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SOCIAL OBJECTIVES AND COMPETITION IN COMMON CARRIER
COMMUNICATIONS: INCOMPATIBLE OR INSEPARABLE?

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I. INTRODUCTION

A criticism of the current efforts to reduce or end economic regulation of certain industries is that social objectives are being sacrificed in the name of competition for competition's sake. It is argued that many of the results of regulated monopoly or regulated competition that are valued, such as benefits for rural interests, the poor, or other favored groups, will be lost or that in certain industries deregulation will make society worse off because prices and costs will rise instead of fall due to the inherent market power of particular firms.^{1/} These concerns have played a major role in the current common carrier communications debate.^{2/}

The thesis of this paper is not only that increased competition in the common carrier communications industry is compatible with the achievement of social goals, but also that many of the goals may be unattainable without competitive forces. It is often said that telephones are not like airplanes, that the principles of competition that have been applied to the airline industry will not work in telecommunications markets. We believe that unless those competitive deregulatory principles are applied, the dominant telephone utilities will share the fate of the railroads. Rate regulation and controls on entry and exit are not likely to be any more successful at serving social goals in common carrier communications than they have been at serving basic transportation goals. Thus, following the airline

deregulation example may be the only way to ensure that basic telecommunications goals continue to be served.^{3/}

A. Social Goals of Common Carrier Communications

Any assessment of the effects of policies on goals must begin with a discussion of the perceived goals. Congress set the social goals for common carrier communications in the Communications Act of 1934. Title I states that the Act was passed "for the purpose of regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges . . ."4/ These broad goals, together with the general public interest standard, serve as the basis for the public policies affecting common carrier communications services.

The goal of making services available to "all the people of the United States . . . Nation-wide, . . . at reasonable charges . . ." is clearly concerned with prices consumers pay. It recognizes that a system is more valuable if more people can be reached. Furthermore, it raises the possibility that it may be appropriate, in the name of equity, to ask one group in society to pay part of the cost of serving other groups.

The goal of "rapid and efficient" communications services requires an environment that encourages new technologies that improve service, lower costs, or both.

The environment that raises the fewest barriers to testing new techniques and new services in the marketplace is most likely to satisfy the goals. In short, the Act calls for an economically efficient organization of the industry.

B. Achieving the Social Goals

In the past, the specific policies that have been adopted to serve the broad social goals have been based upon a regulated monopoly industry. Many of the policies that allegedly serve the goal of universal service have at least implicitly relied upon barring entry and then allowing a regulated monopolist to develop and implement cross subsidies. These subsidies were supposed to lower the prices that would otherwise have been paid by certain ^{all} groups, such as rural and poor users.^{5/} Monopoly power was supposed to be controlled by rate of return regulation.

Some of the subsidy and regulatory policies have been imposed directly by regulators, while others have been instituted by firms with the acquiescence of regulators.^{6/} It is becoming apparent, however, that policies that may have been acceptable in the past are increasingly inappropriate given new technologies and rapid innovation. Moreover, such policies may serve one of the two broad sets of goals at the expense of the other. Thus, for example, the decision to allow long depreciation lives for equipment, a policy that allegedly aids "affordable" rates and universal service by keeping costs down, reduces the incentive to discover and adopt innovations. Underdepreciation in

periods of rapid technological innovation subsidizes today's consumers at the expense of tomorrow's, and today's consumer pays more because of the past subsidies. In the process, the goal of efficient service is sacrificed. More important, in the long run, rates are higher than they might otherwise have been to the detriment of the goal of affordable rates as well.

The problems caused by long depreciation schedules have been recognized.^{7/} There is disagreement, however, about whether other subsidies should be built into rates. These other subsidies are of several types. Some argue that low income families who might otherwise not subscribe should be charged lower prices than higher income subscribers (this is related to the "lifeline rate" movement).^{8/} Others urge that telecommunications services demanded mostly by high-income people or businesses should subsidize those purchased by low-income consumers. An example is requiring users of long-distance or interexchange services to subsidize local exchange users, and users of services such as extension telephones, PRX's, and call forwarding to subsidize basic interconnection. In another manifestation of this policy, high cost users, such as those in rural areas, are supposedly subsidized by charging all customers rates based on average costs for all interexchange service.

A problem with all subsidies built into the price system is that they distort the price mechanism. Prices influence innovation and investment. If the price of a

service is artificially low, incentives to seek less costly ways of providing the service are discouraged. At the same time, firms are encouraged to devote resources to finding new ways of providing the overpriced service.^{9/} Over time, the subsidized group might have ended up with even lower prices if cost-reducing innovation had been encouraged by the proper price signals.^{10/}

A second major problem is that it has been impossible to determine how large cross subsidies are, what they accomplish, exactly who receives them, or even whether they exist at all.^{11/} Internal subsidies defy accountability both in practice and in principle. The joint cost nature of telecommunications service makes it impossible in many cases to determine subsidy free prices. Moreover, if subsidies are to exist they require a monopoly, even if technological conditions do not call for a monopoly. Thus, entry controls and other regulation induced distortions are maintained to protect the subsidies when consumers would be better off with no regulation and no subsidies.

Even with the open entry policy adopted in many telecommunications markets, some argue that the tools of rate of return regulation are still needed for carriers that continue to enjoy large or complete shares of various communications markets.^{12/} Rate of return regulation and entry controls, however, are inherently unable to reproduce the results of efficient markets.^{13/} Moreover, rate of return regulation distorts investment and innovation

incentives.^{14/} These incentives may lead to an increasingly inefficient telephone system compared with what might have developed under a more competitive industry structure.

Elimination of entry controls and rate of return regulation for all telecommunications services offers a potential solution to the conflict between present policies designed to foster both universal nationwide service and efficiency. The remainder of the paper is devoted to showing that competition is not only sufficient but also necessary to the attainment of social goals as defined by the Communications Act of 1934.

C. The Organization of the Paper

A substantial portion of the argument that follows is devoted to demonstrating that market failures will not occur if the common carrier communications industry is deregulated. Part II shows that consumption externalities can be internalized with innovative pricing mechanisms or can be dealt with using existing direct subsidy programs. Part III shows how to deal with the problem of unregulated firms pricing at levels substantially above costs.

Finally, Part IV describes the potential course of the common carrier communications industry if competition is not allowed to play a major role in determining the price, quality, and quantity of services. We argue that, absent deregulation, society may be on the verge of repeating its response to trucking in the 1930's. Trucking became regulated, at least in part, in an attempt to contain the

damage to railroads, including the effects that competition might have on such values as universal railroad service and averaged railroad rates.^{15/} Yet, rate regulation and entry controls did not prevent the wholesale deterioration of the railroads, the consequences of which are being suffered today. The moral is that new communications technologies should be allowed to develop unencumbered by any government interference; the alternative is clearly worse for both consumers and existing communications firms.

II. CONSUMPTION EXTERNALITIES

Economists generally agree that under certain circumstances efficiency could be increased through government intervention to correct externalities -- situations where significant costs or benefits are derived by parties other than those directly involved in market transactions.^{16/} Two broad externalities allegedly affect the consumption of telecommunications services: the external benefits derived from assuring universal service, and the benefits consumers receive from having a carrier of last resort who is required to provide service. These alleged external benefits have been used to justify rate of return and entry regulation of common carrier communications.

In both cases, however, efficient pricing mechanisms are available that are superior to entry and rate regulation. To the extent that either of these externalities remain even with efficient price structures, they are better handled by direct means without indirect cross-subsidies in the price mechanism and without restrictions on competition or freedom of entry and exit.

A. Universal Service

It can be argued that regulation is needed to ensure universal service because an individual's welfare can be increased when others purchase telephone service. These external benefits are of two types. First, the value of an individual's telephone service depends on the number of people with whom he or she can communicate. The larger the

number of people who choose to buy service, the more each person's service is worth to him or her. That is, the social value of an individual's purchase of telephone service may exceed the value of that service to the individual. Second, most people derive benefits from knowing that other people have access to telephone service in an emergency. If these external benefits are significant, then from society's point of view consumers may not purchase enough service.

Before discussing the role of cross-subsidies in achieving universal service, it should be noted that in the 1930's, when rural, and even to a large extent, urban telephone service was considered a luxury, a direct subsidy to eliminate the consumption externality may have been useful. In 1980, however, penetration of the service is very high because telephone service is a necessity for most households (that is, demand is extremely price and income inelastic). Therefore, the social value of adding a marginal subscriber to the system is low. Moreover, even substantial price increases may not deter most of the population from subscribing. This means that the only problem may be emergency access for the very poor. In the following discussion, however, we assume that both problems exist.

The present (regulated) price structure allegedly contains several internal cross-subsidies that encourage universal service. There are, for example, two subsidies

allegedly being paid by users of long distance service: one to local service (although there is no consensus on the size of the subsidy); and one from customers on high density routes to customers on low density routes. These subsidies, if in fact they do exist, would act to reduce the price of service in the short-run to isolated rural users, who would have both their local as well as their long distance service subsidized. Many interest groups argue that upsetting these internal cross-subsidies, as a competitive market might, could significantly raise the prices for local and rural service. Such price rises in turn would discourage poor and rural users from subscribing to phone service and undermine the benefits of universal service.^{17/}

From the view point of the subscriber, telephone service can be broken into three basic components: the ability through physical connection to use the system; an instrument that serves as the means of use, and actual usage. Each could be priced separately. Universal service objectives are most closely related to the price charged for connection to the telephone network because it is the ability to call in an emergency and the ability to reach others that provide the external benefits.

Each component of telephone service imposes different costs on the telephone company. Providing the ability to use the telephone system imposes fixed costs that are independent of usage. The cost of the instrument is also unrelated to use. The costs of usage, in contrast, depend

significantly on both the frequency and timing of use.

Providing usage requires switches and trunk lines between switches. These facilities are shared by the users rather than being dedicated to a single user. If each customer uses the shared facilities often, more switches and trunks between switches would be required than if each customer rarely places calls, assuming the pattern of calling is evenly distributed throughout the day. If customers concentrate their calling in a particular time period, more switches and trunks will be needed to handle that peak load than if the same amount of calls were evenly spread throughout the day.

In many jurisdictions, prices do not reflect the three aspects of telephone service or the underlying cost characteristics. Instead, users pay two charges. The first is a flat rate that covers the right of use, the means of use, and part, but not all, of actual use. The second charge is based on the frequency and timing of use of the long distance portion of the system.

Charging flat rates fails to provide incentives for customers to tailor their usage to minimize the costs they impose on the system. Indeed, flat rates may provide the contrary incentive. Without a charge that makes explicit the additional system costs of either frequent or peak period usage, customers face no reason to limit either. They place calls in peak periods, and the system must expand to accommodate that usage.^{18/}

1. Long distance to local cross subsidy

Under current policy in most jurisdictions, the costs of providing local service, minus the alleged subsidy, are recovered by the flat rate. The costs that must be recovered are larger than necessary because customers have no incentive to minimize their use of the system. Moreover, since not all customers use the system equally, low frequency users face a charge that is more than proportionate to the relative costs they impose on the system. If telephone rates for local service were unbundled so that connection charges were independent of usage charges, connection charges would properly reflect the lower costs of providing connection only. Local telephone companies would still receive sufficient revenues from usage charges to cover their remaining costs. Thus, the impact on universal service of eliminating any subsidy from long distance users could be reduced by efficient pricing of local service.

Indeed, with efficient unbundled prices universal service may be obtainable without any subsidization. Connection charges reflecting actual costs would, most likely, be low enough to encourage subscription. The decision to connect may not be absolutely independent of the charges for using the network, but the desire to reach help in an emergency, which connection offers, is a very powerful incentive. Thus, the decision to connect is unlikely to be highly related to the price of actual usage. Moreover, competition could lead to an expansion of the potential uses

of the network, making connection even more desirable.

It is possible, however, that in rural areas the costs of providing connection to isolated users might be so high that even with unbundled prices, non-subsidized connection charges would be sufficiently large to result in decreased subscription. If levels of rural subscription were judged inadequate, direct subsidies to rural telephone companies to lower connection charges would be far more efficient than indirect subsidies through the price mechanism.

It should be noted that rural telephone service is already heavily subsidized directly through the Rural Electrification Administration. Since 1949, REA has provided over 4.6 billion dollars in long term low and reduced interest loans to rural telephone companies to assist them in providing service to over 4.1 million customers. With this help, by 1977, 92 percent of America's farms had telephone service and all subscribers on systems financed through REA have dial or touch tone service.19/

Direct subsidies through REA can be increased rather easily. Similarly, to the extent that even an efficient, unbundled pricing structure leaves low income people unable to pay connection charges, direct grants to telephone companies by welfare agencies could be made available. Welfare agencies currently include the cost of telephone service in setting payment levels. There is no reason why welfare programs should exclude expenditures for telephone service in the future. Maintenance of cross-subsidies in

the current price structure simply is not required to achieve universal service.20/

2. Nationwide rate-averaging

Under the existing price structure for long distance services, interstate rates are averaged across the country. Thus, for example, interstate calls between points 500 miles apart are priced identically no matter what two points in the country are connected.21/ Due to economies of sharing traffic on trunks, costs over high density routes presumably are lower than over low density routes. Therefore, nationwide rate-averaging may provide a subsidy from users along high-density paths to users making calls over low-density routes.

It is argued that nationwide rate-averaging promotes universal service because the prices facing rural users for long-distance services are lower than they would otherwise be.22/ As noted above, however, universal service objectives are more closely related to the cost of connection to the system than to the cost of actual usage.23/ Because the cost of connection is incorporated into the flat rates for local service, subsidizing the long distance portion at best has a small impact on decisions to connect to the system.

To the extent that usage prices do affect decisions to connect to the system, people on high density routes face a disincentive to connect because of the higher prices for long distance usage. The alleged subsidy would facilitate universal service only if users along low density routes who

are encouraged to connect outnumber the users along high density paths who are discouraged from connecting.

Even if subsidizing the price of long distance usage does result in a net increase in the total number of subscribers, the size of the subsidy required may be very small. The National Telecommunications and Information Administration preliminarily estimated that the subsidy required to prevent the prices for calls along low density routes from rising more than 20 percent above current levels is only 100 million dollars.^{24/} This is because most calls originating or terminating in rural areas are routed over high density trunks for at least some portion of the total distance traveled. It is far from obvious that rate deaveraging of the magnitude supported in the NTIA study would have a major effect on the desire of rural consumers to purchase telephone service. Thus, the price distortions in the current rate structure may be providing few benefits in terms of achieving universal service.

Moreover, a higher proportion of rural as compared to urban calling is probably intrastate toll. In states where intrastate toll rates are actually higher than equivalent interstate rates, rural users may be subsidizing themselves, or even subsidizing urban users.

3. Long Run Implications of Subsidies

Even if subsidies for local service and thin long distance routes were to increase the desire of consumers to subscribe and thereby further the goal of universal service,

such a scheme may be self-defeating in the long run. Subsidizing those services reduces the incentive to develop new techniques that would lower costs. This is true even if entry is allowed. To estimate the profitability of a new method for providing service, corporate strategists necessarily compare the costs of the alternative with the current price of service. If the service is subsidized, the private gain to the firm from lowering costs is less than the social gain determined by comparing actual costs. This discrepancy artificially blunts the incentive to innovate. The net result is that, over time, the provision of those services may be more costly than it would have been if the price mechanism had reflected the underlying costs. These higher than necessary costs inevitably mean higher prices, no matter who actually pays. Higher prices than necessary in turn tend to diminish incentives to purchase and use telephone service.

In the long run, higher costs and prices than necessary increase incentives to invent new systems that avoid using the existing telephone system altogether. This reflects the more general incentive to innovate around bottlenecks. Several firms are working on new distribution systems that bypass the local carriers.^{25/} Thus, the ultimate effect of price distortions caused by a subsidy scheme may be obsolescence of the subsidized service. In brief, cross-subsidy in order to promote universal service may be ill conceived.

Efficient pricing and competition can promote universal service without reducing the current level of telephone subscription. More important, efficient pricing and competition will send the signals to encourage research and development that will ensure universal capability to communicate efficiently in the future.

B. Carrier of Last Resort

It can be argued that the loss of telephone company profits due to competition will impair the ability of telephone companies to stand ready to serve everyone in the public utility sense. Stand-by capacity may be needed in three types of circumstances. One case relates to peak demand; some customers may want assurance of access at any time of day, every day of the year, no matter how many others are demanding access at the same time. Stand-by capacity is also important when regular facilities must be repaired. In both of these cases, stand-by capacity increases the quality of service. A third source of demand for stand-by capacity is to restore or maintain service in an emergency, such as a flood or hurricane. This last case is the only one of the three that necessarily exhibits externalities. Presumably, all of society gains when communication with disaster areas is available.

It should be noted that guaranteed connections at peak periods and disaster communications are not necessarily available to the average user now. To the extent they are available, virtually all companies include in the basic

service offering the stand-by capacity that makes them possible. Thus, those using the system during unusual peak periods pay the same as users who make no demands on stand-by capacity. Also, customers rarely are offered any choice in the degree of system reliability. By building capacity sufficient to offer all customers a very high probability that a call will be completed, the telephone companies have removed from the market the choice of trading off lower costs for lower quality.

Providing stand-by capacity increases costs. If that capacity is provided at the same price as capacity that is used more regularly, customers receive two incorrect signals. First, subscribers are encouraged to demand more stand-by capacity than they would if they bore the full cost. Second, those who use only regular capacity pay more for that service than the costs of providing it. The regular capacity users are paying a particularly excessive price if there are only a few customers who want a very high degree of service reliability. Overpricing regular telephone service may reduce the number of customers who will subscribe.

The failure to charge a different price for stand-by capacity also means that the monopoly telephone company has a reduced incentive to seek out or choose technology that could provide that capacity at least cost. Indeed, due to the desire to expand the rate base caused by rate of return regulation, telephone companies have perverse incentives to

underprice stand-by capacity in order to increase the demand for such capacity and to choose capital-intensive methods of providing it.^{26/} Perhaps the largest overinvestment occurs, therefore, because the trade-off between cost and service quality has not been made in the market. If service reliability has been set at a level at which the costs exceed the value consumers place on reliability, all who subscribe are paying more than necessary for the service, and some may fail to subscribe because less costly options are unavailable.

Competition and the entry of new firms undermines the telephone company price structure for stand-by capacity. If, once competition is allowed, companies continue to handle sudden increases in demand at the same price as they handle normal traffic loads, they would be susceptible to substantial losses of customers to competitors who would not provide assurances of adequate capacity in times of excess demand. As in any competitive market, firms are likely to respond to prices that exceed costs by entering the market to provide the overpriced services. Telephone company customers should not have to pay for spare capacity to serve surges in demand from customers who have purchased competitive services in part because such services were priced lower due to the lack of spare capacity.

This does not mean that demand for stand-by capacity would be unfulfilled in a competitive marketplace. If people value guaranteed service and are willing to pay for

it, companies could provide it under flexible pricing schemes that would cover the extra costs of stand-by capacity without requiring all who do not use it to help pay for it. Price differentials reflecting whether or not service is interruptible, for example, would efficiently accommodate demand for guaranteed service. If some customers require spare capacity to ensure that calls are completed even during high demand periods, they could pay vendors for the necessary facilities. If people desire the option of using telephone company facilities even though they normally use facilities of competitors, the telephone companies should be able to devise charges to satisfy such option demand that cover the costs. By charging peak service users the actual cost of providing such service, some users would be encouraged to switch to other periods, and companies and competitors would be encouraged to find less expensive "peaking" plant, thereby increasing the efficiency of telephone operations.

Stand-by capacity in emergencies, as noted above, benefits more people than those in the affected region. Using cross-subsidies to pay for such service, however, may lead to facilities much more costly than necessary for the task. Portable facilities may be more economical than building the entire system to survive earthquakes, fires and floods.^{27/} Much existing emergency service is actually provided by non-telephone means such as amateur radio.

To encourage the search for and adoption of least-cost techniques of emergency communications, stand-by capacity would best be offered as a separate service to governments, procured competitively and paid for by tax mechanisms.28/ The cost would be made explicit, and there would be incentives to seek the least costly means of providing it. Although it is unlikely, the government may even decide that the cost of such a service exceeds the benefits of correcting for the externality. The conclusion then, is that the carrier of last resort problem can be solved in the market without resort to cross-subsidies.

III. RESIDUAL MARKET POWER

The efficient and affordable communications services called for in Title I of the Communications Act require that costs be minimized and that prices reflect cost. A common theme of those who have opposed competition in telecommunications is that competition will result in higher costs because of the natural monopoly characteristics of the market.^{29/} It can also be argued that the market power of particular firms will lead to prices that greatly exceed costs if entry controls and rate of return regulation are eliminated.

The argument that competition will lead to higher costs because of natural monopoly has been discussed at length elsewhere.^{30/} Our conclusion is that economies of scale and scope are largely irrelevant to the question of competition in telecommunications markets. In a dynamic, rapidly growing market such as telecommunications, competition is likely to come mainly from two directions. One major source of competition is from firms developing new technologies that dominate existing technologies. The other is from firms that offer services that cater to market segments ignored or inefficiently served by existing monopolists. In either case, the cost conditions under which the monopoly service is produced are largely irrelevant. Moreover, if scale economies are large and pervasive, market forces would lead to single firm supply so production will be efficient. Thus, the remainder of this part of the paper will

deal with the concerns about monopoly pricing rather than cost conditions.

We noted in Part II that, from the point of view of the user, telephone service has three components, the right of use, the means of use, and actual usage. From the point of view of the telephone companies, however, the industry has four different components, each of which can be thought of as a separate market. The means of use -- the telephone handset, PBX, or data terminal -- is the customer premises equipment market. The right of use and actual usage are provided by the local exchange, basic interexchange, and enhanced services markets.^{31/} Market power questions should be addressed in the context of these markets.^{32/}

A decision to rely solely on competition to satisfy society's goals in these markets raises four major concerns. First, the firms that provide local exchange service might have the ability to prevent interconnection to their facilities, thus blocking entry. Second, even if interconnection is assured, the dominant firm might use its large size to drive out competitors and then raise prices to monopoly levels. Third, even if a monopoly structure is avoided, only a few firms might enter and then use oligopoly pricing to earn monopoly profits. Fourth, while individuals and businesses located in the largest cities and wishing to call others similarly situated might receive the benefits of competition, rural areas and the so-called thin routes to and between smaller cities would continue to be monopolized.

None of these four problems, interconnection, predatory pricing, oligopoly supply, and monopoly in smaller markets provides sufficient justification to maintain traditional regulation of the telephone industry. Indeed, except perhaps for the problem of pricing interconnection, price and entry controls may make the problems more severe.

A. The Problem of Interconnection

Several firms are both competitors in, and by virtue of their ownership of monopoly local exchanges, suppliers to, the basic interexchange, enhanced communications and, indirectly, the customer premises equipment markets.^{33/} Such dual roles are not uncommon in industry. What creates a problem in telecommunications, however, is that, at least in the near term, access to customers may continue to be effectively monopolized by those companies. This means that most entrants into the equipment, enhanced service, and interexchange markets will have to deal with local exchange monopolists in order to offer service. In other words, the local exchange firms have control over a bottleneck point in the other markets.

When a firm is both a bottleneck local exchange monopolist and a participant in the other markets, two problems arise. The first is providing physical access to the local exchange facilities to the non-integrated firms. The second is establishing the price for access.

The problem of ensuring physical interconnection of competitors' equipment with the local facilities of

integrated firms is fairly straight-forward in the case of customer premises equipment. A regulation requiring such interconnection; accompanied by technical standards to ensure the technical compatibility of all parts of the system are needed. This has been largely accomplished already.^{34/} Industry negotiations, the MTS/WATS Inquiry,^{35/} or an antitrust decree may provide such a system for interexchange carriers.

It is more difficult to ensure that the prices charged for interconnection are appropriate. This involves two questions: are the charges paid by competitors reasonably equivalent to the charges paid by the integrated companies?; and, are those charges reasonably related to costs?

Ensuring that all competitors, including the integrated firms, pay the same price for interconnection cannot be accomplished by the use of costing methodologies or accounting conventions. As long as a firm is fully integrated, no regulatory agency is able to determine what price it is paying for interconnection to the local exchange system. The regulator can ensure that the same price is paid by all participants in the market only by prohibiting jointly owned plant and employees and requiring the firm to deal with itself on an arms length basis at the interface between local service and each of the other markets.^{36/}

Two proposals for preventing the local exchange portions of integrated companies from discriminating against unaffiliated firms are requiring the separate activities to

be put into separate subsidiaries or preventing the bottleneck firm from operating in the other markets. The former method is the one that has been advocated in the various bills to amend the Communications Act and by the Federal Communications Commission in its Tentative Decision in the Second Computer Inquiry.^{37/} The latter approach is equivalent to the divestiture that is advocated by the Justice Department in its suit against AT&T.

A problem involved any time regulators or others interfere with the methods businessmen use to organize their activities is that efficiencies of integration may be lost. In non-regulated sectors of the economy it can generally be assumed that businessmen have sought out and implemented the most efficient structure. Thus, government mandated changes are likely to involve costs. In the regulated sector, however, it is likely that cost-plus pricing reduces incentives to seek out the most efficient organization. At the same time, a desire to increase the rate base and the opportunity to shift profits from regulated to unregulated markets may lead regulated firms to enter entire lines of business that non-regulated firms would not enter.^{38/} Moreover, a cost-benefit analysis taking long-run dynamic effects into account may show that the benefits of having many suppliers outweigh the short-run costs of lost economies of integration.^{39/}

It might seem that price controls of the kind contemplated by the tariffing process would be the answer to the

problem of keeping charges for interconnection reasonably close to actual costs. Relying exclusively on the tariffing process, however, is unlikely to offer much help in solving the problem. While rate of return regulation undoubtedly affects the prices a firm might charge, the problems of collecting sufficient data in the relevant time period make it impossible for a regulatory body to know that the tariffs are actually related to costs.^{40/}

Dealing with the problem by requiring the other parts of the integrated companies to pay the same price for interconnection as their competitors do, on the other hand, may offer some hope of keeping the price close to the cost of providing interconnection. If interconnection is priced too low, all firms would receive the subsidy. If it is too high, all firms including the integrated one would suffer from the loss of users brought about by the higher prices for the interconnected service.

Without advocating the superiority of divestiture over separate subsidiaries or vice versa, it is assumed in the following discussion that equipment competitors are given access to local exchanges at terms that do not disadvantage them vis a vis the integrated firms.

B. The Problem of Predatory Pricing

One fear is that a dominant firm could drive its smaller, weaker competitors out of business by predatory pricing, even if competitors have access to local exchanges on the same basis. The argument is that if a firm is very

large and participates in many product and/or geographic markets, it can afford to underprice its rivals and wait for their bankruptcy.

The subject of predatory conduct has generated a great deal of controversy within the economics profession. There is a school of thought that holds that predatory pricing is an irrational business strategy that very seldom, if ever, occurs.^{41/} A relatively recent group of articles, however, suggests that dominant firms do have incentives to engage in predatory conduct in response to, or in anticipation of, entry.^{42/}

If predatory pricing is a potential problem, the question is how to deal with it. One alternative is to continue the full panoply of price and entry regulations contained in Title II of the Communications Act on the dominant carrier while ending regulation of all other carriers.^{43/} Others have urged the adoption of conduct rules.^{44/} Neither of these proposals, however, seems likely to provide net benefits beyond the structural changes advocated above.

Relying on continued Title II regulation seems more likely to encourage than prevent predatory pricing, and is likely to discourage rapid technological development as well. The view that predatory pricing is irrational does not necessarily apply to rate of return regulated firms. Effective rate base regulation provides incentives for the

regulated firm to engage in interservice cross-subsidies.45/ Moreover, this incentive is so strong that the regulated firm would be willing to capture business in these new markets by pricing below its costs, even over the long-run if necessary, as long as prices can be raised in monopoly markets to cover the losses in competitive markets. Thus, to the extent regulation succeeds in constraining the prices of dominant firms, interservice cross-subsidies by those firms become profitable. Because of joint costs, these cross-subsidies will be difficult to detect regardless of the accounting used.46/

Moreover, continued rate of return regulation may be unfair to the dominant firm to the extent it prevents profitable exploitation of new technology or legitimate welfare enhancing responses to competition. Regulatory lag may discourage the regulated firm from engaging in high-risk business ventures that require high returns. High cost entry by competitors may not be deterred if the regulated firm is not allowed to meet the competition.

The conduct rules that have been developed differ from, but offer little or no improvement over, Title II regulation. One such rule would allow the dominant firm to charge any price in any market as long as costs, appropriately defined, are covered.47/ The major problem with this rule is the same as with Title II regulation: the difficulty of determining costs in a timely fashion.48/

An alternative or supplementary rule would operate directly on prices: dominant firm price reductions would become "quasi-permanent," rising only as costs rise; prices could not rise in the dominant firm's other markets.^{49/} It is alleged that below cost pricing would be deterred since there would be a continuing drain on firm profits. Unless the dominant firm is forced to undergo structural separation, however, this rule would also require complex knowledge of costs in order to be effective.

Moreover, each of these rules can have unintended consequences, some of which may be worse than the original problem. Rules that limit dominant firm pricing flexibility by preventing legitimate price reductions, for instance, may serve as an umbrella protecting inefficient entrants. Indeed, the rules may stimulate inefficient entry. In the long-run, consumers might be better off paying a monopoly price based on efficient technology than a "competitive" price based on high cost production that is wasteful of resources.

Arguing against either the continuation of Title II pricing regulation or the imposition of the antitrust pricing rules does not necessarily mean, however, that nothing can be done to limit the possibility of predatory pricing. First, if integrated firms are required to make appropriate separations of their activities in the four market segments and affiliates must deal with one another in the same way competitors do, the integrated firms will have

lost much of their ability to engage in predatory conduct.^{50/}

Second, requiring dominant firms to allow resale of all offerings would reduce even further the likely success of any attempt to engage in cross-subsidized predatory pricing. Because unlimited resale acts as a form of arbitrage among similar services, firms that attempt to engage in predatory behavior would suffer a large drain on profits. Thus, for example, if prices for MTS were raised substantially, resellers could compete away significant amounts of MTS business by making WATS services available to residential customers.

The third deterrent to predatory pricing is the threat of antitrust actions, either by the government or by disadvantaged competitors.^{51/} The government could ask for further restructuring while competitors could seek treble damages. By requiring restructuring, predatory conduct would become more transparent and thus easier to detect and prosecute.

C. Oligopoly Pricing

Even if predatory conduct is eliminated, some markets, perhaps the basic interexchange or enhanced communications markets, may develop into an oligopoly, a market dominated by only a few firms. Some may argue that if this is the case, performance will approximate that of a monopoly so rate of return regulation will be necessary. Even should the market become oligopolistic, however, economic goals would be better served by unregulated than regulated oligopoly.

Many studies have attempted to measure the effect of oligopoly structure on industry profits. The consensus seems to be that higher concentration leads to slightly higher profits, where concentration, usually measured by the market share of the four leading firms, is the measure of oligopoly.^{52/} But the results cannot be interpreted unambiguously. Concentration ratios are very poor measures of competition. While oligopoly prices and profits may be higher on average than they would be if there were more competitors, particular oligopoly markets may well exhibit competitive prices. Moreover, it may be true that profits are only temporarily higher in some oligopoly industries because of recent technological change or increases in demand that have not yet been subject to inevitable competitive forces.^{53/}

The ambiguous results of the statistical studies are due to the nature of oligopoly. Since there are many kinds,

it is difficult to generalize. Although economists have not developed a single theory of oligopoly pricing, it is generally accepted that the keys to raising price are the ability of the firms to agree not to undercut one another's prices and entry barriers. If entry barriers are low, or if agreement cannot be reached and maintained effectively, then prices will not exceed competitive levels.

Even if barriers are high, agreement is not automatic. The easiest way to reach agreement, simple out-right price fixing, is per se illegal. This often prevents agreement altogether since the alternative of tacit collusion may not work satisfactorily. In particular, where transactions are complicated, as in uniquely designed services, or where costs and demands change frequently, it is difficult to agree tacitly on prices and difficult to detect cheating on the agreement even if one is attempted. If prices are above costs in these situations, there are strong incentives for one firm to increase business and thus profits by cheating on the explicit or tacit agreement, thus eroding its effectiveness.

All of this is not to say that oligopolists never manage to form tacit or explicit agreements that result in non-competitive pricing. They sometimes do.^{54/} The point is that such agreements are not inevitable and many oligopoly industries price more like competitive firms than monopolies. Moreover, if price competition is dampened by agreement, rivalry may lead to other forms of competition,

some of which may be productive. Oligopolists who refrain from price competition, for example, may try to enhance market share and profits by engaging in research that leads to new and better products or less expensive methods of production.

The discussion to this point has focused on the short-run aspects of oligopoly pricing assuming the existence of entry barriers. Over longer periods of time, entry barriers tend to be eroded. Consistently high prices tend to spur research on the part of those outside the industry (customers or firms in related markets) to develop substitutes for the high-price product or methods to enter more cheaply. One pricing strategy that might be adopted by oligopolists is to avoid pricing their products at levels that stimulate this sort of activity.^{55/} The conclusion to be drawn is that oligopolists do not necessarily have market power, and even if they do, natural market forces are likely to limit or erode this power over time.

Thus, unregulated oligopoly does not necessarily prevent realization of overall economic goals. Regulation of oligopoly may adversely affect those goals.^{56/} First, when oligopolists are unable to charge high prices by themselves, regulation often provides the mechanisms that allows them to do so by providing a cartel manager.^{57/} Second, even when prices are already high, regulation may act to maintain rather than reduce prices and may cause distortions that lead to increased costs of production.^{58/}

Finally, the very process of regulation consumes the resources of both the taxpaying public and regulated firms (and, through the firms, of the ratepayers). The conclusion is that where there are competitors, no matter how few, market forces have a chance to work at least over the long run. Regulation is only likely to increase costs, if not in the short run, then surely, in the long run.

D. Monopoly Pricing

Most observers expect that, for some time to come, local service will be a monopoly. Moreover, even assuming that nondiscriminatory interconnection has been assured and that there are no dangers of predatory or oligopoly pricing, some believe that small users, particularly rural users, may have access to only one supplier of interexchange services. The possibility of such monopolies leads to calls for continuation of rate of return regulation, at least for these portions of the common carrier communications industry.^{59/}

1. Thin Interexchange Routes

Even small town and rural users could be served by more than one interexchange supplier. Competitors do not need facilities to serve a given area. If resale were allowed, for example, In-Wats service could be used to allow customers in small towns to reach the networks of the competitors.

Even if there were only one carrier on a given route, the threat of potential competition could serve to keep

prices at a reasonable level. The microwave technology competitors use obviously presents much lower barriers to entry than does cable. Moreover, new technologies that allow cost effective transmission of small numbers of circuits may be developed. If orbital slot capacity, spectrum availability, and continued satellite technology improvements allow, satellite competitors will have access to central offices of even the smallest towns. As long as competitors have access to local distribution facilities, the new technologies would allow competition. As noted elsewhere in this paper, subsidizing the thin routes will have the effect of reducing the innovative activity needed to develop the competitive technologies.

In sum, the customers who live along the less dense routes will not necessarily be subjected to monopoly pricing. If costs are higher along these routes, however, then these customers will be paying higher prices. This should not be confused with monopoly pricing. In the unlikely event these prices conflict with the universal service goal discussed in Part II, the direct subsidy mechanisms discussed there could be used.

2. Local Exchange Service

Economic regulation of local telephone service franchise monopolies has existed since shortly after the invention of the telephone. Local telephone service remains a monopoly and the conventional wisdom is that it is still a natural monopoly. There is no reason, however, why open

entry should not apply to this service. In particular, new radio technologies may at some not too distant point in the future provide a cost-effective alternative to traditional service.

One company has already requested the FCC to allocate spectrum for multiple electronic mail systems that would provide electronic local distribution.^{60/} Technology currently in use in the land mobile bands, such as trunked land mobile, might be competitive with local distribution service if spectrum allocations or regulatory policies were changed. A new citizen's band service at 800 MHz that would allow a user to signal the desired receiver and block all other use of that channel for the duration of the conversation has been discussed. Such a service would be the equivalent of a telephone system with the switching capability in the handset.

All of the potentially competitive technologies involve bringing to local distribution service the same technical innovations that have opened up interexchange service to competition, namely substitution of spectrum for wire as the transmission medium, and digital computer technology for mechanical switching and routing equipment. Sufficient spectrum for some of these systems may not be available in urban areas, but could provide welcome relief from high costs in rural areas. Another potential substitute for rural distribution may lie in civilian applications of spread spectrum technology.

Many of these techniques, particularly those developed in the computer field have been known for some time and could have been developed to improve telephone service, and yet have not been. A major reason is that the incentive structure that a rate of return regulated local exchange monopolist faces discourages the deployment of new technologies.61/

If new technologies, which offer consumers service advantages as well as potentially lower costs, are to be rapidly implemented, controls on entry should be ended. However much regulators want to encourage technology and competition, the procedural requirements of entry controls delay the introduction of new firms and new technology both directly and indirectly. The direct effects are the delays and legal costs inherent in the regulatory process.62/ The indirect effects are worse. New firms are required to expose both their marketing plans and their new technologies to the existing firms before they can enter. The existing firms can often block entrants by moving to serve the potential customers or by adopting the new technologies themselves.63/ As a result, entrepreneurs become reluctant to apply for entry without the prospect of very substantial gains. Small changes in technology, ones that entrepreneurs in unregulated markets would exploit, go unused in regulated markets.

As noted above, regulation also discourages existing firms from implementing new technology.64/ Both the firm

and the regulators have incentives to depreciate equipment over long periods. New improvements often are introduced only as old equipment is replaced. Moreover, if an existing firm is threatened with entry, regulators become concerned about the ability of the existing firm to recover its sunk costs.65/

Arguments in favor of eliminating local exchange regulation do not necessarily depend on a high probability of new, competitive technologies developing. If fiber optics or new local digital switching and transmission techniques give existing monopolists cost advantages over alternatives, those alternatives will still provide a "back-stop" or limit that will constrain monopoly pricing. Moreover, the end of regulation may have the effect of inducing monopolists to implement the new, lower cost technology more rapidly. Consumers may be better off with a monopoly price based on efficient technology rather than a regulated price based on obsolete facility costs.

The discussion thus far has implicitly assumed that the institution of rate of return regulation is indeed capable of keeping local exchange prices close to costs. While this is subject to investigation, it is particularly questionable whether state public utility commissions have the resources to achieve that result. The resources devoted to state regulators are typically small and the burdens large. Given the distortions caused by such regulation and the inability of the regulators to counteract them (in part because they

never have the information they need), prices might not rise with deregulation.

There is enormous reluctance to abandon rate of return regulation of the local portion of the system. Given the high cost in lost technological change at the local level, however, we believe society would be better served if a transition out of economic regulation were achieved. Monopoly local exchanges are the bottlenecks on which the monopoly structure of all telecommunications was built, so their replacement by competitive technologies would provide enormous benefits.

IV. CONCLUSIONS: TELEPHONES, TRAINS, TRUCKS, AND PLANES

The theme of this paper is that society's basic objectives for common carrier communications services, as set out in Title I of the Communications Act, no longer appear to be served by regulated monopoly. We have discussed in some detail the basic goals of the Act, the major policies that have been developed to serve those goals before and since 1934, and the consequences of following these policies.

The policy recommended here is the complete elimination, for all telecommunications products and services, of rate of return regulation as well as the elimination of the price and entry controls that accompany rate of return regulation. This recommendation is based on our belief that rate of return regulation does not effectively control monopoly power and that, in the long run, such regulation only serves to perpetuate monopoly at the expense of cost-reducing and service-improving innovation. Other social controls over the industry such as structural safeguards must remain, however, to assure that social objectives will be met.

A. Where Common Carrier Communications is Today

The preceding analysis leads to several basic conclusions about the present and possible futures of common carrier communications services. Two conclusions about the present are fairly simple. First, the long period of monopoly control that saw monopoly profits in some services

while stifling innovation in others may be coming to an end. Second, if that period is ending, it is because society is recognizing that regulation sacrificed too much efficiency in its attempts to provide for social goals by means of internal subsidies and an over-reliance on rate of return regulation.

The success of competitive entry into equipment, basic services, and enhanced services are events that are already recognized and are unlikely to be stopped. Less well understood, perhaps, are the gathering signs that innovation, begun in the interexchange portion of the market, may now be coming to local loop services. Such new technology is coming only in small doses from the established wireline carriers. Most of the signals of future innovative competition are coming from potential entrants. Plans for all radio distribution for electronic mail services, as advocated by Xerox and SBS, are one such signal. New and better radio systems for a variety of applications, such as trunked land mobile, possible service features of new citizens band service, cellular mobile radio, and even some potential spread spectrum applications all signal technological changes that could lessen user dependence on existing systems.

The acknowledged competition in interexchange services and the approaching competition in exchange services highlight the underlying reason for the demise of monopoly control, namely the failure to serve society's basic goal of

the best service at lowest cost over the long run. That goal requires elimination of barriers to innovation. The decisions to serve society's other basic goals by using internal subsidies, however well-intentioned, posed increasingly large barriers to the search for and deployment of new techniques. Ultimately, those barriers posed larger costs than any gains to society from the internal subsidies.

It is possible, of course, that some competition being observed today is an attempt to avoid paying the subsidies rather than implementation of better technology per se. To the extent this is true, even more resources are being wasted and the case for ending regulation and the internal subsidies that go along with it is even more urgent.

B. Transition Needs

1. Consumption Externality Problems

In Part II it was suggested that the manner in which exchange operators charge for service might have to change to solve consumption externality problems. Overt interference is probably unnecessary to promote this type of pricing. There is already movement to usage sensitive pricing by telephone utilities.^{66/} With usage sensitive prices revenues automatically increase as the economy grows. Thus, this movement is based, in part, on the desire of firms to avoid general rate increase requests necessitated by rapid inflation.

Ending rate of return regulation is likely to accelerate rather than reduce this trend. The current

bundled rates were encouraged by regulation in the days before double digit inflation. There was little incentive to cut peak period use as long as the increased capital costs could be used to justify rate increases. With an end to distortions induced by regulation, firms will have an incentive to charge people for the costs they impose on the system and, more important, to reduce capital expenditures. Moreover, the desire to reduce costs will be strengthened further because subsidies from the users of interexchange services will no longer be possible.

It is possible that some users will face large price increases so Congress and state legislatures may wish to add to the direct subsidies of REA and other welfare programs in anticipation of deregulation. Another necessary change is to establish a government program to identify and provide stand-by capacity that is needed beyond what the carriers would provide.

2. Market Power

There are some substantial transitional problems in deregulating local and interexchange service. As noted in Part III of this paper, the primary prerequisite to solving any market power problem is providing for the restructuring of exchange carriers that operate in other markets. At a minimum, subsidiaries must be established for terminal equipment and for interexchange offerings of firms that are affiliated with local exchange carriers in order to prevent cross-subsidies. This restructuring, plus requiring all parts of

these newly structured companies to deal on an arms-length basis and ensuring unlimited resale of service offerings are more effective tools against abuse of monopoly power than rate of return regulation.

In the transition from regulated to unregulated communications, it will also be necessary to allow carriers an opportunity to develop the access charge system that will replace the current system that is used to reimburse local exchange carriers for interconnection with and use of their facilities. Finally, a third transition and implementation problem that must be resolved is determining the extent to which established regulated carrier plant is underdepreciated and making the necessary adjustments.

It is not our intent to underestimate the magnitude of the transition and implementation problems. Some of these changes may require legislation. Wholesale changes in the way firms do business take time. But, if the benefits of competition are to be realized, the process should begin. The time has come to look carefully at the choice between following the airline or the railroad model.

C. Future Trends

How events will move in the future is partially determined by the state of affairs today. As noted above, competition around substantial fringes of local distribution is already visible on the horizon. What is not yet set, however, is what direction that competition will take. Will all competition to existing local distribution systems be

complete substitute systems (so-called stand-alone networks) such as the system proposed by Xerox, or will new innovations be marginal changes and improvements to the existing systems? The answer will depend in good measure on the competitive policies, including the policies adopted to deal with potential anticompetitive behavior by the present monopolists, discussed in Part III of this paper. It is here that the analogies to railroads, trucks and airlines become instructive.

The new technologies beginning to crowd in upon local distribution service offer the promise of consumers being able to freely alter where a message originates, how it is routed, and where it ends. This differs significantly from wireline service, where the fixed nature of the facilities prevents such flexibility. This situation has some striking similarities to the advantages trucks offered to customers who had until then been limited largely to railroads for carrying freight.^{67/} Railroads were subjected to rate of return regulation in 1887.^{68/} Along with regulation came the same basic social goals that are expressed in the Communications Act, which is patterned after the Interstate Commerce Act.

The advent of trucks posed a threat to the ability of railroads to provide for social goals by using internal subsidies. The response was to impose the same regulatory regime (and social goals) upon the trucking industry.^{69/}

Subsequently, Congress also regulated water carriers for much the same reason.70/

Despite applying regulation to the competitors, railroads are in sorry shape. Inflexible rates cause key equipment shortages during peak times and discourage investment in new capital. Innovation is biased and retarded by the inability of firms to price in a manner that would generate business for new kinds of equipment. Existing controls prevent abandonment of unprofitable business, which leads to cross-subsidies that can only cause more traffic diversion from profitable services.71/ For some time society has been facing periodic railroad bankruptcies and miles of abandoned track. Track remaining in use is in very poor shape, which in turn means slow movement and frequent accidents. The conclusion is that regulating the competition will not protect the internal subsidies. At best, it only holds off the day when society faces the facts of overinvestment and the problem of what to do with the unneeded plant and equipment.

The same choices may soon face society with respect to common carrier communications services. As a society we have a chance either to replicate the railroad experience or to avoid it. The potential railroads of tomorrow may be the local telephone companies of today.

To avoid making these companies into tomorrow's railroads, several steps need to be taken. First, internal subsidies as a means of serving social goals should be

abandoned. Prices closely tied to costs coupled with direct subsidies to the end user better serve these goals; internal subsidies carry with them the inhibitions for innovation.

Second, competitors should not be subjected to regulation. Rate of return regulation, however well carried out, does not serve society well.^{72/} It neither protects customers against abuses of monopoly or oligopoly power, nor prevents predatory pricing in non-monopoly situations. Competitors should be allowed to enter and exit freely, offer whatever services they wish to offer, at whatever price. They should not be required to make financial "contributions" to any other part of the system in the name of any social goal.

Third, existing telephone companies need to participate fully in the competitive market. It is not in society's best interest to abandon the vast amount of plant and equipment in place if it can be reconfigured to provide desired services. To free those carriers, society must deal with the potential for anticompetitive behavior by means other than rate of return regulation and entry barriers into markets that are merging with communications. Instead, necessary interconnection and unlimited resale need to be assured.

In sum, society today has a choice of paths to follow for telephone service. While it is trivially true that telephones are not like airlines, in a broader sense society now faces the choice of governing them like airlines or like

railroads. We hope society will see that the competitive environment it created for airlines is the better model to follow.

Footnotes

1. See the references cited in U.S. Congress, Senate Judiciary Committee, Subcommittee on Administrative Practices and Procedures, Civil Aeronautics Board Practices and Procedures, 94th Congress, 1st Session (Washington: Government Printing Office, 1975), pp. 63-70, for discussions of these arguments in the context of airline deregulation. Trucking issues are discussed by James C. Miller III, "Economic Regulation of Trucking," in Report of the Economic Advisory Panel to the National Commission for the Review of Antitrust Laws and Procedures, Nov. 9, 1978.

2. These arguments have been raised in the Hearings on various proposed amendments of the 1934 Communications Act. See, for example, "Statement of National R.E.A. Telephone Association Concerning H.R. 13015" and the statement of Philip S. Nyborg, Computer and Communications Industry Association, in U.S. Congress, House Committee on Interstate and Foreign Commerce, Subcommittee on Communications, The Communications Act of 1978, Vol. II, 95th Congress, 2nd Session (Washington: U.S. Government Printing Office, 1979), pp. 1083-1102 and pp. 785-817, respectively.

3. It is important to note that the airline example has two components. The first is the phased in abolition of entry controls and rate of return regulation. The second

component involves increased government scrutiny over the structure of the industry as a whole. Both elements of the airline example are appropriate for common carrier communications. It is also important to note that the airline deregulation legislation may not have been flawlessly designed. The principles being advocated here are the broad ones of abolition of rate of return regulation and its accompanying price and entry controls, not necessarily the details of The Airline Deregulation Act of 1978, Public Law 95-504 (S2493); October 24, 1978.

4. Title I, Section 1, The Communications Act of 1934, As Amended.

5. As discussed more fully in Part II, in actual practice the REA direct subsidy program has played a significant role in developing rural telephone services.

6. Some of these policies may continue in force only because of inertia on the part of the monopolists or because of regulatory lag.

7. See "AT&T's Ingredients of Success--The View from the Executive Suite," Telephony, January 14, 1980, p. 51. Also see Walter G. Bolter, "The FCC's Selection of a 'Proper' Costing Standard after Fifteen Years--What Can We Learn From Docket 18128" in Harry M. Trebing, ed. Assessing New

Pricing Concepts in Public Utilities (East Lansing: Michigan State, 1978) p. 357 and p. 371, fn. 73. There is some belief that slow depreciation is justified because telephone companies install durable equipment. The decision to install durable equipment may stem from the bias caused by rate of return regulation as much as from a desire to provide high quality service.

8. See William S. Fockler, "Lifeline: Welfare Pricing of Local Telephone Service," in Harry Trebing, ed., Assessing New Pricing Concepts in Public Utilities, for a discussion of the California lifeline rate experience.

9. This process may be spurred on by the payers of subsidies who want to find some firm that will provide the service but not charge the subsidy.

10. This is in addition to the inefficiencies caused when consumers make consumption decisions that are not based on opportunity costs. This paper, however, will not add to the excellent literature on this subject. See any standard intermediate microeconomics text.

11. See the testimony of Alfred E. Kahn in U.S. Congress, House Interstate and Foreign Commerce Committee, Subcommittee on Communications, Competition in the Telecommunications Industry, 94th Congress, 2nd Session

(Washington: Govern Printing Office, 1977), pp. 1000-1009, for a discussion of the inability of the telephone company to demonstrate that terminal equipment charges subsidize basic rates.

12. All of the recently introduced Bills that would rewrite the Communications Act provide for continuing regulation of dominant firms.

13. See Nina W. Cornell and Douglas W. Webbink, "Common Carrier Regulation and Technological Change: The New Competition in the Communications Industries," Joint Economic Committee, forthcoming.

14. See William G. Shepherd, "The Competitive Margin in Communications," in William M. Capron, ed., Technological Change in Regulated Industries (Washington: Brookings, 1970), pp. 86-122.

15. Thomas G. Moore, Freight Transportation Regulation (Washington: American Enterprise Institute, 1972), pp. 25-30.

16. See Alfred E. Kahn, The Economics of Regulation (New York: John Wiley, 1970), Vol. I, pp. 193-195. Of course, government intervention to correct externalities will only improve economic efficiency if the benefits of the correc-

tion exceed the costs of the government intervention.

17. Note, however, that if the social value of adding an additional subscriber is indeed very low because of widespread penetration of service, the impact of competition on universal service goals may be minute and, therefore, largely irrelevant.

18. See Bridger M. Mitchell "Telephone Call Pricing in Europe: Localizing the Pulse," Rand Corporation Paper, 1979, for a discussion of the effects of peak load and measured pricing in Europe.

19. Statement of National R.E.A. Telephone Association, in U.S. Congress, The Communications Act of 1978, Vol. II, pp. 1083-1102.

20. This is also true for the other alleged cross-subsidy, heretofore unmentioned, that supposedly flows from consumers of vertical services to consumers of basic telephone service. It has been claimed that consumers of vertical or enhanced telephone services, whether the enhancement is in the form of an extension telephone, a sophisticated PBX, or a service such as call-forwarding, are paying more than the costs of providing them with the extra equipment or service, and that the surplus generated from these customers subsidizes the provision of basic telephone service. We would first note that it is highly questionable whether vertical

services are even providing the alleged subsidy. A study by the New York Public Service Commission found that New York Bell's charges for terminal equipment were not covering the costs of providing that equipment. See Alfred E. Kahn in U.S. Congress, Competition in the Telecommunications Industry. Second, even if vertical services were providing a subsidy to basic services, it is not obvious that this subsidy would promote universal service objectives. As noted above, telephone service may now be a necessity for the vast majority of consumers so that universal service may be a fact of life for all plausible alternative pricing structures. Third, as argued previously, if telephone subscription levels are determined to be inadequate, direct subsidies are preferable to meet universal service objectives rather than indirect subsidies with their necessary restrictions on entry and competition. The benefits of competition, so amply demonstrated already in the terminal equipment area, are too great to sacrifice in the name of universal service, which can be attained in a much less costly manner.

21. This is not true for intrastate long distance rates, which vary among states and can be considerably different than the interstate rate for the same distance. It should also be noted that even in a more competitive subsidy free market some averaging would probably remain to keep rate structures simple.

22. See Rural Telephone Coalition, Rural Telephone Coalition Proposals For Telecommunications Policy Reform, July 1979.

23. Indeed, those who argue that there is a subsidy to local service being paid by long distance users and that this subsidy aids universal service must implicitly be saying that the connection price is more important than the price of usage in deciding whether to acquire service.

24. See National Telecommunications and Information Administration, "Deaveraging of Interexchange Toll Rates Due to the Introduction of Competition--Preliminary Estimates," Working Paper, June 1979. As mentioned in the paper, the \$100 million subsidy is quite modest when contrasted with over \$20 billion in revenues for the Bell System alone for MTS/WATS long distance toll services in 1978.

25. Both Satellite Business Systems and Xerox have proposed such systems. The SBS system is well on the way to implementation.

26. See Harvey Averch and Leland Johnson, "Behavior of the Firm Under Regulatory Constraint", American Economic Review, December 1962, pp. 1053-1069.

27. As radio systems are more fully developed, the potential for portable facilities increases.

28. Although the tax revenues should come from general revenues, even a tax on telephone users that goes to the government would be preferable to an internal subsidy. Only with the government receiving and disbursing the money can society be sure what service it is receiving, and how much it costs. Moreover, only when society knows both the service received and the cost can it put pressure to find the least cost means of providing that service.

29. For example, in Congressional testimony, John D. deButts, then Chairman of the Board of AT&T claimed" . . . that the FCC's brand of competition, instead of spurring innovation, will impede it. It will impede it by dividing among two or more carriers traffic that could more economically be handled by one and that, if it were, might sooner warrant investment in the higher capacity transmission systems that would mean lower unit costs for everybody." Statement of John D. deButts in U.S. Congress, Competition in the Communications Industry, p. 15.

30. See Federal Communications Commission, Second Report and Order, Economic Implications and Interrelationships

Arising from Policies and Practices Relating to Customer Interconnection, Jurisdictional Separations and Rate Structures, Docket No. 20003, adopted January 9, 1980, for a discussion of economies of scale.

31. The distinction between basic and enhanced inter-exchange services is made in the Tentative Decision of the Federal Communications Commission's Second Computer Inquiry, Docket No. 20828, released July 2, 1979.

Basically, the former is pure transmission of voice or data while the latter involves additional services such as store and forward, code and protocol conversions, etc.

32. Technological change in an unregulated context may have lead to development of totally different product markets. Also note that a fifth market is the one for telecommunications equipment used by the service providers. There is no reason why the markets for switching, transmission and related equipment cannot be as competitively structured as the customer premises equipment market. The digital electronic technology that telecommunications services are moving towards is shared by many firms in several countries. A combination of competitive procurement and independent choices of technology could reduce equipment costs and increase not only innovation, but also deployment of new technology. In this area, as in the terminal equipment area, some changes in the way telephone companies

do business is probably necessary because of the high degree of vertical integration in the existing industry. The costs and benefits of this integration must be assessed and alternatives found. This process is currently underway both at the FCC in the continuing Docket No. 19129 implementation efforts and in the Courts (U.S. v. AT&T), but will not be discussed further here.

33. The American Telephone and Telegraph Company and General Telephone and Electronics Company are the major firms in this category.

34. This has been implemented through the Federal Communications Commission's equipment registration program. See Second Report and Order in Docket No. 19528, 58 FCC 2d 739 (1976).

35. In the Matter of MTS and WATS Market Structure, Common Carrier Docket 78-72, adopted August 14, 1979.

36. In the customer premises equipment market what is needed in addition is an unbundling of the equipment from the charge for local service.

37. Docket No. 20828, released July 2, 1979.

38. See Harvey Averch and Leland Johnson, "Behavior of the Firm Under Regulatory Constraint" and John Sheehan "Integration and Exclusion in the Telephone Equipment Industry," Quarterly Journal of Economics, May 1956, pp. 249-269.
39. A uniform policy for all telephone companies would probably not be desirable. For example, there may be no savings from integration for large urban utilities because the markets may be large enough that economies of specialization realized by independent suppliers may outweigh economies of scale or integration in the telephone company. On the other hand, there may be large economies of integration for rural firms.
40. See Administrative Law Judge Walter C. Miller's Initial Decision in Phase I of Docket No. 20814 (MPL Hearing), released March 12, 1979, for a discussion of "the FCC's unsuccessful efforts to obtain appropriate costing and pricing data from AT&T . . ." Also see Robert W. Crandall, "The Impossibility of Regulating Competition in Interstate Communications Markets, Paper delivered at Eastern Economic Association Meeting, May 12, 1979.
41. John S. McGee, "Predatory Price Cutting: The Standard Oil (N.J.) Case," Journal of Law and Economics, October 1958, pp. 137-169.

42. Oliver E. Williamson, "Predatory Pricing: A Strategic and Welfare Analysis," Yale Law Journal, 1977 pp. 284-340, A.M. Spence, "Entry, Capacity, Investment and Oligopolistic Pricing," Bell Journal of Economics, Autumn 1977, pp. 534-544 and Robert J. Reynolds, "Entry, Reaction and 'Pre-emptive' Product Introduction," unpublished paper, June 1978. These articles attempt to integrate the "limit pricing" and predatory pricing literature while at the same time extending the concept of predatory conduct to the investment, capacity and innovation variables.

The circumstances that make predation a viable dominant firm strategy in the new models may not be present in the communications industry, particularly when interconnection is assured. The Williamson model, for example, assumes that entrants have access to the same technology as the dominant firm. In telecommunications, much competition is the result of entrants developing new technology that costs less or does more. Eliminating this competition is more difficult than preventing competition in the standard case.

43. This is the basic approach in S611, Senator Hollings' rewrite of the common carrier portions of the Communications Act.

44. See Oliver E. Williamson, "Predatory Pricing: A Strategic and Welfare Analysis," Phillip Areeda and Donald F. Turner, "Predatory Pricing and Related Practices Under Section 2 of the Sherman Act," Harvard Law Review, 1975, pp. 697-733 and William J. Baumol, "Quasi-Permanence of Price Reductions--A Policy for Prevention of 'Predatory Pricing,'" Yale Law Review, forthcoming.
45. This is true of all cost plus regulatory schemes. Also see Harvey Averch and Leland Johnson, "Behavior of the Firm Under Regulatory Constraint," pp. 1057-1059.
46. Full structural separation of each basic interexchange service from all others would be very costly since all use the same facilities.
47. Areeda and Turner suggest average variable costs if marginal cost data are unavailable.
48. The FCC's attempts have been ongoing without real resolution since the institution of Docket 16258 in 1965. See Walter G. Bolter, "The FCC's Selection of a Proper Costing Standard after Fifteen Years--What Can We Learn from Docket 18128?"
49. This is Baumol's approach.

50. Moreover, with the end of rate base regulation, much of the incentive to engage in such conduct will be eliminated.
51. See Ronald R. Brauetigam, "The Role of Antitrust in a Deregulated Environment," unpublished paper, June 1979.
52. For an exhaustive list of such studies to 1974, see Leonard W. Weiss, "The Concentration-Profits Relationship and Antitrust," in Harvey J. Goldschmid, et. al., eds. Industrial Concentration the New Learning, (Boston: Little Brown, 1974) pp. 184-233.
53. See F.M. Scherer, Industrial Market Structure and Economic Performance (Chicago: Rand McNally, 1980), 2nd edition, pp. 267-295, and references cited there for more elaborate discussion of these problems.
54. George A. Hay and Daniel Kelley, "An Empirical Survey of Price Fixing Conspiracies," Journal of Law and Economics, October 1974, pp. 13-38, discusses explicit price fixing found by the U.S. Department of Justice in the 1960's and early 1970's.
55. See Frederick M. Scherer, Industrial Market Structure and Economic Performance, pp. 243-252, for a discussion of limit pricing theories.

56. See Nina W. Cornell and Douglas W. Webbink, "Common Carrier Regulation and Technological Change."
57. See Bruce M. Owen and Ronald Braeutigam, The Regulation Game (Cambridge: Ballinger, 1978) p. 6.
58. See Alfred E. Kahn, The Economics of Regulation, Vol. II, pp. 47-93.
59. None of the Bills introduced to date would end regulation of local exchange or AT&T's MTS service.
60. Xerox has requested an allocation of Spectrum for their XTEN System. See Notice of Proposed Rulemaking and Inquiry, General Docket No. 79-188, released August 29, 1979.
61. Nina W. Cornell and Douglas W. Webbink, "Common Carrier Regulation and Technological Change."
62. See Bruce M. Owen and Ronald Braeutigam, The Regulation Game, pp. 2-9, for a discussion of how existing firms use regulation to thwart or slow down entry through "strategic use of the Regulatory process."

63. The situation is even worse in trucking. Firms can block entry by showing the ICC that a shipper's needs can be met by existing carriers, see Thomas G. Moore, Freight Transportation Regulation, p. 45.
64. The discussion below assumes no subsidies to these services have been built into the rates allowed to be charged. The effect of subsidies on incentives to innovate are discussed in Part II of this paper.
65. See Bruce Owen and Ronald Braeutigam, The Regulation Game, p. 21 and pp. 23-29.
66. See Joseph A. Baude, et al, eds., Perspectives on Local Measured Service (Kansas City: Telecommunications Workshop, 1979).
67. Radio systems offer society an advantage over wireline that trucks do not offer, namely the lack of necessity to construct a right of way along which the traffic would pass. Trucks require the construction of roads but they make more versatile use of their right of way, and can share it with other traffic, unlike railroads. The advent of digital switching adds some flexibility of consumer routing, but the fixed wires going into and out of the switch are the main constraints.

68. Interstate Commerce Act of 1887. See Thomas Gale Moore, Freight Transportation Regulation: Surface Freight and the Interstate Commerce Commission (Washington: American Enterprise Institute 1972), p. 11-24 for a history of the laws governing the regulation of railroads.
69. *Id.*, p. 25-31.
70. *Id.*, p. 31-32.
71. *Id.*, p. 76-77.
72. For a detailed discussion of the problems with rate of return regulation, see Nina W. Cornell and Douglas W. Webbink, "Common Carrier Regulation and Technological Change."