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**PUBLIC POLICY AND PRIVATE INVESTMENT IN ADVANCED  
TELECOMMUNICATIONS INFRASTRUCTURE**

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*Abstract*

The Telecommunications Act of 1996 was supposed to usher in a new era of competition in U.S. telecommunications markets in which advanced services were made available to all consumers. In this paper, we discuss how policies designed to promote competition, investment, and universal deployment may conflict with each other. We do not believe that these conflicts are the inevitable consequences of conflicts between the *objectives*; we do, however, believe that there are inescapable conflicts between the specific *policies* being implemented in pursuit of these objectives.

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## I. INTRODUCTION

In February 1996, the U.S. Congress passed the Telecommunications Act of 1996.<sup>1</sup> The Act makes sweeping amendments to the Communications Act of 1934, which set up the regulatory structure that prevailed for over sixty years. While the 1996 Act covers a wide range of policies, the biggest changes were in the areas of two-way voice, data, and video services.

The 1996 Act has three overarching objectives with respect to these services: (a) to promote competition; (b) to ensure the timely deployment of advanced services and the underlying infrastructure necessary to support this deployment; and (c) to ensure universal service—the widespread availability of basic and advanced services to consumers in all parts of the United States. The 1996 Act sets in motion a variety of policy changes intended to achieve these objectives. While many of these policies are directed at achieving specific goals, the fact is that new and existing policies collectively determine the success in meeting any of these goals, and there may be important unanticipated interactions among the policies.

Our focus here is on how the overall set of policies affects the deployment of advanced infrastructure. There is widespread agreement that the vast majority of this investment will have to come from private providers, not public programs. Many industry participants argue that, far from promoting advanced infrastructure investment, public policy is largely a deterrent. Past

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<sup>1</sup> Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56. The 1996 Act amends the Communications Act of 1934, 47 U.S.C. §§ 151 et. seq.

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arguments have surrounded claims of rate ceilings that do not cover investment costs—particularly in the presence of risk—and the need to get regulatory approval before constructing new facilities. Today, the debate centers on the legal ability of the RBOCs to invest in long-distance (“interLATA”) networks, on the effects of unbundling requirements on investment by incumbents and entrants, and on whether universal service policies have the unintended effect of slowing regulation by making it difficult to pursue commercially rational service roll-outs.

We do not frame the issue as whether regulation is “promoting” the deployment of advanced infrastructure; we do not believe that this an appropriate public policy. Instead, we discuss whether regulation leads market forces to produce *efficient* investment (because market power or other problems would not lead them to do so absent all regulation), or whether it gets in the way by obstructing and diverting efficient investment that unregulated market forces would otherwise drive.

As background to our analysis of public policy and private incentives, we first discuss some of the most important public policy changes following passage of the 1996 Act. We then discuss how these public policies affect private firms' incentives to invest in innovation and the deployment of advanced infrastructure. Because many of the issues and institutional features are very different in the two cases, we consider investment in local access networks and investment in backbone networks separately. We close with a brief conclusion.

## **II. PUBLIC POLICY DEVELOPMENTS**

### **A. Advanced Services and Infrastructure**

The 1996 Act expresses strong concern that advanced telecommunications services (*e.g.*, Internet access and broadband services such as switched video) be available in all regions of the United States. Section 706 instructs the FCC to review (by 1999) "whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion," and, if not, to "take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market."

To understand these developments, we must place them within the context of the rest of the 1996 Act and the changes that it set in motion.

### **B. Competition**

Perhaps the most sweeping policy change embodied in the 1996 Act is the fundamental shift in regulatory objective from protecting monopoly to promoting competition. Not so long ago, consumers had no choice of provider for telephone handsets, local exchange service, or long-distance services. For decades, policy makers in the United States were hostile to competition, on the theory that carriers were in need of protection from competition in order to ensure their ability to invest in new facilities and their willingness to serve all segments of the public -- notably including segments to whom service was to be priced below cost.

Even before the passage of the 1996 Act, however, important telecommunications

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markets were opened to competition. Reluctantly, with prodding from the federal courts, the Commission opened customer premises equipment and then long distance services to entry. In each case, the resulting competition was seen as providing greater choice and lower prices. Competitors were later able to offer exchange access<sup>2</sup> services (although only service to high-volume customers was profitable), but state policy generally prohibited them from offering local exchange services. In the 1990s, however, some states began to open even local exchange markets to competition.

The 1996 Act takes several steps to promote competition in the provision of local access to both voice and video services. One is to remove legal barriers to entry. The Act drops the prohibition against telephone companies' entering the cable business, and it forbids states from enforcing laws and regulations that block competitive entry into telecommunications markets (section 253). The Act also embodies the view that simply removing legal entry barriers is not enough to induce actual entry and competition in local exchange markets. Borrowing terminology from antitrust, the Act takes the somewhat pessimistic view that many parts of a local exchange carrier's network may well constitute *essential facilities*. That is, access to them is needed – at least in the short run, but this qualification is not made very clear -- in order for other firms to compete in service markets and in those parts of the network where competition is efficient (which may vary over time and space).

The first respect in which an incumbent's network is an essential facility stems from the

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<sup>2</sup> Exchange access is the service that connects the end user's premises with the facilities of his or her

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nature of communications services. Suppose that an entrant built an innovative network covering, at first, only a small number of subscribers. Users would be very reluctant to subscribe to this instead of to the incumbent's network, if they could then only call other subscribers on the entrant's network and not the vast majority of users who remain on the incumbent's.

Competition would likely be thwarted and efficiency reduced if subscribers to the smaller network could not communicate with subscribers to the larger network. Therefore, it is efficient for competing carriers to be able to rely on one another's facilities to complete calls made by subscribers on one network to subscribers on another. The Act requires all carriers (not only incumbents) to offer such *transport and termination* service to rivals on a "reciprocal compensation" basis, via a process of negotiation among carriers backed by the prospect of regulatory intervention if negotiations involving an incumbent local exchange carrier fail.

A second, and more problematic, way in which an incumbent's network may be an essential facility is the following. It may also be efficient for society as a whole if incumbent network owners provide services or facilities at wholesale to other carriers in order to facilitate entry and minimize the costs of entry, by reducing the sunk costs and risk and avoiding inefficient duplication of infrastructure. Moreover, such wholesaling of network components will allow entrants to specialize on those segments where entry is efficient rather than being forced to come in as integrated providers who also operate in segments where entry is inefficient.

The wholesale components of the incumbent local exchange carrier's network are known as

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long distance carrier.

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*unbundled network elements*; the loop (the connection, usually copper wire, between customer premises and a switch) is often regarded as the most "essential" and least readily duplicated on a mass scale.<sup>3</sup>

The Act requires incumbent local exchange carriers to make unbundled network elements available to their competitors, through a process of negotiation backed by the prospect of regulatory intervention to set prices "based on cost" if negotiations fail (sections 251 and 252). The Act mandates such unbundling "at any technically feasible point," and in principle this can let the market decide which segments can support competition and which may be "natural monopolies". As we will discuss below, the sharing of the incumbent's facilities raises difficult issues for innovation incentives.

### **C. Universal Service**

A third area in which the 1996 Act may lead to fundamental changes is universal service policy. There was widespread agreement among economists that the policies in place at the passage of the Act—which entailed implicit cross-subsidies, as well as explicit subsidies paid to only a subset of providers and funded with taxes levied on only a subset of providers and services—were incompatible with meaningful and efficient competition. Cross-subsidies rely on the exercise of market power to support above-cost pricing in some services or to some

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<sup>3</sup> On the other hand, some have long viewed wireless and/or (coaxial) cable-based telephony as imminent competition bypassing the incumbent telephone companies' local loop infrastructure. See for instance House/Senate Conference Report on the Telecommunications Act, February 1, 1996, Report 104-230, page 148.

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customers, in order to generate profits to allow the below-cost pricing of others. In the presence of rivals, such a pattern of pricing may discourage even efficient entry into provision of the subsidized services and may encourage even inefficient entry into the provision of the subsidizing services. Similarly, competition will be distorted as those firms who bear relatively low tax burdens or collect relatively high subsidy payments are able to attract traffic despite not offering the best combination of service cost and quality.

The 1996 Act calls on the Commission and state regulators, through a Joint Board, to reform universal service policies (section 254). The new policies are supposed to be explicit and provide predictable support. The Joint Board adopted the additional principle of competitive neutrality. While the goals are laudable, the technical challenges in implementing these principles are tremendous. Moreover, it remains to be seen whether there is the political will to institute meaningful reform or whether the "new" policies will be a repackaged version of the old. For example, universal service taxes are assessed largely on a traffic-sensitive basis, which inefficiently suppresses calling. Moreover, subsidies generally are still not targeted towards low-income consumers, which dramatically inflates the cost of the program and increases both calling suppression and competitive distortions.

This last concern is particularly great with respect to advanced services. The 1996 Act calls for explicit subsidies for broadband services to schools, libraries, and rural health care providers. The 1996 Act also calls for advanced services to be made available in all parts of the nation. It does not, however, specify how this rollout will be funded if the services are not commercially viable everywhere. As we will discuss below, depending on how it is

implemented, universal service policy may reduce the incentives to deploy advanced infrastructure.

### **III. THE EFFECTS OF POLICY ON LOCAL NETWORK INVESTMENT**

Because many of the concerns and the states of the markets are so different, we will discuss local networks and long distance, or backbone, networks separately. We begin, in this section, with local access networks.

There are two big issues regarding whether regulation discourages deployment of advanced local access infrastructure: (1) whether the unbundling requirements imposed on incumbent LECs discourage efficient investment; and (2) whether universal service policies have the unintended effect of slowing investment by making it difficult to pursue commercially rational service roll-outs. In each case, the threat of *future* regulation also limits the expected returns from investments being considered today.

#### **A. Unbundled Network Elements and Investment Incentives**

It is important to consider the effects of unbundling, and of the prices at which it takes place, on incumbents' and entrants' incentives. An unbundling requirement, especially at a low price, for a particular unbundled element reduces the incumbent's incentive to invest in that element, reduces an entrant's incentive to invest in bypassing that element, and increases the entrant's incentive to invest in assets that complement that element. This complementarity can take two broad forms: (1) complementarity in serving a user, and (2) complementarity across users. For instance, an entrant's incentive to take an unbundled copper loop and add xDSL

electronics is greater if the price of the unbundled loop is lower; and an entrant's incentive to build high-capacity infrastructure to some users may be greater if it can cheaply get unbundled loops to offer service to other users, if there are economies of scale and ubiquity in marketing and other aspects of service provision.

### **1. Incumbents' Incentives**

Regulation affects the prices charged for end-user services and for carrier-to-carrier services. In each case, the regulated prices affect investment incentives. Telecommunications providers have long argued that regulation provides insufficient investment incentives. Past concerns tended to be based on the claim that rate-of-return, or cost-plus, regulation held prices below the levels needed to cover investment costs, particularly in the presence of risk. If a firm was held to a competitive rate of return when a risky project succeeded, but was not guaranteed a normal rate of return when it failed, then incentives would be low. We digress somewhat here to consider this argument in a little more detail, since it helps illuminate some difficulties of transition from pervasive regulation to deregulation.

In its simplest form, the argument is incomplete. If, when innovations and new investments fared poorly in the marketplace, regulators allowed a firm to raise the prices of those services over which it had market power as compensation, then regulation might actually increase the amount of innovation and investment by immunizing the firm against commercial failure. In some cases it may well have done so—consider the example of Bell Laboratories, which flourished under pervasive regulation of its owner. And indeed economists have long recognized that cost-plus regulation may create perverse incentives to over-invest.

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Thus the problem is not that cost-plus regulation per se leads to inadequate incentives; rather, under cost-plus regulation, the question is whether regulators will allow commercially unsuccessful R&D expenditures and investments in advanced infrastructure to enter the rate base. In a sense, the problem is not that incentives are systematically too low but that incentives do not closely track the firm's best estimate of commercial value: the firm's business judgment is replaced by a heavily procedural and sometimes litigious regulatory "prudence review."

For this reason among others, telecommunications regulators have moved towards a model in which some activities of regulated firms are unregulated. Unfortunately, this is not as simple as it may seem: precisely because the regulated firm often is a particularly efficient provider of a related unregulated service, one cannot neatly separate the unregulated from the regulated activities. In economic terms, the flip side of *economies of scope* between regulated and unregulated activities is *common costs* that cannot even in principle be directly attributed either to the regulated or to the unregulated service. Thus, if a firm can efficiently use the same wires or the same conduits for regulated and unregulated communications, it becomes unclear how much of the cost of those wires or conduits should be counted as the cost of providing the regulated service.<sup>4</sup>

When the costs allocated to the regulated service(s) affect prices, there can be inefficient investment incentives and consequent harm to regulated ratepayers. This tends to put regulators back in the position of having to screen investments that are at least partly intended for

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unregulated purposes. One popular solution is to have strong “separation” requirements between the regulated and unregulated activities; however, this inevitably compromises the efficiencies of joint provision and/or is difficult to enforce. Perhaps the cleanest solution (short of full deregulation) is to sever the link between “regulated costs” and regulated prices, as indeed happens under a pure price cap (a regulated price that does not vary as a function of the firm’s accounting costs or profits). While the large incumbent local exchange carriers are under price caps in the Federal jurisdiction, there is some dispute as to how pure the price cap regime is: if a firm’s price cap is periodically adjusted in light of its profit performance, the mechanism may essentially re-create cost-plus regulation.<sup>5</sup>

In view of the 1996 Act, incumbent local exchange carriers not only face (or may face) regulation of the prices of advanced services, but also face the unbundling obligation described above. In its *Local Competition Order* interpreting the pricing provisions of the Act, the Commission stated that, if negotiation failed and state regulatory arbitration was invoked, the prices of unbundled network elements, and of transport and termination, should be based on forward-looking economic costs of providing those elements and services, with due allowance for risk and the faster economic depreciation of investments that will result if competition and

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<sup>4</sup> Competitors in the unregulated services often are prominent participants in these “cost allocation” discussions, asking for price floors on the regulated firm’s provision of those services.

<sup>5</sup> At the federal level there are multiple large incumbents whose performance can be rated against one another, which ameliorates this problem; such (formal or informal) “benchmark competition” is less common at the state level (which accounts for the majority of the incumbents’ revenues).

innovation accelerate.<sup>6</sup> Thus, although incentives to invest will not match the "high-powered" incentives available to an unregulated firm, investment ought not to be deterred if these pricing rules were correctly implemented. But the Eighth Circuit federal court ruled that the Commission did not have jurisdiction to lay out these pricing principles, so regulatory arbitration is (pending a Supreme Court appeal) entirely up to the state regulators. Some incumbents have claimed that, in such arbitrations, states have paid too little heed to the higher risks and faster depreciation rates of investment, particularly innovative investment, in a more competitive environment.

The Act also allows non-incumbent local exchange carriers to purchase the incumbents' retail services at a discount and then resell them. In principle this is less likely to be a disincentive to investment by the incumbent, since the wholesale price is based on the retail price (in a way that should broadly preserve the incumbent's profit margin on the service) rather than on an estimate of cost.

## **2. Entrants' Incentives**

It is helpful to separate (i) an entrant's incentive to bypass an existing network element owned by the incumbent, from (ii) an entrant's incentive to build a network element instead of the incumbent's doing so.

Given that the incumbent's network element exists, the social gains from an entrant's investment in bypass facilities arise if: (a) the entrant can provide services that are

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6 [Cite to the Commission Order.]

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technologically infeasible over the incumbent's network element (as when an entrant builds broadband infrastructure to customer premises otherwise served only by narrowband incumbent infrastructure); (b) the entrant can provide services that would be technologically feasible over the incumbent's network element, but that are not so provided because the incumbent withholds the necessary cooperation and the incumbent does not provide the service itself; or (c) regulation of the incumbent's provision of the network element and the services provided over it by the incumbent can be relaxed as a result. This last social gain arises from the fact that regulation inevitably gives rise to unintended distortions and administrative costs.

For (ii), the efficiency question is whether it is cheaper (adjusting for quality, etc.) for an entrant to build the network element or for the incumbent to do so. If the price of the incumbent's network elements are too high, the entrant may "inefficiently bypass", while if the price is too low, even an entrant who could provide the network element to itself at lower cost than the incumbent may instead choose to rely on the incumbent's provision of the artificially cheap unbundled element.

### **3. What should be unbundled?**

These concerns suggest that we view the problem of what carrier-to-carrier services should be regulated as a matter of allocating scarce incentives. If unbundling at cost is mandated, both the incumbent's and an entrant's incentive to build that element or a substitute are reduced, while the entrant's incentive to build a complement is increased. The question then is where we most value "high-powered" incentives. Presumably the answer should be: where the benefits of the boost to entrants' opportunities to compete and to innovate outweigh the reduction in

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incumbents' incentives. Indeed, section 251(d)(2) of the Act suggests as much, stating that "in considering what network elements should be made available" through unbundling, the Commission should consider whether access to a proprietary element "is necessary" and whether failure to provide it "would impair the ability" of competitors. This, however, is a rather abstract standard, and it seems worth putting forward some ideas for implementing it.

Some, including one of the present authors, have discussed the idea that "new" network elements be fully or partially excluded from the unbundling requirements. In terms of the standard just described, the point is that it is likely to be more important for "new" elements than for "old" ones that the incumbent's incentives be "high-powered," and it is perhaps more likely that an entrant can provide the "new" element itself, so that it is less "necessary" in the sense that the effects on complementary investment by the entrant may not be too severe. However, these consequences may not always follow; for example, it has been suggested that "conditioning" the incumbent's copper loops for provision of xDSL service is an activity for which high-powered incentives are not necessary (it does not demand a great deal of imagination or extraordinary effort, and its costs are fairly measurable), and that only the incumbent can perform at reasonable cost. Thus, even with a new service, one cannot fully escape the need to make a determination of whether the service is "essential." Indeed, this observation might reasonably explain why Congress told the FCC to decide, rather than putting a rule (such as "new vs. old elements") in the statute.

## **B. Universal Service: Doing the Opposite of What was Intended**

### **1. The Nature of the Concern**

It is natural to want advanced services to be available to “all Americans.” Unfortunately, the politics and history of what has been done in the name of universal service in the past may deter investment in advanced infrastructure, or may encourage investors to wait at least until the policy choices are clearer. The policy is murky enough that that could be a long wait.

Broadly speaking, two tools have been used to subsidize telecommunications services to promote universal service. There has traditionally been a modest amount of (fairly) explicit tax and subsidy policy, and an unknown but surely very large amount of not very explicit internal cross-subsidy on the part of monopoly local exchange carriers. Because the incumbent carriers are obliged to serve unremunerative parts of their service territories, one can view the internal cross-subsidies as closely analogous to “build-out requirements,” which require that a carrier offering service to some consumers also offer it to others (perhaps in higher-cost or lower-demand areas, or otherwise less attractive to serve).

The 1996 Act, and the Joint Board to implement its universal service provisions (section 254), aimed to make the implicit subsidies explicit. This has the advantage that, provided the taxes are imposed on—and the subsidies are available to—all competing carriers equally, competition is not distorted (although consumption patterns are because the taxes raise the prices faced by consumers). Unfortunately, it is much more popular politically to say one favors explicit, competitively neutral policies than it is to implement them. Telecommunications vouchers, for example, would achieve both objectives, but have not proven popular in Congress.

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Consequently, the 1996 Act gives up on the purity of the idea before it starts: section 214(e), which gives minimal criteria for eligibility for universal service subsidies, requires that service be offered throughout a “service area” (which tends to favor the incumbent already serving that entire area), and it allows state regulators to protect rural incumbents from competitors who could otherwise satisfy the eligibility criteria.

Given politicians’ reluctance to move to a fully explicit system, incumbents and non-incumbents alike may therefore be wary that if they offer advanced services, they may find themselves pressured to offer the service beyond what is commercially optimal, without necessarily getting full recompense. This threat may deter investment. Perhaps even more significantly in the short term, the value of waiting for policy news about the implementation of universal service may be large enough to encourage even enthusiastic investors to wait.

### **2. Policy implications**

As a matter of economics, a modest competitively neutral subsidy available to serve any given customer (meeting defined eligibility criteria) with a defined set of services, and funded with a reasonably efficient tax system, need not be extremely damaging (although we believe that most of the subsidies embodied in today’s prices are not very helpful to intelligent social goals in any case). The anomalies created by not knowing what is the desired subsidy to each customer, and by unwillingness to be explicit about the taxes, may be more of a threat. In either case, however, a fundamental principle of economics is that the distortions (into consumption patterns, if not into competition) introduced by taxes and subsidies are broadly proportional to the square of the difference between price (including tax) and marginal cost. Because the cost structure of

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telecommunications often makes it necessary to price well above marginal cost in any case, imposing a tax in addition is quite damaging. Thus we urge policy-makers to limit the scope of universal service taxes and subsidies. Doing so will minimize the impact of the many anomalies that an inevitably somewhat patched-together system creates. By improving private incentives to invest in advanced infrastructure, we believe that this proposal is in the spirit of section 254(c) of the Act, which recognizes that “universal service is an evolving level of telecommunications services.”

#### **IV. THE EFFECTS OF POLICY ON BACKBONE NETWORK INVESTMENT**

Most of the firms making investments in backbone networks are unregulated. This raises the question of how regulation could affect investments in these facilities. There are two potential mechanisms: (1) currently unregulated providers may anticipate future regulation; and (2) regulation currently limits the ability of certain companies, the Regional Bell Operating Companies, to enter these markets.

##### **A. Future Regulation**

As we noted earlier, a firm making long-lived investments is concerned with the future regulatory treatment of those investments, as well as the present. There are several forms of expected regulations that could suppress investment incentives.

##### **1. Retail Rate Regulation**

If firms anticipate that successful new services will be subject to retail rate regulation,

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especially (but not only) if the regulation may not fully account for the riskiness of those investments, then their investment incentives will be blunted. As discussed above, accounting for the risk in sunk investments is far from easy. Moreover, once the investments have been made, the ex post inefficiency of maintaining high prices to recover these sunk costs (as well as the popularity of low prices among voters), may tempt regulators to reset prices at lower levels than would be optimal ex ante. Finally, in the case of innovative services, we might properly be more concerned with ensuring that they will become available as quickly as is efficient than with trying to minimize the price at which they are eventually available.

These considerations suggest that policy makers might attempt to commit to keeping their hands off the retail rates of new, advanced services. No attempt at such commitment appears in section 254 of the Act, although there has been much talk about keeping regulatory hands off the Internet. As one might expect, there is evidently ambivalence about the idea. Indeed, a commitment might not be wise even if credible: a new service might turn out to be an important service and a natural monopoly, and some form of regulation might perhaps then be efficient. These are difficult issues, but because uncertainty often creates an incentive to wait, these issues should surely be addressed more openly than they have been.

### **2. Carrier-to-carrier services.**

Just as in voice telecommunications, if we want thriving competition in advanced services it may turn out that some regulation of carrier-to-carrier relationships is required. For example, it has been suggested that Internet backbone traffic exchange relationships may need to be regulated if one provider acquires a large share of capacity, in order to avoid “tipping” to a

monopoly. While we cannot analyze this suggestion here, it is clear that nobody can guarantee that competition policy in advanced services will not involve carrier-to-carrier regulation.

### **3. Universal Service Obligations**

Just as with local network investment, the key questions are whether carriers will be forced to offer the service to some subscribers at a loss, and will the revenues generated by advanced services be subject to universal service taxes? For the reasons discussed above, we believe that it is important for Congress and the FCC publicly to agree on an efficient set of policies and to do so sooner rather than later.

## **B. Restrictions on RBOC Investment**

### **1. Background**

The 1982 consent decree that broke up AT&T aimed to quarantine the monopoly services (which went to the Baby Bells, or RBOCs) from the relatively competitive services such as long-distance (technically, inter-LATA, a LATA being a geographic region). The quarantine was based on the view that the monopoly Bells would have an incentive and ability to leverage their regulated monopoly power in exchange access into unregulated market power in long-distance (and in telecommunications equipment), as well as to engage in cost misallocation. The 1996 Act removed a parallel restriction on GTE, and set up a process to remove these restrictions on the Bells on a state-by-state basis once a Bell company opens up its local-exchange and exchange-access markets to competition, in ways laid out in sections 271 and 272 of the Act. This can be viewed as demanding competitive conditions that will assuage the concerns that

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motivated the original quarantine, but many observers also see it as a “legislative bargain” or a “carrot” to encourage the Bells to cooperate with the breaking open of their near-monopoly positions.

Until the FCC finds that these conditions are met, Bell companies are thus prohibited from offering interLATA services in their home regions. Recently, Ameritech, Bell Atlantic, and USWEST (all Bell holding companies) have filed petitions under Section 706 (the provision to encourage deployment of advanced infrastructure), asking to be allowed to construct interLATA networks to offer data services. Because it is difficult or impossible to distinguish Internet voice packets from other Internet packets, some observers are concerned that these petitions may become a means of evading section 271.

### **2. Do these Restrictions Matter?**

Whatever the merits of the inter-LATA prohibition on the Bells, it cannot have a substantial effect on backbone infrastructure investment unless the Bells are particularly well situated or particularly keen to invest. It is therefore important to ask why that might be.

One possibility is that the Bells are particularly efficient, in a technological sense. An example might be if they already have infrastructure (*e.g.*, their official services networks over which they carry their own messages to monitor their networks) that could be used in providing inter-LATA data services and that currently sits (at least partly) idle. Or they might have innovations that can be used to provide backbone capacity at particularly low cost.

Another possibility is that, even if not more efficient, they would appropriate a larger fraction of the benefit from incremental investment than would other backbone providers. There

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is some reason to think this could be the case. If Internet backbone capacity is “mis-priced”, meaning that an investor who increases that capacity does not capture the full benefits of doing so, then much of the private (as distinct from the social) benefit from backbone investment might come in the form of increases in value of complementary assets. One asset that might be importantly complementary to Internet backbone capacity is high-capacity local access infrastructure. If local copper loops turn out to be a bottleneck in broadband local access, their value will be enhanced by backbone improvements. If such enhancements to value are captured by the local incumbent, then the Bells will have more incentive to invest in backbone than would stand-alone backbone providers. On the other hand, if loop unbundling policy results in those enhancements to value being captured by customers, the incentive argument is weaker (of course, so too, is at least part of the reason for the consent-decree quarantine).

## V. CONCLUSION

These issues will be with us for at least as long as significant portions of the local network are viewed as essential facilities (which may be a long time, unless wireless or cable telephony pans out) and universal service remains as important and complex as it looks set to remain. The high degree of uncertainty, and consequent value of flexibility, argue for an approach in which regulation seeks to "do no (unnecessary) harm" to investment incentives, rather than actively to promote investment.