Chapter 2

THE FUTURE OF TELECOMMUNICATIONS REGULATION

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The deregulation mood of the late 1970s and the dissolution of the Bell System as part of the settlement of the government's antitrust suit against AT&T have caused some significant changes in the content of the ongoing debate over telecommunications policy. Perhaps most significantly, devotees of the communications industry can no longer complain that their hobby horse is receiving less attention than it deserves in the policy arena. Telecommunications, broadly defined to include computing, is basking in the sunlight of substantial attention, especially in Congress, but also in the courts and in the Department of Justice. Of course, this too shall pass, but in the meantime, there is some chance that the posture of public policy for the next decade or two is now being determined, and that it will be decided in a manner that is relatively open and informed by evidence and analysis. This means that it is time for scholars to put up

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or shut up about what their work has to say about the proper role of public policy in the new regime.

The second major change in the public dialogue is that there is no longer any serious question about whether competition or franchised, regulated monopoly is the long-term industry structure for which public policy should be aiming. In contrast to the situation of a few years ago, all the major players—except the military, state regulators, and some die-hard engineers—seem now to believe that in the future the telecommunications business will be more or less competitive. The main issue of concern, over which rousing battles can still be waged, is how to get there, how fast to move, and what, if anything, will remain as a "residual" of natural monopoly.

This article provides no definitive answers to these questions. Indeed, the state of the science is such that to provide them is probably well beyond our abilities. Instead, my purpose will be limited to two general lines of analysis. The first will be to make some observations about the nature of the problem of deciding upon a regulatory policy for the rapidly developing telecommunications industry. These observations will not lead to definitive conclusions about structure, but they will, I hope, lead to the second general topic: what is the domain in which reasonable policy options can be found, and what ideas are probably doomed to failure?

The article leads to a rather heretical conclusion for these days. It is not yet time to close down the Federal Communications Commission; there is indeed a role for economic regulation in telecommunications. But there is a great danger lurking in the dark halls of Congress: that the FCC will be retained for the wrong purpose. The key issue is to have the FCC regulate AT&T for what is likely to be a relatively long transition period (e.g., a decade or two) in a manner that allows market forces to work, but not to get carried away with the business of switching from the pro-AT&T protectionism that characterized the agency for the first 20 years after World War II to an anti-AT&T protectionism of inefficient competitors in the name of "competition by numbers" or "promotion of small business."

CHARACTERISTICS OF THE INDUSTRY

The development of a rational policy in the telecommunications sector requires as a first step a realistic view of the basic technical and economic facts about where it is and where it is likely to go.

Until the 1970s, the telecommunications industry was deceptively simple. Virtually all of the capital investment in telecommunications was for a single technical purpose: to provide two-way, narrow bandwidth communications links of a given technical quality that interconnected practically everyone in the country. There were exceptions to this generalization, telegraph and broadcast distribution systems being the most notable. But the basic technical structure was remarkably homogeneous in its design and purpose.

Lurking behind this simplicity was diversity in several different forms. First, the standard quality, four kilohertz two-way connections could be provided by a variety of technical means. Second, customers put these connections to a variety of uses, leading to a wide array of devices that were developed to connect to the system. AT&T, as the dominant firm in the industry, tried to cover as many of these bases as it could, but eventually this technical diversity in both the production technology and the use of the system led to competition. Its form, initially, was that companies other than AT&T began coming up with technical ideas about producing or using the standard service that were different from the avalanche of ideas pouring forth from AT&T's own R&D program.

The rise of television foretold of still another way that competition could rear its head. In seeking a method for distributing programming nationally in real time, the television industry sought a different set of technical characteristics in the network. While this was relatively easily accommodated, it was not always to be so. The general point is this: as uses of telecommunications proliferated, as the costs per unit of capacity of telecommunications networks declined, and as income and demand rose, subcategories of users sensed incentives to form coalitions to demand a new network that was designed to suit their special technical desiderata. Rather than design peripheral technologies to fit into a homogeneous system, entrepreneurs began looking for ways to change the design of the telecommunications system to satisfy subcategories of users.

The stance of the Federal Communications Commission with respect to these developments has evolved dramatically since the mid-1950s. Initially, the FCC sought to maintain the homogeneous, single network. It regarded telecommunications as a natural monopoly, and looked askance at any attempt to introduce competition into any phase of it. In the 1960s, the Commission entered a second phase, best illustrated by its position in the *Specialized Common*

Carrier decision and the *First Computer Inquiry*. In this phase, the Commission was likely to look with favor upon entrants seeking to provide a new service. Competition was permitted in the form of specialized networks providing a distinct technical service in some way identifiably different from that of the services being provided by AT&T. But the FCC clearly regarded all this as a separate—indeed, peripheral—activity in comparison with "standard" telecommunications service, which it saw as continuing to be a natural monopoly that not only needed to be regulated, but that needed to be protected from competitive erosion.

Eventually this policy fell for the illogic of its basis. The Commission simply could not develop a rational, consistent boundary between the categories of services that ought to be provided by a regulated monopoly and those that ought to be open to competitors. The spectrum of technical possibilities in both production and use of telecommunications was continuous. Any attempt to slice it up into discrete segments was not only arbitrary but created incentives for firms in the industry to pile up their entrepreneurial activities on the boundaries to capture as much as possible of the continuum for themselves.

By the time of the *Second Computer Inquiry*, the FCC had all but abandoned the notion of a well-defined, fixed domain of the "monopoly" service. On the surface, the "separate subsidiary" policy looks like the old policy of line-drawing between monopoly and competition. The idea is that if the "monopoly carrier" (e.g., Ma Bell) wants to compete with another company, it must do so through a subsidiary that is totally separate in an accounting and managerial sense from its monopoly activities. The new departure is that the concept of the monopoly service is elastic. By also pursuing a policy of permitting resale of AT&T services, the FCC is trying to set up a process whereby the marketplace, not the telephone company, decides which markets will be competitive and which monopolized. This represents the third phase in the evolution of the FCC, for if the separate subsidiary and resale policies work and if there is no long-run natural monopoly in telecommunications, the FCC will have nothing left to call a monopoly service, and thus nothing left to regulate. Although people associated with the FCC can surely speak for themselves, I suspect that many of them—especially the dominant group during the Ferris era at the Commission—believe in

the essential correctness of this long-run expectation about the industry.[1]

There exists no definitive proof of either the existence or the nonexistence of a core natural monopoly in telecommunications. The "existence" side of the argument relies upon a demonstration of scale and scope economies and upon the projection that new technologies will continue to make them a dominating influence. The trouble is that these arguments are necessary but not sufficient to support the case for natural monopoly. If, in order to capture these economies, the technological characteristics of the network have to be less heterogeneous than the spectrum of technological characteristics users might want, it might be more efficient to forego some of these economies and have more than one system, each being tailored to the particular characteristics valued most by a subset of users. This implies a differentiated communications product, and a long-run market structure either of oligopoly or of monopolistic competition. And, of course, in the equilibrium market structure in either case, firms will exhibit the presence of scale and/or scope economies that are not fully captured, even if economic welfare would be sacrificed if regulators limited entry so that they were captured.

The best arguments on the "nonexistence" side of the argument are empirical: there is a readily observable spectrum of highly differentiated demands for communications services owing to developments in computer technology, automated sensing and control devices, and other forms of nonvoice communications. In any case, the costs of telecommunications facilities have become so low that giving up integration economies is not very expensive.

For the sake of further analysis, I will assume that there really is no long-run natural monopoly in telecommunications. I include in this technical assumption the absence of a long-run monopoly in local service in the sense that differentiated technical demands may be most efficiently served by separate systems, perhaps interconnected to the "plain old telephone system" (POTS), or perhaps not. This imagines technologies like cellular radio, cable television, and high performance networks for computer services gradually moving into substantial competitive overlap with POTS. In this milieu, the pertinent question for regulatory policy is how best to manage the transition to a competitive market. Subsidiary questions that need to

be addressed before solving the transition problems are whether the market would converge to a competitive arrangement naturally; if so, how fast; and what, if anything, regulators can do to enhance the prospects for, and the speed of achieving, competition.

Whatever the long-term equilibrium configuration of the industry, the market we inherit is hardly competitive. Although new technologies may make local service competition feasible, it is now virtually entirely provided by local franchised monopolies. AT&T operating companies have held approximately 85 percent of this market for years, and any movement in this fraction has been due to differences in population growth rates among franchise territories rather than any serious development of competition.

In the interexchange market, AT&T's market share has dropped slightly, from 85 percent in 1970 to about 80 percent in 1980.[2] The major beneficiaries of the decline have not been the firms that constitute the competitive fringe. Their share has hovered between 2 and 3 percent throughout the period since 1970. Nearly all of the growth in market share is accounted for by independent telephone companies. The main exception to this generalization is private line service, in which the share of the competitive fringe has grown from about 1 percent in 1970 to about 10 percent in 1980; however, AT&T's share still remains near 85 percent, although it was 94 percent in 1970.

The equipment market has experienced substantial growth in competition in some areas. Manufacturing arms of companies that also own operating systems are dominant in producing the components of the network, namely transmission and switching equipment. But competition has been more successful in terminal devices, especially PBX and decorator telephone equipment. Approximately 600 companies have registered at the FCC as manufacturers of terminal equipment. For some of the less expensive items, the market shares of companies who are not in the business of operating systems have as much as half the market.

High market shares do not automatically produce an ability to engage successfully in monopolistic practices. Whether a high share produces monopolistic gains is a complicated issue to which we will turn later. Before proceeding with that analysis, two additional preliminaries are necessary, for they affect the choice of market strategies by a dominant firm. One is the nature of the regulatory

process, which will be the subject of the next section. The other is the structure of the dominant firm itself, a matter which we will now discuss.

In almost every facet of telecommunications, AT&T is the dominant firm; and for years to come, that position will be held by the entities created by the AT&T divestiture. The crux of the AT&T antitrust case[3] was that the structure of the company in combination with its regulated status gave it the incentive and the opportunity to engage in anticompetitive practices. The settlement focuses on the connection between the operating companies and the remaining parts of AT&T that can be regarded as providing "inputs": the manufacturing activities of Western Electric and the interconnection services of Long Lines, as well as managerial and financial functions in the holding company. The local franchised monopolies in POTS, goes the argument, provided a captive market for equipment and interconnection; moreover, a single company that was relatively immune from competitive entry and that held 85 percent of the market in local POTS could, if made independent, create monopsony problems for independent interconnection and equipment companies. Hence the genesis of the idea not only to sever the connection between the operating companies and the rest of the system, but also to create several independent operating companies.

The first step removes the incentive for operating companies to buy exclusively from AT&T entities that provide equipment and interconnection. The second protects against potential monopsony problems in the equipment market. It does not remove all of the potential for monopsony problems in the interconnect market, because interconnection is a point-to-point service either within one operating company or between two. But there does not appear to be any iron-clad insurance policy against this problem as long as there are local franchised monopolies.

The settlement does not address the connection between AT&T Long Lines, which provides interconnect service, and the manufacturing and research components of AT&T. If the assumption about long-run equilibrium being competitive is true, then this does not matter much for the future: a vertically integrated entity will survive or fail, once equilibrium is attained, on the basis of its efficiency. But meanwhile, the structure of AT&T will continue to be one in which a regulated, franchised monopoly in message toll telephone

service (and, temporarily at least, some other interconnect services) is corporately connected to an essentially unregulated manufacturing and research entity. To the extent that this arrangement created a problem prior to the antitrust case with respect to the local operating companies, it could continue to create the same problem in the interconnect market. Whether it *will* do so turns on the crucial assumption of this form of divestiture: that the interconnect market has sufficient competitive forces operating in it that the structure of what remains of AT&T as a vertically integrated entity does not, or will not long, continue to provide an incentive and opportunity for profitable anticompetitive behavior.

One element of checking this assumption is to review in broad strokes the nature of federal regulation. This will provide the final preliminary element before we can launch into an analysis of the optimal corporate strategy of what remains of AT&T in the new regime, and of the questions of whether this has potential for inefficiencies owing to the retardation of competition, and what, if anything, can be done about whatever problems can be identified.

THE FEATURES OF COMMUNICATIONS REGULATION

The subtle, ultimate purposes of regulation are a matter of some dispute. The Progressivist notion that economic regulation is supposed to lop off some of the monopoly profits that utilities might otherwise earn is now regarded with considerable skepticism, and I will dutifully pay my respects to that literature by citing it.[4] Surely the prospects for the creation of rents by political actions is an element of regulatory policy, so the Progressive ideal is Pollyanna-ish at best; however, as Ralph Nader's success has effectively demonstrated, there is probably more to politics than producer protectionism.[5]

In the case of the telecommunications industry, regulation has often been protectionist. Even in the recent era of pro-competitive attitudes and deregulation, it remained for the courts to overthrow an FCC decision that prevented competition in intercity long-distance telephone business.[6] And despite the pro-competitive mood in Washington that developed in the 1970s, the concept of a protected franchised monopoly for local service is surely alive and well

in most states. Nevertheless, there are counter-examples to the generalization that telecommunications regulation is always protectionist. In any case, there is certainly good evidence that telecommunications companies do not earn full monopoly revenues. Both monopoly theory and the theory of a regulated monopolist subject to a constraint on the rate of return predict that companies will operate in the elastic portion of the demand curve; however, studies of the demand for telecommunications service normally produce estimates of the long-run demand elasticity at current rates of output that are less than unity at peak periods.[7] This suggests that federal and state regulation succeed in producing prices and profits below the levels that would result from unrestrained monopoly.

What regulators have not done is introduce much rationality into the price structure, or control the ability of a regulated monopoly to inhibit competition. Because regulation controls profits by basing them on some measure of total cost, the regulated monopoly is especially fond of keeping as big a share of the market as possible, even if that means retaining services that are unprofitable. Spinoffs of losing operations can reduce profits, for by reducing the total costs of the firm, a spinoff also reduces the total revenues allowed it. If prices for individual services are not closely tied to costs, a spinoff may force prices lower in profitable services that had been subsidizing the unprofitable ones.

A vertically integrated, regulated monopoly has several strategies for foreclosing economically warranted competition: predatory pricing, denial of interconnection, creation of technical incompatibilities between its monopoly services and the services or equipment offered by competitors, and use of the administrative process to increase the costs and time required for entry. Throughout the 1970s, the FCC seemed genuinely to want to promote competition in some areas of telecommunications, yet never seemed to develop an effective, coherent, and rational set of policies to achieve it. Indeed, many have concluded from this effort that AT&T is essentially unregulatable with respect to its ability to prevent or significantly to retard competitive entry.[8]

Total deregulation has at least one attraction. It would remove the regulation-created incentives for AT&T to retain in the monopoly system things for which it really has no efficiency basis for wanting to retain. But it would still end up with monopoly returns in the

monopoly business, and with a possibility of a large market share that was undeserved on efficiency grounds in products and services that use the monopolized services as an input. Monopoly creates an incentive for downstream vertical integration, for a firm can then set internal transfer prices equal to marginal cost, rather than market price, and thereby gain production efficiencies unavailable to competitors in the downstream market.[9] The appeal to the FCC of the proposal for continued monopoly regulation of parts of AT&T, combined with separate subsidiaries in competitive markets, is the belief that it can prevent some of the problems associated with monopoly while letting the technical proficiency of AT&T be loosed upon the full spectrum of communications services. The key to this proposal is whether its optimistic attitude about the effectiveness of regulation to inhibit anticompetitive practices is correct. If it is not, a third alternative waits in the wings: the prohibition of AT&T's participation in competitive markets, a position espoused by some in Congress.[10]

To begin to get some insight into the practical issues that underpin this policy choice, it is useful to review why a regulatory agency, regardless of how well meaning, would be better able to limit monopoly returns than to prevent anticompetitive behavior, assuming that it wanted to do both. There are many technical reasons why this might be so, but here the focus will be on a few reasons that are likely to be especially important.[11]

One reason is the difference in informational requirements for setting price level ceilings versus designing an optimal price structure. The former requires an estimate of total cost and an assessment of whether the regulated entity is using "best" technology. Ambiguities arise in both cases, but if the possibility for monopoly returns is very great, the ability of the firm to capture them all through gold-plating, Averch-Johnson[12] effects, continued operations in unprofitable markets, and perquisites for executives will be limited if regulators are at all serious. For one thing, the behavior of the equities in the regulated firm will give away a move that captures a major new, untapped source of monopoly rents. For another, regulators can make checks—albeit crude—on substitutions of one kind of input for another, or on the extent of excess capacity in the system.

To regulate the price structure requires two additional kinds of information: service-specific demand elasticities (including cross-

elasticities among all services) and marginal costs. Tools that succeed in preventing gross monopoly rents can still be too crude to provide much help in deciding whether a given move by the regulated firm is a legitimate competitive response or an anticompetitive, predatory act. The reason is that fairly small differences in price in a competitive market can have a very large effect on market share. A regulator will determine whether a monopolist's price response is legitimate by comparing it to some measure of cost—in principle, to marginal cost or to an optimal departure[13] from marginal cost based upon demand elasticities. In telecommunications, prices among competitors are usually within a few tens of percents of each other. In the best of circumstances, econometric estimates of demand elasticities and marginal costs rarely have a confidence interval that is tighter than this, and that could therefore confidently distinguish between an optimal, legitimate competitive response and an anticompetitive, noncompensatory one. In the real world of regulation, accounting practices have not been developed to make the circumstances of estimation very good, and regulated firms (either monopolists or competitors) have no incentive to institute data collection methods that make good costs and demand information a matter of public record.

A similar argument pertains to the problems regulators face in ascertaining whether a firm selects the most efficient technology. If operating in the inelastic portion of demand, the firm has a reason to make additions to cost categories that are included in the calculation of allowed profits. In rate of return regulation, this means substituting capital for operating expenses. Substitution of capital for operating inputs has another effect: it reduces short-run marginal costs and hence lowers the floor regulators would place on a competitive price response. Assuming that small but not large inefficiencies can slip through, a capital substitution that adds a small chunk of excess profits can also be decisive in determining whether a firm can respond successfully to an entrant without bringing down the wrath of either regulators or antitrust officials.

The preceding are the major sources of the skepticism of people in regulatory agencies—even the ones who are good economists—toward adopting fancy pricing rules derived from economic theory for establishing the price structure of a regulated firm, and especially for establishing the ground rules for a regulated monopolist

that is engaged in battle with an unregulated competitive fringe. Theory is simply ahead of practice in this regard.

Another important difference between regulating overall profits and regulating the price structure in a partially competitive environment has to do with the administrative process itself. The due process requirements in regulation create built-in biases for the status quo; things can be changed only after the procedural, evidentiary, and substantive requirements are met. A regulated monopolist must establish the validity of new rates; however, a potential entrant must establish that it has a right to enter (if the agency has asserted jurisdiction) or that it has been treated unjustly by the monopolist. This situation gives an entrenched monopolist an opportunity to raise the entry costs of potential competitors—or to engage in strategic use of the administrative process for anticompetitive purposes—simply by exercising its full spectrum of legal rights.[14]

Finally, the role of research in a regulated environment has quite different implications for the two kinds of problems. If regulators have difficulty deciding whether a given telecommunications technology is most efficient for its intended use, this problem is slight compared to the difficulty of assessing whether a research program is the right size, and directed at the right technical problems and opportunities. If overall profit control is all that matters, the problem is not quite so difficult, as long as research and development costs are *not* allowed into the rate base for calculating allowed profits but are treated as an operating cost. In a world of natural monopoly, regulators need to worry about cost-increasing innovations (e.g., picture phones and random orbit satellites) but can probably catch most, if not all, of the outrageous ones. In a world of some monopoly and some competitive fringe, the problem is severe, for the issue of cross-subsidization and other strategic uses of innovation for anticompetitive purposes becomes important. How does a regulator know whether the AT&T tax on operating company revenues for supporting research and development is being used primarily to finance excessive effort on improving technology at the competitive fringe, as contrasted to there simply being more ripe research opportunities in long-distance transmission and terminal equipment than elsewhere? Obviously, the regulator cannot know the answer to this question.

DOMINANT FIRM STRATEGY IN THE NEW REGIME

The purpose of this section is to explore the profit-maximizing strategy of a dominant firm in the telecommunications market. The object is to identify incentives and opportunities for monopoly practices within the range of plausible regulatory structures for the industry, from instant deregulation to partial regulation with separate competitive subsidiaries to total regulation with and without participation in competitive markets. Before proceeding, a word of caution is in order. Obviously, this topic cannot be approached while the players are anonymous. AT&T is the company we are talking about, and the analysis constitutes a kind of prediction about future market structure problems in the telecommunications business. Nevertheless, the business at hand is not to comment upon matters of business ethics or lawfulness. Business executives have a fiduciary responsibility to do the best they can for stockholders. Moreover, the definition of legality that matters is the one used by lawyers: what is legal is what you are acquitted of or not caught at, not what in principle obeys the philosophical spirit of the law. Here the focus is incentive and opportunity, not moral judgment.

The first step in the analysis is to investigate the strategy of a dominant firm that is not subject to regulation and whose situation is like AT&T's: it has a very large market share in almost everything, but, by hypothesis, it has no natural monopoly. What strategic possibilities are open to it?

In order to answer this question, a prior one must be addressed. Whereas in principle there is a world of competitors ready to jump in, the question remains how fast they will enter, and how the speed of their entry depends upon the strategy of the dominant firm. This question has been the subject of a large body of theory in economics. Whereas this work provides numerous insights into how to think about the problem, there is as yet no general theory. What does exist is a series of special theories. No attempt will be made to survey them; instead, some central issues will be raised that are pertinent to the case of telecommunications.

Presumably competitors enter a market because they believe it will be profitable. They observe prices charged by incumbent firms

and have an estimate (it may be subject to narrow or wide uncertainty) of the incumbent's costs. Both pieces of information are important, because the decision to enter will be based upon an expectation of what the incumbent will do when entry occurs, if anything. In addition, the entrant knows its own costs. In general, these can include a start-up cost of getting into the business (e.g., transmitting to customers the possibility of getting a better deal, or winning approval from a regulatory authority that grants franchises, or even winning a court battle that requires the incumbent to sell the entrant some "bottleneck" input that is necessary to enter and compete effectively against the same firm in another market). There are also costs related to the capacity and operations of the business. By hypothesis, there is no long-run natural monopoly in the industry; however, the cost function may exhibit some scale economies for small rates of output. In addition, the firm may face a cost penalty if it expands very fast. Capital markets may not supply it with unlimited capital at a constant, perfectly competitive interest rate, or its own management may have a maximum efficient rate of expansion, beyond which it faces a rising marginal cost of capacity in the short run, but not in the long run.

Suppose an extreme case holds: that firms can enter and leave an industry instantaneously at any level of capacity with no cost penalty.[15] Assume further that all firms have identical long-run cost functions that exhibit neither economies nor diseconomies of scale. In such a case, firms will instantly enter if price is the slightest bit above long-run marginal cost. The dominant firm can retain its market share, no matter how large, by immediately setting price equal to long-run marginal cost. No entry will occur and the market will appear to be monopolized, but no excess profits will be earned. "Potential competition" polices the market perfectly by promising severe and instantaneous punishment if the incumbent deviates ever so slightly from charging the equilibrium competitive price.

Although unrealistic, this extreme case is a useful place to start an analysis of the real world because it brings into focus the many ways in which results can be not quite so happy, and how a more complex strategy can develop for both the dominant firm and the potential entrants. Suppose we first introduce the notion that entrants face limits on the rate at which they can expand their capacity without facing a cost penalty. For any given expectation about prices in

the market over the life of an investment, an entrant can calculate an optimal initial capacity, and an optimal rate at which to expand. In general, higher prices will induce firms to bear greater cost penalties for faster expansion as the profit-maximizing entrant calculates the rate of capacity expansion that equates price with the long-run marginal cost of output. For the incumbent firm, a difficult choice must then be made: to set lower prices and retard entry, thereby earning less profit per unit on a larger market share, or to set higher prices that generate high profits per unit of output, but lead to a more rapidly declining market share. This conceptual model, developed originally by Gaskins,[16] seems particularly appropriate for the telecommunications market, because of its enormous and elaborate capital requirements.[17] Entry has normally begun with the construction of a specific capital plant for offering a specific service in a specific subset of markets, inducing the early fiction at the FCC that what was really going on was that "new services" were being introduced that offered, or should have offered, no threat to the mainline natural monopoly service. This is how first telegraphy and then telephony were introduced.

It is worth noting that continued regulation of the monopoly firm will, if successful, force it into the lower price, higher market share strategy. To the extent that continued regulation holds down prices, competitors will expand more slowly and will push back the boundary between monopoly and competition more deliberately. The potential problem with this policy is that it can easily be doomed through misinterpretation of its own success: will political leaders really believe that regulation is *succeeding* in making the market more like a competitive one (in the efficiency sense) by pursuing a strategy that sees slow erosion of AT&T's market share? Certainly one group—the entrants—is *not* going to think so.

The second element of the entrant's costs is the initial fixed cost of getting into the business. This requires very little analysis. To the extent that entry costs are higher, the entry-inducing price will also be higher. The entrant must be able to expect prices after entry that exceed average production costs and therefore recover the fixed cost of entry, or entry will not occur. Brock has examined one dimension of these entry barriers: the straightforward financial cost (cash on the barrelhead) to get in. Another element, however, is delay. Both erecting and tearing down entry barriers may be quite inexpen-

sive compared to the stakes in the market; however, if the entrant cannot get in until after the barrier is dismantled, brick by brick, the incumbent will have enjoyed the monopoly position for a longer period of time than might otherwise have been the case. Telecommunications can here borrow from the experience in airline and trucking deregulation: let competitors in, and ask questions later. The trouble is that the issue is somewhat more complicated in telecommunications, where entrants will not enter simultaneously in all markets that they optimally should serve. They will seek to buy interconnection service in the gaps and equipment from AT&T as they complete the network. As a policy matter, AT&T will be subject to nondiscrimination rules and, of course, to the possibility of someone making use of the resale provisions to arbitrage an attempt to engage in price discrimination. As a practical matter, though, this offers great opportunities for erecting entry barriers, making close calls in a self-serving way that will take regulators and the courts years to unravel.[18] Such is certainly the case in the principal interconnection issues of the 1970s regarding access to the local loop by competitive suppliers of interconnect services or terminal equipment.

A third element of the entrant's calculations about when and how fast to enter is its expectations about the future price of the dominant firm. This issue has been a major focus of considerable research in recent years and, as with most issues in economics having to do with expectations formulation, does not lead to very firm conclusions. But the issue is relatively easy to describe. The entrant, whether the only entrant or a member of a group, will expect the threat of entry to alter the pricing strategy of the incumbent firm. One possibility is predatory pricing: the dominant firm will not nicely solve some differential equations about long-run pricing from some variant of the Gaskins model,[19] but will punish the upstarts who threaten to erode its market share.

The rationale for a predatory pricing strategy is not just to teach the specific entrant a lesson, but to teach potential entrants that it is bad policy to respond to the perception of a high price/cost margin anywhere in the dominant firm's domain. The so-called "chain store paradox" develops the notion that even when the best strategy for the dominant firm would be to share the market with the entrant, if

one could assume no further entry in other markets later, the possibility of the latter can make it in the dominant firm's interest to behave "irrationally" by punishing the entrant in a way that is quite costly to the incumbent, but that teaches others a lesson.

Predatory pricing is one of the central issues of antitrust policy, and is the subject of extensive work to develop "tests" for detecting it that boil down to measurable versions of whether price is above or below the appropriate marginal-cost concept.[20] The difficulty is that strategic manipulations to provide a means to avoid a rule are usually possible. If the test is price above short-run marginal costs, then one can spend a little extra to substitute capital for variable factors of production, and build a little excess capacity.[21] If the test is the relationship of price to long-run marginal cost, a dominant firm has an incentive to favor technologies that exhibit economies of scale and yield lower marginal costs but higher average costs at the competitive equilibrium than does the (more efficient) constant returns to scale technology. The difference in average costs at the monopoly price will then be the cost of the insurance policy against competitive entry, for the latter will provoke a perfectly legal predatory price reduction to long-run marginal cost.

Regulation provides additional incentives for predatory pricing, as described above, because of its cost-based pricing methods. If cost-allocation procedures among services are subject to manipulation, losses in the market where a service is underpriced will be used to justify price increases in the regulated monopoly market, cushioning the firm against even the short-run losses of a predation strategy. The tactics are not much different from those described above: structure the technical configuration of the firm so as to maximize flexibility to adjust to a competitive threat.[22]

The idea behind the separate subsidiary proposal is that it makes this tactic much more difficult. This is probably true for the relatively clean cases of a competitive service that uses monopoly interconnection as an input. Whereas interconnection interrupt strategies may apply, even the crude accounting methods of regulators should catch any predation here that involves transference of some of the costs in the competitive market to the regulated market. But separate subsidiaries will not so constrain monopoly services that are close substitutes of competitive ones. Once again, regulators will

run up against the indistinct boundary between the two. The rational regulated monopoly will engage in pricing strategies that produce low prices for the services that are most likely to be the next in line for competitive entry, and high prices for the best protected. The vagaries of monopoly cost-allocation and demand-estimation problems will haunt this world as they have haunted the FCC for the past 15 years.

The last area of strategy choice for the dominant firm is that of opportunities created by vertical integration. Divestiture does nothing to alter the incentive for AT&T Long Lines to continue to buy its equipment from Western Electric. Although Western Electric is not regulated, it probably makes sense to regard it as if it were. If AT&T earned monopoly profits of embarrassing proportions from Western by using high equipment prices to pass through the monopoly rent potential in service markets, it would be both obvious and intolerable to regulators. At the same time, AT&T has an incentive to be integrated in order to expand the domain in which it can earn its regulated return. This is true even if excess profits are zero as long as expansion does not hurt the company in some way owing to unmanageable size; and managers and stockholders, all other things being equal, prefer larger companies to smaller ones. This will persist with separate subsidiaries as long as Western Electric is not a high-price producer. If Western is high-cost, of course, in markets for competitive inputs, it will not necessarily be high priced; it may instead cross-subsidize with higher prices for equipment used only by the monopoly service. As long as the cost cross-subsidy is small relative to the size of the monopoly service, this is not likely to be detected or to hurt the company financially. Again, to the extent that Western Electric is properly regarded as regulated, there is a positive incentive to engage in this kind of pricing strategy, within limits.

Research and development at Bell Labs poses no significant differences from that at Western Electric. R&D can be regarded as an input that reduces the need for other inputs in the production process. It thereby enables a company to threaten lower prices to entrants over time, and consequently has rewards beyond the straightforward profit calculus when directed at competitive or potentially competitive markets. This, too, will not be effectively touched by the separate subsidiaries proposal, no matter how much

effort is put into cost-accounting for R&D, because of the fundamental intractability of the problem.[23]

In reviewing this section, some of the available strategies appear more plausible than others. It seems highly unlikely, for example, that AT&T will adopt a strategy like that of Western Union in 1880: to set monopoly prices against the residual demand curve and watch its market wither to nothing. More likely, it has approached divestiture with a stiff upper lip (if not the faintest smile), especially after the *Second Computer Inquiry*, because it looks forward to growth in the direction of computer-related communications. Here tactical decisions will be faced about which new markets are promising, which of its current markets are vulnerable, and which are protected. AT&T will continue to have an incentive to engage in creative accountancy for the purpose of cross-subsidization. Message Toll Service (MTS) will be the potential target for loading up the costs, for it is probably the regulated service that will be the last to experience serious erosion of market share. Separate subsidiaries will provide some protection, but not against cross-subsidization through equipment prices and research, and not against exclusive dealing, as long as AT&T's costs are roughly the same as those of its competitors.

The extent to which AT&T can follow this strategy is limited, though, because MTS has a limit price that is relatively low due to the resale and shared use policy of the FCC. This policy does not make entry instantaneous and costless, but it does avoid the capital investment requirements to get into the MTS business (or a close substitute) if too wide a band opens up between private line and MTS. This will keep large intercity markets relatively competitive, but not interconnection between markets for which there is no significant private line service. The reason is that the competitive fringe companies already in the former are in a position to enter MTS competition if it appears profitable to do so. Thus, AT&T after divestiture, and with separate subsidiaries, faces the same incentive structure as it did in the early 1970s, when it proposed the "Hi-D, Lo-D" tariff structure, a price structure that would have enabled the company to engage in competitive pricing in markets in which entry was threatened, but to maintain higher prices elsewhere. Neither separate subsidiaries nor divestiture alters the incentives to engage in this practice. Whatever incursions have been made against it in

other regulatory policies (such as resale and shared use) since the early 1970s remain the principal limiting forces against propensities to engage in predatory pricing.

CONCLUSION

The preceding analysis provides a rationale for the continued regulation of AT&T. Part of AT&T will continue to have monopoly power, and regulation will continue to succeed in a crude way to limit the ability to translate this power into excess profits and high prices. In addition, the resale and shared use policies will provide some check on price discrimination in larger markets, thereby working to limit the possibilities for both predatory pricing and regulation-induced incentives to pad the rate base by continuing to offer money-losing services but making up the loss in monopoly services. This latter benefit of regulation duplicates antitrust policy; however, the slowness and expense of antitrust litigation makes regulation a useful weapon in this regard, even if it is no panacea. Whereas regulation cannot really prevent cross-subsidization in the price structure of a regulated firm, it can limit its extent. Moreover, it does create an evidentiary burden on the firm to justify price changes; and this generates, among other things, some of the information that is required for an effective antitrust attack. An important part of the successful antitrust cases against AT&T during the 1970s was the evidentiary trail left by the company's resistance to implementing pro-competitive decisions by the FCC. During a transition from monopoly to competition, regulation and antitrust can be mutually supportive as long as the regulator shares the trustbuster's commitment to competition as a long-run aim in all markets in which it is feasible.

The preceding analysis also suggests that there is very little positive purpose served by the separate subsidiaries policy in the *Second Computer Inquiry*. Whereas it may offer some barrier to direct internal subsidization from the monopoly service to competitive services, the vertical integration of AT&T that remains will allow the practice to continue indirectly through Western Electric and Bell Labs. Divestiture eliminated the regulation-induced incentives for exclusive dealings between the operating companies and the rest of AT&T, but not between Long Lines and other divisions of the corporation.

The separate subsidiaries approach has another problem. AT&T's perception of the source of its technical advantages is through integration in a technical sense. Separation of competitive subsidiaries maintains only financial and high-level strategic integration, but cuts off coordination at the working level. Thus, if there is an economy of scope from coordination of the elements of telecommunications services and products, separate subsidiaries erect a barrier against it.

If the separate subsidiaries proposal is not a particularly useful idea, what then? The key choice is between allowing AT&T to become a regulated monopoly and a partly unregulated competitor, or attempting to confine AT&T to purely monopoly services. If there really were a large, growing, technically challenging natural monopoly in, say, MTS that was well-defined and policeable, the latter strategy might have some appeal. Or, if AT&T were not as active and productive in communications R&D, the latter choice would also stand out. In either case, there would not be much of a sacrifice in trying to maintain a clean separation between what is mildly regulatable and naturally monopolistic and what is competitive and, therefore, a poor choice for regulation. The choice is difficult, however, because neither condition is true. AT&T as a research entity is an important national resource that ought to be employed as effectively as possible. Confining the company to a dwindling monopoly market will inhibit the effective use of this research resource.

A final observation seems to me to tip the scales conclusively in one direction. The principal major competitor to AT&T by 1990 is likely to be not the struggling competitive fringe of 1980, but the computer industry, and IBM in particular. The financial and technical strength of these competitors make them less vulnerable to anticompetitive practices than the early specialized common carriers were. This is not to say that such practices no longer become an attractive strategy for a dominant partially regulated monopoly; they will, however, be less effective both as generators of effective protection of market share and as sources of short-run profit.

Thus, the conclusion I reach is that AT&T should continue to be regulated, but should be permitted to enter essentially any market it wants. The separate subsidiaries feature is, in my opinion, a relatively unimportant symbolic act. My guess would be that it will not affect the next decade of developments in the industry in any perceptible way; it will remove little opportunity for anticompetitive

behavior, and I suspect that formal managerial and accounting separation will not prove a very great deterrent to technical interchange, even if there is a rule against it. As long as the FCC continues to maintain regulatory oversight of AT&T, its likely corporate strategy is almost certain to be to preserve market share rather than to capture dwindling monopoly rents while experiencing declining market share. And it is likely to continue to engage in controversial activities relating to relationships among its components that will be widely interpreted as anticompetitive. Indeed, a third wave of antitrust activities in the late 1980s is a distinct possibility.

This course is preferable to the policy of keeping AT&T out of competitive markets—computer services and interconnect other than MTS—because there exists no plausible evidence that an integrated firm has no technical advantages in some dimensions of this market. The lesson of the 1970s is the futility of attempting to draw lines that separate components of the telecommunications and computation businesses. Technology is too integrated, and moves too quickly, to be coped with at all well by the imperfect, slowly reacting regulatory process, let alone by the Congressional system. If a "live and let live" policy (with scowls at AT&T to keep some semblance of control over its strategy) does not work, further actions can come later. This will not be terribly comforting to the early entrants, of course, but the other side is that the anticompetitive strategy of the 1970s did not keep them out; it merely slowed them down. AT&T is substantially less well positioned in the 1980s to erect effective entry barriers and to engage in predatory pricing than it was in 1970, so it is not to me plausible that the very existence of competition is threatened by the new regime.

And what about the choice of a long-run structure if and when the next wave of antitrust actions washes over the industry? It is probably to undertake the form of divestiture that should have been undertaken as the outcome of the last antitrust case. This would have left AT&T with a "small" operating company (e.g., GT&E-sized, or 5 to 10 percent of the market) and with part, but not all of Long Lines, Bell Labs, and Western Electric. The remainder of Long Lines, Bell Labs, and Western Electric could also be combined, creating two well-positioned companies with integrated manufacturing and interconnection, and perhaps a small operating company. As with the actual settlement, most operating companies

would be made independent. Neither of the new integrated companies, of course, would have to remain a regional company not competing with the other; both could encroach on each other's turf. The details of how this would be done, and what it would imply about the exact dismemberment of Bell Labs, will not be described here. If there is a point to integration, this restructuring would have preserved it and provided a test for its superiority. Suffice to say that the problems and issues in this article would not be so interesting—and puzzling—if divestiture had made the starting point *two* versions of AT&T, rather than one. The problem with this idea, of course, is that it conceivably could cause a significant loss of integration efficiencies; however, one would still end up with two very large companies, at least one of which would be larger than Long Lines, Bell Labs, and Western Electric combined were 15 to 20 years ago.

Such a restructuring will come about only if today's potential competitors do not become actual ones. It would be triggered by a failed or only partially successful entry attempt by competitors to set up reasonably integrated but perhaps specialized national networks, combined with a continuation of AT&T practices like those of the 1970s to inhibit entry.

Such an outcome cannot be predicted as likely. More likely is that entry will be successful, either because AT&T perceives its corporate interest to be one of a few integrated telecommunications firms, or because the strategies available today for creating entry barriers will not prove to be very effective. But it is possible; further divestiture can be held as a trump card by political leaders who are skeptical about a relatively loose approach to AT&T.

The possibility that anticompetitive strategies will be effective seems less threatening to the future development of the industry at this juncture than would be the alternative: to turn the game exclusively over to the competitors. The reason is that the latter runs the risk of neoprotectionism—of simply changing the objects of protection against competition from AT&T in the 1950s and 1960s to the other common carriers in the 1980s. Moreover, with big firms like IBM and Xerox ready to move in, the focus of protection will not fix solely on restraining AT&T, but on keeping the other big firms in check as well.

Despite all of the problems about corporate battles for position

through courts, Congress, and state and federal regulatory processes, the decade of the 1970s was, nevertheless, one of growth, progress, and increasingly "honest" competition in telecommunications. This ought to tell us a lot about the value of structuring the future so that all the players with a potentially important contribution can remain in the game.

FOOTNOTES

1. For example, see Kelley, D., "Deregulation After Divestiture: The Effect of the AT&T Settlement on Competition," OPP Working Paper No. 8, FCC, April 1982.

2. FCC annual reports contain summary data about market shares. For a summary of developments during the 1970s, see the Report to the Congress by the Controller General, *Legislative and Regulatory Actions Needed to Deal with a Changing Domestic Telecommunications Industry*, U.S. General Accounting Office, September 24, 1981.

3. *U.S. v. AT&T, et al.*, CA 74-1698 (USDC for the District of Columbia), 1974.

4. Peltzman, S., "Toward a More General Theory of Regulation," *Journal of Law and Economics 14*, October 1976, p. 109; Posner, R., "Theories of Economic Regulation," *Bell Journal of Economics and Management Science 5*, Fall 1974, p. 335; and Stigler, G., "The Theory of Economic Regulation," *Bell Journal of Economics and Management Science 2*, Spring 1971, p. 3.

5. For an alternative to the Chicago view about the politics of regulation, see Levine, M.E., "Revisionism Revisited? Airline Deregulation and the Public Interest," *Journal of Law and Contemporary Problems 44*, Winter 1981, p. 179; and Breyer, S., *Regulation and its Reform*, Cambridge: Harvard University Press, 1982, Chapter 1.

6. *MCI Telecommunications Corporation v. FCC*, 561 F.2d 365 (USDC for the District of Columbia), 1977.

7. For example, Taylor, L., *Telecommunications Demand: A Survey and Critique*, Cambridge: Ballinger, 1980.

8. See, for example, Cornell, N.W., Kelley, D., and Greenhalgh, P.R., "Social Objectives and Competition in Common Carrier Communications: Incompatible or Inseparable?" in Trebing,

H.M., ed., *Energy and Telecommunications in Transition,* Lansing: Michigan State University, 1981.

9. Perry, M.K., "Vertical Integration: The Monopsony Case," *American Economic Review 68,* September 1978, and Warren-Boulton, F., "Vertical Control with Variable Proportions," *Journal of Political Economy 82,* July/August 1974.

10. Majority Staff of the Subcommittee on Telecommunications, Consumer Protection and Finance, *Telecommunications in Transition: The Status of Competition in the Telecommunications Industry,* Committee on Energy and Commerce, U.S. House of Representatives, Washington, D.C., November 3, 1981.

11. For an exhausting list of all the things that can go wrong with economic regulation, see Breyer, S., *Regulation and its Reform, op.cit.*

12. See Harvey Averch and Leland L. Johnson, "Behavior of the Firm Under Regulatory Constraint," *American Economic Review 52* (December 1962): 1058-59.

13. See Frank P. Ramsey, "A Contribution to the Theory of Taxation", *Economic Journal* 37 (March 1927): 47-61; and William J. Baumol and David Bradford "Optimal Departures from Marginal Cost Pricing," *American Economic Review 60* (June 1970): 265-83.

14. This pervasive feature of regulation has led to the construction of a political theory of regulation that sees delay as its purpose. See Owen, B., and Braeutigam, R., *The Regulation Game: Strategic Use of the Administrative Process,* Cambridge: Ballinger, 1977.

15. Every nuance of the theory of this kind of market has been thoroughly examined in Baumol, W., Panzar, J., and Willig, R.D., *Contestable Markets and the Theory of Industry Structure,* San Diego: Harcourt Brace Jovanovich, 1982.

16. The theory of picking a profit-maximizing rate at which market share dwindles is analyzed in Gaskins, D., "Dynamic Limit Pricing: Optimal Limit Pricing under Threat of Entry," *Journal of Economic Theory 3,* September 1971.

17. The strategy of Western Union in dealing with the entrance of AT&T in the nineteenth century has been interpreted in this way in Brock, G.W., *The Telecommunications Industry: The Dynamics of Market Structure,* Cambridge: Harvard University Press, 1981.

18. The idea of contrived barriers is discussed in Caves, R.E., and Porter, M.E., "From Entry Barriers to Mobility Barriers: Con-

jectural Decisions and Contrived Deterrence to New Competition," *Quarterly Journal of Economics 91,* May 1977.

19. See Darius W. Gaskins, Jr., "Optimal Pricing by Dominant Firms." (Ph.D. diss., University of Michigan, 1970.)

20. A recent contribution that references to other important works in the field is Joskow, P., and Klevorick, A., "A Framework for the Analysis of Predatory Pricing," *Yale Law Journal 89,* December 1979.

21. Spence, A.M., "Entry, Capacity, Investment and Oligopolistic Pricing," *Bell Journal of Economics 8,* Autumn 1977, introduces the idea of excess capacity as a means for policing a collusive price strategy. It is not much of a stretch to apply it here.

22. How this strategy works is discussed more fully in Noll, R.G., and Rivlin, L., "Regulating Prices in Competitive Markets," *Yale Law Journal 82,* June 1973.

23. Conceptualizing the rules, though laborious and complex, is nonetheless doable, but their very statement reveals how difficult they would be to use effectively. See Ordover, J.A., and Willig, R.D., "An Economic Definition of Predatory Pricing," in Salop, S., ed., *Strategic Views of Predation,* forthcoming.