC	Other Common Carrier
ONA	Open Network Architecture
OSP	Outside Plant
POP	Point of Presence
POT	Point of Termination
RBROR	Rate Base Rate of Return
RHC	Regional Holding Company
SAS	Special Access Surcharge
SIS	Bell Operating Company Separations Information System
SLC	Subscriber Line Charge
SLU	Subscriber Line Usage
SMOU	Switched Minutes of Use
SNET	Southern New England Telephone
SPF	Subscriber Plant Factor
TS	Traffic Sensitive
USF	Universal Service Fund
USOAR	Revised Uniform System of Accounts
USTA	United States Telephone Association
WATS	Wide Area Telecommunications Services