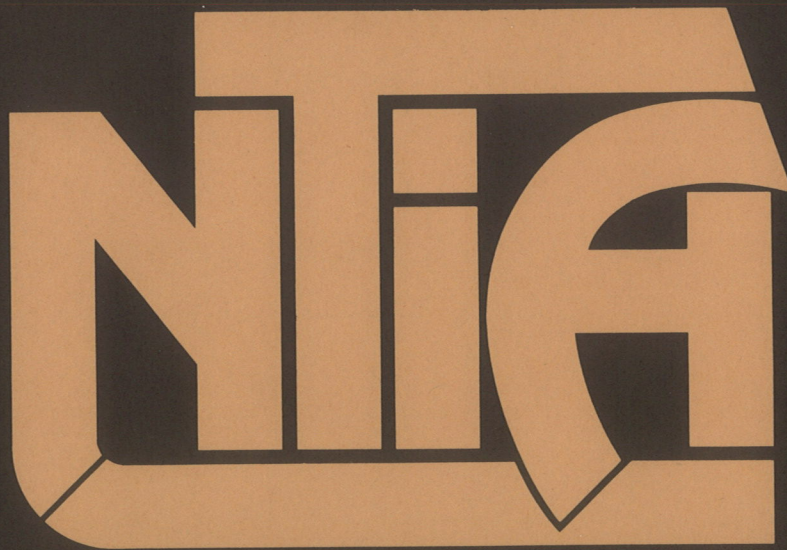


# NTIA Competition Benefits Report



***special publications***

---

U.S. DEPARTMENT OF COMMERCE • National Telecommunications and Information Administration



# NTIA Competition Benefits Report

NTIA SPECIAL STUDY STAFF



**U.S. DEPARTMENT OF COMMERCE**  
**Malcolm Baldrige, Secretary**

David J. Markey, Assistant Secretary  
for Communications and Information

**NOVEMBER 1985**







**UNITED STATES DEPARTMENT OF COMMERCE**  
**The Assistant Secretary for Communications**  
**and Information**  
Washington, D.C. 20230

In July 1985, the National Telecommunications and Information Administration (NTIA) released an extensive review of current U.S. domestic telecommunications policies. That review advanced the general public policy case for less Government regulation of our communications industry. It suggested, for example, that having undertaken to restructure the former Bell System, Government now should afford competition and less regulated marketplace forces a chance to work and thus to yield benefits to the American public.

In this collection of NTIA staff papers, some of the empirical support for our traditional commitment to competition and deregulation is set forth. Under preparation for considerable time, these staff papers reflect the views and conclusions of individual researchers and, in some instances, could bear further work and improvement. There has not been in recent memory, however, any comparable effort undertaken by Government or the private sector conscientiously to examine the benefits and costs of our policies favoring competition. These staff papers, any faults and shortcomings notwithstanding, thus do make a potentially valuable contribution to the literature regarding telecommunications policy, deregulation, and competition generally.

America's progress toward a more diverse, competitive, and efficient telecommunications infrastructure has been neither easy nor without cost. Any fair assessment of the results of this national venture, however, must conclude that the upside gains far outweigh any downside costs. As the foreword to this collection of NTIA staff papers aptly notes, no other nation in the world today affords its citizens the diversity and abundance of communications and information choices that are routinely available to the average American today. And these plain benefits are in large part a function of the procompetitive, deregulatory policies pursued to date.

David J. Markey  
Assistant Secretary of Commerce  
for Communications and Information





NTIA Special Study Staff

Richard Firestone  
Office of the Chief Counsel

Kenneth Robinson  
Office of the Assistant Secretary

Terry Monroe  
Dekkers Davidson  
Anita Wallgren  
Office of Policy Analysis  
and Development

Roger Salaman  
Institute for Telecommunication  
Sciences

Support Staff

Janice L. Robinson  
Lorraine A. McAllan

Mary E. Lipscomb  
Cecelia L.K. Fong

Tentative Table of Contents

Foreword

Purpose of this Assessment  
Scope of the Report

Part I. Origins of Telecommunications Change

Introduction  
Ingredients for Change  
Early Results  
Contemporary Developments  
The AT&T Restructuring

Part II. Review of Affected Telecommunications Lines of Commerce

- A. Telephone Equipment -- Customer Premises
- B. Telephone Equipment -- Network Equipment
- C. Long-Distance Network Services
- D. Local Service Rates
- E. Specialized and Enhanced Services
- F. Satellites and Fiber Optics
- G. Information Services
- H. Consumer Electronics
- I. Land Mobile Radio
- J. Radio
- K. Broadcast Television
- L. Cable Television
- M. Film and Video Production
- N. Electronic Banking

Part III. Conclusions and General Findings

Acknowledgments

The writers gratefully acknowledge the assistance of agencies, firms, and organizations including the Federal Communications Commission, AT&T, Citibank, IBM, Irving Trust Co., MCI, the National Association of Broadcasters, Pacific Telesis, RCA, Telecommunications Reports, and US West, although the writers alone bear responsibility for the contents of this staff report.





## Foreword

The past two decades have been a time of major change, indeed, upheaval throughout American telecommunications. Twenty years ago, our common carrier industry was characterized by a small number of monolithic enterprises, supplying chiefly basic and undifferentiated services, employing relatively stable technology, and subject to pervasive Federal and state economic regulation. The telephone industry was also largely self-contained. The leading firms typically were vertically integrated, their manufacturing affiliates concentrated chiefly on satisfying internal corporate needs, and communications imports constituted a relatively small factor in the industry overall. In broadcasting, television services were provided by two well-established and one less successful national network, cable television service was available to only a small fraction of U.S. households, home video cassette recorders were undreamt of, and the range of viewing options afforded most of the public was limited accordingly.

In less than a generation, and particularly within the last ten years, the complexion of American communications has been radically altered. Today, for example, there are throughout the United States a diversity of suppliers of virtually all common carrier products and services, except perhaps certain components of very basic local telephone service. Widespread application of demand-inducing and cost-reducing microelectronics has stimulated growth of traditional offerings, facilitated new services such as cellular mobile radio, and greatly expanded the range of available customer choice. The long-dominant firm in the telephone industry, AT&T, has been restructured by the courts, and entry by major firms such as IBM and General Motors as well as a number of large foreign-based telecommunications firms has occurred. The level and intensity of traditional rate base regulation has begun to diminish. The U.S. communications equipment market has become much more integrated with the world market, both because of increasing participation of foreign-based firms in our domestic markets and the growing importance to American companies of market opportunities overseas. And, the growth of multinational enterprises, expanded international trade, plus increased global economic interdependence have all fostered communications demand generally.

In the broadcast television field, three major national networks plus a number of regional broadcast and cable television networks today offer the American public an unequalled diversity of viewing options. The number of unaffiliated, independent television stations and the breadth of service they provide the public has substantially increased. The cable television business, which 20 years ago had fewer than six million subscribers, today serves over 40 percent of the Nation's households. The consumer electronics industry has also yielded an abundance of new equipment offerings. Half the Nation's television homes may have video cassette recorders by mid-1986, for example, given present sales trends. FM radio has very rapidly expanded and, indeed, in many markets now commands a majority of the listening audience. By the end of this year, moreover, some 1.4 million American families reportedly will enjoy their own satellite earth stations and thus benefit from even greater video service options.

No other nation in the world provides its citizens the diversity and abundance of communications and information services and choices which are routinely available to Americans today. Yet many of the changes which have

reshaped the American communications landscape have proven a fertile source of speculation, confusion, and widespread misunderstanding, especially abroad.

Competition and maximum possible reliance on private enterprise -- now deemed cardinal American communications policy virtues -- have not yet been widely embraced overseas. Circumstances are changing, however. Commendable "privatisation" initiatives are underway in Britain and Japan. Other nations which have seriously considered or are planning to liberalize their communications regulatory regimes include Norway, Sweden, West Germany, Belgium, Canada, Malaysia, and Sri Lanka. Nevertheless, there remains abroad a widespread view that free market competition, American-style, is a game not worth the candle.

Much of this skepticism seems to reflect adverse publicity accorded some of the transitional difficulties the United States has recently experienced in the common carrier field, chiefly in conjunction with the 1984 AT&T divestiture. Perhaps too little emphasis has been given the substantial gains which have been otherwise achieved in communications and related fields, the entire new industries which have emerged as a consequence of procompetitive Government policies, and the new choices which have thus been made available to the public.

The United States has a number of critical interests in assuring that communications policymakers overseas command a fuller understanding of the important changes which have taken place in this country. To the extent that foreign administrations overreact to perceived adverse developments here and seek to maintain rigid regulatory regimes, export opportunities otherwise available to U.S. firms may be diminished. To the extent foreign administrations also seek to block competitive communications developments, potential problems for their own economies may be engendered. If the efficiency and productivity gains inherent in the new communications technologies are unavailable, or offset by transaction costs incurred while trying to exploit these technologies, there may be adverse effects on the economies of our allies and major trading partners.

The United States has a strong national interest in the strength and vitality of the economies of other nations, including Canada, Western Europe, Japan, Israel, Latin America, and our other major trading partners. Effective and efficient communications systems are increasingly important to the development and maintenance of modern national economies, and American experience indicates this is most likely to be achieved by reducing Government regulation and facilitating competition. Economic growth, telecommunications, and forward progress are increasingly intertwined, and the American experience amply demonstrates that when it comes to Government intervention in the communications marketplace, less usually is more. If foreign administrations fail to accommodate changes today, therefore, they may handicap their own national economic development and heighten the costs of transition to competition when it is necessitated by technical and other forces.

#### Purpose of this Assessment

This broadranging assessment of some of the quantifiable benefits and costs of a marketplace approach aims to provide communications policymakers both here and abroad with a better appreciation for some of the competitive and deregulatory changes which have occurred in the United States. The individual biases and assumptions that are reflected in the separate staff survey papers

which follow are relatively plain and straightforward, but they should be noted at the outset in the interests of full and fair disclosure.

The first major premise underpinning many of these staff papers is that most of the changes which the United States communications and related industries have experienced are fundamentally the consequence of interrelated technical and other factors and forces, most of which are present, although in varying degree, in many markets overseas. This implies that communications policymakers thus may not really enjoy a choice between sanctioning competition and prohibiting competition altogether. Competition, in short, may in fact prove inevitable and policymakers might instead more fruitfully focus on developing reasonable means of easing the necessary transition from monopoly toward more pluralistic and competitive marketplace conditions.

A second premise reflected throughout these staff papers is that most communications authorities worldwide share fundamental goals: ensuring that firms and individual consumers continue to enjoy reasonable service at reasonable prices, ensuring that services critical to emergency preparedness, defense, and national security are available, and maintaining a strong, up-to-date, and responsive national telecommunications sector. These goals and the objective of expanded customer choice produced by telecommunications competition, however, are not mutually exclusive. The U.S. experience demonstrates that nations can accommodate competition in communications and other social goals. One can, for example, sanction competition almost unreservedly in a number of communications sectors with little or no adverse consequence in terms of maintaining the technical integrity of the basic core telephone network. One need not, moreover, undertake broadscale restructuring of the telecommunications industry -- as the United States has done in the telephone business -- to capture the benefits of effective competition. Throughout these assessments, therefore, an effort is made to indicate means of facilitating competition with minimal transaction costs.

The third premise reflected in these assessments is that the competitive and deregulatory developments in the United States, on balance, have demonstrably proven of considerable benefit both to ordinary American consumers and U.S. industry as well. New enterprises have been made possible, aggregate demand for communications services has been stimulated, innovation and research have been fostered, and the range of reasonably priced communications options has greatly increased. American industry, moreover, has necessarily "leaned-down" to adapt to today's more competitive and challenging world marketplace environment. It has become more export oriented, and thus our industry may now be in a better posture to compete more effectively both at home and overseas.

The transition costs manifestly associated with the American journey from communications monopoly to competition should not be underestimated; nor are they obscured in this report. As a result of competitive developments, there clearly have been significant changes in our workforce, necessary adjustments have been made in basic service rates, and some undesirable dislocations have occurred. Given the benefit of hindsight, some actions by U.S. communications policymakers might best have been avoided. But these adverse effects have generally been far less dramatic than the general press too often reports. U.S. difficulties and errors, moreover, do serve to highlight for communications administrations abroad transitional missteps which bear avoiding. The lesson



here, in short, is that telecommunications policymakers should not reject the American experience out of hand. Rather, they should endeavor to learn from it, particularly since many of the forces and changes with which Americans have contended are present, or will be present soon, in other communications markets as well.

### Scope of the Report

Structurally, this report is in several parts. The first part surveys some of the fundamental causes for the substantial competitive and deregulatory changes which have occurred in the United States. It discusses some of the technological, demographic, economic, regulatory, and political forces which have converged and lent velocity to competitive change.

In the second part, appraisals of discernible benefits achieved and costs incurred by industry sector and activity group are undertaken. Fourteen commercial sectors are surveyed. In several sectors, there is not now an abundance of public data; precisely determining causality in some instances also is difficult. Where feasible, published sources and official Commerce Department data have been employed. Also included, however, is information premised on reasonable estimates and informed perspective. It has been assumed that most readers will benefit from having some information available, even if it is subject to qualifications, rather than no information at all.

The final portion of this report focuses on generalized societal and economic benefits of the deregulatory and procompetitive changes in the United States. Perhaps most difficult to document, there is nevertheless evidence indicating that communications industry developments have yielded more benefits to the public, and contributed more to the efficient evolution of our overall economy, than would otherwise have proven true had Government steadfastly sought to prevent or regulate all industry metamorphoses.

## PART I. Origins of Telecommunications Change.

### Introduction

There is considerable literature addressing the various competitive changes which have occurred in the U.S. communications field. Most popular treatments attribute the trend toward competition and ensuing deregulation, first, to technology, inexorably forcing changes beyond Government's ability to control, and, secondly, to efforts by the Federal bureaucracy and the courts, aimed at allowing technological forces to run their course. All-powerful technology, coupled with progressive Government most typically are advanced as the primary reasons for America's telecommunications industry changes.

As with most convenient explanations of complicated economic occurrences, this popular view unfortunately constitutes a substantial over-simplification. It was not, for example, merely the availability of a demand-inducing and cost-reducing microelectronics technology which engendered competition. Rather, it was the confluence of a number of related developments, both technological and, as importantly, economic and demographic, that precipitated change. Similarly, and popular misapprehensions to the contrary notwithstanding, not a few of the competitive changes which revolutionized American communications initially occurred not so much because of Government as despite it. The Government, for

example, in 1977 joined AT&T in opposing efforts by MCI Communications to offer other than a relatively narrow class of intercity, long-distance communications services.

Government in the Fifties opposed proposals to liberalize rules governing the sale and use of noncarrier-supplied telephone terminal equipment and did not until the late Seventies adopt any affirmative policy toward cable television developments. For more than 12 years, cellular mobile radio service was bogged down by regulatory proceedings and court challenges. Government sought to lessen some regulatory constraints on incumbent broadcasters, yet balked at proposals to reduce institutional barriers to competitive broadcast entry. Not infrequently, changes occurred here not because of regulatory or Executive branch initiatives but rather due to progressive actions by the courts.

Later, the Government embraced competition and deregulatory ideals. Particularly in the late Seventies and continuing to the present, the FCC undertook a number of commendable deregulatory initiatives. The notion, however, that the Federal Government from the outset sought consistently to foster competitive opportunities and marketplace diversity in communications is overstated. And, this aspect of the American experience is highly significant; for if the U.S. civil service, with all its acknowledged talents, efficiency, and capabilities proved unable to contain the forces of communications competition, it is unlikely less well-endowed bureaucracies will be able to manage any such task.

#### Ingredients for Change

Broadly understanding the competitive forces and marketplace developments which reshaped the U.S. telecommunications industry requires some appreciation of factors on both the supply and demand side of the equation. Consider, first, some of the major changes which occurred on the supply side.

Between 1965 and 1976, for example, the National Aeronautics and Space Administration (NASA) expended some \$49.5 billion on space and related high-technology programs. 1985 U.S. Statistical Abstract at p. 583. Much of this Federal spending, coupled with high Defense Department budgets during this same period, stimulated the already rapid development of the communications equipment, aerospace, and microelectronics industries.

Microelectronics functioned as both a demand-inducing and cost-reducing factor. Widespread application of the technology engendered new demands for special data communications services, for example. Inherent in the technology, moreover, was the potential for greater efficiencies in most sectors of the conventional telecommunications business, especially in switching and related operations which then, as today, comprised the bulk of the common carrier industry's investment. Unlike some other previous technological developments in communications and electronics, furthermore, knowledge regarding the potential of microelectronics was widely dispersed. Not only traditional industry leaders but also a diversity of new, typically aggressive, entrepreneurial firms appreciated and had ready access to this new technology. Thus, with the initial stimulus of Government spending, new technology emerged, it was widely dispersed, and a number of commercial applications began to surface.

It is axiomatic, however, that even the newest and most innovative of technologies may make relatively little short-run difference, absent marketplace

conditions conducive to its further commercial exploitation. Fortunately, conditions favorable to the further, rapid development of microelectronics and associated communications applications prevailed in the United States during this critical period.

It was about 1965, for instance, when both the conventional telephone and broadcast television industries achieved essentially universal coverage within the United States. Prior to that time, these industries' primary focus had been extending basic services -- and the public's primary interest had been on obtaining those basic offerings. The attainment of "universal" telephone and television service availability altered marketplace priorities, both for the suppliers and the consumers of communications services.

Contemporaneously, the United States experienced rapid growth in disposable personal income. Between 1965 and 1976, for example, disposable personal income in the United States increased from \$3,171 per person to about \$4,972, an increase of some 57 percent. Basic communications needs having been satisfied, the American public turned increasingly toward satisfying additional communications desires -- and it enjoyed the discretionary income necessary to purchase the new products made available through the commercial exploitation of the new technologies.

Further changes occurred on both the business and residential sides of the demand equation, due particularly to the inflation which intensified during the Seventies and corporate managers' belief that increasing reliance on new communications services could enhance productivity and reduce "white collar" overhead expenses. The Seventies, for example, saw the introduction of the first "word processing" and "information management" systems. Business reliance upon computers increased rapidly, with the installed base approximately doubling from 1965 to 1975. Computer-data processing was increasingly adopted by major industries including banking and financial services, printing and publishing, retailing, and manufacturing generally, with the result overall demand for new communications equipment and services was stimulated.

#### Early Results

Among the first consequences of these interrelated supply pushes and demand pulls were proposals to sanction "specialized common carriers," and to liberalize traditional regulations which had previously prohibited use of other than carrier-supplied communications equipment in conjunction with public message-switched telephone services. In 1969, the FCC in its first MCI ruling licensed limited competition in the long-distance communications field and, in 1971, it extended this ruling to permit nationwide establishment of competitive, terrestrial communications services. Contemporaneously, the FCC relaxed restrictions on the use of noncarrier-supplied, customer-premises terminal equipment in its 1968 Carterfone decision. Multiple, competitive entry was also allowed into the domestic communications satellite business under the Nixon Administration's progressive "open skies" policy. 1/

---

1/ See generally Note, Resale and Sharing of Private Line Communications Services: AT&T Restrictions and FCC Regulations, 61 Va. L. Rev. 679 (1975); Note, Competition in the Telephone Equipment Industry: Beyond Telerent, 86 Yale L.J. 538 (1977); Comment, Intercity Telecommunications Competition After Execunet, 31 Fed. Com. L.J. 117 (1978).



The Federal Government initially opposed expanding the range of permissible long-distance services which the "specialized carriers" might offer, but regulatory service restrictions were struck down by the courts. Similarly, the Government sought to limit competition among cable television systems, national television networks, and local broadcast stations, but many of these limitations again were also overturned by the courts. At approximately the same time, multiple and competing domestic communications satellite services appeared. The availability of such satellite distribution services fostered the development of pay cable television services which, in turn, stimulated the growth of the cable television industry generally. Domestic satellites and the proliferation of pay cable services also led to whole new industries, the manufacture and sale of receive-only earth stations, for example. <sup>2/</sup>

Government and communications regulatory authorities throughout the late Sixties and Seventies consistently overestimated their ability to manage or control competitive developments, and underestimated the speed with which competition would materialize notwithstanding relatively cautious Government policies. By the middle to late Seventies, the small, procompetitive steps of a few years earlier had produced major changes. The noncarrier-affiliated telephone equipment vendors or "interconnect" industry, for example, saw sales increase from about \$300 million in 1975 to about \$1.4 billion in 1981 -- impressive gains particularly when compared with the far lower overall rate of economic growth of the times and given the allegedly anticompetitive activities of the dominant firm in the telephone field, AT&T. Similarly, the new long-distance service providers which in 1975 had revenues below \$100 million, by 1981 enjoyed revenues exceeding \$1 billion.

#### Contemporary Developments

Federal communications policy which theretofore had lagged behind competitive marketplace developments, and underestimated the impact of technological, commercial, and demographic changes, by the late Seventies and early Eighties was oriented toward affirmatively promoting competition in several communications sectors. Common carrier restrictions on the resale of interstate private line services were struck by the FCC in 1976. While the FCC in 1977 rejected proposals to strip AT&T of its manufacturing and supply arm, Western Electric, the agency nonetheless directed the firm to expand reliance on unaffiliated suppliers and also instituted a "registration program" aimed at facilitating competition and new entry in the telephone equipment field. In 1980, it adopted as part of its Second Computer Inquiry procedures calling for the "deregulation" of communications equipment manufacturing, supply, and installation as well as the provision of "enhanced services."

In 1979, the FCC commenced proceedings to deregulate long-distance service suppliers other than AT&T and in 1980 removed many of the most economically significant Federal controls from the cable television business. The

---

<sup>2/</sup> See, e.g., Besen & Woodbury, Regulation, Deregulation, and Antitrust in the Telecommunications Industry, 28 Antitr. Bull. 39 (1983); MacAvoy & Robinson, Winning By Losing: The AT&T Settlement and Its Impact on Telecommunications, 1 Yale J. Reg. 1 (1983).

installation and use of receive-only domestic satellite earth stations was deregulated. In related action, the FCC in 1982 finally resolved longstanding regulatory controversies which had impeded the emergence of domestic cellular mobile radiotelephone services.

#### The AT&T Restructuring

As a consequence of these converging market forces, and deregulation by the FCC, much of the U.S. telecommunications business was either actually or potentially competitive by 1982. That year, however, the Justice Department's Antitrust Division and the management of AT&T announced a settlement of the antitrust action begun by the Government in 1974.

The stated purpose of the AT&T settlement was to accelerate competition in the domestic communications industry and to facilitate eventual deregulation of certain lines of commerce, including intercity long-distance telecommunications. The settlement allowed AT&T to retain its nationwide communications network (subsequently designated AT&T Communications), its manufacturing and supply arm, Western Electric (redesignated AT&T Technologies), and its world-renowned research subsidiary, Bell Laboratories. Under the settlement, however, local telephone and intrastate toll facilities comprising about three-quarters of the former Bell System's assets were ordered divested.

These divested assets were transferred to seven large regional holding companies which, in turn, assumed ownership of some 22 local Bell telephone companies providing service to more than 80 percent of the American public. Under the decree, the local phone companies were restricted to offering exchange service within some 164 "local access and transport areas" or "LATAs," several of which geographic areas encompassed whole states. The local companies were also directed to undertake switching plant modifications sufficient to afford all long-distance carriers substantial "dialing parity" or "equal access" by September 1986.

This equal access obligation was not necessarily universal. The obligation extends to all former Bell System central offices. But the decree also provides for waivers with respect to telephone central offices serving 10,000 or fewer lines or unequipped with computerized, "stored-program" switches. Such offices reportedly comprise 40 percent or more of the former Bell System's 12,000 central offices, though they serve a far smaller percentage of subscribers. The decree's equal access requirements, moreover, do not apply with respect to "intra-LATA" long-distance services. Once equal access is achieved by September 1986, however, at least three-quarters of all residential customers in Bell company areas should be afforded far greater toll service options than they previously enjoyed.

Under other provisions of the consent decree, AT&T was barred for seven years, and the regional companies barred indefinitely from providing "electronic publishing" services. The regional companies were further prohibited from offering "information services," and from manufacturing, but not retailing, communications equipment.

At the same time as the AT&T restructuring, the FCC and other regulatory authorities accelerated their efforts aimed at revising telephone industry cost allocation and pricing policies. Traditionally, a substantial part of local capital investment had been allocated to long-distance services, with the effect toll prices were pushed substantially above marginal cost and local service prices were usually sustained at artificially low levels. An effect of this policy -- comparable to the approach followed in most other countries -- was to induce probably excessive investment in local plant and equipment and, by overpricing toll, to depress demand for long-distance services. Subsidizing local service prices may also have lessened research and development into means of reducing local telecommunications costs, while encouraging overconsumption on the part of some local service customers. One rationale for the practice was an assumption that competition in toll services was unlikely (due to assumed economies of scale) and thus would not ensure consumers an ability to share in the producers' surplus generated in the long-distance area. Over-allocation of local costs to toll operations was regarded as a means of accomplishing some of the surplus redistribution objectives of conventional competition.

But competition did prove feasible in toll services. Many of the recent changes in traditional cost allocation and pricing policies proposed and accomplished by the FCC and state regulators would have occurred independent of the AT&T divestiture, since an unintended result of those traditional policies was to distort the efficient development of the industry while limiting the ability of established firms including AT&T to compete on a price basis with new long-distance service providers such as MCI and GTE Sprint. It is axiomatic, moreover, that in effectively competitive markets, cross-subsidies fueled by overpricing in some sectors and underpricing in others will become more difficult to sustain, since prices will tend to gravitate toward underlying costs. Virtually all profitable telecommunications markets today are thus vulnerable to actual or potential competition, particularly where regulation has impeded industry efforts to correlate prices with actual costs. The AT&T divestiture, in short, did not necessarily cause so much as simply facilitate inevitable pricing policy changes and make them occur more quickly.

Similarly, the divestiture had the practical effect of accelerating efforts which were already underway to alter traditional industry depreciation practices. To maintain annual revenue requirements, and hence local residential rates, at artificially low levels, regulators long had mandated stretched-out depreciation periods. As a result, plant and equipment owned by local telephone companies were carried on company books at levels often exceeding the economic value of this investment. Increasing competition rendered these practices unsustainable. Local companies, even where they did not confront direct competition in providing local service, moreover, had to modernize their plant more rapidly to take into account developments in long-distance markets. Demand for long-distance data communications, for instance, caused local firms increasingly to provide local digital loops. Such programs have been financed in part by speeding up traditional capital recovery.

These depreciation changes have had the short-term effect of raising certain local telephone prices, which in turn understandably has triggered some public and, subsequently, political concern. But the changes have also resulted in an industry better able to provide new services and more efficient technology to customers, as well as new pricing packages and options.

Unanticipated by some proponents of the AT&T restructuring were its effects on retail service quality and international trade. AT&T spokesmen in the course of the breakup described the process as tantamount to endeavoring to disassemble and then rebuild a Boeing 747 -- while in flight and without losing altitude. There is little credible evidence the technical or network performance standards of the established carriers declined. But divestiture turned out to be far more complicated than planned and, in the first year, certain long-distance order fulfillment schedules suffered. Initial service failures, however, appear to have been greatly reduced. Many of the private line orders that were not filled on a timely basis, moreover, were for facilities desired to piece together private communications networks. Customers thus did not necessarily suffer an absolute denial of telephone service; they simply did not have available precisely those categories of service they sought as quickly as they wished.

Divestiture accelerated the incorporation of the United States into the world telecommunications equipment market by making it possible for foreign-based suppliers of network and central office switching apparatus to sell to a portion of the U.S. market -- the Bell Operating Companies -- that was previously supplied principally by Western Electric. In the immediate aftermath of divestiture, the U.S. telecommunications trade deficit worsened, partly because the divested local companies bought more imported products while U.S. suppliers sold less abroad as a consequence of a strong dollar. At the same time, AT&T did acquire potentially important commercial footholds overseas, purchasing one-fourth of Olivetti Corporation, establishing a marketing joint venture with Phillips, and strengthening existing arrangements with South Korea's Gold Star Ltd. organization. Other important U.S. equipment producers, such as GTE, also established or strengthened their international business alliances.

As discussed subsequently, an effect of the divestiture was to amplify and accelerate changes that were already underway. Divestiture and restructuring of AT&T did not cause competition and deregulation in telecommunications. As the Justice Department noted in its "Competition Impact Statement," filed in conjunction with the settlement, divestiture was deemed necessary to "substantially accelerate the development of competitive markets for interexchange services, customer premises equipment, and telecommunications equipment generally." 47 Federal Register 7170, 7178 (1982). Even at that time, the Justice Department conceded that "all segments of the market now are characterized by some degree of competitive activity." Id. at 7173.

Following announcement of the settlement, the FCC continued the process of overhauling local and long-distance pricing practices and commenced proceedings looking toward the eventual deregulation of certain of AT&T's offerings as well as those of its competitors. At present, too much U.S. regulatory policy remains asymmetrical for no good reason. AT&T, the former Bell System companies, and most of the other established telephone companies remain subject to regulation which imposes costs and service obligations while limiting their ability to compete. Price competition by established firms too often is limited or even blocked. Changes are occurring in this regard, however, as both the FCC and state regulators take commendable initiatives toward affording all players in our communications marketplace a full and fair opportunity to compete. The FCC has indicated willingness to accord AT&T considerable pricing flexibility, where the cost-justification requirements of present law are fulfilled. Similarly, the FCC has commenced a Third Computer Inquiry which, in part, seems aimed

commendably toward affording established firms greater opportunity to offer new services and to compete without regulatory handicapping in the communications marketplace. Kenneth Robinson, Office of the Assistant Secretary, NTIA (202) 377-1551.

PART II. Review of Affected Telecommunications Lines of Commerce.

A. Telephone Equipment -- Customer Premises.

Introduction. The telephone equipment business is generally considered to be roughly divided into two parts: first, the manufacture, distribution, installation, and maintenance of equipment located on the telephone subscriber's premises; and, secondly, that part involving equipment installed in the nation's 22,000 central offices and transmission switching centers (together with the wires, cable, conduit, and other transmission apparatus associated with the distribution system). Customer premises equipment (CPE), including private branch exchanges (PBXs), is the focus of this discussion.

Current Status Report. U.S. telephone instrument production totalled about 12.2 million units in 1984, more than double the 1983 production of 5.6 million. Domestic shipments amounted to about \$920 million. Chiefly because of changes facilitated by the FCC's 1980 Second Computer Inquiry ruling and the 1983 AT&T antitrust settlement, the U.S. telephone instrument market shifted from a 70 percent leased market in 1983 to a 60 percent privately owned market in 1984. About 40 percent of the telephone sales in 1984 involved "embedded base" equipment, i.e., leased telephones which were purchased by their users. Three-quarters of all sales (measured by number of units sold) in 1983 involved residential telephones. As a result of this saturation of much of the demand, and overproduction by some foreign manufacturers which anticipated greater post-divestiture sales than materialized, prices (and profits) in the handset in recent months have declined sharply. Sales of domestic and imported telephone instruments, however, nevertheless amounted to about 31.4 million units in 1984.

About twice as large in terms of revenues, and substantially more profitable, is the PBX business. Shipments of such customer premises switching apparatus have steadily increased for the past seven years, as changes in local telephone company prices as well as tax benefits have made it financially advantageous for many commercial users to install their own PBXs. Shipments in 1984 reached about 30,000 units, worth some \$3.0 billion (the value installed being about twice value shipped). Principal U.S. suppliers include Rolm Corporation, since 1984 a wholly-owned subsidiary of IBM, Northern Telecom, primarily U.S.-based but more than half-owned by Bell Canada, and AT&T Technologies (previously known as Western Electric). Foreign telephone equipment suppliers, however, have made major efforts to capture PBX market share, as such devices are regarded as central to the "electronic office" of the future and thus, in part, deemed potentially determinative of a broad range of other future commercial goods and services sales. 1/

Overall, most forecasters expect significant changes in both the telephone instrument and related PBX markets over the next five years. Demand for

---

1/ See 1985 U.S. Industrial Outlook, Ch. 30.

inexpensive, "disposable" telephone instruments is expected to remain flat or decline as customer preference for higher quality products resurfaces and grows. The PBX market is seen as less volatile, with demand (mostly conversions) continuing to grow by about 20 percent annually, although these estimates depend in part upon actions by the local telephone companies in pricing substitutable services, such as Centrex, as well as any changes made in current investment tax credit and depreciation allowances due to pending comprehensive Federal tax reform proposals.

Competitive History. Prior to the Second World War, virtually all U.S. telephone companies required both business and residential subscribers to make use of chiefly carrier-provided, installed, and maintained telephone equipment by imposing sundry tariff restrictions on the use of "foreign attachments." At the time, the principal U.S. telephone companies -- AT&T, GTE, and United -- each had extensive manufacturing affiliates. Restrictions on customer equipment choice, rationalized as necessary to safeguard the technical integrity of the public-switched network, were widely regarded as efforts to ensure "captive markets" for commonly-owned equipment suppliers. <sup>2/</sup> The industry argued such limits on subscriber choice among other things, engendered excess profits that were necessary to cross-subsidize and thus keep local phone rates low.

The first major breach in this traditional policy occurred in 1947, when the FCC sanctioned the direct connection of telephone recording and answering devices to the public-switched network. <sup>3/</sup> In 1948, the Hush-a-Phone Corporation filed a complaint with the FCC challenging the lawfulness of AT&T tariff prohibitions on the use of a plastic, sound-muffling device that could be clipped onto a telephone mouthpiece in order to facilitate communications in noisy and other work environments. Although the FCC agreed with AT&T that permitting use of this device could give rise to such alleged harms as a "blasting effect" or the instrument handset being "not well-seated on the ear," the Court of Appeals for the District of Columbia Circuit in 1956 overturned the FCC's action and directed removal of the pertinent tariff restrictions on the ground they constituted an "unwarranted interference with the telephone subscriber's right reasonably to use his telephone in ways which are privately beneficial without being publicly detrimental." <sup>4/</sup>

---

<sup>2/</sup> These restrictions, it should be noted, generally applied to public-switched but not necessarily private line circuits. Similarly, restrictions on the use of noncarrier-supplied terminal equipment were not necessarily applied in the case of carrier-furnished private networks, although if such networks were interconnected with public-switched facilities, use of an approved network signaling device was typically required.

<sup>3/</sup> Use of Recording Devices, 11 F.C.C. 1033 (1947).

<sup>4/</sup> Hush-a-Phone Corp. v. United States, 238 F.2d 266, 269 & n. 10 (D.C. Cir. 1956).

More than a decade later, the FCC in its Carterfone ruling ordered broad changes in AT&T's "foreign attachment" tariffs. 5/ Thereafter, the FCC in 1976-77 adopted its "registration program," which authorized the interconnection of terminal equipment meeting relatively minimal standards sufficient to safeguard the network from technical harms. 6/

In 1980, the FCC adopted new rules governing carrier provision of terminal equipment as part of its Second Computer Inquiry. 7/ The decision in that proceeding deregulated the business of retailing, installing, and maintaining terminal equipment. The Second Computer Inquiry also required the Bell System companies to establish separate subsidiaries to handle regulated and unregulated operations, ostensibly to minimize the potential for anticompetitive cross-subsidization. 8/ Contemporaneously, AT&T and its local telephone operating units established a network of retail telephone equipment outlets, "Phone Centers," and AT&T's manufacturing arm, Western Electric, began marketing its terminal equipment through a diversity of retail outlets including Sears Roebuck.

---

5/ Carterfone Device, 13 F.C.C. 2d 420, 14 F.C.C. 2d 571 (1968). See also AT&T Foreign Attachment Tariff Revisions, 15 F.C.C. 605 (1968), 18 F.C.C. 2d 871 (1969). It should be noted that the Carterfone decision did not initially apply to embedded plant; it gave subscribers the right to use additional terminals of their own choosing, but not necessarily to replace existing equipment. The FCC in 1975 unequivocally applied Carterfone to embedded plant. Mebane Home Teleph. Co., 53 F.C.C. 2d 473, 476 (1975). See generally Fuhr, Competition in the Terminal Equipment Market After Carterfone, 28 Antitr. Bull. 669 (1983).

6/ See Registration Program, 56 F.C.C. 2d 593 (1975), 58 F.C.C. 2d 736 (1976). See also North Carolina Util. Comm'n v. FCC, 537 F.2d 787 (4th Cir. 1976). See generally Note, Competition in the Telephone Equipment Industry: Beyond Telerent, 86 Yale L.J. 538 (1977).

7/ Second Computer Inquiry, 77 F.C.C. 2d 384, reconsid., 84 F.C.C. 2d 50 (1981), further reconsid., 88 F.C.C. 2d 512 (1981), aff'd sub nom. Computer & Communications Indus. Assoc. v. FCC, 693 F.2d 198 (D.C. Cir. 1982).

8/ This FCC separate subsidiary requirement, it should be noted, was applied only to Bell System Companies. GTE, for example, was exempted. See 84 F.C.C. 2d at 72. The requirement has been continued by the FCC with respect to the divested Bell Operating Companies (see Illinois Bell Teleph. Co. v. FCC, 740 F.2d 465 (7th Cir. 1984)) although changes in this regard have recently been proposed in conjunction with the agency's Third Computer Inquiry (Docket No. 85-229) (FCC Mimeo No. 85-397, 36028 (rel. Aug. 16, 1985)). Certain restrictions were placed on joint service and equipment marketing by GTE subsidiaries under the 1984 consent decree which enabled GTE to acquire Southern Pacific's Sprint Communications affiliate. See United States v. GTE Corp., 1985-1 Trade Cas. Para. 66,355 (D.D.C. 1984). Recently, the FCC relaxed certain of these constraints with respect to AT&T's operations. (Docket No. 85-26) (FCC Mimeo No. 85-509, 35963 (rel. Sept. 30, 1985)).



Effects of Deregulation. An immediate consequence of the FCC's deregulatory actions regarding the customer premises equipment market was a substantial increase in sales and revenues for noncarrier-affiliated manufacturers and vendors, the so-called "interconnect" companies. In 1974, for example, the interconnect industry's principal trade association estimated total interconnect sales of about \$320 million. In 1979, however, such sales totalled an estimated \$729 million and, in 1981, they totalled some \$1.4 billion. Sales, in other words, essentially quadrupled in about seven years. <sup>9/</sup> In 1984, there were more than 2,000 firms marketing telephone apparatus nationwide and they enjoyed sales of some \$1.7 billion. <sup>10/</sup> The Electronics Industry Association has estimated total telephone instrument sales of about 31.4 million instruments in 1984 and forecast about 35.3 million will be sold in 1985. The average price of standard telephone instruments has also held flat or declined slightly over recent years, despite the frequent addition of new features (e.g., automatic redial, "hold," etc.). In the case of specialty and "decorator" telephones, prices have steadily fallen.

FCC deregulatory policies made possible the emergence of a significant, new retail line of commerce and demonstrably broadened the range of consumer equipment choice. They also afforded many Americans new business and investment opportunities. There is no credible evidence, moreover, indicating that the proliferation of customer-supplied apparatus has had any adverse effect on the technical integrity of the national telephone network.

There has been comparable substantial growth in the business telephone equipment sector. The number of PBXs installed nationwide has grown by about 15 percent annually each year since 1974 and now stands at about 265,000 units a year. The average price per line has steadily fallen. Since 1983, for example, the average price per line for PBXs has dropped 20 percent to about \$800. Similarly, the average cost to end-users for key telephone systems has been reduced more than 50 percent since 1981, from about \$1,000 per line to less than \$450 per line. <sup>11/</sup>

Not only has the price of business telephone equipment steadily declined, but the range of features available -- and the related economies achievable -- has also grown substantially. Equipment and line or circuit expenditures are cross-elastic; that is, a "smarter" or more "feature-rich" PBX may require fewer external phone lines than a less sophisticated installation. Commonplace today, moreover, are devices capable automatically of securing least-cost routing of long-distance calls among a repertoire of public-switched, private line, or Wide Area Telephone Service (WATS) circuits. Such features, which are often incorporated in PBXs, increase potential cost savings for business users.

---

<sup>9/</sup> See North American Teleph. Assoc. Industry Statistical Review 1980; 1982 U.S. Industrial Outlook at p. 228.

<sup>10/</sup> 1985 U.S. Industrial Outlook at p. 30-4. This was a decline from 1983 total sales of \$2.2 billion, but that record sales volume was due to certain aberrational marketplace conditions caused by the AT&T antitrust divestiture.

<sup>11/</sup> Management Information Systems Week, May 8, 1985, at p. 48 (reporting estimates of Eastern Management Group).

The FCC's actions deregulating the customer premises telephone equipment market had the effect of lowering nontariff trade barriers and thus facilitating entry by foreign equipment vendors. Between 1978 and 1984, Far East telephone shipments to the United States, excluding Japan, rose from about \$18 million to \$440 million, much of that representing very low-priced, "disposable phones." <sup>12/</sup> Japanese, Canadian, and European manufacturers have also captured a significant share of the 4.2 million lines a year U.S. PBX market, as shown in the commercially developed and published sales estimates set forth below:

1984 New PBX Lines Shipped  
U.S. Market Share (estimated)

<u>Company</u>	<u>Percent 1984 Shipments</u>
Northern Telecom (Can.)	21.2 %
AT&T (US)	18.9
Rolm (US)	18.4
Mitel (Can.-UK)	10.2
NEC (Japan)	6.9
Siemens (FRG)	3.9
InterCom (US)	3.0
Ericsson (Swe.)	2.9
GTE (US)	2.9
Harris (US)	2.6
Fujitsu (Japan)	2.1
Oki (Japan)	1.6
ITT (US)	1.6
United Technologies (US)	1.6
Solid State (US)	1.2

Popular misapprehensions notwithstanding, however, U.S. PBX suppliers still command nearly half the total market and, indeed, if AT&T's 1984 shipment of 420,000 lines of "Horizon" units were included in these figures, AT&T's market share would have been about 26 percent. <sup>13/</sup> While technically a Canadian company, moreover, about one-fourth of Northern Telecom is reportedly American-owned and the company maintains that it produces a majority of the products it sells here in U.S. factories.

U.S. telephone companies, moreover, are obviously the exclusive providers of Centrex service, which constitutes the principal competitor for PBX vendors. Centrex is a service offered by most local telephone companies which provides PBX-like functionality for business customers, but without the need for on-premises switching equipment. According to a study by Northern Business Information, from 1980 to 1983 aggregate growth of Centrex lines nationwide was only about 1 percent, and the share of the total subscriber switching market supplied by Centrex declined during that period from about 26 to 20 percent, a decline attributed to AT&T's "migration strategy," which allegedly aimed at

---

<sup>12/</sup> 1985 U.S. Industrial Outlook at p. 30-4.

<sup>13/</sup> The "Horizon" line, designed for small business installations, is not generally included within the PBX category by many private market statistics compilers who consider it to be a key telephone system.

phasing out Centrex in favor of on-premises equipment, hopefully supplied by Western Electric.

This steady decline in Centrex, however, reversed itself in 1984. Centrex line growth rose 5.5 percent in the areas of the country served by Ameritech, for instance. This change has not been uniform nationwide given the fact that the economics of Centrex vary, essentially, with the distance between the customer and the local central office. Centrex service usually is most profitable in major metropolitan, densely populated areas.

The long-term viability of Centrex, and its competitiveness with PBX and other customer premises equipment, is affected by limitations placed on the Bell companies under the AT&T consent decree. The decree prohibits provision by these firms of "information services," a term some have construed to include certain advanced telephone features as voice storage. It has also been suggested that incorporating "least-cost" long-distance call-routing features within a Centrex service package would contravene other provisions of the decree which prohibit provision of "intraLATA" services by the Bell companies, particularly if Bell subsidiaries maintain the rate information software necessary for call-routing.

These provisions, together with other regulatory constraint on the joint provision of "basic" and "enhanced" telecommunications services have significant trade implications. To the extent Federal rules drive the "intelligence" out of the public-switched telephone network and into customer premises equipment, foreign-based equipment suppliers may be advantaged as their share of the customer premises market is considerably higher than in the case of network equipment products. Changes in both consent decree and regulatory constraints, however, have been recommended by the Commerce Department and are under consideration by other parts of the Government as well.

In addition to seeking to improve the utility of public-switched network, all of the regional Bell Operating Companies created by the AT&T antitrust divestiture have also moved aggressively over the past 18 months to become major retailers of telephone equipment including PBXs. Bell Atlantic, Ameritech, and US West have become major distributors of NEC'S NEAX 2400 line; NYNEX is distributing GTE's Omni and GTD-5 lines as well as IntelCom's IBX; Bell South, Southwestern Bell, and Pacific Telesis are distributing Northern Telecom's NL product line; Bell South is marketing the ITT 3100 and Ameritech, Ericsson products. Ameritech, Bell Atlantic, NYNEX, and Pacific Telesis, however, which serve older, more densely populated regions, appear to be emphasizing Centrex offerings, while US West, Bell South, and Southwestern Bell, which serve less densely populated regions, appear to be pushing PBX sales.

With the installation by telephone companies of high-capacity digital switching apparatus on an increasingly widespread basis, competition between Centrex and PBX offerings should increase. Customers, of course, stand to gain, as in the past, from this competition.

Competition is especially strong in the key systems business and has intensified since 1984 and the breakup of the Bell System. Key systems are multiline "push-button" installations which bridge the market between single-line, chiefly residential, subscribers and large users with sufficient volume to warrant installation of a PBX. Estimated 1984 market shares are shown in the commercially developed and published figures set forth below.

1984 Key System Suppliers  
(By Number of Systems)

<u>Firm</u>	<u>Market Share</u>
AT&T (US)	26.0%
TIE (US)	21.8
ITT (US)	14.7
NEC (Japan)	5.7
Executone (US)	5.1
Toshiba (Japan)	5.0
Iwatsu (Japan)	4.9
Inter-Tel (US)	2.8
Other	14.0

These figures and designations may be slightly misleading. Much of the equipment installed by U.S.-based firms such as TIE and Executone, for example, is manufactured abroad. AT&T is increasingly "out-sourcing" some of its production while NEC is stepping up its U.S. operations. The internationalization of the telecommunications equipment industry is such as to render precisely ascertaining the "nationality" of products increasingly a difficult chore. AT&T, moreover, generally has a larger share of the key system market the bigger the system at issue. It has, for example, only a 16.9 percent share of the 4 to 16-station market but a 32 percent share of the 17 to 40-station market and a 54.7 percent share of the over 40-station part of the market. 14/ Since larger installations are usually regarded as more profitable than smaller ones, these market share figures may understate the actual distribution of profits in this sector.

Estimates, however, are that the per-line price of key systems has declined 5 to 10 percent in the first quarter of 1985 and will decrease another 15 percent this year. Price competition and technological advances continue to push price down. The average price per key telephone system station is expected to drop to \$225 in 1985 and \$160 by 1989 from \$280 in 1984. Such substantial equipment price reductions, of course, represent a significant benefit, especially to the medium to small business telephone user.

Employment Effects. The microelectronics revolution and the competitive changes associated with it obviously have had an effect on traditional patterns of employment generally. Perhaps most affected to date have been the printing, banking, and financial services sectors in terms of number (though not necessarily compensation) of total employees. 15/ While there have been studies both here and abroad which link "deregulation" with alleged declines in telecommunications sector employment, some of these studies may not be determinative, given possible biases. 16/ It is nevertheless clear that there

---

14/ Communications Week, July 1, 1985 at pp. C-1, C-2.

15/ See generally Rada, The Impact of Micro-Electronics (Int'l Labour Office, 1980); Norman, Microelectronics at Work: Productivity and Jobs in the World Economy (Worldwatch Inst., 1980).

16/ See, e.g., British Telecommunications Union Committee, The American Experience: A Report on the Dilemma of Telecommunications in the USA (1983).

have been industry jobs lost coincident with the move toward competition (although few would agree on what factor contributed most to this drop).

There have been declines in total employment in the U.S. telephone and telegraph equipment manufacturing industry since the advent of more effective competition due to FCC deregulation and related developments. Employment in this sector peaked at 152,000 in 1980. Declines have occurred chiefly in AT&T employment with the closing of long-established facilities in Chicago, Baltimore, and New Jersey. In August 1984, AT&T announced it would eliminate 11,000 manufacturing jobs over the next year and, in August 1985, the firm announced a further reduction of 24,000. In July 1985, AT&T announced it would close major parts of its Shreveport, Louisiana, telephone terminal plant and open a similar facility in Singapore. Total U.S. manufacturing employment in this sector is forecast to be about 135,000 by the end of this year. 17/

FCC statistics developed in connection with administering the agency's registration program indicate the changing nature of the equipment manufacturing business. These statistics indicate that about 25 percent of registration applications submitted in 1985 were for equipment manufactured in the United States, while 75 percent were for equipment manufactured in foreign countries. Of the foreign total, 95 percent of the registration applications were for equipment manufactured in the following Pacific Basin countries: Hong Kong, Japan, South Korea, Singapore, Taiwan, and China. Canada and European countries accounted for most of the remaining five percent. Judging from the photos of the U.S.-assembled equipment, the FCC estimates approximately 70 percent of the components were manufactured in the Far East.

Reductions in other employment opportunities offered by traditional telephone companies have also occurred coincident with the deregulation of the terminal equipment installation and maintenance businesses. Between 1982 and 1983, for example, employment among the independent telephone companies declined from 192,100 to 186,800 employees. For the Bell companies, employment declined from 840,675 to 739,168.

Some of the jobs lost by virtue of telephone company cut-backs in the number of installers may be compensated for by increased employment on the part of the new equipment and service competitors. New jobs, however, sometimes are non-union or otherwise lower paying positions. British union surveys have noted, for example, that while total employment in the U.S. telecommunications business overall has stayed at least level and perhaps even increased slightly over the past decade, the average wage has grown less rapidly than in the past under pervasive regulation. Ordinarily excluded from such workforce analysis, however, is possible growth in conventional retail employment due to the trend toward making the telephone instrument another part of the broader consumer electronics business.

The changes in the telephone workplace, while legitimately a matter of concern, are nevertheless not appreciably different in magnitude or character from changes that have taken place in a number of other industrial or utility service sectors both here and abroad. Some maintain these changes are unquestionably the consequence of competition. Competition is a process which causes producers to share their surplus with consumers, and producers may have

---

17/ See 1985 U.S. Industrial Outlook at p. 30-7.

been willing or able to share their surplus with employees to a greater degree in the past than is perhaps true today. Others contend that it would be a mistake to assume any direct, unavoidable, causal relationship between Government actions expanding competitive opportunities and customer choices, and short-run, transitional dislocations in the U.S. telephone workforce, because the primary contributing factor is the increasing adoption of new labor-saving technologies.

Even had it been possible to forestall competition in the telephone terminal equipment market, the industry would certainly have moved away from labor intensive, traditional electronics toward greater reliance on less labor intensive, solidstate devices. A conventional electromagnetic "cross-bar" switch of 20,000 lines capacity, for example, might have required as many as 100 employees to operate and maintain it, while a new electronic switch of comparable capacity requires only about a dozen employees or fewer. Indeed, the relatively inflexible regulation of the past, which placed rigid "caps" on overall firm profits and, in some instances, sought to hold returns on capital at artificially low levels, may have supplied some incentive for regulated telephone companies to pare-down their costs and step-up their productivity through even faster deployment of new labor-saving technology.

Overall, it would probably be a mistake to rely too heavily upon, or unduly to extrapolate, employment experiences in the U.S. telephone equipment sector in recent years. Much of the period at issue here -- 1977 to 1982 -- was a time of severe recession and economic downturn. Telephone equipment demand is sensitive to the business cycle. Job losses may have been due as much to depressed economic conditions as other factors. Indeed, it is noteworthy that interconnect and other equipment vendors during this period were able to accomplish major sales gains annually notwithstanding economic conditions inhospitable to the sale of consumer or producer durables generally.

As the state of the U.S. economy stabilizes and improves, there should follow some commensurate improvements in telephone sector employment as well. Particularly if Government and industry programs aimed at increasing U.S. telecommunications sector exports prove successful, there should also be a positive effect on overall employment opportunities. Kenneth Robinson, Office of the Assistant Secretary, NTIA (202) 377-1551.

#### B. Telephone Equipment - Network Equipment.

Introduction. FCC deregulation opened much of the customer-premises part of the telephone equipment business to competition. But it was the AT&T divestiture which had the major effect in terms of facilitating competition in network equipment.

Current Status Report. By "network equipment" is generally meant the transmission and distribution facilities as well as central office switching apparatus that makes up the nationwide telephone network. 1/ The U.S.

---

1/ There are nationwide and other long-distance communications networks in addition to the common carrier system owned and operated by AT&T and other established telephone companies. Networks are also maintained by some of AT&T's long-distance telephone competitors and many major users and utilities also have their own extensive regional communications networks which interconnect with the public-switched message network in varying degree. In 1984, AT&T estimated there were about 304,000 route miles and 111 million circuit miles of private microwave systems domestically, excluding U.S. Government systems.

public-switched telecommunications network today consists of some 22,000 telephone switching and central offices and more than a billion miles of transmission paths, including 6 million trunks, almost as many special services circuits, and 114 million access lines connecting subscribers to central offices. 2/ The telephone network currently represents a capital investment of at least \$232 billion, substantially more, incidentally, than the United States spent on total highway construction between 1960 and 1983. 3/ The human resources of the industry, which consist of a large cadre of well-educated, well-trained, highly motivated, and competent workers, also constitute an important national asset.

In 1984, telephone companies not previously affiliated with AT&T spent some \$4.4 billion for plant modernization and expansion. The divested Bell Operating Companies had capital expenditures of about \$13.8 billion, and AT&T's domestic capital expenditures (primarily but not exclusively on network projects) totalled \$3.2 billion. 4/ Long-distance, competitive common carriers invested about \$2.5 billion to expand and improve their facilities and networks. Nationwide, telephone service in 1984 was provided to 92 percent of the 85.4 million households in the United States and virtually every business establishment. More than 198 million telephones were in-place, 37 percent of the phones in use worldwide -- or more than three times the number in Japan and more than half again as many as in all of Western Europe.

In the Seventies, the most dramatic changes in the U.S. telecommunications network occurred because of the rapid deployment of domestic satellite systems (discussed later in this report) and the installation of electronic switches (both analog and digital), which currently total about 4,900 units. At present, fiber optic communications systems promise to have a major effect on the character and abundance of network offerings in the Eighties, with an estimated 200,000 kilometers of lightguide facilities produced this year by U.S. firms.

Competitive History. Provisions of the 1934 Communications Act apply the antitrust laws (and the procompetitive policies those laws reflect) to trade in communications apparatus. They also establish competition as one of the statute's overall goals. 47 U.S.C. Secs. 313, 314 (1980). In 1934, it was proposed to require competitive bidding by all telephone companies to be subject to the Communications Act, but the proposal was not adopted. Nevertheless communications common carriers continued subject, as today, to provisions of section 10 of the Clayton Act (15 U.S.C. Sec. 20 (1980)), which generally requires regulated carriers to use competitive bidding for annual purchases exceeding \$50,000 from companies with which they share an officer or director.

---

2/ See 1984 U.S. Industrial Outlook at p. 28-1; 1985 U.S. Industrial Outlook at pp. 31-3.

3/ See U.S. Telephone Association, Phone Facts '84 at p. 8; 1985 U.S. Statistical Abstract at p. 587.

4/ Phone Facts '84 at p. 9; 1984 AT&T Ann. Rep. at p. 16.



The Antitrust Division of the U.S. Department of Justice in January 1949 filed suit under sections 1 and 2 of the Sherman Act (15 U.S.C. Secs. 1, 2 (1980)) alleging that AT&T's ownership of the Western Electric Company had unlawfully restrained competition in the U.S. telephone equipment field. This lawsuit was settled by consent decree in 1956. United States v. Western Elec. Co., 1956 Trade Cas. (CCH) Para. 68,246 (D.N.J. 1956). Under this decree, Western Electric agreed to limit its manufacturing to the support of regulated communications services and the Bell System companies were limited to providing such services. The 1956 consent decree permitted Western Electric to sell goods and services to non-Bell System telephone companies and it did so until the early Seventies when, evidently concerned about potential antitrust exposure, Western generally discontinued the practice (although it continued to market major switching systems such as the 4ESS and 5ESS switches to independent telephone companies).

The FCC in 1971 commenced an inquiry into the interrelationship between AT&T, the Bell Operating Companies, and Western Electric to determine whether the vertical integration of the Bell System had caused suboptimal levels of innovation, or led to a slackening of competition in the telephone equipment market. Contemporaneously, the world's second largest telephone equipment manufacturer, ITT Corp., filed a private antitrust suit against the vertically integrated General Telephone System, on the ground GTE's acquisition and control of local telephone companies serving about 8 percent of U.S. households had unlawfully restrained competition in the equipment field. 5/ ITT also sued AT&T alleging its ownership of Western restrained competition for Bell System business; this latter suit subsequently was settled by AT&T agreeing to purchase several hundred million dollars of ITT products.

In 1977, the FCC ruled that while AT&T's vertical integration had generally benefited ratepayers, AT&T should nevertheless take steps to increase its consideration and purchase of products from nonaffiliated firms. 6/ As a result of these pressures, AT&T increased its outside purchases significantly. In 1974, AT&T purchased about \$1 billion in telecommunications products from outside suppliers and by 1979, purchases from general trade sources amounted to \$1.8 billion. About one-third of all Bell System expenditures for telecommunications products, including Western Electric purchases of components for its own products, went to outside suppliers that year. 7/

As part of its lawsuit against AT&T filed in 1974, the Antitrust Division alleged that the Bell Operating Companies had been required to buy Western Electric products to the exclusion of comparable offerings of superior price and quality available from outside suppliers. The so-called "procurement" part of the AT&T litigation, however, was among those aspects of the complaint

---

5/ ITT Corp. v. GTE, 518 F.2d 913 (9th Cir. 1975). See also Cia. Petrolera Caribe, Inc. v. Arco Caribbean, 754 F.2d 404 (1st Cir. 1985); Montfort v. Cargill, \_\_\_ F.2d \_\_\_, 48 ATRR 774 (10th Cir., Apr. 23, 1985).

6/ AT&T Phase II - Final Decision, 64 F.C.C. 2d 1, 25 (1977).

7/ Defendants' First Statement of Contentions and Proof, United States v. AT&T, filed Jan. 8, 1979 at p. 56, n. 25; 1979 AT&T Ann. Rep. at pp. 12, 15.

essentially dismissed by the trial court in 1981, prior to the announcement of the settlement. 8/

Effects of Deregulation. Although divestiture facilitated new entry into the network equipment market, AT&T remains the principal supplier of central office switching apparatus in the United States today, as shown by the 1984 commercial market share estimates below.

1984 U.S. Central Office Market Share  
(Total Local Lines Placed in Service)

<u>Company</u>	<u>Share</u>
AT&T (US)	47 %
Northern Telecom (Can.-US)	28
GTE (US)	22
Stromberg-Carlson-Plessy (UK)	2
ITT (US)	1 <u>9/</u>

Northern Telecom and AT&T have indicated that in 1985 they expect to produce about 12 million lines of their respective DMS-100 and 5ESS digital switching equipment. Northern Telecom, which was approved as a supplier of digital switching apparatus by the former Bell System in January 1980, claims a 70 percent share of the U.S. digital central office switch market measured by number of units, although not necessarily lines. Since divestiture, AT&T has begun marketing its 5ESS outside the former Bell System and has reportedly signed sales contracts with United Telephone, Continental Telephone, and Rochester Telephone, as well as with Merrill Lynch and Boeing Computer Services Co., both of which will use the switches in connection with their extensive private networks.

Major multinational switching equipment suppliers including CIF-Thomson-Alcatel, Siemens, Ericsson, Fujitsu, and NEC have sought to supply switches particularly for "class 5" central offices, those facilities which rank lowest in the telephone industry's switching hierarchy and represent about 90 percent of the total switch market. But, to date, they have not secured appreciable market share in this line of commerce which is expected to account for about \$2.5 billion sales in 1987. Recently, GTE and Siemens announced the two firms would collaborate in developing and marketing communications products. In July 1985, Siemens announced it had been awarded a contract to supply certain small (4,000-line) central office switches to Wisconsin Bell Telephone. Although significant, this transaction represents but a relatively small part of the overall U.S. central office equipment market. Thomson-Alcatel has also reportedly sold a few switches in the United States and has certain marketing agreements with AT&T.

Competition in the communications industry generally has given local telephone companies an incentive to accelerate their plant replacement and

---

8/ See United States v. AT&T Co., 524 F. Supp. 1336, 1370-72 (D.D.C. 1981).

9/ Communications Week, Mar. 18, 1985 at p. C-1 (reporting estimates of Northern Business Information, Inc.).

modernization programs, in order to remain responsive to the service demands of major customers and thus to lessen the likelihood of "bypass" whereby those customers might otherwise deploy private long-distance or local communications facilities, or both. But this acceleration in plant improvement programs has also resulted in benefits for ordinary residential telephone subscribers.

Electronic switching makes it possible for local telephone companies to offer residential customers a diversity of customized services not previously available except to major business users. Services including call forwarding, call-on-hold, international direct dialing, and the like have been "democratized" and today are increasingly available universally and, typically, at a low marginal cost. There are legal limitations imposed on the range of new services the Bell companies may provide under the AT&T consent decree, as discussed briefly above in connection with customer premises equipment offerings, although these firms today do offer services to residential users comparable to some otherwise available to major business. Switching costs, moreover, have steadily declined by an estimated 7 to 10 percent annually since the early 1980s, when broadscale deployment of electronic switching apparatus was undertaken by most telephone companies. Since switching costs constitute between half and three-quarters of overall telephone circuit costs, an effect has been to hold operating expenses down while, at the same time, offering residential subscribers an increasing diversity of service options.

Competition has also stimulated progress on the part of equipment suppliers. A dozen years ago, for example, half the total output of Western Electric's switching operations (measured by lines produced) reportedly consisted of conventional electromechanical apparatus that some engineers have suggested was only somewhat more sophisticated technologically than the first Strowger switches introduced in the early years of this century. As one critic contended in 1974, it was as if half the output of Ford Motor Company then consisted of Model Ts. In about a decade, however, Western's production, as well as that of most other industry firms, radically changed and is now almost completely electronic. While it cannot be conclusively shown that procompetitive and deregulatory decisions by the FCC necessarily forced all of this beneficial change, it is relatively clear that without the stimulus of competition, such changes would have occurred more slowly.

There have also been major changes in the fields of transmission technology and network management. Under pressure to reduce costs, new microwave transmission techniques such as single sideband operations have been introduced which have had the effect of doubling or tripling the transmission capacity of existing microwave facilities in some instances. Pressures to reduce other cost elements have also stimulated the development of lightguide or fiber optics. Fiber optics systems substantially reduce installation costs, as such facilities are far less bulky and more easily handled than coaxial cables of comparable capacity. Such systems also make it possible to offer at lower cost a variety of services which previously required expensive bandwidth capacity. Estimates are that some 200,000 kilometers of fiber optic cables will be produced in the United States in 1985.

Advances in transmission and related technology are, in significant part, a function of the increased amounts spent by the U.S. telecommunications industry on research and development. Since 1981, research expenditures have grown steadily, from \$1.6 billion in 1981 to \$2.4 billion in 1982, \$3.1 billion in

1983, and \$3.8 billion in 1984. <sup>10/</sup> Some estimates suggest the United States today is spending at least as much on telecommunications research as Western Europe and Japan combined.

Progress in transmission and switching technologies, and reductions in these costs, have facilitated emergence of major private communications networks, most of which today use microwave technology, although increasing use of other technologies including satellites and fiber optics is evident. At present, the FCC has licensed more than 20,000 private, "operational fixed" microwave and more than one million other private radio communications facilities. Private, non-Government microwave system capacity currently exceeds a reported 111 million circuit miles and has increased by about 5 percent yearly between 1979 and 1984.

Private communications systems typically are installed and used for both service and cost reasons. The conventional telephone network is engineered chiefly to provide low-cost, efficient, public-switched, voice communications service and not necessarily the extremely high capacity data transmission, very secure, or ultra-reliable services some specialized users may require. Placing specialized service demands on the conventional network could impose unacceptable costs and entail efficiency losses as well. To the extent private communications networks satisfy these requirements, investment and operational burdens which might otherwise be imposed on the public network may also be reduced. Reduced as well is the possibility ordinary telephone ratepayers might be obliged to absorb some of the cost of providing highly specialized communications systems desired by only a small number of major corporate users.

In recent years, there has been increased interest in installing private communications systems not necessarily to satisfy specialized service requirements but rather to reduce more conventional communications costs. This is the so-called "uneconomic bypass" phenomenon which has been the focus of FCC and other inquiries, and also was a major reason for the FCC's Access Charges rulings.

Under traditional pricing and cost-recovery systems, revenue requirements associated with nontraffic sensitive plant were recovered chiefly through traffic-sensitive assessments. A result was substantially to overcharge some major users, i.e., to charge them prices greatly exceeding the cost of serving them, while to undercharge others, chiefly residential subscribers who make few long-distance calls. Private communications systems offer major users a means of avoiding carrier prices which might be significantly above the actual cost of service. Such "bypass" of the conventional switched telephone system implies the possible loss of contribution to fixed joint and common costs now made by major users. To the extent local telephone companies might be unable to reduce costs commensurate with such traffic losses, the effect could be higher charges for those customers with fewer alternatives who remain dependent on the conventional telephone network for service.

There is little evidence indicating that existing or proposed private communications systems have caused the price of local or long-distance telephone

---

<sup>10/</sup> 1985 U.S. Industrial Outlook at p. 31-3.

services to rise more quickly than might otherwise have been the case in recent years. Indeed, some suggest the proliferation of such systems has benefited the industry and ordinary residential customers, because established carriers have not had to invest their capital in such privately financed facilities. Future traffic diversion, however, could cause some rates to rise faster.

The availability of private system alternatives, on the other hand, should also have some positive effect in terms of spurring established carriers to hold their prices down and to be more responsive to the communications requirements of customers. Absent such private system competition, established companies might be less responsive and less willing to reduce prices and profits. And, at least in the case of very specialized networks, there may well be advantages to encouraging private user financing of such systems since that might, first, relieve capital budget pressures in the case of established telephone companies and, second, minimize any potential that ordinary telephone ratepayers' funds will be used to develop communications capabilities of direct benefit only to a small number of large corporate customers.

Conclusion. By virtue of rapid technological advances, increasing competitive pressures, and procompetitive, deregulatory Government policies generally, the capabilities of network equipment have grown rapidly and switching and circuit costs have declined. These advances have occurred on a broader scale and faster in the United States than any other country. This trend is likely to continue, and to continue to yield significant benefits for all classes of business customers as well as most residential customers. Kenneth Robinson, Office of the Assistant Secretary, NTIA (202) 377-1551.

### C. Long-Distance Network Services.

Introduction. The United States today enjoys the most sophisticated and diverse long-distance communications service in the world and, more than any other country, has sanctioned, indeed, encouraged facilities-based and other competition. The long-distance services sector, moreover, is experiencing significant changes today, chiefly as a consequence of new technology and procompetitive Federal policies, as well as the industry restructuring caused by the 1984 AT&T divestiture.

Current Status Report. Revenues from all U.S.-domestic telephone and telegraph services reached almost \$96 billion in 1984, while international service revenues grew to about \$2.8 billion. In 1984, the most recent year for which statistics are available, the principal suppliers of U.S. domestic interexchange (toll) services and their revenues and market shares are as shown below.

#### 1984 Domestic Interexchange Revenues (MTS, WATS, Private Line)

<u>Company</u>	<u>Revenues</u> (Billions)	<u>Market Share</u>
AT&T	\$33.25	63.5 %
Competitive Carriers	4.95	9.4
BOCs and Independent Telcos	13.40	25.6
Private Microwave	.80	1.5
	<u>\$52.40</u>	<u>100 %</u>

1984 Non-AT&T Domestic Interexchange Capacity  
(millions of circuit miles)

<u>Terrestrial</u>	<u>Year-End 1984</u>
MCI, GTE Sprint, USTS	379M
Satellite Carriers	570M
Private Microwave	130M
BOC Toll	87M
Independent Toll	24M <u>1/</u>

Competitive History. Prior to 1959, virtually all U.S. domestic long-distance communications services were provided by AT&T's Long Lines Department, except for certain limited services provided by railroad and other utility-owned and operated systems and service in Alaska, where the long-distance telephone network was owned and operated by the U.S. Air Force. In 1959, however, the FCC set changes in motion when it allocated radio frequency spectrum to facilitate private microwave systems by major users generally. 2/

AT&T responded to potential competition from private microwave systems by instituting its Telpak bulk-discount tariffs, which offered major users the opportunity for substantial savings if large blocks of long-distance circuits were purchased. These bulk-discount offerings were to prove a source of substantial controversy for nearly two decades. 3/ In December 1963, a firm named Microwave Communications, Inc. (MCI) filed applications with the FCC to construct and operate competing common carrier long-distance telephone facilities between Chicago and St. Louis, using General Electric as prime contractor. MCI maintained its specialized communications services would prove especially valuable to business users whose private line communications needs would not otherwise be efficiently met.

Three years after the MCI applications were filed, the FCC designated them for hearing (31 Federal Register 2666 (Feb. 2, 1966)), and three years later service authorizations were issued. 4/ A general rulemaking was undertaken and the courts in 1975 upheld the FCC's decision to permit facilities-based competition with established telephone companies in the "private line" part of the long-distance communications business. 5/ Resale and sharing of private line

---

1/ See NTIA, Issues in Domestic Telecommunications: Directions for National Policy at p. 85 (1985); AT&T Reply Comments in FCC Docket No. 83-1147 (Long-run Regulation of AT&T), filed June 4, 1984, Appendix B, Schedule 1, p. 2.

2/ Allocation of Frequencies in the Bands Above 890 Mc., 27 F.C.C. 359 (1959), 29 F.C.C. 825 (1960).

3/ See, e.g., Aeronautical Radio, Inc. v. FCC, 642 F.2d 1221 (D.C. Cir. 1980), cert. denied sub nom. General Elec. Co. v. FCC, 451 U.S. 976 (1981); AT&T v. FCC, 449 F.2d 439 (2d Cir. 1971); American Trucking Associations v. FCC, 377 F.2d 121 (D.C. Cir. 1966), cert. denied, 386 U.S. 943 (1967).

4/ MCI Communications, 18 F.C.C. 2d 953 (1969), 21 F.C.C. 2d 190 (1970).

5/ Specialized Common Carriers, 24 F.C.C. 2d 318 (1970), 29 F.C.C. 2d 870 (1971), aff'd sub nom. Washington Util. & Transp. Comm'n v. FCC, 513 F.2d 1142 (9th Cir. 1975).

circuits was sanctioned by the FCC in 1976. 6/ In 1980, resale of message toll service (MTS) and "Wide Area Telephone Service" (WATS) was permitted. 7/

The FCC in 1974 permitted ITT, then the world's second largest telephone equipment manufacturer, to enter the U.S. domestic long-distance field. 8/ In 1979, joint entry by the dominant computer company, IBM, the largest shareowner-owned insurance company, Aetna, and Comsat was also sanctioned. 9/ Competitive, multiple entry into the U.S. domestic satellite field was allowed by the FCC in 1972 under the Nixon Administration's progressive "open skies" policy and the first domestic satellite system, operated by Western Union Corp., began operation in 1976. 10/

Prior to 1977, the FCC sought to place service limitations on competitors in the domestic long-distance field, chiefly in an effort to sustain the established telephone industry's traditional cross-subsidy system. In the United States, as in other developed countries, revenues from public-switched long-distance services traditionally have been used to defray some of the costs of local telephone service as well as to subsidize service in remote and rural areas. This was accomplished chiefly by allocating increasing percentages of local plant and switching investment to toll operations, so-called "toll loading." By the late Seventies, some 26 percent of certain local plant was allocated on average to toll operations although it was used only about 8 percent of the time for long-distance calling. 11/

Many domestic private line and public-switched services, however, are cross-elastic and in some regards physically undifferentiable. The FCC in 1971 failed to specify with sufficient clarity the boundaries of each offering. In 1977-78, therefore, the courts overturned an FCC effort to prohibit new offerings by specialized carriers which resembled public-switched service and

---

6/ Resale and Shared Use, 60 F.C.C. 2d 261 (1976), aff'd sub nom. AT&T v. FCC, 572 F.2d 17 (2d Cir. 1978). See generally Note, Resale and Sharing of Private Line Communications Services: AT&T Restrictions and FCC Regulation, 61 Va. L. Rev. 679 (1975).

7/ MTS-WATS Resale, 80 F.C.C. 2d 54 (1980).

8/ U.S. Transmission Systems, Inc., 48 F.C.C. 2d 859 (1974), aff'd sub nom. AT&T v. FCC, 539 F.2d 767 (D.C. Cir. 1976).

9/ See Satellite Business Systems, 62 F.C.C. 2d 997 (1977), 64 F.C.C. 2d 872 (1978) aff'd sub nom. United States v. FCC, 652 F.2d 72 (D.C. Cir. 1979) (en banc).

10/ Domestic Satellites, 35 F.C.C. 2d 844 (1972), aff'd sub nom. Network Project v. FCC, 511 F.2d 786 (D.C. Cir. 1975).

11/ See generally Congressional Budget Office, The Changing Telephone Industry: Access Charges, Universal Service, and Local Rates (1984). See also Separation Procedures, 26 F.C.C. 2d 247 (1970).



the agency, instead of seeking to remedy its previous actions, determined to eliminate constraints on permissible specialized carrier services. 12/

The FCC endeavored to sustain the traditional cross-subsidization system by sanctioning significant increases in the rates charged competitive long-distance carriers for access to local exchanges, although the rates remained substantially lower than comparable payments by AT&T. 13/ The advent of broad-scale competition in the long-distance telephone business, however, necessitated an overhaul of traditional pricing practices which the FCC commenced in 1978. Change was necessary, among other reasons, because the subsidy paid by AT&T toll operations had been steadily increasing for the previous decade, thus boosting that firm's costs higher, and at precisely the same time competitors (bearing substantially less of a subsidy burden) were increasingly penetrating the long-distance market. 14/

The FCC's first major actions to overhaul the telephone industry's traditional cross-subsidy arrangements occurred contemporaneously with the restructuring of the Bell System pursuant to the AT&T consent decree. Under the decree, local Bell Operating Companies were required to provide "equal access" -- technically equivalent interconnections -- to local telephone facilities to all "interLATA" long-distance carriers, and to charge carriers cost-based local access rates. The FCC's Access Charges decision issued in 1983 envisioned a gradual shift in the cost burden associated with providing local telephone facilities. There were to be two types of access charges: those paid by toll carriers (and, presumably, passed along to their customers) and those paid by individual subscribers. Under this decision, the toll carriers initially were to pay 90 percent of local access costs with the remaining 10 percent to be recovered through monthly charges paid directly by business and residential subscribers. Subscriber line charges were to increase while carrier charges declined over time. 15/

For the average urban or suburban U.S. telephone subscriber, with a \$12 bill for local service and a \$20 bill for inter- and intrastate long-distance service,

---

12/ See MCI Telecommunications Corp. v. FCC, 561 F.2d 365, 580 F.2d 590 (D.C. Cir. 1977, 1978). See also Note, Competition in Intercity Telecommunications After Execunet, 31 Fed. Com. B.J. 117 (1978).

13/ See generally AT&T-ENFIA/BSOC-8 Tariff, 53 P. & F. Radio Reg. 2d 965, 969 (1983) (and citations therein); ENFIA, 71 F.C.C. 2d 440 (1979).

14/ Between 1970 and 1982, for example, the amount of local telephone company "nontraffic sensitive plant" assigned to interstate long-distance services increased by 50 percent, imposing the equivalent of an additional \$5 billion subsidy burden chiefly on AT&T and its toll ratepayers. See Amendment of Part 67 of the FCC Rules (Freezing SPF), 89 F.C.C. 2d 1, 5 (1982).

15/ See Access Charges Order, 93 F.C.C. 2d 241 (1983), modified on reconsid., 48 Fed. Reg. 42,984 (1983), further modified, 49 Fed. Reg. 7810 (1984), aff'd in part and remanded in part sub nom. National Association of Regulatory Utility Comm'rs v. FCC, 737 F.2d 1095 (D.C. Cir. 1984). See also Lavey & Carlton, Economic Goals and Remedies of the AT&T Modified Final Judgment, 71 Geo. L.J. 1497 (1983).

the FCC's decision implied little bottomline change. While the local service bill would increase by the amount of subscriber line charge, the subscriber's long-distance bill would show a commensurate decrease as the long-distance carriers would no longer be billing their customers for all of the amount of their previous payments to local telephone companies. Although only AT&T was required to pass along its access charge savings to customers, indications are other toll carriers did so in part as well. The FCC's decision also sought to make allowances for subscribers of limited means who make few toll calls, as well as subscribers in high-cost, rural areas, by including provisions mandating a "High-Cost Fund," supported by toll carrier assessments, and encouraging states to institute "lifeline" and similar discounted local rates.

Federal end-user access charges -- now known as "subscriber line charges" -- began for U.S. business subscribers in June 1984 and for residential subscribers in June 1985. In 1984, AT&T instituted an across-the-board 6.1 percent reduction in interstate long-distance prices and a further 5.7 percent reduction occurred in 1985. Other competing carriers reduced their rates as well, though by a smaller amount.

At present, FCC regulations essentially envision that the local facilities access charges paid by long-distance carriers will be equalized, as Bell Operating Company and other central offices are converted over to "equal access" operations. Currently, carriers pay different amounts depending for the most part upon the varying quality of interconnection received.

The AT&T consent decree envisions the conversion of all Bell Operating Company central offices by September 1, 1986, but it provides for exemptions for central offices serving 10,000 or fewer lines, or not yet equipped with stored-program switches (offices which reputedly constitute about 60 percent of all offices but serve less than 40 percent of subscribers). Under a consent decree signed by GTE in conjunction with its 1984 acquisition of Southern Pacific's Sprint Communications, all GTE's central offices serving 10,000 lines or more will be equipped for equal access by December 1990; many will be so equipped by September 1987. Recently, the FCC also took administrative action requiring other phone companies to offer "equal access" to all toll carriers within three years of a "reasonable request." <sup>16/</sup> Some in the industry maintain that the technology will soon be available to permit all central offices regardless of size to offer equal access.

The process of conversion to equal access, and accompanying increases in assessments on the competitive carriers, has engendered controversy. Some companies maintain increased carrier charges are unwarranted since not all central offices will be converted and, indeed, the equal access requirement may continue to be inapplicable to "intra-LATA" toll traffic, i.e., long-distance

---

<sup>16/</sup> See United States v. GTE Corp., 1985-1 Trade Cas. (CCH) Para. 55,355 at p. 64,778 (D.D.C. 1984); Independent Company Access (CC Dkt. 78-72, Phase III), 57 P. & F. Radio Reg. 2d 1303 (1985). See also GTE-SPCC Merger, 94 F.C.C. 2d 235 (1983). At present, GTE's local telephone companies serve about 8 percent of the nation's telephones. The 1984 acquisition of U.S. Telephone, a resale carrier, by the second largest independent, United Telecom, was not challenged and is not now subject to a judicial "equal access" requirement. See United Telecom, File No. ENF-84-8, FCC 84-272 (34779) (June 20, 1984).

service within the 164 geographic service areas prescribed for the Bell Operating Companies under the AT&T consent decree. Other companies argue AT&T's toll competitors should continue to enjoy a substantial discount from what AT&T pays for local exchange access because of AT&T's "historical advantage." Complaints have also arisen regarding local phone company procedures in markets converted to equal access. Typically, conversion in those areas affords subscribers an opportunity to choose a new toll carrier but there are instances in which a majority of subscribers do not exercise this option. Procedures now call for "default traffic" to be apportioned among the competitive carriers and AT&T. 17/

Since 1981, the FCC has sought to reduce the level and intensity of its traditional rate base regulation. The FCC in 1983 declared its authority to forebear from regulating so-called "non-dominant carriers" and, more recently, took steps to require such carriers to withdraw their tariffs. 18/ Currently, the only interstate long-distance carrier pervasively regulated is AT&T. The FCC continues to regulate the construction programs of AT&T, and to police the rate of return it and other established telephone companies earn on their interstate rate bases. While the courts recently ruled that the FCC could not require the withdrawal of tariffs, such filings and submissions by long-distance firms other than AT&T are subject to only minimal, if any, scrutiny by the agency. So-called "foreborne carriers" are subject to scrutiny through established FCC complaint processes, but the agency reports only a handful of complaints have been filed against these carriers in recent years.

Congress from 1977 through 1983 considered proposals to amend title II of the 1934 Communications Act and the U.S. Senate passed a comprehensive, deregulatory measure overwhelmingly (90 to 4) in 1981. 19/ Common carrier legislation became unlikely, however, with the announcement of the AT&T divestiture. Most expect continued gradual deregulation of the telephone business through administrative action to continue at both the state and Federal levels. The Commerce Department has recommended that the FCC promptly remove outdated facilities-approval and other restrictions from AT&T and begin the process of deregulating AT&T services other than MTS and WATS which are effectively competitive today.

Internationally, substantial procompetitive regulatory reforms have been undertaken by the FCC and these too have yielded significant public gains. Historically, there was relatively little price competition between the dominant international voice telephone service supplier, AT&T, and the U.S. firms providing international private line voice, record, and alternate voice-data services. Government policies curbed competition among firms and between

---

17/ See Default Traffic, 56 P. & F. Radio Reg. 2d 337 (1985).

18/ See Competitive Carrier Services, 91 F.C.C. 2d 59 (1982); 56 P. & F. Radio Reg. 2d 1219 (1983), rev'd sub nom. MCI Telecom. v. FCC, \_\_\_ F.2d \_\_\_, No. 85-1030 (D.C. Cir., July 9, 1985). Cf. AT&T v. FCC, 572 F.2d 17 (2d Cir. 1978).

19/ See, e.g., Hutton, The Proposed Deregulation of Domestic Common Carrier Telecommunications, 69 Calif. L. Rev. 445 (1981); Symposium, Federal and State Roles in Telecommunications: the Effects of Deregulation, 36 Vand. L. Rev. 949 (1983).

transmission media, and competitive entry was restricted both here and overseas. 20/ Congress in 1981, however, enacted the Record Carrier Competition Act of 1981 (Pub. L. 97-130, 95 Stat. 1687) and in so doing instructed the FCC to "promote the development of fully competitive domestic and international markets in the provision of record communications service and facilities (including terminal equipment), the variety and price of which are governed by a fully competitive marketplace." Id. Both immediately prior and subsequent to this enactment, the FCC took a number of commendable actions which had the effect of greatly increasing international communications competition generally. 21/

Competition in the international public-switched voice market has grown significantly in the past two years. As of August 1985, MCI was offering service to 30 countries abroad, representing 50 percent of the world's telephones and GTE Sprint was serving 16 nations. GTE Telenet's global data network currently extends to over 50 countries and a number of U.S. competitive carriers offered service between the United States and Canada, the largest single source of U.S. international telecommunications revenues.

Effects of Reduced Regulation. The clearest result of procompetitive FCC policies and marketplace developments in the long-distance services field has been a very substantial increase in the number of companies offering toll service to the public. In 1970 there was essentially a single long-distance service provider in the United States, AT&T. While AT&T did offer a number of discount and other service options to its major business customers, virtually no options were available to ordinary residential subscribers. The price of long-distance service provided by AT&T, moreover, which had declined throughout the Fifties and Sixties, was then beginning to increase (in part reflecting growing revenue requirements on the part of local telephone companies and, in part, due to inflation).

By 1984, however, there were at least 300 -- and some estimate as many as 1200 -- companies marketing long-distance telephone service in the United States. A majority of these companies were "resellers," that is, firms which purchased bulk communications capacity (chiefly from AT&T) and then resold that capacity to individual business and residential users. Many resellers concentrate on serving relatively limited geographic markets or only certain selected user groups. There are also, however, several major facilities-based competitive carriers including MCI, GTE Sprint Communications, United Telecom's U.S. Telephone subsidiary, ITT's long-distance service operations, as well as IBM's affiliate, Satellite Business Systems (SBS). Recently, MCI and SBS

---

20/ See Senior Interagency Group on International Communication and Information Policy, White Paper on New International Satellite Systems (February 1985) at pp. 2-5, 6-11.

21/ See, e.g., AT&T (Dataphone), 75 F.C.C. 2d 682 (1980) and WUI (Datel), 76 F.C.C. 2d 166 (1980), both aff'd sub nom. WUI v. FCC, 673 F.2d 539 (D.C. Cir. 1982); International Carriers - Gateway Expansion, 76 F.C.C. 2d 115 (1980) and International Telex Interconnection/Unbundling, 76 F.C.C. 2d 61 (1980), both aff'd sub nom. Western Union Teleg. Co. v. FCC, 667 F.2d 1126 (D.C. Cir. 1981); Resale & Shared Use of International Services, 84 F.C.C. 2d 622 (1980). See also Modification of Authorized User Policy, 90 F.C.C. 2d 1934 (1982), rev'd in part sub nom. ITT Worldcom. v. FCC, 725 F.2d 732 (D.C. Cir. 1984).

consolidated their operations and IBM acquired some 20 percent of the resulting firm. Two leading resale carriers, Allnet and Lexitel, also merged. While further industry consolidations are expected, few question the view that the U.S. long-distance telephone business is likely to become and remain effectively competitive after completion of the equal access process in September 1986.

The majority of U.S. telephone subscribers continue to rely on AT&T for "interLATA" long-distance and on the local Bell company for "intraLATA" service. About five million of the nation's 96 million telephone subscribers, however, do make use of competitive carriers to fulfill some or all of their toll service requirements and, in general, the more long-distance calls made, the more likely one of the competitive carriers will be used to make them. AT&T's relatively high market share, therefore, may not be an accurate indication of competition in this market. Many of the geographic markets the firm serves are low traffic density markets less likely to attract competitive suppliers in the near future. As AT&T's chairman recently said, "We have about 55 percent of the markets everyone wants and 100 percent of those nobody wants." AT&T's competitors also appear to continue to enjoy substantial commercial progress in further penetrating the high traffic, high profit parts of the market.

For those long-distance users willing to accept the inconvenience and sometimes lower service quality of some competitive carriers, savings of between 20 and sometimes exceeding 40 percent compared with AT&T's prices have been available. Many competitive carrier customers are substantial toll users; estimates today indicate that about 30 percent of all users with monthly toll bills of \$100 or more subscribe to competitive carrier service. For these major users, the lower prices charged by the competitive carriers represent a substantial welfare gain. There are no definitive estimates of total welfare gains as a result of the presence of the competitive carriers, but it is reasonable to assume they amount at a minimum to several hundred million dollars annually.

These benefits have not obviously been achieved at the expense of other telephone subscribers generally, the assertions of certain established carriers' executives notwithstanding. Some established carriers maintain that local rates have increased more rapidly than might otherwise have occurred. Other commentators suggest that the very substantial costs of converting to "equal access" -- variously estimated as high as \$3 billion -- outweigh likely competitive gains. It has not yet been shown, however, that, absent competition from the competitive carriers, there would have been either significant local rate reductions or reductions in the local rate hikes recently sought. At least some of the costs of equal access, moreover, would have been incurred in any event as the industry upgraded local facilities.

An explanation for the ability of the competitive carriers to grow rapidly, and without appreciably affecting the profitability of local or AT&T long-distance operations adversely, may be that rapid increases in demand occurred contemporaneous with, and perhaps because of, competitive developments in the long-distance field.

Experience with competition in the U.S. telephone business suggests two positive effects. First, in good economic times, the more competitive the industry the greater the annual rate of growth. Second, even in times of general

economic downturn, there is still substantial, positive service revenue growth. Between 1978 and 1979, for example, telephone industry revenues increased about 6 percent. Nineteen seventy-eight was the year MCI's Execunet service was finally legitimized by court action, however, and generally unrestricted competition in interstate toll markets began to appear. Between 1979 and 1980, the annual rate of revenue increase rose a full percentage point, to about 7 percent (using constant 1972 dollars). Between 1980 and 1981, the annual rate of increase rose to about 10.5 percent -- nearly 40 percent higher than when the industry had been less competitive. Overall, the long-distance service business basically doubled in size between 1976 and 1981. Some of this revenue growth may be a consequence of certain minor rate increases instituted by some toll carriers during this period, although much was also evidently due to rapid increases in call volumes. Competition, in any event, seems generally to have helped make the overall telephone revenue "pie" grow faster and allowed all participants to secure significantly bigger slices.

Long-distance competition has also stimulated established firms such as AT&T to operate more efficiently and responsively, although it is difficult precisely to quantify this positive effect and, in too many instances, efforts by the firm to introduce new services and prices unfortunately have been impeded by regulation. Reviewing the rate at which the former Bell System had introduced new, more efficient network transmission equipment prior to 1977, the FCC Common Carrier Bureau staff stated:

What experience does show is that the vertically integrated Bell System is not always significantly ahead of independent manufacturers in developing innovative equipment, and in fact sometimes lags behind. It also suggests that when the Bell System is threatened with potential competition, its rates of innovation take a quantum leap. 22/

Competition is generally acknowledged to be a principal reason for AT&T's rapid introduction of Digital Dataphone, Net 1000, and similar data communications services which are targeted at meeting special business communications needs. AT&T marketing personnel have sought aggressively to meet specialized business communications needs including video teleconferencing, and the company has recently proposed new services such as its "software-defined network" service which will enable small to medium-sized customers to secure the service advantages of dedicated private line circuits, but at lower cost. AT&T in recent years has also proposed new service offerings designed to give smaller residential customers discounts on their long-distance calls comparable in some regards to the bulk discounts long available to major users.

Persistent regulatory constraints have reduced some of the benefits which more deregulation might have yielded. The positive effects of competition on the efficiency and responsiveness of AT&T and other established carriers, however,

---

22/ Proposed Findings of Fact and Conclusions of the Common Carrier Bureau's Trial Staff in FCC Docket No. 19129 (Phase II), Feb. 2, 1976, vol. II, p. 552, reprinted in Hearings on Domestic Telecommunications Common Carrier Policies Before the Senate Communications Subcommittee, 95th Cong., 1st Sess., part 1, pp. 726-27 (1977).

are especially important given difficulties inherent in the traditional regulatory process. At least ideally, ratebase regulation can be effective in most instances when it comes to minimizing carrier overcharges and ensuring the availability of basic communications services. Regulation, however, cannot easily command responsiveness, inventiveness, and innovation on the part of regulated firms.

The literature available on the effect of market structure and regulation on the innovation process, which is scant, suggests that regulated monopoly (and other lines of commerce with high concentration levels) is somewhat conducive to cost-reducing innovation. Regulated firms do have some incentive continually to strive to reduce their operating costs through means including cost-reducing innovation. By reducing operating expenses, while maintaining prices, the carrier can increase its net return. Demand-inducing innovation, however, is relatively less common in a pervasively regulated industry because, among other things, the development of new goods and services may jeopardize existing investment. While the regulated firm may develop prototypes of new goods and services, it will tend to be relatively slow in deploying the fruits of its innovation and making them available to consumers. That is, it will lag in developing or deploying demand-inducing innovation -- absent the spur of competition.

In addition to tending to maximize the pace of demand-inducing innovation, effective competition may also yield a collateral public policy dividend, by supplying some greater degree of marketplace discipline and decisionmaking accountability than would otherwise be present. All telecommunications administrations, both here and abroad, are familiar with efforts on the part of monopoly service providers to introduce certain new services without regard to discernible marketplace demand and, when confronted with costs substantially exceeding revenues, to seek to place those costs on monopoly customers.

In the United States, the clearest example of unsuccessful and costly efforts to introduce service well in advance of demand by a regulated firm is AT&T's ill-fated efforts to market its Picturephone service. Comparable initiatives, however, such as the West German Bildschirmtext program or British Telecom's teletext services, have occurred abroad.

When companies are, in effect, guaranteed reimbursement for all development and other costs, regardless of their success in achieving consumer acceptance, the result can be inadequate research into actual marketplace demands coupled with the unfair burdening of monopoly ratepayers. When the decisions of regulated firms are made more subject to market discipline, however, the quality of product and service innovation appears to improve.

Today's long-distance communications market in the United States has changed rapidly from a seller's market characterized by efforts to administer demand toward a buyer's market where meeting consumer needs and interests commands higher industry priority. There is no clear consensus regarding the long-run competitiveness of the long-distance communications business. Some skeptics maintain that today's competitive carriers will prove unable to compete successfully with the dominant firm, AT&T, over time if current controls on AT&T's pricing flexibility are relaxed and the discounts these carriers enjoy with regard to access to local facilities are gradually phased out. These views



are generally premised on the assumption there are significant scale economies inherent in the present AT&T plant which ultimately will be reflected in decisively lower toll service prices.

There is some economic evidence suggesting scale economies in AT&T plant, but little evidence these economies are reliably reflected in AT&T prices. Indeed, some of the available -- if sharply disputed -- evidence suggests AT&T was the least efficient producer in this sector. In 1982, for example, annual sales per AT&T Long Lines employee were estimated at around \$116,000. MCI sales per employee, however, were about \$207,000, and those of U.S. Telephone, a leading resale carrier, about \$225,000. <sup>23/</sup> These revenue comparisons probably overstate the efficiencies of the competitive carriers and understate those of AT&T, particularly given the differences in the scope and character of these firms' operations. It is nevertheless doubtful that AT&T enjoys operating efficiencies which are so much greater than its competitors that there is a reasonable likelihood it might hypothetically "re-monopolize" the long-distance market.

At present, local exchange access charges constitute more than 60 percent of AT&T's overall long-distance costs and much of the balance of the firm's costs consist of billing, administrative, and other costs -- functions that do not necessarily admit to appreciable scale economies. Actual transmission -- that component of the overall production process where scale economies are most likely to be present -- constitutes only about 7 to 10 percent of overall cost. It is unclear that this alone is sufficient basis for the reconstituted monopoly some critics of unregulated competition in toll markets hypothesize.

Obviously, some significant entry into the long-distance telephone business has occurred not because the entrants enjoy superior efficiency, managerial acumen, or foresight but because of imperfections in the present pricing and cost-allocation schemes. As those imperfections are lessened, it is reasonable to assume that firms which entered the business solely to capitalize on regulatory imperfections will experience difficulties.

Historically, however, many of the competitive carriers have demonstrated great marketing and managerial ability as well as indomitable commercial resiliency. MCI, for example, experienced nearly the most rapid growth of any publicly traded corporation in U.S. commercial history notwithstanding many allegedly anticompetitive actions by the unified Bell System. Other major carriers, such as GTE Sprint and U.S. Telephone, have the backing of multibillion dollar corporations staffed by managers with much experience and considerable talent. Market structure having been made more conducive to sustained competition by virtue of the changes mandated by the AT&T consent decree, it is not unreasonable to assume the continued presence, indeed prosperity, of these and other carriers since conditions have plainly become more competitively hospitable.

Implicit in an effectively competitive market, moreover, is not only the chance to succeed, but also the risk of market failure. Those lines of commerce least characterized by company failure often may be the least competitive.

---

<sup>23/</sup> Teleconnect, July 1982 at p. 34.

Indeed, there are some who suggest that the rate of failure is a reasonable measure of the competitiveness or the effectiveness of competition.

While there is evidence that long-distance competition has benefited users, little of this evidence has been systematically gathered or organized. Nevertheless, the information which we have been able to develop does indicate significant user gains. An official of a major New York City financial services firm, for example, reported that historically their communications costs had risen 12 to 15 percent annually but in the last two years, total increases have been less than 3 percent annually, despite substantial new access charge assessments, new local directory assistance charges, and a new state tax on communications expenditures. The individual estimated his organization is now saving a minimum of \$30-40,000 a month chiefly because of competition among equipment and service vendors.

Nor have the benefits of price reductions necessarily been limited to major urban customers. Because of increasing intrastate long-distance competition, at least one Bell Operating Company, US West's Northwestern Bell subsidiary, commendably has instituted a volume discount system for certain intrastate, intraLATA calling. Despite the common view that long-distance competition has not yet benefited residential or business customers outside major metropolitan areas, here a rural "route-specific discount" system was recently instituted, for example, offering a flat 20 percent discount on MTS calls between two Northwestern Bell cities -- Sioux Falls and Rapid City, South Dakota, and the intermediate town of Hall, which is served by another company. Volume discounts on calls between Pierre and Aberdeen, South Dakota, are as shown below:

<u>Intrastate Toll Usage</u> <u>(dollars per month)</u>	<u>Discount</u> <u>(Percent)</u>
\$ 25-75	5%
75-150	10
150-225	15
above 225	20

Private communications networks, together with savings on competitive toll offerings provided by long-distance carriers, have also provided significant user savings. The manager of perhaps the largest non-Government communications network in the country, owned by a major energy firm, reported that their average cost per minute today is about 25 cents compared to an average charge of 55 cents per minute currently on the public-switched network. This substantial cost savings was attributed, again, to the presence of competition among equipment and service suppliers and the ability to piece together both private and carrier communications facilities due to progressive regulation.

Competition and expanded user options have made it possible for major communications users to piece together specialized systems tailored to meet their needs. Most of these extensive private communications systems are comprised of a broad range of carrier-leased, customer-supplied, and, in some cases, shared facilities, and further the efficient operation domestically of many major U.S. firms.

Internationally, increasing competition and related developments have also resulted in significant price reductions. Some of these price reductions are

indicated in the figures which were provided by one of the major U.S. international carriers and are set forth below.

<u>Destination</u>	<u>Leased AVD Channel</u>		<u>Telex</u>	
	<u>1979</u>	<u>1985</u>	<u>1979</u>	<u>1985</u>
United Kingdom	\$4225	\$3710	\$2.00	\$1.4496
Germany	4255	3710	2.50	1.9596
Italy	4244	4120	2.50	1.9596
Japan	6000	4339	2.78	2.2496

Since these rates are expressed in absolute rather than constant dollars, moreover, the extent of reductions is understated by not taking account of inflation over the 1979-85 period.

Conclusion. By virtue of competition in the long-distance communications field, particularly over the period 1977-1984, substantial public policy gains were achieved. The market nearly doubled in size to today's \$50 billion a year levels. Price reductions previously offered only to major users became more widely available. The pace of technological improvements, the deployment of new facilities, and the offering of new service options grew. These benefits, moreover, were not demonstrably secured at the expense of any particular user group. While this is an area in which there is a broad range of views and room for a diversity of opinion, finally most experts forecast continuation of effective long-distance service competition and resultant public benefits. Kenneth Robinson, Office of the Assistant Secretary, NTIA (202) 377-1551.

#### D. Local Service Rates.

Introduction. Local telephone service today is provided by 22 Bell Operating Companies (BOCs) which serve about 80 percent of U.S. households, GTE's operating companies, which serve about 8 percent of subscribers, and approximately 1,500 "Independent" companies which serve the remaining 12 percent of American households. Prior to the AT&T divestiture on January 1, 1984, local service was defined as a call between any two points within a single exchange or zone. Exchanges varied in size, from a few hundred subscribers in some rural areas, to millions of subscribers in large urban areas.

The AT&T consent decree created 164 court-approved "local access and transport areas" (LATAs), and local service is now generally considered to be non-toll calling within a LATA. Local service subscribers, in turn, are basically divided into two groups: residential and business. For residential subscribers, telephone service traditionally has meant flat rate, unlimited call service. Today, however, customers in 45 states have measured service options available to them. Measured service offers a lower "dial tone" charge, but additional charges are levied for each call above a certain number on a per call or per minute basis. In addition to flat rate and measured service, business subscribers have available such services as Centrex and local private lines. Some businesses, moreover, have begun to satisfy certain of their own local communications service needs, such as for high-speed data communications, by building or leasing local distribution facilities independent of phone companies.

Current Status Report. Local service revenues for the BOCs exceeded \$26 billion in 1984, compared with \$31 billion in 1983. 1/ This decrease was due primarily to the loss of revenues previously derived from the lease of customer premises equipment (CPE) which was transferred to AT&T on January 1, 1984, in conjunction with the divestiture. Partially offsetting this revenue loss were increases in local service rates and growth in the number of customer access lines. 2/

Currently, about 92 percent of U.S. households have at least one telephone. 3/ This percentage has remained steady the past two years, despite an increase in the Consumer Price Index (CPI) for telephone service of 9.2 percent in 1984. 4/ Despite recent increases, rates for local service continue to remain low, compared to increases in other goods and services measured by the CPI. From a base of 100 in 1967, the CPI had increased to 319 by early 1985, while the Telephone Rate Index increased from 100 to 191.3. 5/

Some subscribers did experience large increases in their local rates in 1984. According to the CPI, local telephone prices in 1984 rose by 17.1 percent. However, one should be aware that because the components of the Telephone Price Index are based on a 1977 index, it is difficult adequately to represent recent changes in telephone pricing. As the index is currently designed, it is likely to upwardly skew increases in local service rates. For example, in 1982 the ratio of the BOCs' residential customers with flat rate service versus those with measured service was 88/12. 6/ This was due largely to the unavailability of measured service. Currently, however, the ratio is estimated at 80/20. 7/ NYNEX has reported that 55 percent of its subscribers have measured service. 8/ While, in part, this may be attributable to some states mandating measured service, nevertheless it does appear that, where available, subscribers have been

---

1/ FCC Form M, Schedule 35, 1985. Local service revenues for the Independents were \$2.2 billion in 1983. Totals not available for 1984.

2/ 1984 Annual Reports of the Regional Holding Companies (Ameritech, Bell Atlantic, BellSouth, NYNEX, Pacific Telesis, Southwestern Bell, US West).

3/ Bureau of the Census, U.S. Department of Commerce, Current Population Survey, (March 1985).

4/ Bureau of Labor Statistics, U.S. Department of Labor, Consumer Price Indexes, (December, 1984), at p. 20.

5/ Bureau of Labor Statistics, U.S. Department of Labor, CPI Detailed Report (March, 1985).

6/ "Telecommunications: Everybody's Favorite Growth Business - The Battle for a Piece of the Action," Business Week (October 11, 1982), p. 61.

7/ Consumer Federation of America, Ringin' Off the Wall: An Alarming Increase in Residential Phone Rates, 1984-86, (May 12, 1985) at p. C-14, (hereinafter cited as "CFA, May, 1985").

8/ See "Telephone Woes Mount With Rates," USA Today, (June 3, 1985), at p. 1-B.

switching to measured service. Because the telephone price index is not structured to measure the shift of subscribers between services, it is likely to overrepresent increases in flat rate service prices to which a greater percentage of residents subscribed in 1977.

The same problem arises with regard to equipment leasing. The index reflects changes in charges for leased equipment which became effective upon the transfer of already installed or "embedded" CPE to AT&T as of January 1984. Any increase in the charges for leased equipment, however, now affects a much smaller group of consumers, as sales of telephones continue to increase. Therefore, the index once again is overrepresenting the effect of price increases.

Yet despite these limitations, the index has shown that since the end of 1984, the percentage increases in local service rates have been declining. For the period between December 1984 through April 1985, for instance, local service charges increased only 0.6 percent, while intrastate toll rates increased even less (0.1 percent). Based on recent activity, this trend should continue in the near future. For example, Maryland recently awarded C&P Telephone only 2.5 percent of its initial request of \$122.7 million and allowed residential rates to increase by an average of only 40 cents per month. In Nevada, the Public Service Commission allowed urban residential rates to increase by only 70 cents monthly, up to \$9.90 for flat rate service (\$15.05 had been proposed) and up to \$4.40 for measured service (\$9.15 proposed).

A March 1985 NTIA study of local service rates indicated that nationwide, the price of residential flat rate local service in urban areas ranged from \$7.75 to \$19.61, and averaged approximately \$14.00 a month. The rate for low-usage, measured service ranged from \$3.18 to \$13.80, and averaged approximately \$7.00. In rural areas, residential flat rate service ranged from \$5.01 to \$15.55, and averaged approximately \$10.00. Measured service ranged from \$1.76 to \$9, with an average of approximately \$6.00. <sup>9/</sup> Low-use measured service is currently offered as an alternative to flat rate service for urban subscribers in 45 states (42 states for rural subscribers) compared with 1977 in which it was offered by the BOCs in only 18 states. <sup>10/</sup> Even after recent rate increases, rural local service rates remain lower than rates in urban areas and there is virtually no evidence rate increases have caused reductions in telephone penetration. <sup>11/</sup>

---

<sup>9/</sup> National Telecommunications and Information Administration, Summary of State Telephone Regulatory Data (March, 1985) (hereinafter cited as "NTIA, March, 1985").

<sup>10/</sup> National Association of Regulatory Utility Commissioners, Exchange Service Telephone Rates - June 30, 1977; NTIA, March, 1985. The City of Chicago has only measured service, while the District of Columbia does not have any rural service areas.

<sup>11/</sup> One possible explanation for lower rural rates is that calling areas are often smaller in rural areas. As a result, rural subscribers may not be able to reach as many telephones through local calling as their urban counterparts and thus may need to make a greater number of toll calls.

Finally, some states have instituted a "lifeline" service option designed primarily as a means of maintaining local service for low-income subscribers. These states include Arkansas, California, the District of Columbia, Maryland, New York, Vermont, and Wisconsin. Lifeline has been proposed by the BOCs in other states including Nevada, West Virginia, and Washington.

In California, the monthly rate for lifeline service in urban areas is \$2.23, with 30 free calls allowed. This includes a \$.75 allowance for the telephone instrument itself; the actual service price is thus \$1.48 a month, with additional calls charged at a flat rate per call. For rural customers, lifeline is a flat rate service priced at \$4.13 (one-half the regular flat rate charge). Eligibility is restricted to households with income below \$11,500. <sup>12/</sup> In New York, the monthly rate is priced 50¢ below the rate for budget service (\$3.28). In addition, eligible subscribers may obtain a 50¢ reduction in the monthly \$1 Federal subscriber line charge.

Nationally, residential installation charges for single-line service not requiring a service visit ranged from \$23 to \$65, with an average of approximately \$43.

For business subscribers, flat rate service in urban areas ranged from \$21.60 to \$57, with an average of approximately \$35 a month. Measured service ranged from \$5.58 to \$35.69, with an average of approximately \$18. As with residential service, rural rates were generally lower than in urban areas, ranging from \$10.87 to \$38.65 (average of \$26.00) and \$9.40 to \$26.00 (average of \$18.00) for measured service.

Concern has been raised about the impact of changes in telephone pricing on small businesses. A survey by the General Accounting Office requested by the House Committee on Small Business found one-fourth of small businesses reported monthly telephone bill increases of more than 25 percent since January 1984; 39 percent had increases of less than 25 percent; and 3 percent saw their bills decrease. <sup>13/</sup> Monthly bills, however, included charges for local service, as well as intraLATA and interLATA toll, equipment leasing, and Yellow Pages advertising.

The survey did not distinguish between the causes of the reported increases in monthly bills. For example, 17 percent of businesses reported "long-distance" increases of 25 percent or more. The survey, however, did not ask respondents to distinguish between interstate and intrastate toll calling. As interstate rates have decreased, one would expect any perceived increase to be related to intrastate rates. Intrastate MTS rates from January through October 1984 increased only 3.9 percent, while intrastate WATS decreased 1.6 percent. As the survey notes, "it seems likely that businesses reporting sharply increased long-distance costs are, to some degree, making an increased amount of long-distance calls."

---

<sup>12/</sup> Assemblywoman Gwen Moore, architect of California's original lifeline legislation, has introduced new legislation to replace the \$11,500/yr. income ceiling with a standard equal to 150 percent of the Federally defined poverty level.

<sup>13/</sup> General Accounting Office, Survey of Small Businesses' Reactions to Changes in the Costs of Telephone Service, (GAO/RCED-85-106), May 22, 1985.

In addition, the 34 percent of respondents who reported increases in their equipment leasing costs could most likely reduce their monthly telephone costs by purchasing their equipment.

In the case of local service, rates for business and residential subscribers have increased by roughly the same percentage over the past year. From March 1984 to March 1985, the producer price index (PPI) for local service to business subscribers increased by 7.6 percent, compared with an 8.7 percent increase in the PPI for residential subscribers. 14/

Historical Pricing. For years, residential local telephone service in the United States has been, as the industry frequently notes, quite a bargain. As discussed earlier in this report, the major reason was the traditional cost allocation and pricing policies devised and administered by the industry and regulators jointly, which had the effect of subsidizing local residential service prices.

Until 1952, local exchange plant and equipment costs were allocated based upon the relative usage of facilities for interstate calls. Beginning in 1952, however, measures of relative use were weighted so as to assign an increasing share of local costs to interstate service. This process accelerated in the Sixties and, by 1981, the "separations and settlements" process had apportioned on average over 26 percent of the costs of local exchange plant and equipment to the interstate service, although interstate usage nationwide was only about 8 percent. This burden borne by toll subscribers increased at the same time that the costs of interstate service were declining because of advances in the underlying technology. 15/

Another factor that contributed to artificially low residential rates was the long-term depreciation schedules prescribed by regulators for local fixed plant and equipment. By recovering telephone company investment in plant and equipment over many years (e.g., 30-40 years), ratepayers were required to bear only a small burden of depreciation costs each year. So long as technology remained stable, this was not a problem.

The political unpopularity of rate increases, moreover, made it easier for regulators to shift some of the costs of residential service to business customers, who were heavily dependent on service from the local operating companies. Consequently, in addition to subsidies between local and long-distance, there were subsidies flowing among various classes of customers for each service.

As a result of these practices, increases in the price of residential local telephone service through the early 1980s remained well below both increases in the CPI and the wage rate for U.S. workers. And as the accompanying table shows, during the period 1967-1985, the CPI for telephone service, which is generally

---

14/ Bureau of Labor Statistics, U.S. Department of Labor, Producer Price Indexes, (March, 1985) at p. 162.

15/ Telecommunications in Transition, Harvard Business School Case Series, No. 384-207 (1984).

considered a necessity today, remained well below increases in the indexes for food, housing, fuel and utilities, medical care, and clothing. 16/

Over a 30-year period (1950-1980), the price of residential local telephone service fell in real dollar terms. In 1950, the average monthly charge for residential service in current dollars was \$4.29. In 1980, the charge had risen in current dollars to \$8.61. However, when the actual purchasing power of the 1980 dollar is taken into account, the average monthly charge for phone service in 1950 was \$14.58, or almost \$6 greater than in 1980. 17/

INDEXES FOR SELECTED COMMODITIES\*

<u>Commodity</u>	<u>Index</u>
Housing	344.7
Rent, residential	259.2
Fuel & other utilities	388.2
Fuel oil	626.3
Electricity	354.2
Food	309.2
Medical care	395.3
Apparel & upkeep	205.3
<b>Telephone services</b>	191.3

\* Indexes: 1967 = 100 (seasonally adjusted)  
(As of March 1985.)

One benefit of low-priced residential local service was that it helped the United States achieve the goal of "universal service." As a result, in January 1983, the United States had 71.0 telephones per 100 people, compared with 54.7 in Canada, 53.0 in Japan, 38.2 in Italy, and 8.0 in Mexico. 18/

As the goal of universal service was being achieved, the costs of providing local service were increasing (in part because of rising wage rates). For 1982, the Congressional Budget Office estimated the cost of local loops (wiring connecting subscribers to central offices) at \$24 billion. When the costs of CPE and inside wiring were added, subscriber plant costs in 1982 totalled \$39 billion while industry revenues were \$80 billion. On a per line basis, the fixed plant costs of providing service were estimated at more than \$25.00 per month while local rates were typically less than half that amount. 19/

Rapid advances in technology and increased competition made continuation of the traditional cost allocation and pricing policies infeasible. Without

---

16/ Bureau of Labor Statistics, U.S. Department of Labor, Consumer Price Indexes, (March, 1985) at pp. 24-6.

17/ NTIA Comments to the FCC Federal-State Joint Board, CC Docket 80-286, Appendix B, at p. 11.

18/ The World's Telephones, AT&T Communications, (January, 1983).

19/ Congressional Budget Office, The Changing Telephone Industry: Access Charges, Universal Service and Local Rates (June, 1984), at p. 35, (hereinafter cited as "CBO, June, 1984"); CBO, June, 1984; at p. 13.



changes, large businesses might bypass the network to reduce their costs and the local operating companies would not be able to reduce their substantial fixed costs as rapidly as revenues were lost. Prices would increase disproportionately for those subscribers (mostly residential and small business) that could not take advantage of alternative technologies for the provision of local service. FCC actions in the early 1980s were in part a response to this development.

Effects of Deregulation. Contrary to popular belief, the AT&T divestiture has had relatively little direct effect on local rate increases. Rate increases which can be related directly to divestiture include the BOCs' loss of profits from embedded CPE (to the extent rates were set so as to subsidize local service), intrastate toll subsidies, and possibly the cost of converting facilities for equal access.

A major factor which appears responsible for the recent increases in local telephone service rates, however, is the FCC's 1980 decision to change the depreciation methods for interstate investment. 20/ Faster depreciation is intended to recover capital more quickly and thus reflect more accurately the economic life of fixed plant. This in turn is expected to stimulate technological innovation and capital investment embodying new technologies. In the short-run, however, revenue requirements are increasing and thus resulting in higher rates for all subscribers. Residential subscribers may also be asked to bear a larger share of the burden in order to discourage "uneconomic bypass." 21/ If larger business customers leave the local network, more pressure will be brought to bear on the remaining subscribers, who will be mostly residential and small business, to pick up the fixed costs of the local network.

In the long-run, newer plant and equipment will enable local exchange companies to handle much more traffic and reduce per unit costs of service. Therefore, rates in the future should stabilize as the marginal costs of providing local service decline. With rates more in line with costs, the threat of bypass should also be diminished. In addition, new technology will bring enhanced service features to residential as well as business customers. For example, such features as call forwarding, call supervision, call holding, and speed dialing are currently available to many residential customers and the number is growing rapidly as local companies install more and more electronic switches.

A second FCC decision which has had a direct effect on local service rates was the change in the separations process. Concerned with the increasing share of local fixed costs being shifted to the interstate sector, the Commission in 1982 froze the percentage of subscriber plant costs allocated to the interstate

---

20/ Report and Order, CC Docket 20188, 83 F.C.C. 2d 267 (1980), on reconsid., 87 F.C.C. 2d 916 (1981).

21/ "Bypass" generally refers to businesses establishing their own communications systems (usually using microwave, cable, or satellites) and thus avoiding use of the local network and paying for its fixed costs. It is considered "uneconomic" when the principal reason for such vertical integration is distortions imposed by regulation in carrier rates.

jurisdiction (also known as the "subscriber plant factor" (SPF)) at the 1981 level. 22/ Late in 1983, the Commission accepted a Federal-State Joint Board recommendation to freeze SPF until January 1, 1986, followed by a transition period during which a 25 percent "Basic Allocation Factor" would be phased in in four equal steps, subject to the limitation that no area is to experience a decrease in its interstate nontraffic sensitive (NTS) allocation of more than 10 percent per year. The new allocation factor was to be supplemented with direct assistance to those areas (in many cases rural) with total fixed local exchange costs in excess of the national average. 23/ One year later, after the Joint Board's reconsideration, the Commission ordered the transition to the 25 percent allocation formula to be implemented in eight steps. 24/

As a result of freezing SPF in 1982, local operating companies have not been able to shift an increasing share of subscriber plant costs to interstate ratepayers. According to C&P Telephone, if SPF had not been frozen, the interstate allocator for the District of Columbia (D.C.) currently would be 51.48 percent, rather than its actual level of 43.76 percent. 25/ Such an increase would have meant that D.C. ratepayers would have paid over 50 percent of their local fixed costs through interstate, rather than local rates. Thus, by freezing SPF, a higher percentage of local costs had to be recovered through local rates. The staff of the D.C. Public Service Commission concluded that the costs to be recovered through the intrastate jurisdiction are \$5.1 million (or \$1.24 per month per line) greater because of the SPF freeze. In addition, they estimate that the phase down of the interstate SPF to 25 percent will impose an additional total monthly cost of \$2.80 per access line. 26/ Over the eight years of the SPF phase down, this would result in a yearly access line increase of 35 cents.

It is important to note that under SPF interstate ratepayers in low-cost, high interstate usage areas, such as DC, were paying an increased amount both for their own local fixed costs as well as those costs for subscribers in high-cost areas. In 1982, for example, \$87 million of C&P's subscriber plant costs in DC were allocated to the interstate jurisdiction, yet subscribers in the District paid \$118 million into the toll pool. Conversely, in a high-cost, high interstate usage area such as Nevada, \$114 million (62 percent)

---

22/ Decision and Order, CC Docket 80-286, 89 F.C.C. 2d 1 (1982), reconsid. denied, 91 F.C.C. 2d 558 (1982), appeals pending sub nom. MCI v. FCC, D.C. Cir. Nos. 82-1237, 82-1456 (filed March 4, 1982 and April 23, 1982).

23/ Decision and Order, Amendment of Part 67 of the Commission's Rules, CC Docket 80-286, 96 F.C.C. 2d 781 (1984).

24/ Decision and Order, Amendment of Part 67 of the Commission's Rules, CC Docket 80-286, FCC 84-637 (1984).

25/ Opinion and Order, Formal Case No. 814, Investigation into the Impact of the AT&T Divestiture and Decisions of the FCC on C&P Telephone Company's Jurisdictional Rates, Order No. 8229, Public Service Commission of the District of Columbia (1985).

26/ Ibid.

of subscriber plant costs were allocated to the interstate toll pool, while Nevada subscribers paid only \$97 million in interstate rates towards support of those costs. 27/

While the replacement of SPF with the 25 percent Basic Allocation Factor will lower the burden on interstate ratepayers in low-cost areas, subscribers may be asked to bear more of the local fixed costs in high-cost areas which will lose some of their interstate subsidies. Through its high-cost assistance fund, however, the FCC is seeking to minimize the potential for significant increases in intrastate cost allocation, and thus increases in local rates. In high-cost and/or low SPF states, the interstate allocation will rise, reducing the revenue requirements for local service. According to the FCC, the biggest benefits will be for Alabama, Kentucky, Louisiana, Michigan, Mississippi, South Carolina, West Virginia, and the Virgin Islands (on a per loop basis).

Local rates have also been affected by a 1981 decision to expense the costs of "station connections" (i.e., the costs incurred in installing telephone equipment and inside wiring). Historically, these costs were capitalized and recovered through the rate base. In its 1981 order, however, the FCC ordered that future inside wiring costs be charged directly to expense accounts and embedded investment in inside wiring be amortized over a ten-year period. 28/ At the time of the FCC's 1981 decision, \$14 billion in station connections had been capitalized. In a further move to have those subscribers who cause inside wiring costs pay for them, the FCC recently proposed detariffing of simple inside wiring. 29/

Expensing of station connections has resulted in higher one-time charges for the installation of inside wiring and service connections. And, for the next few years, all subscribers will bear the costs of previously installed station connections. Some states also require subscribers to pay a separate monthly fee (averaging approximately 40 cents) to receive "insurance" for their inside wiring. For this fee, the local operating companies will maintain inside wiring at no additional charge. Once the costs of the embedded investment are eliminated from the rate base, however, subscribers may pay lower rates for local service. 30/ Detariffing of inside wiring should produce a competitive environment for its provision and thus result in reduced costs to the public.

Similar to the experience with station connections has been the deregulation of customer premises equipment (CPE). By 1982, CPE investment

---

27/ CBO, June, 1984, at p. 14.

28/ First Report and Order in CC Docket 79-105, Expensing of Inside Wiring, 85 F.C.C 2d 818 (1981). The Commission notes that under current jurisdictional separations procedures, approximately 28 percent of the expenses of inside wiring are assigned to the interstate jurisdiction for recovery from interstate ratepayers. The remainder of expenses are assigned to the intrastate jurisdiction and recovered through intrastate tariffs.

29/ Further Notice of Proposed Rulemaking, CC Docket 79-105, FCC 85-148.

accounted for annual charges of \$7 billion, of which \$1.8 billion was allocated to interstate toll service. 31/ As the cost of embedded CPE investment is phased out of the rate base, local rates should decrease. And, as noted earlier, many residential subscribers have taken advantage of the cost savings associated with purchasing their telephones. In 1983 alone, telephone purchases led residents to discontinue leasing 22.7 million sets from the BOCs. 32/

Finally, a great deal of discussion, confusion, and controversy has resulted from the FCC's decision to impose subscriber line or "access" charges on residential and business subscribers. While access charges are intended to replace the traditional practice of recovering of local fixed costs from interstate subscribers, and thus have no direct bearing on local rates, they are often discussed in the context of local rates. Consumer groups, such as the Consumer Federation of America, estimate that the imposition of monthly residential access charges of \$1 in June 1985, and \$2 in June 1986, along with approved and projected rate increases, may force six million people to give up telephone service by the end of 1986. 33/

The FCC correctly does not see subscriber line charges as a threat to universal service. On the contrary, the FCC believes that subscriber line charges will protect universal service by reducing the incentives for large customers to desert the present telephone network. The FCC cites a variety of studies and the fact that nationwide penetration rates have remained constant as support for their view that subscriber line charges have not reduced subscribership.

In addition, the FCC cites the reductions in interstate rates which have accompanied the imposition of access charges. To coincide with the June 1985 implementation of the \$1 a month charge on residential and single-line business subscribers, the FCC ordered AT&T to lower its interstate MTS rates by 5.6 percent. Last year, the Commission required a similar reduction (6.1 percent) when access charges were implemented for multi-line business subscribers. To lessen the impact of the access charge on low-income subscribers, the Commission accepted a recommendation of the Federal-State Joint Board for an optional program providing a 100 percent reduction in the access charge for subscribers meeting a state-established means test. The revenue shortfall would be funded through interstate carrier access charges. States taking advantage of this assistance program would be required to match the access charge reduction by providing for lower local exchange rates for qualified subscribers.

---

30/ It is difficult to generalize regarding the effects on local rates from the expensing of station connections. However, in those states in which station connections costs had been subsidized and where tariffs for new station connections will reflect actual costs, subscribers who do not incur station connection costs should see lower rates.

31/ CBO, June 1984, supra n. 50 at p. 6

32/ NATA 1985 Telecommunications Source Book, "Statistical Review," p. 82.

33/ CFA, May 1985, at p. 4.

Conclusion. It is axiomatic that, in an effectively competitive industry, prices will tend to move closer to cost, and elaborate inter- and intraclass subsidies will become less and less sustainable. The changes which have occurred in local telephone prices reflect a reallocation of revenue requirements from toll to local service which is inevitable under competition.

Local telephone rates are unlikely to decline in the near term. Changes in industry depreciation and capital recovery programs may also increase annual revenue requirements in the shortrun, though such changes also contribute to subscriber welfare by facilitating the provision of new service options and by ensuring the continued viability of local telephone operations. Were there to be changes in the AT&T consent decree to permit local Bell companies to provide "information services," local companies might earn additional revenues while also promoting subscriber choice.

Critics of the AT&T divestiture and FCC deregulatory measures forecast that local rates would "skyrocket" and cause sharp reductions in telephone penetration. The available evidence clearly shows, however, that while rates have increased, the increases have been far less than popularly imagined and are within the ability of nearly every American household to afford. By nearly any measure, U.S. local telephone service remains a genuine bargain and, in terms of cost, service quality, and availability, is unmatched in the world. Terry Monroe, Office of Policy Analysis and Development, NTIA (202) 377-1880.

#### E. Specialized and Enhanced Services.

Introduction. Telecommunications services today extend well beyond basic voice communications and range from enhanced data communications to expanded opportunities for interpersonal communications. They include electronic mail, teleconferencing, and rapid access to large information data bases. (The latter are discussed in more detail in the subsequent section on information services.) Demand for such services reflects increasing reliance on computers and similar apparatus and these services, in turn, have stimulated substantial growth in the markets for equipment such as modems, office automation, and networks for local area distribution of information.

Current Status Report. Data communications has grown to be a \$2.2 billion industry. Established carriers handle by far a majority of data communications but a number of other companies including GTE Sprint, Tymnet, Graphnet, and United Telecom's Uninet also offer such services including sophisticated "packet switching" services. Packet switching revenues are difficult to determine precisely since many of the enterprises involved in this business are parts of larger firms. It is estimated that about \$300 million of the \$2 billion data communications market is accounted for by packet switched services. In addition, there are several major intracorporate networks such as IBM's nationwide "I-Net" which are used to meet a variety of internal needs including high speed data communications.

A majority of data communications today support such operations as commercial banking, credit card billing, transportation and travel reservation services, and intracorporate transactions. Also of importance, however, are services which support remote access data processing and computerized library or related information services.

While efforts by the U.S. Postal Service to develop a nationwide electronic mail system failed, several private corporations including Federal Express and MCI now offer such services and efficient electronic message systems are now recognized as potentially a major force in productivity improvement. Provision of electronic mail services is expected to be a \$1.5 billion a year business by the end of this decade.

In addition, data communications-related equipment needs are increasing substantially. Domestic consumption of word processors and office computers is gaining strength while the sale of facsimile machines (about 50 percent of which are imported) seems to be tapering-off. U.S. facsimile machine consumption in 1982 was about 80,000 machines at about \$326 million. The average annual compounded growth rate from 1972 to 1982 was only 13.4 percent compared to 29.4 percent from 1960 to 1982. Similarly, as the annual growth rate of office typewriters decreased almost 2 percent in this same period, the domestic consumption of text processor workstations increased 23 percent, with 1982 sales of almost \$2 billion. Although "communicating word processors" remain relatively rare, services such as AT&T's "Acunet" are now available which should facilitate such high-tech developments.

Competitive History. Some commentators believe that the use of the nationwide telecommunications network for data communications was partly delayed in the United States because of the time it initially took regulators to resolve by-now familiar technical and structural issues facing the telephone industry. The structure of the telecommunications system was monopolistic, and undisputedly excellent for voice communications. But dominant firms including AT&T were resistant to making changes when specialized data services were needed and the magnitude and character of the demand for such service was not clearly defined. Technically, the telephone system was designed to carry voice communications and presented serious constraints to emerging communications applications for the following reasons:

- o The voice system was designed to carry 4 kHz speech. Achieving the capability to transmit higher data rate signals would require the removal of certain constraining electrical components.
- o Higher information rate signals were likely to cause interference to other users of the voice-oriented system.
- o Data communications usage, often of longer duration than that for a telephone conversation, was anticipated to impose undesirable costs particularly switching costs.
- o Customer-attached data equipment might put signals on the lines that were incompatible with the current system design.

Arguments such as these surfaced during FCC hearings on potential technical and economic harm of connecting equipment and noncarrier networks to the voice telephone system. In the mid-1960s, data transmission over the majority of the telephone network was limited to about 100 words per minute and it took six minutes to transmit a page of facsimile. There was little incentive by others to develop advanced equipment since only telephone company equipment could be attached to the system. In addition, there was little opportunity for others to offer transmission capabilities to overcome these limitations.

Fundamental to this problem was the question whether telephone companies should be constrained to offering the conventional voice services for which their systems were designed, and other firms allowed to develop to fill more advanced telecommunications needs. The FCC sought to resolve this question by allowing the voice telephone system to become an integrated voice and data system, while endeavoring to separate between monopoly and competitive operations making use of the system.

In a slow and deliberate manner, with intensive hearings and court proceedings involving all interested parties, but with no master plan, the FCC over the past 30 years removed many of the restrictions to the offering of new and other data communications services. These are some of the significant milestones:

- o 1956 - customers were allowed to attach acoustic devices to the telephone system (Hush-A-Phone).
- o 1959 - private microwave networks were approved using frequencies above 890 MHz.
- o 1968 - customer equipment was permitted to be attached to the public-switched network, provided a protective coupler was used.
- o 1969 - non-telephone company microwave service was approved (MCI).
- o 1971 - specialized common carriers were approved to provide private line service.
- o 1971 - unregulated, carrier-affiliated computer services were allowed but only through separate subsidiaries -- except for AT&T (Computer Inquiry I).
- o 1972 - domestic satellite common carriers were authorized.
- o 1975 - direct connection of certified equipment was permitted without the use of a protective device.
- o 1977 - specialized carriers were permitted to provide public-switched long-distance services (Execunet).
- o 1980 - customer-owned equipment and enhanced services could be offered on an unregulated basis (Computer Inquiry II).
- o 1981 - resale and sharing of intercity public-switched phone services was authorized.

Finally, following the 1984 divestiture, AT&T was permitted to enter retail data service fields that had been prohibited under the 1956 Western Electric consent decree, although it was required to provide for arms-length separation between regulated and unregulated activities under the FCC's rules.

The most obvious business need that was not adequately filled by the voice telephone system was for transmission systems and equipment to handle emerging

data processing (ADP) operations. The need to convey hard copy ADP output, among other factors, stimulated the growth of competitive private messenger services which provided more timely delivery than offered by the U.S. Postal Service.

Competitive Developments. Technological advances and the spur of competition opened new opportunities which took at least three directions. First, the incentive was provided to increase the speed with which data communications could be handled. In the case of facsimile transmission, for example, a page can now be sent in less than a minute -- a ten-fold improvement over that possible before deregulation of the terminal equipment market. There were about 270,000 business facsimile units in the United States in 1982, with estimates of 331,000 by 1987 and facsimile was estimated that year to be a \$560 million a year market.

Second, widespread availability of digital equipment and networks led to a rapid expansion in computer-based message systems. Service bureaus were formed for the purpose of providing remote access to information. Electronic mail operations with revenues estimated at about \$52 million in 1982 grew rapidly and are projected to generate \$850 million by 1987. It is estimated that 75 percent of the Fortune 500 companies now use electronic mail and electronic "mail boxes" are estimated to grow from about 225,000 in 1982 to over three million by 1987. It is estimated that over one billion electronic mail messages are sent each year, with projections of 19 billion by 1990 and 60 billion by the year 2000.

Third enhanced data communications services stimulated the need for associated hardware. For example, there has been 14-percent growth per year over the past four years in modem sales, with 250 U.S. vendors now offering over 1000 products. The \$750 million in 1984 sales is expected to expand into a \$2.2 billion market by 1989.

As U.S. society and the American economy become increasingly reliant on computers and associated data processing applications, demand for data communications should rapidly increase. Sophisticated computer-assisted design and manufacturing systems are now being developed, by GM's EDS subsidiary, for example. Such systems, which are based in part upon the complex, computer-based logistical and command-and-control systems long employed by the Defense establishment, have the potential greatly to increase the productivity and hence the overall competitiveness of American industry generally.

U.S. experience indicates a competitive, unregulated marketplace is most likely to facilitate such desirable developments since it will tend to assure users have available on timely basis just that mix of bandwidth, facilities, and equipment choices they want and need. In marked contrast to the circumstances prevailing in a number of countries abroad, the American business community's access to domestic data communications and equipment today is essentially unconstrained by Government and thus the opportunity to capture communications and computer efficiencies is quite high. As remaining restrictions on potential participants, chiefly AT&T and the companies previously comprising the Bell System, are reduced and eliminated, further substantial public gains should result.

Future Developments. Some believe we stand on the threshold of a very rapid expansion in the volume and importance of data communications. The American "white collar" workforce is becoming increasingly computerized, and computers linked to communications are increasingly employed by industry. Most major



national retailing organizations have established extensive sales and inventory management systems which in the near term may be expanded to accommodate retail point-of-sales operations. Several major newspaper and publishing firms now rely on sophisticated computer-communications systems to facilitate not only remote or "satellite" printing of editions within a given metropolitan area, but also, as in the case of the Wall Street Journal and USA Today, regional editions distributed as part of a nationwide coverage effort.

Overall, moreover, the forecast rapid growth of data communications may prove, in the final analysis, a function of demographics. As a new, affluent, and "computer-literate" generation moves increasingly "on-line," acceptance of and, indeed, reliance upon computer and communications applications -- all of which implicate rapid growth of data communications traffic -- should expand exponentially. Roger Salaman, Institute for Telecommunication Sciences, NTIA (303) 497-5396.

#### F. Satellites and Fiber Optics.

Introduction. Unique broadband transmission capabilities, required to meet new high capacity communications demands, emerged with the development of satellite and fiber optic communications. There are four categories of satellites: domestic and international satellites, both of which provide communications similar to those of land-based common carrier systems; direct broadcast satellites (DBS), with services comparable to those of terrestrial broadcasters; and specialized satellites, such as those used in navigation, environmental sensing, and military and intelligence-gathering applications. The domestic satellite business in the United States has been open to competition since its inception following adoption of the Nixon Administration's progressive "open skies" policy in 1972. Recently the FCC approved proposals to establish new U.S.-based international communications satellite systems subject to certain limitations, and there is now potential to provide the U.S. business community a greater diversity of international satellite service choices. Fiber optic communications is the newest form of transmission to gain widespread acceptance and this development provides additional user options to both satellite and existing terrestrial systems for communications at very high information rates. Such systems are being installed domestically in addition to providing international service.

Current Status Report. There are now some 27 U.S. domestic satellites with over 400 transponders being operated by ten U.S. companies. By 1990, there are expected to be twice as many companies offering four times this capacity. 1/

Thirteen organizations with 25 satellites are providing fixed service communications in other non-communist countries. In addition, the International Telecommunications Satellite Organization (INTELSAT), in which the U.S. firm Comsat has a 23 percent interest, provides a global satellite system and over two-thirds of the world's international telecommunications traffic is now transmitted via its satellites.

---

1/ 1984 Satellite Performance Reference Chart by Walter L. Morgan and Margaret Petronchak, Satellite Communications, March 1984; Information Week, pp. 47-47, May 20, 1985.

The use of satellites to broadcast television signals directly to the consumer is being planned in several countries. Systems are presently in operation on a limited experimental basis in Canada and Japan. Concerns in recent years regarding the commercial viability of such services, however, have dampened some of the earlier enthusiasm for DBS.

U.S. shipments of satellite communications systems increased from \$1.45 billion in 1982 to nearly \$2 billion in 1984 -- with potential growth to \$5 billion by 1989. Sales of commercial earth stations, a \$500 million market in 1983, may reach \$1.3 billion by 1988. Aggregate revenues of the satellite common carriers were about \$700 million in 1984. Annual revenues are expected to increase to about \$2.2 billion in 1988, and possibly \$5.6 billion by 1995. <sup>2/</sup>

U.S. domestic satellites now provide a wide range of services including voice-grade telephone service, teleconferencing, high-speed data transmission, and network and cable television program distribution. Expansion of business needs and use of satellites to relay video programming should drive growth of satellites through the end of the century. Domestic satellite circuit prices continue to be lower than comparable circuits internationally, where competition is less intense. The minimum charge for a one-hour, New York to London video transmission in 1984, for example, was about \$2,727, or about three times the price for a New York to Los Angeles transmission carried by a U.S. domestic satellite carrier. On a per-mile basis, the international video circuit cost about 54¢, compared to about 30¢ per mile domestically. Such low U.S. domestic prices, are in part responsible for the proliferation of specialized cable television system programming services as well as the increasing use of satellite circuits to piece together private intracorporate communications networks.

With deregulation, receive-only earth stations have dropped sufficiently in price (from \$10,000 in 1979 to between \$500 and \$8,000 today) to create a significant market in consumer reception of satellite programs intended for local television and cable television distribution. At present, there are reportedly about 920,000 residential receive-only earth stations in the United States and about 1.4 million total. The industry's principal trade association reports that about 80,000 home earth stations are bought by American consumers each month.

With the announcement by Comsat Corporation in late 1984 that it was discontinuing efforts to establish a domestic DBS system using a dedicated satellite and very small, roof-top antennas, prospects for DBS services in the United States dimmed considerably. The rapid growth of cable television, coupled with the demonstrated ability of conventional broadcasters to satisfy the public's news, information, and entertainment needs, suggests it will not be easy to establish a commercially viable DBS service in the United States, certainly not within this decade and, in all likelihood, not for the balance of the century. There are some efficiencies implicit in DBS technology, however, which might be attractive under certain circumstances. Government and other forecasts regarding demand for satellite services are notoriously conservative, and the industry has often surpassed official performance expectations.

---

<sup>2/</sup> EIA Market Data Book, 1984; 1985 U.S. Industrial Outlook at p. 31-3; Communications News, pp. 44-45, March 1985.

The principal factor affecting prospects for U.S. DBS operations is programming; were entrepreneurs to secure access to sufficient volumes of programming software which was not otherwise readily available conventionally, such operations might prove commercially attractive. Similarly, DBS could facilitate the offering of "High-Definition Television" (HDTV), because it can efficiently provide the wide bandwidth channels necessary to support such a service. Definitive international transmitter and receiver standards have not yet been developed for HDTV, however, and thus the commercial viability of DBS as a necessary HDTV adjunct currently is again uncertain.

While full-fledged DBS operations have encountered problems, so-called "hybrid DBS" systems should continue to develop slowly. Such systems make use of capacity leased on conventional domestic communications satellite systems and distribute programs to standard "backyard" receive-only earth stations on a pay basis. Because such DBS systems do not require dedicated satellites or receivers, their costs are relatively low. To date, such hybrid DBS offerings have not enjoyed substantial customer appeal, though circumstances may change given the trend toward encryption of pay cable signals relayed via domestic satellites. Such signals currently can be intercepted by homeowners without payment and this makes it difficult to sell competing services. Once satellite signals are no longer "free," however, hybrid DBS entrepreneurs may enjoy greater commercial success.

Large scale installation of fiber optic systems has just begun. Such systems have found utility in supplementing telephone trunks where there is need for a large number of circuits, such as between major cities, or in urban areas where duct or conduit space is limited. Fiber optic facilities also have found application in providing cost-effective digital intercity and international transmission capacity. Fiber optic cable is a rapidly growing sector of this industry with sales of \$200 million in 1983 projected to \$266 million in 1984. There has been a slower than expected growth in fiber replacing coaxial cable for cable television systems but at least one firm is now experimenting with such applications. Fiber optics, being especially valuable for data transmission, may facilitate and, in turn, be driven by a broad range of new digitally-based services.

Competitive History. After ten years of experimentation with satellite communications, the first successful orbital satellite was launched by the USSR in 1957, and the U.S. space program expanded rapidly thereafter. In order to promote and widely disseminate the benefits of satellite communications throughout the world, INTELSAT was established and supported by the United States in 1964. With the benefit of U.S. technology, INTELSAT's first geostationary international communications satellite was launched eight months later. Worldwide satellite service now being provided, attention both in the United States and abroad is turning toward providing more diversity in international communications services through multiple suppliers.

After six years of study, and with many industry proposals in hand, the FCC ruled in 1972 that the domestic satellite services should be developed on a competitive basis. Consistent with Executive branch recommendations, the FCC determined that domestic communications needs could best be served by permitting competitive entry. This "open skies" policy resulted in a significant amount of industry research, with advances made in reducing satellite power requirements,

improving the payload ratio, enhancing receiver and antenna performance characteristics, and increasing the rate at which information can be communicated. As a result, domestic satellite services today extend beyond traditional common carrier services. U.S. satellite firms also offer specialized services to meet unique business needs such as high-speed data transmission, teleconferencing, and other commercial services. Several "teleports" are also under construction in a number of major urban areas.

Other Developments. In addition, applications to establish "Mobile Satellite Service" (MSS) systems are now before the FCC. Such systems would make possible mobile radiotelephone and other communications services in areas outside metropolitan areas now or soon to be served by cellular mobile radio services. MSS has particular value as a means of increasing productivity in the transportation business by making possible, for example, efficient communications between intercity trucks and company dispatchers. Nationwide paging services using satellites are expected to commence operation in the United States soon.

Both large private business systems and the cable television industry rely heavily on satellite communications for distribution of programming and other information. The number of transponders used by private domestic networks is expected to increase from 49 in 1981 to 296 by 1985, with revenues growing from \$146 million to \$1.2 billion in this period. It is expected that 40 percent of the projected 1600 U.S. domestic satellite transponders in 1990 will be used for data transmission. One in six transponders are expected to be used for video transmission with 65 percent of them for cable television program distribution.

Until 1979, the FCC required licensing of receive-only earth stations. Elimination of the requirement for frequency coordination and construction permits for earth terminals used to receive domestic satellite signals not only removed this burden for fixed commercial earth stations, but removed a barrier to reception of broadcast programming from satellites by residential customers. As the price of satellite antennas has decreased to under \$3,000 in recent years, homeowner interest in receiving such signals developed for many reasons -- such as substandard VHF or UHF signal quality and lack of cable television availability.

DBS reception is a potential option for the 1.2 million U.S. households without television service, and the four million served by only one station. As mentioned in the subsequent section on consumer electronics, however, also significant is the possible use of DBS in offering unique services such as high definition television (HDTV). Such services are more difficult to achieve at the traditional VHF/UHF frequencies used by conventional broadcasters because of the broader bandwidth needed by HDTV.

In 1982, the FCC established domestic regulatory policies for DBS, including rules for experimental systems, contingent on the outcome of an 1983 ITU regional radio conference. 3/ Subsequent to RARC-83, the FCC requested the previous eight approved applicants to amend their plans in accordance with the results of that conference. 4/

---

3/ FCC Report and Order, General Docket No. 80-603, June 23, 1982.

4/ FCC Memorandum Opinion and Order, FCC 83-451, October 7, 1983, at pp. 2-5.

There has been international concern about transnational broadcast of programming. Satellite transmission increases the potential for the unauthorized reception and use of copyrighted programming material. This is important from a communications policy standpoint since it could affect the development of technology. If satellite transmissions are not secure because of imperfections in the law, users may have an incentive to use cable communications facilities rather than satellite circuits, thus artificially skewing demand for these competing media.

In 1984, however, the United States ratified the Brussels Convention, which obligates signatories to take appropriate measures to safeguard satellite common carrier transmissions of copyrighted programming. Enforcement of section 605 of the Communications Act may be sufficient with respect to domestic violations. Provisions of recent legislation regarding U.S. foreign aid expenditures in the Caribbean Basin also provide that aid should be conditioned upon assurances by the governments of the nations involved that unauthorized interception and commercial use of satellite transmissions will be curtailed or eliminated. Domestically, the principal pay programming supplier, Time, Inc.'s Home Box Office subsidiary and other firms, have indicated they will commence scrambling transmissions in the fall of 1985. These measures lessen some of the concerns which have prevailed regarding the protection of satellite-transmitted programs.

There has also been concern about social and political implications of DBS. As early as 1968, the UN Outer Space Conference adopted Resolution 2453 which requested a study and report on the "implications of such developments in the social, cultural, legal and other areas." Subsequent international meetings have been held to discuss this issue. 5/

Regulatory Issues. Fiber optic systems use light waves for communications. Since they do not radiate energy at the radio frequencies, there has been little need for their regulation. With field installation now practical, large scale installation has begun. United Telecomm, for example, is now developing a fiber optic system for the purpose of interconnecting LATA's nationwide. RCI Corporation, a subsidiary of Rochester Telephone, has been reported to be planning to construct 900 miles of fiber optic cable along Conrail routes in 10 states at a cost of \$40 million in 1985. AT&T plans to construct 21,000 miles of fiber optic communications by 1990, with 4,200 miles in service by 1987. By 1988, this AT&T digital transmission system will operate at 1.7 gigabits per second, transmitting up to 25,000 simultaneous two-way conversations (equivalent to sending the entire Encyclopaedia Britannica over a single strand of fiber in less than 2 seconds). Sales of fiber optic equipment to U.S. telephone companies are estimated at about \$1.5 billion by 1988 -- about 50 percent of the total telephone company purchases for carrier equipment.

Some have expressed concerns regarding possible "overcapacity" of domestic long-distance circuits due to the proliferation of satellite and fiber optics

---

5/ Signitzer, Regulation of Direct Broadcasts from Satellites, (Praeger Publishers, 1976).

facilities. Estimates are that the present U.S. domestic satellite capacity is only about 53 percent utilized, for example, and that if all the fiber optic systems recently announced were in fact constructed, U.S. intercity transmission capacity might increase as much as six-fold. These points, however, should be borne in mind.

First, existing terrestrial communications facilities have long functioned profitably notwithstanding utilization levels which seem quite low to laypersons. The average residential telephone, for example, is in use but 20 minutes daily; such communications facilities, in other words, are by some measures unused about 98 percent of the time. Both local and long-distance telephone plant, moreover, are engineered to accommodate peak calling loads adequately with the result that at many hours of the day by far a majority of facilities are not utilized. Measured against some conventional telephone plant, in short, the current 53 percent utilization levels for U.S. domestic satellites may actually be relatively high. It is also possible that the break-even point for fiber optics systems will prove lower than in the case of satellites.

Second, effectively competitive markets generally evolve mechanisms by which "overcapacity" is avoided over the long term. Among other factors, capital markets will tend to minimize the likelihood of unprofitable levels of overcapacity, of course, as unneeded or redundant facilities will simply not receive funding. Such constraints on facilities construction, moreover, generally function more efficiently and effectively than regulatory intervention aimed at policing overall levels of communications capacity.

Third, much of the critical commentary regarding possible overcapacity of satellite and fiber optics channels does not adequately account for the very rapid future growth potential of data communications traffic in particular, which seems likely. As alluded to in the section of this report dealing with "electronic banking," the volume of commercial, industrial, financial, and retail trade transactions likely to be processed using computers and communications facilities combined into a network is increasing rapidly. Such operations imply substantial, growing demand for high-speed data communications channels such as satellites and fiber optics facilities can provide efficiently. Roger Salaman, Institute for Telecommunication Sciences, NTIA (303) 497-5397.

#### G. Information Services.

Introduction. Information services include: broadcast services, interpersonal communications, and information-on-demand. Traditional radio and television broadcast services and interpersonal communications such as electronic mail and teleconferencing are discussed elsewhere in the report. This section addresses services that allow individuals selectively to access information, typically information stored or maintained by computer.

Current Status Report. The traditional broadcast industry is oriented toward providing scheduled programming. In the 1960s, an entirely new group of services

emerged which were oriented toward affording business and residential customers selective access to a large amount of information on a broad range of subjects through use of telephone, television, or cable television systems. One such service, called teletext, allows the user to select one of about 100 video pages of information transmitted by a television broadcast station. It is a form of "electronic publishing," providing a limited menu of information that would be of interest to a large audience of users.

Another service, called videotext, also uses the television set for information display. This service differs from teletext by using a two-way link (such as a telephone or cable television system) to request potentially hundreds of thousands of pages of information. Videotext is a new commercial service in the United States and is not widely available. It is expected, however, to attract an installed base of 11,000 units by year-end 1985. There are projections that this base will increase to 1 million by 1990 and 2.6 million by 1994, and possibly over 10 million by 1995 and generate substantial revenues annually.

There are almost 400 information suppliers that provide access to millions of records through telephone lines by use of a data communications or computer terminal. Firms including Control Data, Mead Industries, Boeing, Dun & Bradstreet and others market these services both domestically and overseas. Information so available ranges from a search for articles on a particular subject to up-to-date news and stock quotations. Revenues for these services were about \$1.4 billion in 1984. Such information services now constitute by far the most commercially important of the enterprises generally considered to make up the "information industry."

Competitive History. The FCC in recent years has encouraged the use of broadcast transmissions for conveying additional information where such signals would not interfere with the distribution of broadcast programming. The use of subcarriers for transmitting information by way of FM radio stations, called Subsidiary Communications Authorization (SCA) was approved in 1984. Today, these signals are used to transmit educational material, as well as business and financial information, to receivers equipped to decode such signals. There are plans for up to five subcarriers which can share the signal of a single FM station. If combined, information rates up to 56 kilobits could be achieved.

Television signals also contain a short period of time -- when the video beam is returning from the bottom to the top of the screen -- when auxiliary information could be transmitted. Television stations have long used part of this time to send operational signals. In the mid-1960s, interest emerged in using this time to send accurate time-of-day information as well as to caption TV pictures for use by the deaf. With recent advances in TV receiver technology, and the continual increase in the average time spent in viewing television, there is growing commercial interest in using this time to send information for public consumption, such as shopping, weather, and even home banking. In 1983, the FCC stepped further from regulation by ruling that such information

transmitted to the public would not be subject to content regulation. <sup>1/</sup> There are neither state nor Federal restrictions on the offering of videotext service by cable television companies.

The FCC's decision in its First Computer Inquiry that computer and data processing should not be regulated, and its subsequent deregulation of "enhanced services" in the Second Computer Inquiry, encouraged the development of new information services. Under the Modified Final Judgment (MFJ) which concluded the AT&T antitrust litigation, AT&T and the Bell Operating Companies (BOCs) were restricted in providing certain of these services. AT&T was placed under a seven-year restriction which prohibited it from providing "electronic publishing" services although provision of transmission capacity and data processing were allowed. The BOCs were flatly and indefinitely precluded from providing any "information" service including electronic publishing.

In the 1960s, the volume of data was rapidly expanding. Both government and private organizations began to develop textual data bases of legal, technical, economic, and social information, using mainframe computers for storage, and performing batch searches of information on demand. In the early 1970s, the emergence of specialized carriers, advances in time-share computer technology, and the availability of communicating data terminals created the opportunity for widespread on-line access to these large reservoirs of information. Today, there are about 1,800 such databases available, up from 362 in 1977. They are offered by almost 400 vendors and produced revenues estimated at over \$1.4 billion in 1984 from almost half a million customers. Revenues are expected to exceed \$4.3 billion by 1989. In order to reduce communications costs and delays in system access, large database suppliers have recently begun to offer their database services through their own dedicated leased networks as well as through established specialized data communications carriers.

Industry Importance. The so-called "information industry," a broad array of companies capitalizing on the capabilities of today's computer and communications technologies, has been greatly aided in its development by the virtual absence of Federal regulation. Had Government sought here, as in other countries, to regulate or manage this sector, unquestionably Americans would not enjoy the abundance of service options that presently exist. Unavailable as well would be the almost immeasurable benefits which the companies in the information industry sector confer on a broad spectrum of U.S. commercial, government, research, and other activities.

By virtue of ready access to the result of advanced medical research, for example, the potential for duplication of efforts in the health services sector is minimized and the efficient use of scarce research dollars made far more likely. Easy access to the legal literature fosters more effective administration of justice and contributes to improved law enforcement. Affording U.S. industry access to industrial research information, as well as powerful computer and data manipulation capabilities, helps promote the productivity, innovativeness, and world market competitiveness of U.S. industry.

---

<sup>1/</sup> Transmission of Teletext by TV Stations, 55 F.C.C 2d 1309 (1983).



The information industry sector is also an increasingly important component of the U.S. export portfolio. Precise statistics are not readily available in this competitive and unregulated field. There are Commerce Department estimates that the U.S. electronic data base service providers had 1984 revenues of about \$1.4 billion, and firms providing remote data processing services are estimated to have had revenues of about \$6 billion in 1984. A significant portion of these revenues, and others associated with the industry, can be attributed to foreign and export activities. See 1985 U.S. Industrial Outlook, Ch. 51.

Bridging the gap between straight data communications and the provision of information services are "value added networks." Value-added networks are unregulated in the United States and developing rapidly. Such "intelligent" network services, of course, also contribute greatly to the efficient functioning of the U.S. economy. Again, had such enterprises been subject to pervasive Government regulation, or had regulated monopoly been entertained in this area, the diversity of choices available today would unquestionably be much reduced.

U.S. experience demonstrates that the new services, efficiencies, and expanded capabilities of modern communications and computer data processing are most likely to be available to users under conditions of minimal or no regulation. It is true that in certain respects, some of the services associated with the information industry sector -- teletext services, for example -- are less available in the United States than in other countries, particularly in Europe. On the other hand, few, if any, of the teletext and similar information services offered by telecommunications administrations abroad command significant public appeal and, in most instances, these services are available only on a heavily subsidized basis. The American approach tends to assure that the public will have available the services that it wants; at the same time, our reliance on unregulated, competitive private enterprise for the most part tends to ensure that substantial capital is not devoted to providing services which the public apparently does not want.

Key policy questions in the information industry sector include the role of Government and the need to balance, on the one hand, the public's right to access to Government information and, on the other, the need to minimize unfair Government competition with the private sector. Also increasingly at issue are questions regarding appropriate regulation, if any, of the information industry activities of regulated companies, including local telephone companies. The sound resolution of these difficult policy issues, of course, will have important ramifications for the industry as well as the public. Roger Salaman, Institute for Telecommunication Sciences, NTIA (303) 497-5397.

## H. Consumer Electronics.

Introduction. It has been said by experts including the late Herman Kahn that three important characteristics of microelectronics are that they are: first, cost-reducing (i.e., they facilitate substantial savings with respect to conventional goods and services); second, demand-inducing (i.e., they make it possible to provide and market new products efficiently); and, third, they admit to ubiquitous application (i.e., microelectronics can be used in a broad array of producer and consumer goods and services). Analysts writing on the "microelectronics revolution" have suggested that their effect to date has been greatest in sectors including printing and publishing, watchmaking, office equipment, the cash register business (where today, for example, virtually no electromechanical machines are manufactured in the United States any longer), and in telecommunications. To the average American consumer, however, the most visible results of the widespread application of microelectronics are in the sector which can be broadly, if somewhat imprecisely, denominated "consumer electronics."

Under the Standard Industrial Classification (SIC) system, last revised in 1977, some of the array of products classified under the "consumer electronics" category (SIC 3651) include television receivers, radios, phonographs, video cassette recorders (VCRs), audio tape recorders, stereo system components, and automobile radios and tape players. 1/ In addition to these items are other products which are generally marketed as "consumer electronics," yet fall under different SIC classifications and are therefore not necessarily included in the totals for the "consumer electronics" category. Among these products are video cameras, photographic equipment, electronic calculators, home security systems, telephone equipment (including answering machines), personal computers and software, video games, TV antennas, and citizen band (CB) radios, as well as major appliances such as microwave ovens, air conditioners, refrigerators, etc. 2/ Sales of these products reached \$9.5 billion in 1984.

The consumer electronics business is only peripherally regulated and reflects the diversity and abundance ordinarily associated with classical marketplace competition. The business employs technology typically developed for and initially used by the telecommunications industry and demand for consumer electronics is also dependent in major regards on the performance and regulation of telecommunications companies.

Current Status. In 1984, factory shipments of all consumer electronics had an estimated value of \$25 billion, with shipments of products specifically listed under the SIC code for consumer electronics of \$16.7 billion, up 26 percent from 1983. U.S. production was up 11.6 percent to \$6.7 billion, and employment rose slightly. U.S. imports, meanwhile, accounted for \$9.0 billion of the \$16.7 total, an increase of 39 percent from the previous year. Imports now account for over 60 percent of the U.S. consumption of consumer electronics

---

1/ 1985 U.S. Industrial Outlook at p. 47-7.

2/ Ibid.

products, due in large part to the dominance of Japanese imports in the video and audio products markets. 3/

Perhaps the single fastest selling, "big ticket" consumer electronics product today is the VCR. Since the VCR's introduction in 1975, its market penetration has grown to approximately 20 percent of U.S. households with projections of 28 percent by the end of 1985. 1984 shipments of VCRs topped 7.8 million and the number of U.S. households with VCRs nearly doubled from 8 to 15 million. 4/ 1985 sales are far ahead of last year, with close to one million units per month sold as of mid-year, a 60 percent increase over sales for all of 1984. 5/ In the last four years, factory sales of VCRs have moved ahead of radios, audio components, and audio tape equipment and last year were second today only to color television monitors.

Through 1984, all VCRs sold in the U.S., including those units marketed under the labels of U.S. firms such as RCA, Zenith, and General Electric, were manufactured by Japanese firms. Japan's dominant position is expected to erode slightly this year, however, with Korea's entry into the market. It is estimated that Korea will produce 800,000 of the estimated 15.6 million VCRs imported into the U.S. in 1985. Korea's entry is expected to further intensify competition and lower prices, particularly in the low end of the market.

Products ancillary to VCRs have also experienced strong growth in recent years. Shipments of blank videocassettes, for example, exceeded 61 million units in 1983, while shipments of prerecorded cassettes exceeded 10 million. 6/ In 1985, revenues from the rental and sale of prerecorded videocassettes are expected to reach \$3.3 billion, a 39 percent increase over 1984. Ninety percent of that revenue will come from rental fees. 7/

The decision by the movie studios to reduce prices of prerecorded videocassettes has helped to boost sales. Bob Klingensmith, executive vice president of Paramount Video, noted that "by dropping our prices...we've sold 20,000 more tapes of 'Charlotte's Web' in a couple of months than we sold in the previous five years."

With the introduction of portable 8 mm VCR units in 1984, color video camera shipments grew 25 percent to surpass the half million mark. 8/ One-piece

---

3/ Id. at pp. 47-6,7.

4/ Electronics Industry Association, Electronic Market Data Book 1985. (Washington, DC), Table 1-11.; "The Outlook For the Japanese VCR Industry." Merrill Lynch, Pierce, Fenner & Smith, Inc., March 4, 1985, Table 1.

5/ "Big Gains for Video Cassettes," New York Times, Aug. 21, 1985, p. C-12.

6/ 1985 U.S. Statistical Abstract at p. 777.

7/ "Big Gains for Video Cassettes," New York Times, Aug. 21, 1985, p. C-12.

8/ Current units use 16 mm (half inch) tapes.

camera-recorder combinations, or "cam-corders" are expected to further stimulate video camera sales in 1985. 9/

The video disc continues to struggle for acceptance in the home video market and RCA's withdrawal from the retail field in 1984 was a serious blow to the technology. Video disc shipments peaked in 1983, with shipments of 326,000 units valued at \$81.4 million. Although shipments figures are not available for 1984, it is estimated that the value of video discs shipments did not exceed \$45 million. 10/ The newer technology of digital video discs with recording capability, although still in its infancy, may markedly increase consumer demand for video discs. Video disc technology may find widespread commercial or industrial application, however. At present, for example, the U.S. Army has underway programs which call for information and instructions for the repair and maintenance of complex weapons and other systems to be distributed via video disc to reduce downtime and related operational costs.

The demand for new video accessories appears in part responsible for the recent increase in television sales. After five years of 5 percent annual growth, television sales increase 15 percent in 1984. Production of color television receivers totalled 17 million units in 1984, 58 percent of which were cable compatible. The number of U.S. homes with color receivers increased almost 5 million to exceed the 100 million level (102.3). Although production and factory sales of monochrome television receivers decreased in 1984, the number of homes with such receivers increased nearly 1 million to 88.9 million. 11/ It is estimated that penetration of imported color and monochrome receivers has reached 30 percent. 12/ A total of 84.9 million households, or 98 percent of all U.S. households own at least one television and 91 percent (77.7 million) of those homes own a color television. 13/ The average American household today owns two television sets. 14/

Other markets which reflect the American public's seemingly insatiable appetite for video options have also experienced exponential growth. The home satellite earth station market, for example, showed strong growth in 1984. By mid-1985, it was estimated that 60,000 units were being sold per month, and more than one million have been installed nationwide since 1981. 15/ The earth station market was aided by 1984 legislation which clarified the right of individuals to use earth stations for home viewing of unscrambled domestic television programming. In addition, competition and technology have brought the price of earth stations down from \$20,000 in 1978 to less than \$3,000 today.

---

9/ Electronic Market Data Book 1985, p. 17.

10/ Id. at Table 1-17.

11/ Id. at Tables 1-2, 1-3.

12/ 1985 U.S. Industrial Outlook at p. 47-7.

13/ Broadcasting Cablecasting Yearbook 1985, Broadcasting Publications (Washington, DC), p. G-16.

14/ 1985 U.S. Statistical Abstract p. 542.

15/ Statement of the Honorable Judd Gregg, 131 Cong. Rec. E1493 (1985).

Radio shipments (auto, portable, table, and clock) reached a record 62 million units in 1984, up nearly 10 million from 1973, 16/ Leading the surge in sales were portable radios, especially "convertibles" -- complete portable component stereo systems -- and "pocket stereos" -- radio and/or cassette systems with headphones. According to one study, over 20 percent of U.S. households bought at least one pocket stereo within the past year, and nearly one-third of those households purchased two or more. 17/ In the same year, 11.6 percent of households purchased at least one portable AM/FM radio/cassette system. Imports account for nearly one-half (50 percent) of the U.S. market. By 1985, 99 percent of U.S. homes had radios, and the number of working radios sets exceeded 480 million, of which over 360 million were home and personal radio sets, and 120 million were auto receivers.18/

Audio digital compact disc (CD) players have enjoyed excellent success since their introduction in 1983. Factory sales of disc players topped 208,000 in 1984, up from 35,000 in 1983. 1985 sales are projected at 600,000, with a factory value of \$168 million. Disc sales were projected to have increased from 800,000 in 1983 to 5.8 million in 1984. 19/

Home computer shipments reached 5.5 million units in 1984, up 20 percent from 1983. Although the 1984 growth rate was less than in 1983, sales of peripheral equipment increased. 20/ One reason for a slump in home computer sales is that many people are evidently disappointed in the capabilities of home computers in comparison with the more powerful personal computers used at work. As personal computer prices continue to fall, more households can be expected to upgrade home computer systems. Computer software sales continued strong in 1984, with estimated revenues 30 percent higher than in 1983. Continued growth in computer software is projected for the next few years as the installed base of personal computers at the office and home continues to grow.

U.S. telephone instrument production totalled 12.2 million units in 1984, compared with 5.6 million in 1983. Production of telephone answering machines has also increased, with shipments of 2.1 million in 1983. 21/ Nineteen eighty-five sales are projected at \$3.3 million units, while prices for top-quality machines have dropped in the past five years from \$200-300 to \$75-100. 22/ Cordless telephone sales topped 6.3 million last year, and units may be purchased for less than \$50.

---

16/ Electronic Market Data Book 1985, Table 1-G.

17/ Id. at p. 224-5.

18/ Radio Advertising Bureau; Broadcasting Cablecasting Yearbook 1985, p. G-16.

19/ Electronics Industry Association; Recording Industry Association of America.

20/ 1985 U.S. Industrial Outlook at p. 28-3.

21/ 1985 U.S. Statistical Abstract at p. 777.

22/ "We're Hung Up on Quality," USA Today, Sept. 3, 1985, p. 6B.

Competitive and Product Development History. As previous sections indicate, U.S. consumers today enjoy a multitude of choices in the home video and audio market. This was not always the case, however. In fact, the boom in consumer electronics has taken place mainly in the past ten years. Prior to the 1970s, consumer choice was limited chiefly to radio (during the 1920-50s) and television, beginning in the late 1940s-early 1950s. The changes which occurred in this field were not only a function of the available technology and technological progress but also, in part, the result of changes in prevailing regulation of broadcasting, as discussed briefly below.

Radio Developments. By the early 1960s, 40 years after radio's introduction, microelectronics technology had greatly reduced the size of radio receivers. A major breakthrough came with the invention of the transistor in 1947 by AT&T's Bell Labs. Despite technological advances, however, the overwhelming majority of radio receivers sold in the United States were limited to the AM band. Although FM stations were licensed as early as 1941, FM was unable to make substantial inroads into the dominance of AM radio through the 1950s. FM radio's difficulties were attributable, in part, to AM's well-established position in the radio market prior to FM's introduction and the lack of separate programming on FM channels. For consumers, FM radio meant having to purchase receivers more expensive than AM receivers.

By the 1960s, however, procompetitive FCC policies and technological advances helped spur the growth of FM radio. In 1955, the FCC authorized use of the subcarrier portion of the FM signal. This "subsidiary communications," as it was called, allowed nonbroadcast services to be transmitted by FM stations in order to generate revenues. 23/ The Commission took further steps to enhance FM radio when in 1965, it prohibited duplicative programming on co-owned and co-located AM-FM stations as a means of increasing FM diversity. 24/ Perhaps the most important development in the growth of FM radio was the development of stereo technology. In 1961, acting on the request of the National Stereophonic Radio Committee, the FCC adopted an FM stereo transmission system standard. 25/

With the development of stereo technology and improvement in listening quality to consumers, FM music format stations have flourished since the 1960s. As expected, the result has been significant new demand by consumers for FM stereo receivers. The growth in FM radio has been so significant in the past 20 years that as of 1984, the number of FM licenses and construction permits was greater than for AM (5,141 to 4,880) and in many metropolitan areas, FM stations attracted a majority of the listening audience. 26/

---

23/ 47 C.F.R. 73.293, 73.593 (1982). In 1983, the FCC extended subsidiary communications uses of FM subchannels. First Report and Order, BC Docket 82-536, FCC 83-154, adopted April 7, 1983, 53 R.R. 2d 1519 (1983).

24/ 47 C.F.R. 73.242 (1983).

25/ FM Stereo Multiplexing Decision, 21 R.R. 1605 (1962).

26/ Television Digest, AM-FM, Action Update, as listed in TV Cable Factbook No. 52, (1984), p. 17.

In an effort to enhance the competitive position of AM radio, the FCC in 1982 authorized AM stereo, but left it to the marketplace to determine an industry standard. 27/ While declining to select a single standard, the 1982 Order did establish minimum technical rules to prevent spectrum interference and ensure stereo performance levels. The FCC's decision not to select an AM stereo standard has been criticized by many for delaying consumer availability and acceptance of AM radio. It appears, however, that the industry may be closer to resolving the standard issue. By 1985, the number of competitors vying to establish the AM stereo standard has been reduced from five to two -- Motorola and Kahn. With Harris Corporation's decision to endorse Motorola's C-QUAM system, the number of stations using this particular system is expected to reach 400 worldwide by the end of 1985, nearly four times the number of stations employing the Kahn system. Nevertheless, Kahn has refused to give up the struggle, noting that its system is used by stations in major markets such as New York, Los Angeles, Chicago, San Francisco, and Washington, D.C. It is estimated that the AM stereo receiver market today is comprised of two dozen manufacturers and 1.5 million receivers. Most receivers are produced exclusively for reception of C-QUAM or Kahn, although multi-standard receivers are available (e.g., Sony and Sansui).

Television Developments. A major event in the consumer electronics/home entertainment market occurred in the 1950s with the introduction of commercial television. In the first five years of television (1947-1952), few households had receivers, due to the lack of stations on the air (FCC freeze on allocations from 1948-1952), and the consequent expense of purchasing a receiver. In 1950, for example, the average factory cost of a new monochrome television receiver was \$190. By 1982, however, the factory cost of monochrome receivers was down to \$83, while color receivers averaged \$377. 28/ With imported receivers reducing retail prices at the low-end of the market, a monochrome receiver today may be purchased for as little as \$50, and a color television for about \$200.

For those households that could afford television in its early years, viewing choices were limited to the VHF band. Although the FCC approved allocations for UHF channels in 1952, 29/ throughout the early 1960s, most television sets were still being produced without UHF tuners. To aid the development of UHF television, Congress passed the All-Channel TV Receiver Act in 1962, which required all new television receivers sold after April 30, 1964 be capable of receiving UHF as well as VHF channels. 30/ The FCC took additional steps in the 1970s to foster greater parity between the two services with regard to picture and noise quality and channel selectors. 31/

---

27/ Report and Order, Docket 21313 (FCC 82-111), adopted March 4, 1982, 47 Fed. Reg. 13152 (March 29, 1982).

28/ Sterling, Electronic Media, (Praeger, NY), 1984, Table 680-A.

29/ Sixth Report and Order on Television Allocations, 41 F.C.C. 148 (1952).

30/ 1962 All Channel Receiver Act, Pub. L. 87-529, 76 Stat. 150 (1962).

31/ 47 C.F.R. 15.66, 15.68 (1983).

The next major change in television receivers was the introduction of color television. Although the FCC first gave approval to a color television standard in 1949, 32/ legal challenges and lack of enthusiasm among set manufacturers and the public stalled color's growth. In 1964, only 1.4 million color receivers were produced, compared with 7.1 million monochrome receivers. 33/

By 1984, however, color television receivers have become the dominant product of the consumer electronics industry, with factory production at 17.2 million units (three-quarters of all receivers produced) and valued at \$5.9 billion. Sales should continue at a brisk pace in the coming years as technology greatly enhances the quality of reception as well as creates new uses for the television receiver, or as it now being referred, the "home video terminal." Among some of the recent advances in television technology:

- o Projection Television - often referred to as "large screen" television, with screen sizes ranging from 37 inches to more than six feet in diagonal measurement. Production of projection units doubled in 1984.
- o Improved Picture Standards - industry groups are working on new standards to enhance current picture quality (e.g., contrast, line flicker). In the years to come, digital television will further improve picture quality as well as provide new capabilities (e.g., split screen viewing). As the cost of integrated circuits declines, digital televisions should become less expensive. Currently available in West Germany and Great Britain, it is estimated that by 1992, up to 40 percent of color televisions sets sold in developed nations will be digital.
- o Digital Television - Replacing transistors with integrated circuits has many advantages. Digital sets are free of the flicker common with analog sets. In addition, digital units may be able in some cases to double the number of lines scanned, thereby increasing picture quality. This is often referred to as "enhanced resolution." Digital televisions also have the capacity for "split screen" viewing. Finally, as the costs of integrated circuits declines, digital televisions should become less expensive. Currently available in West Germany and Great Britain, it is estimated that by 1992, up to 40 percent of color television sets sold in developed nations will be digital. 34/
- o High Definition - high definition television (HDTV) would provide a far sharper image than current televisions because it would consist of 1,125 lines per set, as compared to the 525-line U.S. standard and 625-line European standard. The image has been compared to that of a quality 35 mm film. HDTV has been delayed primarily from difficulties

---

32/ See also Adoption of NTSC Standard, 10 R.R. 1501 (1953).

33/ TV & Cable Factbook, No. 52 (1984), p. 19.

34/ "Television Receivers: The Next 10 Years," Mackintosh International (1984).



in selecting production and transmission standards compatible with the different color television systems in the world today although recent reports indicate some progress in achieving success within the International Telecommunication Union's International Consultative Committee on Radio (CCIR).

- o Liquid Crystal Display (LCD) - long used in watches and calculators, liquid crystal displays are now being employed as television screens. Prices for LCD televisions continued to decrease in 1984, with prices ranging between \$100-\$400, depending on the model and features. 35/ At the same time prices have dropped, picture quality has continued to improve. It is expected that color LCD televisions will be available in the immediate future.
- o Two-Channel Receivers - These units would be capable of receiving only VHF channels 3 and 4. The receivers are intended for use with VCRs, video games, personal computers, and cable television. In June 1984, the FCC authorized Sanyo to manufacture its two-channel receiver. More importantly, the Commission determined the unit was not a "receiver" for purposes of the All Channel Receiver Act, and therefore, a waiver of the Commission's rules was not necessary. 36/ This decision was affirmed in February 1985.
- o Multichannel Television Sound (MTS) - In March 1984, the FCC adopted a Second Report and Order expanding broadcasters use of the television aural baseband, to include among other things, stereophonic sound, and, bilingual broadcasting. 37/ In less than one year, stereo broadcasting is available on 100 stations, with at least one station in each of the top 10 markets, 25 of the top 30, and 50 of the top 100. This equates to 53.5 million households in 64 markets with access to TV stereo. Already 26 MTS markets, with more than 22 million households, have two or more stereo stations. 38/
- o Remote Control/Interactive Devices - With the growth of cable, remote controls have become a popular method of switching among numerous program options. Remote controls have also become a popular feature of VCRs, allowing individuals to "zap" commercials when viewing off-the-air programs. In the years to come, it is anticipated that one remote control device will be able to control television programming, VCRs, and home computers. Two-way cable interactive devices will make available such services as videotex, pay-per-view programming, and home banking and shopping.

---

35/ Electronic Market Data Book 1985, p. 14.

36/ Memorandum Opinion & Order, FCC 84-261, adopted June 15, 1984, 55 R.R. 2d 681 (1984).

37/ Second Report and Order, Docket No. 21323, 49 Fed. Reg. 18100 (adopted March 29, 1984).

38/ "TV Stereo Hits the Hundred Mark," Broadcasting, July 29, 1985, p. 45.

Other Product Developments. Other rapid changes took place in the consumer electronics industry beginning in the 1970s. Interestingly, it was an older consumer electronics product -- citizen band (CB) radios -- which dominated the market in the mid-1970s. During 1975-1976, an estimated 15 million units were sold. Faced with thousands of requests for CB equipment licenses, the FCC determined the public interest would best be served by eliminating the licensing requirement. Shortly after the FCC's deregulatory decision, the bottom fell out of the CB radio market. By 1983, the number of CB radios had fallen to 3.8 million.

The mid-1970s also saw the introduction of the video cassette recorder, the most recent sales statistics for which were noted briefly above. Initially, Sony set the standard for both machines and tapes with its Beta format. However, by 1985, the VHS format controlled the market by a 70 percent to 30 percent margin. The VCR market is one instance where the marketplace and consumer preference, rather than FCC regulation has set the industry standard. In only ten years, factory sales of VCRs have grown from 40,000 units in 1975 to an estimated 12 million units in 1985. Prices for units have dropped dramatically at the same time that features have been enhanced. In 1980, the average price of a VCR was \$800; today, most units sell for under \$500, with some models going for as little as \$300. 39/ Prices of prerecorded videocassettes have also fallen in recent years. Walt Disney recently announced it would offer 21 titles (including classics such as "Pinocchio" and "Mary Poppins") for three months beginning this November, at a price of \$29.95. Currently, these films sell for as much as \$79.95. Vestron and other distributors have also announced plans to cut prices, with many titles selling for \$24.95 and less. 40/

In addition to the VCR's popularity for viewing of prerecorded cassettes, another major use has been in allowing consumers to "time-shift" -- tape broadcast or cable programs for later viewing. Time-shifting has provided consumers with the ability to view programs they might otherwise miss either because of not being at home, being occupied with some other task, or wishing to view two programs aired during the same time period. The U.S. Supreme Court has recognized time-shifting for personal viewing as a "legitimate fair use" under the copyright laws. 41/ Of the ten most taped programs, the first six are daytime soap operas. 42/

As spectacular as the recent sales of VCRs, the growth of audio compact discs (CDs) players has been even more extraordinary. Disc player sales have skyrocketed from 35,000 units in 1983, the year of introduction, to 240,000 units

---

39/ "Changing Media," Vol V., No. 1, Ogilvy & Mather (June 1985), p. 2.

40/ Broadcasting, Sept. 2, 1985, pp. 42-3.

41/ Sony Corporation of America v. Universal City Studios, \_\_\_ U.S. \_\_\_, 78 L. Ed. 2d 574, 104 S. Ct. \_\_\_ (No. 81-1687).

42/ "Tales of the Tapes: Video's Most Popular Fare," Newsweek, August 6, 1984, p. 53.

in 1984, with projections of 600,000 in 1985 and one million in 1986. 43/ By comparison, it took six years for VCRs sales to reach the one million mark. Compact disc sales of 15 million are expected in 1985, up from only 70,000 in 1983. Approximately 2,500 titles are available in compact disc, with some 4,500 expected by the end of 1985. 44/ Some manufacturers are predicting that compact disc players will outsell turntables and cassette decks as early as 1986.

Similar to the VCR market, prices in the compact disc market have dropped dramatically. When first introduced in 1983, compact disc players sold for more than \$1,000 and discs costs about \$20. Today, a player can be purchased for \$180, with estimates of prices as low as \$100 in 1986. Disc prices meanwhile, average \$12-\$14.

Audio tape equipment sales have also done well in recent years. Once suited only to voice recording, cassette tape recorders today can produce excellent musical reproduction quality. In just the past five years, factory sales of audio tape equipment have grown from 17 million units in 1980 to 28.2 million units in 1984. 45/ Imports of audio tape equipment increased to 54.5 million units in 1984, an increase of almost 12 million over 1983. 46/ This market is expected to continue to experience strong growth in the coming years as retail prices continue to decline. As evidence of this price decline, U.S. factory shipments in 1980 were valued at \$1.4 billion versus \$1.2 billion in 1984, despite the fact that unit shipments increased by more than 11 million (67 percent) from 1980. The strength of the U.S. dollar has further helped to lower the value of imported products.

Telephone Products. Deregulation of the telephone customer premises equipment market and technological advances have helped the market for cordless telephones. In 1984, an estimated 6.3 million units were sold and some units were priced at under \$50. 47/ This past July, Sanyo announced plans to increase its U.S. shipments of cordless telephones to one million units by March 1986, a 25 percent increase over current levels. 48/ By comparison, 700,000 cordless phones were sold in 1982, representing 12 of all consumer telephones sold that year. By 1983, sales were up to 3.2 million, approximately 21 percent of all consumer telephones sold. By the end of 1985, over nine million phones are expected to be in U.S. homes. 49/

---

43/ "The Bright New Sound of Music," Time, July 1, 1985, p. 38.

44/ Id. at p. 39.

45/ Electronic Market Data Book 1985, Table 1-21.

46/ Ibid.

47/ Id. at p. 27.

48/ Nihon Keizai Shimbun Japan Economic Journal, July 16, 1985, p. 13.

49/ "Cordless Telephone Owners Face Problems of Privacy," Washington Post, April 2, 1984, p. A-1.

The increased popularity of cordless telephones, however, has raised privacy issues. Historically, cordless telephones were allocated a very narrow band of spectrum. As cordless telephone usage grew into the millions, interference problems developed, and conversations were being overheard by other cordless phone operators and/or AM or amateur radio listeners. A potentially more serious problem was the intentional theft of telephone service. Manufacturers have responded to this privacy problem by marketing phones which include scramblers. The FCC, meanwhile, has established new frequency requirements (46.4 - 46.97 MHz) for cordless telephones manufactured after October 1, 1984, and required manufacturers to attach labels warning of the risk that conversations may be overheard and identifying the security features possessed by the cordless telephone. 50/

Conclusion and Forecasts. Domestic factory shipments of consumer electronic products are expected to increase annually by 6.8 percent through the end of the decade. 51/ It will become more common for U.S. households in the late 1980s to have an integrated home entertainment center, with a digital television used for viewing over-the-air broadcast, cable, MMDS, satellite programming, or video cassettes. In addition, the television set may be used as a monitor for teletext, two-way communications (e.g., shopping, banking, pay-per-view cable) and personal computers. Audio quality of television will be enhanced either through stereo television receivers, or connecting the television with audio stereo speakers. Audio quality of records and cassettes will be improved by newer compact audio discs and tapes. The home itself may be protected through the tie-in of home security systems to the television. Conceivably, the entire array of services will be controlled by remote control, timers, and one integrated interface.

The FCC, under Chairman Mark Fowler, appears commendably determined not to permit the regulatory process to impede introduction of new consumer electronics. The Commission, in its decisions authorizing new services and products, has repeatedly sought to avoid FCC intervention in place of normal marketplace development. In the case of AM radio, this marketplace approach has been criticized for delaying, rather than hastening, the introduction of new services. Aware of this criticism, the Commission, in its MTS decision, accepted one transmission system proposed by EIA. At the same time, however, the Commission reemphasized its goal not to preclude "marketplace advances in technology" which might result in the development of additional MTS systems. 52/

Congress has largely supported the FCC's actions regarding new services and products, declaring that it "shall be the policy of the United States to encourage the provision of new technologies and services to the public." 53/ The Congress also has required the FCC to make a public interest

---

50/ Report and Order, Gen. Docket 83-325; RM-4062; RM-4075; FCC 83-597, 49 Fed. Reg. 1512, (adopted December 22, 1983); Second Report and Order, 59 Fed. Reg. 24512 (adopted May 20, 1985).

51/ 1985 U.S. Industrial Outlook at p. 47-8.

52/ Second Report and Order, at 47 Fed. Reg. 18101.

53/ FCC Authorization Act of 1983, Pub. L. 98-214, 97 Stat. 1467 (1983).

determination within one year after an application or petition for a new service has been filed. Congressional commitment to new services was evident in 1984 legislation clarifying the legality of individuals' reception of unencrypted satellite signals for personal use. 54/

Minimal government regulation of new products and services should continue to ensure consumers with an abundance of choices in the consumer electronics marketplace for the foreseeable future.

#### I. Land Mobile Radio.

Introduction. Perhaps no part of the U.S. communications industry has been more affected by advances in technology and competition than the field of land mobile radio (LMR). LMR is a generic term generally applied to a number of public safety, industrial, and land transportation services. With the exception of Citizen's Band radio, no other general radio service, not even AM or FM radio broadcasting, has grown so rapidly; none has experienced as much technical change in attempts to meet the burgeoning demand for service. Excluding broadcasting, no other non-Government radio service reaches or affects so many Americans; almost half of all FCC authorized transmitters are in the land mobile radio services. Few other industries play so critical a role in furthering and supporting health, safety, and economic activities.

Just a few years ago, most people thought of mobile communications in terms of noisy beepers that only operated within a small geographic area and expensive car telephones that hardly worked. Although critical to certain businesses and industries, land mobile radio attracted little general public interest because users could not afford the expensive equipment, could not secure licenses to use it, and generally had little need for the limited service it provided. Traditional "affinity group" licensing schemes limited the availability of mobile radio to the public of large and a majority of officials in government probably were unaware that the mobile radio field existed. To them, CB and land mobile were synonymous. But with the technological development and commercial sale of new, more efficient systems, such as cellular telephone, digital paging, and potentially, satellite paging networks, the land mobile radio industry has emerged as a major force in the communications marketplace. Not only has the efficiency of the private radio services benefited, but radio common carrier services now are widely available to increasing numbers of the public. Here, as in other communications sectors, a result of technological advances spurred forward by competitive marketplace pressures has been to "democratize" the service. That is, benefits and efficiencies once available only to major users or limited numbers of business groups now constitute increasingly viable options for the public at large.

Industry Features. Radio has long been the only practical way of communicating with mobile vehicles, whether they be on land, on the sea, in the air, or in space. Since there have always been alternatives for communicating between fixed points on land (e.g., by "wirelines" or cables), mobile communications has been regarded as among the highest priority uses of the radio spectrum. The current

---

54/ Cable Communications Policy Act, Pub. L. 98-549, 98 Stat. 2779 (1984).

uses of land mobile communications are so diverse that it is not possible to define a set of functions for them that are mutually exclusive. Nevertheless, it is possible to make some distinctions regarding some of the following modes of use: paging, dynamic routing, vehicle monitoring, emergency beaconing, data transmission, and voice conversation. There are currently three basic types of land mobile radio services: one-way signaling (paging), dispatch, and mobile telephone; each of these applications is discussed briefly below.

One-way Signaling (Paging): Uses a radio signal to alert or instruct the user to do something. The user (an office machine repairman or, doctor, for example) carries a small receiver which is automatically actuated when a message is directed to it. There are three types of paging systems: tone-only, tone-voice, and digital display. In the tone-only system, the receiver emits a tone and the user takes some predetermined action, such as calling his or her office or telephone answering service. In the tone-voice system, the tone is followed by a short voice message which allows alternative instructions (e.g., call a specific telephone number). Tone-only is cheaper than tone-voice because less "air time" is used and the equipment can be somewhat less complex. In the digital display system, a short numeric message (such as the telephone number to be called) is delivered to the receiver and displayed on a small readout device. Recent systems of this type are capable of storing and displaying much longer messages consisting of alphanumeric characters. 1/

Dispatch Communications: Allows two-way communications between a base station and mobile units or between mobile units without access to the regular, public-switched message telephone system. Dispatch communications are generally a feature of private radio systems and are used to coordinate and control a fleet of vehicles, e.g., police cars, taxis, or cement trucks. The mobile user can normally talk only to the dispatcher or, less frequently, to another mobile; users cannot dial a telephone in the regular landline network. Messages on a dispatch system are typically short, usually one minute or less. 2/

Mobile Telephone: Services allow the mobile user to receive or place regular calls through the exchange (local) and message toll (long distance) facilities of the regular landline telephone system. The service can be exactly equivalent to regular landline service except that the telephone can be mounted in a vehicle or perhaps carried in a briefcase. Messages on a mobile telephone system are typically of longer duration than is true of other mobile radio services. 3/

---

1/ Hatfield, Telecommunications: An Interdisciplinary Text (1984) 106.

2/ Ibid.

3/ Ibid.

These three types of land mobile radio services can be provided on either a private or common carrier basis; in addition, several users may join together in a cooperatively shared system. Although each of these individual services can be used to perform a number of functions, they are not equally efficient or convenient for any given use. The amount of spectrum required per user varies greatly from one service to another, and the nature of the technology required to provide the service also varies.

Public policy in the field of land mobile radio, primarily formulated in the Federal regulatory arena, has evolved through a series of difficult and far-reaching decisions involving the allocation of the scarce radio spectrum among competing users. Regulatory decisions have profoundly affected the structure of the industry and heavily influenced the quality, quantity, and cost of service ultimately provided to the public. The frequent delays in the commercial introduction of new land mobile radio technologies have generally been attributed to the "regulatory lag" and services and have led to a number of significant regulatory changes in recent years.

Current Status Report. The most publicized new mobile service recently has been cellular radio, but the mobile services industry is also seeing the emergence of satellite and land-based nationwide paging, mobile data transmission, phones for airplanes, and paging devices that serve as "pocket electronic mailboxes." While the long-term outlook for mobile communications appears quite bright, the initial high price for some equipment and services has somewhat dampened consumer demand. But prices fallen rapidly as competition matures in these markets; in fact, cellular competition is beginning to show signs of intense rivalry in a number of large metropolitan areas with prices declining as a result.

In the view of one industry expert, "the mobile communications industry has at least two things going for it, the increasing mobility of our society and the ever-growing demand for voice and data communications." <sup>4/</sup> Most believe fundamental advances in mobile communications have been achieved; mobile radio has been able to take advantage of gains in electronics and computer technology first developed in military communications systems and, in the case of cellular radio, AT&T. Recent decisions to expand the allocations for mobile systems, including cellular, private 800-band, and the new paging frequency in the 900 MHz band suggest a bright future.

According to a 1984 report on telecommunications by Arthur Andersen & Company, a panel of industry observers predicted that the annual unit sales of one-way signallers (pagers) will quadruple from 250,000 in 1982 to one million in 1990. The study predicts that annual sales of two-way radios (dispatch systems), used mostly for public safety and transportation, will double between 1982 and 1990, to three million units. Two-way radios will still constitute the largest percentage of sales in the mobile market, the study said, but the percentage will drop to 66 percent in 1990 from 84 percent in 1982.

---

<sup>4/</sup> R. Violino, "Special Report: Mobile Communications - Emerging Technologies Create Industry Rebirth," Communications Week, June 24, 1985, C-1.

Arthur Andersen also predicts that sales of mobile telephones, starting from a small base of 15,000 units in 1982, will rise dramatically reaching 550,000 units by 1990; nearly all the growth will come from the recently introduced cellular phones. 5/ According to another estimate, 1982 sales of cellular equipment exceeded \$100 million; they are projected to top \$2 billion by 1990. 6/ Almost 100,000 people -- mostly professionals such as doctors and lawyers, small businessmen and salesmen -- now have cellular systems in their vehicles. 7/

By the end of the decade, one "conservative" forecast places the number of subscribers at about 1.7 million. 8/ The consulting firm of Arthur D. Little estimates that by 1994, a decade after cellular's debut, the number of domestic subscribers will reach three million; worldwide subscribers are projected to be 7 million. 9/ Another consultant estimates that the U.S. cellular market will have grown to a \$5.4 billion a year industry by 1994; another \$4 billion in equipment sales and \$4 billion for the antennas, computers, building and other aspects of the transmitting and receiving systems also can be added to this total. 10/

Land mobile radio systems (other than Federal Government systems) are regulated under the rules and regulations of the Federal Communications Commission (FCC). There are two general categories of land mobile radio service as defined in the rules: (1) Domestic Public Radio (Common Carrier) and (2) Domestic Private Radio, which includes a number of different user subcategories. The "public vs. private" dichotomy in land mobile radio market is described below:

1. Domestic Public Radio (Common Carrier) Services: Radio common carriers (RCCs) provide radio telephone and paging service to the general public, including the fast-growing cellular mobile telephone services. About 15,000 stations are licensed by the FCC, about one-third held by entities affiliated with telephone companies ("wireline carriers") and two-thirds to independent or "non-wireline carriers." In 1982, sales in this sector totalled about \$90 million (\$30 million on the part wireline and \$60 million on the part of the radio common carriers). In many markets, nonwireline RCCs have a larger market share than wireline carriers.
2. Domestic Private Radio Services: In determining spectrum allocations, the Commission public safety, industrial, and land transportation together for purposes of maximizing efficient use of the spectrum. Many of the licensing

---

5/ Ibid.

6/ Electronic Industries Association, Annual Telecommunications Trends and Directions Seminar, (Hyannis, Massachusetts, June 3, 1982), Presentation by C.E. Niles, Chairman of Communications Industries, Inc., 2.

7/ Paul Taylor, "Testing the Promise of Revolution," Financial Times, March 27, 1985, VIII.

8/ Ibid.

9/ Ibid.

10/ Ibid.



eligibility and frequency coordination functions for these services are performed by private "frequency coordinator" groups (e.g., National Association of Business and Educational Radio (NABER), Associated Public Safety Communications Officers (APCO), and Special Industrial Radio Services Association (SIRSA)).

- Public Safety Service: These so-called "private radio" (as distinguished from common carrier) operations support police, fire, state and local government, forestry conservation, highway maintenance, state guard, medical doctor, hospital, and certain non-federal safety purposes. More than one-quarter of all FCC-authorized mobile radio stations are in this critical service, about half of which are for police and fire department operations. Annual equipment sales in this sector average about \$150 million.
- Industrial Radio Services: These are radio communications services which serve practically every segment of the American industrial, business, and commercial communities. Nearly two-thirds of FCC-authorized private radio stations fall into this category. The Business Radio Service has about 60 percent of these assignments and has about three times the number of stations as the next largest service, Special Industrial Radio. All of these radio services are of great importance to both large and small business. This is also by far the largest sector from an equipment sales standpoint, totalling about \$1.8 billion a year.
- Land Transportation Radio Services: These are radio communications services needed to support our surface transportation infrastructure (railroads, truckers, business, taxicabs, etc.) and organizations including automobile clubs and garages. These services account for about 10 percent of private land mobile stations; about 40 percent of these stations are assigned to the nation's railroads. Equipment sales here are about \$58 million.

The Land Mobile Radio Market  
(Dollars in Millions)

	<u>1982</u>	<u>1985</u>	<u>1990</u>
Basic Radio Equipment (Stations, Pagers, Cellular Phones, Switching Offices)	\$1,378	\$2,530	\$5,713
Antenna Systems (Towers, Terminals)	52 148	82 256	184 637
Common Carrier Services (Mobile Telephone Pocket Paging)	708	1,280	3,149
Installation/Maintenance	320	539	1,162
TOTAL	2,206	4,687	10,845
Compound Growth Rate		21.6%	19.5%

source: Communications Industries, Inc. (1982)

Regulatory policy during the past half century has had to contend with a number of difficult decisions related to competing needs for limited radio spectrums (types and sizes of allocations), technology choices, and industry structure. After a long period of examination and delay, the FCC has significantly loosened its grip over these matters, allowing many of the existing technologies to be commercially developed.

Competitive History. The development of the land mobile radio field has been profoundly affected by the debates over spectrum allocation (land mobile radio versus competing uses), types and sizes of allocations, technology choice, and industry structure. 11/ Recent actions by Federal regulatory authorities have done a great deal to unlock the logjam that had stifled progress in this field. Land mobile radio now appears ready to play an even more essential role in our overall communications infrastructure.

One of the earliest uses of land mobile radio was by city police departments who began experimenting with one-way (i.e., base to car) systems in the early 1920s. Within a decade this form of police communications became widespread; the first license for a mobile transmitter, permitting two-way communications, was issued in 1932. Soon thereafter, a number of other private radio systems were started, most often in the form of dispatch operations. In these cases, communications occurred only between the central dispatcher and associated vehicles, and no interconnecton with the local telephone system was provided.

Problems of channel congestion caused by the rapid growth of land mobile communications plagued users from the outset. In the early 1930s, police radio systems were allocated frequencies just above the broadcast spectrum band. The first Very High Frequency (VHF) band came into use soon after establishment of the FCC, thereby expanding the use of private radio to other users; frequency modulation (FM) was introduced, allowing even greater access. These advances and the extensive research and development undertaken by the military for mobile communications during WWII brought about considerable improvements in radio performance.

By the close of the war, private land mobile radio was flourishing; the FCC, aware of continuing problems of radio frequency congestion, formally recognized a number of specific subcategories of service (Docket 8658), including Police Radio, Land Transportation, Automobile Emergency, and several others. At the same time, the FCC allocated the first channels for mobile telephone service, thereby extending use of the spectrum for a public or common carrier service. The first mobile telephone system was established in 1946, on an experimental basis. 12/ In an effort to ensure competition in the provision of mobile telephone service, the Commission provided separate sets of frequencies for the telephone companies, referred to as "wireline" common carriers (WCCs), and the radio common carriers (RCCs).

---

11/ See generally Mobile Radio Commuunications, Inc., 29 F.C.C. 2d 62 (71) ("headstart" policy); NARUC v. FCC, 525 F.2d 630 (D.C. Cir. 1975) (and citations therein).

12/ See Hatfield, supra at 107.

In 1949, the FCC concluded a four-year long inquiry that completely revised and enlarged the field of land mobile radio service. For the very first time, the Commission authorized radio use solely to support an economic activity with no reference to a safety or life or property justification; the user category "Special Industrial Radio Service" was thereby recognized. According to one historical account, this FCC Order "permitted a demonstration of the latent demand for spectrum access by private commercial access that could not be ignored... . Future effort of the Commission, as well as the industry, would be devoted to the matter of locating spectrum space to satisfy the rapid growth of the service." <sup>13/</sup> The FCC was unable to decide between the merits of private vs. public (common carrier) mobile radio. Although many Commissioners openly favored common carrier operation on the basis that it made service available to the greatest number of people, the experimental allocation for common carrier radio was not expanded.

In a series of proceedings culminating in a 1958 ruling, the FCC reduced channel spacing, which required users to employ channel splitting equipment. This compulsory decision was an attempt to deal with the growing spectrum congestion problem. The Commission also designated a host of new subcategories for industrial users; by this time, commercial use of the radio spectrum far outpaced all others in terms of number of licensed transmitters in operation.

Another major development, this time on the "public side" of the land mobile radio industry, occurred in 1961 when RCCs were able to negotiate interconnection agreements with the former Bell System. Prior to that point in time, RCCs were unable to compete effectively with WCCs because they could not interconnect their central switching facilities with the publicly-switched, landline network. Even so, mobile telephone still languished as a little used common carrier service.

Meanwhile, one-way paging -- offered since the late 1940s -- had become a major growth area. This one-way service had been successfully offered since the late 1940s. The development of small portable receivers and the extension of service to these convenient units added greatly to user interest in paging service. RCCs had been particularly successful in promoting common carrier paging service; in light of the high demand, the FCC allocated two new channels to both RCCs and WCCs for exclusive use in paging systems (Docket 16778).

The continuing rapid growth of land mobile radio services again produced channel congestion problems by the mid-1960s; radio interference was especially acute in large metropolitan areas where mobile radio service was in high demand. In the late 1960s, this crowding was addressed in reports by a number of study teams, including a Presidential task force, an industry commission, and a regulatory review group. As a result of these studies, the Commission established a Spectrum Management Task Force to design a system to effectively

---

<sup>13/</sup> J.O. Robinson, Spectrum Management Policy in the United States: An Historical Account, (Washington, D.C.: Federal Communications Commission - Office of Plans and Policy, 1985), 62.

manage existing LMR frequencies; it also moved to allocate additional frequencies for land mobile radio use (Dockets 18261 and 18262). 14/

Up until this point, the "private" land mobile radio services had access to channels in the 30-50 MHz (referred to as "low band"), 150 MHz ("high band"), and 450 MHz ("UHF band"). The approximately 39 MHz of spectrum allocated to private systems was divided between users as follows: Public Safety (14.65 MHz), Industrial (18.65 MHz), and Transportation (5.78 MHz). "Public" land mobile radio was allocated three MHz, which was spread among the same bands; this, in turn, was divided between WCCs and RCCs for providing radio telephone and radio paging service.

In 1968, the FCC proposed to reallocate the lower seven UHF television channels (i.e., 14-20) in the largest urban areas to the land mobile radio service. These channels, located adjacent to an existing land mobile radio allocation, were considered ideal to facilitate use of existing equipment. Broadcasters, claiming recent progress in developing the underutilized UHF channels, strongly opposed the proposal, and sought to limit the scope of FCC action. This confrontation between broadcast and land mobile radio interests has been a continual one and persists to this day. Faced with the rapid growth of LMR systems (several million mobiles were then being served) and recognizing that technological innovation was unlikely to improve the use of existing allocations, the FCC provided short-term relief to the most congested LMR markets. In 1970, the FCC assigned UHF channels in each of the top ten mobile radio markets.

In a parallel inquiry, begun in 1968, the Commission began to address the entire spectrum range from 806 to 960 MHz. The Commission eventually announced plans to reallocate a number of UHF channels (70-83) to land mobile radio systems in the top 25 metropolitan areas. These decisions contrasted with another FCC inquiry, undertaken nearly two decades earlier, when television was awarded spectrum over claims from the land mobile radio field. At the time, the Commission stated that: "in arriving at this conclusion we are forced to resolve a conflict between two socially valuable services for the precious spectrum space involved. We find that needs of each of the two services are compelling." 15/

While much of the spectrum allocation debate centered around the long-running dispute between the broadcasting and mobile radio industries, the FCC also encountered resistance when it first considered allocating spectrum in the vicinity of 900 MHz. Industrial, scientific, and medical (ISM) services interests complained loudly when they learned that they might lose spectrum to make room for expanded LMR service. Similarly, broadcasters fought attempts to reduce the amount of spectrum allocated for studio-to-transmitter links in the vicinity of 900 MHz. Since the band near 900 MHz was also used for microwave ovens, the Commission was sensitive to the fact that any spectrum compression

---

14/ See generally, Final Report, The President's Task Force on Communications Policy, U.S. Government Printing Office, Washington, D.C., 1968; Report of the Advisory Committee for the Land Mobile Radio Services, U.S. Government Printing Office, Washington, D.C., 1968; and Joint Technical Advisory Committee, Spectrum Engineering -- The Key to Progress, The Institute of Electrical and Electronics Engineers, Inc., New York, 1968.

15/ See Hatfield, supra at 113.

would likely increase the cost of microwave ovens. Notwithstanding these concerns the Commission, in mid-1970, expanded LMR allocations to the 806-947 MHz range of the spectrum. In its decision, the Commission clearly believed it had solved the allocation problem; the amount of spectrum available to the LMR market was nearly quadrupled. Problems of congestion, however, did not end.

In the aftermath of the reallocation dispute, the next major issue centered around how use should be subdivided among the various land mobile radio services, the dichotomy between public (common carrier) and private radio systems soon became much sharper. Essentially the competition for spectrum within the new allocation scheme was between the WCCs and RCCs; they argued, respectively, for developing more common carrier services (mobile telephones) and more paging services. In an effort to ration existing radio spectrum, the Commission continually monitored, and at times adjusted, the assignment of frequencies to various user groups. Private systems were generally divided between public safety, industrial, and land transportation users.

As part of its ongoing inquiry into the land mobile radio field, the Commission announced that it would welcome studies and proposals for spectrally-efficient, high-capacity systems by private land mobile radio interests. In 1971, both AT&T and Motorola submitted detailed technical and marketing representations that described the cellular concept for mobile telephone service. AT&T's proposal called for the use of 64 MHz of spectrum for a domestic public land mobile service and 11 MHz for a ground-to-air system.

In 1974, the Commission denied AT&T's request for 64 MHz and reduced it to 40 MHz; the ground-to-air proposal was rejected (a subsequent proposal by another firm was eventually accepted). At the time of its decision, the Commission also decided to limit cellular systems to wireline carriers only. The FCC ultimately resolved that two cellular licenses should be awarded, allowing a WCC and RCC to compete head-to-head. Equally significant the amount of spectrum available to conventional and trunked systems was reduced from 40 to 30 MHz. In so doing, the FCC departed from its long-standing policy of allocating spectrum according to user category; technological application was now considered of paramount importance.

Three classes of technologies, each with relatively increased spectral efficiency had come under close scrutiny by the FCC. These included conventional, trunked, and cellular systems. The "conventional" system, which has a relatively simple design, allowed for manual access to channels as they become available to the user. In contrast, the "trunked" system normally provided a block of channels, which are seized automatically by a computer as they become available. The cellular system, through its series of hexagonal cells, could accommodate the most number of users. Moreover, as demand increases in any given locality, cells can be subdivided, allowing for even greater spectral efficiency.

The intra-industry rivalry was further intensified with the one particularly controversial part of the FCC's 1974 decision: the licensing of "specialized mobile radio" (SMR) systems. SMR licenses were awarded to encourage the development and use of innovative techniques for more efficient utilization of the radio spectrum resource. By allowing an entrepreneur to operate a block of channels, the Commission believed marketplace forces would ensure that smaller radio users would have better access to new technologies at more

reasonable costs. It was also thought that SMR, which employed trunking efficiencies, would help reduce congestion caused by the proliferation of private paging and dispatch systems. Under this new scheme, 600 channels would be designated for private radio (100 for "Conventional Systems," 200 for "Specialized Mobile Radio Systems," and 300 for "Reserve").

It had always been clear to the Commission that the awarding of certain allocations and the licensing of new services would have a major impact on industry structure. From the very beginning, concern was expressed that the wireline carriers would cross-subsidize their mobile radio business with revenues derived from monopoly telephone service. To alleviate that potential problem, the Commission required wireline common carriers to set up separate subsidiaries to offer mobile services; WCCs were also prohibited from manufacturing LMR gear. In light of expressed concern that mobile equipment makers might dominate the market for trunked type SMR systems, the Commission limited manufacturers to owning one SMR system per market, and to five nationwide.

By 1978, problems of channel congestion had begun to reappear. The original channels set aside for conventional systems were fully utilized forcing the Commission to allocate some of its reserve spectrum for this service. Various adjustments were made in subsequent years, but pressure mounted to release the remaining spectrum that was being held in reserve. By the early 1980s, in the face of this pressure, the FCC returned to its "user block" or subcategory approach to assigning mobile radio licenses. The Commission was reluctant to use this old approach, but tried to minimize any disadvantages by encouraging users to share allocations; it also stressed that blocks would eventually be discarded. In a related decision, the FCC liberalized the rules and regulations for SMR systems, allowing interconnection with the publicly-switched telephone network.

In mid-1981, the FCC reached a major decision pertaining to the regulatory framework for the operation and licensing of cellular telephone service. The 40 MHz set aside for cellular service in each market was subdivided, allowing for two systems, one owned and operated by a WCC and the other by an RCC. Some RCCs objected to the fact that competition for the one WCC license would not be competitive, because it would --in most cases -- be awarded to the local telephone company. On the other hand, the RCC cellular franchise would be fiercely contested. The Commission nevertheless reaffirmed its "dual allocation" approach. In order to make the license process more manageable, the FCC divided the top 90 markets into three equally-sized tiers. The FCC received nearly 200 applications for the first tier (top 30 markets), 400 for the second tier (30-60 markets) and over 550 applications for the third tier (61-90 markets). Since it was inundated with applications (each averaging several hundred pages), little likelihood that a timely review could be conducted, the Commission resorted to a lottery process for the second and third tiers; applicants for the top 30 were evaluated, although the number of applicants was eventually reduced, as many firms joined together their separate bids.

Recently, the FCC has acted to remove unnecessary regulatory restrictions on the non-broadcast uses of broadcast subcarrier frequencies to promote efficient use of this previously underutilized spectrum for the provision of needed non-broadcast services, such as mobile communications. The FCC has authorized non-broadcast services on both a private and common carrier basis utilizing FM station subcarriers, television broadcast station subchannels, the

television vertical blanking interval, AM subcarriers and the Instructional Television Fixed Service. 16/ In the mobile communications area, these subcarrier frequencies can be utilized for paging services and data transmission. In addition, the FCC has preempted state regulation of subcarrier services offered on a common carrier basis to the extent such regulation prohibits or impedes entry in order to assure efficient spectrum use, competition and the provision of new and additional common carrier services over these subcarriers. 17/ The Commission has also proposed to preempt state entry regulation of common carrier services using conventional Public Land Mobile Service frequencies to ensure that the public receives the intended benefits of the FCC's policies promoting spectrum efficiency, competition and the encouragement of new technologies and services. 18/

After nearly 15 years of technical development, public debate and regulatory scrutiny, the first commercial cellular telephone service, introduced by AT&T, went into operation in October 1983. During those intervening years, both Japan and Europe (mainly Scandinavian countries) were able to develop extensive commercial applications for cellular telephones. It is also worth noting that the first equipment sold in the market was already in its "fourth generation" of technical development; research on "fifth generation" technology was already well underway. By early 1985, cellular systems were "on stream" in 36 urban areas across the United States. If even the most conservative of the marketing forecasts proves to be correct, the cellular telephone industry in the United States could have a very major effect on the communications industry.

Competition and a flood of imports are already pushing prices down. A few months ago, the average price of a cellular telephone was about \$2,000; it has now dropped to \$1,500, and equipment costing \$1,200 is becoming available. In five years, most analysts believe the cost will dip below \$1,000. The battle for the U.S. marketplace was punctuated by Motorola's anti-dumping complaint against Japanese manufacturers, whose import of cellular phones into the United States totalled \$85 million in the first nine months of 1984 (about 50 percent of the market). The U.S. International Trade Commission has reached a preliminary determination that these imports may be harming U.S. manufacturers.

Cellular service costs were also being forced down as the competition between the Bell companies and their designated local rivals has intensified. As this rivalry develops, some predict that average monthly charges could drop from the \$150-200 range to \$80 during the next five years. But in those cities where cellular competition is especially fierce, those estimated price reductions have already been realized.

The Baltimore-Washington, D.C. market, where Cellular One had gained a substantial headstart on Bell Atlantic, has seen prices tumble now that both

---

16/ For a summary of FCC actions authorizing the use of these subcarriers see Notice of Proposed Rulemaking in CC Docket No. 85-89, FCC 85-147, released May 17, 1985 at n.8.

17/ FCC 85-147, supra, at n.4.

18/ FCC 85-147, supra.

firms have operational systems. Both began by offering monthly charges of \$99, including leased equipment and up to two hours of free calling. Bell Atlantic has recently reduced prices to \$49.95 a month; this includes a car phone and 100 minutes of free calling. In the Boston market, both entrants started at \$89 and subsequently reduced prices to \$84. Although these price cuts were not especially significant, the addition of cellular features, such as call forward, call waiting, call transfer, three-party conference calling, and call restriction codes were enormously appealing to new users. And, as these two carriers engaged in a "competitive chess game," consumers watched the sale price of cellular phones plummet from \$3,500 to \$1,000. 16/

Efficiency Gains. Numerous studies of efficiency gains achieved through use of land mobile radio have been conducted over the years. Most experts agree that mobile radio can offer certain businesses the opportunity to reduce operating costs by as much as 40 percent. Three radio-equipped delivery trucks, for example, can accomplish the same as five non-radio-equipped vehicles. In many instances, mobile radio facilitates operations (e.g., taxi services) which might otherwise prove exceedingly costly. The various Industrial Radio Services are a particularly fertile source of economic efficiencies.

The fact that mobile radio spectrum from the outset has been tightly constrained while the number of users has steadily grown has had a positive effect in terms of inducing manufacturers to develop and users to adopt spectrum-saving transmission techniques. The development of amplitude-compandored signal sideband," spread spectrum," and narrowband FM systems has been spurred by the need to accommodate greater number of users within relatively static spectrum allocations.

Conclusion. In contrast with some other telecommunications sectors, continuing Government involvement in land mobile radio is necessary given the nature of the service involved. In the short-run substantial improvement and change in regulations, not wholesale deregulation, may be in order.

Both in the United States and abroad, pressures and demands on the radio spectrum are rapidly growing. This is a function of factors including the development of new "smart" weapons systems heavily dependent on radio and the emphasis most military establishments are placing on improved command and control systems. Similarly, civil sector demand for services which are very heavily dependent on radio communications -- air traffic control, public safety, emergency and other health care, for example -- is growing to meet public demands and needs. Industrial and commercial radio communications requirements are growing in complexity commensurate with the diverse needs of our modern day economy. Public demand for mobile services such as cellular radio is growing. And, in addition there is a proliferation both of products which make limited use of the spectrum (e.g., cordless phones, security systems, microwave ovens) and products which may be vulnerable to radio frequency interference (e.g., certain computers).

---

16/ D. Easter, "A Fair Start and a Fierce Race," Telocator Magazine, June 1985 at p. 26C.



The public policy challenge for the balance of the century will be in developing improved radio spectrum management tools and procedures to accommodate this array of new requirements while, at the same time, ensuring maximum free-play is accorded competition and marketplace forces. In the land mobile area, it is expected that the FCC will act to provide additional spectrum to meet (non-federal) demand for services while endeavoring to maximize the ability of carriers and others to offer both conventional services in response to competitive and marketplace forces as well as to foster more efficient technology and services. Dekkers Davidson, Office of Policy Analysis and Development, NTIA (202) 377-1880.

J. Radio.

Introduction. Radio broadcasting, the oldest form of electronic mass communications, has proven its adaptability over the last 30 years. AM, or standard, broadcast stations first confronted competition from television in the late 1940s and early 1950s. The development of television forced radio service to shift its emphasis from national programming for large, general audiences, to very specific formats tailored to local communities. AM radio faced a second competitive challenge from FM radio in the 1970s and 1980s. FM radio grew in popularity due to better quality sound, stereo capability, and perhaps, innovative formats which were more responsive to listeners' changing tastes.

Successful AM and FM radio broadcasters today seek to carve out audience segments representing particular demographic characteristics and deliver carefully formatted programming to those segments. Most stations broadcast a specific type of music, interspersed with news, weather, traffic, sports, and talk segments. A station may affiliate with a national program network for national or regional programming and news. Sale of advertising time is done by national radio networks, local stations, and "rep" firms which represent radio stations to advertisers placing "spot" buys. The spot advertiser's headquarters are usually located outside of the radio market but the advertiser wishes to tailor its advertising plan by purchasing time in specific markets. Most stations are authorized by the FCC to operate on a 24-hour basis, although "daytimers" are limited to broadcast sunrise to sunset to avoid interference with other AM stations. The FCC permits stations to broadcast prerecorded programming on automated equipment with minimal supervision. Stations are discouraged from simulcasting the same programming over co-owned, co-located AM and FM facilities. Many believe that, today, radio in the United States constitutes the least regulated and most competitive of the electronic mass media.

Current Status. Since 1965, the most dramatic change in radio has been the rapid rise of FM listenership. In 1985, FM accounted for 70.6 percent of total radio listening, an increase of over 15 percent since spring, 1980. 1/ Commercial AM stations, however, still outnumber commercial FM stations, 4,792 to 3,808. 2/ Nearly 1,200 noncommercial, public FM stations were also on the air

---

1/ Spring 1985 RADAR 31 data compiled by Statistical Research, Inc. (SRI), using average quarter-hour, persons 12-plus, Monday to Sunday, 24 hours. Quoted in Broadcasting, June 10, 1985, p. 7.

2/ Federal Communications Commission Release 6319, August 9, 1985.

in mid-1985. There were well over 100 national and regional networks; 3/ almost 8,000 stations were affiliated with the top 15 networks. 4/ The national radio networks had gross revenues of \$221 million in 1982; national spot billing was \$884 million, and local sales totalled \$3.4 billion. 5/ Of over 470 million radio receivers, 26 percent were found outside of homes and 74 percent were in homes. 6/ Radio reached over 12 million people with walk-along sets. 7/ Advertisers might pay as little as \$1.00 or as much as \$750 for one 30-second spot. 8/ In 1983, a sample of AM and FM stations yielded an average profit margin of 7.29 percent of net revenues. 9/ The typical station spent 36 cents of each expense dollar on sales and promotion, 33 cents on general and administrative costs, 26 cents on programming and news, and five cents on technical expenses. 10/ Over the course of a week, nearly 184 million people, or 95 percent of the adult U.S. population, listen to AM or FM stations. 11/

Effects of Deregulation. In its early days, radio was dominated by national program networks including NBC, CBS, and Mutual. Program networks clearly provided significant public benefits by providing affiliates with programming which they might not otherwise have produced. Some anticompetitive consequences may flow from network practices, however, if the balance of commercial power between networks and affiliates tips in favor of the networks. In 1940, the FCC adopted several "Chain Broadcasting Rules" and the Supreme Court affirmed the FCC's ability to do so, because the Commission had found it was in the public interest to limit the power of the networks over their affiliates. 12/ The issue of "network dominance" since that time has proven much less controversial in radio than in television, in part, because few radio stations rely on networks for their entire program supply.

---

3/ Broadcasting/Cablecasting Yearbook, 1984, pp. F-31-52; F-54-58.

4/ "Optimism on the Network Radio Front," Broadcasting, July 22, 1985, p. 49.

5/ Estimated by Radio Advertising Bureau, cited in Broadcasting/Cablecasting Yearbook, 1984, p. A-2.

6/ Ibid.

7/ Comments of Commissioner James H. Quello, at the United Kingdom Radio Festival, July 18-19, 1985, Bristol, England.

8/ Broadcasting Cablecasting Yearbook 1984, p. A-2.

9/ National Association of Broadcasters, based on a 21.9 percent response rate from all AM and FM stations asked to provide voluntary revenue and profit information for 1983.

10/ Comments of Commission James Quello, supra n. 7.

11/ RADAR report, supra n. 1.

12/ National Broadcasting Co. v. United States, 319 U.S. 120 (1943).

The FCC also sought early on to limit the number of radio stations owned by one entity. Recent debate over modifying what had evolved to a limit of 7 AM, 7 FM, and 7 television stations throughout the country, resulted in adoption of a new rule permitting one entity to control 12 AM, 12 FM, and 12 television stations (so long as the audience covered by the television stations does not exceed 25 percent of the U.S. population). Licensees today may not own more than one of each service in a community; may not own a radio and television station in the same community; and may not acquire other media in the same community where they hold a broadcast license.

Most of the 8,600 commercial AM and FM broadcast outlets in the United States operate on small profit margins. The "average" radio station has gross annual revenues of less than \$500,000 and only a few dozen have annual revenues exceeding \$1 million. Radio in the United States is very much a small business enterprise. Since the burden of regulation falls most heavily on those operating close to the line of profitability, in its radio deregulation proceeding the FCC stressed the need to do away with regulations which were especially burdensome limited connection to the public interest. 13/ In 1981, Congress extended radio license terms from five to seven years, and television license terms, from three to five years. 14/ Later that year, the FCC adopted a brief "postcard" renewal form; these two actions have made renewal a much easier process for most radio licensees.

The FCC's 1981 radio deregulation order was, perhaps, the most significant deregulatory action involving television or radio to that time. 15/ It eliminated the need for stations to keep officially prescribed program logs; lifted limits on the amount of time that could be devoted to commercials; eliminated the requirement to ascertain community needs; and eliminated the mandatory quota of news and public affairs programming. The Commission noted that:

Today,...it has become essential in view of the proliferation of radio stations and other broadcast services that radio licensees specialize to attract an audience so that they may remain financially viable. Consequently, policies that may have been necessary in the early days of radio may not be necessary in an environment where thousands of licensees offer diverse sorts of programming and appeal to all manner of segmented audiences. 16/

---

13/ Report and Order, Deregulation of Radio, BC Docket No. 79-219, released February 24, 1981, 84 F.C.C. 2d 968, 1006 and 1007 (1981), aff'd, United Church of Christ v. FCC, 707 F.2d 1413 (D.C. Cir. 1983).

14/ Pub. L. 97-35. Report and Order in BC Docket 80-253 (FCC 81-146), adopted March 26, 1981; Memorandum Opinion and Order in BC Docket 80-253 (FCC 30362), adopted November 4, 1982; Black Citizens for a Fair Media v. FCC, 719 F.2d 407 (D.C. Cir. 1983).

15/ Radio Deregulation Order, supra n. 13.

16/ Id. at 969.

Notwithstanding the dismal forecasts some advanced in conjunction with the FCC's deregulation proceedings, there is virtually no credible evidence of any adverse effects on the public as a result of deregulation. Indeed, all evidence indicates that radio continues to be a medium enjoying substantial public acceptance and appeal.

Forecast Developments. The potential for profitability, plus the low multiples used to value stations (usually below ten times cash flow), are expected to lead to almost 2,000 assignment and transfers of AM and FM licenses in 1985. 17/ One financial analyst pointed out that "radio is much more management-intensive than TV. If you lose programmers or talent, the possibility of getting knocked off is very great." 18/ But wise management decisions on talent and programming may also pay off. Stations in markets where people spend more time in their cars also tend to do better than other markets -- for example, total radio advertising revenues in Los Angeles (a strong automobile-using market) topped those of New York (a larger market, but with less automobile use.) 19/

Advertisers maintain confidence in local radio as an effective means of getting their messages across. Eighty percent of advertising executives polled recently said they were "somewhat confident" or "very confident" in local radio, and 17 percent said they were more confident of local radio's effectiveness than they were in 1984. 20/ The prospects for network radio advertising are good: gross billings were up 12.8 percent for the first five months of 1985 over the same period a year before. 21/ Growth in network radio has been attributed in part to the return of some advertisers to the radio medium and because of increasing costs of advertising in other media.

Satellite technology has boosted the ability to establish and operate radio networks. ABC, NBC, CBS, and RKO have each operated multiple networks for many years, gearing network formats to fit different types of affiliate programming. These and other networks which provide news, features, and specific program feeds have been joined by newer 24-hour "format" networks. For example, the Satellite Music Network provides 185 affiliates its country music format, 168 stations its adult contemporary format, 96 stations its nostalgia/middle-of-the-road format, and 37 stations its rock format. 22/ Another satellite network, Transtar Radio Networks, offers country and adult contemporary formats, and has developed a light contemporary format specifically targeted toward an audience with a median age of 41, taken by 279 affiliates. 23/

---

17/ "Goals, Objectives and Priorities: Fiscal Years 1985, 1986, and 1987", Federal Communications Commission, February 28, 1985, p. 126.

18/ "Hot Market for Radio Stations", The New York Times, July 25, 1985, p. D-1.

19/ Ibid.

20/ Vitt Media Monitor, Spring, 1985.

21/ "Optimism on the Network Radio Front", Broadcasting, July 22, 1985, p. 46.

22/ Id. at p. 47.

23/ Ibid.

Changes in radio service are prompted by the needs of advertisers and the opportunities presented by new technology. Many stations have begun using compact digital audio disk players (CDs), particularly those stations reliant on providing high quality sound, like classical music stations. CDs provide extremely high fidelity sound with virtually no wear to the disk.

Searching for ways to utilize the spectrum more efficiently, and to facilitate new, potentially minority-owned stations in urban areas, in 1979, the FCC lauched a proceeding to examine whether AM stations could operate within 9 KHz of spectrum. 24/ Reduced spacing would have permitted more stations to operate within the AM band, but might also have created certain interference problems. In the course of the FCC proceeding, significant costs were estimated for stations and consumers to convert to 9 KHz AM service and the Commission decided that conversion was unwise.

Technical advancements led to stereo capability for AM transmission and reception, and in 1982 the FCC authorized commercial AM stereo service. 25/ As discussed above in regard to consumer electronics, however, the ruling was controversial because the Commission refrained from selecting a standard. 26/ Four companies had brought separate standards proposals before the FCC. The FCC believed consumer acceptance and marketplace forces would better select the best of the competing systems to become the de facto standard. To date, the Commission has granted type acceptance to systems developed by Kahn, Magnavox, Motorola, and Harris. Delco Electronics in 1984 announced plans to build General Motors car radios compatible with the Motorola system. Sony Corporation and Sansui have begun production of portable radios compatible with all of the systems. Today, over 350 AM radio stations are transmitting some or all of their programming in stereo. 27/

In 1983, the FCC expanded commercial use of the FM subcarrier by FM licensees. 28/ The subcarrier (SCA) of the FM signal can carry voice and data

---

24/ Notice of Inquiry, BC Docket 79-164 (FCC 79-365), adopted June 21, 1979, 44 Fed. Reg. 39550 (July 6, 1979).

25/ Report and Order, Docket 21313 (FCC 82-111), adopted March 4, 1982, 47 Fed. Reg. 13152 (March 29, 1982). See Meyer, The FCC and AM Stereo: A Deregulatory Breach of Duty, 133 U. Pa. L. Rev. 265 (1984).

26/ Commissioner Quello voiced the views of many when he reflected recently that "in hindsight, it might have been better had the Commission endorsed one AM stereo standard," because standard-setting in the marketplace has delayed consumer availability and acceptance. (Comments at United Kingdom Radio Festival, July 18-19, 1985).

27/ "Radio Technology Coming of Age," Broadcasting, July 22, 1985, pp. 76-77.

28/ First Report and Order, BC Docket 82-536, FCC 83-154, adopted April 7, 1983 (47 CFR 73.293, 73.593 (1982)); Second Report and Order, FCC 84-113, adopted March 29, 1984 (1984); Memorandum Opinion and Order, FCC 84-187, adopted April 26, 1984 (1984); Report and Order, MM Docket 83-1322, FCC 84-301, adopted June 27, 1984 (1984); Memorandum Opinion and Order, BC Docket 82-536, FCC 84-531, released January 25, 1985.

without disrupting the main FM program. Uses for subcarriers include paging, data transmission, utility monitoring, and background music. For example, an electric utility might lease time on an FM SCA to monitor energy needs at substations. SCAs are being used by about one-third of all FM licensees for these and other commercial uses, at least on a part-time basis. 29/ On a large scale, the owned and operated ABC radio stations recently launched a nationwide data transmission SCA service to be linked with individual personal computers. 30/

Perhaps the most ambitious FCC attempt to accommodate modern technical improvements in its regulations has been the proposal to revamp FM allocations. 31/ Through downgrading stations to newly created intermediate classifications and intermixture of Class B and C channels, the Commission proposed to add an indeterminate number of new FM assignments, estimated at up to one thousand. Some established broadcasters criticized the FCC's proposal, claiming significant levels of interference would be caused by co-locating new FMs where it had been believed infeasible. Government engineers and policymakers identified on 689 locations for new stations, and applications are being processed for them. 32/

The AM and FM services have provided many more opportunities than television for diverse ownership. 34/ Today, although stations in the largest markets remain available to relatively few, well-financed companies, ownership of radio stations does not pose high entry barriers. Prices for stations vary widely, from hundreds of thousands to multiple millions of dollars. For example, FM stations in Pueblo, Colorado, Phillipsburg, Kansas, and Belen, New Mexico, each sold for under \$300,000, while an AM/FM combination in Portland, Oregon, sold for just under \$7 million. 33/

Because of the proliferation of broadcast stations, the historic "scarcity rationale" underlying FCC content regulation has been questioned. The FCC, private parties, and some members of Congress have made legislative and regulatory proposals to do away with content regulations applying to radio and television alike.

---

29/ The National Association of Broadcasters estimates that SCAs can generate additional revenues of \$3,500 per month for a middle market FM station.

30/ Broadcasting, July 15, 1985, p. 51.

31/ Notice of Proposed Rulemaking, BC Docket 80-90 (FCC 80-108), adopted February 28, 1980, 78 F.C.C. 2d 1235 (1980). Report and Order, FCC 83-259, adopted May 26, 1983, 94 F.C.C. 2d 152 (1983); First Report and Order, MM Docket 84-231, adopted December 19, 1984, 57 R.R. 2d 863 (1985); Second Report and Order, FCC 85-124, adopted March 14, 1985, 50 Fed. Reg. 15158 (April 19, 1985).

32/ The Commission will use comparative hearings to choose among mutually exclusive applications. Lotteries are being used, however, to establish the schedule of channels for which applications will be taken.

33/ "Changing Hands", Broadcasting, July 15, 1985, pp. 53-54.

The FCC now has before it a proceeding contemplating repeal of the personal attack and political editorializing rules. 34/ The political editorializing rule prohibits broadcasters from endorsing a candidate without providing opportunities for opponents to make personal replies in the same time slot on other broadcasts; the personal attack rule permits a right of reply to a private individual who has a reasonable basis for showing the broadcaster permitted a speaker to attack his or her personal integrity or character in the course of airing a matter of public controversy. A number of leading legislators have called for repeal of the fairness doctrine, a vaguely stated requirement that broadcasters must air "contrasting points of view" on controversial matters of public importance to the local community. 35/ Nevertheless, opposition in Congress has prevented radio and television broadcasters from receiving the same free speech status as newspapers and magazines have enjoyed in this country. Until Supreme Court rulings change, lower courts must follow earlier cases upholding rules which define broadcasters' free speech rights more narrowly than other media. 36/

Most successful radio stations develop unique blends of carefully selected personalities, music, and service, but must keep adjusting their formats to keep pace with changing listeners' tastes. The contemporary hit radio (CHR) format has generated top ratings for FM stations in 1984 and 1985, but may not be as successful in 1986 because some programmers believe listeners' tastes are changing. One AM station in San Francisco began airing games and contests during a block of time from 9 a.m. to 3 p.m. The program director said it was "necessary to set aside traditional thinking about radio programming and concentrate more on audience entertainment as a whole." 37/

The following chart lists the number of AM and FM commercial stations programming specific formats, as of July 1985:

---

34/ Notice of Proposed Rulemaking, in Gen. Docket 83-484, RM-3739 (FCC 83-218), adopted May 12, 1983.

35/ Sec. 315(a) of the Communications Act of 1934; 47 C.F.R. 73.1910 (1984).

36/ See, e.g., Red Lion v. FCC, 395 U.S. 367 (1969); CBS, Inc. v. Democratic National Committee, 453 U.S. 367 (1981). See also Krattenmaker & Metzger, FCC Regulatory Authority Over Commercial Television Networks, 77 Nw. L. Rev. 403 (1982); Note, Content Regulation and the Dimensions of Free Expression, 96 Harv. L. Rev. 1854 (1983).

37/ "The Many Faces of Radio," Special Report, Broadcasting, July 22, 1985, p. 56.

<u>Format</u>	<u>Stations</u>	<u>Percent</u>
Country	2,346	28
Adult Contemporary/ Soft Rock	1,940	23
MOR/Nostalgia	964	11
Rock/CHR	855	10
Religious	499	6
Easy Listening	437	5
Variety	252	3
Album Oriented Rock	237	3
Black	174	2
Oldies	168	2
Spanish	154	2
News/Talk	148	2
Urban Contemporary	91	1
All News	47	.5
Classical	46	.5
Ethnic	30	.4
Jazz	15	.2
	<u>8,403</u>	<u>100 % 38/</u>

Examples of firms searching for innovative ways to use radio include the following:

o At least one marketing company has begun promoting direct response advertisements on radio stations by offering the stations a percentage of sales revenue in exchange for free broadcast of the direct sales offer. 39/

o When retransmitted by cable systems, radio signals are listened to from a television set in many homes. WFMT, a Chicago classical music station, has been distributed by United Video, a satellite carrier, since 1980 and serves more than 150 cable systems with 1.2 million subscribers. Eastern Microwave has begun distributing by satellite the signal of WQXR-FM, a New York classical music station; KKGO, a Los Angeles jazz music station, is offered free to cable systems in 14 markets. 40/

These initiatives and others support the view that radio will not be eclipsed by other technologies but will continue to adapt to the American public's changing needs and tastes.

---

38/ Radio Information Center, New York, table taken from Broadcasting, July 22, 1985, p. 56. Percentages total 99.6.

39/ "Direct Response Ads Seek Niche on Radio," Electronic Media, July 11, 1985, p. 2.

40/ Reported in Radio World, July 15, 1985, p. 1.



Employment Effects. In 1985, radio stations employed approximately 111,000 people, up from 108,000 in 1982 and substantially more than in 1960, when the combined employment for radio and television was 92,000. <sup>41/</sup> Several thousand more people will be employed by the new FM stations proposed by the FCC in 1983 and in businesses related to new uses of radio.

Conclusion. In contrast to some other industries, there are few examples in telecommunications where an existing service has been overwhelmed or eclipsed by technological developments. The rise of commercial television in the Fifties and Sixties was forecast by some as likely to lead to the demise of aural broadcasting as a major factor in the industry. Radio's ability to adapt to changing marketplace conditions unquestionably was adversely affected by the persistence of a regulatory scheme premised largely on previous economic and market assumptions that, by the Seventies, no longer were valid. As one expert commented, the United States initially regulated television as if it were just radio with pictures; and then continued for too long to regulate radio as if it were simply television without pictures.

In the early Seventies, however, NTIA's predecessor agency officially floated the concept of broadscale radio deregulation and the FCC commendably in the late Seventies adopted and sought conscientiously to implement this concept. Coupled with the demonstrated talent and resiliency of the commercial radio industry, the result of deregulation has been an even more competitive American radio broadcasting business that has continued to pay substantial public dividends. Anita Wallgren, Office of Policy Analysis and Development, NTIA (202) 377-1880.

#### K. Broadcast Television.

Introduction. It is difficult to overstate the growth of broadcast television in the last 20 years in terms of the number of stations on the air, their economic vitality, and impact on our national life. Advertiser supported stations today generally affiliate on a de facto exclusive basis with one of the three major program networks, ABC, CBS, or NBC. Each of these national network spends about \$1 billion or more on news, entertainment, and sports programs annually and distributes nearly 100 hours of programming each week to over 200 affiliated stations. The networks sell advertising time to national advertisers at rates which vary, depending on frequency, daypart, and a program's ratings. Affiliated stations receive compensation fees from the networks for carrying the network programs. In most instances, moreover, the costs of network program distribution are borne by the networks and time is provided within the network "feed" for stations to insert locally generated commercials. Some stations are owned by companies devoted to the operation of several broadcast properties with various affiliations, but individuals or enterprises often own a single station. The national program networks also own and operate stations in the largest markets in the United States.

In recent years, more unaffiliated, or independent, television stations have gone on the air. As a group, the independents are improving their financial prospects although their business continues to be more risky in general than that

---

<sup>41/</sup> Bureau of Labor Statistics, May, 1985.

of the network affiliates. Each independent station must pay for exhibition rights to programs chosen by station personnel, and such costs may account for up to 50 percent of its budget. 1/ The independents' revenue comes from local advertising sales and sales in the national "spot" market which serves as a supplement or alternative to network advertising.

Affiliated and independent stations operate on VHF and UHF channels, at power levels assigned by the FCC. The Commission recently authorized an estimated 4,000 "low power" stations on both VHF and UHF frequencies. These full stations will operate at maximum power levels of 10 watts VHF and 1,000 watts UHF and are prohibited from interfering with primary television service. Few of these stations are on the air as yet; most will operate as independents because the networks have affiliation agreements with existing stations in almost all of the 211 television markets throughout the United States.

Noncommercial stations typically provide educational programming for schools and adult home audiences during the day and general news and entertainment programming in the evening. Although paid advertising time is not generally allowed, noncommercial stations are funded through corporate underwriting, private fundraising, and government grants.

Current Status Report. On March 31, 1985, there were 909 commercial television stations on the air and 245 commercial stations being built; 297 noncommercial stations were on the air and 28 were under construction. 2/ Ten years before, noncommercial and commercial stations on the air totalled only 952, and 20 years earlier, only 586 noncommercial and commercial stations were operating. 3/ In March 1985, there were 550 low-power television stations either under construction or on the air, as well. 4/

Total television advertising revenues were estimated at \$18.6 billion in 1984 and could reach \$20.8 billion in 1985. 5/ In 1984, network television advertising accounted for 44 percent of total industry revenue, national spot sales made up 29 percent, and local sales were 27 percent. 6/ One 30-second spot on the most popular prime-time network programs cost well over \$100,000 in 1984 and was predicted to cost in excess of \$200,000 in 1985-86. 7/ In 1982, public broadcasting had revenues of \$845.2 million, of which 23.4 percent were provided by the Federal Government. 8/ The Federal contribution to public broadcasting's

---

1/ "3 TV Stations' High Margins," The New York Times, July 1, 1985, p. D-2.

2/ "Summary of Broadcasting," Broadcasting, April 29, 1985, p. 103.

3/ "Growth of Broadcasting -- 1922 - 1984," Broadcasting Cablecasting Yearbook 1984, Broadcasting Publications, 1984, p. H-55.

4/ "Summary of Broadcasting," Broadcasting, April 29, 1985, p. 103.

5/ U.S. Department of Commerce, 1985 U.S. Industrial Outlook, p. 55-3.

6/ 1985 U.S. Industrial Outlook, p. 55-3

7/ Broadcasting, May 13, 1985.

8/ 1984 Broadcasting/Cablecasting Yearbook, p. A-2.

annual budget, however, has been declining percentagewise now for more than a decade and in 1985 should stand at about 19 percent.

Ninety-eight percent of homes in the United States had television sets and over half had more than one set. There were 85 million households using television during primetime (7 p.m. to 11). In 1983, a television set was in use in the average home for 7 hours and 2 minutes a day. 9/

Competitive History. Apart from its infant years, television has consistently held a favored position with both advertisers and audiences. While interest in the new technology of television increased through the 1940s, it took the FCC almost 10 years from its introduction to settle on a plan for station assignments and spectrum usage. In a ruling issued in 1952, the FCC made two policy decisions which profoundly affected the structure of the television broadcasting industry in the United States. 10/

First, the Commission rejected an allocations scheme proposed initially by the old DuMont Network which was based on a relatively small number of powerful regional stations and opted instead for a system of considerably more local television stations. The FCC believed this concept of "localism" would result in stations acting as "mouthpieces" for their communities. Second, the FCC chose to develop television broadcasting making use of both the Very High Frequency (VHF) and Ultra High Frequency (UHF) bands and "intermixed" channel assignments in over 200 markets. The results of these choices have become apparent: too few VHF stations were planned for many urban areas and UHF stations continue to lag behind VHF in terms of reception and acceptance by audiences and advertisers. The Commission conceded that UHF stations would be handicapped, but believed it would be a temporary condition. 11/

For program networks to develop, however, adequate support from VHF stations was necessary particularly before enactment of "all-channel" legislation resulted in greater UHF set penetration. In any given market, if viewers had a choice between VHF and UHF stations, they tuned to the VHF stations for better reception; until the 1960s, too, many television sets were not built with UHF tuning capacity. 12/ In 1952, a prospective program supplier could reach 45 of the top 50 markets with VHF stations on one network; a second network could also affiliate with VHF stations in 43 of the top 50 markets; but a third network could only gain VHF affiliate in 27 of the top 50 markets and a fourth network would find only 7 VHF stations left among the top 50 markets. 13/ These

---

9/ 1984 Broadcasting/Cablecasting Yearbook, citing A.C. Nielsen, p. A-2.

10/ Sixth Report and Order on Television Allocations, 41 F.C.C. 148 (1952).

11/ Sixth Report and Order, supra, at 208.

12/ 1962 All Channel Receiver Act, Pub. L. 87-529, approved July 1, 1962, 76 Stat. 150.

13/ FCC Network Inquiry Special Staff, New Television Networks: Entry, Jurisdiction, Ownership and Regulation (vol. I) 3-4 (Final Report) (1980) (hereafter "FCC Network Inquiry").

limitations made it very difficult for more than three program networks to survive. Indeed, it took a good 25 years for ABC, the third network, to become competitive with CBS and NBC, and a fourth, the DuMont Network, gave up programming shortly after the Sixth Report and Order. 14/

Dramatic changes may be underway in television program distribution as a result of deregulation and industry restructuring. 15/ These changes could foster renewed efforts to launch new networks and other sources of original programming.

Unlike some other spectrum licensees, 16/ broadcast television and radio operators are licensed by the FCC in "the public interest, convenience, and necessity." 17/ Broadcasters consequently are often referred to as "trustees" of the airwaves. 18/ To enforce this public interest standard, the FCC has been concerned about a wide range of business practices, prohibiting those which it believed were harmful and promoting those which it determined would serve the public interest. Over the last decade, the FCC increasingly has maintained that the vast majority of broadcasters act responsibly as trustees, if for no other reason than because it constitutes good business to be responsive to audience demands. 19/ Nonetheless, some practices continue to be forbidden. For example, stations are prohibited from airing information concerning most lotteries 20/ and must adhere to a standard of fairness 21/ when dealing with controversial issues.

---

14/ FCC Network Inquiry, *supra*, vol., II, p. 88. The Network Inquiry Special Staff cites figures from Sterling and Kittross, Stay Tuned, p. 515 (1978) and Publishers Information Bureau, which reveal that in 1960, NBC had 214 affiliates and gross network billings estimated at \$249.6 million; CBS was competitive with NBC by that time with 197 affiliates and grossed \$274.1 million. ABC, after five years of full operation, lagged dramatically, with 87 affiliates and estimated network revenues of \$158.5 million. *Id.* at pp. 79, 83, 87. The principal assets of the DuMont network, incidentally, were sold in the Fifties to the firm that subsequently became Metromedia, one of the most successful independent television operations in recent years.

15/ See, e.g., "Hollywood Panel Explores '80's Media Proliferation," Broadcasting, June 17, 1985, p. 54.

16/ In contrast, Sec. 332(a) of the Communications Act requires the Commission to manage the land mobile service, for example, to "(1) promote the safety of life and property; (2) improve the efficiency of spectrum use...; (3) encourage competition...; or (4) increase interservice sharing opportunities..."

17/ Communications Act of 1934, Sec. 309(a); see also Sec. 307(c) and Sec. 303.

18/ National Broadcasting Co. v. FCC, 319 U.S. 190, 216 (1943).

19/ See, e.g., Address by Mark S. Fowler, Chairman, Federal Communications Commission, before NATPE International, Las Vegas, Nevada, March 15, 1982.

20/ See 18 U.S.C. Sec. 1307 (1984).

21/ Sec. 315(a) of the Communications Act of 1934; 47 C.F.R. 73.1910 (1984).

Case law and FCC policy statements often rely on the elusive terms "localism," "diversity," and "scarcity" as the basis for regulation. Localism generally imposes an obligation on a broadcaster to serve the information needs of his community of license. Diversity refers to the underlying need of a democratic society to hear contrasting points of view in vigorous debate. It is the allocational scarcity of broadcast frequencies in the electromagnetic spectrum which necessitates FCC channel assignments and which justifies FCC selection criteria. To select a broadcast licensee, the FCC looks at the technical, financial, and citizenship qualifications of an applicant. The extent of other media holdings is also considered, as is the extent to which the applicant is locally based and intends to be actively involved in station management. In certain circumstances, an applicant's character and programming practices or promises will also be evaluated.

The FCC has increasingly relaxed content regulation. Where effective competition can be assured by structural rules, the need for regulatory intervention into areas such as programming can be diminished. 22/ The Department of Justice has contended that a basic principle of broadcast regulation is that competition should be fostered to the end that the advertising community and ultimately the viewer will receive both the commercial and sociological benefits implicit in a competitive regime. 23/

By encouraging diversity of ownership, the Commission has emphasized repeatedly the goal of developing diversity in viewpoints expressed on radio and television. To that end, the FCC also adopts and enforces regulations affecting the structure of the television industry. For example, a newspaper owner generally may not acquire control of a radio or television station serving the newspaper's market; the rules similarly bar crossownership of radio and television properties in the same market. 24/

The rise in the number of independent stations, cable networks, and VCRs has evidently cut into the networks' share of the viewing audience, 25/ yet the three national networks nevertheless held 76.6 percent of primetime viewing shares for the 1984-85 season. 26/ Perhaps more significant, however, was the networks'

---

22/ See, e.g., Citizens Committee to Save WEFM v. Federal Communications Commission, 506 F.2d 252 (D.C. Cir. 1974) (en banc); FCC v. WNCN Listeners Guild, 450 U.S. 582 (1981). See also NAACP v. FCC, 682 F.2d 993 (D.C. Cir. 1982).

23/ Comments of the United States Department of Justice in Docket 20350 (VHF Television Service for New Jersey), May 3, 1976, at p. 22.

24/ 47 C.F.R. 73.3555(a) et seq. (1984).

25/ Reference to "share" means the percentage of televisions in use during a particular time period; a "rating" is the percentage of all television sets.

26/ Broadcasting, April 29, 1985, p. 37. CBS made a midcourse correction to its continuing 10-year study of TV viewing by projecting an end to network erosion because it foresees that cable is peaking and may even decline. CBS now predicts that in 1990, the three networks will have a combined 70% audience share and will be viewed in 39.4 million homes. Independent over-the-air TV stations will have 20% share (11.3 million homes), pay cable 8% (4.4 million homes), and basic cable 9% (5.1 million homes). Communications Daily, May 23, 1985, p.3.

combined primetime rating decline, to 48.5 for an average week during the 1984-85 season. 27/ For the first time ever, the combined network primetime rating for the season dropped below 50 percent, reflecting the fact that many people are not consuming over-the-air television as much as in the past.

The mass audiences delivered to advertisers through network primetime television are dramatized by noting that the loss of one rating point in primetime today represents approximately 850,000 households and thus would cost a network \$79 million in lost primetime advertising revenue over the course of one year. 28/

Over the last decade, the FCC authorized new services which compete with broadcast television and which may ultimately lead to greater diversity in media ownership and program content. To allow existing broadcasters to compete with the relatively unregulated new services, many of the FCC rules governing broadcast practices and some governing the structure of the industry have been repealed or substantially modified in the last five years.

An important task of the FCC over the last several years has been to improve ownership, investment, and employment opportunities in broadcasting on the part of women and ethnic and racial minorities. When Congress in 1981 adopted amendments permitting the FCC to use lotteries to assign licenses for certain services, weighted preferences were created to benefit groups who have historically been underrepresented in telecommunications ownership. This action has resulted, for example, in assignment of 58 percent of low-power television construction permits granted thus far to members of minority groups. 29/

In other deregulatory activity, Congress in 1981 extended license terms for television from three to five years and, for radio, from five to seven years. 30/ Over the last two years, the Commission determined that licensees do not need to hold a license for a certain period (three years) before being able to transfer it 31/ and changed the method by which ownership is attributed to an entity acquiring stock. 32/ The FCC adopted a television deregulation order that relaxed advertising limits, ascertainment procedures, program log requirements and specific amounts of noncommercial programming. 33/ The Commission also

---

27/ Ibid.

28/ "The TV Column," Washington Post, June 14, 1985, p. C-10.

29/ Pub. L. No. 97-259, 96 Stat. 1087. Report to the Congress by the FCC, Accomplishments, Fiscal Year 1984, February 28, 1985, p. 91.

30/ Pub. L. 98-35.

31/ Report and Order in BC Docket 81-897, (FCC 82-519), 47 Fed. Reg. 55924 (released December 2, 1982).

32/ Report and Order in MM Docket No. 83-46, (FCC 84-155), adopted March 29, 1984, 55 R.R.2d 1465 (1984); Memorandum Opinion and Order in MM Docket No. 83-46 (FCC 85-252), adopted May 9, 1985.

33/ Report and Order in MM Docket No. 83-670, (FCC 84-293), adopted June 29, 1984; 98 F.C.C. 2d 1076 (1984).

relaxed its ownership rules to permit one entity to control 12 AM and 12 FM radio stations, and 12 television stations, so long as the signals from all of the stations combined do not cover more than 25 percent of the U.S. population. 34/

Effects of Deregulation. In 1985, the public, Wall Street, and many of the broadcasters themselves were awakened to important changes in the ownership of television stations, typically involving startling prices. The flurry of merger, acquisition, and sales activity was attributed in large part to the FCC's changes in station ownership limits.

In a short span of time in early 1985, for example, Capital Cities, a group owner with seven television stations in large markets, announced its intention to purchase the ABC network, for more than \$3.5 billion. Taft Broadcasting purchased the television stations of Gulf Broadcasting for \$755 million. Mr. Rupert Murdoch announced plans to purchase six Metromedia television stations in the largest markets for \$2 billion. The Tribune Company announced the acquisition of KTLA, a VHF station in Los Angeles, for \$510 million. Ted Turner launched an unsuccessful takeover bid for CBS, followed by an effort to acquire MGM/UA studios.

Financial analysts and other industry experts have predicted these enlarged companies will have a new strength to produce programming competitive with the major studios. 35/ Some of those owning several independent stations may be more likely to launch new program distribution networks which could compete with ABC, CBS, and NBC.

Other Changes in Broadcasting. In addition to these recent industry changes due in part to deregulation, there have been other important developments as a consequence of greater reliance on marketplace forces and the rapid advances in communications technology which occurred as a consequence. Advances in microelectronics and miniaturization, for example, permitted the development of ENG (electronic news-gathering) equipment which has led, in turn, to more and better news coverage by both individual stations and the national networks. Using this compact, mobile equipment, many stations are capable of providing live coverage of events out of the studio for news and special programming. The FCC does not assign individual mobile frequencies; when an event is covered by more than one television station, personnel from various stations must cooperate in

---

34/ 47 C.F.R. 73.355(a) (1984) Report and Order in Gen. Docket No. 83-1009 (FCC 84-350), adopted July 26, 1984, 56 R.R.2d 859 (1984); Order in Gen. Docket No. 83-1009, (FCC 84-400), adopted August 9, 1984, 49 Fed. Reg. 32, 581 (August 15, 1984). National Association of Black-Owned Broadcasters v. FCC, No. 85-1139 (D.C. Cir., March 4, 1985).

35/ "New TV Programming Force Is Seen," The New York Times, May 7, 1985, p. D-11.

using frequencies to avoid interference. 36/ In addition, advances in videotape technology have contributed to the programming choices available to the public by reducing local production costs. Satellite distribution systems have also been adapted to broadcast operations and one of the national networks, NBC, will soon be relying almost exclusively on domestic satellites to distribute programming to affiliates.

Another television service, teletext, was authorized by the FCC in 1983. 37/ This one-way electronic text service transmits a variety of information over the vertical blanking interval. Typically, viewers are offered constantly updated news, stock quotes, weather, sports, and other information similar to that which might appear in a newspaper. Videotex, a two-way interactive service, uses telephone lines or coaxial cable to connect a central computer with users' televisions. Several companies, including the national television networks, AT&T, group broadcasters, and newspapers, are engaged in private development of teletext and videotex service and equipment. Such services follow on the heels of closed-captioning services which now enable the 16 million Americans who are profoundly deaf or hearing impaired to enjoy television broadcasts. At present, nearly half of the Public Broadcasting Service and more than 20 percent of ABC's network programming feed is close captioned.

Multichannel sound (MTS) -- the use of the FM subcarrier channel portion of the television signal -- was approved by the FCC in 1984, 38/ and by the middle of 1985, 70 stations covering more than half of the total U.S. households had the capacity to broadcast in stereo sound. 39/ One quarter, or 22 million households, could choose between two or more stereo television channels. 40/

---

36/ In response to a petition by CBS, the Commission authorized use of frequencies between 38.6 and 40 GHz for television auxiliary service (Report and Order in Gen. Docket 81-415 (FCC 82-148), adopted April 1, 1982, 47 Fed. Reg. 17994 (April 27, 1982)). The FCC is also looking into the proposed use of subcarriers by ENG crews for cuing and coordination (Notice of Proposed Rulemaking in Gen. Docket 82-335 (FCC 82-287), adopted June 23, 1982, 47 Fed. Reg. 31170 (July 16, 1982)). The Commission has initiated two proceedings to examine how best to manage use of broadcast auxiliary bands. (Notice of Proposed Rulemaking in MM Docket No. 85-36 (FCC 85-63), adopted February 12, 1985, 50 Fed. Reg. 8172 (February 28, 1985) and Notice of Proposed Rulemaking in MM Docket No. 85-126 (FCC 85-215), adopted April 25, 1985, 50 Fed. Reg. 19,555 (May 9, 1985).)

37/ Report and Order in BC Docket No. 81-741 (FCC 83-120), adopted March 31, 1983, 53 R.R.2d 1309 (1983); 47 C.F.R. 73.682 (1982).

38/ First Report and Order in Docket 21323 (FCC 18-307), adopted June 30, 1981; Further Notice of Proposed Rulemaking (FCC 83-364), adopted July 28, 1983; Second Report and Order (FCC 84-116), adopted April 23, 1984; Memorandum Opinion and Order, (FCC 85-63), adopted February 8, 1985.

39/ Communications Daily, June 27, 1985, p. 6; Broadcasting, July 1, 1985, p. 80.

40/ Id. at p. 80.



The Future of Video Service. Several emerging technologies are in various stages of private development as a result of recent FCC actions including: low power television (LPTV), direct broadcast satellite (DBS), and multichannel multipoint distribution service (MMDS). High Definition Television (HDTV) promises to improve significantly our expectations of picture quality. Inevitably, some lines of business will decline as other eclipse them in popularity; this appears to be the case with subscription television (STV). Once a city has become cabled, subscribers have shifted from STV delivery of one movie channel delivered over the air, to cable which provides excellent reception of many channels for about the same price. It remains to be seen, however, which, if any, of the new technologies will pose direct competition to traditional television broadcasting.

Some conventional wisdom has traditional broadcast television service over time attenuating to a shadow in the face of the long-heralded "dazzling new electronic abundance." There is not a great deal of evidence available today, however, in support of this not uncommon notion. While national network audience share may be declining, for example, and there is dispute regarding the accuracy of measurements which suggest this is true, the total number of persons reached may be constant or even increasing given overall population growth. Certainly the prices now commanded by major market television stations when sold do not support the notion of conventional broadcasting being somehow eclipsed by new media.

Perhaps the most critical challenge for traditional over-the-air commercial television will be to assure advertisers that people and, in some cases, specific groups of people, are really watching and that broadcast television messages retain their value as an essential lubricant of mass merchandizing commerce. Advertisers need more detailed demographic information and more assurance, for instance, that viewers have not "zapped" ads by switching channels or deleting commercials from taped broadcasts. Research methods and products are being developed which will better predict audience behavior. 41/

But as advertising research becomes more detailed and reliable, advertisers may not need the large audiences traditionally delivered by over-the-air television, particularly network primetime television. Senior advertising executives polled recently said that spot television is the medium in which they have the most confidence for delivery of their advertising messages. 42/ Advertisers may hold back dollars automatically committed to network television in the past for use in the spot market where they have more control. The computerization of most rep firms and ad agencies makes more

---

41/ For example, the Nielsen Company will double the number of homes in which it is testing use of its "people meter;" the company will complete evaluation of the new ratings method by January 1987. (Variety, July 17, 1985, p. 1.) BBDO, a large advertising firm, has developed a research technique called "The Loyalty Factor" measuring TV viewers' loyalty to programs, week by week. See Broadcasting, March 11, 1985, p. 18.

42/ Vitt Media International survey indicated the most confidence in spot television (66%); national magazines (62%), local television (57%), network television (54%), local radio (34%), direct response (22%), cable television (20%), and outdoor (14%). Reported in Broadcasting, June 10, 1985, p. 20.

"target efficient" placement of commercials feasible and thus has expanded the options available to major advertisers, a phenomenon likely to be more pronounced and significant in the future.

Another development which may shift advertising dollars from network television has been barter programming. Producers today offer programs directly to a station, with little or no cash to be paid by the station. In exchange, the producer retains and sells a certain number of commercial spots. There is some evidence that advertisers are diverting network dollars and spot dollars to barter, instead of developing new "barter spot" budgets. 43/

The television picture may look sharper, program supply may change, and viewing habits may be reported more accurately in the future, but there is little to forecast any great change in the dominant status of television as the medium of mass entertainment in the United States.

Employment Effects. In 1985, there were 120,000 people employed by television stations, in contrast to 110,000 people in 1982. 44/ In 1960, only 90,000 people were employed by radio and television stations combined. 45/ Employment is expected to increase as new low power and full power stations go on the air. Anita Wallgren, Office of Policy Analysis Development, NTIA (202) 377-1880.

#### L. Cable Television.

Introduction. In the last 20 years, cable television has clearly become a major force among U.S. media. The hookup of coaxial cable from a central headend to a subscriber's home has spurred the development of new satellite-based program networks, locally originated cable programs, and the delivery of conventional audio and video broadcast signals, all with excellent technical quality. Cable television has also proven one of the more resilient of media offerings, evidently prospering despite adverse general economic circumstances. During the severe U.S. economic downturn of the late Seventies and early Eighties, for example, cable television subscribership continued to grow at the rate of about 300,000 new subscribers monthly. While some cable television firms have encountered financial difficulties, there is little doubt that today the services offered by the industry enjoy substantial public appeal.

The chameleon-like character of cable television has posed challenges for firms entering the business and regulatory bodies alike. In some instances, cable is desired by consumers chiefly to obtain better quality reception of local broadcast signals; in other cases, consumers apparently want the specialized programming that can be provided using cable's additional channel capacity. Today, most cable systems provide viewers with a basic subscription service consisting of locally available broadcast signals plus programming from nonlocal

---

43/ "Barter Taking \$450-million Bite Out of Spot," Broadcasting, June 17, 1985, pp. 27-29.

44/ Bureau of Labor Statistics, 1985 statistics for SIC Codes 4832 and 4833.

45/ Ibid.

"superstations" and specialized cable networks. For additional fees, cableviewers can also subscribe to "pay tiers" including very recent motion pictures without commercial interruption or editing, sports, popular music video formats, and other specialized programs.

Current Status Report. Today, approximately 35 million American households representing over 95 million people pay an average of \$7.94 per month for basic cable service. Approximately 5,800 systems serve more than 15,000 communities in all 50 states. 1/ Cable penetration has surpassed 43 percent of U.S. households 2/ and is predicted to reach between 55 and 65 percent penetration by the end of the decade. 3/ Cable programming in some cases is cutting into broadcast television audiences: it is reportedly a factor in the three networks' combined primetime share drop from over 90 percent a few years ago to 76.6 percent in 1984. 4/ The growth of cable households has also been paralleled by the explosion of cable networks, both advertiser and subscriber supported. A recent count of satellite-distributed cable programming services included more than 40 existing and 23 announced or proposed offerings. The industry's revenues from basic and pay subscriptions, advertising, and installation charges were estimated at over \$8.0 billion for 1984, a 9.3 percent increase over 1983. 5/ Cable systems in 1984 were valued at prices over 10 times cash flow, and not infrequently commanded more than \$1,000 per subscriber when sold. 6/

Competitive History. Although the rate of system growth has varied over the last several years, cable has generally experienced a consistent increase in penetration, gross revenues from subscriptions and advertising, and the number of cities where cable is available. Three factors have contributed to the vitality of the cable industries: an increasingly deregulatory environment in which both regulatory and franchising bodies have recognized that excessively burdening the industry with "blue-sky" obligations may seriously impair the availability of any service; new program sources; and satellite distribution of programming to cable system headends.

---

1/ "A Short Course in Cable, 1984," Broadcasting/Cablecasting Yearbook 1984, p. D-3.

2/ "Nielsen: U.S. Penetration Reaches 43.7 percent," CableVision, January 14, 1985, p. 17.

3/ "Cable TV Penetration," New York Times, March 16, 1984, p. D-14; "Cable Stats," CableVision, April 30, 1984, p. 62; Roth, "New Technology Aims for Jackpot at Web's Expense, Claims Bleak JWT Study," Variety, August 18, 1982, p. 46.

4/ Broadcasting, April 29, 1985, p. 37; Roth, "New Technology Aims for Jackpot at Web's Expense, Claims Bleak JWT Study," Variety, August 18, 1982, p. 46.

5/ Standard & Poor's Industry Surveys, Media Current Analysis, March 28, 1985.

6/ "Market for Cable-TV Systems Booms, As Outlook for the Industry Improves," Wall Street Journal, May 31, 1985, p. 5.

Cable television in the United States is now regulated at both the local and Federal levels of government. In addition, 11 states provide for some degree of regulation. The primary focus of regulatory oversight, however, traditionally has been the local municipality which typically establishes the framework for a cable franchise, selects the local operator, and is responsible for renewing the franchise. Federal oversight rests with the Federal Communications Commission which provides a framework for local cable regulation and system operation. As a result of Commission deregulatory decisions in the late 1970s, along with court decisions limiting its authority over cable, and comprehensive deregulatory legislation enacted in 1984, the FCC's current cable regulation is minimal, permitting cable television systems wide latitude in design and operation.

Some cable systems have begun using some of their capacity for non-video data and voice transmissions, services similar to those also provided by local telephone companies. 7/ Although cable television is not typically regulated by states, local telephone companies are closely regulated by state utility commissions. Several of these commissions have attempted to impose strict common carrier regulation on cable systems providing two-way data services that potentially compete with tariffed telephone company private line services. 8/ In 1976, the courts ruled that the FCC could not preempt state jurisdiction over purely local data transmission carried by cable television systems. 9/ However, the Commission recently revisited the question and determined that it has jurisdiction over interstate data services terminated locally by cable systems. 10/

Effects of Deregulation. The FCC adopted several of the first cable regulations in 1966, 11/ including rules designed to protect local broadcasters from actual or potential competition from cable television. 12/ The basic rules were expanded in 1974 when the Commission instituted a comprehensive regulatory

---

7/ See, e.g., R. Pepper, "Competition in Local Distribution: The Cable Television Industry," in B. Compaine (ed.), Understanding New Media: Trends and Issues in Electronic Distribution of Information, (Cambridge: Ballinger Publishing Co. 1984), pp. 147-194.

8/ See e.g., "Indiana Says All Carriers Must Be Regulated Like Telcos," State Telephone Regulation Report, March 29, 1984, p.6.

9/ National Association of Regulatory Utility Commissioners v. FCC, 533 F.2d 601 (1976).

10/ DCC File No. CCB DFD 83-1, In re Petition of Cox Cable Communications, Inc. et al. For Declaratory Ruling For Preemption of and Jurisdiction Over Broadband Coaxial Cable's Local Distribution of Inter/Intrastate Communications and Interconnection with Digital Termination Systems. Memorandum Opinion, Declaratory Ruling and Order, (FCC 85-455), adopted August 7, 1985.

11/ Second Report and Order, Docket 14895, 2 F.C.C. 2d 725 (1966).

12/ "Assuring the effective use of the radio spectrum allocated to television broadcasting was the reason for the imposition of extremely restrictive regulations that have substantially retarded the ability of cable television to compete ree'lv in the marketplace." United States v. Southwestern Cable Co., 392 U.S. 157, 167-73 (1968).

scheme for cable franchising, signal carriage, cross-ownership, equal employment opportunity, technical standards, and political broadcasting. 13/ In the years immediately after this regulatory high-water mark, many of the FCC cable rules were curtailed or eliminated, only to be replaced by local regulations and as noted above, increasingly demanding franchise terms. 14/ In 1984, therefore, Congress passed the Cable Communications Policy Act of 1984 to normalize relations between Federal, state and local authorities in the field. 15/ Under the new law, most cable systems will be free of rate regulation of basic service in two years and franchise fees charged by the cities cannot exceed five percent of gross revenues from basic service. Among the many other provisions of the new cable law, operators will have a reasonable expectancy that their franchise will be renewed.

The elimination of rules which mandated creation and maintenance of local public access channels and rules prohibiting the importation of distant signals gave cable operators greater flexibility to select and tier programming. In 1975, Home Box Office (HBO) began delivering uncut long-form programming via satellite to cable headends on a per-subscriber basis and this service expanded rapidly following deregulatory court rulings. 16/ Among the many pay channels now available are movie channels like HBO, Cinemax, Showtime, The Movie Channel, specialized channels like The Disney Channel, Galavision, The Playboy Channel, and Bravo.

Advertiser-supported "superstations", such as WTBS (Atlanta), WOR (New York), and WGN (Chicago) have also been made possible chiefly through satellite delivery and also, in part, due to FCC repeal of limitations on imported distant signals. The noncommercial C-SPAN satellite-delivered service provides live coverage of the U.S. House of Representatives floor proceedings, supplemented with coverage of select hearings and important speeches. MTV, one of the most popular satellite program services, delivers music videos which feature popular rock groups in creative film sequences. MTV has recently been joined by VH-1 to produce music videos directed towards a slightly older audience. 17/

---

13/ Cable Television Report and Order, 36 F.C.C. 2d 143 (1972).

14/ See, e.g., Report and Order on Cable Television, 567 F.2d 41 (1980); Report and Order on Cable Television Syndicated Exclusivity Rules, 79 F.C.C. 2d 663 (1980).

15/ Pub. L. 98-549, 98 Stat. 2779 (1984).

16/ See Home Box Office, Inc. v. FCC, 567 F.2d 9, (D.C. Cir.), cert. denied, 434 U.S. 829 (1977); FCC v. Midwest Video Corp., 440 U.S. 689 (1979); Capital Cities Cable, Inc. v. Crisp, 467 U.S. \_\_\_, \_\_\_, 81 L. Ed. 2d 580, 595 (1984).

17/ One company, Satellite Program Network (SPN) sells advertising time on its 24-hour program network to producers, who, in turn, sell time within their shows. SPN revealed it receives 40% of its revenues from how-to and magazine type shows, the remaining 60% of revenues coming equally from religious programs, sports, and international programming provided by foreign countries and tourist bureaus.

Basic cable service currently is priced about \$8 per month on average and typically provides the subscriber all of the local broadcast signals plus dozens of other channels. "Premium" pay channels, etc. -- HBO, Showtime/The Movie Channel, Cinemax -- cost an average of \$10 each. Pay channels, however, are beginning to drop in popularity and the firms are also experiencing increasing subscriber "churn." New pay subscriptions, for example, increased over the previous year by 32 percent in 1982, 21 percent in 1983, and 10 percent in 1984. 18/ Pay programmers are launching a two-pronged response to this leveling off of interest: they are producing and financing new programs, and they are experimenting with pay-per-view (PPV) programming, promoting the delivery of a single movie or special event at a set date and time for a modest price, e.g., \$4 to \$10.

Copyright Issues. When cable systems began retransmitting non-local broadcast signals, copyright owners brought suit which culminated in a U.S. Supreme Court decision that cable retransmission did not constitute a "public performance" subject to copyright liability under the 1909 Copyright Act. 19/ In the 1976 Copyright Act Revision, therefore, Congress defined cable retransmission as a "performance" and created a compulsory license permitting cable systems to carry broadcast signals without having to seek authorization and established a statutory royalty scheme. In order to provide for distribution of compensation to copyright owners, Congress also established a Copyright Royalty Tribunal (CRT), with the power to adjust rates approximating the value of cable retransmission rights and to adjudicate disputes among claimants to the fees collected from cable systems. 20/

The CRT recently has come under much criticism and its future is currently being debated. Some legislators have proposed its replacement by a "copyright court" or closer administrative supervision by another governmental agency.

Recent court decisions have expanded the First Amendment rights of cable operators. 21/ An important recent appellate court opinion ruled the cable "must carry" rules violate the free speech rights applicable to cable operators under the First Amendment, being an unwarranted impingement on editorial discretion. 22/ These FCC rules required cable operators to carry local

---

18/ "Cable TV, Older and Wiser, Looks Like a Good Bet Again," Business Week, July 22, 1985, p. 127.

19/ Fortnightly Corp. v. United Artists Television, Inc., 392 U.S. 390 (1968). See also Teleprompter Corp. v. CBS, Inc., 415 U.S. 394 (1974).

20/ 17 U.S.C. Sec. 801 et seq. (1983). See National Assoc. of Broadcasters v. CRT, 51 R.R.2d 329 (D.C. Cir. 1982); Christian Broadcasting Network v. CRT, 54 R.R.2d 1215 (D.C. Cir. 1983); National Cable Telev. Assoc. v. CRT, 55 R.R.2d 387 (D.C. Cir. 1983).

21/ See, e.g., Preferred Communications, Inc. v. City of Los Angeles, 754 F.2d 1396 (9th Cir. (1985)).

22/ Quincy Cable TV, Inc. v. FCC, No. 83-1283, and Turner Broadcasting System, Inc. v. FCC, 768 F.2d 1434 (D.C. Cir. 1985). The decision has been appealed to the Supreme Court by the National Association of Broadcasters and other nongovernment interests.

broadcast signals without regard to the desires of cable subscribers. If the decision invalidating the rules is permitted to stand, cable operators will be free to market program choices in various combinations. It is possible, however, that certain local broadcast signals would not be carried, particularly those of some independent and public stations, in the absence of the must carry rules.

While the Federal Government and some states have been reducing their regulations, most cities still endeavor to regulate many aspects of cable operations, subject to the limits contained in 1984 Federal cable legislation. One of the unintended results of bidding competition for large urban systems is that cities of all sizes came to expect, and in some cases demand, state-of-the-art, sophisticated cable systems regardless of whether their city economically could support such a system. The most sophisticated bid, therefore, became the expectation of even the smallest community, for either a new system or an existing one at renewal time. Recently, however, cable operators and some cities recognized the problems of overbidding, and have scaled back their proposals, attempting to renegotiate existing but unbuilt commitments. New York City, for example, has agreed to accept single cable 70 channel systems for new constructions instead of the 108 channel dual cable system originally agreed to. 23/

One industry observer has said typical cable service realistically provides "plain vanilla," that is, good signal quality for basic service, while charging "nuts and sauce" to segments of the market who select sports, movies, adult, and children's programming. 24/

Financial analysts say the economic outlook is positive for the cable industry, although "much depends on how companies manage in the new deregulated environment." 25/ Experts maintain that with construction of major systems largely completed, companies have reduced their debt and are beginning to produce profits; the industry had a total loss of about \$200 million in 1982 when construction was at its peak, in striking contrast to 1984 total profit of \$800 million. 26/ Deregulation of subscriber rates may also improve profitability when this provision of the 1984 Cable Act becomes effective in 1987. 27/ The focus has shifted from growth and new construction to customer service and marketing, as firms strive to make their operations more efficient. 28/

---

23/ See, e.g., P. Kerr, "Cable TV Rule at Issue," New York Times, March 13, 1984, p. C-17; and "NYC Unit OKs Switch to Single Cable," CableVision, March 26, 1984, p. 15.

24/ "Telecommunications: An Interview with Maurice B. Mitchell," Federal Bar News and Journal, June 1985, p. 213.

25/ "Market for Cable-TV Systems Booms, As Outlook for the Industry Improves," Wall Street Journal, May 31, 1985, p. 5.

26/ Ibid.

27/ Ibid.

28/ "Cable TV, Older and Wiser, Looks Like a Good Bet Again," Business Week, July 22, 1985, p. 126

Theft of service continues to plague some cable systems. By one account, illegal reception of cable service in Arizona was valued at over \$14 million a year, or 18 percent of total cable revenues in the state. 29/ Limited amnesty programs and lawsuits have reduced cable losses in some instances.

Perhaps the most important and certainly the most dramatic growth has occurred in cable advertising revenues over the last five years as shown below:

<u>Cable Advertising Revenues</u> (Millions of Dollars)					
<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985E</u>
\$ 58	\$ 122	\$ 227	\$ 353	\$ 546	\$ 725 30/

New methods of audience measurement are helping cable programmers identify audience size and demographics with greater certainty. Large cable operators are hiring sales forces and advertising "interconnects" are selling advertising time on several systems at once to new advertisers who otherwise would find cable an inefficient advertising purchase.

Employment Effects. Cable television is capital intensive rather than labor intensive, and once systems are built, the operations employ relatively few persons; on average only 10 persons per system. (The Bureau of Labor Statistics, incidentally, currently includes cable television in its broadcasting statistics.) Auxiliary businesses have been spawned, however, ranging from cable system brokers, engineers, consultants, and attorneys, to large trade associations, trade publications, and conventions. As cable television matures, new employment opportunities will be generated in program development, production and distribution and, increasingly, in cable television advertising sales. Anita Wallgren, Office of Policy Analysis and Development, NTIA (202) 377-1880.

#### M. Film and Video Production.

Introduction. The film and video supply industries are in a period of transition as traditional lines blur among firms supplying theatrical film, television programming, and home video, prerecorded entertainment.

The program supply business has three basic segments: (1) program producers -- traditionally television networks, independent producers, and movie studios, but now also including television group owners in ad hoc consortiums, advertisers and ad agencies, television syndicators, and cable satellite networks; (2) distributors -- often wholly-owned subsidiaries of production companies, which sell product to movie theaters, home video retailers, cable and broadcast networks, and independent syndicators -- which sell limited exhibition

---

29/ "Cablecasting," Broadcasting, Mar. 11, 1985, p. 20.

30/ 1985 estimated by Cable Television Advertising Bureau. 1980-84 data from Paul Kagan Associates, Inc.



rights to broadcast stations, cable networks, and other outlets; and (3) exhibitors -- the network-affiliated and independent stations, theaters, and cable systems.

The ownership of the bundle of rights in each video or film product is usually held by the producer, or is broken up into contractually agreed upon pieces between the producer and distributor. Film and video products are then licensed, or rented, for various uses.

Theatrical motion pictures have been produced and distributed for many years by seven or eight major studios headquartered in Hollywood. 1/ Several dozen independent companies also produce films, and about ten of these have established consistent enough records of success to develop their own distribution subsidiaries. The independents generally rely on the major studios for international distribution and may look to the majors for some financing. Joint ventures are increasingly employed for production and distribution of video product. The studios are barred, however, by antitrust consent decrees from owning theaters. 2/

Television programming is not created and distributed in one predictable pattern. In general, the Hollywood movie studios have become essential in the supply of network television programming, either by creating programs themselves or through joint ventures with independent producers (often individuals or small companies with limited network television experience). Each network negotiates a license fee with the distributor and obtains the rights to exhibit the show a specific number of times (original and repeats), in certain dayparts, for a certain period of time. Typically, a prime time network license agreement grants a network exhibition rights for 22 episodes of a new series, to be aired twice over the course of one calendar year between the hours of 8 and 11 p.m.

Not all television programs are produced for the networks. The demand for programming by nonaffiliated (independent) stations to fill their entire broadcast day and by network affiliates for broadcast during non-network hours is met by the syndication market. Two types of syndicated programs have evolved. The most successful shows are re-releases of series originally aired on the networks, called "off-network syndication." Other shows are initially produced for syndication and are not intended to be aired by the networks; this market is called "first-run syndication."

Syndication requires that the supplier/syndicator enter into license agreements with stations in several individual markets before a specific show will be exhibited to a large audience. National advertisers generally require an audience base of 70 percent of total U.S. households; because the syndicator

---

1/ In 1985, the members of the Motion Picture Association of America, Inc., were Columbia Pictures, Embassy Communications, Walt Disney Productions, MGM/UA Entertainment Co., Orion Pictures Company, Paramount Pictures Corporation, Twentieth Century Fox Film Corporation, Universal Studios, Inc., and Warner Brothers, Inc.

2/ United States v. Paramount Pictures, Inc., 334 U.S. 131 (1948).

needs to assemble a group of stations from the approximately 200 U.S. markets, an effort will be made to sell, or "clear," the show in the largest markets first, to cover the most audience with minimum syndicator effort. The FCC adopted rules in the 1970s prohibiting the networks from holding off-network syndication rights or other financial interests in programming. 3/

In the relatively new home video business, cassette manufacturers and retail outlets have so far sought motion picture releases from the studio distributors. 4/ There is some indication that certain television series might be popular in cassette form, and some made-for-home-video cassettes have been among the most popular. For example, Jane Fonda's Exercise Workout has been among the best selling cassettes for several years.

The majority of video and film product is supplied by domestic entertainment companies; other important sources of programming include local broadcast stations, sports teams, and foreign producers. Advertising agencies and other kinds of firms are also entering the film and video supply market. It is clearly an area marked by change and uncertainty.

Current Status. The motion picture production and exhibition industries had record revenues in 1984. Box office receipts for the first six months of 1984 were a record \$2.8 billion and the total for the year was projected at \$4.0 billion. 5/ There were 14 major distributors of theatrical features with 185 films scheduled for release in 1985. 6/ Eighty-four independent distributors were planning 284 features, many of them by foreign producers, for release in 1985 in the United States. In 1983, there were 19,000 screens throughout the country, up from 15,000 in 1975. 7/ The average price of admission was \$3.15 in 1983, up from \$2.94 in 1982, \$2.78 in 1981, and \$2.69 in 1980. 8/

Revenues from sale of syndicated television programming were estimated at over \$1 billion in 1985, compared to \$242 million in 1975. 9/ This estimate was

---

3/ 47 C.F.R. 73.658(j) (1984).

4/ In 1980, 20th Century-Fox acquired home video rights for 250 United Artist movies and 88 ABC motion pictures. CBS entered a joint venture with MGM to market videocassette and videodisc versions of the MGM titles, and MCA began a mail-order distribution business of its own theatrical titles as well as parts of the Warner, Walt Disney, and Paramount film libraries. "Video Fever," Forbes, September 1, 1980, p. 35.

5/ 1985 U.S. Industrial Outlook, p. 58-1.

6/ "1985 Films Released in U.S. by Company," Variety, March 6, 1985, p. 188.

7/ 1985 Statistical Abstract, Table 383, p. 227.

8/ Ibid.

9/ "Hot Independent TV Stations," The New York Times, June 25, 1985, p. D-1.

slightly down from actual program expenditures in 1984 of \$1.2 billion, in part because independent stations had reduced programming budgets from \$3.5 million in 1984 to about \$3.0 million. Affiliates, however, increased their program budgets from about \$900,000 in 1984 to about \$950,000 in 1985. 10/

There were at least 22,000,000 videocassette recorders in use in 23 percent of U.S. homes and penetration was estimated to increase by at least 7 percent in 1985. 11/ From its introduction within the last ten years, the growth in VCR usage has been most dramatic in the last five years. In contrast, with the announced exit of RCA from production of videodisc players, there remain only two manufacturers of videodisc players, and sales decreased from 307,000 in 1983 to 200,000 in 1984. 12/

Total revenues from sales and rentals of prerecorded videocassettes were estimated to reach \$3.3 billion in 1985, a 39- percent increase over 1984. 13/ Sales were expected to increase 96 percent over 1984, reaching 26,000,000 units valued at \$931,245,000; rentals of videocassettes were expected to increase by 50 percent over 1984 to reach 587,000,000 transactions generating \$2.35 billion in industry wide revenues. 14/

Competitive History. The popularity of moviegoing peaked in 1948, when movie theater attendance topped 3.5 billion paid admissions for the year. 15/ For decades leading up to that time, the major studios held tight control over every aspect of filmmaking and distribution. The Department of Justice brought a major antitrust suit against five studios which also operated theaters. In 1946, the parties entered into consent decrees with the Government prohibiting the studios from engaging in several exhibition practices: fixing admission prices, maintaining anticompetitive clearance systems, franchising, making master agreements, and conditional block booking. After further proceedings, the U.S. Supreme Court affirmed the Department of Justice position when it overturned a lower court holding and required the studios to divest their theater circuits. 16/

The film production, distribution, and exhibition industries became less concentrated after the Paramount decrees; about the same time, the advent of television drastically eroded moviegoing audiences. By 1967, box office receipts hit their all time low, less than \$1 billion on 553 million paid

---

10/ "Syndication a \$1.2 Billion Nut in '84: Programmers' Survey," Television/Radio Age, January 7, 1985, p. 179-180.

11/ Electronic Industries Association.

12/ Electronic Industries Association.

13/ Fairfield Group study done for National Video, Inc., reported in Variety, July 10, 1985, p. 99.

14/ Ibid.

15/ See Conant, The Paramount Decrees Reconsidered, 44 Law and Contemp. Prob. 79 (1981).

16/ United States v. Paramount Pictures, 334 U.S. 131, 161-66 (1948).

admissions. 17/ Although the development of television seriously wounded the theatrical film business, television has created important markets for theatrical films. In addition, the studios began producing television programs, a multi-billion dollar business.

In 1943, the U.S. Supreme Court held that the FCC had power to make rules denying licenses to those who engaged in certain network practices. 18/ The courts and the FCC since then have attempted to address concerns that the networks exert control over television programming.

The public has benefited from network development by their delivery of many hours of entertainment and news programming. Many stations would otherwise be unable to afford the high costs of programming. Each television network today spends about \$250 million on its news operation and about \$1 billion for entertainment programming. 19/

The Commission found early on that the radio networks attempted to lock affiliates into network programming schedules, preventing them from making independent programming selections. 20/ The FCC engaged in studies of network television in the 1950s (the Barrow Report) 21/ and again in the 1970s (the Network Inquiry). 22/ Though it has been difficult for the FCC to determine how to regulate the business practices of the networks in their relationships with affiliates and program suppliers, it has adopted several regulations governing network/affiliate relationships. 23/

The rules regulating television network practices include: a two-year limit on the term of an affiliation agreement; prohibition of exclusive affiliation agreements; prohibition of territorial exclusivity; prohibition of a network obtaining options to program enumerated portions of affiliates' time; a

---

17/ Pearce, Telecommunications Information Industry at p. 114, cited in Telecommunications in Transition, U.S. Congress, House Committee on Energy and Commerce, 1981, p. 281. Motion picture attendance has since rebounded to over \$3.7 billion in gross receipts on over 1 billion paid admissions for 1983. 1985 Statistical Abstract, Table 383, p. 227.

18/ National Broadcasting Co. v. United States, 319 U.S. 190 (1943).

19/ "Networks Pondering Budget Cuts," The New York Times, August 12, 1985, p. C-15.

20/ National Broadcasting Co. v. United States, supra, at 199, 203, 205-06.

21/ Network Broadcasting, Report of the House Committee on Interstate and Foreign Commerce, 85th Congress, 2d Session (1958).

22/ Commercial TV Network Practices, Notice of Inquiry, 62 F.C.C. 2d 549 (1977). The Final Report of the Network Inquiry Special Staff was consolidated in two volumes, hereinafter referred to as "Network Inquiry, vol. \_\_\_."

23/ For a concise but complete explanation of each of these, see FCC Network Inquiry, supra, vol. I, pp. 443-465.

requirement that an affiliate must have a right to reject carriage of network programs; and barring the networks from control of station rates for non-network time. In addition, though television networks were not precluded from station ownership, limits were imposed on them. Pursuant to one of the recommendations of the Barrow report, networks were also prohibited from representing their affiliates for sale of spot advertisements.

In the early days of television, most programs were financed and produced by local stations and advertising sponsors. By the 1960s, however, program supply shifted to the major studios. The quiz-show scandals of the late Fifties were given as a reason for the networks assuming greater control of programming. Advertisers also found production costs to be too high, and determined that selective purchasing of television advertising time in many different programs was a more efficient way to reach targeted viewers. The networks played increasingly important roles in program financing, development, and distribution through the 1960s and 1970s.

In 1970, the FCC adopted three rules specifically aimed at curbing network control over program acquisition, with the intent to stimulate new production sources. First, the primetime access rule (PTAR) limits affiliated stations to airing three hours of network programs during the primetime hours of 7-11 p.m. The FCC also prohibited the networks from entering the domestic syndication market for any program, or from entering foreign syndication for programs produced by non-network suppliers, and, finally, prohibited the networks from holding other financial interests in program produced by non-network sources.

Several of the Radio Chain Broadcasting Rules were repealed by the FCC in 1977 because of changed circumstances in the radio industry. 24/ In a related policy statement, the FCC reiterated its 1940 view that "licensees have an affirmative, nondelegable duty to choose independently all programming they broadcast." 25/

In 1974, the Department of Justice initiated antitrust actions against each of the networks for alleged anticompetitive practices in the program supply market, which resulted in three consent decrees. 26/ Among the terms of the consent decrees, limits were set on the amount of programming each network may produce itself, the network's ability to acquire financial interests in revenues from uses other than network exhibition, participation in syndication, and the term of years for which a network may hold an option to renew a show.

The rules governing network-supplier practices have been controversial. The consent decrees will expire in 1990; an effort by the FCC to modify or repeal the syndication and financial interest rules has been put off indefinitely; and

---

24/ Report, Statement of Policy, and Order, 63 F.C.C. 2d 674 (1977).

25/ 63 F.C.C. 2d 674, 690 (1977).

26/ United States v. Columbia Broadcasting System, Civil Case No. 74-3599-RJK (C.D. Cal., December 10, 1982); United States v. American Broadcasting Companies, Civil Case No. 74-3600-RJK (C.D. Cal., December 10, 1982); United States v. National Broadcasting Co., 449 F. Supp. 1127 (C.D. Cal. 1978), aff'd mem., No. 77-3381 (9th Cir., April 12, 1978), cert. denied sub nom. CBS v. U.S. District Court for Central Division of Calif., 48 U.S.L.W. 3186 (1979).

there appears no movement towards reexamination of the primetime access rule. The rules governing network-affiliate practices have not been modified. A special limitation on network ownership of stations was discussed but was not adopted in the new 12-12-12 ownership rule, effective in April 1985, so that an entity, including a network may control 12 AM, 12 FM, and 12 television stations, so long as no more than 25 percent of the total U.S. audience is reached by the television broadcast signals. 27/

In 1980, four of the major studios established a joint venture with Getty Oil to launch a satellite delivered pay cable network. The service, called Premiere, was to compete with HBO and showtime, but the Department of Justice blocked its development as anticompetitive. The U.S. District Court enjoined formation of Premiere as it was structured, and the venture was dissolved. 28/

Market Evolution. New modes of exhibition, increasing production and distribution costs in traditional lines of business, changes in technology, and a regulatory environment which is more favorable for vertical integration are some of the challenges and opportunities facing program supply firms. The firms supplying film and video products are also attempting to create products suitable for multiple uses.

The increase in business activity and film and video product is attributable, at least in part, to the potential profits from "after market" uses. 29/ A program supplier can anticipate revenues from videocassettes, cable, and other uses, in addition to theatrical exhibition fees. Many entertainment companies today are vertically integrated, capable of theatrical production, home video production and distribution, television production and distribution, music recording, and sometimes, operation of the outlets as well (e.g., cable systems and television stations).

One company describes the typical range of possible uses for its theatrical and television product as follows:

Domestic Theatrical: Films generally are released next in the United States and Canada. The strategy of when and where a film opens is individually designed to maximize each film's theatrical rentals...and its ultimate earnings potential, since success in the theatrical marketplace strongly influences performance in subsequent markets.

International Theatrical: Films generally are released next in international theaters. Openings are staggered from country to country, taking into account each film and local market conditions. In certain cases a film may be re-released in the theatrical market, either domestically or worldwide.

---

27/ Report and Order in Gen. Docket No. 83-1009, FCC 84-350, adopted July 26, 1984, 56 R.R.2d 859 (1984).

28/ United States v. Columbia Pictures, 507 F. Supp. 412 (S.D.N.Y).

29/ "The Relationship of Exports in Selected U.S. Service Industries to U.S. Merchandise Exports," U.S. International Trade Commission, Publication No. 1290, September 1982, p. 321.

Worldwide Home Video: After theatrical release in a given country, a film usually is released for home entertainment on videocassette and videodisc.

Worldwide Pay Television: Another home entertainment market is pay television, an important market in the United States and an emerging one internationally. Films are licensed to pay television services and distributed to homes via cable or over-the-air transmission.

Domestic Television: Most films are licensed to television networks for a specific number of airings over a certain number of years. In the syndication market, films are licensed to independent and network-affiliated television stations. A film may return to pay television after appearing on a network or in syndication.

International Television: In the international marketplace, films are licensed to broadcast television following theatrical, home video, and, where available, pay television distribution. Films generally are licensed territory by territory for a specific number of airings over a given time period. 30/

Film and video production is becoming increasingly decentralized. Most, if not all, states have active film and video commissions which have had success in enticing major studios and independent producers to shoot projects on location in their states. For example, production of films, videotapes, and commercials generated \$27,500,000 statewide revenues in Nevada during fiscal year 1985, up from \$13,500,000 in fiscal 1984. 31/ New York now rivals Hollywood as a production center.

The studios and networks are trying hard to control rising production and promotion costs. The average U.S. film production cost in 1981 was \$9.8 million, 75 percent higher than the average cost in 1978 or \$5.6 million. 32/ One industry forecast for 1985 noted that directors, writers, and actors are commanding much higher prices. Exhibitors, as well, are currently able to make more attractive deals with the studios because of the large number of theatrical releases available. As a result, the studios will retain about 38 percent of their box office receipts, in comparison to 44 percent three years ago. 33/

---

30/ 1984 Annual Report of the Coca-Cola Company, p. 30. Coca-Cola's Entertainment Business Sector includes Columbia Pictures, Columbia Pictures Television Group, and a joint venture participation in Tri-Star Pictures.

31/ "Nevada Film Production Doubles, But Lack of Soundstage Hurts," Variety, July 31, 1985, p. 23.

32/ "The Relationship of Exports in Selected U.S. Service Industries to U.S. Merchandise Exports," U.S. International Trade Commission, Publication No. 1290, September 1982, p. 322.

33/ "Unlike TV, the Film Biz Has Few Coming Attractions," Business Week, March 22, 1985, p. 256.

The large overhead tied up in housing a major studio may in the future constitute a separate profit center for some studios. 34/ The three major television networks are also trying to control costs. Total network advertising revenue for 1985 was estimated at a 10 percent increase over 1984, but is now expected to grow at 7 percent. 35/

New forms of distribution made possible by applications of technology will put pressure on existing industry relationships. For example, pay per view (PPV) selections offered by cable systems (and new distribution services like MMDS and DBS) are predicted to grow very rapidly during the next ten years. According to a new report by A.D. Little, PPV revenue will go from \$36 million in 1984 to \$1.1 billion in 1990. 36/

Certain changes, including the rise of cable systems, distribution by satellite, the growth of group station ownership, improvement of UHF reception, increasing numbers of unaffiliated, independent stations, and other developments have caused many to predict radical changes in television production and distribution will occur in the next decade.

Substantial growth in the use of VCRs promises to alter the entertainment program industries. Early opinions ranged from a belief that television and moviegoing would be replaced by home viewing on VCRs to a belief that there would be no impact on television viewing and moviegoing habits. Under current copyright law, the studios make a profit on the first sale of recorded videocassettes, retailers keep the fees from rentals. Congress has taken up modification but of the first-sale doctrine, but has left it intact so far. During Congressional hearings, one studio representative said that program producers would have an incentive to start producing a line of low-priced videocassette programming, if the first-sale doctrine were modified. 37/

---

34/ For example, in the next three years, Paramount will invest \$80,000,000 to upgrade its facilities, but has already begun to see increased revenues: videotape operations are expected to bill \$20,000,000 up from \$500,000 three years ago; the property department should produce a \$300,000 profit, compared to prior "good years" of \$50,000; and the grip department may show a profit of \$100,000 up from zero. "Par's Studio Group Sees Income Surge Following Upgrade," Variety, July 9, 1985, p. 3.

35/ Nevertheless, total network revenues are estimated to reach a record \$7 billion in 1985. "Networks Pondering Budget Cuts," The New York Times, August 12, 1985, p. C-15.

36/ Broadcasting, June 10, 1985, p. 32.

37/ Testimony of Alan J. Hirschfield, President of 20th Century-Fox Film Corp., on behalf of the Motion Picture Association of America, Inc., Hearings on H.R. 1027, HR. 1029, and S. 32, Audio and Video First Sale Doctrine, before the Subcommittee on Courts, Civil Liberties, and the Administration of Justice, U.S. House of Representatives, October 27, 1983, 98th Cong., 2d Sess., p. 189.



On the other hand, supporters of maintaining the first sale doctrine point out that the studios have not demonstrated harm due to rental of videocassettes. One Congressional witness testified that over 10,000 retailers bought \$350 million of prerecorded cassettes in 1982, and that total revenues from sale of videocassettes were estimated for 1984 at \$1.3 billion. 38/

Advertisers are reemerging as program suppliers. In a particular kind of syndication transaction, the program supplier "barter" a program to a station, providing the show for a reduced price, but holding back the right to sell advertising time in an agreed number of minutes.

One large advertiser, the Procter & Gamble Company, acquired U.S. syndication rights for the Time-Life film library, including 49 theatricals and 144 television movies, paying about \$50,000,000. Interestingly, Home Box Office, a pay cable network, owns the film library, and retained a right to exhibit some of the films on HBO within a window of time before over-the-air exhibition. 39/

The dominant position of the major studios in supplying television series is eroding. In 1980, independent television producers provided 25 hours of primetime programming compared to the major studios' combined 19 1/2 hours; in 1981, independent producers provided 28 hours of primetime shows, the major studios totalled 20 hours; and in 1982, independent television producers provided 29 1/2 hours of network primetime programming, compared to the studios' 18 hours total. 40/

Buyers and sellers of film and video product are faced with new opportunities for growth; simultaneously, they face increased competition in their traditional lines of business. A new video marketplace is emerging as old labels and predictable relationships fall away. These business changes are occurring in an environment in which consumer choices and changing lifestyles are putting pressures on program suppliers and underwriters to respond quickly and effectively. The industry is facing a period of experimentation in which many new suppliers may introduce new products and marketing strategies. Anita Wallgren, Office of Policy Analysis and Development, NTIA (202) 377-1880.

N. Electronic Banking.

Introduction Data processing and communications technologies have changed the basic nature of the financial services marketplace, dramatically altering what banking services are provided, by whom and how, and how those services are priced

---

38/ Testimony of Jack Wayman, Senior Vice President, Consumer Electronics Group, Electronic Industries Association, and Chairman, Home Recording Rights Coalition, Hearings on H.R. 1029, before the U.S. House of Representatives Subcommittee on Courts, Civil Liberties and the Administration of Justice, 98th Cong. 2d Session, p. 230.

39/ "P & G Pays Heap Big \$50-Mil for Time-Life Syndie Pack," Variety, May 8, 1985, p. 130.

40/ "Indies Increase Production Lead for Network TV," Variety, April 14, 1982.

and used as well. The electronic banking industry has developed based upon, and in turn has provided a spur to, the development of advanced data communications technologies.

To meet the varied needs of its business and individual customers, financial institutions in the United States have put to use a wide variety of communications equipment and technologies acquired under diverse ownership, lease, tariff, and other arrangements. Financial institutions today use and sometimes own satellite transponders and earth stations, private microwave and fiber optic facilities, and sophisticated computerized switches. They may link their branches within a small town through dial-up access to the public-switched network, or they may have established national and international systems through dedicated packet-switched networks on private leased-lines or their own facilities. Cost, control, speed, reliability, and security have all been necessary criteria for the development of these networks.

Development of electronic banking alternatives based upon sophisticated communications technologies has helped control the cost of banking and has enabled companies and individuals to obtain the most modern financial services wherever they locate their offices or homes. The affordability and availability of data processing and communications technologies has also reduced entry barriers to the financial services market and allowed smaller institutions to offer a broad range of services in many markets, and thus "stay in the game" with much larger competitors. It has reduced the costs of processing financial transactions and provided tools to fight fraud.

This increased competition among providers of financial services has given American customers choices in price and service they could not otherwise have. Consumers can now have access to their funds anywhere -- e.g., at shops, restaurants, and grocery stores, not just at banks -- worldwide and at any time, day or night. Costs to consumers -- not just to financial institutions and merchants -- of paying bills have been reduced. And, consumers are less prone to face the lack of acceptance of their checks or credit cards now that their access to funds can be verified electronically.

This array of benefits has not come without concurrent costs. The dramatic changes highlighted above have helped to undercut traditional regulatory structures in the financial services market, a process of change still not completed. Issues such as whether to allow more interstate competition and the extent of state regulatory authority, familiar in the telecommunications context, are very much alive in the financial services industry as well. Questions such as the uneven application of regulation and the fact that some participants in markets are strictly regulated while others are not regulated at all -- familiar to communications policymakers -- are debated in the financial service sector. The growth of electronic banking and remote access to bank accounts and financial data has also raised concerns with respect to safety, security, and personal privacy. Indeed, some of the same communications and data processing technologies that help bank and merchants fight credit card fraud, for example, also present new opportunities for crime and abuse.

On balance, consumers and businesses have clearly spoken in the marketplace and electronic banking will remain an integral part of daily life. Genies, in short, do not go back into bottles.

Current Status Report Even a cursory look at the electronic banking marketplace produces numbers of staggering proportions. By 1980, approximately \$140 trillion was changing hands annually in the U.S. economy, and \$6 out of every \$7 of this total moved electronically. 1/ Traditional paper-based payments methods too have become dependent on modern data processing and communications technologies to cope with the 37 billion checks, 3.5 billion credit drafts, and 30 billion shares of securities traded which must be processed in the United States each year. 2/ In 1980, the retail financial services industry contributed \$100.04 billion, or 5 percent of the U.S. national income. 3/ Nine thousand financial institutions in the United States are members of 175 computerized payments systems. 4/ The Society for Worldwide Interbank Financial Telecommunications (SWIFT) electronically links more than 1500 banks in over 50 countries, carrying over 400,000 funds transfer messages a day. 5/ Of the estimated 45,000 automated teller machines in use in the United States approximately half are linked to one or more than 200 regional and seven national shared networks. 6/

Despite such impressive statistics and the dependence of modern banking on communications systems, the potential for applying communications technologies to financial transactions has only begun to be tapped. Only 4 percent of all automated teller machine transactions transfer funds from one account to another. 7/ Most thus still are used today only to make traditional payment

---

1/ Association of Reserve City Bankers, Report on the Payments System (1982) at 11.

2/ U.S. Congress, Office of Technology Assessment, Effects of Information Technology on Financial Services Systems, Sept. 1984 (OTA Report) at 19. The Association Reserve City Bankers summarized payment systems activity as of 1980 as:

Means of Payment	Amount (Billions)	Transactions (Millions)	Average Transaction
Fed Wire	\$80,000	43	\$1,800,000
CHIPS	37,000	13	2,800,000
Checks	19,000	34,000	570
ACH	164	239	686
Bank Cards	49	1,300	38

Report on the Payments System (1982) at 12.

3/ OTA Report at 97. For purposes of their report, the Office of Technology Assessment used a definition of the financial services industry which, while excluding real estate, nonetheless involved more than 90,000 business entities. Included were 15,000 banks, 4,000 savings and loans, 1,000 mutual savings banks, and 22,000 credit unions, as well as pension funds, insurance companies, insurance brokerage agencies, and other.

4/ EFTS Industry Report, Mar. 1985 at 9.

5/ Euromoney, Jan. 1985 at 56.

6/ 1985 U.S. Industrial Outlook at 59-4.

7/ Journal of Bank Research, vol. 15, no. 4, Winter 1985 at 210.

method -- cash -- more convenient, and not to their full potential. Despite a base of 5 million home computers installed by 1983, and an estimated 11 million by 1988, 8/ only 44,000 Americans now pay bills, transfer funds, check balances, and conduct banking over computer terminals linked to their bank. 9/ Many apparently sophisticated telephone bill-paying systems, where consumers use push-button telephones to "talk" to a bank's computer, still use this electronically-gathered information merely to generate paper checks which are mailed to the merchants involved. The spread of point-of-sale terminals with dedicated or dial-up access to switches and remote data bases is only beginning to provide on-line, on-the-spot credit and check verification, reducing fraud and losses, and providing data capture, and eventually the direct transfer of funds to merchants. 10/ Gas stations combining electronic pumps on-line to company or financial institution computers with debit or credit cards provide just one such example beginning to appear in the marketplace. 11/ Some idea of the potential communications traffic generated by applying today's technologies to a variety of retail transactions is shown by the figures below:

	<u>Total Transactions</u>	<u>Transactions Susceptible To Point-of Sale Operations</u>
Food and liquor stores (\$110 billion sales per year with average of \$5-\$6/transaction)	20 billion	6 billion
Gasoline (60 transactions per year per car)	5 billion	5 billion
Retail stores (Natl. Retail Merchants Assoc. members)	27 billion	5 billion
Miscellaneous (non-NMRA retail outlets, travel and recreation, rentals)	57 billion	17 billion

National Science Foundation, The Consequences of Electronic Funds Transfer (1975) at 70.

8/ United States Banker, Feb. 1985 at 37.

9/ American Banker, Jan. 28, 1985 at 14. Of those 44,000 customers, 84 percent are signed up with only two banks: Chemical Bank and Bank of America.

10/ Penney and Baker identified a series of technological, marketing and legal barriers in 1980 which retarded the development of point-of-sale systems. The Law of Electronic Fund Transfer Systems at 7-16.

11/ Mobil Oil Co., for example, has 2,400 point-of-sale terminals electronically linked to its data processing center. This assures Mobil of "good funds," eliminates costly paperwork, and provides receipt of payment immediately, compared to the general lag time for credit card sales drafts of 10 days. OTA Report at 124.

History Electronic banking had its genesis in a series of developments in the 1950s and 1960s. In the 1950s, banks shifted their focus from big business customers to also pursuing a retail banking market targeted at small business and individual customers. The travel and entertainment card and bank credit card business took off as well. To deal with the deluge of transactions in succeeding years, banks turned to techniques such as MICR (Magnetic Ink Character Recognition), encoding of checks to allow some automated processing.

Banks increasingly used computers to cope with the burden of paperwork. But this also allowed them to develop new uses for the data processing capabilities they were installing, including new ways to conduct and process financial transactions faster and with less paper than ever before. We then saw the creation of automated clearing houses and communications networks interconnecting them and providing the wire transfer of funds, direct deposit of social security and payroll, and the spread of automated teller machines. 12/

Conclusion. The continued rapid expansion of electronic banking and related activities has major implications for the telecommunications industry in general. Such expansion represents substantial new demand, particularly for local and long-distance data communications services, as noted in other sections of this report.

Reliance on competition and less regulated or unregulated marketplace forces has contributed to growth of new electronic financial services and improved efficiency in this key sector. It has tended to ensure that users have available the service and equipment options they need to piece together and operate electronic banking systems. Supply and demand, in short, have tended to be much more correlated than any Government planning or regulatory regime might have closely achieved. Users have also had the opportunity to exploit and capture the efficiencies inherent in new computer and communications technologies to a greater degree than in some other countries where the opportunity to benefit from high technology developments is dependent on the willingness and efficiency of Government-controlled structures.

### Part III. Conclusion.

The president of Japan's Nippon Telephone & Telegraph Company, recently privatised pursuant to carefully crafted and in many respects, commendably progressive legislation, has observed that the world should experience, in the next two decades, changes as a consequence of advances in telecommunications which are comparable to those accomplished when we learned that electricity could be used to provide more than simply illumination. And, many of those changes are already apparent, especially in the United States, Japan, and Britain, where public policymakers actively and affirmatively have sought to facilitate effective competition and marketplace developments.

For those who believe that telecommunications will truly serve as the fundamental infrastructure of tomorrow's forecast "Information Age," procompetitive, marketplace policies should have a special attraction. Such policies in most instances tend to ensure that precisely that mix of quality, choice, and capabilities will be available, and at prices users are willing and

---

12/ For a detailed history of the development of electronic banking, see, e.g., Penney and Baker, The Law of Electronic Fund Transfer Systems, Chapter 1 (1980).

able to pay. Certainly the American experience, not only in common carrier but in other parts of the telecommunications field generally, demonstrates that competition will tend to function as a far more efficient and responsive "management tool" than traditional regulation or reliance upon a handful of pervasively regulated firms. For no single firm, no matter how competent or outstandingly managed, after all, can reasonably be expected to anticipate, much less satisfy all user needs and desires in a technological environment which facilitates pluralism and diversity. And, regulation, even at its best, may be able only to prevent abuses, not command industry success.

In the United States, for more than two decades, there has been evident strong, bipartisan support for the fundamental policy approach that is reflected throughout Federal telecommunications actions, namely, that less regulation and more competition is most likely to further the national interest. There may be disagreement at the margins; regulators, elected and appointed politicians, industry spokesmen, and consumer advocates often differ legitimately on the mechanics of deregulation, and how rapidly we should continue to move to a full marketplace economy in telecommunications. But there is not in this country the outright, strident political opposition to competition comparable to that which is unfortunately present in too many countries abroad. Our national debate, in short, concerns not whether there should be more reliance on the unregulated marketplace, but rather how most fairly and efficiently that greater reliance should be achieved.

While the American progress toward accomplishing a more competitive and diverse telecommunications industry has occasioned some transitory uncertainty -- perhaps, as one Government official recently quipped, because as the hero in Raiders of the Lost Ark commented, "We're making this up as we go along" -- one central and unarguable reality prevails: American business, industry, Government, and consumers really do enjoy broader choice and more service options in virtually every communications sector than in any other place in the world.

This breadth and depth of user choice, moreover, will almost certainly grow in years to come. For U.S. business and industry is seeking to capitalize on the efficiencies inherent in today's communications and computer technologies. Equally important, demographics and especially the advent of a new, computer-literate generation of producers and workers, is driving and facilitating change.

There remain significant difficulties and issues yet to be resolved. The comprehensive and detailed report on U.S. domestic telecommunications policy which NTIA released in July 1985 reviews the principal topics. These include allowing the American public to secure maximum possible competitive benefits from the AT&T antitrust restructuring by changing or eliminating artificial restrictions on the Bell companies, restrictions which many believe are inimical to 20 years of procompetitive, deregulatory Federal policy in this sector. Such changes are important intrinsically, since they could contribute to a more diverse and competitive telecommunications sector. But they are also highly desirable given the range of businesses and industries which are increasingly dependent on telecommunications, and to ensure continued strong public and political support for necessary deregulation in telecommunications as well as other sectors.

Implicit in Government's endorsement of the AT&T-initiated restructuring of the U.S. telephone industry was a promise to the American public that gains exceeding the costs of divestiture would result. Too many today, both here and abroad, question whether Government has yet fulfilled its part of the bargain. This perception, as discussed in the part of this report dealing with local telephone rates, for example, is sometimes wide of reality. Avoidable, adverse results in fact have been few. In certain instances, there have been some gains. But we clearly have not yet fully exploited all of the opportunities for expanded user service and broader, more competitive choice, which the divestiture could otherwise occasion.

In other parts of this overall industry, in broadcasting, cable television, and related sectors such as consumer electronics, procompetitive and deregulatory initiatives by the Reagan as well as Carter and Ford Administrations are today clearly benefiting the public. The Nixon Administration's progressive "open skies" policy regarding domestic satellite systems has also proven very successful in terms of advancing technology, fostering innovation, and thus yielding substantial public dividends. The success experienced in all these areas should encourage us to continue our deregulatory course. Less here has truly proven, from the public's standpoint, more.

This NTIA staff project has been underway for nearly a year and substantial effort has been devoted to the overall task. As Assistant Secretary Markey observes in his memorandum at the beginning of this staff report, not all of the reviews developed to date are as detailed, comprehensive, or insightful as, ideally might be the case. In fairness to the authors, this in part is a function of a lack of published data. It is also due to the significant difficulties which were encountered in trying to secure detailed information from the private sector. Not all of the companies, trade associations, and other organizations asked to assist in this project responded affirmatively, if at all.

NTIA, as the Executive branch agency principally responsible for the development and presentation of domestic and international telecommunications policy, will continue efforts effectively and persuasively to advocate procompetitive, deregulatory, marketplace-oriented changes. To accomplish such changes, which we believe are in the best interests of the United States, however, will require additional, active support on the part of all sectors of the telecommunications industry. Deregulation is not a process which can be readily achieved by relying solely on Government. Private enterprise has to be prepared to devote time, attention, and resources to this undertaking.

As we continue our efforts to perfect our analysis, we encourage all interested in providing support to do so. With the assistance which ought to be forthcoming, we should be able to increase the likelihood of forward progress. Kenneth Robinson, Office of the Assistant Secretary, NTIA (202) 377-1551.





**BIBLIOGRAPHIC DATA SHEET**

	1. PUBLICATION NO.  NTIA-SP 85-17	2. Gov't Accession No.	3. Recipient's Accession No.
4. TITLE AND SUBTITLE  NTIA COMPETITION BENEFITS REPORT		5. Publication Date November 1985	
7. AUTHOR(S) NTIA SPECIAL STUDY STAFF		6. Performing Organization Code	
8. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. DEPARTMENT OF COMMERCE NATIONAL TELECOMMUNICATIONS & INFORMATION ADMINISTRATION WASHINGTON, D.C.		9. Project/Task/Work Unit No.	
11. Sponsoring Organization Name and Address		10. Contract/Grant No.	
14. SUPPLEMENTARY NOTES		12. Type of Report and Period Covered	
15. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)  Provides an analysis of marketplace developments and procompetitive U.S. policies for the past 15 years, and undertakes a net assessment of the benefits and costs of competition in 14 separate telecommunications and related lines of commerce.		13.	
16. Key Words (Alphabetical order, separated by semicolons) competition policy; Federal Communications Commission actions; marketplace developments; telecommunications market costs and benefits.			
17. AVAILABILITY STATEMENT  <input checked="" type="checkbox"/> UNLIMITED.  <input type="checkbox"/> FOR OFFICIAL DISTRIBUTION.		18. Security Class. (This report)  Unclassified	20. Number of pages  121
		19. Security Class. (This page)	21. Price.







