

Detering Predation in Telecommunications: Are Line-of-business Restraints Needed?

Susan Gates, Paul Milgrom and John Roberts

Graduate School of Business and Department of Economics, Stanford University, Stanford, CA, USA

We analyze whether lifting the remaining line-of-business restraints in the Modified Final Judgment (thus permitting the Regional Bell Operating Companies to provide interLATA calling services and to manufacture equipment) would plausibly lead the RBOCs to practice predatory pricing. We assume throughout that the regulated portions of the RBOCs' business would be subjected to price-cap or similar incentive-based regulation and that equal access to bottleneck services would be enforced. Despite employing a very broad definition of predation, we find that it is highly unlikely that the RBOCs would profitably engage in predatory pricing.

The Modified Final Judgement (MFJ) of *US v. Western Electric and A.T.&T.* (entered 24 August, 1982) prevented Regional Bell Operating Companies (RBOCs), responsible for providing local telephone services, from engaging in three types of business activities: (1) the manufacture of telecommunications products or consumer premise equipment; (2) the provision of inter-exchange telecommunications services; and (3) the provision of information services. The restriction on the provision of information services was removed in July 1991. In this paper we analyze the likely effects on pricing behavior of lifting the remaining line-of-business restraints contained in the MFJ to permit the RBOCs to provide interLATA calling services and to manufacture equipment. In particular, we focus on whether such permission might lead the RBOCs to adopt predatory pricing.

Our analysis is based on two maintained assumptions about the regulatory environment: that the regulated portions of the RBOCs' business would be subjected to price-cap or equivalent incentive-based regulation and that equal access to bottleneck services would be enforced. We use an unusually broad definition of predatory pricing, encompassing all pricing behaviors intended to injure or curtail competition. We find that it is

highly unlikely that the RBOCs could profitably engage in predatory pricing, either as we broadly define it or as more narrowly defined by federal courts in antitrust cases, where an additional cost-based test is imposed. In view of current trends, arguably the greater danger to competition in interLATA calling comes from the planned vertical integration of existing interLATA carriers providing local wireline or wireless calling services. Their integrated structure and first-mover advantages may enable them to establish and maintain uncompetitively high prices for interLATA calling services.

The first section of this paper describes the economic rationale behind various predatory pricing strategies. The second section outlines some of the relevant characteristics of the markets in question. The third section then examines the potential for predatory pricing behavior by the RBOCs in the interLATA and telecommunications equipment markets. The fourth section concludes.

POTENTIAL PREDATORY PRICING STRATEGIES

For the purposes of this analysis, we define predatory pricing broadly as an attempt by a firm to

reduce long-run, future competition by temporarily reducing prices. The reduced prices mean that the firm practicing predation earns lower short-run profits than might otherwise be possible. The firm chooses to sacrifice short-run profits and incur temporary economic losses in an attempt to increase its future profitability, either by inducing current competitors to exit or complete less aggressively or by deterring the entry of future competitors.

Our definition of predatory pricing requires only that the firm price at a level lower than it would if it were not attempting to reduce competition. In particular, price need not be below some accounting measure of cost. This definition is suggested by recent theoretical work in industrial economics. It is a broader definition than those typically used by antitrust courts. It is also one that is more useful for a prospective analysis of the likely effects of lifting the MFJ's line-of-business restrictions. Because our definition of predatory pricing is broader, it leads to a test for predation that is more likely to be satisfied than traditional legal tests. A finding that no predatory pricing would occur under the broader definition thus implies that antitrust violations are especially unlikely to follow the lifting of the line-of-business restrictions and that even aggressive pricing that damages competition but is legally permissible is unlikely to occur.

As is usual in economic analyses of industrial competition, we assume throughout that firms try to maximize the present value of their present and future profits. A firm will rationally forego possible profits in the short run to increase future profits only if there is a reasonable likelihood that future profits will compensate for the foregone short-run returns.¹ A number of scholars (e.g. McGee, 1958, 1980; Bork, 1978) have argued that, in general, predation is unlikely because there will typically be little realistic possibility of recouping the short-term economic losses it entails. However, more recent research based on explicitly strategic (game-theoretic) models of competition has identified several mechanisms through which temporarily low prices can reduce future competition and thereby increase profits.² We label these as *deep-pocket* scenarios, *expectational* and *informational* scenarios, and *cross-subsidization* scenarios, and we discuss the logic of each in turn. Although these arguments do suggest that predation is logically possible, we find that they

require stringent conditions to be met for it actually to prove profitable—conditions that are not met in the telecommunications industry.

Deep Pockets

In the 'deep-pockets' or 'long-purse' scenario (Telser, 1966; Benoit, 1984) predatory prices impose actual losses on competitors who, either fearing or actually experiencing bankruptcy, leave the market. Several requirements must be met for predation to be successful in a 'deep-pocket' scenario.

First, the predator must be able to impose losses on the competitor by cutting prices and forcing the competitor either to match the predator's price cuts or to maintain its prices and lose market share. There are many instances in which price cutting will not impose losses on the competitor. For one, price cutting will be ineffective if the competitor's customers are tied to it by contracts or if switching costs make it expensive for customers to change suppliers to take advantage of temporary price cuts. Even in the absence of such contracts and switching costs, a sophisticated customer whose purchases form a large share of demand may still resist the predatory attempt. Realizing that the predator, if successful, will charge even higher prices once its predatory strategy succeeds, sophisticated customers who recognize that their business may be important to the survival of the target firm will continue to deal with it despite its relatively higher prices. Finally, even in cases where customers are neither sophisticated nor tied to the target firm, the competitor may be able to defend itself against the predator's temporary price cut by temporarily redeploying its assets.

In cases where price cutting can successfully impose losses on a competitor, the deep-pocket scenario also requires that the competitor be less able to absorb losses than the predator. If the two firms are equally efficient, then the predator will suffer losses equivalent to those suffered by the competitor as a result of the pricing strategy. If the competitor has 'deeper pockets', that is, better access to financial resources relative its size than does the predator, this strategy will not be viable. For example, attempts at deep-pocket predation may be futile if the competitor is earning revenues in excess of costs in other markets, has cash reserves or assets that can be sold to raise

cash, or has access to external sources of financing. Thus, in general, this sort of predation aimed at large, well-established and well-financed firms is unlikely to succeed and thus is unlikely even to be attempted. Predation is also unlikely to occur in cases where the predator has significantly higher costs than a competitor. Such a predator would lose more per unit sales than its competitor. Under these circumstances it would be doubly difficult for the predator to drive the competitor into bankruptcy while maintaining its own financial viability. Thus, predation aimed at bankrupting a more efficient competitor is unlikely to succeed or be attempted.

Even if the deep-pocket predator could force a competitor into bankruptcy, that may not be enough for a successful predatory strategy. The bankrupt competitor may simply reorganize and return to the market. Other competitors may remain in the market or, if there are low barriers to entry, new competitors may enter. In each instance the predator would find it difficult to recoup the profits it lost during the predatory episode by raising its prices and keeping them elevated.

The cost of executing a deep-pocket strategy may be prohibitive even where there are entry barriers that allow the firm to maintain its elevated price in the long run after ousting the competitor. If the competitor has large sunk costs and relatively low incremental costs of supplying additional output, the competitor will still prefer to stay in the market as long as possible to recover at least some of those sunk costs, even at very low prices. Finally, to the extent that aggressive deep-pocket pricing is subject to sanctions under antitrust law, this is another significant deterrent to attempting it.

Expectations and Information

Predatory pricing can also be a rational strategy in the context of expectational and informational scenarios. Low current prices might reduce future competition by affecting competitors' beliefs about the profitability of entry or continued presence in the market. By setting low current prices that reduce the profits of current competitors, a company may manipulate its competitor's expectations about future prospects in the hope of deterring their entry or expansion.

One way for an incumbent to alter competitors' perceptions is by establishing a reputation for aggressive pricing (Scherer, 1980; Kreps and Wilson, 1982; Milgrom and Roberts, 1982b). Firms contemplating entering a market might decide that entry is not worth-while if experience leads them to expect the incumbent to cut prices significantly in response. This expectational scenario is most applicable when the incumbent foresees an ongoing threat of additional entry, either in the given market or in others in which it operates. It is least plausible in single markets where there are relatively few potential entrants.

A predatory pricing strategy designed to establish a reputation for aggressive pricing is less likely to be used in markets with multiple incumbents than in those with a single incumbent. If a predator cuts prices widely to force losses on an entrant in a market with multiple incumbents, it runs the risk that its pricing policy will lead to more intense price competition among the incumbent firms. In the event that it reduces prices in a focused way and successfully drives out the new entrant, it bears all of the cost of its actions but must share the benefit of reduced competition with the other incumbents.

Even in cases where a firm can reap substantial benefits from a reputation for aggressive pricing, such a reputation may be difficult to establish. Potential entrants must believe that the aggressive pricing behavior observed in the past will occur again. Where circumstances are thought to differ across entry attempts, and where it is thought that the incumbent has found its predatory strategy to be very costly, potential entrants may view the aggressive pricing as a one-time occurrence.

Differences in the distribution of information across firms can also create an incentive for predatory pricing. Firms considering entering a market or continuing to compete in one are typically concerned with their rivals' costs, since cost differences among competitors are an important determinant of long-run profits. Firms often lack accurate information about their rivals' costs. An incumbent's costs may not be directly observed by the potential entrant but may be inferred from indirect evidence such as price. Similarly, established firms may infer a new entrant's costs from the prices it charges. When rivals lack information about a firm's costs, the firm's use of a

low-price strategy might give the impression that it has lower cost than its rivals, thereby deterring entry or inducing exit of current competitors (Milgrom and Roberts, 1982a; Roberts, 1986). Such behavior is predatory under our definition, even if it does not involve prices that are below actual costs.

Sophisticated rivals are likely to recognize that an incumbent firm's reduced prices in the face of new entry are not indicative of particularly low costs, in which case the low prices would not damage competition. Similarly, an incumbent would recognize that a new entrant's very low prices may not reflect especially low costs and so will be unlikely to cede it market share. Again the low prices would not damage competition.

Cross-subsidization

The final set of mechanisms through which temporarily low prices can reduce competition is reflected in cross-subsidization scenarios. These often involve some other rationale for predation, with the cross-subsidization making the predatory strategy more attractive than it otherwise would be.

Cross-subsidies are traditionally a concern when a firm operates in several markets, one or more of which is a monopoly. A common argument is that such a firm may be especially likely to practice predation because it can raise prices in its monopoly market to finance predatory activities in other markets. This argument, however, makes little economic sense. If the firm is not regulated and is already maximizing profits in its monopoly market, it cannot increase profits in that market, whether to finance predatory losses or for any other purpose. If the firm is regulated in its monopoly market, however, its pricing there may not maximize profits. Raising prices in the regulated market could then increase profits, but regulators would resist price increases aimed at financing predation. Thus, the unembellished general argument that a firm—regulated or not—would raise prices in its monopoly market to finance predation is incorrect.

There are, however, three ways in which monopoly power in one market might, in particular circumstances, make predation in another market more likely.

In the first scenario, the availability of profits from another market—regulated or non-regu-

lated—is crucial in allowing an incumbent firm to finance its temporary losses from a predatory strategy. The predator is able to finance actual operating losses in the market in question only because it receives current profits from other markets. This scenario of predation financed by current profits is relevant only under special conditions. First, the firm must find predation to be profitable; otherwise, the ability to finance it is irrelevant. Second, the strategy must involve negative cash flows for the predator that require financing; mere economic losses are not enough. Third, the predator must have limited cash or other liquid assets with which to finance these losses, and limited access to the financial markets and bank loans; otherwise, the predation can be financed without relying on profits from the other market. All these conditions must be met before the existence of profits from one, possibly regulated, market would influence the firm's decision to undertake cross-subsidized predation in another market.

In the second scenario, the availability of profits from a market subject to rate-of-return regulation lowers the cost of adopting a predatory strategy in another market. Regulators may allow the firm to increase prices and earn higher profits from the regulated market when it preys on the unregulated market. These profits would allow the firm to offset all or part of the costs of predation (Averch and Johnson, 1962). As with the previous scenario, several conditions must be met before such predation could actually be attractive. First, the firm would have to fool regulators into allowing it to increase its prices in the regulated market when its costs in the unregulated market rise or profits fall. It is unlikely, however, that the regulators will knowingly allow the firm to allocate costs in the unregulated sector to the customers of the regulated monopoly business. Second, the firm must believe that predation will succeed in the unregulated market, notwithstanding the obstacles discussed above. Third, the firm must also believe that, should predation succeed, regulators will not then demand that profits in the unregulated market be used to reduce rates and lower profits in the regulated market. The conjunction of the first and third assumptions is particularly demanding. Note too that this strategy loses its appeal entirely when rate-of-return regulation is replaced with price-cap or other, incentive-based, regulation.

The third case in which predatory cross-subsidization may be attractive is where the service or product produced by a firm in a monopolized 'upstream' market is an important input to the production of a service or product in a 'downstream' one. This monopoly extension scenario arises when a firm reduces competition in a downstream market in order to increase the profits it earns from an upstream one. Some economists have argued that if a firm has a non-regulated upstream monopoly and the downstream market is competitive, the firm has no incentive to monopolize the upstream market in an effort to dominate the downstream market in which the input is used. There is only a limited amount of profit that can be achieved from the two markets, even if both are monopolized by the same firm; control of the upstream market alone should allow the firm to extract the full upstream monopoly profits that could be earned from the two markets together (Spengler, 1950; Blair and Kaserman, 1983).

This generally powerful argument loses some of its force, however, if there are substitutes for the monopolized input or if the downstream market is less than perfectly competitive. In these cases, the upstream monopolist will not be able to extract all the profits available from both markets. It may then have an incentive to integrate forward. If it does so, it will rationally choose to charge a lower price to its affiliate in the downstream market than to competitor firms. This price discrimination, however, is generally not predatory.

Additionally, if the upstream market is regulated, it is unlikely that the upstream monopolist will be able to use its dominance of this market to set prices in a way that permits it to extract the full two-market monopoly profit. Instead, the firm might find it attractive to enter the downstream market using a non-regulated affiliate. Of course, any downstream monopoly profits are equally available and equally attractive to any firm that could monopolize this market. Thus, control of a regulated upstream market has little impact on the incentives for trying to control the downstream market, whether by predatory means or not. If regulators are ineffective at preventing cross-subsidization and price discrimination, the regulated upstream monopolist may have an incentive to charge prices that favor its unregulated downstream affiliate. This pricing practice would

be most likely to occur under rate-of-return regulation, because it allows the regulated company to evade the profit cap by effectively transferring profits to its unregulated affiliate. Even under rate-of-return regulation, however, the regulators would want to prevent this sort of cross-subsidization.

ECONOMIC CONDITIONS IN THE INTERLATA AND TELECOMMUNICATIONS EQUIPMENT MARKETS

The general propositions outlined in the previous section indicate that a strategy of predation may be worthwhile in some circumstances. However, they also suggest that specific conditions are needed to make predation attractive. The issue at hand is whether these conditions prevail in the case of the RBOCs and, more importantly, whether they are likely to prevail in the foreseeable future. Only if the theoretical conditions are met is there any reasonable likelihood that the lifting of the line-of-business restrictions might result in the RBOCs adopting predatory pricing strategies.

In this section we examine the economic conditions in these markets. Based on our analysis here, we argue in the next section that, in the circumstances that prevail in the relevant markets (and, more significantly, in those circumstances that are likely to prevail in the future), the threat of predation is negligible in those jurisdictions that enforce equal access to bottleneck local services and that maintain price-cap or similar, incentive-based, regulation. The danger is potentially significant only when rate-of-return regulation is employed *and* when the regulators would be ineffective in preventing an RBOC from charging the costs incurred in its unregulated businesses to its regulated businesses.

It is worth noting, in any case, that if the line of business restrictions are economically costly, then the mere logical possibility that the RBOCs *might* adopt predatory strategies cannot suffice to justify them. If the relevant markets for interLATA and equipment are highly concentrated and the RBOCs are effective potential competitors, and especially if the RBOCs are also losing control of the bottleneck services that they previously provided on a monopoly basis, then the greater threat

to competition comes from *maintaining* the line-of-business restrictions and thereby restricting competition in the markets from which the RBOCs are barred.

Historically Prevailing Conditions in Relevant Markets

The MFJ currently prevents the RBOCs from competing in the provision of interLATA telecommunications services and in the manufacture of telecommunications equipment. Meanwhile, these firms are currently active in providing local wireline telephone service, certain information services (such as voice mail), cellular telephone service, and related businesses. In many cases, the companies involved are organized so that the provision of local telephone service is done through a dedicated subsidiary subject to regulation by state authorities, while other markets are served by unregulated subsidiaries.³ A major element in the revenue of the regulated firms has been access charges that they receive from long-distance carriers using the RBOCs' local networks to initiate and complete calls. Access charges amounted to over 23% of RBOC revenues in 1992 (NATA, 1993, p. 49). The other major revenue element (amounting to 41% of revenues (NATA, 1993), is receipts from customers for provision of local service. These rates are regulated by the states. It is generally acknowledged that access charges exceed the costs of providing connection to the long-distance companies' systems and that the resulting revenues have been used to subsidize local rates, particularly for residential customers. There are often claims as well that rates for commercial telephone users exceed costs and subsidize residential service.

The RBOCs, and AT&T before them, historically had regulated, legal monopolies for the provision of local telephone service. It has traditionally been argued that the network of wires and switches needed to accept calls from and direct calls to specific local users creates a natural monopoly: A second firm in the market would have to duplicate the RBOC's investment in a local network, and that would be wasteful. Regulation was then deemed necessary to prevent the local monopolists from abusing their position. To

prevent the RBOCs from using their supposed natural monopolies over local service to compete unfairly in other services, the MFJ also forbade the RBOCs from entering some lines of business and allowed them to enter others only through separate subsidiaries that were subject to various restrictions and requirements. The RBOCs also are required by the FCC to provide access to their local networks on a nondiscriminatory basis and to disclose technological and other relevant information in a timely fashion to other firms.

New Competition in Local Service

Recent and continuing technological changes have substantially altered this situation. Wireline services through the local exchange are no longer the only major route to service private telephones. Since the introduction of cellular telephony in 1982, the number of cellular telephone subscribers has grown rapidly, so that by the end of 1993 there were over 16 million subscribers (Advanced Wireless Communications, 1994; Cellular Telecommunications Industry Association, 1994). Specialized mobile radio (SMR) subscriptions raise the figure by another 1.3 million (Merrill Lynch & Co., 1993). As new digital technologies are introduced to improve the quality and capacity of transmission, and as the size of the cells is reduced to increase capacity even more, cellular telephony offers a partial alternative to wire-based local networks, both for local calls and for connecting to long-distance services. Crucially, cellular telephony is not a natural monopoly. To date, FCC regulatory practice has resulted in two competitors operating in most markets, and more competition is technologically feasible.

In addition, competitive access providers (CAPs), which purchase blocks of capacity from the major interLATA carriers and then sell access to end-users, have constructed direct links to the long-distance carriers, bypassing the RBOCs' local telephone networks, providing lower costs and additional services for business callers and reducing the significance of the local exchange bottleneck. Recently, MCI, one of the three major long-distance companies, announced that it intends to invest billions of dollars in extending its long-distance fiber-optic network down to the

level of the individual user, providing additional bypass opportunities (Keller, 1994).

Further, the Federal Communications Commission has already begun to assign licenses to 120 MHz of radio spectrum in the 2 GHz range for personal communications services (PCS), an enhanced form of cellular telephony for use with voice and data transmission services.⁴ The so-called 'build-out requirements' imposed on operators to retain these licenses ensure that they will be deployed rapidly to provide services to local telephone customers. Services must be made available to at least one-third of the population of the license area within five years, at least two-thirds within seven years, and at least 90% within ten years.⁵ In the most densely populated areas, the desire to obtain first-mover marketing advantages is likely to lead to even more rapid build-out of the systems.

Still more spectrum—another 200 MHz—is required to be transferred from federal agencies to the FCC for licensing to the private sector, bringing the total to 320 MHz.⁶ For purposes of comparison, only 50 MHz is currently allocated to cellular telephony, which is enough to serve over 16 million customers, with excess capacity left over. Adding 320 MHz to the current 50 MHz represents an immense increase in capacity, especially when it is recognized that technological improvement and reductions in cell sizes mean that the carrying capacity per MHz will be much higher than under existing systems.

The net result is that the new PCS services will be widely available and will have very large capacity. Even household customers will be able to bypass the wireline system. Initially this bypass might be only for household connections to long-distance services; but eventually, regulation permitting, PCS services could provide full competition to wireline services in the local telephone markets. Thus, numerous alternatives to the local wire network are already coming into existence.

Further, although currently barred by law from providing local telephone service, the cable television companies are increasingly laying fiber-optic networks that could carry two-way information flows and thus compete with the local wire network. Such competition is growing rapidly in the United Kingdom, where as of 1 January 1994 cable television operators were providing 314,381 access lines of telephony service over their cable

systems (Independent Television Commission, 1994). In the United States, a consortium consisting of the interLATA carrier Sprint and several cable television companies was formed to bid for spectrum rights to provide a wireless telephone service.

Changing Patterns of Regulation

Until 1991, the norm of regulation of the RBOCs was rate-of-return regulation. Prices were approved to permit the regulated firm an allowable rate-of-return on its capital. Rate-of-return regulation provided little incentive for cost control, and it was alleged to be subject to manipulation that would permit cross-subsidization. For example, a firm operating under rate-of-return regulation might charge an unremunerative price to an unregulated affiliate. If the regulator did not discover this, the regulated firm's reduced earnings would then be the basis for an increase in price in the regulated markets. Meanwhile, the low price on the input bought from the regulated firm would permit the unregulated affiliate to earn superior returns or to price at levels that competitors could not profitably match. Of course, the regulators would monitor the firm in an attempt to prevent manipulations of this sort, but monitoring is a complex task and failures of the monitoring system surely occurred.

More recently, most state regulators have adopted price-cap regulation or a related form of incentive-based regulation. In essence, price-cap regulation involves establishing maximum (and, possibly, minimum) prices for categories of services and providing the company freedom to set prices as it wishes within that range. The allowed prices are then reduced in inflation-adjusted terms over time to reflect a target rate of reduction in the costs of providing various services and products. This approach is favored because of its incentive properties (firms have an incentive to increase efficiency because their prices are not required to fall immediately when they lower costs, and do not rise automatically when costs increase). The system also makes cross-subsidization less attractive because a decline in revenues arising from an attempt to cross-subsidize does not provide a basis for a rate increase.

California, Michigan, Montana, North Dakota, Oregon, Rhode Island and New Mexico now

operate according to price-cap regulation.⁷ More than 20 other states have adopted hybrids intended to capture most of the advantages of price-cap regulation while allowing the public to enjoy more of the gains from any unanticipated technological innovations. As of summer 1994, Illinois, Iowa, New Hampshire, New York and South Carolina, a large share of the states where traditional rate-of-return regulations was still in place, had initiated proceedings to establish flexible regulation.⁸

Current Competition in the InterLATA Market

The interLATA calling market is currently dominated by AT&T, MCI and Sprint. There is also a fringe of a large number of resellers—'Competitive Access Providers' that buy access to the long-distance networks in bulk at wholesale and then resell to individual users at retail prices. Each of the three major long-distance companies has constructed an extensive national network of long-distance lines. Increasingly, these are fiber-optic lines with immense capacities. For 1992, AT&T had annual revenues of \$64.9 billion and total assets of \$57.2 billion (AT&T Corp., 1993). Its corporate debt has a Standard and Poor's bond rating of AA. For the same year, MCI and Sprint had revenues of \$10.6 and \$9.2 billion, respectively; their total assets were \$9.7 and \$10.2 billion, respectively (MCI Communications Corp., 1993; Sprint Corp., 1993). Sprint had a rating of A on its corporate bonds, while MCI had not issued any pure corporate debt, relying on convertible bonds instead, which were rated BBB+.

Besides these companies, GTE was active in both local and long-distance calling from 1984 to 1992, when it owned part, and later all, of Sprint. During this time there were no findings that GTE's activity in both markets led it to behave anticompetitively. The GTE experience is direct evidence that participation in both local and long-distance markets does not necessarily lead to predatory behavior.

Current Competition in the Telecommunications Equipment Market

The market for telecommunications equipment involves many different submarkets. Increasingly,

many of these are becoming global markets, and many are increasingly dominated by a small number of strong firms. For example, the key market for central office switches has seen extensive consolidation. AT&T and Northern Telecom dominate the market, with 1992 market shares of 48% and 39% respectively (NATA, 1993; Northern Business Information, 1993a). The next-largest suppliers, Ericsson and Siemens, hold only a 6% share and 5% share, respectively (NATA, 1993, note 9, p. 200). On the buyers' side, no RBOC accounts for more than about 11% of purchases in the United States in a typical year (Northern Business Information, 1993a, p. 70), and that share becomes smaller when one considers buyers in all countries that have adopted the North American Standard.

Other parts of the equipment industry are highly competitive, with many producers active and few apparent barriers to entry. An example is the manufacture of simple telephone sets for residential use, which is highly competitive and international in scope. The market for key systems (multi-lines telephones used to provide intra-office links and to route outside calls through a central operator) is also very competitive, with a large number of producers and, typically, small profit margins. The three largest firms in terms of market shares are AT&T, Northern Telecom and Executone, with 1992 market shares of 23%, 14%, and 11% respectively (NATA, 1993, p. 163). In private branch exchanges (PBXs), AT&T has 29% percent of the market, Northern Telecom has 25% and Siemens has 16%; NEC, MITEL and Fujitsu each has a market share of between 4% and 6% (NATA, 1993, p. 153).

In fax machines, the ten largest producers worldwide include eight major Japanese corporations plus Xerox and Pitney Bowes. Together, the four largest firms have just over 60% of the global fax machine market (NATA, 1992). In cellular equipment, Ericsson, Motorola and AT&T are the major players (EMCI, 1994). In transmission equipment and systems, fiber-optic technology is becoming dominant. The fiber itself is produced under license from Corning. AT&T is the leading producer of fiber-optic transmission systems and the runner-up in the fiber cable market. A variety of major firms are involved in each of these areas as well (Northern Business Information, 1993b). A large number of firms are active in the components markets.

THE POSSIBILITY OF PREDATORY PRICING BY THE RBOCS

In this section we examine the possibility of predatory pricing by the RBOCs in light of the theory expounded in the first section and the market characteristics outlined in the second. We consider both the market for interLATA telecommunications and that for equipment.

The InterLATA Market

The possibility that predatory pricing by a RBOC might drive any of the current interLATA carriers into bankruptcy is extremely remote. As noted, all three carriers are major firms with substantial assets and excellent access to the financial markets. They would not be easily bankrupted. Further, to the extent that the established firms' existing customer bases give them larger volumes and lower costs because of economies of scale in the fiber-optic networks, the RBOCs would, at least initially, be at a cost disadvantage relative to their presumed prey. This makes attempts at predation aimed at bankrupting the target particularly unlikely.

The possibility that a RBOC that had established itself in the interLATA market would attempt to bankrupt any later entrants also seems unlikely. At this point, the RBOC would be one of several carriers (at least four, and perhaps as many as ten if all the RBOCs were active), and in all likelihood, given the cost structure, not one of the largest ones. A predatory effort would be costly to the RBOC, and the benefits would be shared by all the existing carriers. It is very unlikely that an RBOC in this situation would find the costs of attempted predation to be justified. Thus, the deep-pocket scenario for predatory pricing is inoperative.

Furthermore, the spread of price-cap regulation means that if there ever was a possibility of financing losses incurred in predatory pricing in the interLATA market by raising local rates, it is rapidly disappearing. Even where rate-of-return regulation survives, the regulators have an incentive to prevent such cross-subsidization. Moreover, the local monopoly that the RBOCs have had over telecommunications is being eroded, and with it, the market power needed to make cross-subsidization possible.

Thus, if predation by the RBOCs in the interLATA market is to be profitable, it cannot be due to a deep-pocket or cross-subsidization scenario. Successful predation would therefore have to occur through an expectational or informational scenario, in which the firm influences rival firms' perceptions of future competitive conditions and future profitability. Recall that theory suggests that one mechanism through which this might occur is the incumbent's building a reputation for predation that induces exit, deters entry or encourages rivals to accommodate entry by the predator for fear of facing similar, aggressive behavior. The other mechanism involves creating the belief that the predator has especially low costs and therefore that its implicit claims to a large market share under normal competition cannot successfully be countered. Neither scenario accurately describes the interLATA market.

Consider first the reputation scenario. It is unlikely that one of the RBOCs could persuade one of the existing interLATA carriers (AT&T, MCI or Sprint) that it was such a tough competitor that the firm would do better to withdraw from the market. According to standard economic analysis, a firm closes down its operations only when the revenues are insufficient to cover its average variable costs—excluding fixed costs. Given the large infrastructure investments required for long-distance service, which imply correspondingly large fixed costs, it would take huge and quite visible price reductions to force a firm to shut down or even to scale back its operations. Moreover, even if the firm operating a particular fiber-optic network were forced into bankruptcy, another firm might be able to acquire the network and continue to operate it, since optical fiber has a long useful life.

Second, the reputation theory relies on there being numerous opportunities to use reputation to affect actual or potential competitors' behavior and thus offset the costs of creating the reputation. This condition does not seem to be met in the case of an RBOC entering the interLATA market. Whether it seeks to provide a nationwide service or to serve customers only in its own territory, there is no sequence of entry opportunities for the RBOC to use to exploit a reputation built by a costly predatory battle.

It could be suggested that, once the RBOC is established in the interLATA business, it might

seek to deter future entrants by responding in a predatory fashion to any entry attempts by other firms. Yet this too is implausible. Again, once the RBOC is established, it would be only one of four to ten firms in the industry and not the largest. Consequently, the benefits of deterring entry would be shared widely, which means that they would be unlikely to justify the RBOC's costs in building a reputation for aggressive responses to entry.

The other mechanism through which predation aimed at influencing perceptions theoretically could work would be signaling that the predator has especially low costs. This mechanism relies on the existence of uncertainty on the part of the predator's rivals about its costs and also on these rivals being unsophisticated about their inferences, ignoring the incentives that the potential predator has to attempt to bias their estimates. Neither of these factors seems relevant to the interLATA market. The relevant technologies are well known, and the interLATA carriers are large, sophisticated corporations.

Thus, conditions in the interLATA market indicate that there is little reason to expect that the RBOCs would have any effective incentive to act in a predatory fashion were they to enter this market. Their control of the local wire networks does not alter this conclusion. There is little chance of an RBOC being able to bankrupt one of the existing interLATA carriers by aggressive pricing. Even if it could finance such an effort by earnings from its local monopoly, an RBOC would have no reason to make the effort. Further, the regulators would have every reason to prevent cross-subsidization, and the spread of price-cap and other forms of incentive regulation increases the likelihood that such cross-subsidization would not be possible. Furthermore, the local monopolies are eroding, and with them the possibility of tapping any monopoly profits to finance the predation. The control of the local network also does not make a reputation for predation easier to establish or more valuable to have, and so it cannot influence the incentives to practice predation based on this logic. Nor does the control of the local market increase the effectiveness or attractiveness of trying to bias rivals' beliefs about costs in the interLATA market.

In principle, as noted above, a monopolist may have incentives to integrate forward into markets using its products or services as an input. This is

especially the case when the firms in the markets in question are not competing vigorously and when they can find competitive substitutes for the monopolist's product. Further, were the monopolist to integrate forward, it would have reason to charge lower prices to its affiliate than to other firms competing with it. Yet, as also noted, there is no reason to expect that the integrated firm is more likely to be predatory (by either our broad definition or by the narrower one used by the courts) than would an independent firm in the downstream market.

The greatest danger from integration by an RBOC into interLATA services is that it would favor its own interLATA affiliate with respect to access charges or service quality. This practice is not predatory *per se*, so we do not investigate it in depth. Nevertheless, the best way to control it is likely to be regulation of the sort already in place, rather than banning RBOC provision of interLATA service. Existing regulations requiring the RBOCs to give nondiscriminatory access to their local wire networks serve to limit or prevent discrimination in access charges and service. Price-cap and other forms of incentive regulation are largely immune to the danger of the RBOCs using below-cost pricing to a long-distance affiliate combined with cross subsidization. Even where rate-of-return regulation is still in place, regulators will have every reason to prevent such cross-subsidization. Finally, of course, the erosion of the RBOCs' monopolies ultimately removes the whole basis for this concern.

Equipment Markets

The prospects of the RBOCs practicing predatory pricing in the telecommunications equipment markets are equally remote. In the market for switches, the economic analysis is essentially the same as for the interLATA market; the market for switches is extremely concentrated and served by giant firms with extensive experience and massive financial resources. Consequently, the deep-pocket scenario provides no likely basis for predatory pricing. Cross-subsidization is unlikely for the reasons we have already described. Informational and expectational scenarios that depend on misleading potential competitors or facing them in a sequence of markets are similarly inapplicable. Also, as in the market for interLATA services, the usual economic analysis implies that

new competition would have a salutary effect on industry performance.

Predatory pricing in the markets for customer premises equipment is even less of a concern, because there is little reason to believe that an RBOC entering one of these markets would have the sort of position that would give it incentives for predation. In handsets, there are no apparent barriers to entry such as are needed to make predation worthwhile. In the PBX and key systems markets, the participants are large, sophisticated and well-financed firms that cannot be easily bankrupted or fooled.

Finally, in transmission equipment, fiber-optic technology is sure to be the relevant market. The major presence of AT&T in all aspects of this market implies that the RBOCs (1) are highly unlikely to become dominant players that might attempt to reduce competition to the benefit of all existing participants, (2) are unlikely to be able to bankrupt their key competitor, and (3) are unlikely to be able to bias competitors' beliefs about costs. Nor is it likely that the RBOCs could use the fact that they might be important customers in this market (especially if they were also allowed to provide interLATA service and thus had to build major networks) to subvert the intent of state regulation. To do so, the RBOCs would have to pay inflated prices for the transmission systems and then fool the regulators into allowing them to raise local rates to compensate. This should be easy to prevent, especially given that there are other providers of these systems whose prices the regulators can use for comparison.

CONCLUSION

Even using the very expansive definition of predatory pricing that we have adopted here, there is little danger that the RBOCs would adopt predatory pricing in any of the relevant markets if the line-of-business restrictions in the MFJ were lifted. The danger of predation becomes even more remote if regulators can enforce nondiscriminatory access to the local networks and prevent cross-subsidization. Further, with the erosion of the local exchange monopoly, which is now occurring, the possibility of predation grows increasingly implausible. For these reasons, we concluded that the interLATA and manufacturing

bans could be eliminated without any appreciable danger of predatory harm to consumers or the competitive process.

NOTES

1. The Supreme Court recently recognized that successful recoupment requires good long-term prospects of reducing competition in *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 114 S. Ct. 13 (1993).
2. For more detailed surveys of this research, see Milgrom (1988), Milgrom and Roberts (1990) and Ordovery and Saloner (1989).
3. This organization was mandated in considerable degree by the decision in *United States v. Western Electric Co.*, 604 F. Supp. 256 (DDC 1984), which imposed strict organizational requirements on RBOCs seeking to enter unregulated businesses. Those restrictions were relaxed in *United States v. Western Electric Co.*, 900 F.2d 283 (1990).
4. The first license awards were announced by the FCC on December 23, 1993 in the form of pioneer preference awards to serve the New York, Los Angeles-San Diego, and Washington-Baltimore major trading areas. Amendment of the Commission's Rules to Establish New Personal Communications Services, Third Report and Order, Gen. Dkt. No. 90-314, FCC LEXIS 1348 (1993). The auction sales of the remaining licenses for broadband personal communications services began on December 5, 1994.
5. Amendment of the Commission's Rules to Establish New Personal Communications Services, Second Report and Order, Gen. Dkt. No. 90-314, 8 FCC Rcd. 7700, 7754 ¶134 (1993). See also Merrill Lynch & Co., (1993, note 10, p. 14).
6. Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, §113(b)(1), 107 Stat. 312 (1993) (codified at 47 USC §923).
7. New Jersey has adopted a system of incentive regulation that incorporates some price cap features. *National Regulatory Research Institute Update to the Maine and Missouri Reports on Alternative Regulation Plans in Telecommunications* 47 (June 1993) (prepared at the request of the NARUC Staff Subcommittee on Communications).
8. *Ibid.*
9. AT&T's share includes AG Communications, of which AT&T owns 80%.

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