

Economic Case for Voluntary Structural Separation

William H. Lehr¹
MIT

R. Glenn Hubbard²
Columbia University and NBER

** November 2003 **³

Abstract

In recent years, there has been much interest and discussion about the desirability of mandating structural separation of incumbent local exchange carriers into separate regulated and unregulated businesses (Crandall and Sidak, 2002⁴; Hall and Lehr, 2002⁵; OECD, 2001⁶). While it is conceivable that further advances in technology and business models will enable sustainable and adequate local infrastructure competition to eliminate any question of a bottleneck for last-mile access facilities, it is also conceivable (even probable) that next generation broadband infrastructure (*e.g.*, fiber to the home) will once again revive concerns about last-mile monopolies.

This paper takes a step back from the policy question of the desirability of mandatory structural remedies to focus on the private incentives for providers of last-mile facilities to structurally separate voluntarily in a broadband future. We take as a starting point a hypothetical world in

¹ Corresponding author. Email: wlehr@mit.edu; Address: One Amherst Street, E40-237, Massachusetts Institute of Technology, Cambridge, MA 02139-4307.

² Email: rgl1.columbia.edu; Address: Graduate School Business, 609 Uris Hall, Columbia University, 3022 Broadway, New York, NY 10027.

³ The authors would like to thank Sharon Gillett, Roger Noll, and Alain de Fontenay for helpful comments.

⁴ Robert Crandall and J. Gregory Sidak, "Is Structural Separation of Incumbent Local Exchange Carriers Necessary for Competition?" *Yale Journal of Regulation*, Vol 19:2 (2002) 1-75.

⁵ Robert E. Hall and William H. Lehr, "Rescuing Competition to Stimulate Telecommunications Growth," white paper prepared on behalf of AT&T, October 2001, available from <http://www.sandhillecon.com/research/>.

⁶ Organization for Economic Cooperation and Development (OECD), *Structural Separation in Regulated Industries*, DAF/CLP(2001)11, Paris, April 2001.

which the provider of broadband access services would be required to provide regulated wholesale access to its local network, while at the same time continuing to compete in downstream retail markets that might otherwise be unregulated. The marriage of regulated and unregulated services within a single firm has been uncomfortable – at best – for regulators, managers, and investors. The standard economic analysis of structural separation focuses on the coordination, scale, or scope economies that would be foregone by divesting the regulated and unregulated activities, and compares those to prospective welfare gains from implementing more effective open access to bottleneck facilities. While this analysis provides a useful starting point, it is incomplete. Economic, organization, and finance theory suggest a number of additional reasons why a firm operating in mixed markets might choose to separate its regulated and unregulated activities. In this paper, we apply these arguments to expand understanding of the conditions under which a firm would seek to structurally separate voluntarily.

We conclude that much of the current resistance by incumbents to structural separation is based on their belief that the open access regime adopted by the Telecommunications Act of 1996 is temporary. In a future with effective open access rules, incumbents may find it advantageous to structurally separate voluntarily.

I. Introduction

In most locales, the copper loops and associated network facilities that provide the "last mile" infrastructure of our Public Switched Telecommunications Network (PSTN) are owned by a single company. These local networks are the on/off ramps to electronic communication networks and thus comprise a critical input or complement for most telecommunication services and products. Because the telephone and other communication services supported by these local access networks are so critical to modern society, and because of the lack of competitive alternatives, local telephone providers have been heavily regulated throughout most of their history.

Various forms of structural remedies including line of business restrictions, accounting separation, or even full divestiture have played an important role in the history of telecommunications regulation and the regulation of other industries (electric

power, natural gas pipelines, and airlines, for example). Such rules can provide a clear point of demarcation between regulated and unregulated markets. Proponents of such rules argue that structural separation – the segregation of regulated and unregulated activities into separate businesses -- offer many important benefits. Opponents argue that such rules preclude what would otherwise be efficient modes of vertical or horizontal integration.

In the United States and Europe, policymakers frustrated with the pace of local competition and confronting a global downturn in the telecommunications sector have been considering mandating structural separation of local exchange carriers (ILECs) in recent years.⁷ The chief motivation for this renewed interest is dissatisfaction with the progress being made under current open access policies.

In this paper we review the structural separation debate and offer additional perspectives regarding the potential incentives of an ILEC to separate voluntarily under one scenario of how the broadband future might evolve.⁸ The analysis helps clarify that

⁷ As of 2001, Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, New Hampshire, New Jersey, North Carolina, Pennsylvania, South Carolina, Tennessee, Virginia, Wisconsin were considering or had considered adopting structural remedies for ILECs (see Curtis J. Williams, "Structural Separation in Other States," Florida Public Service Commission, prepared for Commission Workshop on Structural Separation Petition of BellSouth, July 2001). In Europe, a report prepared by the Ovum, a consulting firm, comments that "many influential voices within the European telecommunications industry now appear in favour of it [structural separation]," but Ovum "has warned governments and regulators against the break-up of incumbents" (see "Incumbents must not be broken up," Press Release, Ovum Consultants, November 27, 2002).

⁸ For an early discussion of voluntary divestiture incentives, see Eli Noam, "Liberalization is Just the Beginning: From Competition to Self-Divestiture," *ComWeek International*, Special Issue for ITU Telecommunications 1995 (available online at: <http://www.columbia.edu/dlc/wp/citi/citinoam17.html>). Also, for an analysis of the economic basis for vertical integration of an ILEC see Alain de Fontenay, "An Analysis of Economies of Scale and Scope in the Current U.S. Policy Debate," paper prepared for Workshop at the Columbia Institute of Tele-Information, October 2002.

much of the ILECs' resistance to structural separation hinges on their belief that the open access regime currently in place is temporary or is rendered less effective through vertical integration. Faced with the prospect of ongoing and *effective* open access rules, the ILECs would be much more likely to see divestiture of their bottleneck facilities as in their best interests. In short, effective open access rules eliminate the strategic and economic advantages that are claimed to arise from integration of the bottleneck facilities, yet these rules still impose asymmetric regulatory costs on the ILEC, reducing its efficiency in both regulated and unregulated communication service markets.

The balance of this paper is organized into five sections. Section II provides a summary of the debate in the United States. Section III discusses several examples of structural separation in telecommunications, with a focus on examples of voluntary separation. Section IV describes a scenario for the broadband future and Section V considers the ILECs' incentives to structurally separate in such a future. Section VI concludes.

II. The Case for Structural Separation Reviewed

A. Existence of a Local Access Bottleneck

The economic argument for structural separation of local telephone companies rests on the premise that the ILECs' local access networks are bottleneck facilities. That is, providers of telecommunication services (a) require these local access facilities as a necessary input for production of their retail telecommunication services; and (b) there are no economically viable alternative sources of supply. Obviously, local access services are necessary for providing most telecommunication services, including local and long distance telephone, fax, and data (Internet access) services. Therefore the first point is

seldom contentious. However, the ILECs and others who oppose the need for open access regulation vigorously dispute the second point.

In support of their contention that adequate alternatives exist, the ILECs point to the progress made by CLECs in competing in the market for local telephone services; to the promise of new technologies, especially new wireless technologies; and to the availability of telecommunications network equipment from multiple suppliers (e.g., digital switches).⁹ The ILECs cite data on the share of end-user lines served by CLECs, noting the rapid growth of the CLECs' share of lines served;¹⁰ on the number of CLECs competing in each market (as demonstrated by the number of CLECs licensed); and on a variety of estimates of potential CLEC capacity (e.g., telephone numbers listed in the "911" emergency services data base) and estimates of CLEC installed facilities (e.g., CLEC-owned fiber optic transport).

Critics note that the CLEC data is presented in aggregate and that no single CLEC nor even all of the CLECs in aggregate control facilities that come anywhere close to matching the size or ubiquitous coverage of the ILEC-owned legacy network. While progress has been made, most end-users (especially small business and residential consumers) still lack effective competitive alternatives for local telephone service, and

⁹ For representative testimony, see: *Panel Testimony of Harry M. Shooshan, Joseph H. Weber, and William E. Taylor on behalf of Verizon*, in the Matter of the Application of Bell Atlantic-New Jersey, Inc. for Approval (i) of a New Plan for an Alternative Form of Regulation and (ii) to Reclassify Multi-line Rate Regulated Business Services as Competitive Services, and Compliance Filing, Before the State of New Jersey Board of Public Utilities, Docket No. TO01020095, February 15, 2001.

¹⁰ As of December 2002, the FCC data reports that CLECs provided service to 13 percent of end-user lines, with most of these being provided to business rather than residential consumers, and with 74 percent being provided using facilities leased from the ILEC (see *Local Telephone Competition: Status as of December 31, 2002*, Federal Communications Commission, June 2003, pages 8-9.) The share of services provided entirely over CLEC-owned facilities is small.

the alternatives that do exist are critically dependent on the ILEC facilities leased under open access rules.¹¹ Alternative technologies such as wireless telecommunications, while promising for the future, do not offer viable alternatives for the ILECs' copper loops today and many of the most promising technologies have not been proven in the marketplace yet. Nor does the competitive availability of network equipment eliminate the bottleneck nature of the ILECs' local access networks. Much more is involved in providing local access services than acquiring digital switches.

The state of local competition has been evaluated in numerous proceedings before the FCC and state commissions. In all cases thus far, regulators have affirmed the continued need to provide CLECs wholesale access to ILEC networks. At some point, it is conceivable that the evidence may show that sufficient progress has been made such that the ILECs' local access networks are no longer deemed to constitute a bottleneck. If one were to conclude that adequate wholesale alternatives *do* exist, then there would be no economic basis for mandating open access rules. For the purposes of this paper, however, we will assume that local access networks will remain a bottleneck for the foreseeable future.

B. Ongoing Need for Open Access Regulation in the Face of a Bottleneck

Access to advanced communication services is essential to a modern economy. Unregulated control of the local access bottleneck would pose a severe risk for the economy. Demand for basic telephone services is quite price-inelastic, so that monopoly pricing could be used to extract large rents. Demand for some of the newer services such

¹¹ See note 10, *supra*.

as broadband access is more price-elastic, however. If the ILEC cannot effectively price-discriminate, its monopoly pricing may result in substantial deadweight losses, and may block the emergence of innovative services. Thus, absent regulation of the ILEC bottleneck, the threat to consumer surplus and to overall static efficiency from deadweight losses is likely to be large.

The threat to dynamic efficiency is even larger. If the ILECs can discriminate in the access they provide to other communication service providers, they can use their control of the bottleneck to protect, extend, and leverage that market power into adjacent markets. By denying a competitor economic access to the bottleneck facilities, the ILEC can effectively foreclose the competitor from the market. The abuse of market power could adversely impact competition all along the value chain of information technology businesses that depend on access to or interconnection with the PSTN.¹² Because investments in high technology products and services (which includes investments in network infrastructure) typically involve a substantial component of sunk or fixed costs (*e.g.*, R&D or local access facilities), investors in complementary assets will face a risk of expropriation if the ILECs' market power over bottleneck facilities is not adequately controlled. This threat will increase the cost of investing in complementary assets and therefore will deter investment.

Industry convergence which is accelerated by the transition to packet-switched networking based on the Internet Protocols (IP) magnifies the risk from abuse of monopoly power over a "last mile" bottleneck. The convergence of computing and

¹² Examples include Sony's ability to offer an Internet appliance, Microsoft's ability to deliver an online gaming platform, or Disney's ability to offer interactive programming.

communications technology means that these assets are increasingly used together as closely coupled components in complex information technology systems. Computers, software, and applications are more valuable when networked. Communications services, computer equipment and services, and media content are increasingly inter-related which means that economic distortions in one sector may more easily spillover to other sectors. Thus an unregulated local access monopoly poses a threat for numerous information and communications technology markets that might otherwise be deemed to be effectively competitive (*e.g.*, long distance telephone service, personal computers, or interactive media content).¹³

Retail rate regulation of local telephone services can control some of the potential abuses from monopoly power. However, local access services are used to support many other communication services for which retail rate regulation would neither be attractive nor practical.¹⁴ Furthermore, regulation of retail local telephone services enhances incentives to leverage monopoly control into unregulated retail services in order to bypass the rate regulations. For these reasons, regulation of a last-mile bottleneck will necessarily include access regulation.

¹³ This interrelatedness can be seen in several lights. First, the ILEC may foreclose competition for local telephone service and tie local telephone service to the sale of other potentially competitive retail communication services to leverage monopoly power and thereby distort competition in adjacent markets (*e.g.*, long distance telephone service or Internet access). Second, computing services are more valuable when networked, so demand for complementary products such as personal computers, multimedia content, and electronic commerce services are increasingly tied to access to data services such as Internet access. The negative impact of monopoly power over local access services can cascade into numerous information and communications technology sectors upstream and downstream of the bottleneck.

¹⁴ For example, rate regulation of content services potentially threatens freedom of speech and access to diverse content.

To summarize, as long as the ILEC retains its bottleneck over local access facilities, these will have to be regulated and the necessary regulation will have to include open access regulation. The open access regulation will need to specify both the rates and terms under which the ILEC will be required to provide access to its bottleneck facilities. In order to protect competition in the markets that make use of the facilities, access must be provided on a non-discriminatory basis.

To maximize economic efficiency, the rate for access should be set at economic costs.¹⁵ Of course, because the ILEC is likely to have superior information about the true costs of providing service, regulators will not be able to set rates perfectly. The ILEC will be able to exploit this information asymmetry to extract an "information rent."¹⁶ To the extent the bottleneck facility is priced above economic costs, there will be some deadweight losses. However, as long as the excess price is not too large, the risk from discriminatory access is likely to be more important.

If the ILEC can effectively discriminate in the terms it provides to different competitors (including its own retail operations), this discrimination can have an adverse effect on competition in downstream markets. The ILEC can use discriminatory access to raise rivals' cost by increasing the cost or lowering the quality of service available to

¹⁵ If policymakers deem that additional funds are required to recover any one-time adjustment costs or to compensate the incumbent for under-recovery of costs in the past, than these should be collected using an efficient lump sum subsidy scheme, but should not be included in the pricing for marginal resources. Any price that exceeds the Total Element Long Run Incremental Cost (TELRIC) will suppress demand resulting in deadweight losses and will bias investment towards less efficient entry strategies. Other strategies for collecting additional subsidies such as Ramsey Pricing or the Efficient Component Pricing Rule (ECPR) are less likely to be efficient.

¹⁶ See F. Gasmi, J.J. Laffont, and W.W. Sharkey, "The Natural Monopoly Test Reconsidered: An Engineering Process-based Approach to Empirical Analysis in Telecommunications," *International Journal of Industrial Organization*, 20 (2002): 435-459.

particular customers for bottleneck access services. While regulating the rates charged for wholesale access is difficult, controlling the terms of access is even harder because it involves many more details that are difficult to monitor or regulate efficiently.

For access to be "non-discriminatory," the ILEC must provide access to all users of the bottleneck facilities under equivalent terms and conditions, including the ILEC's affiliated retail operations. The only valid reason for differences in terms would be because of cost differences (*e.g.*, volume discounts justified on the basis of transaction cost savings).

Before the ILEC puts in place the processes and safeguards necessary to assure non-discriminatory access, the costs of providing access to the ILEC's affiliated retail operation are likely to be lower than for providing access to an unaffiliated third-party CLEC. However, this does not provide a valid cost basis for discrimination. Indeed, to allow such an advantage to continue would perpetuate the problem of monopoly power that open access rules are intended to rectify.

Adoption of an open access regime creates a wholesale market for services that would not exist otherwise. Creation of this market entails one-time implementation costs (*e.g.* to establish the necessary electronic ordering and provisioning interfaces). These costs will be incurred by *all* market participants,¹⁷ and the beneficiaries will include end-

¹⁷ Both ILECs and CLECs will incur the costs associated with implementing new ordering/provisioning interfaces. The adjustment costs borne by the ILEC *may* be larger in absolute terms because of its control of the underlying network facilities. Also, some portion of the adjustment costs may include ILEC efforts to enhance its efficiency in anticipation of increased competition.

users who benefit from enhanced competition.¹⁸ Once the appropriate mechanisms are in place, the ILEC's affiliated retail operations and CLECs should all receive the same terms and conditions for accessing the ILEC's facilities.

C. Case for Structural Separation of Regulated Bottleneck and Competitive Retail

If the ILEC participates in any of the retail markets that use the bottleneck facilities, then that firm will have a strong incentive to favor its retail operations over those of non-affiliated providers. The ILEC will also have an incentive to discriminate selectively among competitors in order to favor any with business strategies or technologies that pose a lesser threat to ILEC market power.

Additionally, the regulation of bottleneck access is complicated if the ILEC participates in both regulated and unregulated businesses because of the inherent difficulty of allocating costs, and in the case of shared or common costs, the inherent arbitrariness of cost allocation.¹⁹

If, however, the ILEC does not compete directly in any market which uses the ILEC's bottleneck facilities, then the ILEC's incentive to provide non-discriminatory access is enhanced. Structural separation more closely aligns ILEC incentives with the goals of access regulation. Additionally, regulation of the bottleneck is simplified because the need to separate costs is also reduced or eliminated.

¹⁸ The appropriate mechanism for financing these one-time adjustment costs represents an optimal taxation problem. Further discussion of this issue is beyond the scope of this paper, however, we note that the extent to which the ILECs are entitled to cost recovery associated with regulatory compliance remains contentious both with respect to the underlying justification for such recovery and with respect to estimates of the magnitude of the adjustment costs.

¹⁹ See, for example, Jean-Claude Delcroix, "Structural Separation Will Make Telecommunications Regulation Easier," *Gartner Group Report*, May 14, 2002.

Finally, because regulation is inherently imperfect, structural separation helps ameliorate negative spillovers which might otherwise occur. Structural separation of the regulated wholesale and unregulated retail services businesses limits the scope of economic activity which is subject to regulation. This demarcation protects potentially competitive sectors from unnecessary regulatory oversight, reducing the attendant distortions and reducing the costs of regulation. The economic performance of both the regulated and unregulated sectors is enhanced when regulatory policy is narrowly targeted.

D. Debate over Mandated Structural Separation

Even among those who accept the need for open access regulation, mandatory structural separation is not generally embraced. Indeed, a number of arguments have been advanced to explain why mandatory structural separation is not necessary.²⁰

1. Need for Structural Separation in Light of Existing Open Access Regime

First, some opponents of structural separation argue that the principal goal of such a policy is already being realized by the open access regime adopted by the Telecommunications Act of 1996 (TA96). The TA96 requires ILECs to provide CLECs with equivalent, non-discriminatory wholesale access to Unbundled Network Elements (UNEs) at cost-based prices (as measured by the concept Total Element Long Run

²⁰ For example, see Crandall and Sidak, note 4, *supra*. As noted earlier, we do not discuss further here whether a local bottleneck exists.

Incremental Cost or TELRIC).²¹ Proponents of structural remedies argue that without structural separation, the opportunities and incentives for ILECs to avoid complying with the open access rules are simply too great.²² Structural separation would enhance the effectiveness of the open access regime adopted by the TA96, and therefore complements the regime already in place.

2. *Economies of Vertical Integration*

Second, some opponents of structural separation argue that vertical integration of the wholesale and retail businesses is economically efficient. They cite a number of potential sources of efficiency from integration. These sources include coordination, scale, and scope economies. Telecommunication networks are complex systems consisting of many components, which require close coordination in their design and operation, which plausibly can give rise to significant coordination economies if these networks are owned and operated as a single entity.²³ Similarly, the same network facilities may be used to support multiple services (*e.g.*, outside infrastructure supports access to multiple homes, and loops support local and long distance telephone service and Internet access), which implies the existence of scope economies. Finally, the presence of substantial fixed costs implies the existence of scale economies. However, these

²¹ For a discussion of the UNE framework and TELRIC concept, see *First Report and Order, In the Matter of Implementation of Local Competition Provisions in the Telecommunications Act of 1996*, Federal Communications Commission, CC Docket No. 96-98, Released August 8, 1996 (available at <http://www.fcc.gov>).

²² See Robert Hall and William H. Lehr, "Rescuing Competition to Stimulate Telecommunications Growth," White Paper prepared on behalf of AT&T, October 2001, available from <http://www.sandhillecon.com/hlpaper/>.

²³ For a dissenting perspective that questions the efficiency of vertical integration of the different components of network services, see De Fontenay (2003), note 8, *supra*.

arguments are relevant for explaining why it is advantageous to operate a local access network as a single integrated entity.²⁴ Importantly, they do not explain why it is necessary to integrate wholesale network services (the construction and operation of the network) with retail services (the sale of communication services to end-users).

The case for economies between wholesale and retail operations is much more tenuous. A telephone network and retail telephone service are co-specialized operations. Neither can exist without the other. There are many activities that need to be coordinated between the wholesale network service provider and the retail operations that use those services. These include provisioning, metering, and fixing/monitoring customer service. Infrastructure planning requires forecasts of demand that retail operations may be better able to provide. While these points argue in favor of vertical integration, they apply most strongly in the absence of open access rules which anticipate that there will be a regulatory-mandated interface that will assure non-discriminatory access to network services for multiple retail operations.

For example, in an open access regime, infrastructure planners will need to forecast aggregate demand which will come from multiple retail service providers offering a divergent array of services, not just the demand from the in-house retail operation. Additionally, to assure competitively neutral access, the open access mechanism must guarantee that a retail affiliation with the network service provider is unnecessary to achieve equivalent provisioning, metering or (network-side) customer service support. If the mechanism is effective at assuring non-discriminatory access,

²⁴ Thus coordination, scale and scope economies in providing ubiquitous network services in a contiguous geographic area help explain why facilities-based competition against the incumbent is so difficult, and hence why local access networks remain bottleneck facilities.

whatever economies do arise from vertical integration will be shared with non-affiliated CLECs.

There are also likely to be important diseconomies from integrating retail and wholesale network services because the businesses are distinct. The type of technical expertise, and hence the sort of personnel required to manage a modern telecommunications network are very different from the sort of expertise that is required to retail a mass-market consumer product or service. The modes of management and compensation,²⁵ the types of investment (for example, investments in a brand image versus investments in a fixed network), and many other aspects of the prospective wholesale and retail businesses are quite different. On one side, there is an engineering-intensive "network-centric" business that must make long-lived investments in complex infrastructure. On the other side, there is a "customer-focused" retail business. These differences in business types and personnel can create management problems and diminish strategic focus.

The argument in favor of scale and scope economies is also tenuous because the network and retail businesses are unlikely to share many resources beyond those associated with corporate overhead (*e.g.*, corporate headquarters support) which are not likely to comprise a major component of costs.

3. Cost of Implementing Mandatory Structural Separation

Third, many opponents of structural separation argue that the costs of implementing structural separation will be large. If one further believes that fully

²⁵ For example, sales commissions are unlikely to comprise a significant share of a network engineers compensation.

contestable local access markets either already exist or will exist shortly, incurring the one-time costs of forced structural separation are not justified.

This argument, however, is difficult to reconcile with the argument that the regime adopted by the TA96 already assures non-discriminatory access. Much of what would be required to implement structural separation has already been done in order to comply with the UNE rules adopted by the TA96.²⁶ Furthermore, if the need for open access rules turns out not to be transient then the relevance of one-time adjustment costs diminishes.

4. Potential Threat to Network Quality of Service

Fourth, some opponents argue that structural separation will attenuate incentives for the wholesale network provider to innovate and improve service quality – to wit, the lack of direct contact with retail customers may allow the wholesale provider to ignore end-user complaints. The problem of regulating service quality, of course, is created not by structural separation, but is an artifact of the open access regulation. To the extent that separation simplifies enforcement of the open access regulation, the regulation of service quality will also be easier.

III. Experience with Structural Separation in Telecommunications

A. Regulatory Induced Structural Separation

As the preceding discussion makes clear, the debate over mandatory structural separation raises complex points. Critics point to the fact that no state has ordered

²⁶ See, for example, *Verified Statement of Lee L. Selwyn* before the Pennsylvania Public Utility Commission Re: Structural Separation of Bell Atlantic-Pennsylvania Inc.'s Retail and Wholesale Operations, in Docket No. M-00001353.

structural separation, although numerous state commissions have considered it. Pennsylvania came the closest, but in the end, the PUC decided to adopt a framework of enhanced performance metrics which were intended to accomplish the goals of mandatory separation – namely, assuring non-discriminatory open access to UNEs – without forcing full divestiture.

The lack of regulatory experience with mandated structural separation and the continued vertical integration of the ILECs does not imply that structural separation would be inefficient, however. As long as an ILEC believes that open access regulations are ineffective or temporary, it has a strong incentive to oppose mandatory separation. Indeed, vertical integration into retail services offers a powerful opportunity to leverage monopoly power and to reduce the effectiveness of open access rules.

Although structural separation has not yet been ordered for an ILEC, structural remedies have played an important role in the regulation of telecommunications and other industries.²⁷ For example, in 1956, AT&T agreed to a consent decree to settle its antitrust suit with the Department of Justice (DOJ) that resulted in AT&T adopting line-of-business restrictions that precluded its equipment manufacturing subsidiary, Western Electric (ancestor of Lucent), from making non-telecommunications-related computing equipment.²⁸ The motivation for these restrictions were to protect the data processing and computing industry from an abuse of market power by the monopoly telecommunications

²⁷ For a review of the widespread use of structural remedies in telecommunications and other sectors, see OECD, note 6, *supra*.

²⁸ The U.S. Department of Justice had argued for complete divestiture at the time.

provider, AT&T, and to protect competitive industries from the burden of telecommunications regulation.

During the 1960s, the FCC attempted to clarify the boundary between regulated (basic) and unregulated (enhanced) communication services, once again with an eye toward simplifying required regulation while minimizing negative spillovers for related sectors (*i.e.*, data processing and computers). In the Computer I (1971), Computer II (1980), and Computer III (1986) decisions, the FCC successively modified its rules to account for changes in network design that involved increasing amounts of computer-like intelligence being deployed within the core of the network. These successive decisions relaxed what had been stronger structural separation requirements.²⁹

The splitting of the Bell System into separate long distance (AT&T) and local telephone companies (Bell Operating Companies, BOCs) is perhaps the most familiar example of structural separation in the telecommunications industry. In 1982, AT&T agreed to a consent decree (known as the Modified Final Judgment, or MFJ) to settle its antitrust case with the DOJ, and the divestiture of assets was completed in 1984. The MFJ imposed line of business restrictions on the BOCs that restricted them from manufacturing telephone equipment, offering "information services" (as with the

²⁹ For example, the Computer II case introduced the basic (regulated versus enhanced (unregulated) services dichotomy. A regulated telephone company could offer enhanced services only via a separate subsidiary. The Computer III decision replaced this framework with the Open Network Architecture (ONA) framework that allowed re-integration of the enhanced service subsidiary but required some accounting separation and required that enhanced services be offered using the same ONA tariffs for the supporting network services that were offered to unaffiliated enhanced service providers. This ONA program bears a number of similarities to the UNE approach adopted in the TA96. (For additional discussion, see Gerald Brock, *Telecommunications Policy for the Information Age: from Monopoly to Competition*, Cambridge, Harvard University Press, 1994.)

Computer II decision), or offering within-region, interLATA services. The last restriction proved critical in promoting the emergence of robust competition in long distance services because it simplified implementing equal access for interexchange carriers that required BOC facilities to originate and terminate long distance calls. Because of the structural separation imposed by the MFJ, the BOCs did not have an incentive to discriminate among long distance providers. With the threat of discriminatory access to bottleneck facilities removed, multiple facilities-based and non-facilities-based interexchange carriers entered long distance services, creating vigorous competition in wholesale wide area transport services.

During the late 1980s, the FCC and DOJ started backing away from their reliance on strong forms of structural separation, favoring instead alternative regulatory mechanisms to guarantee open access. For example, the 1986 Computer III decision eliminated the fully-separate subsidiary requirement in favor of a mix of accounting safeguards and wholesale tariffs for basic network services to protect competition in enhanced services. Additionally, in 1987, the DOJ issued a report opposing retention of the MFJ prohibition against a BOC offering information services. In 1991, the MFJ restriction was relaxed.³⁰ Finally, the TA96 did not explicitly order structural separation, but rather adopted UNE rules that bear a resemblance to the open access regime adopted by the Computer III decision.³¹

³⁰ See Brock, note 29, *supra*, pages 217-242.

³¹ This decision does not imply, of course, that the TA96 is inconsistent with structural separation.

This history illustrates the complexity of regulatory policies designed to control monopoly power and assure open access to bottleneck facilities. As technologies and services have evolved over time, as convergence between computers and communications blurred industry boundaries, and as regulators' objectives have shifted, policymakers have had to continually re-evaluate and adapt line-of-business restrictions. Throughout this history, however, the BOCs have remained staunch opponents of line-of-business restrictions. This opposition is understandable because an unregulated monopoly is more valuable than a regulated one, and line-of-business restrictions constrain monopoly power.

Implementing structural remedies is much simpler (and presumably less costly) if the incumbents choose to adopt such remedies voluntarily. One important inducement for voluntary acceptance can be to avoid more stringent regulatory alternatives. For example, the threat of mandatory structural separation played a role in inducing AT&T to accept both the 1956 Consent Decree and the 1982 MFJ. In other cases, the carrot of reduced regulation has induced firms to adopt structural remedies or has improved compliance with other forms of open access rules. For example, Rochester Telecommunications voluntarily adopted a modified form of divestiture of its bottleneck assets in anticipation of local competition in New York in 1995, and several pro-BOC analysts proposed various forms of voluntary divestiture to facilitate further deregulation of BOC retail service operations.³² The TA96 relied in part on the promise of relief to enter long

³² Crandall and Sidak (note 4, *supra*, pages 44-49) cite several examples of voluntary structural separation in telecommunications. The authors are strong opponents of mandatory structural separation and cite the Rochester example to demonstrate that voluntary structural separation will not eliminate CLEC access complaints. Opponents of the Rochester plan argued that it did not

distance competition (under Section 271) as a "carrot" to induce compliance with the UNE rules.

These examples of voluntary structural separation were all undertaken by the incumbent in order to avoid less attractive regulatory outcomes. If, in the present instance, the ILECs believed that ongoing open access regulation were unavoidable, the desire to gain release from regulatory spillovers onto the firm's otherwise unregulated businesses would provide a powerful motivation for voluntary structural separation. (We discuss this point further below). The desire to obtain regulatory relief, however, is not the only motivation for voluntary divestiture.

B. Examples of Voluntary Structural Separation

Recent years have witnessed a number of examples where telecommunications firms have divested selected assets voluntarily, providing evidence of additional business motivations for voluntary divestiture. Some of the recent examples of voluntary structural separation include:

- AT&T's decision to spinoff its equipment manufacturing subsidiary Lucent (1996);³³
- Lucent's decision to spinoff its enterprise networking division Avaya (2000);³⁴
- Time Warner Cable's decision to spinoff its CLEC business Time Warner Telecommunications (1997);³⁵

fully divest bottleneck assets. Structural separation cannot resolve all problems associated with the regulation of bottleneck assets.

³³ See Lucent website at <http://www.lucent.com/investor/historical.html>.

³⁴ See Lucent website at <http://www.lucent.com/investor/spin.html>.

- British Telecom's decision to reorganize, including splitting its business in the United Kingdom into BT Retail and BT Wholesale (2000);³⁶ and,
- AT&T's decision to spinoff its local cable assets to Comcast (2002).

Because all of the examples involve telecommunication assets, and because telecommunications remains heavily regulated, the desire to simplify, reduce, or immunize non-telecommunications business units from telecommunications regulation was part of the motivation. For example, the Time Warner Cable divestiture appears to have been influenced in part by a desire to rationalize more clearly the regulatory treatment of Time Warner's cable and CLEC businesses;³⁷ while British Telecom's decision to split its U.K. operations into BT Wholesale and BT Retail was intended in part to gain flexibility for BT Retail, given the requirement that BT Wholesale had to unbundle local loop facilities.³⁸

Another important motivation was unfavorable changes in equity valuations reflecting investor sentiment about the combined firm. For example, British Telecom's

³⁵ See Time Warner Telecommunications 1998 10k (available online at: http://www.twtelecom.com/Documents/Announcements/Financial_Docs/1998/financial1998_01_01_Form10k.pdf)

³⁶ See British Telecommunications Website newsrelease at <http://www.btplc.com/mediacentre/Archivenewsreleases/2000/nr35.htm>.

³⁷ Because of Time Warner Cable's significant interests in content and the divergent regulatory treatment of local cable systems, splitting off the CLEC portion of the business helped reduce regulatory uncertainty for each. The original cable businesses would continue to be regulated as a cable company, while the telecommunication assets would clearly qualify for treatment as CLECs.

³⁸ According to BT, "BT believes that the separation of the wholesale and retail businesses could allow regulation to be concentrated on the wholesale business and enable the retail business to be regulated in a similar manner to other equivalent business" (see Annual Report and Form 20-F, BT Group, March 31, 2000, page 11).

restructuring in 2000 and AT&T's sale of its broadband assets to Comcast in 2002 were widely reported to be related to the poor performance in their stock prices.³⁹

In addition to motivations from regulation and the need to restructure to address pressure from investors, voluntary divestiture can be motivated by the desire to improve both internal and external coordination. Such coordination improvements include the desire to:

- Avoid distribution channel conflicts;
- Reduce conflicts over allocation of internal resources;
- Enhance communication with external community; or,
- Increase strategic focus and flexibility⁴⁰

Divestiture of business units that lack appropriate scale for their markets can facilitate industry consolidation and asset redeployment. Spinning off poor performers can allow these to be integrated into organizations with management better suited to the challenges faced by the particular business; spinning off high performers can free these units of the drag from less successful business units. In both cases, divestiture can enhance value.

The examples of voluntary divestiture cited earlier provide evidence of these motivations. For example, the decision by AT&T to divest itself of Lucent, and the subsequent decision by Lucent to divest itself of Avaya helped alleviate distribution channel conflicts and conflicts over the allocation of internal resources. In both cases,

³⁹ See Corey Grice, John Borland, and Jim Hu, "Sale of AT&T Broadband Could Rock Industry," CNET News.com, August 17, 2001.

⁴⁰ See Todd Spangler, "Network Firms Have the Urge to Diverge," *Inter@ctive Week*, March 20, 2000, page 18.

prior to divestiture, there were multiple units competing with each other for downstream demand. Lucent sold equipment to all the major ILECs which were direct competitors of AT&T in local telephone services. The decision to spinoff Lucent eliminated any incentive that Lucent had to discriminate in favor of AT&T.⁴¹

Similarly, the decision by Time Warner to spinoff Time Warner Telecommunications or Lucent to spinoff Avaya also helped resolve distribution channel conflicts. Time Warner Telecommunications would be free to sell transport services to content providers that might compete directly with Time Warner's media content interests. By spinning off Avaya, Lucent eliminated the tension between direct sales to corporate clients who purchased telecommunications networking equipment used to bypass ILEC-owned facilities, and its service-provider clients.

In each of these cases, there was also tension for the allocation of internal resources that was resolved by divestiture. For example, when AT&T divested Lucent, it eliminated the tension between whether internal capital should be devoted to building local networks (which compete directly with the ILECs), or to improving the capabilities of network equipment sold to ILECs. Additionally, AT&T became more free to purchase equipment from the provider that offered the best price/performance benefits for AT&T's network.

Conflicts can exist because of internal competition (*e.g.*, multiple business units competing for the same customers) or because of problems in communicating among different business units. For example, combining a custom-design shop with a mass-

⁴¹ By spinning off Lucent, AT&T helped settle ongoing litigation with ILECs that were customers of Lucent and resolved a conflict of interest that threatened Lucent sales (see "Lucent Technologies," SBC Warburg Equity Research, September 27, 1996).

production unit may result in internal conflicts because of the very different nature of the two types of businesses. Firms that elect to divest portions of their businesses voluntarily argue that this allows them to improve their focus. Limiting the scope of business activities reduces total costs and increases the amount of management attention that can be directed towards the remaining market opportunities.⁴²

Internal conflicts may also lead to problems in communicating with the outside world of end-user customers, investors, and regulators. Separating risky, high-growth assets from less risky, slow-growth assets can enhance the market value of both. The motivation to divest assets with very different risk and return characteristics for investors helps explain why Lucent decided to spinoff Avaya and Time Warner to spin off its telecommunications assets.⁴³

IV. Scenario for a Broadband Future

The preceding discussion provided an overview of the debate over structural remedies, but the focus was on today's industry environment. If, as is hoped, there will be sufficient facilities-based competition for local access services in the near future, then it would make little sense to order structural separation today. The costs of forcing it over

⁴² Regarding the BT restructuring of its UK operations, management claimed that "This move anticipates the continued expansion of a competitive communications market place and will provide greater management emphasis on the very different needs of wholesale and retail customers" (see "BT Reveals Plans to Lead the Next Wave of the Communications Revolution," British Telecommunications Press Release, April 13, 2000, page 6); or, regarding Lucent/Avaya spinoff, Cope, James, "Lucent Spins off Corporate Networking," *Computerworld*, March 6, 2000, page 12.

⁴³ See Haber, Carol, "Lucent to spin off slow growers," *Electronic News*, March 6, 2000, page 14; or, "Time Warner offers Minority Interest," *Telephony*, April 13, 1998, page 20.

the opposition of the incumbents likely would not warrant incurring the one-time implementation costs, even if these costs are not significant.

A. Prospects for Local Facilities Competition Remain Uncertain

There are promising technical and industry developments that suggest that local facilities competition may be sufficiently robust to eliminate a local bottleneck. For example, most homes are served by both cable and telephone wireline carriers. Both of these carriers are upgrading their networks in such a way as to provide a general platform for higher speed, two-way digital local access connections that can each support interactive multimedia applications (telephony, video, and broadband Internet access). However, these networks are not yet close substitutes (and perhaps never will be);⁴⁴ the upgrades are not proceeding uniformly so the extent of duopoly competition is uneven; and duopoly competition may fail to be adequately robust.

Additionally, there is the hope of competition from alternative distribution channels such as cellular for the basic telephony services provided by ILECs and direct broadcast satellites for the television services provided by the cable companies. However, this multi-modal competition is vulnerable to mergers⁴⁵ and blended products may be poor substitutes to bundled services offered by broadband providers.

⁴⁴ At the margin, both ILECs and cable companies have been extending fiber optic facilities closer to end-customers, and have been adopting packet switching technologies. These trends are making the networks more similar architecturally. However, whether this will process will continue and whether the two networks will choose to offer a similar array of services remains to be seen. Cable companies offering telephony services have focused on offering second-line service, and ILECs have not proceeded aggressively to offer television services. Two monopolies that do not compete may be more profitable to their owners so the intensity of future duopoly competition remains uncertain.

⁴⁵ The ILECs already have a strong equity control of a major portion of the cellular industry, and rumors persist of an ILEC acquiring a direct broadcast satellite company as a preferred path to

Prospects for more robust competition would be enhanced if there were three or more facilities-based conduits into each home. Several technical candidates for new paths exist. First, communication services might be offered over power lines. Policymakers interest in such services is reflected in some recent positive announcements.⁴⁶ However, this technology is still unproven, and whether power lines can support communications that will compete with next generation broadband (*i.e.*, in excess of 1Mbps services) remains questionable.

Wireless technologies seem to offer more promising hope for a "third conduit into the home." There are several candidate technologies utilizing both licensed and unlicensed spectrum. The licensed alternatives include so-called Third Generation or "3G" services provided over cellular networks that have been upgraded to support integrated voice and broadband data; and various fixed wireless alternatives such as LMDS, MMDS, and others. The most interesting unlicensed alternatives are based on wireless LAN technologies such as WiFi.⁴⁷ However, the prospects for wireless remain

offering video services. Indeed, SBC discussed acquiring DirectTV in the spring 2003, and is currently involved in developing a joint offer with EchoStar (see Bernier, Paula, "SBC to Add Branded EchoStar Satellite TV into ServiceBundles," *XChange Magazine*, July 21, 2003 (available at: <http://www.xchangemag.com/hotnews/37h21103757.html>)).

⁴⁶ For example, the FCC initiated a proceeding to research broadband access over power lines (see, Gross, Grant, "Will Your Broadband Travel Over Power Lines? The government is examining this high-speed Internet alternative," *IDG News Service*, April 23, 2003 (available at: <http://www.pcworld.com/news/article/0,aid,110390,00.asp>)).

⁴⁷ Quite recently, a number of communities have started to provide public wireless LANS and there is a grass roots movement to extend these networks which can offer an alternative mode of last-mile access to wireline services provided by an ILEC or cable company. Currently, these networks use the wireline facilities to interconnect to the Internet and so they do not offer yet an alternative infrastructure. Additionally, these technologies were not developed to support public access services and additional enhancements are needed to make this feasible (*e.g.*, support telephony or serving billing). For more on these wireless alternatives, see William H. Lehr and

uncertain. A number of earlier wireless local access ventures failed⁴⁸ and none of the current crop of technologies has proven its long-run viability as a substitute for the ILEC local-access infrastructure.

One of the technologies that figures prominently in technologists' forecasts for the future of local access infrastructure is Fiber-to-the-Home (FTTH).⁴⁹ The costs of installing FTTH, the huge capacity of such a system, and the low marginal costs of operation once installed raise important questions about the extent to which FTTH may be a sustainable natural monopoly. If this were the case, then some locales may have only a single provider in the future, while others are unlikely to have more than a duopoly (cable and telecom).⁵⁰ In either case, there will be an enduring risk of market power over local access connections into the foreseeable future. If that occurs, the need for non-discriminatory open access regulation also will continue.

Lee McKnight, "Wireless Internet Access: 3G vs. WiFi?," *Telecommunications Policy*, 27 (2003) 351-370.

⁴⁸ For example, AT&T and Sprint abandoned their much discussed attempts to roll-out fixed wireless access networks. Winstar and Mobilstar are two other examples of earlier attempts to provide wireless last-mile services that failed. There are many more.

⁴⁹ See Sharon E. Gillett and Emy Tseng, "Asymmetric Regulation on Steroids: U.S. Competition Policy and Fiber to the Home," paper presented to 29th Telecommunications Policy Research Conference, Alexandria, VA, October 27-29, 2001 (available at: <http://arxiv.org/pdf/cs.CY/0109082>).

⁵⁰ For other scenarios of how a local bottleneck may evolve in the future, see "The Evolution of the U.S. Telecommunications Infrastructure over the Next Decade: : Dominant Firms Control over Connectivity and Services," Study Group 2, Joint IEEE-USA/Cornell Workshop, October 21-23, 1999 (available at: <http://www.ieeeusa.org/committees/CCIP/workshop/stg2breakout.pdf>).

B. Bottleneck Broadband Access Facilities will be Subject to Open Access Rules

While competition – when feasible – is to be preferred to regulation, unregulated monopoly control of bottleneck broadband local access connections harms consumers. The continued progress of convergence and other associated trends such as globalization, the growth of eCommerce, and the move to IP-based networking will increase the extent to which economic activity in diverse sectors will be dependent on last-mile access connections.

Thus one plausible scenario for how a broadband future might evolve is that open access regulations will remain an enduring feature of the telecoms regulatory landscape. The precise form of these rules may be different from the current UNE rules, but the general economic intent will be the same -- to assure non-discriminatory, cost-based access to all downstream providers that require wholesale access to the bottleneck local facilities. If there is more than one local access provider, these rules will be applied to each of the providers, hopefully in a symmetric fashion. If there is only one, the owner of the bottleneck network may be the heir to the legacy telecommunications network, the cable network, or another firm that is first to install FTTH in a serving area. In the context of the discussion here, the origins of the future local access bottleneck are not relevant so long as a bottleneck exists.

In this future, if the incumbent believes that it can evade the economic intent of the open access rules – that is, to neutralize its monopoly power over essential facilities – then it will have the same incentives to oppose structural separation as today's ILECs.⁵¹

⁵¹ It remains an open question as to whether regulating open access of broadband networks will be more difficult than today's UNE-based regulation of the ILEC legacy network. On the one hand, the range of services and complexity of potential network architectures/strategies for

Thus vertical integration to protect, extend, and exploit local market access power – including attempts to evade regulatory efforts to control such power – will remain a powerful and likely sufficient incentive to avoid structural separation in the future. Therefore, to focus on the implications for voluntary divestiture, we will stipulate that open access regulations *will be effective* in this broadband future.

C. Broadband Platform will Support Diverse Array of Services

The next-generation broadband infrastructure will be able to support substantially higher bandwidth connections than are offered by today's generation of broadband Internet services. For example, FTTH and other technologies can support (several) order-of-magnitude higher bandwidth connections than today's 1Mbps cable modem and DSL services.

Furthermore, we will assume that these future networks will support IP-type networking which means that the local access network will be capable of supporting a diverse array of applications over a common local network infrastructure. The local network will no longer be the bottleneck or limiting capability in what can be done. As long as all users have equivalent access to the local network, efforts to enhance the performance or lower the costs of last mile access will no longer provide the basis for

supporting those services is likely to be greater. This increased complexity would increase the information asymmetry which would favor incumbents seeking to evade regulation. On the other hand, continued progress towards networks based on open standards such as IP, the further development of industry standardization for optical networks, and more sophisticated tools for remote network monitoring and management might make regulation of broadband networks easier. At the current stage of market and technical development, it seems premature to conclude that open access regulation will be more difficult in the future.

strategic advantage. This is consistent with the assumption that the future broadband network will remain a bottleneck.⁵²

Relaxing the last-mile bandwidth bottleneck will expand the space of communication services which can be offered (e.g., enabling a wider range of burst capabilities or committed information rates). Precisely how these services will be provided remains to be seen (e.g., whether composed from a relatively small set of well-defined standard services or as end-user customized, bandwidth-on-demand services).

V. Voluntary Structural Separation in a Broadband Future

In the broadband world described above, the vertically integrated incumbent is subject to effective open access regulation for its broadband bottleneck facilities, while at the same time competing in a potentially wide range of rapidly changing, unregulated, competitive retail markets.

If this broadband scenario is realized, The incumbent is much more likely to find voluntary divestiture attractive. First, effective open access regulation, by its very nature would neutralize most of the alleged benefits of vertical integration. For example, if access is to be non-discriminatory then the incumbent must access the bottleneck facilities under terms and rates that are equivalent to those faced by non-affiliated carriers. To the extent that there are any coordination, scope, or scale economies associated with vertical integration of the wholesale and retail operations, these must be shared with competitors. If they are not shared, than access is discriminatory. If vertical

⁵² That is, as long as all competitors have equivalent access to broadband local access services, the benefits in terms of achieving lower costs or higher quality from trying to improve on such access are limited.

integration allows the affiliated retail operation to gain access to privileged communications, special cost savings, or improved treatment (coordination), then access will be discriminatory.

These implications of effective open access regulation are hardly surprising. Indeed, one way to improve open access regulation is to mandate that all communication between the wholesale and retail operations occur using the same interfaces and procedures used by other carriers. This equal access will enforce an "arm's length" relationship between the wholesale network operation and its affiliated retail operation which in accomplishing the goals of non-discriminatory access will mimic the effect of structural separation.

Competing in the rapidly changing retail markets will require strategic flexibility. Advanced communication and computing capabilities will support the ongoing evolution from mass markets to one-to-one marketing. Competing in such customized markets will require the ability to engage in customized pricing, investment, product design, and service delivery. As virtual or transient businesses become more common, the ability to form and reform strategic alliances will increase. The sort of flexibility in organizational form and resource deployment is not characteristic of the typical regulated firm. Resolving the information asymmetry that lies at the heart of regulation is made more difficult by changes in the regulated firm's structure or operating practices. The regulation of bottleneck facilities will impose regulatory costs on the integrated carrier that are not faced by competitors. These will take the form of increased reporting obligations, reduced pricing flexibility in downstream markets (e.g., imputation rules), and reduced

flexibility in investment or product or service design.⁵³ Therefore, combining a regulated business (local access) with the unregulated retail businesses in this broadband future will become more difficult. The coordination diseconomies and the negative spillover effects of regulation will be greater.

The hypothesized broadband future also will make vertical integration both less economically attractive and divestiture easier to implement. Adoption of a converged delivery platform such as IP means that the last-mile network will be increasingly application agnostic. Because the network will support services associated with a diverse array of retail markets (for which demand fluctuations are uncorrelated), demand growth for wholesale network services will be less correlated with any particular group of retail markets. This lower correlation implies that local access infrastructure will be less sunk and less co-specialized with respect to demand for any retail service.⁵⁴

Additionally, demand growth for increments to wholesale infrastructure (once FTTH is in place) will likely be more stable and slower than for the rapidly changing downstream retail markets. This is partially what is implied by adoption of a "future proof" technology such as FTTH. Again, the desire to split businesses with very different risk and growth trajectories to simplify external communications with investors and to

⁵³ As long as integrated firm has regulated entity there will remain presumption that firm retains incentive to leverage market power to evade bottleneck regulation. The incumbent will need to continuously defend itself against complaints of anticompetitive activity in downstream markets, some of which may be spurious but nevertheless costly for the incumbent to resolve.

⁵⁴ For further elaboration of these ideas see William H. Lehr and R. Glenn Hubbard, "Telecommunications, the Internet, and the Cost of Capital," in *The Internet Upheaval*, edited by Ingo Vogelsang and Ben Compaine, Cambridge: MIT Press, 2000.

resolve potential internal management conflicts proved an important incentive in several recent examples of voluntary structural separation.

While the broadband bottleneck infrastructure may be less sunk and less co-specialized, the same may not be true for network-specific investments associated with the retail markets. These markets may require substantial investments in complementary customer premise or upstream (from the bottleneck) networking facilities that will be closely specialized with the retail market.⁵⁵ Indeed, ownership of such co-specialized assets may provide an important basis for discriminating one retail competitor from another. For example, battles over open or closed consumer appliance devices; or, proprietary routing technologies may be the focus of competition once access to last mile bottleneck facilities is removed from the picture as a potential source for market power. Regulation will constrain the integrated firm's ability to undertake such retail-market specific investments. In addition, to the extent that the firm is allowed to make these investments, their "sunk" nature may make the quasi-rents vulnerable to expropriation by regulators anxious to control the cost of access to the bottleneck services.

A number of the retail markets will also offer competing services. This competition may be direct -- alternative providers of online storage or entertainment media services that are both competing in the same service market; or indirect: providers of interactive gaming services or online video that compete for consumer attention. Distribution channel conflicts can arise because of forward integration into such potentially competing retail markets.

⁵⁵ For example, consider a new interactive gaming platform or appliance for home-based healthcare monitoring.

VI. Conclusions

Incumbent local telephone companies are required by the TA96 to provide competitors with non-discriminatory access to UNEs. These open access rules are based on the presumption that the ILECs' local access networks constitute bottleneck facilities.

Because the ILECs are both the sole wholesale providers of UNEs and compete directly in the downstream retail markets for which UNEs are used, the ILECs have a natural incentive to provide discriminatory access. This has frustrated efforts to implement the TA96 and lead to calls to mandate structural separation of the bottleneck facilities.

The ILECs have bitterly opposed regulatory mandates to separate structurally. Our review of this debate raises questions about arguments supporting the economic efficiency of vertical integration of the ILECs' wholesale network and retail businesses, especially in light of the implications for effective open access regulation. Nevertheless, as long as the ILECs retain an expectation that such regulation will be temporary or that vertical integration can reduce the effectiveness of open access regulation, it is reasonable to expect the ILECs to continue to oppose divestiture.

However, if the ILECs expected open access regulation to be an unavoidable and enduring feature of future telecommunications regulation, then they might very well choose to divest voluntarily.

For this to be a reasonable expectation, one would have to believe that local access services will remain a bottleneck in the broadband future. This is a point that is disputed, but, based on current knowledge, it seems clearly premature to conclude that the bottleneck will be eliminated. If it is not, it is unreasonable to think that open access

rules will cease to be necessary and that full deregulation of local services will be achievable.

We outline one plausible scenario for how broadband networks may evolve such that local access remains a bottleneck and therefore open access regulation must continue. If, in this broadband future, open access regulation is even more difficult and less effective than it has proven under the TA96, there can be little doubt that incumbents will resist divestiture. Therefore, in this case, mandatory structural separation may be necessary to make effective open access feasible.

However, if open access regulation is more effective in the broadband future, there are reasons to believe that voluntary divestiture may be in the best interests of the regulated firm. This suggests that implementing an effective open access regime for broadband local access which mandates structural separation would not be any more burdensome for the carrier than simply implementing the effective open access regime. In other words, if technology does not result in the elimination of the local access bottleneck, it may be necessary to order structural separation. If the carrier resists, it is likely because implementing effective open access is infeasible without separation -- while if the open access rules are effective, the company and the regulator are likely to agree structural separation is desirable.

Because regulation is costly, the best outcome would be for no last-mile access bottleneck to exist. For this to occur, there must be multiple facilities-based competitors supporting a competitive wholesale market for local access services analogous to the market that exists for wide area transport. If the competition does not materialize, then access must be regulated. A monopoly over last-mile facilities should not be leveraged

into the downstream markets for computer hardware, software, media content, or advanced communication services which depend on access to these facilities. At the same time, to control the market power associated with a last-mile bottleneck, regulation should not be excessive. Therefore structural remedies will remain an important policy option for the broadband future as long as there remains a need for regulation of last-mile services.