Chapter 4

A CRITIQUE OF STRUCTURE REGULATION IN COMMON CARRIER TELECOMMUNICATIONS

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One of the distinctive features of the current debate over economic regulation is the increasing importance attached to market (industry) structure as a determinant of the need for public control.[1] There is a presumption against the imposition or retention of comprehensive price/earnings controls when barriers to entry are low and the number of buyers and sellers is high. Furthermore, the persistence of barriers to entry and high market concentration is no longer accepted as a necessary condition for continued economic regulation. Instead, questions are raised about whether structure can be changed by public policy to induce competition and improve performance. Such changes may range from the simple removal of legal barriers to entry to the massive restructuring required to establish the condi-

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tions necessary for the maintenance of viable competitive markets. The elements of structural intervention constitute what has come to be known as "structure regulation." Structure regulation has " . . . the intent of altering the economic structure and incentives on which all firms in an industry do business . . . it permits market forces, within the bounds set by regulators, to channel conduct into acceptable norms."[2]

This approach to industry structure differs significantly from that which prevails in the classic model of public utility regulation. In this model, the imposition of price/earnings controls on the firm becomes the focal point of attention, and structural intervention is employed to prevent practices that would subvert rate-base regulation. This is best illustrated by the Bonbright model of rate-base regulation/rate-of-return regulation, which emphasizes the establishment of cost-based rates for the public utility enterprise. Market structure issues arise primarily when the public utility forms a holding company or diversifies into nonregulated markets. According to Bonbright, holding companies are conducive to social waste and inefficiency, financial manipulation, secrecy, and exploitative profits that can be taken out through excessive service company fees. Furthermore, combination companies can be faulted because of the opportunities for cross-subsidization, while diversification into nonutility activities would be potentially damaging to the ratepayer because of adverse effects on the credit of the public utility.[3]

Telecommunications provides the best example of an effort to employ market structure as a variable to promote improved industry performance. In large part, this effort is associated with the decisions of the Federal Communications Commission since 1959, the actions of federal courts, and, more recently, the recommendations of the National Telecommunications and Information Administration and the position of the Department of Justice in the proposed modification of the 1956 AT&T Consent Decree. However, it would be a mistake to assume that market structure is a variable exclusively within the province of government. The importance of market structure in telecommunications has been recognized since 1879, and has been employed by both private industry and government to pursue often divergent objectives.

At the present time, market structure regulation takes on a special significance because of the highly dynamic changes taking place in

communications and the growing pressures to deregulate the markets that are perceived to be potentially competitive. This article will examine three areas: (1) the changing pattern of market structure regulation; (2) the strengths and weaknesses of a policy of employing market structure to induce change, particularly by removing barriers to entry and creating conditions conducive to the growth of competition; and (3) the interrelationship between price/earnings regulation and structure regulation in determining whether the two forms of regulation are complementary (implying that structural variables can be used to negate the shortcomings inherent in direct price/earnings controls) or whether they are substitutes (with price/earnings regulation largely the product of a commitment to natural monopoly, and structure regulation the product of a commitment to deregulation and competition).

THE DEVELOPMENT OF MARKET STRUCTURE POLICIES IN TELECOMMUNICATIONS

There is a long history of private and public use of structural variables in the telecommunications industry. Four distinct phases of structural policy emerge. These include a policy of maintaining market shares, the promotion of selective entry, the maintenance of monopoly and competition on a concurrent basis, and broadened entry into all interexchange markets.

Private Control of Market Structure to Maintain Market Shares

The oldest form of structural intervention focused on a policy of maintaining market shares through patents and private agreements. After Bell was granted a patent on the telephone in 1876, a period of rivalry existed between the infant Bell Company and Western Union during which the Bell Company, under the direction of Theodore Vail, competed aggressively with Western Union in the local telephone market. However, Bell and Western Union reached an agreement in 1879 whereby Western Union withdrew from telephone service for 17 years and sold its telephone networks in 55 cities to Bell; in return, the Bell Company agreed to stay out of the telegraph

business. Thus the first market structure policy involved a private division of markets on a voice/record basis.

As architect of this plan, Vail displayed a keen appreciation of the role that structural variables could play in maintaining a tight grip on the entire telephone industry. He moved aggressively to bring 600 patent infringement suits against potential entrants over the life of the original Bell patent. Furthermore, he strengthened his hold on the horizontal telephone market through a series of franchise-licensing arrangements, while he moved to purchase Western Electric, thereby achieving vertical integration into the equipment market. Vail also promoted the development of long-distance telephone service with the completion of the first long-distance line between New York and Boston in 1884. Throughout this period Vail's perception of an optimal industry structure was embodied in his expression, "One system, one policy, universal service."

When the basic Bell patents expired in 1893 and 1894 Bell's high profits served as a strong inducement for potential entrants. At the same time, new equipment suppliers emerged, including Kellogg in 1897, Automatic Electric in 1901, and Stromberg Carlson in 1902. By 1900, telephone competition at the exchange level was widespread and the independents controlled 38 percent of the phones installed in the United States. By 1907, their share had increased to 49 percent. However, Vail's market structure strategies were put to good use when he was called from retirement to again take command of the Bell System. He was able to exercise substantial market power by refusing to interconnect independents with the toll network, by aggressive horizontal mergers, by selective price reductions,[4] and by further research and patent acquisitions. By 1909, the market share of the independents began to decline and Bell's supremacy was reasserted. Vail had demonstrated that a firm can maximize market power by investing in barriers to entry and foreclosure strategies. At the same time, Bell, i.e. AT&T, terminated the earlier voice/record division of the communications industry by purchasing a controlling interest in the Western Union Company.

In response to pressure from the Wilson Administration, the Bell System agreed in 1913 to permit the independent telephone companies to interconnect with its toll network. It also agreed to dispose of its holdings in Western Union but, significantly, Vail divested only the public message telegraph service and retained the more lucrative private line telegraph service.

In 1920, patent control was again employed to influence industry structure, but this time the objective was to stabilize market shares in the face of a potentially disruptive new technology. General Electric/RCA and AT&T/Western Electric signed a cross-licensing arrangement dealing with the vacuum tube and radio communications. AT&T was given exclusive rights for radio telephones as part of the public telephone network, while GE received exclusive rights to develop radio telephones for the electric utility industry and communications among ships, planes, and cars. In 1921, the agreement was expanded to include Westinghouse. However, RCA soon claimed that AT&T was violating the patent exchange agreement, so a new agreement was negotiated in 1926. This provided that AT&T would abandon radio broadcasting and receiver sales to RCA, while RCA agreed to obtain program transmission service from AT&T, thereby eliminating the possibility that RCA would set up its own network. AT&T had foreclosed entry by GE, RCA, and Westinghouse, and once again had demonstrated its ability to maintain complete control of the telephone network.

This effort at market allocation was challenged by a government antitrust action in 1930 which resulted in an out-of-court settlement in 1932 that prevented the parties from enforcing the exclusive provisions of the cross-licensing arrangement. But the government's action had little practical effect since the markets had been stabilized and the new technology assimilated.[5]

Public Control of Market Structure to Maintain Market Shares

Public policy toward the structure of the telecommunications industry took shape with the divestiture of Western Union from the Bell System in 1913. From that time, government moved to foster the development of a separate public message telegraph network and a separate telephone network. This sustained the voice/record separation first instituted by private agreement; but the government's objective appears to have been to prevent domination by a single carrier of all forms of electronic communications. This policy was reinforced in the 1940s when Western Union and Postal Telegraph were merged in order to strengthen the weak financial position of the record carriers vis-à-vis AT&T. Subsequently, Western Union was divided along domestic and international lines by the creation

of Western Union International. The former was confined to the domestic telegraph market; the latter to overseas record markets (together with International Telephone & Telegraph and RCA).

In the FCC's 1964 *TAT-4* decision[6] the market shares policy was reaffirmed in overseas communications when AT&T was confined to voice service while the three international record carriers (IRCs) were given the market for record service. The development of satellite technology was similarly handled on a market shares basis in the FCC's 1966 *Authorized User* decision.[7] Comsat was prohibited from providing satellite services to the general public at the retail level and instead was confined to the wholesale function of providing satellite circuits to AT&T and to the IRCs who used them in conjunction with their cable circuits to provide voice and record services.

In 1970, the Commission imposed cross-ownership restrictions on telephone carriers, which prevented them from providing CATV except under special conditions such as service in rural markets.[8] But by this time, explicit market shares policies attracted less attention than efforts to promote competition in selected markets. After a long hiatus, a last effort to implement a market shares program was contained in the FCC's 1981 *Cellular Communications* decision, which allocated the radio frequency spectrum on a fifty-fifty basis between the wire-line carriers and new entrants.[9] Some might argue that this was no longer a traditional market shares approach, since such an allocation could be interpreted to ensure that new entrants would participate in the development of cellular radio communications. Nevertheless, there appear to be clear parallels with earlier market shares policies designed to prevent single-carrier domination.

Control of Market Structure to Encourage Selective Competition

A second phase in the development of market structure policy focused on the removal of legal barriers to entry into the private line and terminal equipment markets to stimulate broadened consumer choice and to create a greater incentive for innovation and efficiency. In the *Above 890* decision (1959),[10] the FCC encouraged new entry by private microwave systems into private line markets through the use of the radio frequency spectrum. This policy was

augmented in the *MCI* decision (1969)[11] when MCI was authorized to provide private line service as a specialized carrier between St. Louis and Chicago. In the *Carterfone* decision (1968),[12] the Commission opened the terminal equipment market to entry by allowing vendors not affiliated with the carriers to supply customers' needs. In these cases the Commission's objective appears to have been to relax barriers to entry on a selective basis in order to create new sources of supply and to offer the consumer a wider range of choice in terminal equipment. As a secondary consideration, attention seems to have been given to the incentive for efficiency associated with selective competitive pressures and, in the case of private line service, weight appears to have been placed on the fact that the new entrant was willing to provide a service for which the established carrier claimed that no market existed.

Control of Market Structure to Establish Monopolistic and Competitive Markets

A pro-competitive policy in the private line market was further emphasized in the *Specialized Carrier* decision (1971)[13] which, in effect, opened the private line market to competitive entry. In the *Domsat* case (1972),[14] the Commission opened domestic satellites to free entry and, in what some might view as a holdover from an earlier market shares policy, banned AT&T from using domestic satellites for private line service for a three-year period. The intent appears to have been to send potential entrants a signal that the private line market and domestic satellite technology would be open to competitive entry. What had begun on a firm-by-firm basis in the *MCI* case was now expanded to a general invitation to all prospective entrants in the specialized carrier field. At the same time, a line of demarcation had been drawn between monopolistic and competitive services.

Another line of demarcation was drawn in the *First Computer Inquiry* (1970)[15] between communications services that were to be regulated and computer services that were to be unregulated. However, the difficulties of administering this policy led to the *Second Computer Inquiry* decision's demarcation between basic and enhanced services; the former was to be provided under regulation and the lat-

ter was to be deregulated and provided by a separate subsidiary.[16] By means of this structural bifurcation of the firm, cross-subsidization between Message Toll Service (MTS)/Wide Area Telephone Service (WATS) on the one hand, and terminal equipment sales and enhanced services on the other, would be controlled until all interexchange markets became competitive.

The Department of Justice/AT&T *Modified Final Judgment* (1982)[17] ending the Department of Justice's antitrust case against AT&T and terminating the 1956 Consent Decree marks the most recent step in an effort to distinguish between monopoly and competitive markets. The Department of Justice's position is premised on the belief that the local exchange remains a natural monopoly, while interexchange communications is in the process of moving from the status of regulated monopoly to competition. The Court of Appeals of the District of Columbia apparently accepted much of this argument by noting that control of both the local exchange and the interexchange markets has permitted AT&T to constrain the development of competition in interexchange communications. If one accepts this basis for distinguishing between monopoly and competition, then it is entirely consistent to modify the corporate structure of the Bell System to achieve maximum separation of exchange and interexchange services. It is equally consistent that the local Bell Operating Companies (BOCs) be confined to local calls and exchange access, and that they be precluded from engaging in interexchange services, vertical integration, and enhanced services.

Taken together, the DoJ/AT&T modified final judgment and the decision in the *Second Computer Inquiry* (*Computer II*) represent the penultimate step in structure regulation designed to segregate monopoly and competitive markets. Price/earnings regulation would be retained over the local exchanges (or, more correctly, over the Local Access and Transport Areas [LATAs]) as redefined natural monopoly markets; transitional economic regulation would be retained over MTS, WATS, and similar offerings (with the BOCs legally foreclosed from providing interexchange service); and a whole new array of hardware, software, and enhanced service markets would be designated as competitive, pitting AT&T's separate subsidiary against a host of rivals. Only Judge Greene's willingness to permit the BOCs to compete in new customer premises equipment

sales and directory advertising disrupted the symmetry of this aggregate market-demarcation model.

Broadened Entry

The fourth phase in the development of market structure policy stems more from the courts than from the FCC. The FCC *Specialized Carrier* decision did not permit the specialized carriers to provide message toll telephone service. Indeed, when MCI began offering an MTS-equivalent service, Execunet, the Commission ordered MCI to stop. It argued that this service was beyond the scope of MCI's facilities authorization, which limited competitive entry to selected portions of the interexchange market. In *MCI Telecommunications Corp. v. FCC* (Execunet I, 1977),[18] the Court of Appeals held that the Commission could not exclude MCI and other competitors from the MTS market without determining that the public interest would be served by creating an AT&T monopoly in the interstate field. In *Execunet II*,[19] the Court of Appeals granted MCI an order directing compliance with its previous mandate. In effect, *Execunet I* and *II* moved to eradicate the distinction between monopoly MTS/WATS services and competitive private line services in the interexchange market. As a consequence, it is reasonable to say that free entry, in terms of the removal of legal barriers, existed in all major intercity markets.

A less conspicuous development was also taking place in the international field. Beginning in 1976, the FCC took steps to relax the market shares policy set forth in the *TAT-4* decision. In *Overseas Dataphone Service* (1976),[20] the Commission permitted AT&T to offer overseas dataphone service on a secondary basis. Bell's data service could now compete with the international record carriers (IRCs). In the *Gateways* decision (1979),[21] the IRCs were permitted to serve additional gateway cities, thereby broadening their market coverage. In the *Datel* decision (1979),[22] Western Union International (now owned by MCI) and the other IRCs could go into the international voice market on a secondary basis, with the service provided over IRC facilities. Finally, in December 1981, Section 222 of the Communications Act of 1934 was removed so that Western Union could enter the international communications markets.

The FCC had now broadened the scope of competitive entry in the international markets, and it remained only a matter of time before Comsat would be permitted to provide retail services.

Summary

In retrospect, attempts to control industry structure appear to have evolved through a series of phases beginning with private and public policies directed at maintaining market shares and terminating with broadened entry into all interexchange telecommunications markets. These policies do not always follow in a clear sequential pattern and, indeed, remnants of earlier policies still carry forward. Nevertheless, it is possible to discern a definite trend, beginning with corporate efforts to maintain market dominance and market shares, and followed by a conscious government policy of allocating markets between firms in order to assure a pluralistic structure of suppliers. The next phase consisted of regulatory efforts to promote selective entry into specific markets (such as private line and terminal equipment) which in turn gave rise to further efforts to establish general policies conducive to liberalized entry into those markets designated as competitive. Finally, the erosion of boundaries between services, perhaps caused as much by judicial intervention as by new technology, led to broadened entry across the board in interexchange communications.[23]

FACTORS SUPPORTING LIBERALIZED ENTRY AS A BASIS FOR STRUCTURE REGULATION

If structure regulation is to supplant price/earnings regulation as the principal method of public intervention in telecommunications, it must be successful in inducing competitive behavior, diminishing market power, and transforming industry structure. Achieving these objectives through structure regulation depends primarily on the effectiveness of liberalized entry in creating pervasive competitive markets. If entry falters, the gains of competition are apt to be illusory and the need for price/earnings regulation will continue. Conversely, if entry is successful, then a strong case can be made for placing greater reliance on structure regulation.

Entry has been encouraged to varying degrees by public policies that sought to employ structural variables to promote selective competition, to support the coexistence of monopoly and competition, and, finally, to broaden competition in all phases of interexchange communications. Similarly, the entry process has been (or will be) facilitated by the establishment of separate subsidiaries, the divestiture of the BOCs, regulatory efforts to establish nondiscriminatory access charges, and the FCC's reluctance to impose the full burden of regulation on new entrants as well as its willingness to redefine and narrow areas of direct regulatory intervention.

Three economic factors have also provided strong support for entry in telecommunications. These include rapid technological advance; high, sustained rates of market growth; and increasing doubts about the pervasiveness of economies of scale as a barrier to entry in common carrier communications.

There can be little doubt that new technology has had a major impact on entry conditions in telecommunications during the postwar period. Technological advance created new markets, new systems of supply, and dramatically lower costs for certain communications components and products. As a consequence, opportunities for entry increased significantly. Indeed, technological determinists have argued that the threat of entry-related displacement, bypass, and the burden of embedded plant have seriously diminished the market power of the dominant firm and the established carriers. As a result, they argue that AT&T has lost the ability to administer the rate of technological change, that monopolistic pricing has been seriously constrained by potential customer diversion, and that vertical integration is no longer an effective means of achieving market foreclosure or of earning excessive profits by overpricing transmission, switching, and terminal equipment. Furthermore, they argue that the pace of change is so rapid that comparisons between the size of the Bell System and its rivals are meaningless measures of market power and that the potential for entry or diversion has become a reality in every major telecommunications market.

A second factor conducive to entry has been the high, sustained rates of growth in the major telecommunications markets. Measured in terms of the average annual percentage rate of growth in revenues, the performance has been impressive. For the years between

1970 and 1979, message toll telephone service increased at an average annual rate of 12.9 percent, WATS at 23.7 percent, and private line services at 13.6 percent. Combined revenues for overseas communications services increased at an average annual percentage of 16.7 percent for the period from 1970 to 1980, with IRCs' revenues increasing at 10.8 percent while telephone revenues increased at 19.3 percent. Exchange telephone revenues increased at an average annual rate of 9.8 percent during the decade of the 1970s.[24] The rate of growth in terminal equipment markets (as measured by revenues) is somewhat more difficult to measure. However, a study by Dataquest, Inc., indicated that central office equipment would grow at an average annual rate of 10.5 percent from 1980 to 1985, PBXs at 25.6 percent, key telephones at 3.7 percent, microwave at 8.4 percent, and digital multiplex equipment at 27.1 percent.[25]

In terms of the average percentage increase in revenues as a measure of market growth, telecommunications easily outpaced the other major public utility industries during the decade of the 1970s. In fact, rising energy prices cut the rate of growth at peak demand in the electric utility industry by 50 percent. Other things being equal, the substantial rates of growth in telecommunications markets are clearly conducive to entry, increased productivity, and innovation.

A third factor conducive to entry was the growing doubt over the pervasiveness of economies of scale as a barrier to entry. Scale elasticity estimates of the telephone system by Mantell in 1974 ranged from 1.04 to 1.16. Stanford Research Institute reviews of the Mantell work increased the scale elasticity estimates slightly to 1.1 to 1.25, but the estimate was still far from intimidating. Studying Bell Canada, Dobell, Fuss, and Waverman found scale elasticity estimates of .85 to 1.11. On balance, such empirical studies revealed little or no substantial scale effects, and they provided encouragement that a "survivor test" might be the best basis for judging the presence or absence of scale economies.[26]

New technology and market growth could also be expected to have an influence on scale economies as a barrier to entry. To the extent that technology has reduced minimum efficient size (MES), and substantial rates of growth have shifted market demand to the right, the spread between MES and total market demand would increase. This spread, in turn, would create greater opportunities for entry into telecommunications markets.

ASSESSING A STRUCTURAL POLICY BASED ON LIBERALIZED ENTRY

Any attempt to evaluate the impact of a policy of liberalized entry will be handicapped by inadequate data, by the possible persistence of residual barriers to entry, and by the argument that the full effects of new technology and the DoJ/AT&T *Modified Final Judgment* have not yet been felt. Nevertheless, more than 14 years have elapsed since the landmark *Carterfone* and *MCI* decisions, and more than 23 years have elapsed since the *Above 890* case, so there is a basis for evaluation.

An assessment of entry can be made on five grounds: (1) changes in market shares (new entry should diminish the market shares of the established firms and thereby curb excessive profits); (2) changes in price-cost relationships as estimated by the Lerner Index; (3) the persistence of anti-competitive conduct on the part of the dominant firm; (4) the effect of entry on demand elasticity; and (5) the impact of entry on oligopoly behavior.

Changes in Market Shares

Empirical studies by William G. Shepherd indicate that changes in market shares can have a discernible impact on profits. The sequence is essentially as follows: new entry affects market shares and changes in market shares, in turn, have a direct effect on profits. Shepherd has set forth criteria for assessing the effectiveness of entry as a constraint on profits.[27] To be successful, entry must: (a) be substantial, depressing the market shares of the established firm in prime markets; (b) be rapid; (c) reduce the market share of the dominant firm to less than 50 percent in the long run; (d) assure that the decline in market share of the dominant firm is permanent; and (e) permit the new entrants to achieve sales levels equal to at least 25 percent of the market, thereby providing a basis for independent behavior.

Historical experience in telecommunications indicates that substantial entry and a major shift in market shares can depress the profits of the dominant firm. During the original patent monopoly, Bell's overall return on investment was estimated at 46 percent. By 1902, however, the independents had increased their share of the telephone market to 44 percent, and by 1907 to 49 percent. During

the years between 1900 and 1906, Bell's return on investment dropped to 8 percent as Bell reduced prices in response to competitive pressure.

The terminal equipment market is a prime example of a market transformed by new technology while at the same time opened to entry by the *Carterfone* decision in 1968.[28]

Market share data for terminal equipment show mixed results.[29] Sales of PBXs come closest to satisfying Shepherd's criteria. The share of the PBX market held by manufacturers affiliated with telephone companies dropped from 93 percent in 1968 to 56 percent in 1979, while new U. S. entrants increased their share from 0 percent in 1968 to 35 percent in 1979. For key telephones, entry has been virtually ineffective. The share of the market held by manufacturers affiliated with telephone companies dropped from 98.3 percent in 1968 to 89.4 percent in 1979, but no other source of supply accounts for more than 6 percent of the market. The same conditions apply to dial-in-hand set telephones, where the share of manufacturers affiliated with telephone companies dropped from 100 percent in 1968 to 96 percent in 1979. In contrast, there are terminal equipment markets where manufacturers affiliated with telephone companies had no sales in 1968 but have increased their proportion of the business significantly. For example, 100 percent of decorator phones came from imports in 1968, but by 1979 manufacturers affiliated with telephone companies accounted for 38 percent of the market, new U. S. entrants had 52 percent, and imports dropped to 6 percent. Similarly, automatic dialers were supplied by imports (33 percent) and new entrants (67 percent) in 1968, but by 1979 manufacturers affiliated with telephone companies had increased their share of the market from 0 percent in 1968 to 45 percent in 1979; imports had dropped to 27 percent and new entrants to 29 percent. No manufacturers affiliated with telephone companies were producing facsimile, automatic answering, or acoustic coupler equipment in 1979.

Selwyn has argued that annual sales data of the type just discussed fail to give adequate recognition to past sales, i.e., embedded or installed base units. Some insight into market shares in the installed base terminal equipment market has been provided by the Subcommittee on Telecommunications, Consumer Protection, and Finance of the Committee on Energy and Commerce (Wirth

Subcommittee). These data show that the Bell System's share of PBX equipment decreased from 77 percent in 1978 to 67 percent in 1982, while the interconnects' share increased from 11 percent to 22 percent. The share of the PBX market represented by the independents remained at between 11 percent and 12 percent. Bell's share of key systems decreased from 78 percent in 1978 to 71 percent in 1982, while the interconnects' share increased from 4 percent to 12 percent. Bell and the independents together still accounted for 78 percent of the PBX installed base and 88 percent of the key system installed base in 1982.[30]

The Wirth Subcommittee also received data, compiled by Arthur D. Little, which showed competitive penetration of the PBX markets for 15 major metropolitan areas. These data indicated considerable variation in market penetration for different metropolitan areas. The six markets with the largest competitive/interconnect shares (averaging 30 percent) had a large percentage of customers seeking to replace equipment within 18 months. Conversely, where Bell retained more than 85 percent of PBX sales, a smaller percentage of customers anticipated replacement within 18 months. In addition, the data indicate that the age of the installed base affects competitive entry. When Bell's share of the PBX market is high and the percentage of older generation PBX equipment is low, then opportunities for replacement and competitive entry are low.[31]

The Lerner Index of Market Power

As noted earlier, Selwyn argues that current market shares or sales for different types of terminal equipment give inadequate weight to installed or embedded customer premises equipment (CPE). Furthermore, he claims that AT&T is following a pricing strategy designed to promote terminal equipment migration and exploit an interim period in which potential competitors do not have adequate access to the market. Bell's strategy is to raise the prices (rentals) on old equipment while lowering prices (leases) on new equipment. In this fashion Bell will "migrate" a large portion of old PBX customers to the newer Horizon and Dimension models. If correct, this practice stands competition on its head, for in a competitive market the prices for older equipment would be reduced rather than increased.

This type of behavior requires market power sufficient to set prices above marginal cost. A traditional measure for this type of market power is the Lerner Index. Selwyn uses a modified version as developed by Landis and Posner for an analysis of the terminal equipment market. The modified Index requires information regarding market share, elasticity of total market demand, and elasticity of competitive supply.[32] Selwyn then derives a Lerner Index of .78 for 1980 based on an elasticity of competitive supply of .625 and an elasticity of market demand of 1.0. He argues that any index above .50 provides a very strong indication of a lack of competition.[33] He concludes that "[t]he available data indicates [sic] that the Bell System currently exercises extensive market power and that the level of competition is not sufficient to generate downward pressure on price levels for terminal equipment."[34] Further, Selwyn states that ". . . AT&T will continue to enjoy significant monopoly price-setting power even as its market share declines [for the terminal equipment market]. The Bell System currently has the market power to set prices at more than 200 percent over cost."[35]

Changes in market shares in private line markets may be seen by comparing intercity revenues for private line services between 1968 and 1980. In 1968, AT&T accounted for 81 percent of this market, independent telephone companies for 5 percent, Western Union for 13 percent, and specialized carriers for virtually 0 percent. By 1979, AT&T's share had increased to 84.7 percent, the independents' remained at 5.2 percent, Western Union's declined to 5.9 percent, and the specialized carriers' share increased to 4.2 percent. By 1980, AT&T's share was 84.95 percent, the independents' share was 4.8 percent, Western Union's had increased slightly to 6.2 percent, and the specialized carriers' share was 4.0 percent.[36] Although caution must be exercised in drawing conclusions from aggregate data, these results show that Shepherd's conditions for successful entry as a constraint on excessive profits are far from satisfied. Also, it can be debated how much of a decline in market share is needed to reflect a diminution of the dominant firm's market power, but this debate seems curiously out of place when that firm's share increases by 3.9 percentage points.

In overseas telecommunications markets, the Bell System's overseas revenues were $94 million in 1965, while the international record carrier revenues were $106.7 million. In 1970, Bell's overseas

revenues were $222 million and the international record carriers' were $193.8 million. In 1979, Bell's overseas revenues were $990.6 million while the record carriers' were $496.7 million. The ratio of Bell's overseas revenues to international record carrier revenues was .88 in 1965, 1.15 in 1970, and 1.99 in 1979. The FCC's *TAT-4* market shares policy and the subsequent effort to liberalize entry into voice and record markets has had little discernible impact if these policies are to be judged by major shifts in the mix of operating revenues. Interestingly, the loss in the relative share of the total overseas market did not affect prices for Telex and overseas message telegraph, which remained virtually constant for the 1960s and 1970s.[37] Only private line rates were reduced significantly as a consequence of the *TAT-5* decision in 1968,[38] and structure policies had little dampening effect on earned rates of return of the IRCs, which increased steadily from 10.7 percent in 1964 to 18.7 percent in 1978. Since that time, earnings have continued to improve, with ITT WorldCom posting 21.7 percent in 1980. This growth in IRCs' rates of return was matched by levels of idle capacity (percentage of circuits idle) that ranged from 16.7 percent to 24.1 percent for most of the 1970s.[39]

In the message toll telephone market, MCI has made impressive progress since the *Execunet* decision (1977). MCI gets about 70 percent of its revenues from Execunet, which is primarily an MTS/voice service. In 1981, its revenues grew by 62 percent, and its net income by 163 percent over the previous year. It currently covers 75 percent to 80 percent of the Standard Metropolitan Statistical Areas (SMSAs), 180 major metropolitan areas, 4000 towns and communities, and 39 states plus the District of Columbia; approximately 80 percent to 85 percent of MCI's Execunet service does not use transmission lines leased from Bell except for access to the local exchange.[40] Despite these changes, MCI still accounts for less than 1 percent of total MTS traffic (based on revenues). MCI's continued growth depends upon nondiscriminatory access to the local exchange and the removal of major structural and institutional barriers to that exchange. There is another cloud over MCI's continued growth. If one compares the differential between MCI and AT&T's MTS rates by mileage band, the spread is significant for short periods of use (e.g., one minute). But if one considers long periods of usage on peak (e.g., one hour), then the spread between MCI and

AT&T drops from 39 percent for one minute to 13 percent for one hour for medium and long mileage bands. In short, MCI's growth, considered in isolation, has been spectacular; however, it does not come close to indicating a major shift in market shares. Its ability to sustain this growth will depend upon future price differentials and the absence of barriers to entry.

Behavior of the Dominant Firm

If market share data do not support evidence of a rapid and widespread movement toward less concentration, the question can be raised whether liberalized entry has had the effect of limiting AT&T's anti-competitive behavior. Any assessment of the impact of entry on behavior must come to grips with the fact that a certain number of AT&T's entry foreclosure strategies have been inexorably tied to the regulatory process. In this context, strategies can be interpreted as an indictment of the FCC's ability to establish and reinforce adequate pricing and interconnection guidelines in a timely fashion. For example, the FCC did not adopt formal costing guidelines to curb cross-subsidization until Docket No. 18128 (1976), even though it first permitted entry by private carriers in 1959. Also, there was little consistency between regulatory policies at the federal and state levels in the matter of competitive entry. Many state regulatory agencies continued to resist competition in the terminal equipment market or in the private line market for a number of years after the *MCI* and *Carterfone* decisions, thereby giving the dominant firm an opportunity to exploit differences in regulatory policies.

Nevertheless, it appears that liberalized entry and new technology were not sufficient to prevent AT&T and the Bell Operating Companies from delaying interconnection and later imposing significant restrictions on the quality of interconnection. The Department of Justice's Third Statement of Contentions and Proof in the AT&T consent decree[41] contains a detailed narrative of Bell's continued resistance to interconnection with the specialized carriers after the public policy declaration set forth in the *Specialized Carrier* decision (1971). The SCCs (specialized carriers) sought to gain access to the local exchange in order to provide FX (foreign exchange) and

CCSA (common central switching arrangement) offerings to their customers. Court action ultimately compelled such interconnection, but the delay undoubtedly gave a significant advantage to the established carrier.

More recently, the dominant firm has been able to impose restrictions on the quality of interconnection afforded MCI at the local exchange level. MCI is barred from connecting with rotary dial phones, which eliminates approximately 60 percent of the phones in the United States from Execunet service. Also, MCI is denied answer supervision and automatic number identification. Interestingly, there are significant similarities between the United States and Canada in the difficulties experienced by competitive entrants in achieving interconnection. A recent article by Kaiser[42] is replete with stories of market allocation strategies and exclusionary behavior on the part of Bell Canada and the Trans-Canada Telecommunications System which parallel those in the United States.

A second dimension of anti-competitive behavior relates to predatory pricing. It is difficult to develop an objective test for the presence or absence of competitive predatory pricing because of the lack of agreement on a cost-based standard. The Areeda-Turner test presumes that a rational firm will not give up short-run profits, and that therefore the appropriate test should be based on whether prices go below short-run marginal cost. Others, such as Williamson,[43] have challenged the Areeda-Turner criterion and have suggested average cost as the appropriate test, but this standard poses a problem when it is applied to a multiproduct firm. It is also difficult to differentiate between predatory pricing, limit pricing, and a price reduction in response to the perceived action of a rival. According to Stoner,[44] deterrent strategies that do not entail sharp pricing responses of the magnitude needed to dislodge a competitor after it has entered a market should not be considered predation. In practice, however, this distinction will be difficult to make, and one is inclined to agree with Dirlam that "a case-by-case review of dominant firm strategy cannot be avoided" in assessing the presence or absence of predation.[45] In this context, the *Datran* and *MCI* cases must be considered.

In 1969, the Data Transmission Company (Datran) filed an application with the FCC to construct and operate a nationwide micro-

wave system as a common carrier. Datran's proposed switched all-digital communications network was to be specifically engineered for data transmission. The initial system was designed to serve 35 cities. In response, AT&T proposed to use a data-under-voice (DUV) technology as the basis for its dataphone digital service (DDS). DUV was accompanied by a large-scale advertising effort directed at potential Datran markets. This program was followed by a tariff filing setting forth rates by the DDS offering in 1974. AT&T was authorized to offer such service over a 24-city DUV network, at rates which were consistently below those charged by Datran.[46] The FCC found, in January 1977, that AT&T's DDS rates were ". . . anti-competitive in effect and in violation of our policies of 'full and fair competition.' Finally, we have found that the rates for DDS are unreasonably low and are being cross-subsidized by users of other AT&T services."[47] However, on August 19, 1976, Datran had filed a voluntary petition of bankruptcy and on September 15, 1976, it discontinued all service. One response, of course, is that Datran failed as a result of its own incompetence, but this does not dismiss the FCC's findings regarding Bell's pricing practices. It is also interesting to contrast Bell's aggressive entry into DDS (a potentially competitive market) with its cautious, almost reticent effort to promote picturephones in a monopoly market.

A second case dealing with the conduct of the dominant firm is *MCI Communications Corporation v. AT&T Company*.[48] This case dealt with the whole panoply of AT&T's pricing and interconnection policies toward MCI. The jury found that AT&T had monopoly power in the relevant markets, and that it maintained its monopoly position by refusing FX and CCSA interconnections to MCI, by providing inappropriate equipment for interconnection, by negotiating in bad faith for interconnection agreements, and by engaging in predatory pricing of Hi-Lo service. The jury also found that average costs rather than marginal costs were the proper cost standard. Further, the jury found that MCI had been injured to the extent of $600 million, which the treble damages feature converted to $1.8 billion. Of course, this case is on appeal, so a final judgment has yet to be rendered. Nevertheless, it does indicate that the jury found evidence of predatory pricing for Hi-Lo service, and that AT&T's interconnection policy was damaging to the new entrant.

The Effect of Entry on Demand Elasticity

It is generally accepted that the price elasticity of demand for local exchange service is more inelastic than that for message toll telephone service. One would hope that a policy of liberalized entry would tend to make more and more markets price elastic. Unfortunately, there is not sufficient evidence available which reports price and cross-elasticity estimates by specific markets before and after liberalized entry. However, it is possible to gain some appreciation of the impact of liberalized entry on elasticity by examining carrier pricing policy. The current concern of the independent telephone companies about the prospects for bypassing the local exchange would clearly indicate a fear that, after a certain point, the demand for local service will become highly elastic. There is little or no indication, however, when that point will be reached. Similarly, AT&T's policies of limit entry pricing indicate that it perceived certain markets, such as private line, to be elastic. Yet, there is evidence that for a significant interim period demand in much of the telephone market will remain inelastic.

AT&T's success in promoting accelerated cost recovery for plant and equipment indicates that Bell believes there are still significant residual markets that can bear substantial price increases. AT&T and Bell Canada have both been successful in convincing their respective regulatory agencies to substitute equal life group for vintage group depreciation, thereby speeding up the rate of cost recovery. AT&T has also been successful in convincing the FCC to shift from whole-life straight line depreciation to remaining life depreciation, with the result that depreciation charges will again be increased for those items of plant whose service life has been shortened. The so-called three-party agreements (which involve AT&T, the FCC, and the state commissions) have moved toward a represcription of service life estimates, which will inevitably result in shortening service life and in stepping up the rate of depreciation. Finally, AT&T has been able to assure that new station connections will be expensed rather than capitalized as part of the rate base. Such expensing will increase the price of installation significantly.

Obviously, any effort at speeding up the rate of plant turnover and depreciation requires captive markets that can withstand such increases. In other words, there must still be a significant number of markets where demand is inelastic and where a price increase will increase total revenue.

It should also be noted that the Economic Recovery Tax Act of 1981 will further reinforce accelerated cost recovery by shortening the service life of telephone plant and equipment. As Kiefer notes, the telephone companies will be the biggest beneficiaries of the newly prescribed depreciation class. Approximately 70 percent of the assets of the telephone industry will qualify for five-year depreciation, whereas over 60 percent of the assets of the electric and gas utilities will fall in the 15-year depreciation class.[49]

A second perspective on the impact of entry on elasticity can be obtained by examining the ability of the Bell Operating Companies to maintain revenue/cost relationships in the face of prospective entry. Embedded direct analysis studies (EDA) have been made by a number of the Bell Operating Companies since 1973. The EDA studies assign all direct costs to the major service categories. Direct costs constitute approximately 58 percent of the total costs in each state. Of the remaining 42 percent, approximately 30 percent are access costs (primarily non-traffic sensitive local loops). The other 12 percent of the costs are common overheads. By comparing the ratio of revenues to the embedded direct costs for each of the major service categories, it is possible to judge the ability of different services to make a contribution above or below their direct cost. The revenue-to-direct-cost ratio is consistently greater than 1 for state toll, interstate toll, and interstate private line. On the other hand, intrastate private line and vertical services seldom cover their direct costs. This is particularly true of vertical business services.[50] Exchange revenues do not cover direct costs when they are arbitrarily assigned access costs or non-traffic-sensitive costs. What is amazing about this revenue-to-direct-cost ratio is that it holds not only for different states, but also over time for a number of individual states. The results provide another indication that there is still a substantial opportunity for value-of-service pricing in the face of broadened entry.[51]

Entry and Oligopoly Behavior

In an industry where high concentration prevails, it is reasonable to expect that evidence of oligopoly behavior will exist. There is some evidence of price leadership in the private line market. After the demise of Telpak (1980), AT&T raised its private line rates by 16.4 percent, and the other specialized carriers followed suit.[52] On the other hand, it is difficult to detect oligopoly behavior that results in an implicit sharing of markets or a mutual respect for the other firm's "turf." Allegations regarding this type of market sharing did appear during the Litton antitrust suit against AT&T. The chairman of IBM was asked to testify whether AT&T had brought pressure to bear to compel IBM not to import its large switchboards into the United States. These switchboards, which are sold in Europe, would constitute a competitive threat to Western Electric. The IBM witness testified that, to the best of his knowledge, the fear of retaliation by AT&T was based merely on the "opinion" of the sales force, and that he did not recall any reports of threats by AT&T.[53] It is difficult to substantiate this type of behavior, but it is not inconsistent with highly concentrated oligopolistic markets.

CONTINUING BARRIERS TO COMPETITION

It is possible to argue that much of the evidence regarding market shares, cost/price imbalances, and corporate behavior should be dismissed because it predates the *Second Computer Inquiry* decision and the Department of Justice/AT&T *Modified Final Judgment* in the AT&T antitrust case. These actions would introduce a further restructuring that would negate a variety of past behavior, such as the ability of the dominant firm to employ the local exchange as a barrier to entry. However, the question still remains whether even these changes will be sufficient to erode the remaining monopoly focal points, the market power of the dominant firm, and other barriers to competition.

Persistence of Monopoly Focal Points

The local distribution function remains an enigma. It is viewed by the Department of Justice as a natural monopoly, and yet it displays

none of the characteristics of a natural monopoly—notably, pervasive economies of scale. Indeed, AT&T has argued in the past that the average cost per main station increases with the size of the exchange so that exchange rates are higher for large cities than for smaller communities. To further complicate matters, the technological determinists argue with considerable fervor that microwave radio can be used to get around the local exchange, that cellular radio telephone in the 900 MHz band will permit land mobile radio to substantially increase its capacity, that interactive cable TV can serve as a substitute for the local telephone system, and that satellites used in conjunction with earth stations at the customers' premises will permit bypassing the telephone network altogether.[54]

Despite these arguments, there seems to be general agreement on two major factors. First, the cost of the local distribution function looms large in the total cost of communications service. As Hatfield has noted, the bulk of the costs are not in the long-haul portion of the network, but in the local distribution needed to reach the individual customer. Hatfield estimates that long-haul transmission and related switching represent only about 20 percent of the total cost of the nationwide telephone network.[55]

Second, there are no perfect substitutes for the local network. Each of the alternatives suffers from serious shortcomings. Satellite Business Systems (SBS) chooses to serve primarily large-volume customers in a limited number of cities. Land mobile radio may be able to increase its capacity substantially by making use of cellular technology, but it must first gain access to the radio frequency spectrum, and even then there are serious doubts about whether mobile radio can produce sufficient capacity to displace a significant portion of the local exchange capacity. The most sanguine estimates of future growth in cellular radio indicate that it could serve only a small portion of the total exchange market.[56] Cable TV also suffers from serious limitations. At present, no more than 25 percent of the nation's households subscribe to CATV and, in addition, most cable systems provide for an information flow in one direction only. Only about 150 cable systems offer two-way interactive capacity to their subscribers. Finally, it is important to note that the provision of an intercity MTS-type service requires access to the local exchange. With present technology, the substitutes do not lend themselves to the development of a comprehensive MTS network.

Attention must also be given to the fact that the XTEN communications system proposed by Xerox did not prove to be financially viable. Yet this was hailed as a radio-based option for bypassing the local telephone company distribution plant. Although Xerox aimed its XTEN service at the top 50 markets, where it would have the benefit of a high concentration of sales, it was still forced to abandon this project at an apparently substantial loss.

Exchange substitutes will also be confronted by a host of institutional and economic barriers. One is the necessity of securing a certificate of convenience and necessity before commencing operations. Another is the need to gain access to a right-of-way, and while cable companies have been given the right to use telephone poles and duct space at reasonable rates, price still remains as a barrier to entry. Huettner has shown that monopoly pricing of pole attachments prevailed in Ohio in 1976, and that the prospects that federal and/or state regulation will curb monopoly power in this area are not encouraging given the noneconomic guidelines set forth in the National Pole Bill.[57]

Of course, there can be little doubt that any substantial increase in the cost of local exchange service will accelerate the search for substitutes, particularly by large-volume users. The extent of the cost increase that will result from the antitrust settlement has yet to be determined. Our knowledge of the cost of the distribution function is clouded by the debate over the contribution made by settlements and separations procedures to the cost of local exchange service. To some, the local exchange is subsidized by interexchange toll. To others, the local exchange subsidizes toll service. More will be said about these arguments later, but it is appropriate to note here that efficient exchange pricing holds the key to neutralization of the local exchange as a monopoly focal point for most classes of consumers.

A second major monopoly focal point rests in the need to use the radio frequency spectrum. As previously noted, cellular radio requires use of the spectrum, and the rationing of this resource can either constitute a barrier to entry or bestow a benefit on a particular interest group. Similarly, as the number of orbital slots becomes filled, the spectrum will become a constraint on increasing satellite capacity. The satellite problem is further complicated by the possibility that geostationary platforms may permit a substantial concen-

tration of transmission and switching, while allowing more efficient use of the spectrum and the attainment of new economies of scale. On balance, spectrum allocation remains a problem, and its ultimate resolution will require some system of pricing that assures that neither the potential entrant nor the existing firm enjoys a special economic advantage.

A third monopoly focal point will prevail on thin routes, where MES and total market demand foreclose more than one supplier. As long as these conditions exist, the only feasible substitute rests in options such as CB radio, mobile radio, or a small number of circuits leased by a rival intercity carrier. The prospect that these options constitute an effective cap on prices in these markets remains doubtful.

Patterns of Usage Conducive to Price Discrimination

Another barrier to effective competition will be the persistence of usage patterns and markets that are susceptible to price discrimination. Four examples provide some insight into the nature of these markets. First, a significant portion of the interstate residential message toll telephone market has monthly billings so low that MTS substitutes, such as Execunet, are not financially attractive. To illustrate the magnitude of this portion of the interstate toll market, 90 percent of residential MTS users had monthly bills of $15 or less in 1976, yet they contributed one-half of all residential interstate MTS revenues. Conversely, 10 percent of the residential users accounted for almost one-half of long-distance residential revenues.[58]

A second example reflects the highly skewed distribution of business-generated revenues. More than 75 percent of the revenues from long-distance business usage are accounted for by less than 8 percent of the business customers. This means that the remaining 92 percent of business users accounted for the other 25 percent of the revenues.[59] It is doubtful that the latter group would find SBS-type offerings or user-owned facilities an attractive alternative. In addition, as Hatfield notes, the largest portion of business machine communications travels relatively short distances and therefore is less subject to diversion by intercity rivalry.[60]

A third example is the distribution of intercity traffic. The 32 largest cities are responsible for 50 percent of the total MTS/WATS revenues, indicating a high concentration of interstate phone service among a relatively limited number of metropolitan areas.[61]

Finally, there remains the "plain old telephone" (POTS) user who is only interested in a simple telephone and a single connection, and for whom basic service is a necessity. For this customer, intelligent terminals and high-speed data transmission capabilities have no appeal. An estimate of the impact of price increases on the percentage of households with basic telephone service indicates that this is a highly inelastic market. For example, a 100 percent increase in price would result in only an 8 percentage point decline in the total number of households with basic telephone service (from 92 percent to 84 percent).[62]

Strategy of the Dominant Firm Subject to Divestiture and Second Computer Inquiry

There is little doubt that the consent decree divestiture and the *Second Computer Inquiry* decision will weaken the ability of the dominant firm to employ a fully integrated corporate structure to foreclose competition. Separation of the BOCs drives a wedge between exchange and interexchange markets. It also eliminates any advantage to AT&T resulting from the imposition of high access charges at the local level to protect its interexchange markets, and deprives AT&T of its ability to impose license contract fees and equipment supply contracts on the BOCs. The loss of license contract fees is particularly significant to AT&T because of the large dollar amounts involved and because of their substantial increase in recent years.[63]

Divestiture also forecloses the joint ownership of facilities and the joint provision of service as an area for collusive behavior. In addition, it eliminates the ability of AT&T to assign Western Electric equipment prices to markets on the basis of perceived differences in demand elasticities. The *Second Computer Inquiry* decision places an additional limitation on AT&T's ability to cross-subsidize between regulated and nonregulated markets by restricting the parent company's ability to allocate expenses and common costs.

AT&T, however, still enjoys significant advantages. The first of these is Bell's nationwide coverage and its reputation for high-quality service. This gives the firm a major product or service differentiation advantage over the competitive MTS services, which are plagued by allegations of poor quality and by limited coverage due to foreclosure from rotary dial phones. Rivals also have no substitute for Bell's capacity to provide billing to third numbers and INWATTS (800) service. The Wirth Subcommittee hearings revealed interesting insights into consumers' perceptions of Bell and the Other Common Carriers (OCCs). Bell's ability to serve a wide spectrum of cities was viewed as important by business users with branch and dispersed organizations. Customers also reported that it took longer and that it was more expensive to resolve interconnection and transmission problems when one or more elements of a user system involved a non-Bell product. In addition, many users felt ill equipped to accept the responsibility for establishing standards and purchasing equipment and services in a multivendor environment, and testimony revealed that large users could not evaluate and manage acquisitions of competitive communications systems for more than 10 percent of their locations each year.[64]

All of these product-differentiation benefits could be assumed to continue after divestiture. Furthermore, AT&T would enjoy them for an indefinite period, until new entrants were able to achieve comparable levels of recognition and assured levels of service.

The dominant firm will also continue to enjoy cost advantages that do not accrue to the new entrant. This type of advantage constitutes a barrier to entry because it is a cost of production not borne by the firm already established in the industry. One such advantage is the availability of existing right-of-ways. For example, when the Bell System planned a fiber optics light wave system from Boston to Washington, D. C., it was able to use a right-of-way route that was being used by an existing L-3 cable system. This space was suited for the requirements of a new light wave system along 80 percent of the route, permitting low installation costs.

Another barrier to entry that can be exploited by the established firm is the use of excess capacity. Spence argues that the dominant firm can deter entry by picking a level of capacity that will not allow an entrant to earn a profit if the established firm's capacity is fully utilized.[65] The potential entrant knows that the dominant firm has the ability to increase output and drive prices down. A factor

working against this tactic in telecommunications is the strong growth of demand in the interexchange markets; however, an offsetting factor lies in the resilience or elasticity of supply built into a comprehensive communications network of the type developed by AT&T. Large transmission networks, whether in communications or electricity, have a built-in reserve capacity that stems from the ability to use alternate circuits or paths to meet requirements without investing in additional plants. This provides a substantial advantage in meeting load growth that does not accrue to the new entrant until it reaches a high threshold of network development. Furthermore, the imbalance in market shares is so great between AT&T and the OCCs that this network advantage could be denied the OCCs, barring a dramatic shift in market shares.

The possibility that excess capacity may be a deterrent to entry will also arise as more and more of the Bell plant converts to fiber optic light wave systems. Fiber optics are well suited to high density routes, and the incremental costs of adding significant amounts of capacity appear to be small. As a consequence, the cost of redundancy is minimal.

A further deterrent to entry stems from the potential burden of sunk costs if the new entrant should fail. If the sunk costs cannot be readily recovered, then the firm incurs a significant cost of failure that the established firm does not have to bear. Moreover, any losses associated with disinvestment will be costly if excess capacity exists in the industry or if markets are satiated. In retrospect, the new entrant will not be unmindful of the aborted efforts in the interconnect and specialized carrier markets of Video Microwave and United Microwave (1973), Arcata Interconnect (1973), General Electric (1973), Litton Industries (1974), Datran (1976), and, most recently, Xerox (1981). When Datran went bankrupt, its assets were apparently sold at a loss to Southern Pacific. Newspaper accounts indicate that Xerox's losses were substantial when XTEN was terminated.

It is also appropriate to add a note regarding the theory of contestable markets and the possibility of potential competition associated with easy entry and exit. The capital-intensive nature of telecommunications, the burden of sunk costs, and the prospect of significant losses would seem to negate that theory's basic assumptions regarding entry and exit.[66]

Other residual benefits accruing to the dominant firm should also

be mentioned because they constitute an important barrier to viable competition. After divestiture, AT&T will retain the Bell Laboratories and Western Electric intact. If there are significant economies in long-term planning and implementing new systems of supply, this should give Bell a significant advantage. When combined with its superior capital resources, Bell may enjoy an advantage in developing systems such as the integrated service digital network (ISDN). This system would eventually supply an end-to-end digital network in which all communications are reduced to a digital mode. Bell could also enjoy a significant cash flow advantage over its rivals.[67] The Economic Recovery Tax Act of 1981 permits normalization of the tax benefits of new investment, normalization of the investment tax credits, and shortened depreciation life. These conditions bestow a significant advantage on the dominant firm when it is seeking to invest in new markets and new technology. At the same time, potential entrants, such as the radio common carriers, will find it extremely difficult to raise capital to take advantage of new markets and new technologies.[68]

Finally, the established firm will continue to have the opportunity to cross-subsidize between monopoly and competitive markets to the extent that separate subsidiaries do not control this practice. The firm will also have the ability to shift the subscriber plant factor (SPF) burden to the BOCs as a result of divestiture, and thereby diminish whatever comparative cost advantage accrues to the OCCs.

Strategies of the BOCs After Divestiture

The conduct of the BOCs after divestiture may serve to frustrate the original objectives of the Department of Justice, complicate the task of state commission regulation, and impede the broadening of competition. The BOCs will have to cover their revenue requirements primarily from access and usage charges, augmented, as a consequence of Judge Greene's decision, by the sale of Yellow Pages advertising and by entry into the merchandising of new CPE.

There is a definite possibility that the BOCs may be unsuccessful in earning the allowed rate of return on the basis of revenues from

these markets. First, the threat of bypass by large user-owned networks, AT&T, and specialized carriers could exert a strong pressure to maintain low access charges for large-volume users, with the proponents of such concessions arguing that the reduction is justified by the 10/50 rule (i.e., 10% of the exchange's local loop customers are responsible for as much as 50% of total intercity traffic originating or terminating in the exchange). Second, local measured service pricing may result in greater revenue instability and reduced revenues from off-peak sales (assuming that off-peak demand is inelastic and peak/off-peak pricing is employed). Third, the BOCs' efforts to compete successfully in the CPE market will be handicapped by the loss of the installed terminal equipment base and the loss of many of the Bell Phone Center stores (which will be transferred to AT&T under the *Modified Final Judgment*). The BOCs will have to set up a new system of retail outlets and train new personnel. Fourth, the BOCs may be significantly hampered in the cellular radio and packet switching markets by the lack of trained personnel. Fifth, the BOCs will retain approximately two-thirds of the Bell System assets but will retain only about one-third of the operating revenues, much of which will be drawn from those communications markets with the lowest rates of growth. This situation will further complicate the attainment of desired earnings levels. It should be remembered that at least one associated company, Michigan Bell, has been unable to attain the allowed rate of return in recent years, even with the help of a comprehensive indexing arrangement, intrastate toll, and SPF contributions.

If these markets do not provide sufficient revenues to earn the allowed rate of return, then divestiture will create new incentives to subvert or circumvent the intent of the modified final judgment. This may be accomplished by expanding the LATAs to permit the BOCs to enter intrastate toll markets, by BOC entry into heretofore excluded markets such as software and enhanced services, or by sophisticated forms of price discrimination to extract the maximum revenue in the design of access charges and local service rates. Furthermore, if the state commissions endeavor to impose tight ceilings on the rates for POTS users, the search for more subtle strategies to circumvent state regulation will be accelerated. Finally, if earnings continue to remain too low, the BOCs may seek to diversify into unregulated activities.

Strategies of the State Commissions

Two major objectives of the state commissions involve minimizing the burden of divestiture on the local exchange (especially on POTS customers) and maintaining the financial viability of the BOCs. The *Modified Final Judgment* appears to have foreclosed a number of the earlier proposals which the state agencies offered during the period of open comment on the proposed settlement. These proposals included legal prohibitions on AT&T bypass of the local exchange for a five-year period, divestment of the BOCs intact in order to strengthen their hand in dealing with AT&T in property transfers, and the establishment of transfer prices at levels greater than net book value whenever possible. Nevertheless, it seems reasonable to assume that state agencies will continue to press for the design of LATAs that will permit the BOCs to provide services equivalent to interexchange toll. It also seems likely that the state commissions will support BOC management when it seeks a relaxation of DoJ constraints, and that status will move to implement some type of restriction on exchange bypass so that access charges can be set as close as possible to subscriber plant factor contributions.

More importantly, the states may endorse access and usage charges that contain promotional discounts designed to stimulate revenues, but that also favor the largest interstate carrier, AT&T, in securing local exchange access. Such volume discounts may be justified in terms of promoting fuller utilization of the local exchange plant, but the impact on intercity competition could be substantial. MCI and the OCCs simply would not have sufficient message volume to qualify for large-volume discounts, especially if access structures were patterned along the lines of traditional declining block rates. In that event, access charges would have been converted into a form of second-degree price discrimination, and it is doubtful that questions of cost justification or structural impact would be raised by the BOCs, AT&T, or the commission staff if excess capacity prevailed and if the intent were to increase revenues.

TWO MAJOR PUBLIC POLICY OPTIONS

Structure regulation appears to be moving toward broadened entry in the intercity telecommunications market while the older distinction between monopoly and competition has been reasserted at the local exchange level. At the local level, markets will be divided between the monopoly provision of basic exchange telephone service and the competitive provision of CPE, software, and enhanced services. This, of course, is accomplished by excluding the franchised BOCs from all of the competitive markets except new CPE sales and directory assistance. If this approach to structure regulation is to be successful, it must be premised on four conditions: (1) that there will be a substantial erosion of monopoly power in the intercity markets; (2) that the creation of separate subsidiaries will be an adequate constraint on AT&T's capability to cross-subsidize (assuming some monopoly markets persist for an indeterminant period); (3) that new technology, potential entry, and appropriate access charges will curb BOC exploitation of the structure of demand and monopoly focal points; and (4) that the BOCs are sustainable without recourse to policies that are conducive to price discrimination, subsidy, or entry foreclosure by administrative agency action.

A second direction for structure regulation is suggested by the recommendations of the state commissions for maintaining the viability of the BOCs and by the FCC's *amicus curiae* brief on the *Modified Final Judgment* (April 20, 1982). Divestiture could be viewed as a starting point for allowing the BOCs to become major competitors in all phases of the terminal equipment, enhanced service, and interexchange markets. This alternative, which we shall call Option II, would, in effect, apply broadened entry across the board in telecommunications.

Option II would offer a number of strong advantages. First, it would give the BOCs an opportunity to pursue their self-interest after divestiture. The recent stand taken by divested natural gas distribution companies on the impact of accelerated field price deregulation provides a vivid example of how a firm will change past policies and pursue its own self-interest after divestment. Second, the BOCs' entry into terminal equipment, interexchange, and enhanced service markets would constitute a major challenge to AT&T

and could result in a discernible shift in market shares. These markets would still be oligopolistic, but the resultant changes would come closer to satisfying Shepherd's criteria for establishing autonomous action. Third, the BOCs would have some of the advantages of capital attraction, cash flow, and planning capabilities that were attributed to the dominant firm in the previous section. These advantages would tend to make them a serious threat to the established industry organization.

However, for Option II to be viable, certain structural constraints would have to be imposed on the BOCs in order to foreclose the reemergence of the full range of problems that the Department of Justice seeks to resolve through the separation and isolation of the local exchange. These constraints include the following: (1) the establishment of non-discriminatory exchange access charges; (2) the establishment of non-discriminatory exchange interconnection standards;[69] (3) disposal of the installed terminal equipment base and inside wiring by sales to consumers at net original cost;[70] (4) a requirement that the BOCs provide CPE and interexchange and enhanced services through a separate subsidiary; (5) maintenance of full financial and managerial separation between AT&T and the BOCs; (6) rejection of any regulatory policy that imposes restrictions on bypassing the local exchange; (7) rejection of any regulatory policy that imposes a market shares policy to sustain the BOCs; and (8) government administration of any pool or fund designed to subsidize high-cost service areas.

If Option II could be implemented, it would be a significant step in the direction of creating a countervailing force against the market dominance still exercised by AT&T, and it would perhaps serve to introduce another "weak" invisible hand. Its success will ultimately depend upon the ability to deny AT&T and the BOCs an opportunity to engage in collusive behavior through the cross-ownership of property, facilities sharing, leasing arrangements, and joint planning.

Under Option II, the consumer would have the choice of purchasing new terminal equipment from AT&T, from unaffiliated suppliers, or from the BOCs, or of purchasing existing equipment at net original cost, thereby minimizing the opportunity to exploit customers through the migration strategy. At the same time, this choice

would minimize the amount of non-traffic sensitive plant to be allocated in designing access charges. The BOCs, in turn, would have a strong incentive to buy all switching, transmission, and terminal equipment on a world-wide competitive basis, thus retaining the spirit of the settlement's restriction on vertical integration. Regulators would have to require that all equipment be purchased on the basis of competitive bids.

AT&T, MCI, and the BOCs could compete in the interexchange market, the latter through a separate subsidiary that would be free to lease or construct interexchange plant in conjunction with the independents or other BOCs. If the earnings of the separate subsidiary were eventually to be deregulated, then the BOCs would have a strong incentive to select the least-cost method of transmission, and in turn to compete effectively with AT&T in the MTS/WATS market or in the private line markets. The consumer could then choose between BOC/independent intercity service, AT&T, MCI (and any other OCCs), or the specialized carriers such as Satellite Business Systems.

In the exchange market, intercity carriers would be free to select the local exchange and pay the relevant access and usage charges of the BOCs, or to bypass the local exchange, depending on technical requirements (such as band width) and the least-cost course of action. Finally, the enhanced services could be supplied by AT&T's separate subsidiary, the BOCs' separate subsidiary, the independents, value-added carriers, cable systems, or any other potential entrant.

Option II has much to recommend it because it does not fall into the trap of trying to maintain a separation between monopoly and competitive markets while giving an incentive to the monopoly firm to avoid this restriction. It also avoids compelling the regulatory agency to mandate boundary lines in the face of technological change, and it prevents the state commissions from becoming implicit captives of the BOCs.

Regardless of which course of action is ultimately followed, two central features emerge. Access charges must be non-discriminatory, and the separate subsidiary concept must be viable. To this extent, traditional price/earnings regulation becomes an integral part of structure regulation.

EXCHANGE ACCESS CHARGES

The objective in designing an access charge is to promote efficient use of the local exchange plant, while at the same time permitting intercity carriers to use the plant if they are willing to pay the resource cost associated with access. An access charge that is too high can negate the competitive advantage of a more efficient firm.[71] Conversely, an access charge that is too low bestows a comparative advantage of some class of local exchange user.[72] The level of the access charge will depend upon the revenue requirements associated with the exchange and the allocation of costs between access and local calling functions. The allocation process is complicated by the fact that some costs are directly related to output or usage (e.g., switching, metering, etc.), while others are non-traffic sensitive (e.g., local loops, inside wiring, CPE, and overheads associated with the central office).

The Department of Justice settlement requires that the BOCs file exchange access tariffs that are "cost justified." However, this provides little immediate assistance, other than to indicate that access charges based upon Ramsey pricing (as advocated by Robert Willig) would probably not be acceptable.[73]

At the present time, access payments are based on the negotiated Exchange Network Facilities Agreement (ENFIA).[74] ENFIA provides that a charge will be imposed for a voice grade connection to the central office, local switching and trunking, and jointly used plant.

There are three problems with a continuation of the ENFIA arrangement. First, it is arbitrary and subject to manipulation. For example, the charge for jointly used plant is based on a percentage of the subscriber plant factor payments made by AT&T, and this percentage can be increased or decreased with little regard for actual changes in the cost of service. Second, ENFIA is imposed only on OCC-provided MTS substitutes. It is not imposed upon FX and CCSA services, which are also close substitutes. (Rochester Telephone has argued that an access charge should be imposed on all MTS services and close substitutes.) Third, the ENFIA settlement does not necessarily reflect local exchange costs, whether on a marginal or an average basis.[75]

A number of alternatives have been suggested for replacing ENFIA and for the design of a more comprehensive system of cost-oriented access charges. One approach suggests using the existing subscriber plant factor contribution made by AT&T as a starting point for developing an access charge. Subscriber plant factor (SPF) is essentially a loading factor or multiplier applied to the minutes of use of exchange facilities by toll services. Minutes of use are defined in terms of Subscriber Line Usage (SLU). At present, SPF is 3.3 times SLU. The independent telephone companies receive approximately 55 percent of their revenues from this SPF contribution, and both the independents and the state commissions have an incentive to impose an access charge that reflects the SPF formula as closely as possible. On the other hand, the independents are concerned that the higher the access charge is, the greater the incentive to bypass the local exchange. There appears to be an implicit recognition, perhaps more on the part of the independents than on the part of the state commissions, that the demand function for local exchange service may be kinked.

Any allocation based on SPF or relative use is beset by a number of problems. One of these is the incentive not to promote local use as long as an SPF-type formula is applied. If local use increases, then the SPF contribution to the local exchange decreases. Other problems include the tendency for SPF to escalate as toll usage grows,[76] and the likelihood of its benefiting those exchanges with a high proportion of long-haul toll traffic.

Recognizing these shortcomings, a second approach has been proposed that involves a shift to Total Call Minutes (TCM) as the basis for allocation. This is still a relative-use method, but it would presumably reduce the SPF contribution.

A third approach for designing access charges has been suggested by the FCC in the Fourth Supplemental Notice of Inquiry in Docket No. 78-72 (1982).[77] Briefly, the FCC offers a set of four methods for consideration on the assumption that access charges will be applied to all switched network and private line services. The biggest challenge comes in applying access charges to private line service, and the Commission sets forth four possible methods. Method 1 would assess private lines on the basis of minutes of use. Method 2 would assign all non-traffic-sensitive exchange plant directly to all

customers (MTS, private line, etc.) using this plant, by having each of them pay a flat per-line access charge that did not vary with usage. (Customers would, of course, also pay for charges for usage-sensitive facilities.) Those seeking to minimize the burden placed on POTS and small-volume MTS users tend to favor Method 1 since it would increase private line contributions substantially. Those fearful of increasing private line charges and stimulating bypass favor Method 2 (which would place a relatively greater burden on POTS and small-volume MTS customers). FCC Methods 3 and 4 represent attempts to dilute the distributional impact of allocations based on usage (Method 1) or direct assignment (Method 2).

A more generic approach to access pricing has been suggested by Wilson, Melody, and Gabel. Essentially, these economists would re-examine the entire structure of local exchange costs and revenue requirements, and then work forward through a system of plant allocations to derive access charges. The Wilson approach involves unbundling flat exchange rates, eliminating CPE which is to be deregulated, and reallocating all joint costs associated with the local exchange function. Based on a 1980 study of usage and services, Wilson isolates direct costs and assigns both direct and common costs to service categories on the basis of the use of facilities, availability of facilities, and the design and performance characteristics of facilities. His conclusion is that local exchanges have borne too much of the common plant in the past, and that divestiture need not result in an increase in local exchange costs.[78]

Melody and Gabel suggest an approach to cost-based access charges that focuses on cost-causality as the basis for determining the cost of local exchange service. The Melody-Gabel approach argues that the exchange plant currently in use was designed essentially for the requirements of long-distance toll service rather than for local service. Therefore, the exchange plant is much more costly than it would have been if it had been designed and built to supply local service alone, and economic cost-causation would result in allocating a greater share of exchange costs to toll usage. The Melody-Gabel method for determining the cost of exchange service would involve an estimation of the cost of building a stand-alone exchange system, a stand-alone toll system, and perhaps a stand-alone system for enhanced services. The benefits of common supply of multiple services could then be distributed in proportion to the

stand-alone costs.[79] As might be expected, Melody and Gabel are critical of efforts to cap SPF or any type of SPF-based allocation because this ignores the principle of cost-causation. Access charges would be derived on the basis of a fixed charge per loop reflecting cost-causation characteristics rather than the variable charge for usage of the loop. The Melody-Gabel methodology is being applied on a pilot basis by the Kansas Corporation Commission.

An incremental variant of the Melody-Gabel approach might be devised on the assumption that the basic exchange is in place, and that each additional service imposes an incremental cost on the exchange. However, this could assign too much of the common plant to the basic service. On the other hand, the Melody-Gabel approach is confronted by the need to develop reliable estimates of stand-alone systems for a relevant time period. The selection of a historical period may lose touch with reality, so studies would have to be made for a current period reflecting an investment in modern technology.

It is clear that an easy resolution of the access charge problem is not at hand. Yet, without a generally accepted basis for establishing such charges, neither the Department of Justice divestiture plan nor broadened entry by the BOCs under Option II can be successfully implemented. State and federal regulatory agencies must attach the highest priority to the creation of guidelines for exchange access pricing. Equally important, regulators must recognize that the relationship between pricing practices and market structure is reciprocal, and that pricing policies shape market structure by conditioning entry and conduct. The history of Telpak sustains this truism.

SEPARATE SUBSIDIARIES AND THE CONTROL OF CROSS-SUBSIDIZATION

Separate subsidiaries as a means for controlling cross-subsidization (assuming that at least one market is essentially monopolistic) could be applied to AT&T interexchange services, AT&T enhanced services and CPE sales, or to BOC provision of toll, enhanced service, or CPE. The FCC appears to have selected the separate subsidiary in the enhanced service and CPE markets because of the difficulties of developing pricing guidelines that could curb cross-subsidization. Judge

Greene, on the other hand, in the modified final judgment rejected the creation of a separate subsidiary for AT&T's Long Lines Department on the grounds that the potential for cross-subsidization would be controlled by growing competition.

The creation of separate subsidiaries attempts to resolve the cross-subsidization problem by segregating different enterprise functions. This segregation process will be most successful where common expenses and shared plant are minimal or nonexistent. For example, AT&T could provide CPE through separate merchandising outlets with minimum use of common plant. However, there are a number of unanswered questions pertaining to the creation and monitoring of separate subsidiaries. First, the question should be raised whether the separate subsidiary should be confined to a specific activity, or whether it should be free to engage in joint ventures, acquire stock in other firms, and enter an unlimited number of nonregulated markets. The Canadian experience demonstrates that multiple separate subsidiaries can pose a distinct problem for a regulatory agency. Bell Canada has 82 separate subsidiaries and associated companies. These include Northern Telecom; Tele-Direct Ltd.; Bell Canada-International Management, Research and Consulting Ltd.; and publishing companies in Australia. It is apparent that the Canadian Radio-Television and Telecommunications Commission lacks full information about the scope and activities of this diversification program.[80]

Another problem associated with the creation of separate subsidiaries is the transfer price to be attached to property assigned to the separate subsidiary. If the valuation is too low, it confers a benefit on the recipient, and the losers will be the MTS/WATS or exchange customers. Transfer pricing in telecommunications also includes other complex issues. For example, the payment for R&D devoted to toll and enhanced services was included in the license contract fees and Western Electric prices paid by the exchange service users. In the absence of adequate transfer pricing, the beneficiaries of the new technology may not pay a price equal to the cost of the resources committed to the development of that technology.

Another problem associated with the separate subsidiary is the extent of the restrictions that should be placed on the joint use of facilities and the sharing of expenses. The position of the FCC in

the *Second Computer Inquiry* is that the separate subsidiary will not be allowed to share marketing expenses, employees, or office space with the regulated carrier. Furthermore, the separate subsidiary cannot construct or own transmission facilities. On the other hand, the FCC will permit the sharing of R&D expenses and institutional advertising. Restrictions on the joint use of plant are not clear at the present time.

The question of how to maintain an arms-length relationship between the parent and the subsidiary has not been fully resolved by the FCC. At present, the Commission will permit the rotation of personnel, and there are no controls on the misuse of inside information.

Possibly one of the biggest problems still to be resolved is the impact of diversification (through separate subsidiaries) on the cost of capital. If diversification fails, then risk and the required return on equity will increase; but if diversification is successful, then risk and the return on equity will fall. Given the state of the art in measuring the rate of return under regulation, there seems to be no practical solution for isolating the return on the regulated portion of the enterprise from the return on the unregulated portion. Neither the capital asset pricing model nor the discounted cash flow technique seems well suited to isolating a portion of the return of a conglomerate enterprise. Perhaps the only feasible solution is to require that the regulated and nonregulated activities each issue equity capital that would be traded in the market.[81]

There still remains the question of how far regulatory surveillance should go with respect to the activities of the separate subsidiary. There seems to be a consensus that regulation should stay out of non-utility activities and avoid using income from such activities as an offset for deficient utility earnings. That is, the benefits of diversification should not be flowed through to the ratepayer. On the other hand, regulators have a responsibility to protect the utility consumer, and some state commissions have indicated that they will insist upon access to all records of the nonregulated business.[82] Still other regulators have indicated that it will be necessary to monitor any diversion of depreciation funds and retained earnings out of the regulated services, and to assess the impact on quality of service. Finally, there appears to be some sympathy among state regulators

for compelling a utility to withdraw from a nonregulated business if it is deemed to be detrimental to the ratepayer.

On balance, it is difficult to demonstrate that the creation of separate subsidiaries and conglomerate diversification have a discernible benefit in terms of a lower cost of capital. The principal benefit of the separate subsidiary seems to be that it offers a feasible option for controlling cross-subsidization and curbing the market power of the dominant firm. Whether the separate subsidiary will be more effective and less costly to administer than the type of costing guidelines envisioned in FCC Docket 18128 or in the Multi-Schedule Private Line case remains a matter of conjecture.[83] Perhaps the best answer is to push forward with the separate subsidiary concept and the development of a complementary set of cost standards for those interexchange and exchange services where a strong potential for cross-subsidization exists. Such costing systems would provide a basis for examining the creation and operation of separate subsidiaries (insofar as they might burden the major interexchange and exchange services),[84] while at the same time monitoring the revenue/cost relationship for each of the major services that are viewed as essentially noncompetitive. When a service is provided in a market characterized by pervasive competition, then the costing system could be dropped.

CONCLUSION

Structure regulation has been successful in introducing competitive pressures into a number of communications markets. In particular, structural reform appears to have placed the terminal equipment market in a position where workable competition (or at least loose oligopoly) can emerge. However, the major exchange and interexchange markets remain highly concentrated with a clear potential for limit pricing, cross-subsidization, and price discrimination. These pricing practices can frustrate the objectives of structure regulation, but they can also be curtailed by the proper application of price/earnings controls. The challenge will be to recognize the complementary relationship between structure regulation and price/earnings controls, and to apply both of them in a fashion that curbs monopoly power without burdening the capacity of the established carriers or the new entrants to respond to change.

FOOTNOTES

1. Market structure can be defined in terms of the number, size, and concentration of sellers in an industry, conditions of entry, the degree of vertical integration, and the degree to which services are substitutable in consumption and production. Conduct is reflected in pricing practices and policies, production policies, product, and legal strategies. Performance is concerned with the efficiency of resource allocation, X-efficiency, innovation, and adequacy of service. Price/earnings regulation deals more directly with conduct and performance.

2. For a discussion of structure regulation, see: *Telecommunications in Transition: The Status of Competition in the Telecommunications Industry,* A Report by the Majority Staff of the Subcommittee on Telecommunications, Consumer Protection, and Finance of the Committee on Energy and Commerce, U. S. House of Representatives, November 3, 1981. Committee Print 97-V, 97th Congress, 1st Session, p. 35. For a sympathetic explanation of the FCC's approach to structure regulation as developed during the Ferris era, see: Ferris, C. D. and Kelley, D., "The Transition to Structural Telecommunications Regulation," *Challenges for Public Utility Regulation in the 1980s,* Trebing, H. M., ed., East Lansing: Michigan State University, 1981, pp. 3-11.

3. See Trebing, H. M., "The Contribution of James Bonbright to the Development of Public Utility Economics," *Current Issues in Public Utility Economics: Essays in Honor of James C. Bonbright,* Danielson, A. L., and Kamerschen, D. R., eds., Lexington: D. C. Heath and Company, 1983.

4. Vail's policy of selective but aggressive price reductions was highly effective. Aggressive price reductions depressed the profitability and net worth of the independents, thereby facilitating acquisition; but—and this is perhaps more important—this policy established a reputation for predation. Recent literature suggests that establishing a reputation for predation could have greater real-world significance than the deep pocket theory of predatory pricing. Stoner notes, "Predation based on reputation effects is especially likely in a multimarket context, for the reputation established in one market can pay dividends in another. This type of predation should be very relevant in the telecommunications industry. . . ." See: Stoner,

R. D., "Strategic Predatory Practices," *Challenges for Public Utility Regulation in the 1980s, op. cit.*, p. 359.

5. As a postscript to the impact of private policies on market structure during this period, it should be noted that AT&T's conservative financial practices and simplified holding-company organization played a significant role in exempting the Bell System from the death sentence clause (Section 11) of the Holding Company Act of 1935, which had been used to achieve a sweeping structural reorganization of the electric and gas utility industries.

6. *American Telephone and Telegraph Co.*, Memorandum, Opinion and Order, 37 FCC 1151 (1964).

7. *Authorized Entities and Users–Comsat,* Memorandum, Opinion and Statement of Policy, 4 FCC 2d 421 (1966).

8. *Final Report and Order*, in Docket No. 18509, 21 FCC 2d 307 (1970).

9. *An Inquiry into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems,* Report and Order. CC Docket No. 79-318, May 4, 1981.

10. *Allocation of Frequencies Above 890 Mc*, Report and Order, 27 FCC 359 (1959).

11. *Microwave Communications, Inc.*, Decision, 18 FCC 2d 953 (1969).

12. *Use of the Carterfone Device,* Decision, 13 FCC 2d 420 (1968).

13. *Specialized Common Carrier Services,* First Report and Order, 29 FCC 2d 870 (1971).

14. *Domestic Communications–Satellite Facilities*, Second Report and Order, 35 FCC 2d 844 (1972).

15. *Regulatory and Policy Problems Presented by the Interdependence of Computer Communications Services and Facilities*, 28 FCC 2d 291 (1970), 28 FCC 267 (1971), (Final Decision).

16. *Second Computer Inquiry,* Final Decision, 77 FCC 2d 384 (1980).

17. U.S. District Court for the District of Columbia, *U.S. v. American Telephone and Telegraph Co.; Western Electric Co., Inc., and Bell Telephone Laboratories, Inc.*, Civil Action Nos. 74-1698, 82-0192, and 82-0025. Final judgment entered: August 24, 1982.

18. *MCI Telecommunications Corp. v. FCC,* 561 F.2d 365 (D. C. Cir.), *cert. denied*, 434 U.S. 1040 (1977).

19. *MCI Telecommunications Corp. v. FCC,* 580 F.2d 590 (D.C.

Cir.), *cert. denied*, 439 U.S. 980 (1978).

20. *Overseas Dataphone Service,* Report and Order, 57 FCC 2d 705 (1976).

21. *International Record Carriers' Scope of Operations,* FCC Docket No. 19660 (1979).

22. *Western Union International,* Memorandum, Opinion, Order and Authorization, 76 FCC 2d 166 (1979).

23. This is not to deny the fact that technology drives entry, but it is important to note that in the absence of the court's Execunet decision, a major barrier to broadened entry would have remained as long as the FCC adhered to a structural policy which called for a segregation of monopoly services and competitive services.

24. Growth rates calculated by author from data compiled by USITA, NARUC, and FCC's *Statistics of Communications Common Carriers.*

25. *Telecommunications in Transition: The Status of Competition in the Telecommunications Industry, op. cit.,* p. 182.

26. See Mantell, L., *An Econometric Study of Returns to Scale in the Bell System,* Staff Research Paper, Office of Telecommunications Policy, Executive Office of the President, Washington, 1974; Dobell, A. R., *et al.,* "Telecommunications in Canada: Demand, Production, and Investment Decisions," *Bell Journal of Economics and Management Science 3,* Spring, 1972, pp. 175-219; Fuss, M., and Waverman, L., "Multiproduct Multi-input Cost Functions for a Regulated Utility: The Case of Telecommunications in Canada," paper presented at the National Science Foundation/National Bureau of Economic Research Conference on Public Regulation, Washington, D. C., 1977. Mention should also be made of George Mandanis' efforts to study the relationship between cost and scale. Mandanis made a series of engineering cost studies which calculated a so-called scale economy coefficient. This was an estimate of how costs increased or decreased as size and usage increased. Mandanis found that there were modest scale economies for local distribution, and that an integrated system would have cost advantages over a dedicated system largely because of a greater ability to diversify. See: Mandanis, G. P., "An Empirical Analysis of Economies of Scale and Specialization in Communications," *New Dimensions in Public Utility Pricing,* Trebing, H. M., ed., East Lansing: Michigan State University, 1976, pp. 324-388.

27. Shepherd, W. G., "General Conditions of Entry", *Regulation*

and Entry, Klass, M. W., and Shepherd, W. G., eds., East Lansing: Michigan State University, 1976, pp. 48-49, 56-60.

28. After the Carterfone decision, Bell introduced a network protective device which could have had an adverse price effect on sales to single line business and residential customers. However, this device would have had little impact on PBX sales. In 1975, the FCC adopted a registration and certification program that eliminated the need for the network protective device and any market foreclosure effects associated with the price of that device.

29. Terminal equipment/CPE data based on annual shipments. Data collected by Dittberner Associates, Inc., under contract with Office of Technology Assessment, U. S. Congress, for Telecommunications Study, Task No. 11, Impact of Competition—Regulation—Accountability, Washington, D. C., 1979. It should be noted that virtually all of the terminal equipment markets experienced substantial growth over the period from 1968 to 1979.

30. *Telecommunications in Transition: The Status of Competition in the Telecommunications Industry, op. cit., p. 187.*

31. *Ibid.*, pp. 188-189.

32. The Landis-Posner modification takes the following form:

$$\text{Lerner Index} = \frac{\text{Firm's Market Share}}{\text{Elasticity of Market Demand} + \text{Elasticity of Competitive Supply}\left(1 - \text{Firm's Market Share}\right)}$$

See Landis, W., and Posner, R., "Market Power in Antitrust Cases," *Harvard Law Review 94*, March 1981, pp. 937-996.

33. "Competition and Deregulation in Telecommunications Terminal Equipment," Statement of Lee L. Selwyn for submission to the record, House of Representatives Subcommittee on Telecommunications, Consumer Protection, and Finance, July 2, 1981, p. 16.

34. *Ibid.*, p. 17.

35. *Ibid.*, p. 17. It should also be noted that the Wirth Subcommittee applies the modified Lerner Index to MTS, WATS, and private line services and derives estimates of .67 to .93, depending on the assumptions made regarding elasticity of supply. See: *Telecommunications in Transition: The Status of Competition in the Tele-*

communications Industry, op. cit., p. 407.

36. Computations derived by author from FCC, *Common Carrier Statistics, 1980*, and from U. S. Department of Justice, *U. S. v. American Telephone and Telegraph Co., et al.*, Civil Action 74-1698, Plaintiff's Exhibit 4640, "Intercity Telecommunications Services Market, Market Shares, 1960-1979."

37. See Testimony of Kenneth B. Stanley, FCC Trial Staff Exhibit No. 1, CC Docket 80-633 (1982), Tables 5 and 6.

38. *Ibid.*, p. 23.

39. Stanley, K.B., "International Common Carrier Communication: Has the FCC Effectively Regulated Investment, Earnings, and Price?", *Energy and Communications in Transition*, East Lansing: Michigan State University, 1981, pp. 409-411.

40. Data supplied by MCI at the request of the author.

41. U. S. Department of Justice, *U. S. v. American Telephone and Telegraph Co., et al.*, Civil Action 74-1698, *Plaintiff's Third Statement of Contentions and Proof*, Volume I, January 10, 1980, pp. 648-676.

42. See: Kaiser, G.E., "Competition in Telecommunications: Refusal to Supply Facilities by Regulated Common Carriers," *Ottawa Law Review, 13,* August 1981, pp. 95-122.

43. See Williamson, O.E., "Predatory Pricing: A Strategic and Welfare Analysis," *Yale Law Journal 87*, (December 1977), pp. 284-340.

44. See Stoner, R.D., "Strategic Predatory Practices," *Challenges for Public Utility Regulation in the 1980s, op. cit.*, p. 359.

45. See Dirlam, J.B., "Predatory Pricing and Antitrust Policy: Economic Theory and the Quest for Certainty," *Economic Regulation: Essays in Honor of James R. Nelson*, Boyer, K. D., and Shepherd, W. G., eds., East Lansing: Michigan State University, 1981, p. 216. For Stoner's discussion of predation, see Footnote 4, *supra*.

46. Civil Action No. 74-1698, *Plaintiff's Third Statement of Contentions and Proof, op. cit.*, p. 920.

47. FCC Docket No. 20288, Final Decision, dated January 17, 1977, paragraphs 114 and 116.

48. *MCI Communications Corporation v. AT&T Company,* U. S. District Court for the Northern District of Illinois, Eastern Division, No. 74 C 633, June 16, 1980.

49. See Kiefer, D. W.,."The Impact of the Economic Recovery Tax Act of 1981 on the Public Utility Industry," Report No. 82-6E,

Congressional Research Service, Library of Congress. Washington, January 15, 1982, p. CRS-7.

50. Vertical business services include terminal equipment and CPE. Failure of revenue to cover direct costs of vertical business services suggests that the terminal equipment migration strategy embodies both discretionary power and cross-subsidization.

51. U. S. Department of Justice, *U. S. v. American Telephone and Telegraph Co., et al.*, Civil Action 74-1698, Plaintiff's Exhibits 4349, 4371, 4375, 4381, 4382, 4383, 4384, 4385, 4386, 4387, 4388, 4389, 4390, 4391, 4392, 4394, 4396, 4398, 4399, 4400, 4401, 4402, 4403, 4404, 4425.

52. *Telecommunications in Transition: The Status of Competition in the Telecommunications Industry, op. cit.*, p. 66.

53. *Washington Post,* March 10, 1981, pp. D7-10.

54. For a further discussion of bypass, see: Alleman, J. H., and Beauvais, E. C., "Local Loops as Barriers to Entry?" *Challenges for Public Utility Regulation in the 1980s, op. cit.*, pp. 324-340.

55. Hatfield, D. N., "Technology and Public Policy in Telecommunications," *Challenges for Public Utility Regulation in the 1980s, op. cit.*, p. 524.

56. *Telecommunications in Transition: The Status of Competition in the Telecommunications Industry, op. cit.*, pp. 208-211.

57. See Huettner, D. A., "Optimal Second Best Pricing of CATV Pole Attachments," *Southern Economics Journal 48*, April 1982, pp. 996-1015. For a discussion of AT&T pole attachment pricing strategies, see Civil Action No. 74-1698, *Plaintiff's Third Statement of Contentions and Proof, op. cit.*, pp. 1043-1052.

58. See *The Dilemma of Telecommunications Policy–An Inquiry into the State of Domestic Telecommunications by a Telecommunications Industry Task Force*, 1977, especially Table 5.

59. *Ibid.*, especially Table 4.

60. Hatfield, D. N., *op. cit.*, p. 524.

61. See *The Dilemma of Telecommunications Policy–An Inquiry into the State of Domestic Telecommunications by a Telecommunications Industry Task Force, op. cit.*, especially Table 2.

62. U. S. Department of Justice, *U. S. v. American Telephone and Telegraph Co., et al.*, Civil Action 74-1698, Defendant's Exhibit D-4-1518, Table entitled, "Estimated Percentage of Households with Basic Telephone Service."

63. For example, the revenues from Pacific Telephone's license contract fee increased 740 percent between 1965 and 1979.

64. Based on testimony before the Wirth Subcommittee in 1981. See: *User Needs and Concerns in Telecommunications Marketplace*, Hearings before the Subcommittee on Telecommunications, Consumer Protection and Finance of the House Committee on Energy and Commerce, 97th Congress, 1st Session, Serial No. 97-60.

65. See Spence, A. M., "Entry, Capacity, Investment and Oligopolistic Pricing," *Bell Journal of Economics 8*, Autumn 1977, pp. 534-544.

66. See Baumol, W. J., "Contestable Markets: An Uprising in the Theory of Industry Structure," *American Economic Review 72*, March 1982, pp. 1-15.

67. *Electronic News* (May 10, 1982, p. 1) reported that:

> "Since the Federal Communications Commission allocated two cellular licenses to each of 30 markets, with one automatically guaranteed to the local telephone company (*EN*, April 13, 1981), individual RCCs are scrambling for the remaining licenses, only to find that start-up capital of up to $20 million may be required to enter a single city market. The Commission begins considering applications for cellular licenses on June 7.
>
> "The cash crunch has triggered a rash of cooperative deals among the RCCs, between larger corporations such as MCI and Western Union, and resulted last week in one of the largest radio pagers, Radiofone Corp., Englewood Cliffs, N.J., agreeing to be acquired by Metromedia, Inc., a major broadcaster who last month agreed to acquire another RCC, Beep Communications . . ."

68. The extent of this advantage may soon be measured by the survivor test since SBS has announced plans for a digital network.

69. This does not imply that all carriers should be given the same quality of interconnection, since there may be a market for different levels of interconnection quality. It does require that all users of the local exchange have an opportunity to buy the same level of interconnection quality at the same price.

70. This could be accomplished by a self-sustaining fund similar to that used by electric utilities to finance energy conservation programs. It would give consumers the option of buying CPE and inside wiring on a cost-of-service basis.

71. For example, assume that it costs Carrier A 75¢ per message to transmit between exchanges 1 and 2, while it costs Carrier B $1.00 for the same message. Carrier A is 25 percent more efficient. If an access charge of 10¢ per message is imposed, then Carrier A's cost advantage drops to 23 percent. If an access charge of 50¢ per message is imposed, then A's advantage drops to 17 percent.

72. AT&T claims that the OCCs receive an unfair advantage since MTS and WATS make a substantial contribution to the local exchange through settlements and separations. The OCCs argue that they are given inferior local access and therefore overpay for the service received.

73. See Willig, R. D., "The Theory of Network Access Pricing," *Issues in Public Utility Regulation*, Trebing, H. M., ed., East Lansing: Michigan State University, 1979, pp. 109-152.

74. *Exchange Network Facilities Agreement,* 71 FCC 2d 440 (1979).

75. The development of adequate cost information at the local level has been hampered by the long history of relying on statewide ratemaking and value-of-service pricing. Early efforts by the Wisconsin Commission at cost-of-service pricing by exchange were frustrated by carrier opposition. See: *Re St. Croix Telephone Co.*, PUR 1916A, 552, and *Bogart v. Wisconsin Telephone Co.*, PUR 1916C, 1020. The move toward local measured service and the unbundling of exchange rates should result in more cost data being made available. Unbundling, deregulation, and usage-sensitive pricing should isolate the costs of CPE, inside wiring, and directory assistance, and permit a better understanding of how all costs vary with the number and type of customers, as well as with frequency, distance, and peak usage.

76. FCC has capped SPF in *Amendment of Part 67 of the Commission's Rules*, CC Docket No. 80-286 (February 24, 1982).

77. *MTS and WATS Market Structure,* FCC-CC Docket No. 78-72, Phase I, Fourth Supplemental Notice of Inquiry and Proposed Rulemaking, June 4, 1982.

78. See J. W. Wilson & Associates, Inc., *Telephone Service, Cost Study Manual (Preliminary Draft)*, Washington, D. C. (no date). Also, testimony of John W. Wilson before U. S. Senate Committee on the Judiciary, March 25, 1982.

79. The Melody-Gabel approach is discussed in Melody, W. H.,

"Cost Standards for Judging Local Exchange Rates," *Diversification, Deregulation and Increased Uncertainty in the Public Utility Industries*, East Lansing: Michigan State University (forthcoming).

80. The CRTC's regulatory treatment of separate subsidies for Bell Canada is contained in *Bell Canada General Increase in Rates*, Telecom Decision CRTC 81-15, Ottawa, September 28, 1981, pp. 28-32.

81. Another capital structure problem involves the question of whether AT&T's consolidated capital structure should be divided into one which is highly levered for the regulated operations, and much less levered for the competitive operations. It should also be mentioned that modern finance theory attaches little importance to diversification by the firm because the benefits of diversification can be handled through portfolio management.

82. For an analysis of diversification issues from the viewpoint of a state commission, see York, S., Dube, P., and Malko, J. R., "Electric Utility Diversification: A State Regulatory Perspective," *Diversification, Deregulation and Increased Uncertainty in the Public Utility Industries, op. cit.*

83. The initial debate over pricing guidelines to control cross-subsidization centered on the relative merits of fully distributed costs versus long-run incremental costs (incorporated in AT&T's burden test). This controversy terminated in FCC Docket 18128 (1976) with the selection of a fully distributed cost standard. A form of forecasted fully distributed cost, called Method 7, was chosen and applied to the major service categories. There were two problems with Method 7: (1) the difficulty of using forecasts to allocate plant, and (2) the reconciliation of forecasted costs with actual costs when reviewed on an *ex post* basis. In the *Multi-Schedule Private Line* case, Judge Miller recommended a new cost manual and system of auditing control, stating that AT&T had failed to implement the cost standards prescribed in Docket 18128. Miller also reported that there were more opportunities for expense manipulation than for facilities manipulation (Initial Decision, FCC Docket No. 20814, March 1979). Subsequently, the FCC adopted an interim cost manual based on Method 1 (fully allocated cost based on historic usage) for MTS, WATS, private line, and ENFIA. Method 1 eliminated the problems of forecasting and reconciliation but the interim manual also significantly reduced the number of service classifications. Wal-

ter G. Bolter provides an authoritative analysis of the efforts to develop a costing methodology. See: Bolter, W. G., "The FCC's Selection of a 'Proper' Costing Standard after Fifteen Years—What Can We Learn from Docket 18128?" *Assessing New Pricing Concepts in Public Utilities*, Trebing, H. M., ed., East Lansing: Michigan State University, 1978.

84. A similar concern over the need for a costing system to implement Computer II was expressed by GAO. See: U. S. General Accounting Office, "Can the Federal Communications Commission Successfully Implement Its Computer II Decision?" Washington, January 29, 1982, Appendix III.