

**Telecommunications
Costs and Prices
in the United States —
An Overview**

John C. LeGates

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

Program on Information Resources Policy

Harvard University

**Center for Information
Policy Research**

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

An Overview

John C. LeGates

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EXECUTIVE SUMMARY

Findings From The Present

- . There are a large number of competitors in most markets. This is not surprising, as information has become recognized as a high-growth area. In many cases competitors come from differing backgrounds and function under different regulatory status. However, some users and competitors perceive that, in the aggregate, the new competitors still account for too small a percentage of the total installed base to make an effective competitive dent.
- . For better or worse, the telcos maintain a major presence in many markets, including some that are de facto monopolies. They have a large joint and common plant, and over 50% of their costs are joint and common costs among differing markets. Telcos link the markets in which they participate to each other.
- . Benefits claimed for the traditional monopoly market structure include subsidy of socially desirable services, major research breakthroughs, economies of scope and scale, long equipment service life, and strong network integration, command, and control.
- . Benefits claimed for competition include efficient allocation of resources, cost-related pricing, rapid adoption of new technology, innovation, system diversity, overcoming of diseconomies of scale, and market expansion.
- . In the present political climate, the die is cast for greater entry into markets where possible. A mix of competitive and monopolistic structures is the only possibility for the near future.
- . Monopolistic and competitive structures in the same market are claimed to pose a threat to the benefits of each other.
- . A desirable goal would be to mix the approaches so that the benefits of each are maximized, and the harm they can do to one another is minimized.
- . The following specific questions concerning implementation of this goal seem to be common to many markets and submarkets. Many of these questions center on subsidy and/or cost allocation.

Questions for the Future

- . How broadly do we need to look before we can understand a market? I would argue that we need to understand the alternate ways to fill the same function. This approach carries each market segment well beyond its traditional boundaries.

- . Can a single multi-product carrier organization, providing services in a number of markets, do the job better and/or cheaper than a number of smaller, competing organizations, some of them active in only one market? Is there a difference in this regard between regulated and unregulated markets?
- . With more entry in many markets, can fair, cost-related pricing be determined for a multi-product organization which maintains a major monopoly somewhere?
- . Competitors are coming from different traditions and are subject to varying regulatory oversight. Does this bestow unfair handicaps or advantages on some of the suppliers? Does it eliminate the powers of the regulatory bodies and render them useless?
- . Is there potential harm to the public through the possibility of fragmentation of the network? When does one detect the presence of such harm, and what does one do about it?
- . The opening of market entry creates a trend towards cost-related pricing. Will this cause certain socially desirable services or products to become so expensive that the marketplace will not provide them? What techniques are available to address this problem should it arise?
- . What are the implications of network fragmentation for national defense? Is there possible harm to command and control of the domestic network on which the military relies heavily -- to its security, and to its survivability? What techniques are available to address this problem should it arise?
- . Does a competitive market allow for accumulation of the capital required for major, expensive technological breakthroughs and innovations, or is another mechanism, such as maintenance of a large, ongoing research organization like Bell Telephone Laboratories, necessary?

In each of the three areas we discuss, these common questions seem to apply. This is not surprising since the different markets are deeply interconnected and/or competitive, both logically and institutionally. Where the participants perceive common stakes in these questions, a participatory decision-making method is probably possible. Where they perceive opposing stakes, political accommodations will be necessary.

TABLE OF CONTENTS

Introduction	1
Long-Distance Carriage of Information	3
Local Carriage of Information	9
Customer Premises Equipment (CPE).	15
Appendix A: Basic Data on the Politics and Economics of the Information Evolution: Telecommunications Costs and Prices in the United States - Parts 1-5.	18
Appendix B: Partial Schedule of Overlapping Carrier Services. . . .	21

INTRODUCTION

This paper introduces and provides an overview for the five-part series of research papers described in Appendix A. Brevity is our watchword here and thoroughness there. The overview covers three areas of communications and information policy: long-distance message carriage, local message carriage, and customer premises equipment.

We find that the present complexity in each of these areas goes well beyond their traditional structures. Nonetheless, some basic questions emerge as common to these (and other) areas. We offer a framework which, if it will not answer these questions, will at least help in thinking about them. A partial listing of carrier sizes, markets, and regulatory environments is provided in Appendix B.

The three areas under consideration have certain features in common.

First, each of them has experienced major growth since the Second World War.

Second, by and large, this growth has been connected with the exploitation of new technology and has witnessed decreasing unit cost, dramatic in many cases.

Third, each area has seen new market entrants coming from different traditions than those already in the market. In many cases, these new market entrants come from a different regulatory background than the earlier ones.

Fourth, there are important definitional problems involved in trying to understand markets. Many products can be classified into multiple categories or ambiguous categories, or they elude any clear-cut classification. In order to understand the market size and structure, we must frequently ask the question, "What is the nature of the product or the market?"

Finally, in each of these areas, data can be hard to come by. The old SIC (Standard Industrial Codes) do not fit very well. In many cases, companies lump their products into different clusters in earnings reports. This makes it difficult to identify the size of the entry in a particular market segment. In addition to this, much of the relevant data is proprietary and not regularly made available in the public record.

LONG-DISTANCE CARRIAGE OF INFORMATION

The long-distance electronic message market has two traditional players: telephone and telegraph. The latter of these has failed to keep up with telephone growth in the last 30 years. New entries, however, have sprung up. The nine major firms in the "specialized common carrier" market reported 1980 earnings of \$415 million (and growing). The three largest "value added carriers" (there are hundreds of smaller firms) reported earnings of \$86 million. This compares to approximately \$30 billion of gross revenues from toll calls for the traditional telephone companies.

It is worth noting that the cost of delivering a communications service is not strictly related to the distance, and in some cases (as when a single satellite link is used) not related at all. The price, as opposed to the cost, is the product of many factors, only some of which are related to the distance.

Important questions can be raised about what is long distance and what is local. If long distance (sometimes called "interexchange") is judged to be between local service areas, then the actual distance traversed can be considerably less than within some local areas. The Atlanta local area, for example, is approximately as large as the states of Delaware and Rhode Island combined. Distances within Atlanta and many other local areas can be larger than the distances covered by many interexchange, intrastate toll calls, and even some interstate toll calls.

In addition, the price of a toll call varies significantly from state to state in terms of the charge per minute per mile. The discrepancy between the most expensive and the least expensive states for an intrastate toll call

varies by a factor of three. In 1976, a 100-mile, 3-minute call in Mississippi was \$1.58 -- in Idaho, \$.60. Thus price and distance do not necessarily correlate across states. Neither do price and message volume. In measuring the size of the market, one must choose the measurement categories.

The situation is further complicated by intracompany data and voice networks. These usually, though not always, involve leased lines for which we know the lease value. However, utilization technique and traffic figures are usually proprietary and not available to us.

Electronic and non-electronic media can also substitute for one another. Our research indicates that within the last decade there has been a drop in the percentage of paid messages carried by the U.S. Postal Service from over 90% to under 75%. This computation included inter- and intrastate toll calls, WATS and Private Line messages, and letter mail. It excludes local telephone calls. The national magazines or newspapers can be considered a form of long-distance carriage of information: one that might be amenable to electronic carriage. Today, the Wall Street Journal is carried to the region of its final destination by satellite, and then printed and distributed by traditional means. Several newspapers are experimenting with electronic delivery to the home.

Television is distributed by local broadcasting towers. Network TV, however, can also be considered a form of long-distance carriage. Programs originating live in New York, California -- or in some cases around the world -- are transmitted by terrestrial conduits and satellite to the local distributor.

What is the size of this market? Clearly it depends on what you consider to be "in" and what you consider to be "out". Reasonable decisions as to

what is "in" and what is "out" should depend on why you want to know. Attempts to define these markets or sub-markets may become divisive as has been illustrated in several antitrust cases and congressional hearings.

The traditional areas of conflict in long-distance carriage center around competition between the telephone companies and other entrants. Other entrants, in order to reach their customers, have needed connection to local service, traditionally provided by the telcos. Charges have been leveled against the telcos that access was provided poorly, expensively, or not at all. From this acrimonious tradition, general agreement has emerged that interconnection should be provided. Remaining questions, however, include the price and quality of the interconnection and the price of the competing services.

As the non-traditional common carriers came on the scene, they found a world in which local and long-distance services were provided by a club of organizations. These organizations worked closely together and did not consider themselves to be in competition. The joint and common costs associated with these services were very substantial -- over 50 percent. It was possible to know what the overall return had been on the sum of the services. Finding the return on a particular service, however, depended on the allocation of costs.

Over time, an increasing percentage of the joint and common costs have been assigned to long-distance traffic. The telephone companies have argued that an artificially high price has been maintained on long-distance traffic in order to support artificially low prices for local, household, and rural telephone installations. This, according to the telcos, has enabled them to fill the mandate of universal service they perceived in the Communications Act of 1934. It has allowed the telephone companies to become the provider

of socially desirable, uneconomic services, such as rural residential telephony and therefore act as a form of welfare agent. Telephone companies argue that the new carriers have come in under an artificial price umbrella and skimmed the cream of the most profitable markets -- without assuming the burden of the unprofitable markets, thus threatening the ability of the network to provide service to all.

The non-traditional carriers, in common with other competitors of the telephone companies, see it differently. They perceive the telephone companies as maintaining a hold in a monopoly market, namely the local market, and a dominant monopoly position in the long-distance market. From this the telephone companies are able to subsidize their own entries into competitive markets. They see the social welfare benefit as the product of Rural Electrification Administration funds. They also view themselves as being the victims of inconsistent regulatory treatment. As they have fewer joint and common costs which can be administratively or politically reallocated, they cannot take advantage of the same pricing flexibility. Whatever percentage of the joint and common costs is assigned to long distance, there is no proof that this is an accurate reflection of costs. Nor is such a proof possible. It is the nature of such costs that they cannot be allocated according to strict economic principles.

The major questions in the area we have been describing seem to be:

- . What is the most efficient method of allocating resources in this market?
- . How can prices be determined which are cost related or otherwise judged fair? What costs are to be used as the yardstick for comparison?
- . How can services continue to be provided to socially desirable but uneconomic markets?

. How can we assure ongoing technological and service innovation?

Some of these questions involve problems -- i.e., a question which is difficult to answer. Some of them also involve issues -- i.e., a question on which parties stand on opposing sides.

At the heart of coping with these issues is the assignment of joint and common costs. There are, however, difficulties in cost assignment which go beyond both the accounting problems and the political issues.

Joint and common costs mean different things when viewed from different angles. Their presence implies and is caused by the presence of joint and common plant. The only way to get rid of joint and common costs is to create separate plant for each service. Carried to its extreme, this could mean separate plant for long-distance calls and local calls, for business calls and private calls, for daytime calls and nighttime calls -- the list can go on virtually forever. This solution settles the questions of fairness. It is fair to the new entrant. But is it economic? In its extreme form, it is clearly not. It creates diseconomies of both scale and scope which destroy the very purpose of competition, which was efficient allocation of resources. In less extreme forms, such as a separation of local and long-distance plant, consensus has not yet been reached on feasibility and cost efficiency.

Retention of joint plant assures the continuation of joint and common costs, and their allocation problem. Questions of fairness of cost allocation cannot be settled by accounting methods alone. They must be settled by methods that involve political processes. By this we mean agreement by all parties that the allocation is acceptable to them. The growing diversity of the "all parties" list makes agreement increasingly difficult.

Achievement of such agreement would involve bringing organizations who currently speak only through their lawyers into a position of negotiation. Such negotiation might provoke antitrust action. Cost allocation is not only a problem but also an issue because stakeholders stand on opposing sides.

Technological innovation has frequently appeared as another issue in these debates. It is widely assumed to underlie gains in cost reduction, provision of new services, and the strong American position in world trade. The telco school maintains that substantial, ongoing investment without immediate prospect of return is essential to major breakthroughs, such as the transistor. Cost-related pricing can prevent accumulation of the resources for this. Competitors claim that the incentive to succeed in a market drives the innovation process and causes the early introduction of innovations. Evidence can be mustered by both sides.

A practical problem confronting the Congress is to create political machinery that will allocate joint and common costs so as to satisfy the contending stakeholders (including consumers) in the long-distance electronic message market. The present system for cost allocation was created by political processes to satisfy opposing stakeholders -- but the number of opponents and the diversity of their stakes have grown.

LOCAL CARRIAGE OF INFORMATION

The shape of the market for local carriage of information depends very strongly on what part of the market we are looking at. There are actually several markets which lie along a density continuum. On one end we have the markets characterized by a high-density, urban location, or a heavy concentration of business and institutional customers. At the other end, we have the residential, rural, and low-density markets. The various markets in between shade into one another.

At the low-density, rural, and residential end, we find that there is nearly 100% telephone penetration. In 1978, 97.1% of all households had telephones nationally. Penetration varies from 100% or over in 19 states -- to under 90% in 4 states -- the lowest being 84%.

The only distribution medium with higher penetration is the U.S. Postal Service with 100% of households nationwide. This vehicle should not be disregarded in considering electronic carriage, as it is capable of delivering recordings, videotapes, audiocassettes, and the like which can to some extent substitute for electronic media. Electronic media may some day carry first-class mail and/or provide some of the internal carriage within the Postal Service, which raises questions not only of subsidy but also of private/government competition.

Cable television is the next, most widely available, wired electronic connection. Cable passes more than 50% of the households in the country and connects to approximately 25%. It is an industry with gross revenues in 1980 of \$2 billion, compared to approximately \$30 billion in revenues of

the telephone companies' local services and the \$20 billion total budget of the Postal Service.

Whereas the telephone network offers a basic service with various additions in certain localities, the cable business varies widely from location to location. In some areas it has as few as six available channels with fewer occupied, and in some areas over 50. In a few areas it is interactive to one degree or another, but in most areas it is not. It is regulated by 11 states and unregulated at the state level in 39. It is regulated by only some municipalities. The federal history of cable regulation is checkered, beginning with outright prohibition of cable in major markets and moving in the direction of less federal involvement. In some areas cable performs a number of carriage functions, such as distribution of information to and from branch banks and bank headquarters. In some areas cable originates programming, but in other areas is merely a retransmitter. Cable systems, like broadcast networks, are partially coordinated. Some channels offer selections nationwide or nearly nationwide.

It is clear that many information services can be provided by either telephone or cable, and in many cases these two compete head-to-head, as for burglar alarm service. Cable is technologically able to carry telephone signals, provided that there is the addition of switching capability and other technical devices to allow two-way, one-to-one service. Telephone circuits are capable of carrying video signals with the installation of appropriate transmission, multiplexing, and amplifying equipment and with switching to allow so-called "mass distribution." Turning one into the other is largely a question of capital. However, today neither is equipped to provide the other's services, nor is it clear which is best positioned for expansion to provide universal, broadband service.

A sidelight of CPE is the question of location of "intelligence," i.e., computer-like capabilities. In many cases, the intelligence can be provided either at the terminal end, the central switch end, or somewhere in between. It was interest in providing the intelligence that led terminal manufacturers to oppose AT&T's Advanced Communication Service (ACS). Such functions as location identification, redialing, data massaging and packaging, line quality testing, and burglar alarm functions can reside in the terminal. They can also reside in the central switch. There are already cases where a three-way competition for provision of intelligence functions is shaping up: the central switch in an urban area provided by AT&T; the local switch sometimes built by a non-traditional competitor, in a suburban area served by an independent telephone company; and the terminal equipment gear itself, owned by the user and supplied by an independent manufacturer. Again the familiar issues are raised about competition between a monopoly and other organizations, a large organization such as AT&T and smaller organizations, and a regulated entity vs. unregulated entities.

In the household another kind of customer premises equipment has always been unregulated (except for standards specified in the All-Channel Receiver Act): the television set. Insofar as broadcasting is seen as part of the same market as telephony, then this too is a relevant piece of equipment. In Britain where videotex systems are further advanced than they are in the United States, Prestel is provided via a connecting device to the ordinary television set. In this country, there would be major questions about the ownership of the connecting device and its control today; for example American subscription TV providers own the decoder, while the customer owns the receiving gear. The home satellite antenna/receiver may be subjected to more regulatory scrutiny if it becomes widespread.

Regulation varies enormously from system to system. Cable systems may be regulated municipally or by the state, or fall only under federal oversight. Telephone systems are regulated by state commissions and by the FCC. It is important to note that approximately 70% of the joint and common costs we have discussed above are under state jurisdictions. Unless the federal-state jurisdictional boundary is moved, it may be difficult for the Federal Communications Commission to address most of the serious issues. If it is moved, then the federal government could acquire responsibility for a complex burden of local detail. Local networks offered by independent carriers may also be regulated by the state commissions or by the FCC. Internal networks are not regulated at all and, in many cases, compete directly for the same markets.

The introduction of competition in this area is seen as a boon by at least some of the larger users as well as by the new entrants. The former are, by and large, business customers who can purchase in bulk, build their own systems, or use an independent carrier.

On the other hand, small, rural, and residential customers may stand to lose by the present trend. If the high-paying business customer disappears from local markets, there will be increasing pressure to allocate costs to residential and rural services, which could drive those rates up. Those users do not constitute an aware and organized group. There are large numbers of people involved, however, and they could exert considerable political force if motivated. It is worth noting, however, that these customers are often major users of long-distance toll service and may be simultaneously affected by changes in those rates.

There is, however, a well-organized large customer with rural stakes. This is the Department of Defense. Most large defense installations are

in remote areas of the country. In addition, the defense networks, such as AUTOVON and AUTODIN, are made up of numerous local links. Both of these are threatened by local price increases.

DOD requested (prior to the 1/8/82 settlement announcement) that the Department of Justice call off its antitrust suit against AT&T. If so, DOD would be well served in two capacities. The first is maintenance of unified control over the network, which is amenable to pressure from DOD. The second could be maintenance of the perceived subsidy to local links and special DOD services from the AT&T ratepayers.

Some of the major questions in the area are of low visibility.

The flowering of competitors under different kinds of regulation poses the possibility that a regulatory agent, while regulating one of the pieces of this market for some purpose, may render it uncompetitive with something outside the control of the regulatory body. It could thereby lose both the competitor and the regulatory control. Regulatory bodies are, in many cases, deprived of their ability to manipulate or protect organizations they oversee.

These nagging concerns, caused by the proliferation of markets, probably lead to the frequency with which we see proposals for an information czar, for centralization of control under state or federal organizations and the like. However, it has not yet been proved whether or not the question of multiple market entrants and multiple types of regulation actually poses a problem. It poses an intellectual problem. It may not, however, pose a regulatory problem about serving markets. It appears to merit ongoing attention.

An already evident question is the one about anticipated increases in local rates. It is important to note what we mean by this. Some local users can choose among competitors and are protected against some of these price

risers. There remains, however, a kind of uneconomic customer who will continue to be served only by the "carrier of last resort," i.e., the telephone company (and perhaps by a cable company which may or may not be able to offer two-way communication services and which will initially not have access to the telephone network). This is the customer who uses little or no long-distance service, and who may see himself as deserving protection. It is not clear who is in a position to protect him. At the moment, the state regulatory bodies are positioned best, as they have oversight over most of the joint and common costs. They may be unable, however, to insure revenues which provide the means to keep local rates down.

It is worthy of note, however, that local rates also vary from location to location by a factor of three. The likely implication is that the rates in the lower areas could triple without a significant effect on the penetration or usage of telephones. We have no data to indicate how much political pressure will be brought by residential customers in case of an increase, even if only from the lower current rates to the higher current rates.

Another question concerns network integrity and interconnection. There was an era when two or three telephones were required in order to reach everyone you might wish to reach. We are already seeing the appearance of providers who do not interconnect with one another or with AT&T. On certain desks, the number of video-display and other terminals is proliferating. Some observers claim that diffusion of responsibility for different parts of an end-to-end service can cause that service to deteriorate. Others point to modern technology to ameliorate such problems, even though it can not totally resolve the problems of political and economic incentives.

CUSTOMER PREMISES EQUIPMENT (CPE)

The CPE market has witnessed a well-organized, orderly retreat by the telephone companies, who have been under heavy fire in recent years. Up until the mid-1960s, all customer premises equipment was owned by the telephone company if it was to be connected to the telephone network. The telcos have been forced to retreat from owning all station equipment, to the "primary instrument concept," to the protector on the drop wire. They are still very active in these markets although other entrants are no longer excluded.

Customer premises equipment may be as simple as the telephone set or as complex as an internal network operated with or without a PABX. All of the questions we have discussed in other areas also apply here.

Does the regulatory boundary extend all the way to CPE? Non-telco gear is unregulated equipment competing with regulated equipment until a transition period is over. The usual charges of cross-subsidy apply here and the usual questions arise about fairness of competition and what techniques are available to insure it.

The "installed base migration" strategy is an example. Telcos are accused of raising the price on older installed equipment in order to move customers to newer "flagship" equipment before competitors are ready. Some customers contend that they occasionally feel compelled to buy high technology equipment 3 to 5 years before they need it, a practice they do not necessarily regard as cost effective. Interestingly, state commissions, when they disapprove of these price increases, are taking a stand for lower prices against technological innovation.

A sidelight of CPE is the question of location of "intelligence," i.e., computer-like capabilities. In many cases, the intelligence can be provided either at the terminal end, the central switch end, or somewhere in between. It was interest in providing the intelligence that led terminal manufacturers to oppose AT&T's Advanced Communication Service (ACS). Such functions as location identification, redialing, data massaging and packaging, line quality testing, and burglar alarm functions can reside in the terminal. They can also reside in the central switch. There are already cases where a three-way competition for provision of intelligence functions is shaping up: the central switch in an urban area provided by AT&T; the local switch sometimes built by a non-traditional competitor, in a suburban area served by an independent telephone company; and the terminal equipment gear itself, owned by the user and supplied by an independent manufacturer. Again the familiar issues are raised about competition between a monopoly and other organizations, a large organization such as AT&T and smaller organizations, and a regulated entity vs. unregulated entities.

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The television set is already the terminal device for cable television systems, including the interactive ones. Experiments are being conducted with the interactive cable systems as media for banking, burglar alarms, health-care data base, and other services. As these come into growing competition with the telephone systems, we have a tradition of the customer owning a major piece of terminal equipment.

In our own office, we subscribe to more than one of the data services currently available over telephone lines. For each of them we have a different terminal. Although there is no evidence of the use of standards on the part of a dominant supplier to curtail competition, this is a problem which has occurred in other markets. Certain CPE markets have competitors which do not connect with any networks but which can compete with them. Some of these are large and/or growing rapidly. Calculations, records, and video tapes are examples.

APPENDIX A: OUTLINE OF MATERIAL SUMMARIZED IN THIS REPORT.

Basic Data on the Politics and Economics
of the Information Evolution: Telecommunications
Costs and Prices in the United States - Parts 1-5

1. PLAYERS, STAKES AND POLITICS OF REGULATED COMPETITION IN THE COMMUNICATIONS INFRASTRUCTURE OF THE INFORMATION INDUSTRIES
 - A. Politics and Policy in Cost and Price Setting
 1. Stakes in Communications Prices
 2. Costs and Prices
 - B. Strategic Control of Telecommunications Costs and Prices
 1. Cost and Price Relationships in Regulated Utilities
 2. Cost Pools: Jurisdiction and Control
 - C. The States' Role: Local Exchange "Costs" as a Residual
 1. The State Cost Pool
 2. The Residual Local Exchange Pool
 - D. Tactics of Cost Allocation and the Role of the Courts
 1. Separations and Settlements
 2. "Deterrent Effects" as Policy Instruments
 - E. Reawakening Competition: Challenges to Traditional Costing and Pricing Policies
 1. The New Competitors
 2. The Challenges of Competition
 3. Competition and Market Concentration
 - F. Predatory Pricing or Price Umbrella? Cost-Based Pricing or Subsidies
 1. Interplay of Costing and Pricing Decisions
 2. Interpreting Adversary Claims
 - G. Potential Range of Fairness in Jurisdictional Cost Allocations
 1. Functional Cost Pools
 2. Latitude of Cost Allocation
 3. Implications for Consumers and Producers
 - H. Far Out on the Cost Allocation Swing: Geopolitics and Industry Politics
 1. State-by-State Variations
 2. Variations within the Traditional Telecommunications Industry
 3. Implications of Variations
 - I. Cost-Definition and Price Deaveraging Responses to Competition: Geopolitics and Consumer Pressures
 1. Costing and Pricing Responses to Competition
 2. High and Low Density: Pressures and Counterpressures
 3. Implications for Business and Residential Consumers
 - J. Mounting Pressures on Traditional Pricing Policies: The Exchange/Interexchange Disparity
 1. The Limits of Responses to Pressures
 2. The Federal-State Toll Disparity
 3. The State Toll Bulge
 4. The Exchange-Interexchange Disparity
 5. The New Instabilities
2. STAKES IN TELECOMMUNICATIONS COSTS AND PRICES
 - A. Introduction
 - B. Consumers: Players and Stakes
 1. Business and Residential Geographic Concentration
 2. Principal Types and Stakes
 - a. Big Business
 - b. Small Business and Professional
 - c. Urban Householders
 - d. Rural Householders
 - e. Government
 3. Stakes in Growing Communications Competition
 4. Relative Consumption of Services and Contributions to Revenues
 - C. Traditional Services
 1. Traditional Services Definitions
 2. Traditional Service Differentiations: Time, Distance, Implementation
 3. Relative Service Revenues
 - D. Producers: Players and Stakes
 1. Principal Types and Stakes
 - a. Telecommunication Companies
 - b. International Carriers
 - c. Computer Companies
 - i. Hardware Suppliers
 - ii. Software Suppliers
 - iii. Communication Service Companies
 2. Telecommunications Companies
 - a. Bell System
 - b. Independents Reporting to USITA
 - c. Rural Telephone Borrowers
 - d. Competitors of the Traditional Telecommunications Industry
 - e. Geographical Coverage
 - E. Facilities
 - F. Labor
 - G. Capital
 - H. Jurisdictions
 1. Prices, Revenues and Costs--The Loose Linkages
 1. Economics Review
 2. Relation of Regulated Telco Prices to Costs

APPENDIX A (continued)

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

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

APPENDIX A (continued)

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

APPENDIX BPARTIAL SCHEDULE OF OVERLAPPING CARRIER SERVICES

The consumer of telecommunications services has an increasingly large menu from which to choose. Business, residential, rural, and city users of electronic carrier services may, in the mid-1980s, select among transmission systems and information services which provide similar and often substitutable carrier alternatives in matching purchases and investments with needs. The regulatory mechanisms at the federal and local levels do not have rules which recognize the substitutable combinations of telecommunications and information services. Regulatory tools and precedent today require classification of new entrants into Title II (transmission) and Title III (broadcasting) and discourage novel services.

Technological change has dimmed the jurisdictional lines among broadcast, common carrier, private radio, and cable regulation. There is a drawing together and overlapping of traditional areas of regulation where technical opportunities and institutional responses have begun to blur spectrum location and service regulatory responsibilities. Nonetheless traditional regulatory classification schemes are still being applied, and progress may be limited to areas which can fit them.

In presenting a menu of overlapping carrier services the following outline necessarily omits substitutes for telecommunication services which extend beyond the purview of regulation.

This schedule has been abstracted from research by Laurence Povich.

The categories displayed in this schedule are those currently used by the FCC to classify services. The extent to which they are substitutable

for one another depends on the particular needs of the user as well as flexibility in traditional areas of regulation. But the presence of overlaps is quite clear.

This listing does not include all services on the market. Those which do not reach the FCC -- such as the U.S. Postal Service, some intracompany communications, video disks and audio tapes -- are absent.

Multi-Point Distribution Service

Multi-Point Distribution Service (MDS) provides an omnidirectional radio service that operates locally using the microwave spectrum. MDS is generally a one-way service, although it can be used in conjunction with other methods of transmission, such as telephone lines, to provide two-way communications. These regulated common carriers create "pipelines" to connect "local" as well as "interexchange" areas for services such as subscription television, financial and market information, and various business and educational applications. As common carriers, they do not carry the content review limitations applicable to broadcast.

TABLE 1 - Number and Regulation of
Multi-Point Distribution Services

<u>Channel</u>	<u># of MDS Providers*</u>	<u>Regulatory Agency</u>	<u>Type of Regulation</u>
1st	393	FCC regulates	
2nd	295	as common	Spectrum
2A	163	carrier	Allocation

* Estimate includes mutually exclusive and other pending applications in 100 largest standard metropolitan statistical areas.

Source: Federal Communications Commission

Subscription Television

Subscription Television (STV) is regulated as a broadcast service under the rules for radio and television transmission intended for public reception. Its regulatory standard is the "public interest." Broadcast regulation authorizes broadcast stations and imposes financial, programming, legal, and technical requirements on licensees. Regulation requires the STV broadcasters to provide some "non-pay" public service programming.

UHF Low Power Television

The Broadcast Bureau is processing thousands of low power TV station license applications. These limited range TV stations are designed to encourage the growth of TV programming in smaller markets and segments of major markets. Its goal is furthering media diversity. Low power TV applications were closed by the Commission after receiving approximately 5,000.

AM and FM Broadcast Subcarrier

Communications Subsidiary Authorizations (CSA), if authorized by the FCC, will provide services in utility load management, paging, traffic light control, and business data or leased services without degrading the primary broadcast signals. These services will be available both during and following the regular broadcast program.

Direct Broadcast Satellites

Direct Broadcast Satellite (DBS) systems provide broadcast transmission and program services directly to users via communications satellites.

Comsat's application for a broadcast content/transmission system has been accepted by the FCC. The Commission has 13 additional applications at this time.

Satellite-to-Rooftop with Cable and Microwave Delivery Options

Several common carrier applications to provide domestic fixed satellite commercial private network systems include:

- ATT/GSAT COMSTAR private line end-to-end service;
- Domestic fixed satellite transmission in 1983 and 1984 (DOMSAT) from Hughes, RCA, Western Union, and Southern Pacific Communications;
- Satellite-to-rooftop data transmission from Satellite Business System (SBS);

- . Digital radio services (approximately 30 applicants anticipated for 7 frequencies).

Domestic Public Land Mobile Radio Services

Cellular mobile services are anticipated to be comparable in quality to landline message telephone services.

The first applications will be accepted by the FCC in December 1981. Services will be approved for wireline carriers and non-wire carriers on frequencies compatible throughout the country. Single cell offerings will also be considered.

TABLE 2 - Land Mobile Radio
and Telephone (Mobile Carriers)

<u>Service</u>	<u># of Providers</u>	<u>1979 Revenue (millions)</u>	<u>Regulator</u>
Radio Common Carriers	737	\$ 228	FCC Common Carrier Bureau
Telephone (mobile)	442	N.A.	FCC Common Carrier Bureau
Private Radio Services	a	N.A.	FCC Private Radio Bureau ^b

^a 779,000 stations have been authorized. There are an estimated 33,000 additional applications pending.

^b The private radio bureau has regulatory responsibility over two-way communications by individuals and private industry and non-federal and local government. This includes police, fire, aviation, ham, and CB radio. Also included are private land mobile radio systems, which are two-way systems that may be connected to the wireline telephone network.

N.A. not available.

Source: Federal Communications Commission

CABLE TELEVISION

Regulations, although greatly reduced, continue to require "must carry" local signals. Signals are distributed via cables which are physically connected to subscribers' locations. There were approximately 4,400 systems at the end of 1980, owned by about 50 major firms, producing revenue of about \$1.9 billion. Regulation is primarily at the local level.

Telephone and Record Service

Common carriers provide services upon "reasonable" request and at reasonable rates, terms, and conditions, without discrimination. Regulatory practice implements the Communications Act mandated through control of market entry and exit, licensing, and rate regulation.

TABLE 3
Telephone and Related Common Carrier Services

<u>Service</u>	<u># of Providers</u>	<u>1980 Revenue (millions)</u>	<u>Regulator</u>
Telephone AT&T	25 ^a	\$51,900	50 State Public Utility Commissions, FCC, Common Carrier Bureau
Other Telephone Companies	1,483	10,300	50 State Public Utility Commissions, FCC, Common Carrier Bureau
Value-Added Services			
Value-Added Carriers	4 ^b	86	FCC, Common Carrier Bureau
Western Union	1	532	FCC, Common Carrier Bureau
Resale Services	100(est)	100(est)	FCC, Common Carrier Bureau/unregulated
Misc. Microwave Carriers	48(est.) ^c	31.5	FCC, Common Carrier Bureau
Specialized Common Carriers	9 ^d	415	FCC, Common Carrier Bureau

^a AT&T operating companies.

^b Tymnet, Graphnet, GTE/Telenet, ITT/DTS.

^c For example, satellite and terrestrial carriers of CATV signals.

^d American Microwave, Business Telecommunications Corp., MCI, Southern Pacific, Transportation Microwave, U.S. Telephone Comm., USTS, Midwestern Relay, Western Telecommunications.

