The Impact of State Price and Entry Regulation on Intrastate Long Distance Telephone Rates

by

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EXECUTIVE SUMMARY

The regulation of long distance telephone service has changed significantly during the last decade. This report examines the effects on intrastate prices of two recent policy changes that some states have adopted: (1) relaxation of some regulatory entry barriers into the intraLATA[1] toll service market and (2) initiation of alternative forms of price regulation of AT&T's intrastate interLATA toll service.[2]

Our analysis indicates that states that permit entry into the intraLATA toll service market experience prices approximately 7 to 10 percent lower than states that do not allow entry. Relaxation of entry barriers can result in lower prices because firms that can supply toll service at lower

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[1] IntraLATA service is a type of long distance service. In 1982, AT&T was broken into several local telephone companies (the Bell Operating Companies [BOCs]) and a long distance company (retaining the name AT&T). The local telephone companies are not allowed to provide long distance service except within specific areas called Local Access and Transport Areas (LATAs). Many states only allow the local telephone company to provide intraLATA long distance service. Almost all intraLATA service is intrastate and therefore is regulated by state regulatory authorities.

[2] InterLATA service is also a type of long distance service. After the breakup of AT&T, the local companies were forbidden to provide long distance service where the calling and called party are in different LATAs (interLATA). Long distance companies such as AT&T, MCI, Sprint, etc. provide interLATA long distance service. Since many states contain more than one LATA, interLATA long distance service can be either interstate or intrastate. The states regulate interLATA service that does not cross a state line, while the FCC regulates interLATA service that does cross a state line. This report examines the impact of state regulatory policy and therefore focuses solely on intrastate rates.

prices are permitted to compete for intraLATA customers. If all states allowed entry into intraLATA toll markets, the annual dollar savings to intrastate intraLATA toll service customers implied by the study would be about $200 million.[3] The net present value of these cost savings might range from approximately $1.2 billion to $6.9 billion.[4] The savings to intrastate intraLATA customers, however, may be offset, in part, by higher local telephone rates, since revenue from above-cost intraLATA long distance rates may be used to subsidize local telephone use. However, the elimination of the subsidy is likely to yield more benefits to long distance users than the increased costs to local users. This effect occurs because long distance users are likely to purchase more service at the new lower prices. Local users, on the other hand, will tend not to decrease purchases of local service at the new non-subsidized rates.

The study also finds that prices are lower in states that permit AT&T some flexibility in the pricing of intrastate interLATA toll service. Prices for toll are approximately 7 percent lower than prices in states that continue to require prior regulatory approval for any price changes proposed by AT&T. If all states were to switch to flexible regulation of prices, the estimated savings to intrastate interLATA customers would be about $157 million per year.[5] The net present value of these cost savings might range from $942

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[3] This estimate ignores any stimulative effects on calling volume caused by lower prices which would be an additional benefit to consumers. This estimate assumes that the price differences found in the study can be projected to those states that have not yet allowed entry.

[4] We assumed a discount rate of 20 percent and 3 percent respectively.

[5] This estimate ignores any stimulative effects on calling volume caused by lower prices. This estimate assumes that the price differences found in the study can be projected to states that have not allowed AT&T pricing flexibility.

million to $5.4 billion.[6] These results suggest that if adopted, proposals to permit greater pricing flexibility for AT&T in interstate toll service -- such as the "price cap" proposal currently being considered by the FCC -- may generate further declines in interstate long distance prices and save interLATA long distance customers billions of dollars.

Entry Regulation

State regulation of telephone markets is affected by the propensity of the Public Utility Commissions (PUCs) to subsidize local service. One source of this subsidy is to allow the BOCs to charge above-cost intraLATA toll rates and use the excess revenues to price local service below cost. Allowing entry into the intraLATA market by other long distance carriers is likely to diminish the ability of the BOC to charge above-cost toll rates and the ability of the PUC to require such rates. Consequently, states that reduce entry barriers are likely to experience lower intraLATA toll prices than states that maintain regulatory barriers.

Even with state entry restrictions there are several factors that limit the ability of the BOCs to charge PUC authorized above-cost prices for toll service. First, in many states, it is difficult to distinguish between intra-and interLATA toll calls, so prohibitions against interLATA companies providing intraLATA services at more competitive rates may be ineffective.

Second, while many states restrict facilities-based long distance telephone companies from supplying intraLATA service, many permit resellers to provide this service.[7]

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[6] We assumed a discount rate of 20 percent and 3 percent respectively.

[7] Resellers, who are generally independent and largely unregulated firms, do not own their facilities (facilities-based firms) but lease capacity from other carriers and resell this capacity to residential and business customers.

Resellers can attenuate the ability of the BOC to set above-cost prices. Resellers can lease capacity from facilities-based carriers and resell it within LATAs were facilities-based competitors are barred from offering the service. Thus, even though facilities-based competitors may not provide intraLATA service directly, they may be able to do so indirectly via resellers.

Third, the ability of large users to build their own private line system instead of using the BOC's toll service further limits the ability of the BOC to price toll service above cost. Confronted with supracompetitive prices, users in both business and government sometimes may have incentives to bypass the BOC system and provide their own systems.

The empirical model presented in the report explicitly considers some of these factors by assessing the price effects of variations in state policies with respect to resellers, facilities-based carriers, and actions to prevent unauthorized provision of intraLATA service.

Flexible Price Regulation of AT&T

In the intrastate interLATA market, virtually all states permit competition, but continue to regulate the dominant provider of the service, AT&T. States differ significantly in how they regulate the long distance carriers that provide this service. Some states regulate the prices of AT&T on a rate-of-return basis, approving only those prices (tariffs) that yield AT&T no more than the allowed return. In these states, any price changes sought by AT&T require PUC approval.

In place of conventional tariff procedures, however, other states have recently adopted more flexible approaches to price regulation. Pricing flexibility can take several forms. Some of these states do not have any formal rate-of-return regulation and allow AT&T full pricing flexibility. Other states set maximum prices, and still others set both minimum and maximum prices. In addition, the FCC is currently considering adopting a price cap for AT&T, in which the FCC

would regulate only the maximum prices for AT&T's interstate long distance services.

Consumer welfare can improve under the pricing flexibility approach. That approach employs the profit incentive to encourage a utility to reduce its costs and to improve its production technology and service offerings. Under traditional rate-of-return regulation, prices are set so that the utility earns no more than a specific return on its investment after recouping its operating costs. Since its prices are reduced in step with decreases in costs, the utility may have relatively little incentive to minimize its costs or to engage in innovative behavior. Under the pricing flexibility approach, the utility would earn greater profits from cost-reducing innovations because its rates would not be automatically adjusted downward. This incentive to innovate follows whether the utility operates in a competitive or less than competitive environment. However, if the market is competitive, all the gains from the cost reductions induced by pricing flexibility will ultimately accrue to consumers.

A firm may also be more willing to lower prices under a pricing flexibility approach because proposed price decreases cannot be contested by its competitors and subsequent price increases cannot be denied if the price stays within the allowed range. Under rate-of-return regulation, AT&T knows that a future price increase must be approved by the public utility commission. Consequently, AT&T may hesitate to lower prices since future increases involve costly administrative proceedings and politically unpopular price increases may be denied. In addition, a price cap regulatory framework may reduce the administrative and compliance costs of regulation. Under this regulatory approach, a utility would have pricing flexibility with only limited oversight as long as the prices are within permissible limits. Under rate-of-return regulation, by contrast, the utility usually cannot change prices without filing a new tariff and obtaining government approval, procedures which are time-consuming and expensive for both the regulated and the regulators.

Even absent these differences in incentives and administrative costs, if under a pricing flexibility approach the price

ceiling is set to equal the price arrived at under traditional rate-of-return regulation, the two forms of regulation should have equivalent net consumer benefits. The implementation of price ceilings, however, can be difficult. Over time, it is possible that the price ceilings may not drop in response to productivity increases in the telephone industry. In the absence of competition, this could lead to prices that are higher than those under a rate-of-return regulatory regime. The empirical results, however, indicate that those states that have allowed AT&T some degree of pricing flexibility have lower prices than those states that maintain strict rate-of-return regulation.

Extensions of Empirical Model

The telecommunications market is an extremely complex interaction of supply and demand forces combined with both state and federal regulation. Any single empirical model cannot fully incorporate all aspects of this market. Indeed, some of the control variables used in our empirical analysis did not affect pricing as we expected. Nevertheless, our results concerning the effect of reduced regulation lowering prices are always statistically significant and do not vary with alternative tests. Since there is almost no other empirical evidence on these issues, we encourage more research and refinement of the models analyzed in this report to verify that the results we find accurately reflect the state of telephone markets.

I. Introduction

The regulation of intrastate telephone service has changed significantly in the last decade, and this report attempts to measure the impact of some of these changes on the prices consumers pay. For most of this century, the Federal Communications Commission (FCC), in conjunction with the states, priced interstate long distance (toll) services higher than cost. The excess revenues were used to subsidize local exchange telephone service. For the vast majority of American households, these services were provided by AT&T and its affiliated Bell Operating Companies (BOCs -- the local exchange arm of AT&T). Beginning in the 1970's, the FCC adopted policies that encouraged the development of cost-based prices and competition in the provision of interstate long distance services.

It was alleged that AT&T -- via its ownership and control of the BOCs -- frustrated the growth of long distance competition by denying AT&T's rivals access or providing inferior access to the local exchange customers. In a 1982 settlement (know as the Modified Final Judgement [MFJ]) of an antitrust complaint filed by the Justice Department, AT&T agreed to divest the BOCs.[1]

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[1] See *U.S. v. AT&T* 552 F. Supp. 131 (D.D.C. 1982). Among other limitations, the terms of the MFJ define the lines of business that the BOCs may and may not enter. Most importantly for this report, the MFJ permits the BOCs to provide local and long distance services but only within specific geographic areas called Local Access and Transport Areas (LATAs). Almost all of intraLATA service is intrastate and is regulated by state regulatory commissions. Some states only allow the BOC to provide intraLATA long distance service. InterLATA service is provided by AT&T and other long distance carriers (OCCs). Since many states contain more than one LATA, interLATA service can be either intrastate or interstate. The state regulatory commissions regulate the intrastate portion of interLATA service and the FCC regulates interstate interLATA service. Appendix A contains a map of the 161 LATAs.

By eliminating the profit incentives for the BOCs to discriminate against AT&T's long distance competitors in the provision of local exchange access, the terms of MFJ probably assisted the FCC's pro-competitive policies. As a result, the development of interstate competition has led to interstate toll service prices that more accurately reflect its true costs.

The development of pricing that better reflects costs has also reduced the amount of excess revenues from interstate service available to subsidize local telephone service. The decline in the interstate subsidy to local service forced the state Public Utility Commissions (PUCs) to recover those revenues from intrastate service, leading PUCs to rethink their policies towards the pricing of intrastate long distance service.

This report examines the price effects of two of the policy changes some states have adopted in the wake of the reduced local exchange subsidy: (1) regulatory barriers to the entry of carriers into intraLATA toll service markets and 2) alternative forms of regulation of AT&T's intrastate interLATA toll service. Using statistical analysis, we try to determine if greater reliance on market incentives lowers intrastate toll prices.

We first examine the price impact of entry restrictions in the intraLATA toll market. We present an econometric model that estimates the differences in intraLATA toll prices in states that allow entry and those that do not. The empirical results suggest that intraLATA toll rates are about 7 to 10 percent higher in states that prohibit other long distance

companies and resellers[2] from providing this service than in states that allow such competition.[3]

In the intrastate interLATA market, virtually all states permit competition but continue to regulate the dominant provider of the service (AT&T). States differ significantly in how they regulate the long distance carriers that provide this service. Some states regulate the prices of AT&T on a rate-of-return basis, approving only those prices that yield AT&T no more than the allowed return. In these states, any price changes sought by AT&T require PUC approval. Other states allow AT&T some measure of pricing flexibility.[4] Increased pricing flexibility may provide AT&T with greater efficiency incentives than those that exist under traditional rate of return and tariff regulation. Further, some or all of the efficiency gains may be reflected in lower prices charged by AT&T.

A firm, such as AT&T, may also be more willing to lower prices under a pricing flexibility approach because subsequent price increases cannot be denied if the price stays within the

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[2] Resellers, who are generally independent and largely unregulated firms, do not own their facilities (facilities-based firms) but lease capacity from other carriers and resell this capacity to telecommunications users.

[3] However, we do not measure the welfare consequences of eliminating entry restrictions because we have not examined the impact of these restrictions on local service rates. A recent FCC report uses the model in this report to demonstrate that prohibiting facilities-based carriers from providing intraLATA service results in BOC toll rates that are 3 to 4 percent higher. See Frentrup (1988).

[4] Pricing flexibility can take several forms. Some states allow full pricing flexibility; others set maximum prices, and still others set both minimum and maximum prices. For a description of the regulatory approach of individual states, see **State Telephone Regulation Report** (1987) the bulk of which is reproduced in Appendix B.

allowed range. Under rate-of-return regulation, a future price increase must be approved by the public utility commission. Consequently AT&T (or any other firm subject to rate-of-return regulation) may hesitate to lower prices, since increases in the future involve costly administrative proceedings and may be denied.[5]

To date, there has been almost no empirical evidence comparing prices under a pricing flexibility approach with prices under traditional rate-of-return regulation.[6] The second part of this report presents an attempt at estimating the effects of regulatory flexibility. This study presents an econometric analysis that compares the AT&T prices of intra-state long distance telephone service in states that allow AT&T pricing flexibility with those in states that do not. This analysis suggests that these prices are from seven to 13 percent lower in states with pricing flexibility than in states with rate-of-return regulation.[7]

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[5] One other reason AT&T may have lower prices in states that allow pricing flexibility is that AT&T may be able to shift cost allocations between states that maintain rate-of-return regulation and states with flexibility. Though we cannot rule out this possibility, it would seem difficult for AT&T to consistently allocate costs incurred in a flexibility state to a rate-of-return state that is more likely to closely monitor costs.

[6] The Virginia State Commission (1987) examined the effect of deregulation on AT&T pricing and has done a comparison survey of AT&T pricing in 10 states. The study concluded that deregulation has worked well in Virginia. The study, however, does not use statistical analysis and is based on a small number of states. The authors of this report have recently completed a working paper containing some of the results described in this report. See Mathios and Rogers (1987).

[7] While the differences between the alternative regulatory approaches discussed above may be the explanation for the empirical results, it is possible that the states that

We encourage more research and refinement of the models discussed in this paper to verify that the results we find are consistent with alternative data sources and alternative econometric specifications. The telephone market is an extremely complex interaction of supply, demand, and political factors, all in an industry with quickly changing technology. Any single empirical model cannot incorporate all of these complexities.

This report is organized as follows. Section II gives a brief summary of recent developments in the telecommunications industry. Section III discusses the intraLATA market and the potential effects of entry restrictions on the price of intraLATA toll rates. Section IV discusses the interLATA long distance market and examines the expected impact of the alternative regulatory frameworks on the price of intrastate interLATA toll rates. Section V outlines the reduced form price models used for the analysis of intrastate intra- and interLATA toll rates and contains a description of the variables used in the models. Section VI describes the empirical results for the intraLATA price models, and Section VII presents the results for interLATA price models. Section VIII concludes.

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have chosen pricing flexibility are those in which AT&T was (for some reason not captured by our empirical model) predisposed to lower prices. If so, projecting the currently observed price differences between flexible and inflexible regimes to states planning on switching to pricing flexibility regulation may be inappropriate.

II. A Summary of Recent Developments in the Telecommunications Industry

Until recently, AT&T had a virtual monopoly on almost all aspects of telecommunications including long distance and local telephone services. The first major threat to its monopoly position in long distance occurred with the development of microwave radio transmission. This technology made it feasible for companies other than AT&T to set up their own communication facilities. After years of attempts to obtain FCC approval for these private communication systems, the FCC rendered the *Above 890* decisions (1960), in which the Commission stressed the advantages of competition in encouraging development of communications technology in satisfying specialized consumer demands.[9] In 1971, the FCC issued the *Specialized Common Carrier* decision establishing legal competitive entry (presumed to be limited to private line service).[10] The FCC explained that these services offered something that AT&T did not and that allowing this type of entry would encourage more rapid development of new and innovative services.

Microwave Communications Inc. (MCI) began offering ordinary long distance toll service in 1975. The FCC forced MCI to stop providing this service because, among other reasons, MCI had FCC approval to offer only private line services. The appeals court, however, overturned the FCC's decision on the grounds that the FCC had failed to show

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[9] See Allocation of Frequencies in Bands Above 890 Mc., 27 FCC 359 (1959), recon. 29 FCC 825 (1960).

[10] *Specialized Common Carrier Services*, 29 FCC 2d 870, *recon.*, 31 FCC 2d 1106 (1971). Private line services refer to services that link the locations of called and calling party directly and do not require the use of a central office to complete the call.

that competition would be contrary to the public interest.[11] In response to this ruling, several companies began offering ordinary long distance services to residential and business subscribers. The FCC subsequently began pursuing more pro-competitive policies, including a greater reliance on cost-based prices.

One impediment to the FCC's efforts to encourage competition in the long distance telephone market was the bottleneck input controlled by AT&T, access to the local exchange network. It was alleged by the Justice Department among others that AT&T, via its control of the BOCs, delayed/denied access or provided inferior connections to this local network to the OCCs. The Modified Final Judgement (MFJ), which in 1981 settled a 1974 antitrust suit brought by the Justice Department against AT&T, addressed this problem by separating ownership of the local exchange companies (the BOCs) from AT&T. Under the MFJ, the BOCs would no longer have an incentive to treat AT&T differently from any other long distance carrier. The MFJ also specified a timetable for the provision of equal access to the local network for all long distance providers.

The total separation of local and long distance service, however, was impractical. AT&T had so intertwined the long distance and local exchange service that the costs of total separation were extremely high. Therefore, Local Access and Transportation Areas (LATAs) were defined in the MFJ in order to provide a practical regulatory separation of local and long distance service. The LATA system divided

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[11] See *MCI Telecommunications Corp. v. FCC*, 580 F.2d 590 (D.C. Cir.) *cert. denied*, 439 U.S. 980 (1978) ("*Execunet II*"); *MCI Telecommunications Corp. v. FCC*, 561 F.2d 365 (D.C. Cir. 1977), *cert. denied*, 434 U.S. 1040 (1978) ("*Execunet I*").

MCI introduced Execunet service in 1975. Execunet used MCI's established network (which was previously devoted to private line service) and connected it to the local exchange switch with ordinary business lines to provide the usual switched long distance service.

intrastate toll service into two types: service between different LATAs (interLATA service) and service within LATAs (intraLATA service).[12] Both of these services, as well as local exchange service, are regulated by the PUCs. Under the MFJ, the BOCs provide local exchange and intraLATA long distance service, but are forbidden from providing interLATA long distance service.

The increase in competition due to the FCC policy change and the MFJ forced states to reconsider their regulation of intrastate telephone services. Prior to the introduction of competition into the long distance market regulators priced long distance service above cost in order to subsidize local service. This subsidy was accomplished via a cost and revenue allocation mechanism called separations and settlements, respectively.[13]

The breakup of AT&T, the increased competition in the long distance interstate market, and the development of cost-based prices led to a reduction in the local exchange subsidy from interstate toll services. The BOCs could no longer depend on obtaining the same amount of revenue from interstate long distance providers as they did from AT&T prior to divestiture. This resulted in a greater need to raise revenue from the intrastate portion of telephone service, forcing the PUCs to reconsider their regulatory policies regarding intrastate long distance telephone markets.

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[12] Some states only consist of a single LATA. In these states, there is no intrastate interLATA service.

[13] For details of the separations and settlement mechanism see Noll (1986) and National Association of Regulatory Commissioners, the **Separations Manual** (1971). Allocation of long distance revenues among the BOCs was called the division of revenues.

III. State Regulation and the IntraLATA Market

In light of diminishing subsidy from the interstate toll markets, many states have attempted to preserve the cross-subsidy to local service by restricting the entry of all carriers into the intraLATA toll market and only allowing the BOC to provide this service. While we recognize that there are many other local exchange companies in addition to the BOCs, the BOCs serve the vast majority of local exchange subscribers. For this reason and because the BOC intraLATA price schedules were relatively easy to acquire, the geographic focus of our analysis is on LATAs served by the BOCs. Only 14 states allowed facilities-based competition in the intraLATA toll market in 1986 as shown in Table V:1 (p. 27).[14] Many states, while prohibiting facilities-based competition allow resellers to provide intraLATA service. Other states prohibit both facilities-based competition and reseller competition. In this section we discuss the probable impact of these entry restrictions on the price of intraLATA toll service.[15]

In a toll market with no competition and minimal regulation, the BOC would essentially set a monopoly price for intraLATA long distance service. If profitable entry could occur, the introduction of competition into this market would lower that price. The PUCs, however, regulate the price of intraLATA services provided by the BOC. Therefore, the impact of entry restrictions on toll rates is difficult to assess.

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[14] Facilities-based carriers differ from resellers in that facility-based carriers own their own transmission capacity. Resellers do not own their facilities, but lease capacity from other carriers and resell that capacity to other users. For a more complete discussion of resellers see Section III below.

[15] Unless otherwise specified, references to interLATA or intraLATA services refer to services provided on an intrastate basis and therefore subject to the regulatory jurisdiction of the state PUC.

State regulation of telephone markets is affected by the propensity of the PUC to subsidize local service. One method to achieve this subsidy is to allow the BOCs to charge supracompetitive intraLATA toll rates and use the excess revenues to price local service below cost. For example, Pacific Bell estimated that the average cost to the company of a five minute daytime intraLATA call of 31-40 miles was 29 cents but the average price was $1.24.[16] Allowing entry into the intraLATA market by other carriers is likely to diminish the ability of the BOC to charge supracompetitive toll rates and the PUC to require such rates. Consequently, *ceteris paribus*, states that reduce entry barriers are likely to have lower intraLATA toll rates.

Even with state entry restrictions, there are several factors that limit the ability of the BOCs to charge PUC authorized supracompetitive toll rates. First, in many states, it is difficult to distinguish between intra- and interLATA toll calls, so prohibitions against interLATA companies providing intraLATA services at more competitive rates may be ineffective.[17] The response of the PUCs to this difficulty has been varied. Some states that enjoin OCC entry into intraLATA service have taken action to prevent illegal intraLATA calls. For example, some states require interLATA companies operating in their jurisdictions to inform their customers that it is not legal to make intraLATA calls on their system. Seven PUCs have directed the OCCs providing interLATA service in their state to install blocking equipment

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[16] See Noll (1986).

[17] When an interLATA call is made, it originates on the BOC line; then it is connected to the toll carrier network, and finally it arrives at another BOC line. Within this system there is nothing to prevent a call from both originating and arriving within the same LATA (making it an intraLATA call). For example, Noll (1986, p. 186-7) discusses several situations where a customer might use OCC service for intraLATA calls.

to prevent customers from making intraLATA calls.[18] Many states may be hesitant to require blocking since such policies impose costs on residents that use the OCCs for interLATA calls. In addition, requiring the OCCs to incur large expenditures to reduce the flexibility of the telephone system is not very popular to consumers.

Second, in many states that restrict OCCs from entering the intraLATA market, resellers are allowed to provide intraLATA service.[19] Resellers can attenuate the ability of the BOC to set supracompetitive prices. Resellers can lease capacity from facilities-based carriers and resell it within LATAs where facilities-based competitors are barred from offering the service.[20] Thus, even though facilities-based competitors may not provide intraLATA service directly, they may be able to do so indirectly via resellers. Furthermore, the access charges paid by the resellers are often not as high as those paid by the facilities-based carriers, so resellers can provide service for less.[21] Additionally, it can be very inexpensive for a reseller to enter the market. Clinton Perkins, Jr. of Southern Bell claims "capital costs of reseller competition compared to transmission carriers is especially low, running perhaps, in the range of $25,000-$500,000."[22]

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[18] *Ibid.*

[19] For example, as of 1986 there were eighty-three resellers in nine southeastern states competing with the facilities-based providers of intraLATA service. See Weber in Danielsen and Kamerschen (1986) p. 68.

[20] Since the BOC is a facilities-based carrier, the term facilities-based competitors refers to carriers other than the BOC.

[21] The quality of the voice transmission is often lower for the reseller. Therefore, the lower access charge is a way to reflect the difference in quality.

[22] Perkins in Danielsen and Kamerschen (1986), p. 159.

Third, the ability of large users to build their own private line system instead of using the BOC's toll service further limits the ability of the BOC to price toll service above cost. Confronted with supracompetitive prices, users in both business and government sometimes may have incentives to bypass the BOC system and provide their own systems.

The differences in toll rates between states that allow facilities-based carriers and those that restrict them from entering the intraLATA toll market will be mitigated by the above factors. The empirical model presented later in the report explicitly considers some of these factors by assessing the price effects of variations in state policies with respect to resellers, facilities-based carriers, and actions to prevent illegal provision of intraLATA service.

IV. State Regulation and the InterLATA Market

Since almost all states allow extensive competition at the interLATA level, entry restrictions are not an issue.[23] However, the PUCs vary in their form of regulation of the dominant long distance provider of interLATA service. The state PUCs as well as the FCC have traditionally used rate-of-return regulation to determine the prices of interLATA telephone service. The PUC determines an allowed rate of return on the BOC's capital and that return, along with the capital allocated to a particular service and other non capital costs, serve as the cost basis for the BOC's request (tariff filing) for PUC approval of its prices. However, in place of conventional tariff procedures, many states have recently adopted a pricing flexibility approach in their regulation of the interLATA toll services provided by AT&T.[24] Pricing flexibility can take several forms. Some states allow full pricing flexibility without any formal constraint on prices or rate-of-return, others set maximum prices, and still others set both minimum and maximum prices. In addition, the FCC is currently considering adopting a price cap for AT&T, in which the FCC would regulate only the maximum prices for AT&T's interstate long distance services.[25]

The pricing flexibility approach employs the profit incentive to encourage a utility to reduce its costs and to improve its production technology and service offerings. Under traditional rate-of-return regulation, prices are set so that the utility is permitted to earn no more than a specific return on its investment after recouping its operating costs.

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[23] For example, all states permit resellers to provide interLATA service and almost all states allow facilities-based competition.

[24] See Appendix B for details. In all interLATA markets, AT&T is considered the "dominant" provider of toll service, *i.e.* one with market power. Other carriers are not subject to rate-of-return regulation.

[25] See FCC Docket No. 87-313 (1987 and 1988).

Since its prices are reduced in step with decreases in costs, the utility may have relatively little incentive to minimize its costs or to engage in innovative behavior.[26] Under the pricing flexibility approach, the utility would be able to profit to a greater extent from cost-reducing innovations because its rates would not be automatically adjusted downward. This incentive to innovate follows whether the utility operates in a competitive or less than competitive environment.

A firm, such as AT&T, may also be more willing to lower prices under a pricing flexibility approach because subsequent price increases cannot be denied if the price stays within the allowed range. Under rate-of-return regulation, a future price increase must be approved by the public utility commission. Consequently AT&T may hesitate to lower prices since increases in the future involve costly administrative proceedings and may be denied. In addition, a price cap may reduce the administrative and compliance costs of

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[26] In addition, Averch and Johnson (1962) show that under rate-of-return regulation the utility may have an incentive to use too much capital. Regulators attempt to deal with this by requiring approval for new investments. However, Haring and Kwerel (1987) note that this procedure has not been successful at the FCC. They note "[T]he FCC has, for example, approved all of AT&T's requests for new international cables facilities even when there was little demonstrated need for additional capacity." Haring and Kwerel (1987) also cite anecdotal evidence provided by Scherer (1970) indicating that overcapitalization may have, historically, been a problem in telecommunications.

Even under traditional rate-of-return regulation, regulatory lag provides some incentive for the utility to minimize costs. However, sometimes the utility is forced to provide refunds to customers if during the lag it earns an excessive rate-of-return. The greater the frequency of such refunds, the less is the efficiency incentive from regulatory lag.

regulation.[27] Under this regulatory framework, a utility would have pricing flexibility with only limited oversight as long as the prices are within permissible limits. Under rate-of-return regulation, by contrast, the utility cannot change prices without filing a rate case and obtaining government approval,[28] procedures which are time-consuming and expensive for both the regulated and the regulators.

Absent these differences in incentives and administrative costs, if the price ceiling is set to equal the price arrived at under traditional rate-of-return regulation and this ceiling is binding, the two forms of regulation should have equivalent net consumer benefits.[29] It is also possible that the price ceilings may be set higher than the price arrived at under rate-of-return regulation. This could arise because under

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[27] For example, the direct administrative costs (excluding AT&T's cost) associated with the FCC's current regulation of AT&T have been estimated to be $40 million per year. These numbers are summarized by Haring and Kwerel (1987).

[28] Competitors are usually permitted to participate in these rate cases. Haring and Kwerel (1987) note that competitors of AT&T have opposed virtually every price reduction proposed by AT&T since the 1982 divestiture of AT&T.

[29] These conclusions are supported by theoretical work of Hayes and Seigel (1986). Their analysis concludes that rather than fixing the price that the regulated firm must charge, a regulator should grant the firm the option to change price to less than or equal to a ceiling price. Such analysis shows that if the regulated firm has pricing flexibility, both consumers and the firm are at least as well off.

It is also possible that a pricing flexibility framework can in practice be similar to ROR regulation. If Congress and other policy makers insist on monitoring profits or other aspects of the firm they may be able to do this by manipulating the price ceiling. For a discussion of these issues and how they relate to the British experience see Bhattacharyya and Laughhunn (1987).

pricing flexibility changes in ceilings may not perfectly match productivity increases. In this case, if there is not sufficient competition, it is possible that consumer prices could be higher under a price ceiling approach than under rate-of-return regulation.

The comparison of the two forms of regulation suggests that the consumer welfare gains from pricing flexibility could be positive, zero, or negative, and is thus an empirical issue. If the market is competitive, all the gains from the cost reduction incentives created by pricing flexibility will ultimately accrue to consumers. If the market is monopolistic, AT&T will still realize cost savings. It is possible, however, that if the price ceilings do not drop in response to these savings, prices to consumers will not fall.

There are several factors that tend to increase the probability that interLATA toll markets are now operating competitively. The advent of equal access to the local exchange, the entry of other toll providers, and the excess capacity held by those providers have all increased the probability that toll service providers will behave competitively.

First, equal access has provided an environment conducive to competition in long distance service. With equal access all OCCs are able to provide the end user with service of similar quality to AT&T's. Equal access has been rapidly extended to competing long distance carriers over the last few years. Even though in 1984 only about 3.5 percent of industry phone lines had been converted to equal access, by the end of 1986, over three-quarters of the phone lines had been so converted.[30]

Second, there has been entry of long distance competitors. Although we have not conducted a market-by-market study,

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[30] *Ibid.* The remaining lines tend to be at older and smaller offices. For these lines, equal access will be provided when the offices are converted to more modern and sophisticated switching equipment.

some sense of the extent of competition in interLATA toll service markets is provided by statistics revealing the large number of present competitors, many of whom are recent entrants.[31] One indication of the number of providers of toll service is the number of long distance carriers purchasing switched access to the local telephone network.[32] The FCC has reported that in March 1987 over 561 carriers purchased access to the local telephone network and that 219 of these carriers purchased access on an equal access basis.[33] MCI and AT&T purchased equal access in each of the 48 states surveyed by the FCC, while Sprint purchased equal access in 47 of the 48 states. Five other carriers served 25 or more states and 19 served four or more. Moreover, from January 1986 to March 1987 the number of long distance carriers increased in 40 of the 48 states, from a total of 157 to 219 carriers.

Third, while AT&T still has a large market share, technological changes have increased the market potential and capacity of AT&T's rivals.[34] Competing common carriers

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[31] Unfortunately, the following data on the number of competitors do not permit us to identify whether these firms compete in the interstate market or the intrastate interLATA market.

[32] By switched access we mean the use of local facilities provided at each end of a long distance call. Toll service requires the use of local facilities at both ends of a long distance call. The number of long distance carriers, however, may consist of many who do not compete with AT&T and the OCCs, and therefore is not a precise measure of competition.

[33] See Federal Communications Commission, Industry Analysis Division (1987b).

[34] In fact, AT&T's share of interstate switched access minutes fell from 83.1 percent in the first quarter of 1985 to 77.0 percent (preliminary estimate) in the third quarter of 1986. See Haring and Kwerel (1987).

had an estimated capacity of 1.19 billion circuit miles in 1984. This rose to 1.7 billion by the end of 1985, about 64 percent more than AT&T's capacity.[35] A large portion of this capacity is due to the use of fiber optics.[36] The capacity of the competitive fringe indicates that AT&T's competitors are likely to be able to raise output in response to a monopolistic price increase by AT&T. Consequently, it may not be profitable for AT&T to raise its price to the monopoly level.[37]

The heightened long distance competition thus suggests that AT&T has an incentive to seek price reductions to avoid being priced out of the market. However, under the traditional PUC tariff approval process, AT&T's competitors can delay or thwart proposed price reductions by protesting to the PUC. For example, Haring and Kwerel (1987) note that AT&T's competitors have opposed virtually every interstate price reduction proposed by AT&T since divestiture. To the extent that AT&T's competitors are successful in their opposition, AT&T is artificially handicapped in the competitive battle for customers. Thus the pressure for price reductions is reduced; consumers are induced to needlessly change their long distance carrier to a lower priced competitor, and the profits of AT&T's competitors are increased, at least temporarily. By allowing AT&T to lower prices at will, the pricing flexibility proposals may generate a more rapid reduction in toll prices.

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[35] See U.S. Department of Commerce, National Telecommunications and Information Administration (1987a).

[36] *Ibid.* Fiber optic cable has a larger capacity then conventional coaxial cable.

[37] For a general discussion of this argument, see Landes and Posner (1981).

V. Empirical Model

We use the same empirical model (with differing regulation variables) to estimate both the impact of entry restrictions on intraLATA long distance rates (discussed in Section III) and the effect of pricing flexibility on AT&T's interLATA toll rates (discussed in Section IV).[38]

A. The Reduced Form Equation

There are two basic approaches for the empirical analysis of the intrastate long distance service market: (1) the estimation of supply and demand equations (structural equations) for long distance service, and (2) the estimation of a reduced form price equation which includes demand and supply factors in one equation.[39] The focus of this paper is not on the structural parameter estimates of demand or supply, but rather on price differences that might result from variations in the way states regulate the telephone toll markets. Consequently, we specify reduced form equations for the prices of intrastate long distance phone calls: one

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[38] We use the same empirical specification for both intraLATA and interLATA service since the demand and supply factors affecting each market are similar.

[39] Both approaches assume an underlying market equation system consisting of a demand equation and a supply behavior function. There are two ways by which one can derive the reduced form equation. First, one can substitute the demand function into the supply behavior equation and solve for price. The second way is especially appropriate for regulated markets with a dominant firm. This approach postulates a firm or industry group that maximizes profits subject to market conditions and some regulatory constraint. From solving the first order conditions of this problem, we can arrive at the reduced form equation we use in this section. Though we do not explicitly model the regulatory constraint, the effects of the constraint become incorporated into the reduced form equation.

equation for intraLATA service and one for interLATA service.

For the assessment of the impact of entry restrictions on intraLATA toll rates across states, we use data on the lower 48 states of the United States. For the assessment of the effect of alternative regulatory frameworks on interLATA toll rates across states, we use the 39 multiLATA states.

The reduced form equation is given by (1) below.

$$(1)\ \mathbf{PRICE_i} = b_0 + b_1\,\mathbf{OPRICE_i} + b_2\,\mathbf{REGIME_i}$$

$$+ b_3\,\mathbf{DENSITY_i} + b_4\,\mathbf{POP_i} + b_5\,\mathbf{CPI_i} + b_6\,\mathbf{INCOME_i}$$

$$+ b_7\,\mathbf{WAGES_i} + b_8\,\mathbf{SALOMON_i} + b_9\,\mathbf{PRURAL_i} + b_{10}\,\mathbf{ACCESS_i}$$

$$+ b_{11}\,\mathbf{MILES1} + b_{12}\,\mathbf{MILES2} + b_{13}\,\mathbf{MILES3} + b_{14}\,\mathbf{MILES4}$$

$$+ b_{15}\,\mathbf{MILES5} + b_{16}\,\mathbf{MILES6} + b_{17}\,\mathbf{MILES7} + b_{18}\,\mathbf{MILES8}$$

$$+ b_{19}\,\mathbf{MILES9} + b_{20}\,\mathbf{MILES10} + e_i$$

where the subscript i denotes the particular state, b_0-b_{20} are coefficients to be estimated, and e_i is assumed to be a normally distributed error term with a homoskedastic and diagonal variance-covariance matrix. The bold text in equation (1) indicates a vector. Definitions for all variables in equation (1) are given in Table V:2 (pp. 35-38) and Table V:3 (pp. 39-42) and are discussed below.

1. The Dependent Variable (Price)

The dependent variable (PRICE) in the reduced form model is the price of a long distance telephone call in each state. For the intraLATA equation we use the 1986 rate schedules of the BOCs for the lower 48 states.[40] These BOCs account

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[40] For multiLATA states, all of the LATAs within the state had the same rates. These rates were obtained from the tariff schedules that each company files with the local

for the vast majority of the intraLATA toll calls in the U.S. market. In addition, among the BOC rates, any price differences across states are unlikely to be due to differences in the quality of service.[41] For interLATA service, we use the 1987 AT&T toll rates for all of the 39 multiLATA states.[42]

Inter- or intraLATA toll prices vary by time of day, distance, and length (minutes of use) of the call. For example, long distance rates are often 20-60 percent lower if made in the evening or on the weekends rather than during daily business hours. Telephone companies also set higher rates for the first minute of a long distance call than for subsequent minutes of use. Moreover, long distance rates vary according to the distance range into which the call falls. All states categorize distance into bands, each of which commands a different charge. For example, the charge for a call that is between 0 and 10 miles is lower than the charge for a similar call between 11 and 16 miles.

PUC. We obtained them from the seven regional BOCs and two other local telephone companies formerly owned by AT&T but not currently considered BOCs (Cincinnati Bell and Southern New England Telephone [SNET]). For Connecticut, we use the toll rates of the latter company because it covers most of the state's intraLATA toll calls. Cincinnati Bell's rates, however, were identical to those of Ohio Bell, the BOC for its home state.

[41] If we included the prices charged by MCI, resellers, etc, we would need to consider whether the price differences are due to differences in the quality of service. The service offered by different BOCs is probably more homogeneous than the comparable services of the other long distance carriers.

[42] These data were obtained from the CCMI/McGraw Hill service, which maintains computer records of AT&T toll rates for all states. For the intraLATA model, we focus on 1986 rates rather than 1987 rates because in many states the policy toward entry was in flux in 1987.

Further, many states differ in the distance ranges used. For example, one state may charge one price for 0-7 mile calls while another state may charge the same price for 0-18 mile calls. Consequently, if the call is 7 miles or less the two states may have the same price, while if it is between 8 and 18 miles the prices may significantly differ.

To obtain prices that can be meaningfully compared across states, we constructed a set of "standardized" prices for a specified set of mileage ranges and call durations. In choosing which mileage ranges to use, we examined all the tariff schedules for the states and chose the mileage ranges that the largest number of states used. These ranges are 0-10 miles (MILES1), 11-16 miles (MILES2), 17-22 miles (MILES3), 23-30 miles (MILES4), 31-40 miles (MILES5), 41-55 miles (MILES6), 56-70 miles (MILES7), 71-124 miles (MILES8), 125-196 miles (MILES9), and 197-292 miles (MILES10) for the interLATA rates.[43] For intraLATA rates, the first eight ranges are used but not the two longest ones because in some states it is impossible to make an intraLATA call of over 125 miles.

For each of the mileage bands, we construct the price of the initial minute and the price of additional minutes. If the state classifies its prices according to the mileage ranges given above, the prices are obtained from the corresponding entry on the tariff schedule. If, however, a state charges one price for a 0-8 mile call and a higher price for a 9-15 mile call, the standardized 0-10 mile price would be 0.8 times the 0-8 mile price plus 0.2 times the 9-15 mile price.

Appendix C displays the 1986 standardized prices of the first minute and additional minutes of an intraLATA toll

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[43] Some states have distance ranges that exceed 292 miles while some states charge one price for anything over a certain distance. However, since some states are not large enough to span more than this distance, we cannot meaningfully compare prices of calls exceeding 292 miles across states. Consequently, we do not analyze the prices of long distance calls that exceed 292 miles.

phone call in each of the 48 states in the sample, and Appendix D contains the 1987 standardized prices of the first minute and additional minutes of an AT&T toll phone call in each of the 39 multiLATA states. With these standardized prices we can compute the price of a call for different call durations for each mileage band. This paper focuses on the price of a 5 minute call. The manner in which these prices are incorporated into equation (1) is discussed in subsection B.

2. The Independent Variables

The independent variables include factors that may affect either the supply or demand of the intrastate service plus a set of variables that reflect the political environment of the PUCs. For the demand factors, we include variables that other researchers have used in studies on the demand for an assorted set of telephone services.[44] For the supply factors, we include variables based on the work of Evans and Heckman (1983) and Legette (1986) who have modeled the cost function for telecommunication firms. Little empirical work exists incorporating variables that reflect the political environment of the PUC and their affect on the PUCs' policy choices. Nevertheless, we include variables that we think will reflect differences in pricing policies among PUCs.[45] All of the demand, supply, and political variables are discussed below in the order in which they appear in equation (1).

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[44] The variables we use to proxy the demand side of the market are similar to those used in most studies of the demand for telephone service. For an overview of these studies, see Taylor (1980). These other studies, however, model the quantity demanded of toll service as the dependent variable. This makes it difficult to compare the performance of these models with the model used in this study (where the price of toll service is the dependent variable).

[45] Some of the political variables we used were based on the discussion of the regulation of telephone markets by Noll (1986).

Since the market for long distance service is regulated, it is difficult to interpret the coefficients on many of the independent variables. Each coefficient incorporates not only the impact of the variable on the demand and/or supply side of the market, but also the way these demand and supply factors are treated by the public utility commissions. PUC regulation can be an extremely important consideration in predicting the sign on each supply and demand factor.[46] Because we do not explicitly model this latter treatment, we cannot predict the sign of many of the regression coefficients.[47]

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[46] As evidence that regulation makes interpretation of the coefficients on the supply and demand variables difficult, consider that two individuals living in the same household making the same toll call at the same time can pay very different prices depending on whether the call goes over a LATA border. Since the individuals face the same supply and demand factors, economic factors would predict that these prices should be the same. Regulation of intra and interLATA calls differ, however, resulting in two different prices for virtually the same call. For example, a 5 minute 0-10 mile intraLATA call in Mississippi was 63 cents whereas the identical interLATA call was 90 cents. Moreover, since regulation of inter- and intraLATA toll markets differ, the supply and demand factors may affect the price of toll service differently across the inter- and interLATA equations.

[47] The manner in which demand and supply factors are treated by PUCs is not well understood. Explicitly modeling this regulation raises significant econometric identification problems. Consequently, we only use a reduced form model and do not introduce a structural equation for the determinants of regulatory decisions. Other studies such as those discussed by Taylor and by Heckman and Evans do not attempt to model the determination of the price of telephone service.

a. Controlling for Regulatory Bias

We include the 1983 price (OPRICE) in the model as a control for the prices existing before the states decided on their respective regulatory actions.[48] The purpose of equation (1) is to examine the impact of entry restrictions on intraLATA toll rates and pricing flexibility on interLATA toll rates. The use of ordinary least squares assumes that the right hand side variables are exogenous. Consequently, we implicitly assume that the present prices of interLATA and intraLATA services do not affect the state's current actions on entry and price flexibility. However, we do control for the possibility that the regulatory changes were spurred by past price levels by including the price of toll service in 1983 (OPRICE). If regulatory actions occurred in response to the level of prices that existed at the time then the correlation between OPRICE and the REGIME variables should capture this effect.[49]

Another reason for including OPRICE is that it may reflect the pre-divestiture attitudes of the PUC toward pricing policies which are likely to be correlated with current PUC pricing policies. Additionally, the relationship between OPRICE and PRICE may capture the degree to which the PUCs are cautious in allowing large changes in toll rates.

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[48] The data for OPRICE was obtained from National Association of Regulatory Commissioners (1983). The method by which these prices were computed has been discussed above.

[49] In econometric jargon, the 1983 price variable solves a potential endogeneity problem. Note that the inclusion of a lagged dependent variable does not result in biased estimates of the coefficients, because we do not use time series data in this specification. Since we use cross sectional data the usual problems associated with autocorrelation in the error term do not exist.

b. Proxies for Entry and Price Flexibility Regulations

To test our hypotheses concerning the impact of entry restrictions on intraLATA toll rates, we include a vector of dummy variables for the various types of state entry restrictions (**REGIME**). We consider two classes of entrants: facilities-based toll carriers such as MCI and Sprint, and resellers, who lease telecommunications facilities from others and sell the toll service to individual customers. As of October 1986, 34 states had entry restrictions of some sort. Of these, 26 states precluded the facilities-based toll carriers from the intraLATA markets but allowed the entry of resellers.[50] The remaining states restricted the entry of both types of firm. Table V:1 (p. 27) shows the states that restricted entry as of late 1986.

In the intraLATA empirical analysis, we consider four REGIME variables.[51] The first REGIME variable assumes a value of one for the 34 states that restrict facilities-based carriers from providing intraLATA toll service and zero for all other states; this variable is denoted as FBENTRY. The second assumes a value of one for the eight states that preclude resellers and a value of zero otherwise. This variable is denoted as NOENTRY because all states that restrict resellers also restrict facilities-based carriers. The third REGIME variable, denoted as BLOCK, equals one for the 16 states that took some action to prevent facilities-based interLATA toll carriers from carrying unauthorized

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[50] The sources for this information are U.S. Department of Commerce, National Telecommunications and Information Administration, Office of Policy Analysis and Development (1986) and Rodgers and Morelli (1985).

[51] Note that when we refer to a particular REGIME variable we no longer use bold text since it is a single component of the vector.

TABLE V:1

The States that Restricted Entry into IntraLATA Toll Telephone Markets as of Fall 1986

The following states restricted the entry of all firms, both facilities-based carriers and resellers, into the intraLATA toll call markets in Fall 1986:

California	Nebraska	Rhode Island
Connecticut	Nevada	West Virginia
Michigan	New Hampshire	

The following states restricted the entry of facilities-based carriers but allowed the entry of resellers, into the intraLATA toll call markets in Fall 1986:

Alabama	Kansas	Oregon
Arizona	Kentucky	Pennsylvania
Arkansas	Maine	South Dakota
Colorado	Massachusetts	Tennessee
Delaware	Mississippi	Utah
Georgia	New Jersey	Virginia
Idaho	North Carolina	Wisconsin
Illinois	North Dakota	Wyoming
Indiana	Oklahoma	

The following states which restricted the entry of facilities-based carriers and/or resellers also took measures to block the illegal provision of intraLATA toll calls in Fall 1986:

Alabama	Kansas	Tennessee
California	Michigan	Utah
Colorado	Nevada	Virginia
Connecticut	New Jersey	West Virginia
Georgia	North Carolina	Wyoming
Indiana		

TABLE V:1--Continued

The following states allowed the entry of all firms, both facilities-based carriers and resellers, into the intraLATA toll call markets in Fall 1986:

Florida	Missouri	South Carolina
Iowa	Montana	Texas
Louisiana	New Mexico	Vermont
Maryland	New York	Washington
Minnesota	Ohio	

Source: U.S. Department of Commerce, National Telecommunications and Information Administration, Office of Policy Analysis and Development (1986) and Rodgers and Morelli (1985).

intraLATA toll calls and zero otherwise.[52] In addition, we include an interaction variable, NOENTRY*BLOCK; it equals one for the five states that both preclude reseller entry and take action to block illegal calls on the interLATA systems. We include all four variables in equation (1).[53]

If entry restrictions lead to higher prices, we would expect that states restricting both facilities-based carriers and resellers, while in addition blocking unauthorized intraLATA service, to have the highest intraLATA toll prices. Similarly, states that restrict only facilities-based carriers should have higher prices than states with no restrictions, but not as

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[52] There are 16 states that take action to enforce the entry restriction. There are several actions states have taken. The most common actions include: (1) requiring interLATA carriers to install technology that block intraLATA calls; (2) requiring interLATA carriers to compensate the intraLATA carrier for incidental intraLATA calls they provide; (3) levying fines on carriers unlawfully providing intraLATA service; (4) levying fines on customers unlawfully using interLATA carriers for intraLATA calls; and (5) requiring interLATA carriers to advertise that they are not authorized to provide interLATA service. For a detailed description of which states take which actions see Rogers and Morelli (1985).

[53] Ideally we would like to interact each of the REGIME variables with the other independent variables. This would allow each independent variable to have a separate impact across the different regulatory regimes. For instance, the percentage of the population being rural, PRURAL, may have a different impact on price according to whether there are entry restrictions. Data limitations, however, prevent us from doing this. Nevertheless, we have experimented with equations including only one of the REGIME variables and interacting it with most of the other independent variables. We have done this for each of the first three REGIME variables. The results concerning the effect of the REGIME variables on price are similar to the results presented in the text.

high as states that restrict both. Recall that no state restricts only resellers.

For the interLATA price equation, we test our hypothesis concerning the impact of pricing flexibility on toll rates by including a dummy variable for whether the state allows AT&T some form of pricing flexibility. In this analysis the REGIME variable is denoted as REGFLEX and equals one for the 28 states that allow AT&T some degree of pricing flexibility and zero for the remaining 11 states that continue to use rate-of-return regulation without pricing flexibility.[54] Appendix B contains a description of how each state regulates interLATA AT&T services.

c. Other Control Variables

In this section we describe our attempts to control for the demand and supply factors that are likely to affect the price of toll service. While we offer predictions as to what the sign of these variables' coefficients would be in the absence of regulation, these same variables likely shape the decisions of regulators regarding pricing and thereby alter the impact of these variables on price. As we have already noted, the modeling of the interaction of the regulatory process with demand and supply variables is beyond the scope of this

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[54] Pricing flexibility can take several forms. Some states allow full pricing flexibility; others set maximum prices, and still others set both minimum and maximum prices. In the results section we discuss several alternative specifications of the REGFLEX variable. For a description of the regulatory approach of individual states, see **State Telephone Regulation Report** (1987) which is reproduced in Appendix B. We have also included the variable NOENTRY in the interLATA analysis. This variable (whether the state allows entry into the intraLATA market) reflects the propensity of the PUC to cross-subsidize local service via toll service revenues. This may affect interLATA toll rates since a propensity to cross-subsidize may influence the access charges to interLATA carriers.

report. Thus, the signs of the coefficients may not be the same as those based on an unregulated market.

The population density of the state (DENSITY) is likely to affect both the supply and demand for telephone service. Higher population density in an unregulated market is likely to reduce input costs, since the cost of providing each household with local service increases with the distance from the local exchange office. However, the greater the density of the area the greater is the potential demand to communicate which may lead to higher prices in an unregulated market. Once controlling for population, however, it is difficult to predict the sign. Nevertheless, we include the geographic area (in square miles) of the state divided by the state population in 1985 to account for these factors.[55]

We include the population of the state in 1985 (POP) to reflect the number of subscribers to the local systems to which people in the state would make either inter- or intraLATA toll calls.[56] The higher the population in an unregulated market the greater the demand for toll service and the higher the price. We include a measure of prices across states (CPI) to represent the cost of living in the area. This should in large part measure the cost of other goods. Higher costs of other goods invokes both an income and substitution effect on the demand for telephones. Consequently, even in an unregulated market, the sign on this coefficient cannot be predicted. Since there is no publicly available price index on a state by state basis, we have constructed this variable based on an available index of living cost for 246 cities for the fall of 1986.[57] We include

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[55] The data for density were obtained from U.S. Bureau of the Census (1986).

[56] The data for POP were obtained from U.S. Bureau of the Census (1986).

[57] This index was constructed from data obtained from American Chamber of Commerce Researchers Association (1986).

1985 state per capita income (INCOME) since per capita income is likely to affect interLATA and intraLATA toll rates.[58] In an unregulated market, higher per capita income should be associated with a higher demand for toll service and therefore a higher price.

As a measure of the costs faced by the BOCs for intraLATA service and by AT&T for interLATA service, we include the 1984 average wage per employee in each state for the telecommunications industry (WAGES).[59] In an unregulated market, this variable would be positively related to toll prices. We have excluded two other possible determinants of cost: materials cost and the cost of capital. However, these are unlikely to vary significantly across states since materials are purchased largely in a national market and the cost of capital is in part determined by the capital markets faced by the regional holding company. As discussed in more detail below, we have included dummy variables for the regional holding companies. These dummy variables will account for any differences across the regional BOCs not captured by the other included variables. The input costs are also likely to vary with the access charge that the telephone company pays for access to the BOC's local network.[60] Though we do not have a dollar measure of these access costs, we do know whether the local company has lowered the access charge since 1983. Accordingly, we

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[58] Per capita income for 1985 was obtained from the Survey of Current Business (1986).

[59] The data for WAGES were obtained from U.S. Bureau of Labor Statistics (1986). The 1984 values were the most current available data for this variable.

[60] This is an opportunity cost for the BOC in the intraLATA market since the BOC provides the access.

include a dummy variable (ACCESS) to reflect whether the state has lowered its access charge.[61]

One variable we use to reflect the nature of state regulation (what we called political variables above) is a rating of the degree to which the PUCs favor utilities over customers. We know of no such rating for the telephone companies but there is a rating of PUC attitudes towards electric utilities (SALOMON). Salomon Brothers rates PUCs in bond rating fashion from B+ for the most favorable attitude toward utilities to E for least favorable. Using this index we create a dummy variable. The variable takes on a value of one if the 1986 Salomon Brothers rating is C+ or above.[62]

Another variable that may reflect the nature of state regulation is the degree to which the state is made up of rural population. We include this variable because the gains from cross-subsidization of local service have largely gone to rural users where the cost of local exchange service is very high.[63] For example, Noll states "[the distributional impact of the subsidy] may not exist at all in urban areas, but that in any case it is much higher in rural areas.....[T]he details of state regulatory reform ought to differ, in general,

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[61] The data for ACCESS were obtained from U.S. Department of Commerce, National Telecommunications and Information Administration (1986).

[62] For Nebraska and Tennessee, Salomon Brothers did not have a rating since there are either few or no privately owned utilities in those states. For these two states we polled a number of experts on the regulatory environment and used their opinion to subjectively assign a variable value. The Salomon ratings were obtained from Salomon Brothers Inc. (1986). We have also experimented with other formulations of the Salomon rating (for example, a dummy variable for each rating). The results are consistent across the various formulations.

[63] See Noll (1986).

according to the strength of rural interests in the state".[64] Accordingly, we would expect that states whose populations were disproportionately rural would be the least likely to end the cross-subsidization of local rates. We include the ratio of rural population to total population (PRURAL) as a measure for the degree of urbanization in a state, which in turn is a proxy for the political pressures to maintain cross-subsidization from long distance rates to local rates.

Tables V:2 (pp. 35-38) and V:3 (pp. 39-42) list the definitions, means, and standard deviations for all variables for the intraLATA and interLATA equations respectively.

B. The Estimation Methodology[65]

For all the equations, we employ a double log specification.[66] For each mileage range we can estimate a separate reduced form equation using ordinary least squares.[67] However, the disadvantage of estimating a

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[64] *Ibid*, pp 181-182. Note that the impact of this differential urban-rural subsidy is partly captured by variables such as REGIME, DENSITY, and OPRICE. Nevertheless, we include this variable to capture other differences between rural and urban states.

[65] Readers unfamiliar with econometric methodology may wish to go directly to Section VI.

[66] We have estimated a linear specification of the model and obtained qualitatively similar results.

[67] The use of ordinary least squares assumes that the right hand side variables are exogenous. Consequently, for the entry variable, we implicitly assume that the price of intraLATA service does not affect the state's regulatory actions regarding entry into the intraLATA market. To account for the possibility that deregulation efforts were spurred by price levels, we include OPRICE. If deregulation had occurred in states in response to differences in prices at that time, and the regulation itself did not affect prices,

TABLE V:2

Variables Used in the IntraLATA Analysis

Variable	Definition	Mean	Standard Deviation
PRICE	Oct. 1986 price of intraLATA call	$1.24	$0.49
OPRICE	Dec. 1983 price of intrastate call	$1.23	$0.50
FBENTRY	=1 if state restricts facilities-based competition, =0 otherwise	0.71	0.45
NOENTRY	=1 if state restricts facilities-based competition and resellers, =0 otherwise	0.17	0.37
BLOCK	=1 if state takes action to enforce entry restriction, =0 otherwise	0.38	0.48
DENSITY	Area of the state divided by the population of the state (1985)	0.03	0.04
POP	Population of the state (1985)/10000	492.79	506.04
CPI	State consumer price index (1986)	101.47	8.91
INCOME	Per capita income of state (1985)	$12749.27	$1842.18

TABLE V:2--Continued

Variable	Definition	Mean	Standard Deviation
WAGES	Average wage of telecommunication workers in the state (1984)	$27909.96	$1715.71
SALOMON	=1 if 1986 Salomon Brothers rating of how favorable the state's PUC is toward the electric utilities is C+ or above (1986)	0.58	0.49
PRURAL	Percentage of rural population in the state (1985)	33.61	14.15
ACCESS	=1 if state has lowered its access charge to long distance carriers, =0 otherwise	0.48	0.50
MILES1	=1 f call is between 0-10 miles =0 otherwise	0.12	0.33
MILES2	=1 if call is between 11-16 miles =0 otherwise	0.12	0.33
MILES3	=1 if call is between 17-22 miles =0 otherwise	0.12	0.33

TABLE V:2--Continued

Variable	Definition	Mean	Standard Deviation
MILES4	=1 if call is between 23-30 miles =0 otherwise	0.12	0.33
MILES5	=1 if call is between 31-40 miles =0 otherwise	0.12	0.33
MILES6	=1 if call is between 41-55 miles =0 otherwise	0.12	0.33
MILES7	=1 if call is between 56-70 miles =0 otherwise	0.12	0.33
MILES8	=1 if call is between 71-124 miles =0 otherwise	0.12	0.33
BOC1	=1 if state is part of Ameritech =0 otherwise	0.10	0.31
BOC2	=1 if state is part of Bell Atlantic =0 otherwise	0.12	0.33
BOC3	=1 if state is part of Bell South =0 otherwise	0.19	0.39
BOC4	=1 if state is part of Nynex =0 otherwise	0.15	0.35

TABLE V:2--Continued

Variable	Definition	Mean	Standard Deviation
BOC5	=1 if state is part of Pacific-Telesis =0 otherwise	0.04	0.20
BOC6	=1 if state is part of Southwest Bell =0 otherwise	0.10	0.31
BOC7	=1 if state is part of U.S. West =0 otherwise	0.29	0.46

TABLE V:3

Variables Used in the InterLATA Analysis

Variable	Definition	Mean	Standard Deviation
PRICE	Aug. 1987 price of interLATA call	$1.37	$0.46
OPRICE	Dec. 1983 price of intrastate call	$1.41	$0.60
REGFLEX	=1 if state allows pricing flexibility =0 otherwise	0.72	0.45
DENSITY	Area of the state divided by the population of the state (1985)	0.02	0.04
POP	Population of the state (1985)/10000	584.46	519.51
CPI	State consumer price index (1986)	100.94	9.05
INCOME	Per capita income of state (1985)	$12862.49	$1897.78
WAGES	Average wage of telecommunication workers in the state (1984)	$27974.38	$1806.65
SALOMON	=1 if 1986 Salomon Brothers rating of the state's electric utility is C+ or above (1986)	0.59	0.49

TABLE V:3--Continued

Variable	Definition	Mean	Standard Deviation
PRURAL	Percentage of rural population in the state (1985)	32.58	13.16
NOENTRY	=1 if state restricts facilities-based competition and resellers, =0 otherwise	0.15	0.36
ACCESS	=1 if state has lowered its access charge to long distance carriers, =0 otherwise	0.59	0.49
MILES1	=1 if call is between 0.10 miles =0 otherwise	0.10	0.30
MILES2	=2 of call is between 11-16 miles =0 otherwise	0.10	0.30
MILES3	=1 if call is between 17-22 miles =0 otherwise	0.10	0.30
MILES4	=1 if call is between 23-30 miles =0 otherwise	0.10	0.30
MILES5	=1 of call is between 31-40 miles =0 otherwise	0.10	0.30

TABLE V:3--Continued

Variable	Definition	Mean	Standard Deviation
MILES6	=1 if call is between 41-55 miles =0 otherwise	0.10	0.30
MILES7	=1 if call is between 56-70 miles =0 otherwise	0.10	0.30
MILES8	=1 if call is between 71-124 miles =0 otherwise	0.10	0.30
MILES9	=1 of call is between 125-196 miles =0 otherwise	0.10	0.30
MILES10	=1 if call is between 197-292 miles =0 otherwise	0.10	0.30
BOC1	=1 if state is part of Ameritech =0 otherwise	0.13	0.33
BOC2	=1 if state is part of Bell Atlantic =0 otherwise	0.13	0.33
BOC3	=1 if state is part of Bell South =0 otherwise	0.23	0.42
BOC4	=1 if state is part of Nynex =0 otherwise	0.08	0.27

TABLE V:3--Continued

Variable	Definition	Mean	Standard Deviation
BOC5	=1 if state is part of Pacific-Telesis =0 otherwise	0.05	0.22
BOC6	=1 if state is part of Southwest Bell =0 otherwise	0.13	0.33
BOC7	=1 if state is part of U.S. West =0 otherwise	0.26	0.44

separate equation for each mileage range is the limited number of degrees of freedom. For instance, the intraLATA model has only 48 observations; this means that in our model there are only 31 degrees of freedom in the intraLATA model. There are only 22 degrees of freedom in the interLATA model.

In addition, statistical tests concerning the average price effect of any variable across the 8 or 10 mileage ranges require that we have independence across the residuals for the different price equations.[68] However, independence of the residuals across price ranges may not be a reasonable assumption for these data. For example, what we do not explain for the 0-10 mile price of one state may be correlated with what we do not explain for the 11-16 mile price since the same factors (such as omitted cost factors) are likely to affect the price for both mileage ranges.

To resolve these two problems we employ a widely used technique. Pooled time-series cross-section models are similar in structure to the type of reduced form models used in this report. For example, in many instances we observe the earnings of a cross section of individuals for a variety of years. One option is to model each year as a separate equation. The alternative option is to "pool" the data and analyze the cross section and time series data together in a single equation. In the models described in equation (1), instead of having observations over different years for the same individuals we have observations over different mileage ranges for the same state.

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then the inclusion of OPRICE (which is prior to all state deregulation efforts) would cause the relationship between the REGIME variables and current prices to disappear.

[68] If the residuals for each observation were independent of each other, we could test whether the average effect of a variable over all mileage ranges was significantly different from zero by summing the t-statistics from each OLS equation and dividing by the square root of the number of OLS equations.

Borrowing from the time series-cross section models, we pool the data for the different distances and analyze all of the data within a single equation. The pooling of the data may result in correlation among the error terms across different observations. There are numerous ways in which one can adjust the model so that the error term has the desirable statistical properties. The method used in this report is a variant of the covariance model.[69] The covariance model allows each cross-sectional unit (in this case, the state) and each time period (in this case a distance) to have its own dummy variable. Therefore, correlations among error terms across two observations for the same mileage range will be incorporated into the dummy variable for the mileage range. Likewise, any similarities in the error term between two different mileage ranges for the same state will be incorporated into these dummy variables. Consequently, we have included in the reduced form model [equation (1)] two sets of dummy variables. The first set is a dummy variable for each of the 10 mileage ranges (MILESj j=1,10). The second set consists of a dummy variable for each of the seven regional Bell companies (BOCk k=1,7). We use only dummy variables for the seven BOCs because data limitations constrain us from including a dummy variable for each state. Each of these BOC dummies captures the part of the residual that is common to all states served by the particular regional Bell company.

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[69] The error components model is another common model for this type of analysis. For a description of both the covariance model and error component models, see Kmenta (1971, pp. 508-517) and Johnston (1984, pp. 396-407).

VI. The Results for the IntraLATA Model

In this section, we report our estimates of the reduced form models to measure the impact of entry regulation on intraLATA pricing. As discussed in the last section we estimate a model with three regulation or REGIME variables: FBENTRY, BLOCK, and NOENTRY. Our sample consists of all the 48 lower continental states.

The dependent variable for all of the reduced form models is the price of a 5-minute daytime call. We report only the results for calls during daytime hours because we obtained similar results using evening, night-time, and weekend rates.[70]

A. Regulation Variables

From examining the price data, one might surmise that states that restrict entry by both facilities-based carriers and resellers have higher prices than states that do not. Table VI:1 (p. 46) contains the average 1986 and 1983 intraLATA prices for a 5-minute call during the daytime separated into those that have reseller and facilities-based entry restrictions (NOENTRY) and those that do not. States that restricted entry had higher 1986 prices than other states for all but one of the mileage bands.

To examine whether lower prices can be attributed to competition, we also report the average change in prices between 1983 and 1986 given by columns three and six of Table VI:1.[71] For states with competition, prices have fallen in three of the eight mileage bands, whereas average prices have risen in all mileage bands for states without competition. Moreover, in the states that have allowed entry and have experienced price increases, the increase are

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[70] All states allow for some discount for nonbusiness hour calls.

[71] All changes in state policies toward intraLATA entry occurred between 1983 and present.

TABLE VI:1

Average IntraLATA Prices in States With and Without Competition (Day-time Rates for a 5 Minute Call)

Without Total Entry Restrictions

Distance	86 Price	83 Price	Change
0-10 Miles	$0.59	$0.56	$0.03
11-16 Miles	$0.78	$0.76	$0.02
17-22 Miles	$0.96	$0.94	$0.02
23-30 Miles	$1.16	$1.14	$0.02
31-40 Miles	$1.35	$1.34	$0.01
41-55 Miles	$1.52	$1.53	-$0.01
56-70 Miles	$1.68	$1.72	-$0.04
71-125 Miles	$1.82	$1.88	-$0.06

With Total Entry Restrictions

Distance	86 Price	83 Price	Change
0-10 Miles	$0.66	$0.58	$0.08
11-16 Miles	$0.89	$0.77	$0.12
17-22 Miles	$1.02	$0.90	$0.12
23-30 Miles	$1.32	$1.21	$0.11
31-40 Miles	$1.46	$1.38	$0.08
41-55 Miles	$1.56	$1.48	$0.08
56-70 Miles	$1.71	$1.66	$0.05
71-124	$1.81	$1.78	$0.03

smaller than the increases that have occurred in restricted states.

These raw data comparing the price changes in states with and without the entry restrictions, however, do not account for other factors that may affect telephone prices. Thus, the differences suggested by Table VI:1 may be the result of other phenomena affecting the price of telephone service. Consequently, we use multivariate techniques to estimate the reduced form models developed in section V.

Table VI:2 (p. 48) displays the results of the reduced form intraLATA regression model. We present the model with the REGIME variables BLOCK and NOENTRY interacted so that the effect of states actively blocking entry can vary across facilities-based carriers and resellers. This model accounts for most of the variation in toll rates with an R^2 of 0.950.

The impact of a state restricting all forms of competition is given by the sum of the coefficients on facilities-based competition (FBENTRY) and reseller competition (NOENTRY).[72] This sum equals 0.072 (2.74).[73] If, in addition, the state takes action to prevent unauthorized provision of intraLATA service, the impact is given by the sum of FBENTRY, BLOCK, NOENTRY, and BLOCK*NOENTRY, which equals 0.098 (2.33). These results indicate that states which restrict all entry into the intraLATA market have approximately 7.5 percent higher toll prices than other states.[74] If the state takes blocking action prices are 10.3

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[72] As discussed previously, since no state that restricts resellers allows facilities-based competition, NOENTRY is equivalent to a restriction on both facilities-based and reseller competition.

[73] t-values appear in parentheses. A t-value of greater than 1.96 indicates significance at the 95 percent level.

[74] The coefficient (in this case .073) does not directly indicate the percentage effect on price. The conversion from this coefficient to the percentage is given by

TABLE VI:2

The Effect of Various Entry Restrictions on the 1986 Price of an IntraLATA 5 Minute Direct Dial Toll Call During the DayTime

Dependent Variable = Price of an IntraLATA call
(Double Log Specification)

Variable	Coefficient	t-value
Intercept	6.905	4.49**
OPRICE	0.734	26.44**
FBENTRY	-0.010	-0.64
BLOCK	0.024	1.50
NOENTRY	0.082	3.14**
BLOCK*NOENTRY	0.002	0.07
POP	-0.030	-2.87**
CPI	-0.011	-0.08
INCOME	0.065	1.00
WAGES	-0.699	-4.52**
DENSITY	-0.022	-1.85
SALOMON	-0.036	-2.93**
PRURAL	0.046	2.37*
ACCESS	0.015	1.04
MILES(0-10)	-0.229	-5.75**
MILES(11-16)	-0.155	-4.74**
MILES(17-22)	-0.118	-4.20**
MILES(23-30)	-0.075	-3.08**
MILES(31-40)	-0.042	-1.89
MILES(41-55)	-0.025	-1.18
MILES(56-70)	-0.010	-0.48
BOC2	-0.001	-0.03
BOC3	-0.019	-0.79
BOC4	0.020	0.62
BOC5	-0.018	-0.36
BOC6	0.163	6.22**
BOC7	-0.039	-1.41

Adjusted R^2 = 0.950, F-Value = 279.156, N=384
* Statistically significant at .05 level.
** Statistically significant at .01 level.

percent higher.[75] If a state only restricts facilities-based competition, there is no significant impact on price even if they attempt to block the illegal provision of intraLATA calls.

B. Control Variables

We now focus on the coefficients of the other independent variables.[76] As discussed previously, the signs of the coefficients for these exogenous variables are difficult to interpret since the market for long distance service is regulated.[77] Within a regulated market the reduced form

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exp(coefficient)-1.

[75] The results regarding the REGIME variables are robust with alternative formulations of the model. For example, we have also estimated the equation for evening and nighttime/weekend rates and obtained similar results. We have also estimated the model with a longer call and obtained similar results. Additionally, we have estimated the model without the other control variables and obtained similar results. While some of the control variables change with alterations in the specification the effect of the REGIME variables are remarkably stable.

[76] Recall that the mileage band and BOC dummies are included to increase the efficiency of the econometric model; some of these dummy variables are significantly different from zero. The 0-10 mile, 11-16 mile, 17-22 mile, 23-30 mile, and 31-40 mile band rates are significantly less than the left-out 71-124 mile band. The 41-55 and 56-70 mile calls are also less expensive, other things equal, but not significantly. One of the local Bell Operating Companies, Southwestern Bell (BOC6), had rates that were significantly greater than those of the base firm (Ameritech).

[77] It is also difficult to compare the coefficient estimates with those obtained from other studies of telecommunication markets. Most other studies examine the demand for long distance service by examining how toll

coefficients represent the interaction of demand influences, political influences, and factors that influence costs. In addition, because we have included the 1983 price, the impact of many exogenous factors may be already incorporated into the coefficient on this variable. Nonetheless, existing theory suggests that these kinds of variables should be included in the analysis, although current theory does not indicate precisely how these political variables interact with the demand and cost factors. To exclude one or more of these variables from the analysis may lead to biased coefficient estimates.

The coefficient on the pre-divestiture price (OPRICE) is positive and significant. This coefficient, in part, captures the lack of change in the attitude of the PUCs towards the pricing of intraLATA long distance service and the degree to which the PUCs are cautious in allowing large changes in toll rates. For example, PUCs that were generous towards AT&T may now be generous towards the BOCs. In addition, this estimate reflects that prices over time tend to be correlated with each other.

The coefficient on the percentage of rural population in each state (PRURAL) is significantly greater than zero. This result is consistent with the hypothesis that the PUC may be using the revenue from long distance service to subsidize local service in rural areas. Since a large amount of revenue is needed to keep the price of local service low for rural users, we would expect states interested in cross-subsidizing these users to have higher toll prices.

The population variable (POP) is negative and significant. It may be that large population leads to lower costs, but one would think that DENSITY would capture this effect. The coefficients on the cost of living, CPI, and per capita income of a state, INCOME, are insignificant. The coefficient for WAGES is significantly negative. Absent regulation we would expect the opposite result because the higher the labor costs

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demand varies in response to changes in price rather than on the determination of price.

to the BOCs the higher should be prices. Given the reduced form of our model, we cannot determine whether the interaction of wages and PUC regulation is responsible for reversing the relationship.

The Salomon Brothers PUC rating variable (SALOMON) is negative and significant. This implies that the more favorably inclined the PUC is toward the electric utilities, the lower the price. It is possible that decisions regarding intraLATA rates may be indicative of the PUC's preferences towards the rural-urban dichotomy rather than toward the consumer-utility dichotomy. Alternatively, these signs may reflect the inclination of PUCs favorable to business to give the commercial toll customers lower prices at the expense of local service users.

The coefficient on the variable which indicates whether the state has lowered the charges by the BOC to the other long distance carriers (ACCESS) is not significant.

C. Summary

The rates for intraLATA toll service are about 7.5 percent higher in states that restrict both facilities-based carriers and resellers from providing intraLATA toll service than in states that do not. If states that restrict entry also take action to prevent unauthorized provision of intraLATA service the price difference rises to 10.3 percent. Preventing the entry of only facilities-based carriers apparently does not affect intraLATA toll rates.

The lower prices in states that allow entry do not appear to reflect a tendency for pricing regulations to be relaxed in states where prices were already low nor for stricter regulation to remain in states with high prices.[78]

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[78] We control for this possibility by including the December 1983 price in our regression analysis. If deregulation had occurred in states which had low prices prior to deregulation, then, the inclusion of the December 1983 price (which is prior to all state deregulation efforts)

If all states allowed entry into intraLATA toll markets, the annual dollar savings to intrastate intraLATA toll service customers implied by the study would be approximately $200 million. IntraLATA toll revenues in 1985 were estimated to be $15 billion.[79] Since approximately 19 percent of the population resides in states that currently restrict entry, we compute the total dollar savings to be equal to the price effect estimated from the study (7.5 percent) multiplied by 19 percent of total intraLATA toll revenue. This estimate ignores any stimulative effects on calling volume caused by lower prices which would be an additional benefit to consumers. This estimate assumes that the price differences found in the study can be projected to states that have not yet allowed entry.

The savings to intrastate intraLATA customers from an open-entry policy, however, may be offset, in part, by higher local telephone rates, since revenue from above-cost intraLATA long distance rates may be used to subsidize local telephone use. However, the elimination of the subsidy is likely to yield more benefits to long distance users than the increased costs to local users. This effect occurs because long distance users are likely to purchase more service at the new lower prices. Local users, on the other hand, will tend not to decrease purchases of local service at the new non-subsidized rates.

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would capture this effect and the relationship between entry restrictions and 1986 prices would no longer be significant. Since we include the December 1983 price, our estimate relates to the change in price during the deregulation period, not price differences that already existed in 1983. It is possible, however, that the states that have chosen free-entry are those in which the BOCs (for some reason not captured by our empirical model) were predisposed to lower prices. Thus, it may be inappropriate to project the currently observed price differences between free-entry and no-entry regimes to states that switch to free-entry in the future.

[79] See Huber (1987).

VII. The Results for the InterLATA Price Model

In this section we examine the impact of rate-of-return regulation and flexible pricing regulations on interLATA pricing. To do this, we compare the differences in average prices across the two regulatory regimes and estimate the regression model shown in equation (1) above. We also discuss the impact of the control variables on prices.

A. Measuring the Impact of Alternative Regulatory Regimes

Table VII:1 (p. 54) contains the average 1987 and 1983 interLATA prices for a 5-minute call during the daytime in states that allow any form of pricing flexibility and states that do not. States that allowed pricing flexibility had lower 1987 prices than other states for all of the mileage bands. In order to examine whether lower prices can be attributed to the time period when pricing flexibility was instituted we also report the average change in prices between 1983 and 1987 given by columns three and six of Table VII:1.[80] For 8 of the 10 mileage bands, prices have risen more dramatically (or have fallen less dramatically) between 1983 and 1987 in states with rate-of-return regulation. Consequently, 1987 average prices are higher in states with rate-of-return regulation, and part of this difference can be attributed to changes in prices since 1983. For example, since 1983, in states with rate-of-return regulation, the price of a five-minute call between 31-40 miles increased by four cents. In states that allow pricing flexibility, the average price for a 31-40 mile call has fallen by three cents.

Table VII:2 (p. 55) gives the results for the interLATA toll equation. We have estimated the equation using the price of a 5-minute call during daytime hours, evening hours, and

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[80] All states that adopted pricing flexibility did so between 1983 and present.

TABLE VII:1

Average AT&T InterLATA Prices in States with ROR and States with Price Flexibility (Day-time Rates for a 5 Minute Call)

ROR Regulation

Distance	87 Price	83 Price	Change
0-10 Miles	$0.77	$0.61	$0.16
11-16 Miles	$0.91	$0.79	$0.12
17-22 Miles	$1.09	$0.99	$0.10
23-30 Miles	$1.27	$1.17	$0.10
31-40 Miles	$1.43	$1.39	$0.04
41-55 Miles	$1.59	$1.61	-$0.02
56-70 Miles	$1.71	$1.78	-$0.07
71-124 Miles	$1.85	$1.99	-$0.14
125-196 Miles	$1.95	$2.15	-$0.20
197-292 Miles	$2.04	$2.28	-$0.24

Price Flexibility

Distance	87 Price	83 Price	Change
0-10 Miles	$0.70	$0.53	$0.17
11-16 Miles	$0.89	$0.74	$0.15
17-22 Miles	$0.99	$0.90	$0.09
23-30 Miles	$1.22	$1.16	$0.06
31-40 Miles	$1.32	$1.35	-$0.03
41-55 Miles	$1.39	$1.51	-$0.12
56-70 Miles	$1.59	$1.70	-$0.11
71-124 Miles	$1.66	$1.85	-$0.19
125-196 Miles	$1.80	$2.01	-$0.21
197-292 Miles	$1.84	$2.12	-$0.28

TABLE VII:2

The Effect of AT&T Pricing Flexibility on the 1987 Price of a 5 Minute Direct Dial Toll Call During the Day

Dependent Variable = Price of an InterLATA Call
(Double-Log Specification)

Variable	Coefficient	t-value
Intercept	5.91	1.86
OPRICE	0.48	10.19**
REGFLEX	-0.07	-2.91**
DENSITY	-0.02	-0.65
POP	-0.09	-3.89**
CPI	-0.03	-0.13
INCOME	-0.47	-3.48**
WAGES	0.06	0.24
SALOMON	0.07	2.80**
PRURAL	-0.13	-2.58*
NOENTRY	0.11	3.13**
ACCESS	0.08	3.42**
MILES1 (0-10)	-0.25	-3.99**
MILES2 (11-16)	-0.25	-3.99**
MILES3 (17-22)	-0.22	-3.87**
MILES4 (23-30)	-0.13	-2.62**
MILES5 (31-40)	-0.11	-2.42**
MILES6 (41-55)	-0.10	-2.53*
MILES7 (56-70)	-0.04	-1.01
MILES8 (71-124)	-0.03	-0.79
MILES9 (125-196)	-0.00	-0.01
BOC2	-0.05	-1.14
BOC3	-0.03	-0.83
BOC4	-0.05	-0.81
BOC5	-0.34	-3.81**
BOC6	0.07	1.70
BOC7	0.00	0.00

Adjusted R^2 = 0.81, F-Value = 71.11, N=390
* Statistically significant at .05 level.
** Statistically significant at .01 level.

night/weekend hours.[81] We only present the results for the daytime hours, since they are representative of the estimates for the other hours. The equation in estimated in double logarithmic form (except for the dummy variables).[82]

We first discuss the results for REGFLEX. The results demonstrate that after controlling for differences in the daytime 1983 price and other explanatory variables, those states that have allowed AT&T some degree of pricing flexibility have significantly lower daytime prices than those states that maintain strict rate-of-return regulation. The coefficient on the regulatory flexibility variable equals -0.07; this indicates that, after controlling for the other factors in the model, the cost a five minute call is approximately 7 percent lower in states that have allowed pricing flexibility.[83]

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[81] We have also estimated the equation using the price of a 15 minute call and obtained very similar results. Because the results for evening and nighttime/weekend hours are similar to those for the daytime equation, we only report the results for the latter equation.

[82] We have also estimated the equation in linear form. The results using this model were very similar and consequently we do not report them.

[83] The results regarding the regulation variable, REGFLEX, are robust with respect to a variety of specification changes. For example, when we estimate the model where the dependent variable is the change in price since 1983, we obtain a similar coefficient on the regulation variable. We also estimate the model without any of the exogenous variables (except 1983 price) and obtain similar results. We have omitted the 1983 price and the dummy variables and obtained similar results. Moreover, the results for longer calls are similar to those for the five minute call in terms of the percentage effect on price.

We have also estimated the model including proxies for the degree of competition in each state. In particular, we included in separate regressions the number of long distance carriers operating in each state (see Federal Communications

We have also experimented with other formulations of REGFLEX. In the formulation above, we have considered a single regulation variable that equals 1 if the state allows any kind of pricing flexibility.[84] To account for the different types of pricing flexibility granted to AT&T, we have divided the single regulation variable into two variables.[85] The first variable is a dummy variable that equals one if the state sets either a pricing band or a maximum price within which or below which AT&T can freely

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Commission, 1987b) and this number divided by the area of the state as explanatory variables. The competition variables were not significant and did not significantly alter our estimates of the effect of alternative regulations on price, or of the other variables on price.

We have also estimated the equation for evening and nighttime/weekend rates and the results are similar to those reported here. For evening hours the coefficient on the flexibility variable equals -0.11, indicating that other things equal a five minute call, on average, costs 12 percent less in states that have allowed pricing flexibility. For night/weekend rates, the coefficient on the flexibility variable equals -0.12. Thus, the price of a five minute call in states that allow flexibility is 13 percent less than in states that do not.

[84] These are the 28 states listed in Appendix B.

[85] Some states have allowed AT&T to change prices within a specified band or change price as long as it is stays below a maximum price (see Appendix B for details). Other states have formally given AT&T full pricing flexibility, but in some of these states the public utility commission retains the right to review (though not through formal rate cases) prices charged by AT&T and can prevent AT&T from implementing prices deemed anticompetitive. Consequently, for these states, it may be difficult to ascertain the degree of pricing freedom that AT&T actually has. Only Montana and Nebraska have actually taken steps to exempt AT&T from state regulation.

operate (16 of the 28 states that allow flexibility do so in this manner). This type of pricing flexibility is more similar to the type proposed by the FCC.[86] The second variable is a dummy variable that equals 1 if the state has granted AT&T full pricing flexibility (12 of the 28 states are of this type).[87]

The empirical results for the band or maximum price form of flexibility variable indicate that states allowing AT&T this kind of flexibility have approximately 14 percent (4.95) lower prices than states that allow no flexibility. For the full pricing flexibility variable, the results indicate that while states allowing AT&T full pricing flexibility have about 1 percent (0.22) lower prices than states without flexibility, this difference is not significant. The reason for this result is unclear. One might speculate that AT&T actually has more freedom to change prices in states with price bands or price caps than in states with full pricing flexibility, since the latter states retain the right to oppose AT&T price changes while the former have essentially approved all price changes within the specified ranges.

B. Control Variables

We now examine the results for the non-regulatory variables in the regression.[88] The coefficient on the 1983

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[86] The FCC proposed plan would set maximum rates for a basket of services. These 16 states are those listed in Appendix A without an asterisk preceding them.

[87] These states are denoted in Appendix B by an asterisk preceding the state.

[88] The mileage band and BOC dummies are included to increase the efficiency of the econometric model. The coefficients on the dummy variables for mileage range are significant. After controlling for the other factors in the model, the prices of a 0-10 mile call, a 11-16 mile call, a 17-22 mile call, a 23-30 mile call, a 31-40 mile call, and a 41-55 call are all significantly cheaper than a call in the reference

price is positive and significant. This indicates that states that had higher prices in 1983, *ceteris paribus*, are likely to have higher prices in 1987.

The coefficients on DENSITY, CPI, and WAGES are insignificant. As with the intraLATA model, the population variable (POP) is negative and significant. Again, it may be that in areas with large populations it is less costly to link the customer to the telephone network thereby resulting in lower prices. The coefficient on INCOME is negative and significant indicating that the higher the income of the state, the lower is the price of interLATA service. Since income should proxy the demand for service, in an unregulated market we would expect the opposite sign. Unfortunately, we have no way to determine whether the interaction of income and PUC regulation is responsible for reversing the relationship.

The coefficient on SALOMON is positive and significant indicating that states that are rated as being favorable to utilities have higher prices. This result is the opposite of what we found for intraLATA service. Likewise, the results concerning PRURAL are different than those for the intraLATA model. In the intraLATA model the larger the percentage of the population that is rural the higher were

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mileage range of 197-292 miles. The prices of a 56-70 mile call, a 71-124 mile call, and a 125-196 mile call are less, but not significantly less than a 197-292 mile call.

The particular area of the country as represented by the regional Bell company has some systematic effect on price in the regression. For example, *ceteris paribus*, states under Pacific Telesis (BOC5) have significantly lower prices for a given form of regulation than states under the regional Bell company of Ameritech (which represents the midwest region of the U.S.).

toll prices, in the interLATA model a higher percentage of rural population is associated with lower toll prices.[89]

The coefficient on NOENTRY is positive and significant. This indicates that states that preclude entry into the intraLATA market (presumably to cross-subsidize local service) have higher interLATA prices. It may be that states also attempt to cross-subsidize local service through revenues from intrastate interLATA toll service.

Finally, the coefficient on the access variable (ACCESS) indicates that rates are higher in PUCs that have lowered their access charge, even while controlling for the 1983 price of interLATA service. Since access is a direct cost to AT&T, we would expect their rates to be lower in states that have lowered their access charge. To ascertain whether these unexpected results arise from the interaction of demand and cost factors with the political process requires formal modeling of the determination of regulation, which is beyond the scope of this paper.

C. Summary of Results

The results of the interLATA model indicate that AT&T's daytime toll rates in states that allow it pricing flexibility are approximately 7 percent lower than states that do not. There are several explanations for this result. One explanation is that AT&T's prices are lower in states that allow pricing flexibility because of the differences in the incentives to minimize costs and innovate under the alternative regulatory approaches.[90] Further, AT&T may fail

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[89] As discussed earlier, the prices of an identical call are very different depending on whether it is interLATA or intraLATA. Thus it is not surprising that the coefficients from the two reduced form models differ.

[90] These differences are discussed in Section II. These effects would have had to occur quite quickly since most states have only recently (early 1986) allowed pricing flexibility.

to lower prices in states with rate-of-return regulation because of the difficulty AT&T foresees in raising them in the future. Under pricing flexibility, prices can be increased without approval as long as they are below the ceiling price. It is also possible, though we think unlikely, that lax regulation in states that have rate-of-return regulation have allowed AT&T to allocate costs incurred in pricing flexibility states to them.

The differences in prices do not appear to result from the imposition of very low price ceilings. If this were the case, we would expect that prices in most "price cap" states would be "bumping up" against the price ceilings. In fact, AT&T prices below the ceiling in approximately half of the states we surveyed. Moreover, AT&T's prices in these "below ceiling" states are lower by a statistically significant amount than its prices in states that do not allow pricing flexibility.[91] Additionally, AT&T is a proponent of "price cap" regulation, indicating that the ceiling prices are not set at unreasonably low levels. Also, the lower prices in states that allow pricing flexibility do not simply reflect a tendency for pricing regulations to be relaxed in states where prices were already low and for stricter regulation to remain in states with high prices. Our methodology allows us to control for this possibility, and we find that this effect is not significant.[92]

If all states were to switch to flexible regulation of prices, the estimated savings to intrastate interLATA customers

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[91] For the nine states we surveyed the four "below ceiling" states had prices that were approximately six per cent lower than other states.

[92] It is possible, however, that the states that have chosen price cap regulation are those in which AT&T (for some reason not captured by our empirical model) was inclined to lower prices. Thus, it may be inappropriate to project the currently observed price differences between flexible and inflexible regimes to states that switch to price cap regulation in the future.

would be about $157 million per year. Intrastate interLATA toll revenues (net of "access charges" to local telephone companies) have been estimated to be about $8 billion.[93] Since approximately 28 percent of the population (including only multiLATA states) resides in states that currently have rate-of-return regulation we compute the total dollar savings to be equal to the price effect estimated from the study (7 percent) multiplied by 28 percent of total intrastate interLATA toll revenue. This estimate ignores any stimulative effect on calling volume caused by lower prices which would be an additional benefit to consumers. The savings estimate is based on the assumptions that the price differences found in the study can be projected to those states that have not yet allowed pricing flexibility and that other interLATA intrastate carriers price similarly to AT&T.

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[93] See Huber (1987). We have assumed the split between intrastate interLATA and interstate interLATA revenues is approximately 40/60 percent respectively, based on 1983 data on call minutes.

VIII. Conclusion

This report examined the effect on toll rates of: (1) regulatory barriers to the entry of carriers into the intraLATA toll service market and (2) alternative forms of regulation of AT&T's (the dominant firm) intrastate interLATA toll service. We conclude that more flexible entry and price policies result in lower toll prices.

States that restrict both facilities-based carriers and resellers from providing intraLATA toll service have toll rates that are approximately 7 to 10% higher than other states.[93] The study finds no significant impact on toll rates if a state prevents entry of facilities-based competition but allows resellers.

States that allow AT&T pricing flexibility for interstate toll have approximately seven per cent lower toll prices than states that continue to regulate AT&T using rate-of-return regulation. One explanation is that AT&T's prices are lower in states that allow pricing flexibility because of the differences in the incentives to minimize costs and innovate under the alternative regulatory approaches. Further, AT&T may fail to lower prices in states with rate-of-return regulation because of the difficulty AT&T foresees in raising them in the future. Under pricing flexibility, prices can be increased without approval as long as they are below the ceiling price. The results suggest that the FCC price cap proposal and similar proposals at the state level are likely to lead to lower toll prices.

The results in this paper are a first attempt at estimating the price effects of recent changes in regulation of the telecommunications market. The telecommunications market is an extremely complex interaction of supply factors, demand factors, and political factors, all in an industry with quickly

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[93] Resellers, who are generally independent and largely unregulated firms, do not own their facilities (facilities-based firms) but lease capacity from other carriers and resell this capacity to telecommunications users.

changing technology. Any single empirical model cannot incorporate all of these complexities. Consequently, we encourage more research and refinement of the models discussed in this paper to verify that the results we find are consistent with alternative data and specifications.

References

American Chamber of Commerce Researchers Association, **Fourth Quarter 1986:Inter-City Cost of Living Index**, 1986.

Averch, H. and Johnson, L., "Behavior of the Firm Under Regulatory Constraint," **American Economic Review**, Vol. 52 December 1962.

Bhattacharyya, S. and Laughhunn, D., "Price Cap Regulation: Can We Learn From the British Telecom Experience?" **Public Utilities Fortnightly**, Vol. 120, No 8, October 1987.

Braeutigam, R., "The Regulation of Multiproduct Firms: Decisions on Entry and Rate Structure," **Ph.D Dissertation**, Stanford University, 1976.

Brennan, T. J., "Capping 'Average' Prices of Regulated Multiproduct Firms," Discussion Paper D-8718, Department of Economics, the George Washington University, November 1987.

Brock, G., "Bypass of the Local Exchange: A Quantitative Assessment," **OPP Working Paper Series**, #12, September 1984.

California Public Utilities Commission, Policy and Planning Division, **Competition in Local Telecommunication: A Report to the Legislature**, May 1987.

CCMI/McGraw-Hill, **National LATA Map**, Ramsey N.J., 1986.

Cornell, N., and Pelcovits, M., "Access Charges, Costs and Subsidies: The Effect of Long Distance Competition on Local Rates," in **Telecommunications Regulation Today and Tomorrow**, edited by Noem, E., New York, Harcourt Brace Jovanovich, 1983.

Danielsen, A. L. and Kamerschen D. R., **Telecommunications in the Post-Divestiture Era**, Lexington, MA 1986, Lexington Books.

Duvall, J., "Telephone Rates and Rate Structures: A Regulatory Perspective," in **Telecommunications Access and Public Policy**, edited by Baughcum, A., Faulhaber, G., Ablex Publishing Co, New Jersey, 1984.

Evans, D., and Heckman, J., "Natural Monopoly", in **Breaking up Bell: Essays on Industrial Organization and Regulation**, edited by Evans, D., North Holland, 1983.

Federal Communications Commission, Industry Analysis Division, Common Carrier Bureau, **Primer and Sourcebook on Telephone Price Indexes and Rate Levels**, April 1987a.

Federal Communications Commission, Industry Analysis Division, **Summary of Long Distance Carriers**, June 1987b.

Federal Communications Commission, Industry Analysis Division, Common Carrier Bureau, **Trends in Telephone Service**, February 1987c.

Frentrup, C., "The Effect of Competition and Regulation on AT&T's Intrastate Toll Prices, and of Competition on BOC IntraLATA Toll Prices," Federal Communications Commission, June 1988.

Gabel, R., **Development of Separations Principles in the Telephone Industry.** East Lansing, Mich.: Institute for Public Utilities, 1967.

Goldberg, V. P., "Regulation and Administered Contracts" **Bell Journal of Economics**, Vol. 7, No. 2, Autumn 1976.

Haring J. R. and Kwerel, E. R., "Competition Policy in the Post-Equal Access Market," **OPP Working Papers Series**, 1987.

Hayes, B. and Seigel, D., "Rate of Return Regulation with Price Flexibility," **The Journal of Business**, Vol. 59, No. 4, 1986.

Huber, P., **The Geodesic Network: 1987 Report on Competition in the Telephone Industry.** Washington, D.C.: U.S. Government Printing Office, January 1987.

Johnson, L., "Why Local Rates are Rising," **Regulation**, July/August 1983.

Johnston, J., **Econometric Methods**, New York, McGraw-Hill Book Co., 1984.

Joskow, P., "Pricing Decisions of Regulated Firms: A Behavioral Approach," Bell Journal of Economics, Vol. 4, 1974.

Kmenta, J., **Elements of Econometrics**, New York, The MacMillan Co., 1971.

Landes, W., and Posner, R., "Market Power in Antitrust Cases," 94 **Harvard Law Review** 937, 1981.

Legette, J., "Natural Monopoly in the Telecommunications Industry: The Case of Local Service", **Ph.D Dissertation**, University of South Carolina, 1986.

Mathios, A. and Rogers, R. P., "The Impact of Alternative Forms of State Regulation of AT&T on Direct Dial Long Distance Telephone Rates," **Federal Trade Commission Working Paper No. 159**, December 1987.

National Association of Regulatory Commissioners, **Bell Operating Companies' Exchange Service Telephone Rates**, December 1986.

National Association of Regulatory Commissioners, **Separations Manual**. Washington, D.C., 1971.

National Association of Regulatory Commissioners, **Long Distance Message Toll Telephone Rates**, December 1983.

Noll, R., "State Regulatory Responses to Competition and Divestiture in the Telecommunications Industry," in **Antitrust and Regulation** by Greison, R., Heath and Co., 1986.

Oettinger, A. and Weinhaus, C., **The Federal Side of Traditional Telecommunication Cost Allocations.** Cambridge: Harvard University Press, 1981.

Ordover, J., and Willig, R., "Local Telephone Pricing in a Competitive Environment," in **Telecommunications Regulation Today and Tomorrow**, edited by Noem, E., New York: Harcourt Brace Jovanovich, 1983.

Owen, B. and Braeutigam, R., **The Regulation Game: Strategic Use of the Administrative Process**, Cambridge, MA., Ballinger Publishing Company, 1978.

Phillips, Jr., C., **The Regulation of Public Utilities: Theory and Practice**, Public Utility Reports, Inc., Arlington Virginia, 1985.

Rodgers, P., and Morelli, G., **Intrastate Telecommunications Competition**, National Association of Regulatory Utility Commissioners, October 1985.

Salomon Brothers Inc., **Electric Utility Regulation - Semi Annual Review**, New York, 1986.

Scherer, F. M., **Industrial Market Structure and Economic Performance**, Chicago, Ill: Rand-McNally, 1970.

State Telephone Regulation Report, Vol 5, No. 18, Alexandria VA.: Telecom Publishing Group, September 1987.

Taylor, L., **Telecommunications Demand: A Survey and Critique**, Cambridge Ma., Ballinger Publishing Company, 1980.

U.S. vs. AT&T, **Response of the United States to Public Comments on Proposed Modification of Final Judgment**, United States District Court for the District Of Columbia, 1982.

U.S. Bureau of Census, **State and Metropolitan Area Data Book**, Washington D.C.: U.S.P.O., 1986.

U.S. Bureau of Economic Analysis, **Survey of Current Business**, Department of Commerce, April 1986.

U.S. Bureau of Labor Statistics, **Employment and Wages: Annual Averages, 1984**, Washington D.C.: U.S.P.O., 1986.

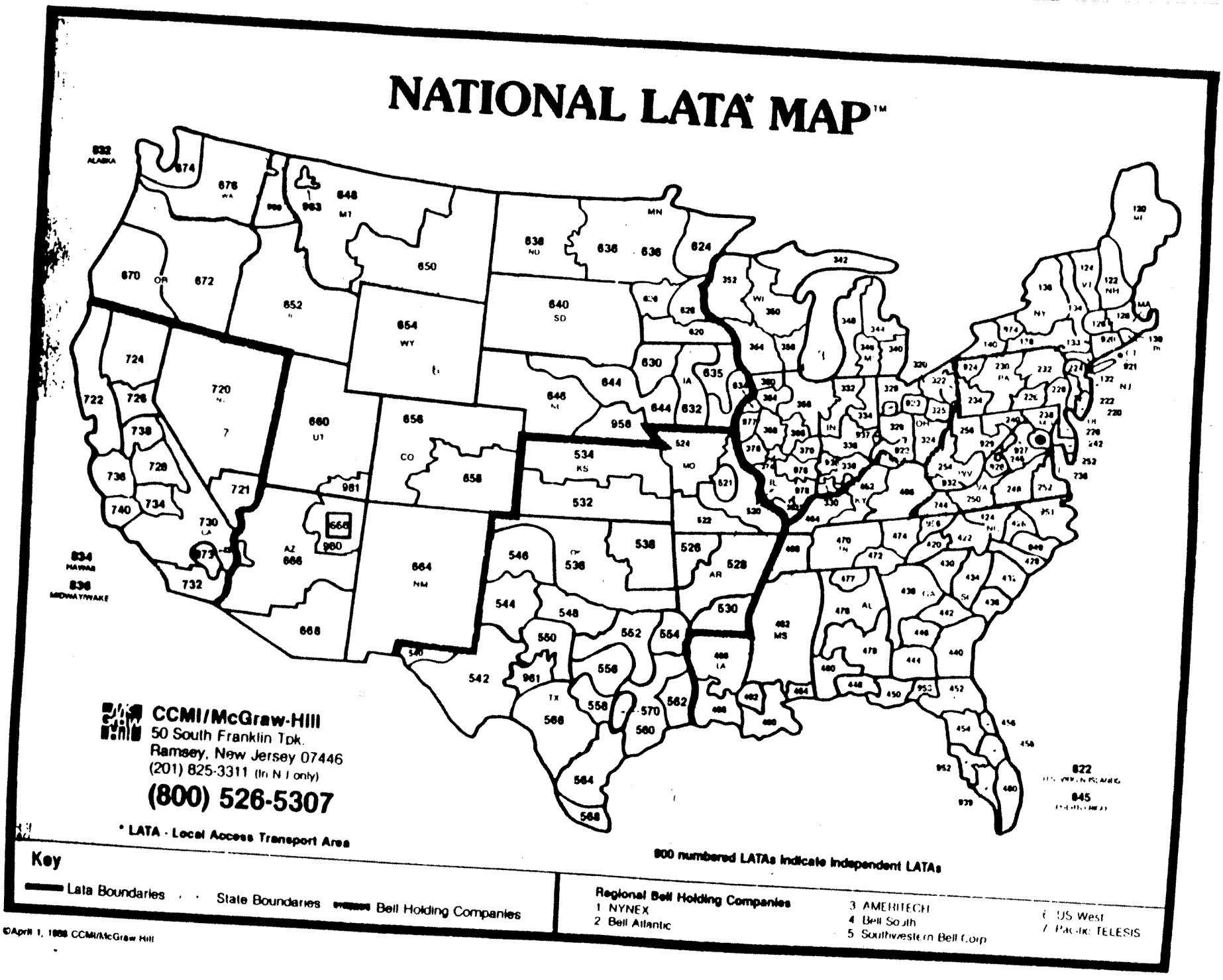
U.S. Department of Commerce, National Telecommunications and Information Administration, **NTIA Trade Report: Assessing the Effects of Changing the AT&T Antitrust Consent Decree**, February 1987a.

U.S. Department of Commerce, National Telecommunications and Information Administration, Office of Policy Analysis and Development, **Telephone Competition and Deregulation: A Survey of the States**, October 1986.

U.S. Department of Commerce, National Telecommunications and Information Administration, Office of Policy Analysis and Development, **Competition in the Local Exchange Telephone Service Market**, February 1987b.

U.S. Telephone Association, **Telephone Statistics**, Vol 1, 1986 edition, Washington D.C., 1986.

Division of Economic Research and Development and the Division of Communications, Virginia State Corporation Commission, **The Effect of Deregulation on AT&T Pricing in Virginia and a Comparison Survey of AT&T Pricing in Ten States Across the United States**, Virginia State Corporation Commission 1987.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LATA #	LATA Name & State	LATA #	LATA Name & State	LATA #	LATA Name & State	LATA #	LATA Name & State	LATA #	LATA Name & State
120	Maine (ME)	334	Auburn/Huntington (IN)	456	Daytona Beach (FL)	556	Waco (TX)	726	Sacramento (CA)
122	New Hampshire (NH)	336	Indianapolis (IN)	458	Orlando (FL)	558	Austin (TX)	728	Fresno (CA)
124	Vermont (VT)	338	Bloomington (IN)	460	Southeast (FL)	560	Houston (TX)	730	Los Angeles (CA)
126	West Massachusetts (MA)	340	Detroit (MI)	462	Louisville (KY)	562	Beaumont (TX)	732	San Diego (CA)
128	East Massachusetts (MA)	342	Upper Peninsula (MI)	464	Owensboro (KY)	564	Corpus Christi (TX)	734	Bakersfield (CA)
130	Rhode Island (RI)	344	Saginaw (MI)	466	Winchester (KY)	566	San Antonio (TX)	736	Monterey (CA)
132	New York Metro (NY)	346	Lansing (MI)	468	Memphis (TN)	568	Brownsville (TX)	738	Stockton (CA)
133	Poughkeepsie (NY)	348	Grand Rapids (MI)	470	Nashville (TN)	570	Hearne (TX)	740	San Luis Obispo (CA)
134	Albany (NY)	350	Northeast (WI)	472	Chattanooga (TN)	620	Rochester (MN)	822	U S Virgin Islands (VI)
136	Syracuse (NY)	352	Northwest (WI)	474	Knoxville (TN)	624	Duluth (MN)	832	Alaska (AK)
138	Binghamton (NY)	354	Southwest (WI)	476	Birmingham (AL)	626	St Cloud (MN)	834	Hawaii (HI)
140	Buffalo (NY)	356	Southeast (WI)	477	Huntsville (AL)	628	Minneapolis (MN)	836	Midway/Wake (US)
220	Atlantic Coastal (NJ)	358	Chicago (IL)	478	Montgomery (AL)	630	Sioux City (IA)	845	Puerto Rico (PR)
222	Delaware Valley (NJ)	360	Rockford (IL)	480	Mobile (AL)	632	Des Moines (IA)	920	Connecticut (CT)
224	North Jersey (NJ)	362	Cairo (IL)	482	Jackson (MS)	634	Davenport (IA)	921	Fishers Island (NY)
226	Capital (PA)	364	Sterling (IL)	484	Biloxi (MS)	635	Cedar Rapids (IA)	922	Cincinnati (OH)
228	Philadelphia (PA)	366	Forrest (IL)	486	Shreveport (LA)	636	Fargo (ND)	923	Mansfield (OH)
230	Altoona (PA)	368	Peoria (IL)	488	Lafayette (LA)	638	Bismarck (ND)	924	Erie (PA)
232	Northeast (PA)	370	Champaign (IL)	490	New Orleans (LA)	640	South Dakota (SD)	927	Harrisonburg (VA)
234	Pittsburgh (PA)	374	Springfield (IL)	492	Baton Rouge (LA)	644	Omaha (NE)	928	Charlottesville (VA)
236	Washington (DC)	376	Quincy (IL)	520	St Louis (MO)	646	Grand Island (NE)	929	Edinburg (VA)
238	Baltimore (MD)	420	Asheville (NC)	521	Westphalia (MO)	648	Great Falls (MT)	932	Bluefield (WV)
240	Hagerstown (MD)	422	Charlotte (NC)	522	Springfield (MO)	650	Billings (MT)	937	Richmond (IN)
242	Salisbury (MD)	424	Greensboro (NC)	524	Kansas City (MO)	652	Idaho (ID)	938	Terre Haute (IN)
244	Roanoke (VA)	426	Raleigh (NC)	526	Fort Smith (AR)	654	Wyoming (WY)	939	Fort Myers (FL)
246	Culpeper (VA)	428	Wilmington (NC)	528	Little Rock (AR)	656	Denver (CO)	949	Fayetteville (NC)
248	Richmond (VA)	430	Greenville (SC)	530	Pine Bluff (AR)	658	Colorado Springs (CO)	951	Rocky Mount (NC)
250	Lynchburg (VA)	432	Florence (SC)	532	Wichita (KS)	660	Utah (UT)	952	Gulf Coast (FL)
252	Norfolk (VA)	434	Columbia (SC)	534	Topeka (KS)	664	New Mexico (NM)	953	Tallahassee (FL)
254	Charleston (WV)	436	Charleston (SC)	536	Oklahoma City (OK)	666	Phoenix (AZ)	956	Bristol (TN)
256	Clarksburg (WV)	438	Atlanta (GA)	538	Tulsa (OK)	668	Tucson (AZ)	958	Lincoln (NE)
320	Cleveland (OH)	440	Savannah (GA)	540	El Paso (TX)	670	Eugene (OR)	960	Coeur D Alene (ID)
322	Youngstown (OH)	442	Augusta (GA)	542	Midland (TX)	672	Portland (OR)	961	San Angelo (TX)
324	Columbus (OH)	444	Albany (GA)	544	Lubbock (TX)	674	Seattle (WA)	963	Kalispell (MT)
325	Akron (OH)	446	Macon (GA)	546	Amarillo (TX)	676	Spokane (WA)	973	Palm Springs (CA)
326	Toledo (OH)	448	Pensacola (FL)	548	Wichita Falls (TX)	720	Reno (NV)	974	Rochester (NY)
328	Dayton (OH)	450	Panama City (FL)	550	Abilene (TX)	721	Pahrump (NV)	976	Mattoon (IL)
330	Evansville (IN)	452	Jacksonville (FL)	552	Dallas (TX)	722	San Francisco (CA)	977	Galesburg (IL)
332	South Bend (IN)	454	Gainesville (FL)	554	Longview (TX)	724	Chico (CA)	978	Olney (IL)
								980	Navajo (AZ)
								981	Navajo (UT)

Appendix B

How States Have Relaxed Regulation of AT&T Intrastate Services

The following descriptions are taken directly from the June 18, 1987 issue of *State Telephone Regulation Report*. State regulatory schemes can be divided into three categories, two of which are represented in the list below. First, states that are not listed below are those with strict rate-of-return regulation. In these states, AT&T must file a rate case to lower or raise its rates. Second, in states with price bands or price caps, AT&T can lower or raise its rates within the allowed range without a rate case. In these states, AT&T almost always must file a rate case in order to implement a rate outside of the authorized range. However, the price ranges or price caps are set by the public utility commissions. Consequently, for these states regulation is essentially a mixture of rate-of-return regulation and pricing flexibility. These states have more flexibility than states not listed in this table since states not listed require formal rate cases in order to change any rates. Third, some states forbear from rate-of-return regulation and give AT&T even greater flexibility. A star (*) preceding the state indicates that the state was treated in the empirical analysis as forebearing from rate-of-return regulation. If a state forbears from rate of return regulation we treat it as full pricing flexibility in the empirical analysis.[1]

Arizona -- Oct. 1985: Banded rates, floor at 50 percent of cap; 14 days notice to change rates within band. New services require prior state approval. Rate of return regulated.

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[1] Note that Ohio, Oregon and Pennsylvania forbear from rate-of-return regulation but also specify some limit on pricing flexibility. The empirical results are consistent across specifications that treat these states as full flexibility states and specifications that treat these states as having partial flexibility.

Colorado -- Nov. 1985: Minimal cost support needed for proposed services; state forbears from regulation of approved new services. Current authorized rate of return on equity is 11.93 percent.

Florida -- May 1986: Banded rates for MTS and WATS only; cap is rates in effect on implementation date with floors at switched access cost; 30 days notice required for rate changes. New MTS/WATS services effective 30 days after filing; initial rates become cap. Current authorized return on equity is 16 percent. An AT&T petition to end rate-based regulation is pending before the Public Service Commission.

Idaho -- May 1985: Rate caps only, no floor; seven days notice required for rate changes. New services need prior state approval, 30 days notice required. Current authorized rate of return on equity is 12.5 percent.

* Illinois -- April 1986: MTS, WATS and other switched services deemed "competitive" by state; floor price is marginal costs of a service with no cap or ceiling price; one day notice for rate cuts, 30 days notice for increases. New services must be classified as competitive or regulated. State forbears from rate of return regulation. Geographic deaveraging temporarily banned.

Kansas -- June 1986: 4 percent rate hike or 7 percent drop allowed without prior approval; 14 days notice needed. Proposed services require prior state approval. The current authorized return on equity is 14.5 percent.

Louisiana -- July 1985: Relaxed regulation for MTS only by rate ceiling approach; MTS rate changes below ceiling made on seven days notice. New services require prior state approval. Current authorized return on equity is 15 percent.

* Maryland -- Sept. 1986: Full pricing flexibility; 14 days notice required to change rates. New services take effect 14 days after filing of tariffs, unless opposed. Geographic deaveraging explicitly banned. State forbears from rate of return regulation.

Michigan -- May 1986: Flexible rate of return, anything below 15.6 percent return on equity is permissible. MTS and WATS rates can vary up to 10 percent below ceiling this year and up to 15 percent below in 1988. New services need prior state approval.

* Minnesota -- June 1987: Services classified as effectively competitive, emerging competitive, or non-competitive, upon petition to PUC. First category requires notification to PUC and customers; second requires 30 days' notice for rate increase, 10 days for decrease, with PUC retaining authority to roll back rates.

Mississippi -- Oct. 1984: Banded rates with separate bands for MTS, WATS, private line, FX and 800 Service; seven days notice of rate changes within band. New services require prior state approval. Rate of return is regulated.

Missouri -- July 1985: Limited pricing flexibility applies to switched services only. For rate changes no more than 15 percent below ceiling, state approval is given through streamlined 14-day process. New services need prior approval. Private lines remain fully regulated. Current authorized return on equity is 15.3 percent.

Montana -- Oct. 1985: Private lines deregulated by statute; switched services have rate caps, no floors; no advance notice required for switched-service rate changes below caps; new services require prior state approval or determination that they are non-switched and exempt from regulation. Authorized return on equity for switched services is 15 percent.

* Nebraska -- March 1987: Pricing deregulated by statute. New services can be launched at will at whatever rate a carrier deems appropriate. Rate of return regulation ended by statute, April 1986. Only legal requirements are maintaining adequate service quality and keeping a list of currently effective prices on file with the state regulatory commission.

* Nevada -- April 1985: Full pricing flexibility; 10 days notice required for rate changes or to launch new services. Rate of return not regulated.

New Jersey -- Aug. 1986: Rates for services can change up to 25 percent; 14 days notice required for hikes, five days notice for cuts. Return on equity may vary up to three percentage points above or below the prescribed target return.

New York -- Oct. 1986: 2.5 percent increase or 10 percent decrease allowed without prior approval; increases must be revenue neutral; 30 days notice required for changes. Band-limit adjustments need prior state approval; adjustments that increase gross revenues by over 2.5 percent require full rate case. New services require prior state approval. Current authorized return on equity set between 14 percent and 15 percent.

North Carolina -- Feb. 1985: Rate caps only, no floor; 14 days notice required for rate changes; AT&T's cap is cap for all carriers. New services require prior state approval. Current authorized return on equity is 14.5 percent.

* Ohio -- April 1985: Banded rates, floor set at 50 percent of ceiling; 20 days notice required for rate changes within band. New services take effect on 45 days notice, unless opposed. State forbears from rate of return regulation.

* Oklahoma -- July 1985: Rate changes or new services take effect 30 days after filing unless state orders suspension; geographic deaveraging explicitly banned. State has eliminated rate of return regulation.

* Oregon -- Nov. 1986: Rates for a service can be anywhere between marginal cost and state-set cap; one day notice of rate changes. New services take effect 30 days after filing of tariffs, unless opposed. Rate of return not regulated.

* Pennsylvania -- Aug. 1985: Rate changes that amount to less than 3 percent of gross revenues or affect less than 5 percent of customers normally require no state review; 30 days notice of rate changes or to launch new services. Individual services must be priced above cost, with state requiring 30 days advance notice of cost changes. Rate of return not regulated.

South Carolina -- Aug. 1984: Rate caps only, no floor; 14 days notice required for rate changes. Rate of return not regulated as of January 1987 but rate caps continue in effect.

Tennessee -- April 1985: Rate caps only, no floor, 30 days notice required for rate changes. New services require prior state approval. Current authorized rate of return on equity is 14.5 percent.

Texas -- March 1987: Service-specific banded rates for MTS, WATS, analog private lines and digital private lines were set to begin July 1 1987; rate changes within a rate band and launching of new services will require 30 days notice. Rate of return is regulated.

* Virginia -- Aug. 1984: Full pricing flexibility; no advance notice required to change rates or launch new service. Geographic deaveraging explicitly banned. Rate of return not regulated.

* Washington -- June 1987: Rate of return not regulated. Can file price lists with implementation on 10 days notice to commission and customers. Geographic deaveraging, abandonment of service, high volume discounts prohibited.

* West Virginia -- June 1986: Full pricing flexibility; 14 days notice required to change rates or launch new service. Rate of return not regulated.

Appendix C

1986 IntraLATA Toll Rates Used in the Analysis

	Distance					
	0-10 miles		11-16 miles		17-22 miles	
State	First	Add.	First	Add.	First	Add.
Alabama	$0.18	$0.13	$0.26	$0.19	$0.33	$0.24
Arizona	$0.26	$0.10	$0.27	$0.12	$0.28	$0.14
Arkansas	$0.14	$0.12	$0.19	$0.16	$0.24	$0.20
California	$0.17	$0.08	$0.27	$0.12	$0.27	$0.12
Colorado	$0.18	$0.13	$0.21	$0.15	$0.25	$0.17
Connecticut	$0.21	$0.11	$0.27	$0.13	$0.32	$0.15
Delaware	$0.14	$0.07	$0.20	$0.09	$0.26	$0.11
Florida	$0.19	$0.09	$0.28	$0.16	$0.28	$0.16
Georgia	$0.17	$0.09	$0.21	$0.12	$0.23	$0.15
Idaho	$0.14	$0.06	$0.19	$0.09	$0.27	$0.14
Illinois	$0.15	$0.07	$0.16	$0.09	$0.19	$0.12
Indiana	$0.23	$0.15	$0.23	$0.15	$0.33	$0.21
Iowa	$0.20	$0.08	$0.25	$0.11	$0.29	$0.14
Kansas	$0.23	$0.11	$0.26	$0.14	$0.36	$0.22
Kentucky	$0.20	$0.14	$0.26	$0.19	$0.31	$0.24
Louisiana	$0.15	$0.11	$0.24	$0.19	$0.32	$0.24
Maine	$0.23	$0.17	$0.33	$0.22	$0.40	$0.26
Maryland	$0.25	$0.10	$0.30	$0.15	$0.34	$0.17
Massachu-setts	$0.20	$0.09	$0.29	$0.13	$0.36	$0.15
Michigan	$0.15	$0.08	$0.21	$0.14	$0.27	$0.17
Minnesota	$0.14	$0.05	$0.18	$0.07	$0.21	$0.10
Mississippi	$0.19	$0.11	$0.26	$0.18	$0.32	$0.22
Missouri	$0.12	$0.10	$0.18	$0.15	$0.26	$0.19
Montana	$0.15	$0.05	$0.18	$0.08	$0.23	$0.13
Nebraska	$0.25	$0.14	$0.28	$0.15	$0.31	$0.17
Nevada	$0.19	$0.07	$0.27	$0.12	$0.27	$0.12
New Hampshire	$0.26	$0.12	$0.30	$0.15	$0.34	$0.17

Appendix C--Continued

	Distance					
	0-10 miles		11-16 miles		17-22 miles	
State	First	Add.	First	Add.	First	Add.
New Jersey	$0.10	$0.03	$0.15	$0.06	$0.20	$0.08
New Mexico	$0.15	$0.09	$0.17	$0.11	$0.20	$0.14
New York	$0.16	$0.05	$0.23	$0.08	$0.26	$0.11
North Carolina	$0.17	$0.11	$0.21	$0.14	$0.24	$0.17
North Dakota	$0.24	$0.10	$0.29	$0.16	$0.32	$0.18
Ohio	$0.32	$0.16	$0.40	$0.22	$0.40	$0.28
Oklahoma	$0.10	$0.07	$0.15	$0.10	$0.18	$0.14
Oregon	$0.11	$0.08	$0.16	$0.13	$0.16	$0.13
Pennsy-lvania	$0.16	$0.08	$0.20	$0.10	$0.23	$0.12
Rhode Island	$0.32	$0.14	$0.39	$0.19	$0.47	$0.23
South Carolina	$0.24	$0.13	$0.25	$0.14	$0.30	$0.19
South Dakota	$0.23	$0.15	$0.28	$0.16	$0.32	$0.18
Tennessee	$0.19	$0.12	$0.24	$0.17	$0.27	$0.21
Texas	$0.13	$0.11	$0.13	$0.11	$0.16	$0.14
Utah	$0.17	$0.09	$0.20	$0.12	$0.23	$0.15
Vermont	$0.29	$0.15	$0.41	$0.21	$0.47	$0.24
Virginia	$0.22	$0.12	$0.28	$0.17	$0.34	$0.22
Washington	$0.18	$0.07	$0.22	$0.12	$0.25	$0.15
West Virginia	$0.26	$0.13	$0.36	$0.23	$0.36	$0.23
Wisconsin	$0.16	$0.11	$0.20	$0.14	$0.22	$0.16
Wyoming	$0.19	$0.09	$0.23	$0.13	$0.26	$0.15

Appendix C--Continued

State	Distance 23-30 miles First	23-30 miles Add.	31-40 miles First	31-40 miles Add.	41-55 miles First	41-55 miles Add.
Alabama	$0.39	$0.27	$0.44	$0.30	$0.49	$0.32
Arizona	$0.30	$0.16	$0.34	$0.21	$0.40	$0.25
Arkansas	$0.28	$0.24	$0.33	$0.27	$0.37	$0.31
California	$0.28	$0.19	$0.32	$0.23	$0.36	$0.27
Colorado	$0.28	$0.19	$0.31	$0.22	$0.34	$0.27
Connecticut	$0.42	$0.19	$0.47	$0.22	$0.52	$0.28
Delaware	$0.30	$0.16	$0.35	$0.20	$0.39	$0.24
Florida	$0.40	$0.28	$0.40	$0.28	$0.40	$0.28
Georgia	$0.31	$0.19	$0.35	$0.23	$0.48	$0.30
Idaho	$0.33	$0.23	$0.40	$0.29	$0.44	$0.33
Illinois	$0.23	$0.15	$0.26	$0.16	$0.30	$0.19
Indiana	$0.33	$0.21	$0.43	$0.28	$0.43	$0.28
Iowa	$0.32	$0.17	$0.36	$0.21	$0.40	$0.25
Kansas	$0.42	$0.28	$0.46	$0.33	$0.50	$0.36
Kentucky	$0.35	$0.28	$0.40	$0.32	$0.44	$0.36
Louisiana	$0.38	$0.28	$0.44	$0.32	$0.49	$0.36
Maine	$0.43	$0.28	$0.56	$0.34	$0.56	$0.34
Maryland	$0.40	$0.23	$0.45	$0.28	$0.50	$0.32
Massachusetts	$0.42	$0.17	$0.48	$0.19	$0.52	$0.21
Michigan	$0.32	$0.21	$0.36	$0.25	$0.37	$0.26
Minnesota	$0.26	$0.14	$0.33	$0.19	$0.42	$0.27
Mississippi	$0.37	$0.25	$0.41	$0.28	$0.52	$0.36
Missouri	$0.41	$0.23	$0.47	$0.26	$0.51	$0.30
Montana	$0.26	$0.16	$0.30	$0.20	$0.33	$0.23
Nebraska	$0.34	$0.20	$0.38	$0.24	$0.39	$0.25
Nevada	$0.36	$0.20	$0.36	$0.20	$0.36	$0.20
New Hampshire	$0.36	$0.20	$0.39	$0.23	$0.44	$0.27
New Jersey	$0.27	$0.10	$0.33	$0.11	$0.36	$0.12

Appendix C--Continued

State	Distance					
	23-30 miles		31-40 miles		41-55 miles	
	First	Add.	First	Add.	First	Add.
New Mexico	$0.23	$0.16	$0.27	$0.19	$0.31	$0.23
New York	$0.29	$0.13	$0.32	$0.15	$0.35	$0.18
North Carolina	$0.28	$0.19	$0.41	$0.25	$0.46	$0.28
North Dakota	$0.37	$0.22	$0.41	$0.26	$0.45	$0.29
Ohio	$0.48	$0.28	$0.48	$0.28	$0.48	$0.28
Oklahoma	$0.23	$0.19	$0.29	$0.24	$0.33	$0.28
Oregon	$0.21	$0.17	$0.21	$0.17	$0.21	$0.17
Pennsylvania	$0.27	$0.16	$0.31	$0.18	$0.34	$0.21
Rhode Island	$0.51	$0.24	$0.54	$0.27	$0.54	$0.27
South Carolina	$0.34	$0.24	$0.43	$0.26	$0.48	$0.30
South Dakota	$0.36	$0.21	$0.38	$0.24	$0.42	$0.27
Tennessee	$0.31	$0.25	$0.37	$0.29	$0.42	$0.32
Texas	$0.24	$0.22	$0.31	$0.30	$0.39	$0.38
Utah	$0.27	$0.18	$0.30	$0.21	$0.35	$0.24
Vermont	$0.52	$0.27	$0.58	$0.29	$0.62	$0.31
Virginia	$0.42	$0.26	$0.46	$0.30	$0.51	$0.33
Washington	$0.29	$0.19	$0.31	$0.22	$0.31	$0.22
West Virginia	$0.62	$0.41	$0.62	$0.41	$0.62	$0.41
Wisconsin	$0.25	$0.19	$0.28	$0.23	$0.31	$0.27
Wyoming	$0.31	$0.18	$0.34	$0.20	$0.38	$0.24

Appendix C--Continued

State	Distance			
	56-70 miles		71-124 miles	
	First	Add.	First	Add.
Alabama	$0.54	$0.34	$0.61	$0.36
Arizona	$0.42	$0.28	$0.43	$0.29
Arkansas	$0.40	$0.34	$0.46	$0.37
California	$0.38	$0.29	$0.44	$0.33
Colorado	$0.38	$0.29	$0.45	$0.31
Connecticut	$0.58	$0.30	$0.65	$0.35
Delaware	$0.41	$0.26	$0.43	$0.28
Florida	$0.51	$0.37	$0.51	$0.37
Georgia	$0.50	$0.32	$0.50	$0.32
Idaho	$0.48	$0.37	$0.51	$0.39
Illinois	$0.34	$0.22	$0.36	$0.25
Indiana	$0.53	$0.34	$0.57	$0.37
Iowa	$0.41	$0.26	$0.44	$0.28
Kansas	$0.52	$0.39	$0.56	$0.43
Kentucky	$0.48	$0.39	$0.55	$0.44
Louisiana	$0.53	$0.40	$0.60	$0.47
Maine	$0.65	$0.40	$0.69	$0.42
Maryland	$0.52	$0.34	$0.54	$0.37
Massachusetts	$0.55	$0.22	$0.57	$0.24
Michigan	$0.40	$0.28	$0.41	$0.29
Minnesota	$0.46	$0.29	$0.52	$0.36
Mississippi	$0.55	$0.39	$0.59	$0.43
Missouri	$0.55	$0.34	$0.57	$0.37
Montana	$0.36	$0.26	$0.40	$0.30
Nebraska	$0.41	$0.26	$0.44	$0.29
Nevada	$0.44	$0.29	$0.44	$0.29
New Hampshire	$0.49	$0.29	$0.51	$0.32
New Jersey	$0.40	$0.12	$0.43	$0.13
New Mexico	$0.32	$0.24	$0.33	$0.25
New York	$0.37	$0.20	$0.38	$0.23

State	Distance			
	56-70 miles		71-124 miles	
	First	Add.	First	Add.
North Carolina	$0.47	$0.31	$0.50	$0.34
North Dakota	$0.48	$0.32	$0.50	$0.34
Ohio	$0.57	$0.37	$0.57	$0.37
Oklahoma	$0.38	$0.33	$0.46	$0.38
Oregon	$0.30	$0.25	$0.30	$0.25
Pennsylvania	$0.37	$0.22	$0.39	$0.24
Rhode Island	$0.54	$0.27	$0.54	$0.27
South Carolina	$0.50	$0.32	$0.52	$0.35
South Dakota	$0.43	$0.28	$0.44	$0.29
Tennessee	$0.46	$0.35	$0.50	$0.38
Texas	$0.43	$0.42	$0.48	$0.46
Utah	$0.42	$0.27	$0.47	$0.31
Vermont	$0.64	$0.32	$0.65	$0.34
Virginia	$0.55	$0.34	$0.57	$0.37
Washington	$0.37	$0.28	$0.37	$0.28
West Virginia	$0.70	$0.45	$0.70	$0.45
Wisconsin	$0.31	$0.27	$0.34	$0.30
Wyoming	$0.40	$0.26	$0.43	$0.29

Appendix D

1987 AT&T Intrastate InterLATA Direct Dial MTS Rates (Day Rates)

	Distance					
	0-10 miles		11-16 miles		17-22 miles	
State	First	Add.	First	Add.	First	Add.
Alabama	$0.29	$0.17	$0.35	$0.23	$0.37	$0.25
Arizona	$0.19	$0.08	$0.24	$0.11	$0.29	$0.12
Arkansas	$0.14	$0.11	$0.19	$0.17	$0.26	$0.21
California	$0.23	$0.11	$0.23	$0.11	$0.26	$0.14
Colorado	$0.21	$0.15	$0.25	$0.18	$0.25	$0.18
Connecticut	$0.21	$0.11	$0.27	$0.13	$0.32	$0.15
Florida	$0.19	$0.09	$0.28	$0.16	$0.28	$0.16
Georgia	$0.17	$0.09	$0.21	$0.12	$0.23	$0.15
Idaho	$0.13	$0.05	$0.21	$0.11	$0.21	$0.11
Illinois	$0.28	$0.14	$0.31	$0.19	$0.31	$0.19
Indiana	$0.33	$0.21	$0.33	$0.21	$0.38	$0.25
Iowa	$0.21	$0.11	$0.21	$0.11	$0.24	$0.14
Kansas	$0.23	$0.11	$0.26	$0.14	$0.36	$0.19
Kentucky	$0.26	$0.19	$0.26	$0.19	$0.31	$0.24
Louisiana	$0.26	$0.13	$0.35	$0.21	$0.39	$0.25
Maryland	$0.27	$0.13	$0.31	$0.15	$0.31	$0.15
Massachu-setts	$0.24	$0.10	$0.32	$0.15	$0.41	$0.19
Michigan	$0.20	$0.10	$0.23	$0.13	$0.28	$0.17
Minnesota	$0.14	$0.05	$0.17	$0.07	$0.21	$0.10
Mississippi	$0.30	$0.15	$0.36	$0.22	$0.40	$0.27
Missouri	$0.11	$0.09	$0.16	$0.14	$0.21	$0.17
Montana	$0.18	$0.07	$0.22	$0.10	$0.28	$0.17
Nebraska	$0.35	$0.22	$0.35	$0.22	$0.36	$0.23
Nevada	$0.23	$0.11	$0.28	$0.15	$0.28	$0.15
New Jersey	$0.12	$0.06	$0.18	$0.07	$0.26	$0.09
New York	$0.24	$0.12	$0.24	$0.12	$0.27	$0.15
North Carolina	$0.17	$0.11	$0.21	$0.14	$0.24	$0.17

	Distance					
	0-10 miles		11-16 miles		17-22 miles	
State	First	Add.	First	Add.	First	Add.
North Dakota	$0.23	$0.10	$0.28	$0.15	$0.30	$0.17
Ohio	$0.30	$0.15	$0.34	$0.20	$0.34	$0.20
Oklahoma	$0.28	$0.18	$0.33	$0.23	$0.33	$0.23
Oregon	$0.30	$0.15	$0.33	$0.21	$0.33	$0.21
Pennsylvania	$0.34	$0.17	$0.34	$0.17	$0.36	$0.18
South Carolina	$0.24	$0.13	$0.25	$0.14	$0.30	$0.19
Tennessee	$0.19	$0.13	$0.24	$0.18	$0.29	$0.23
Texas	$0.07	$0.05	$0.07	$0.05	$0.09	$0.08
Virginia	$0.31	$0.16	$0.33	$0.18	$0.33	$0.18
Washington	$0.28	$0.10	$0.35	$0.17	$0.35	$0.17
West Virginia	$0.27	$0.15	$0.35	$0.20	$0.35	$0.20
Wisconsin	$0.33	$0.17	$0.35	$0.18	$0.41	$0.24

Appendix D--Continued

State	Distance 23-30 miles First	23-30 miles Add.	31-40 miles First	31-40 miles Add.	41-55 miles First	41-55 miles Add.
Alabama	$0.42	$0.30	$0.45	$0.33	$0.48	$0.36
Arizona	$0.33	$0.16	$0.38	$0.21	$0.43	$0.25
Arkansas	$0.31	$0.24	$0.38	$0.28	$0.41	$0.33
California	$0.32	$0.19	$0.32	$0.19	$0.34	$0.20
Colorado	$0.34	$0.22	$0.34	$0.22	$0.34	$0.22
Connecticut	$0.42	$0.19	$0.47	$0.22	$0.52	$0.28
Florida	$0.40	$0.27	$0.40	$0.27	$0.40	$0.27
Georgia	$0.31	$0.19	$0.35	$0.22	$0.43	$0.28
Idaho	$0.36	$0.25	$0.36	$0.25	$0.36	$0.25
Illinois	$0.33	$0.21	$0.33	$0.21	$0.33	$0.21
Indiana	$0.38	$0.25	$0.41	$0.29	$0.41	$0.29
Iowa	$0.30	$0.20	$0.30	$0.20	$0.34	$0.24
Kansas	$0.40	$0.21	$0.45	$0.24	$0.47	$0.26
Kentucky	$0.31	$0.24	$0.40	$0.32	$0.40	$0.32
Louisiana	$0.43	$0.29	$0.47	$0.32	$0.50	$0.32
Maryland	$0.38	$0.19	$0.38	$0.19	$0.38	$0.19
Massachusetts	$0.49	$0.21	$0.54	$0.24	$0.59	$0.28
Michigan	$0.33	$0.20	$0.38	$0.25	$0.39	$0.26
Minnesota	$0.26	$0.14	$0.32	$0.19	$0.42	$0.27
Mississippi	$0.46	$0.31	$0.49	$0.34	$0.49	$0.34
Missouri	$0.35	$0.20	$0.40	$0.23	$0.43	$0.26
Montana	$0.31	$0.19	$0.36	$0.25	$0.39	$0.27
Nebraska	$0.38	$0.25	$0.40	$0.27	$0.42	$0.29
Nevada	$0.29	$0.18	$0.29	$0.18	$0.29	$0.18
New Jersey	$0.30	$0.11	$0.35	$0.13	$0.37	$0.13
New York	$0.29	$0.16	$0.33	$0.20	$0.34	$0.21
North Carolina	$0.28	$0.19	$0.33	$0.24	$0.33	$0.24
North Dakota	$0.35	$0.20	$0.39	$0.23	$0.42	$0.26
Ohio	$0.38	$0.23	$0.38	$0.23	$0.38	$0.23

Appendix D--Continued

	Distance					
	23-30 miles		31-40 miles		41-55 miles	
State	First	Add.	First	Add.	First	Add.
Oklahoma	$0.38	$0.27	$0.38	$0.27	$0.38	$0.27
Oregon	$0.35	$0.26	$0.35	$0.26	$0.35	$0.26
Pennsylvania	$0.37	$0.21	$0.38	$0.22	$0.39	$0.23
South Carolina	$0.34	$0.24	$0.42	$0.25	$0.42	$0.25
Tennessee	$0.34	$0.27	$0.37	$0.29	$0.42	$0.32
Texas	$0.15	$0.15	$0.22	$0.21	$0.28	$0.27
Virginia	$0.36	$0.21	$0.36	$0.21	$0.36	$0.21
Washington	$0.42	$0.23	$0.42	$0.23	$0.42	$0.23
West Virginia	$0.46	$0.28	$0.46	$0.28	$0.46	$0.28
Wisconsin	$0.45	$0.26	$0.49	$0.29	$0.53	$0.32

Appendix D--Continued

	Distance					
	56-70 miles		71-124 miles		125-196 miles	
State	First	Add.	First	Add.	First	Add.
Alabama	$0.48	$0.36	$0.49	$0.37	$0.50	$0.38
Arizona	$0.45	$0.28	$0.46	$0.29	$0.50	$0.32
Arkansas	$0.43	$0.36	$0.51	$0.40	$0.55	$0.44
California	$0.34	$0.20	$0.39	$0.23	$0.42	$0.26
Colorado	$0.41	$0.27	$0.41	$0.27	$0.45	$0.30
Connecticut	$0.58	$0.30	$0.65	$0.35	$0.65	$0.35
Florida	$0.44	$0.31	$0.44	$0.31	$0.49	$0.33
Georgia	$0.45	$0.30	$0.47	$0.32	$0.48	$0.33
Idaho	$0.60	$0.47	$0.60	$0.47	$0.65	$0.52
Illinois	$0.36	$0.24	$0.36	$0.24	$0.37	$0.25
Indiana	$0.43	$0.29	$0.44	$0.29	$0.46	$0.30
Iowa	$0.37	$0.27	$0.40	$0.30	$0.42	$0.32
Kansas	$0.48	$0.28	$0.53	$0.32	$0.55	$0.35
Kentucky	$0.48	$0.35	$0.53	$0.37	$0.59	$0.40
Louisiana	$0.52	$0.33	$0.53	$0.34	$0.54	$0.34
Maryland	$0.43	$0.27	$0.43	$0.27	$0.49	$0.33
Massachu-setts	$0.65	$0.30	$0.73	$0.34	$0.74	$0.35
Michigan	$0.42	$0.27	$0.44	$0.29	$0.46	$0.31
Minnesota	$0.46	$0.29	$0.52	$0.35	$0.56	$0.40
Mississippi	$0.49	$0.34	$0.49	$0.34	$0.50	$0.35
Missouri	$0.47	$0.29	$0.48	$0.32	$0.53	$0.36
Montana	$0.41	$0.30	$0.41	$0.30	$0.44	$0.33
Nebraska	$0.45	$0.32	$0.47	$0.34	$0.51	$0.38
Nevada	$0.32	$0.22	$0.32	$0.22	$0.33	$0.23
New Jersey	$0.40	$0.14	$0.48	$0.18	$0.54	$0.19
New York	$0.37	$0.22	$0.38	$0.23	$0.39	$0.24
North Carolina	$0.35	$0.25	$0.39	$0.27	$0.42	$0.31
North Dakota	$0.48	$0.32	$0.50	$0.34	$0.52	$0.36
Ohio	$0.41	$0.27	$0.41	$0.27	$0.43	$0.29

Appendix D--Continued

State	Distance					
	56-70 miles		71-124 miles		125-196 miles	
	First	Add.	First	Add.	First	Add.
Oklahoma	$0.46	$0.32	$0.46	$0.32	$0.52	$0.40
Oregon	$0.43	$0.31	$0.49	$0.35	$0.51	$0.37
Pennsylvania	$0.40	$0.25	$0.42	$0.26	$0.43	$0.27
South Carolina	$0.45	$0.32	$0.47	$0.34	$0.50	$0.36
Tennessee	$0.46	$0.33	$0.46	$0.33	$0.47	$0.34
Texas	$0.32	$0.31	$0.36	$0.35	$0.38	$0.37
Virginia	$0.41	$0.24	$0.41	$0.24	$0.43	$0.26
Washington	$0.49	$0.30	$0.49	$0.30	$0.52	$0.31
West Virginia	$0.54	$0.37	$0.54	$0.37	$0.58	$0.39
Wisconsin	$0.55	$0.34	$0.57	$0.37	$0.61	$0.40

Distance

197-292 miles

State	First	Add.
Alabama	$0.52	$0.40
Arizona	$0.53	$0.36
Arkansas	$0.60	$0.46
California	$0.43	$0.27
Colorado	$0.45	$0.30
Connecticut	$0.65	$0.35
Florida	$0.49	$0.33
Georgia	$0.50	$0.37
Idaho	$0.65	$0.52
Illinois	$0.37	$0.25
Indiana	$0.46	$0.30
Iowa	$0.43	$0.33
Kansas	$0.56	$0.36
Kentucky	$0.63	$0.44
Louisiana	$0.55	$0.35
Maryland	$0.49	$0.33
Massachusetts	$0.74	$0.35
Michigan	$0.46	$0.31
Minnesota	$0.62	$0.44
Mississippi	$0.50	$0.35
Missouri	$0.57	$0.40
Montana	$0.44	$0.33
Nebraska	$0.52	$0.39
Nevada	$0.33	$0.23
New Jersey	$0.54	$0.19
New York	$0.40	$0.26
North Carolina	$0.42	$0.31
North Dakota	$0.54	$0.38
Ohio	$0.43	$0.29
Oklahoma	$0.52	$0.40
Oregon	$0.52	$0.38
Pennsylvania	$0.44	$0.28

State	Distance 197-292 miles First	Add.
South Carolina	$0.50	$0.36
Tennessee	$0.48	$0.35
Texas	$0.38	$0.37
Virginia	$0.43	$0.26
Washington	$0.54	$0.33
West Virginia	$0.58	$0.39
Wisconsin	$0.63	$0.42

Glossary

Resellers - long distance telephone service firms that do not own their own facilities but lease capacity from other carriers and resell this capacity to telecommunications users.

LATA (Local Access and Transportation Area) - areas designated by the Modified Final Judgement (MFJ) within which the Bell Operating Companies are permitted to provide local and long distance telephone services.

Intrastate long distance telephone service - long distance service consisting of calls within a given state. This service is regulated by the state Public Utility Commissions.

IntraLATA long distance telephone service - calls originating and terminating in the same LATA. With minor exceptions, intraLATA service is intrastate and is therefore regulated by the state Public Utility Commissions.

InterLATA long distance telephone service - calls originating and terminating in different LATAs. The Bell Operating Companies (BOCs) are enjoined from providing this service. InterLATA service can be either inter- or intrastate. The interstate portion is regulated by the FCC and the intrastate portion by the respective Public Utility Commission.

BOCs (Bell Operating Companies) - the seven local telephone service companies that were formed from the divestiture of AT&T. They are Ameritech, Bell Atlantic, Bell South, NYNEX, Pacific Telesis, Southwestern Bell, and U. S. West.

MFJ (Modified Final Judgement) - the document that contains the terms of the 1982 settlement of the antitrust complaint filed by the Justice Department whereby AT&T agreed to divest the BOCs and the LATAs were established. See *U.S. v. AT&T* 552 F. Supp. 131 (D.D.C. 1982).