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Beyond Network Neutrality

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ABSTRACT

In this Article, Professor Yoo takes issue with the emerging scholarly consensus in favor of "network neutrality," which would prohibit network owners from employing proprietary protocols or entering into exclusivity agreements with content providers that would reduce the transparency of the Internet. Economic theory suggests that network neutrality advocates are focusing on the wrong policy problem. Rather than directing attention on the market for Internet content and applications, the segments of the industry that are the most competitive and the most likely to remain that way, communications policy would be better served if the focus were placed on the segment of the industry that is the most concentrated and protected by entry barriers, which in the case of broadband is the last mile. Furthermore, network neutrality is something of a misnomer. Standardizing protocols would inevitably favor certain applications over others and would place the government in the unfortunate position of picking technological winners and losers. The regulatory tools needed to implement network neutrality are also likely to prove ineffective in a world in which communications are increasingly decommodified and in which technological change has become increasingly dynamic.

Most importantly, network neutrality threatens to make things worse by reinforcing the sources of market failure in the last mile and dampening incentives to invest in alternative network capacity. Instead, Professor Yoo proposes a "network diversity" approach that would use product differentiation to encourage investment and to mitigate the supply-side and demand-side scale economies associated with the impact of up-front, fixed costs and by network economic effects. Network diversity can thus make it possible for three different last-mile networks to coexist: one optimized for traditional Internet applications such as e-mail and website access, another for security-sensitive applications like e-commerce, and a third for time-sensitive applications such as VoIP. Although the welfare implications and institutional considerations are complex, in the end Professor Yoo concludes that the policy balance tips in favor of network diversity.

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Christopher S. Yoo*

INTRODUCTION

U.S. Internet policy has reached a crossroads. Both the Supreme Court and the Federal Communications Commission (FCC) are in the process of determining how to fit the current broadband technologies, such as cable modems and digital subscriber line (DSL) services, into the existing regulatory regime.[1] Having largely failed to take the Internet into consideration when enacting the Telecommunications Act of 1996,[2] Congress is preparing to reenter the fray and has begun work on its second major overhaul of the communications laws in less than a decade.[3] The way people are using the Internet is changing just as rapidly, as evidenced by the increasing popularity of bandwidth-intensive applications, such as streaming media and Internet telephony (also known as "voice over Internet protocol" or VoIP). A host of new communications platforms are waiting in the wings, such as third-generation mobile communications devices (3G) and wireless hotspots employing WiFi technology.

As of today, most Internet users communicate through a suite of nonproprietary protocols known as the transmission control protocol/Internet protocol (TCP/IP). Widespread adoption of

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* Professor of Law, Vanderbilt University. Support from the Vanderbilt Dean's Fund is gratefully acknowledged. After this article was substantially complete, I was retained by the National Cable and Telecommunications Association (NCTA) to consult on matters related to issues discussed in this Article. The views expressed herein are my own and should not be attributed to Vanderbilt or NCTA.

[1] *See* Brand X Internet Servs. v. FCC, 345 F.3d 1120 (9th Cir. 2003), *cert. granted*, 125 S. Ct. 654, 655 (2004) (granting certiorari on the proper regulatory classification of cable modem service); Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, Declaratory Ruling and Notice of Proposed Rulemaking, 17 F.C.C.R. 4798 (2002) (initiating proceeding to determine how to classify and regulate cable-modem service); Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, Notice of Proposed Rulemaking, 17 F.C.C.R. 3019 (2002) (initiating proceeding to determine how to classify and regulate DSL service).

[2] *See, e.g.*, Kevin Werbach, *A Layered Model for Internet Policy*, 1 J. ON TELECOMM. & HIGH TECH. L. 37, 42 (2002) ("The 1996 Act simply did not contemplate the radical changes the Internet would bring to the communications world.").

[3] *See, e.g.*, Stephen Labaton, *What U.S. Businesses Are Looking for During Bush's 2nd Term: New Telecom Rules*, INT'L HERALD TRIB., Nov. 5, 2004, at 19.

TCP/IP has given the Internet a nearly universal interoperability that allows end users to access all Internet applications and content on a nondiscriminatory basis. There are some indications that cable modem and digital subscriber line (DSL) systems (often called "last mile" providers because they are responsible for connecting individual residences and end users to the network) are beginning to deploy proprietary protocols and to enter into exclusivity arrangements that threaten to reduce the transparency of the Internet and make it possible for network owners to discriminate in favor of preferred content and applications.[4] Commentators, led by Lawrence Lessig, have almost universally criticized this development, arguing that allowing last-mile broadband providers to reduce interoperability would impair the environment for competition and innovation in the market for Internet content and applications. They call for mandating interconnection of broadband networks along standardized interfaces.[5] Although these proposals

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[4] This Article focuses exclusively on network owners' ability to place restrictions on content and applications providers. It is also possible that network owners can reduce the transparency of the Internet by placing restrictions on end users. For my views regarding the latter issue, see Christopher S. Yoo, Network Neutrality and the Economics of Congestion (forthcoming 2005).

[5] *See, e.g.*, LAWRENCE LESSIG, THE FUTURE OF IDEAS 46-48, 155-76, 246-49 (2001); Mark Cooper, *Open Communications Platforms: The Physical Infrastructure as the Bedrock of Innovation and Democratic Discourse in the Internet Age*, 2 J. ON TELECOMM. & HIGH TECH. L. 177 (2003); Mark A. Lemley, *Antitrust and the Internet Standardization Problem*, 28 CONN. L. REV. 1041, 1062-65 (1996); Lawrence B. Solum & Minn Chung, *The Layers Principle: Internet Architecture and the Law*, 79 NOTRE DAME L. REV. 815, 851, 878 (2004); James B. Speta, *A Common Carrier Approach to Internet Interconnection*, 54 FED. COMM. L.J. 225, 268-79 (2002); Philip J. Weiser, *Toward a Next Generation Regulatory Strategy*, 35 LOY. U. CHI. L.J. 41, 74-84 (2003); Werbach, *supra* note 2, at 65-67; Tim Wu, *The Broadband Debate, A User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69 (2004). These proposals are related to early calls for forcing cable modem systems to provide access to all Internet service providers. *See* Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925 (2001). It is also similar to the complaint that network owners are creating "walled gardens" that favor proprietary content. *See, e.g.*, LESSIG, *supra*, at 156; Hernan Galperin & Francois Bar, *The Regulation of Interactive Television in the United States and the European Union*, 55 FED. COMM. L.J. 61, 62-64, 69-72 (2002). The only contrary voices of which I am aware are BRUCE M. OWEN & GREGORY L. ROSSTON, LOCAL BROADBAND ACCESS: *PRIMUM NON NOCERE* OR *PRIMUM PROCESSI*? A PROPERTY RIGHTS APPROACH 11-12 (AEI-Brookings Joint Center for Regulatory Studies, Related Publication No. 03-19, Aug. 2003), *available at* http://www.aei.brookings.org/admin/authorpdfs/page.php? id=285; and Adam Thierer, *Are "Dumb Pipe" Mandates Smart Public Policy? Vertical Integration, "Net Neutrality," and the Network Layers Model*, 4 J. ON. TELECOMM. & HIGH TECH. L. (forthcoming 2005); *see also* John E. Lopatka & William H. Page, *Internet Regulation and Consumer Welfare: Innovation, Speculation, and Cable Bundling*, 52 HASTINGS L.J. 891 (2001).

vary considerably in both their terminology and details about how to redress this problem, they can comfortably be aggregated within the broad rubric of "network neutrality."

There can be no question that interoperability inherent in mandatory interconnection and protocol standardization would provide substantial economic benefits. Making Internet applications and content universally accessible increases the value of the network both to end users and to providers of applications and content. Indeed, the benefits from network neutrality are often so compelling that I would expect that the vast majority of network owners to adhere to it voluntarily without being required to do so. Furthermore, network neutrality largely parallels back to the regime of mandatory interconnection and interface standardization used so successfully by the courts and the FCC to foster competition in telephone equipment (known as "customer premises equipment" or CPE),[6] long distance,[7] and "enhanced services" (i.e., services that use modems to enable telephone networks to convey computer-related traffic in addition to voice communications).[8] Concepts like openness and neutrality would also seem to promote

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[6] *See* PETER W. HUBER ET AL., FEDERAL TELECOMMUNICATIONS LAW 662-79 (2d ed. 1999). Until the FCC's landmark *Carterfone* decision, the FCC permitted AT&T to prohibit customers from interconnecting any "foreign attachments," i.e., any customer premises equipment not manufactured by AT&T's equipment subsidiary, Western Electric. *Carterfone* broke from that position and ruled that customers have the right entitled to attach any device to the telephone system "so long as the interconnection does not adversely affect the telephone company's operations or the telephone system's utility for others." Use of the Carterfone Device in Message Toll Telephone Services, Decision, 13 F.C.C.2d 420, 424 (1968). In order to prevent AT&T from continuing to prevent foreign attachments, the FCC eventually standardized the interface and required AT&T to allow the attachment of any CPE that complied with certain designated standards. Similar CPE interconnection and standardization requirements were later imposed on the newly divested Bell Operating Companies (BOCs) by the court overseeing the breakup of AT&T. *See* HUBER ET AL., *supra*, at 418-19.

[7] After the advent of microwave transmission made long distance competition feasible, the FCC (at the goading of the D.C. Circuit) eventually required AT&T to interconnect with all long distance carriers. The obligation to interconnect was further reinforced during the breakup of AT&T, in which the court required the BOCs to interconnect with all long distance carriers. The court also ordered the BOCs to redesign and reprogram their switches to incorporate a standardized interface by 1986. This so-called "equal access" mandate was later extended to non-Bell local telephone companies as well. *See* HUBER ET AL., *supra* note 6, at 751-90.

[8] The first and second *Computer Inquiries* required major local telephone companies who wished to provide enhanced services to do so through a separate subsidiary and to provide tariffs that permitted all providers of enhanced services to interconnect with their networks. The court presiding over the breakup of AT&T imposed similar requirements on the BOCs. The third *Computer Inquiry* allowed major local telephone companies to forego the separate subsidiary requirement so long as they complied with regulatory systems known as called "comparably

such widely held values as equality of treatment and freedom of choice. The recent surge of merger activity in the cable and telecommunications industries would appear to make concerns about gatekeeper control by network owners all the more plausible.

That said, when deciding whether to impose network neutrality as a regulatory mandate, the key question is not whether network neutrality provides substantial benefits. (Indeed, to the extent that particular practices are beneficial, private actors generally do not need to be compelled to adhere to them.) The key inquiry is whether circumstances exist in which it would be beneficial to deviate from network neutrality, because it is these benefits that would be foreclosed if network neutrality were imposed. As the Supreme Court recognized in assessing the parallel question of whether to declare a business practice illegal per se under the antitrust laws, the key question is whether the challenged practice evinces such a "pernicious effect on competition" and such a "lack of any redeeming virtue" that nothing would be lost if it were "presumed to be . . . illegal without elaborate inquiry as to the precise harm [it] ha[s] caused or the business excuse for [its] use."[9] In the absence of a clear competitive harm, the standard response under competition policy is to forbear from categorically prohibiting the challenged practice and to permit the practice unless such harm can be demonstrated.[10] Any other rule

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efficient interconnection" (CEI) and "open network architecture" (ONA). CEI and ONA require local telephone companies to interconnect with unaffiliated enhanced service providers on nondiscriminatory terms. *See id.* at 1088-95, 1107-55. The FCC also required the BOCs to "'make available standardized hardware and software interfaces that are able to support transmission, switching, and signaling functions identical to those utilized in the enhanced service provided by the carrier.'" *Computer III* Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services, Report and Order, 14 F.C.C.R. 4289, 4298 ¶ 13 (1999) (citing Amendment of Sections 64.702 of Commission's Rules and Regulations (Third Computer Inquiry), Report and Order, 104 F.C.C.2d 958, 1039 ¶ 157 (1986), *vacated and remanded on other grounds sub nom.* California v. FCC, 905 F.2d 1217 (9th Cir. 1990).). The regime created by the third *Computer Inquiry* was eventually overturned on judicial review. *See* California v. FCC, 39 F.3d 919, 925-30 (9th Cir. 1994); California v. FCC, 905 F.2d 1217, 1230-39 (9th Cir. 1990). The remand proceedings were eventually rolled into the broadband proceedings opened in 2002. *See* Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, Notice of Proposed Rulemaking, 17 F.C.C.R. 3019, 3024 ¶ 8 (2002).

[9] N. Pac. Ry. Co. v. United States, 356 U.S. 1, 5 (1957).

[10] *See* White Motor Co. v. United States, 372 U.S. 253, 262-63 (1963) OWEN & ROSSTON, *supra* note 5.

would short circuit the process of experimentation with new products and alternate organizational forms essential to a properly functioning market.

In this Article, I would like to explore this as-yet unasked question and examine whether imposing network neutrality would forestall the realization of important economic benefits. What emerges is a fascinating picture that is more complex than that suggested by the current debate. My analysis reveals that network neutrality is based on assumptions about the variability of consumer demand and the feasibility of entry that had some validity during the early days of the Internet, but no longer hold true. In addition, it suggests that the term "network neutrality" is something of a misnomer: Adoption of any standardized interface has the inevitable effect of favoring certain applications and disfavoring others. For example, TCP/IP routes packets anonymously on a "first come, first served" and "best efforts" basis. As a result, it is poorly suited to applications that are less tolerant of variations in throughput rates, such as streaming media and VoIP, and is biased against network-based security features to protect e-commerce and ward off viruses and spam. Thus, contrary to what the nomenclature might suggest, network neutrality is anything but neutral. Indeed, using regulation to standardize interfaces has the unfortunate effect of putting the government in the position of picking technological winners and losers.

Indeed, economic theory suggests that network neutrality proponents are focusing on the wrong policy problem. One of the basic tenets of vertical integration theory is that any chain of production will only be as efficient as its least competitive link. As a result, competition policy should focus on identifying the link that is the most concentrated and the most protected by entry barriers and design regulations to increase its competitiveness. In the broadband industry, the level of production that is the most concentrated and protected by barriers to entry is the "last

mile." This implies that the decisions about Internet regulation should be guided by their impact on competition in that portion of the industry. Rather than adopt this orientation, network neutrality advocates direct their attention to preserving and promoting competition among providers of content and applications, which is the level of production that is already the most competitive and the most likely to remain that way.

Once improving the competitiveness of the last mile becomes the central goal of broadband policy, network neutrality becomes problematic and potentially counterproductive. For example, network neutrality can exacerbate the impact of up-front, fixed costs and by network economic effects, which are the most commonly identified sources of market failure in telecommunications markets. What has been largely overlooked is how product differentiation can ameliorate both of these effects and allow smaller producers to survive despite having lower sales volumes and higher per-unit costs. Such solutions are quite common in other industries. For example, it is the same mechanism that allows specialty stores to survive despite competition from low-cost, mass market discounters. Differentiation allows them to retain those customers who place a higher value on a particular type of product despite the fact that prices may be somewhat higher.

A similar solution is possible in the broadband industry. Allowing network owners to differentiate their networks can better satisfy the increasing heterogeneity of end user demand. In addition, increasing the number of dimensions along which networks compete can mitigate supply-side and demand-side economies of scale. Restated in terms of the Internet, network diversity might make it possible for three different last-mile networks to coexist: one optimized for traditional Internet applications such as e-mail and website access; another incorporating security features to facilitate e-commerce and to guard against viruses. spam, and other

undesirable aspects of life on the Internet; and a third that prioritizes packets in the manner needed to facilitate time-sensitive applications such as streaming media and VoIP. Each would survive by catering to the market subsegment that places the highest value on a particular type of service.

Extended to its logical conclusion, this analysis would suggest that public policy would be better served if Congress and the FCC were to embrace a "network diversity" principle that permits network owners to deploy proprietary protocols and to enter into exclusivity agreements with content providers. Conversely, preventing network owners from differentiating their offerings would forestall this process. In other words, standardization on TCP/IP would have the effect of narrowing the dimensions of competition, forcing networks to compete solely on the basis of price and network size. This commodification of bandwidth would reinforce the advantages enjoyed by the largest players.

At the same time, network neutrality threatens to dampen incentives to increase competition through the construction of new networks. Eliminating the potential for short-run supracompetitive returns would also thwart one of the primary mechanisms that markets rely upon to stimulate entry. Furthermore, by providing all applications and content providers with access to the existing network, network neutrality deprives would-be builders of alternative network capacity of their natural strategic partners. Concerns about dampening investment incentives carry little weight when last-mile competition is infeasible, as was arguably the case when interconnection and standardization was mandated with respect to CPE, long distance, and enhanced services. They are paramount when entry by new last-mile providers is ongoing and other last-mile technologies are waiting in the wings. Under these circumstances, regulation

imposed to curb market concentration can turn into a the source of, rather than the solution to, market failure.

What emerges is a vision of competition that is quite different from that envisioned by the current debate. This is not to say that network diversity would be a panacea. Just to highlight a couple of considerations, the viability of network diversity depends in no small part on the heterogeneity of the underlying consumer preferences. If there is no variance in what end users want from networks, there will be no subsegments for smaller network owners to target. In addition, some degree of deadweight loss and redundant entry may be endemic under network diversity, and it is possible that the welfare increases associated with greater product diversity will not completely offset these losses. Furthermore, given that entry is never instantaneous, welfare analysis of network diversity requires balancing the short-run static efficiency losses from allowing network owners to earn short-run supracompetitive profits against the long-run dynamic efficiency gains resulting from stimulating entry by competing networks. In short, determining whether network neutrality or network diversity would lead to the more socially beneficial outcome is a context-specific inquiry that cannot be determined *a priori*.

There are, however, a number of institutional considerations that suggest that network diversity might well be the better approach. Regulatory solutions tend to take the form of *ex ante* rules and as such are poorly suited to the context-specific determinations suggested by network diversity theory. In addition, the regulatory tools needed to implement the regime of interconnection, standardization, rate regulation, and nondiscrimination implicit in network neutrality have long been criticized as difficult to implement and unlikely to be effective in industries like broadband, where the services provided vary in quality and where technology is changing rapidly. Regulatory lag creates the danger that restrictions will persist long after the

conditions that justified their imposition have dissipated. Even worse, by dampening of investment incentives, network neutrality can itself become the means through which market concentration is cemented into place. Indeed, one of the principal drawbacks about regimes of mandatory interconnection and interface standardization is that they implicitly presuppose that regulation will continue indefinitely. Network diversity, in contrast, is better at facilitating competitive entry. As such, it has the advantage of having embedded within it a built-in exit strategy.

Even these arguments, while carrying considerable persuasive force, fall short of providing a definitive resolution of these issues, and the debate all too often risks collapsing into battles over ideology. Competition policy does offer a potential solution by implicitly recognizing that the best response in the face of uncertainty is forbearance. Network neutrality proponents have candidly conceded that it is often difficult, if not impossible, to determine whether a particular practice will help or harm competition.[11] Until we can tell whether adhering to or deviating from complete interoperability would be the better course of action, competition policy would counsel in favor of permitting both architectures to go forward. Intervening by mandating network neutrality would have the effect of locking the existing interfaces into place and have the inevitable effect of foreclosing experimentation into new products and alternative organizational forms that transcend traditional firm boundaries. The decision to permit network diversity to emerge, then, does not necessarily stem from a conviction that it would yield a substantively better outcome, but rather from a technological humility that permits exploration to proceed until policymakers can make a clearer assessment of the cost-benefit tradeoff. In this

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[11] *See* LESSIG, *supra* note 5, at 46-48, 167-75; Mark Cooper, *Open Access to the Broadband Internet: Technical and Economic Discrimination in Closed, Proprietary Networks*, 71 U. COLO. L. REV. 1011, 1050-52 (2000); Lemley & Lessig, *supra* note 5, at 939; *see also* Bresnahan, *supra* note 28, at 160-61, 165, 200-01; Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. ON TELECOMM. & HIGH TECH. L. 141, 147-49 (2003).

sense, network diversity is not the mirror image of network neutrality, in that it does not call for the imposition of any mandatory obligations. Rather, network diversity adopts the more modest position that regards regulatory forbearance as the appropriate course of action when confronted with ambiguity.

The balance of my argument is organized as follows. In Part I, I demonstrate how network neutrality proponents are focusing on the wrong policy problem by supporting regulation to preserve competition in applications and content, which are the portions of the industry that are already the most competitive and the most likely to remain that way. Instead, regulation should be directed toward fostering competition in the last mile, which the industry segment that is the most concentrated and the most protected by entry barriers.

In Part II, I analyze the potential drawbacks to network neutrality, explaining how network neutrality narrows consumer choice, disfavors certain applications, reinforces sources of market failure in the last mile, and dampens investment in alternative network capacity, which in turn threatens to entrench the existing oligopoly into place. I draw on the economic literature on product differentiation and network economic effects to lay out the case in favor of network diversity. In the process, I engage arguments about the "end-to-end" argument, which has played a prominent role in the existing debate. I also show how network neutrality necessarily relies upon regulatory tools have become suspect in a world in which communications have become increasingly decommodified. I also briefly discuss the deficiencies of attempts to offer noneconomic justifications for network neutrality.

In Part III, I consider the policy implications that emerge from the debate between network neutrality and network diversity. I begin by clarifying a common misunderstanding about the relationship between network diversity and the innovation-based theory of competition

articulated by Joseph Schumpeter.[12] I then detail the complexity of the welfare analysis indicated by network diversity, showing that the economic resolution of this debate turns on a number of context-specific determinations that cannot be determined *a priori*. I also outline a number of institutional considerations tending to militate against network neutrality, including a brief discussion considering whether these issues should be resolved under antitrust law. I close by offering a tentative resolution of these countervailing considerations.

I. NETWORK NEUTRALITY'S MISPLACED FOCUS ON APPLICATIONS AND CONTENT

Network neutrality's central concern is that owners of cable modem and DSL systems will use their control over the last mile to harm applications and content providers. This Part demonstrates how network neutrality is fundamentally a concern about vertical integration. Section A maps network neutrality onto the two leading approaches for modeling the vertical structure of the broadband industry. Section B draws on the insights vertical integration theory to show that network neutrality proponents are focusing on the wrong policy problem. Broadband policy would be better served if regulation were targeted not at preserving and promoting competition in applications and content, but rather at increasing competition in the last mile.

A. The Relationship Between Network Neutrality and Vertical Integration

Regulations that compel access to bottleneck facilities are inherently about vertical integration.[13] That this is the case can be easily seen if the broadband industry is mapped onto the vertical chain of production that characterizes most industries. The initial stage is known as

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[12] JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY 81-86 (3d ed. 1950).

[13] *See* 3A PHILIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW ¶ 771, at 169-71 (2d ed. 2002).

manufacturing and consists of the companies that create the products and services that end users actually consume. The final stage is known as retailing and is comprised of the companies responsible for delivering those products and services to end users.[14] Formal vertical integration through mergers or de facto vertical integration through exclusivity arrangements between manufacturers and retailers are a common economic feature, appearing in industries varying from shoes to cars.[15]

The broadband industry fits easily into this vertical structure.[16] The manufacturing stage is composed of the companies that produce webpage content and Internet-based services, such as e-commerce and VoIP. The retail stage includes DSL providers, cable modem systems, and other last-mile technologies. It is also clear that the practices toward which network neutrality directs its attention, which are uniformly about last-mile providers favoring proprietary applications and content, are essentially forms of vertical integration.

The emphasis on vertical integration remains clear even if network neutrality viewed through the "layered model" that has become an increasingly popular to conceive of the structure of the Internet. The leading approach disaggregates networks into four horizontal layers that cut across different network providers.[17] The bottommost layer is the *physical layer*, which consists

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[14] Although it is theoretically possible for retailers to purchase products directly from manufacturers, in some cases logistical complications create the need for an intermediate stage between manufacturers and retailers. Firms operating in this intermediate stage, known as wholesalers, assemble goods purchased directly from manufacturers into complete product lines and distribute them to retailers. *See id.* at 182, 250-51.

[15] *See, e.g.*, White Motor Co. v. United States, 372 U.S. 253 (1963); Brown Shoe Co. v. United States, 370 U.S. 294 (1962).

[16] *See* Christopher S. Yoo, *Copyright and Product Differentiation*, 79 N.Y.U. L. REV. 212, 250-52 (2004).

[17] *See* Werbach, *supra* note 2, at 59-64; Richard S. Whitt, *A Horizontal Leap Forward: Formulating a New Communications Public Policy Framework Based on the Network Layers Model*, 56 FED. COMM. L.J. 587,.624 (2004). The layered model is related to the Open Systems Interconnection (OSI) model developed by the International Standards Organization (ISO) in the 1980s, which divides seven different layers. Because some of these distinctions have greater relevance for technologists than for policy analysts, the four-layer model combines some of these layers. *See* Werbach, *supra* note 2, at 59. Note that other versions of the layered approach use different numbers of layers. *See* LESSIG, *supra* note 5, at 23-25 (employing a three-layer model of physical, code, and content layers); Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation*

of the hardware infrastructure used to route and transmit the data packets that make up a particular form of communications. The second layer is the *logical layer*, which is composed of the protocols used to route a particular packets to its proper destination and to ensure that it arrives intact. The third layer is the *applications layer*, which is comprised of the particular programs and functions used by consumers. The fourth layer is the *content layer*, which consists of the particular data being conveyed.

The differences between the layers can be illustrated in terms of the most common Internet application: e-mail. The physical layer consists of the telephone or cable lines, e-mail servers, routers, and backbone facilities needed to convey the e-mail from one location to another. The logical layer consists of the SMTP protocol employed by the network to route the e-mail to its destination. The application layer consists of the e-mail program used, such as Microsoft Outlook. The content layer consists of the particular e-mail message sent.

The layered model underscores the extent to which network neutrality is focused on vertical integration. The concern is that owners of the physical layer will use their control over the logical layer to give preferential treatment to proprietary applications and content. Network neutrality proposes regulating the logical layer to preserve competition in the applications and content layers.

Towards Sustainable Commons and User Access, 52 FED. COMM. L.J. 561 (2000) (same); Solum & Chung, *supra* note 5, at 816 (proposing a six-layer model); Timothy Wu, *Application-Centered Internet Analysis*, 85 VA. L. REV. 1163, 1189-92 (1999) (proposing a different, four-layer model).

B. The Insights of Vertical Integration Theory

One of the key insights of vertical integration theory is that any vertical chain of production will only be as efficient as its most concentrated link.[18] The intuitions underlying that literature can be easily illustrated through a hypothetical example based on the Supreme Court's landmark *Terminal Railroad* decision, the seminal case for mandating interconnection to a bottleneck.[19] Suppose that a railway company controlled the only bridge across the Mississippi River at St. Louis and that it was using its control of the bridge either to give preferential treatment to its proprietary rolling stock or to forbid competing carriers from using the bridge altogether. One might be tempted to require the bridge owner to interconnect its bridge with other railway networks and to require it to provide access to the bridge to all comers on reasonable and nondiscriminatory terms. Indeed, that is precisely the type of solution sanctioned by the Supreme Court.[20]

Vertical integration theorists have pointed out that compulsory sharing of a monopoly facility represents something of a competition policy anomaly.[21] The focus of competition policy is to maximize economic welfare. When confronted with a concentrated market, the traditional response is to deconcentrate the problematic market, either by breaking up the existing monopoly or by facilitating entry by a competitor. Compelling interconnection to the bottleneck resource leaves the monopoly in place and simply requires that it be shared.

The problem is that compulsory sharing of a bottleneck resource fails to reduce prices below or increase output above monopoly levels. For example, suppose that the monopoly price

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[18] *See* Christopher S. Yoo, *Would Mandating Network Neutrality Help or Hurt Broadband Competition?: A Comment on the End-to-End Debate*, 3 J. ON TELECOMM. & HIGH TECH. L. 23, 59-60 (2004)..

[19] United States v. Terminal R.R. Ass'n of St. Louis, 224 U.S. 383 (1912).

[20] *See id.* at 411-12.

[21] *See, e.g.*, 3A AREEDA & HOVENKAMP, *supra* note 13, ¶ 771b, at 171-73.

for shipping goods between two points across the bridge is $100 and that the cost of providing the rolling stock for that shipment is $35.[22] A bridge monopolist who had vertically integrated into rolling stock would be expected to charge $100 for the combined services. Now consider what would occur if regulators forced the bridge owner to provide all railroad companies nondiscriminatory access to its bridge. Absent price controls, the bridge owner would simply charge $65 to use its bridge. Since the market for rolling stock is competitive, the railroad companies would set their prices equal to their costs and charge $35. In the end, customers still pay $100.

Thus, forcing a bridge monopolist to provide nondiscriminatory access to its bridge provides no consumer benefits, since vertical disintegration does nothing to displace the bridge monopoly that is the real source of market failure.[23] In essence, the Supreme Court focused on the wrong policy problem. It makes little sense to protect the market for rolling stock. That market was already quite competitive, and the barriers to entering that portion of the industry were quite low. Rather than attempting to foster competition among railways, it should have focused its efforts on increasing the competitiveness of the markets for bridges. Only if each segment of the vertical chain of production is fully competitive will economic welfare be maximized. In other words, competition policy would be better promoted if attention were focused on the level of production that is the most concentrated and the most protected by entry barriers.

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[22] The example is adapted from one offered by then-Chief Judge Breyer, who in turn adapted it from the leading antitrust treatise. *See* Town of Concord v. Boston Edison Co., 915 F.2d 17, 32 (1st Cir. 1990) (Breyer, C.J.) (citing 3 PHILIP AREEDA & DONALD F. TURNER, ANTITRUST LAW ¶ 728, at 199 (1978)).

[23] Indeed, if the market for rolling stock were also uncompetitive, double marginalization theory indicates that vertical integration can actually be welfare enhancing. *See* Christopher S. Yoo, *Vertical Integration and Media Regulation in the New Economy*, 19 YALE J. ON REG. 171, 192-93, 260-61 (2002).

The same economic reasoning holds true for broadband. Suppose that vertical integration in broadband were banned altogether and that every last-mile provider were forced to divest its ownership interests in any content or applications provider. Would doing so reduce the market power of the last-mile providers? The answer is clearly "no." The market power exercised by DSL and cable modem providers exists because of the limited number of options that end users have for obtaining last-mile services. The number of options will remain the same regardless of whether or not last-mile providers hold ownership takes in content and application providers or whether unaffiliated content and application providers are granted nondiscriminatory access. Vertical disintegration thus has no effect on last-mile providers' ability to extract supracompetitive returns. Consumers will receive benefits only by promoting entry by alternative network capacity.

This analysis emphasizes the extent to which network neutrality proponents are focusing on the wrong policy problem. By directing their efforts towards encouraging and preserving competition in the market for application and content, they are concentrating on the segments of the industry that are already the most competitive and the most likely to remain that way. Broadband policy would be better served if such efforts were directed towards identifying and increasing the competitiveness of the last mile, which remains the industry segment that is the most concentrated and protected by entry barriers. Restated in terms of the layered model, decisions about whether to regulate logical layer should not be driven by a desire to preserve and promote competition in the application and content layers. Such decisions should instead be guided by its impact on competition in the physical layer.

II. THE SHORTCOMINGS OF NETWORK NEUTRALITY AND THE CASE FOR NETWORK DIVERSITY

Having determined that the central goal of broadband policy should be to foster greater competition in the last mile, the next logical step is to assess whether network neutrality would further or hinder that goal. The analysis will examine two different dimensions of economic performance. The first, known as "static efficiency," holds the quantity of inputs and the available technology constant and asks whether goods and services are being produced using the fewest resources and are being allocated to those consumers who place the highest value on them. Static efficiency is traditionally measured according to the most familiar metrics of economic welfare, such as the maximization of consumer and total surplus and the minimization of average cost and deadweight loss.

My analysis reveals that network neutrality may impair static efficiency in two ways: First, standardization necessarily reduces economic welfare by reducing product variety. Indeed, recent increases in the heterogeneity of the demands that end users are placing on the network suggest that these losses may be particularly severe. Second, and more importantly for our purposes, network neutrality can impede the emergence of competition in the last mile by reinforcing the economic characteristics that drive markets for telecommunications networks towards natural monopoly (i.e., high, up-front costs and network economic effects). Indeed, to the extent that network neutrality is imposed to limit monopoly or oligopoly power, it can have the perverse effect of entrenching industry concentration by short circuiting one the most natural ways to mitigate market failure.

While static efficiency represents the most widely accepted measure of economic performance, it begs an important question by failing to take into account the fact that the distribution of inputs and technology is itself subject to change and optimization. Such

considerations fall within the realm of the second dimension of economic performance, known as "dynamic efficiency," which treats input availability and technology as endogenous. Put another away, while static efficiency optimizes placement along a production possibility frontier, dynamic efficiency also addresses the prospect that the production possibility frontier could shift outwards. Indeed, the growing importance of technology and infrastructure and the accelerating pace of technological change have made dynamic efficiency an increasingly important consideration in the modern economy.

In terms of dynamic efficiency, my analysis draws on the literature exploring the impact of compulsory access on investment incentives to examine how mandating interconnection and its accompanying corollaries can discourage the buildout of new last-mile technologies. The mounting empirical evidence confirms that the imposition of interconnection and standardization regimes of the type envisaged by network neutrality proponents to redress concentration in the last mile may turn into a self-fulfilling prophecy. Network diversity, in contrast, would avoid these problems and facilitate entry by new last-mile providers.

Network neutrality is also hamstrung by the practical consideration that the regulatory tools traditionally used to promote static efficiency are unlikely to work well in a world in industries undergoing rapid technological change. Those tools are also unlikely to be effective when the demands that end users are placing on the network are becoming increasingly heterogeneous in terms of quality of service and content.

These conclusions would suggest that society might be better off if policymakers were to embrace a *network diversity* principle. I close by offering a few brief observations about the noneconomic justifications offered in support of network neutrality. I find that while they are

analytically coherent, they are insufficiently theorized to provide a basis for a coherent regulatory regime.

A. Network Diversity and Static Efficiency

This subpart evaluates network neutrality in terms of static efficiency. It first discusses how compulsory standardization of protocols can reduce economic welfare by reducing product variety and by favoring certain applications over others. Indeed, close analysis reveals that mandating interconnection is inherently nonneutral. It then describes how network neutrality can have the perverse effect of reinforcing the sources of market failure that have historically been regarded as the reason that markets for last mile technologies have remained so concentrated. This analysis suggests that broadband policy might well be better off if Congress and the FCC were to embrace network diversity as a central guiding principle.

1. The Potential Welfare Gains from Network Diversity and the Inherent Nonneutrality of Network Neutrality

The regime of mandatory interconnection and protocol standardization envisioned by network neutrality proponents would have a potentially dramatic impact on static efficiency that is often obscured under the price theoretic approach that dominates law and economics scholarship. Price theoretic analyses assume, explicitly or implicitly, that competing goods serve as perfect substitutes for one another. This in turn allows economic welfare to be measured in terms of price. In short, consumer surplus is created when consumers pay prices that are less than the maximum they would be willing to pay, and producer surplus is created when producers receive prices that exceed the minimum price they would be willing to accept. In a price theoretic world, economic welfare consists solely of the sum of consumer and producer surplus.

A different situation obtains when products are differentiated.[24] The economics of product differentiation acknowledges that utility can also increase by allowing consumers to obtain goods that fit better with their ideal preferences.[25] These welfare effects from product differentiation are not observable in the classic price-quantity space that dominates economic analysis. They nonetheless remain an important potential source of economic welfare. Conversely, protocol standardization can "prevent the development of promising but unique and incompatible new systems."[26] The concomitant reduction in product variety can represent an important, but often overlooked, source of welfare loss.[27]

These problems become more acute when the focus is shifted from standardization in the abstract to the particular form of standardization favored by network neutrality proponents. Adoption of any standardized protocol would have the inevitable effect of favoring certain types of applications and disfavoring others. Even worse, standardization also has the inevitable effect of putting the government in the position of picking technological winners and losers. In addition, to be effective, such intervention would likely be required at an early stage when the underlying technology is still in a state of flux.[28] In short, it appears that the term, network neutrality, is something of a misnomer.

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[24] For an overview of the economics of product differentiation, see Yoo, *supra* note 16, at 236-46, 251-67.

[25] *See* Yoo, *supra* note 23, at 271-72; Christopher S. Yoo, *Rethinking the Commitment to Free, Local Television*, 52 EMORY L.J. 1579, 1617-18 (2003).

[26] Michael L. Katz & Carl Shapiro, *Systems Competition and Network Effects*, 8 J. ECON. PERSP. 93, 110 (1994)

[27] *See* Joseph Farrell & Garth Saloner, *Standardization, Compatibility, and Innovation*, 16 RAND J. ECON. 70, 71 (1985) (counting "reduction in variety" as one of the "important social costs" of standardization); Katz & Shapiro, *supra* note 26, at 110 (noting that "the primary cost of standardization is loss of variety: consumers have fewer differentiated products to pick from").

[28] *See* Yoo, *supra* note 16, at 282-85; Timothy F. Bresnahan, *New Modes of Competition: Implications for the Future Structure of the Computer Industry*, *in* COMPETITION, INNOVATION AND THE MICROSOFT MONOPOLY: ANTITRUST IN THE DIGITAL MARKETPLACE 155, 200-03 (Jeffrey A. Eisenach & Thomas M. Lenard eds., 1999).

Consider TCP/IP, which remains the de facto standard set of protocols on the Internet.[29] As noted earlier, one of its distinguishing features is that it routes packets anonymously, routing them on a "first come, first served" basis without regard to the application with which they are associated. It also transmits packets on a "best efforts" basis without any guarantee of eventual success.

This approach to routing packets was uncontroversial when usage restrictions prohibited commercial use of the Internet and the network was used primarily by technology-oriented academics to share text-based communications that were not particularly sensitive to delays of up a second. There can be no question that the Internet's meteoric success invites treating the status quo as the relevant baseline and to place the burden on those who would deviate from it.[30] In recent years, however, the environment in which the Internet operates has changed radically.[31] The transformation of the Internet from a medium for academic communication into a mass market phenomenon has greatly complicated the decisions faced by network owners.[32] Indeed, the number of possible connections has expanded exponentially with network size.[33] The commercialization made possible by the privatization of the Internet has greatly increased the heterogeneity and variability of Internet usage. The shift from text-based applications, such as e-mail, to more bandwidth-intensive applications, such as webpage downloading and file transfers, has drastically increased the volume of network demand. The emergence of applications that are even more time-sensitive, such as VoIP and streaming video, has created demand for even

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[29] For a preliminary version of this argument, see Yoo, *supra* note 18, at 34-37.

[30] *See* Lemley & Lessig, *supra* note 5, at 930-32, 946; Wu, *supra* note 5, at 91.

[31] *See generally* Marjory S. Blumenthal & David D. Clark, *Rethinking the Design of the Internet: The End-to-End Arguments vs. the Brave New World*, 1 ACM TRANSACTIONS ON INTERNET TECH. 70 (2001) (surveying these changes).

[32] Yoo, *supra* note 18, at 35.

[33] *See* Daniel F. Spulber & Christopher S. Yoo, *On the Regulation of Networks as Complex Systems: A Graph Theory Approach*, 99 NW. U. L. REV. _, _ (2005).

greater reliability in throughput rates and is creating pressure for the deployment of "policy-based routers," which break from TCP/IP by assigning higher priority to packets associated with time-sensitive applications.[34] Furthermore, the unexpected interactions among network components that are the hallmark of complex systems can be quite sensitive to variability of demand.[35] Increases in the variability of network traffic can thus greatly impede network performance even if on average utilization of network capacity remains quite low.[36]

Similarly, the packet anonymity inherent in TCP/IP may be interfering with network owners' attempts to add security features designed to foster e-commerce or to protect against viruses and other hostile elements that are proliferating on the Internet. In addition, the Internet's shift away from academically oriented users who enjoyed a similar degree of institutional support and shared certain common institutional norms has increased the justification for moving responsibility for system maintenance and management away from end users and towards the network's core.[37]

These considerations make network management quite challenging. Although it is theoretically possible for network owners to respond to some of these demands by expanding bandwidth,[38] decisions about capacity expansion can be difficult when facing uncertainty about the magnitude, heterogeneity, and variability of the demand that will be placed on the network. Decisionmaking is complicated still further by the "lumpiness" of network capacity created by

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[34] Yoo, *supra* note 18, at 35-36.

[35] *See* Spulber & Yoo, *supra* note 33, at _.

[36] *See* Jeffery K. MacKie-Mason & Hal R. Varian, *Some FAQs About Usage-Based Pricing*, 28 COMPUTER NETWORKS & ISDN SYS. 257, 259 (1995).

[37] Yoo, *supra* note 18, at 35, 36-37.

[38] For a more detailed discussion of this argument, see *infra* notes 201-203 and accompanying text.

the indivisibility of fixed costs and the fact that increasing network capacity typically takes a considerable amount of time.[39]

In such an environment, it seems unrealistic to tie network owners' hands by limiting the number of ways that they can manage network demand. An example from the early days of the Internet illustrates the point nicely. In 1987, end users began increasingly to rely on personal computers instead of dumb terminals to connect to what was then the NSFNET. The increased functionality provided by shift to personal computers increased the intensity of the demands that end users were placing on the network. The resulting congestion caused terminal sessions to run unacceptably slow, and the fact that fixed cost investments cannot be made instantaneously created an inevitable lag in adding network capacity. This is precisely the type of technology- and demand-driven exogenous shock that makes network management so difficult. NSFNET's interim solution was to reprogram its routers to give terminal sessions higher priority than file transfer sessions until additional bandwidth could be added.[40] Indeed, such solutions need not be temporary: in a technologically dynamic world, one would expect that the relative costs of different types of solutions to change over time. Sometimes increases in bandwidth would be cheaper than reliance on network management techniques, and vice versa. It would thus be short sighted to tie network managers' hands by limiting their flexibility in their choice of network management solutions.

Network neutrality not only limits the ways that network owners can manage network capacity and reliability; it can also restrict the network's functionality.[41] This point is

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[39] *See* Spulber & Yoo, *supra* note 33, at _.

[40] *See* MacKie-Mason & Varian, *supra* note 36, at 259.

[41] The discussion that follows draws on the more extended analysis in Yoo, *supra* note 18, at 41-46.

demonstrated by a close analysis of the "end-to-end argument,"[42] which is often invoked as one of the analytical foundations for network neutrality.[43] The end-to-end argument asserts that the functions performed in the core of the network should be as simple and general as possible and that application-specific functionality should be confined to the computers operating at the edge of the network. The rationale underlying this argument is based in cost-benefit analysis. Increasing the functions performed in the core of the network can increase the functionality of the network, but only at the expense of reduced network performance. The problem is that all applications would have to bear the costs associated with the reduction performance even if they gain no compensating benefits. This tradeoff can be avoided if the core of the network performs only those functions that benefit almost all applications and if higher-level, application-specific functions are confined to the servers operating at the network's edge.

Although the end-to-end argument is frequently invoked in support of network neutrality, such claims appear to be misplaced.[44] The architects of the end-to-end argument candidly reject calls to elevate the end-to-end argument into a regulatory mandate as "too simplistic."[45] Correct application of the cost-benefit tradeoff that lies at the heart of the end-to-end argument requires "subtlety of analysis" and can be "quite complex."[46] Indeed, the architects of end-to-end acknowledge that circumstances exist under which application of end-to-end would do more

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[42] *See* J.H. Saltzer et al., *End-to-End Arguments in System Design*, 2 ACM TRANSACTIONS ON COMPUTER SYS. 277 (1984) (providing the seminal statement of end-to-end).

[43] *See, e.g.*, LESSIG, *supra* note 5, at 34-48, 156-61; Cooper, *supra* note 5, at 180-81; Lemley & Lessig, *supra* note 5, at 930-04; Solum & Chung, *supra* note 5, at 823-38.

[44] The ensuing discussion draws on the analysis first advanced in Yoo, *supra* note 18, at 41-46.

[45] *See* Saltzer et al., *supra* note 42, at 280; *accord id.* at 285 (calling end-to end a guideline rather than an absolute rule).

[46] *Id.* at 284. To take but one example, the desirability of end-to-end depends in part on the length of the file. If a system drops one message per one hundred messages sent, the probability that all packets will arrive correctly decreases exponentially as the length of the file increases (and thus the number of packets composing the file) increases. *Id.* at 280-81.

harm than good.[47] Properly construed, the end-to-end argument calls for case-by-case analysis rather than blanket regulatory prohibition.[48]

The reason is that end-to-end gives preference to innovations operating at the network's edge over innovations in the network's core. There is no reason to believe *a priori* that that preference will always prove to be beneficial. Two examples from the early days of the Internet illustrate the problem. The introduction of digital transmission technologies required the deployment of protocols that were not interoperable with the existing analog network and which required the introduction of computer processing into the core of the network to engage in "protocol conversion."[49] Similar problems were posed by the emergence of "voice messaging services," such as voice mail and advance calling. Voice messaging services appeared to function best when its capabilities were designed directly into the telephone switch.[50] Both developments were inconsistent with the regime of transparency and interoperability envisioned by the second *Computer Inquiry* as well as the simplistic reading of the end-to-end argument. After considerable regulatory wrangling, the FCC permitted both innovations to be deployed

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[47] *See* David P. Reed et al., *Commentaries on "Active Networking and End-to-End Arguments,"* 12 IEEE NETWORK 69, 69 n.1 (1998) ("There are some situations where applying an end-to-end argument is counterproductive.").

[48] *Id.* at 70; *accord* Samrat Bhattacharjee et al., *Active Networking and the End-to-End argument*, 1997 PROC. INT'L CONF. ON NETWORK PROTOCOLS 220, 221; Blumenthal & Clark, *supra* note 31, at 71, 80, 102 n.19; Dale N. Hatfield, *Preface* 8 COMMLAW CONSPECTUS 1, 3 (2000).

[49] *See* Amendment of Sections 64.702 of Commission's Rules and Regulations (Third Computer Inquiry), Report and Order, 104 F.C.C.2d 958, 979-80 ¶¶ 33-34 (1986) ("*Computer III Phase I Order*"), *vacated and remanded on other grounds sub nom.* California v. FCC, 905 F.2d 1217 (9th Cir. 1990); Petition for Wavier of Section 64.702 of the Commission's Rules, Memorandum Opinion and Order, 100 F.C.C.2d 1057 (1985); Petition of AT&T Co. for Limited and Temporary Waiver of 47 CFR Section 64.702 Regarding Its Provision of Unregulated Services Externally to the AT&T-C Network, Memorandum Opinion and Order, 59 Rad. Reg. (P&F) 505 (Common Carrier Bur. rel. Nov. 27, 1985) (FCC 84-561); Communications Protocols under Section 64.702 of the Commission's Rules and Regulations, Memorandum Opinion, Order, and Statement of Principles,, 95 F.C.C.2d 584, 594 ¶ 22, 595 ¶ 24 (1983).

[50] *Computer III Phase I Order*, 104 F.C.C.2d at 971-73 ¶¶ 17-19, 1109-14 ¶¶ 307-317.

notwithstanding their inconsistency with the commitment to interoperability.[51] Had the FCC adhered to its policy of preserving the ability of unaffiliated providers to obtain transparent access to the network, these innovations would not have been allowed to emerge.

Simply put, any choice of standardized protocol has the inevitable effect of favoring certain applications and disfavoring others, just as TCP/IP discriminates against applications that are time sensitive and end-to-end favors innovation at the edge over innovation in the core. As I will subsequently discuss in some detail, whether mandating network neutrality would be socially beneficial better is a complicated question that depends myriad considerations, including the heterogeneity of network uses, the variability in network traffic flows, end users' need for network reliability, and the extent to which technological change is reorganizing the natural boundaries between previously levels that were previously separated by a natural interface, notwithstanding the many claims to the contrary.[52] In short, the desirability of complete standardization and interoperability is an empirical question that cannot be answered *a priori*.

Indeed, the nonneutrality inherent in the choice of baseline principles becomes even clearer when the debates about network neutrality are viewed through the lens of the broader debates about jurisprudence. In essence, it is the same insight driving the critique of Herbert Wechsler's espousal of so-called "neutral principles"[53] as well as the failure of attempts to

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[51] *See* Implementation of the Non-Accounting Safeguards of Sections 271 and 272 of the Communications Act of 1934, 11 F.C.C.R. 21905, 21955-58 ¶¶ 100-105 (1996), *aff'd sub nom.* Bell Atl. Tel. Cos. v. FCC, 131 F.3d 1044 (D.C. Cir. 1997); *Computer III Phase I Order*, 104 F.C.C.2d at 1100-09, ¶ 289-306, 1112-14 ¶¶ 313-317; Petitions for Waiver of Section 64.702 of the Commission's Rules and Regulations to Provide Certain Types of Protocol Conversion with their Basic Network, Memorandum Opinion and Order, FCC 84-561 (F.C.C. rel. Nov. 28, 1984).
Petition for Waiver of Section 64.702 of the Commission's Rules, Memorandum Opinion and Order, 100 F.C.C.2d 1057 (1985)

[52] *See infra* Part III.B.

[53] *See* Herbert Wechsler, *Toward Neutral Principles of Constitutional Law*, 73 HARV. L. REV. 1 (1959).

advance a value-neutral conception of equality.[54] The choice of underlying baseline is an inherently normative judgment. In other words, although there is hope that principles can be neutrally applied once they have been established, the choice of foundation principles is inevitably never neutral.

It would thus be a mistake to regard network neutrality as inherently neutral,[55] as the engineering analog to a competitive market,[56] or as the best way to reflect technological humility,[57] as some network neutrality proponents have suggested. At best, it represents a casual empirical conjecture about how competition and innovation can best be promoted under current circumstances. At worst, it represents an attempt to use engineering principles to impart legitimacy to a naked normative commitment.[58] Like any baseline principle, it must be supported by substantial normative and empirical justification before being imposed as an absolute mandate. Until that occurs, the more technologically humble position would appear to be to permit network diversity through nonregulation, rather than mandating the use of any particular set of protocols.[59]

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[54] *See* Peter Westen, *The Empty Idea of Equality*, 95 HARV. L. REV. 537 (1982).

[55] *See, e.g.*, LESSIG, *supra* note 5, at 37, 156; Wu, *supra* note 5, at 91.

[56] *See* Gerald Faulhaber, Comments at Workshop on the Policy Implications of End-to-End (Stanford Law school Dec. 1, 2000), *available at* http://cyberlaw.stanford.edu/e2e/papers/Fal.pdf.

[57] *See* LESSIG, *supra* note 5, at 35, 39.

[58] Marjory Blumenthal observes:

> Although the embrace of engineering principles such as [end-to-end] appears to impart a legitimacy to certain kinds of advocacy, that advocacy reaches beyond the engineering to the ideology long associated with the Internet. It is an ideology that associates the Internet with freedoms of various kinds, autonomy for the users, and innovation.

Marjory S. Blumenthal, *End-to-End and Subsequent Paradigms*, 2002 L. REV. MICH. ST. U. DET. C.L. 709, 710 (2002).

[59] *See infra* Part IV.D.

2. Network Diversity and the Causes of Market Failure in the Last Mile

There is also considerable danger that mandating interconnection and standardizing interfaces would reinforce the very sources of market failure that network neutrality is designed to redress. The central concern of network neutrality is that DSL and cable modem providers are using their control over the last mile to restrict the ability of applications and content providers to reach end users. In this respect, it is motivated by the same policy concerns animating regulatory intervention into markets for CPE, long distance, and enhanced services. Two factors are typically cited as the reasons for the high degree of concentration in markets for last-mile services. The classic source of market concentration is the supply-side economies of scale that arise when entry requires the incurrence of significant, up-front investments. More recently, attention has also focused on the demand-side economies of scale created by "network economic effects," which arise when the value of the network is largely determined by the number of people connected to it. Both forces tend to give the large players a decisive advantage. In the most extreme case, they create natural monopolies.

Interestingly, my analysis reveals that network neutrality can have the perverse effect of reinforcing both of these considerations.[60] In other words, network neutrality can actually make matters worse by short circuiting one of the most promising ways that smaller players use to survive when confronted with unexhausted returns to scale. If true, this raises the specter that network neutrality could be the source of, rather than the solution to, market failure. It also suggests that policymakers should reject network neutrality in favor of network diversity.

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[60] For a preliminary sketch of this argument, see Yoo, *supra* note 18, at 60-65.

a. Supply-Side Causes of Market Failure: Large, Up-Front Capital Investments

How network neutrality can reinforce the supply-side forces that tend to concentrate markets for network services is best understood in terms of the classic source of scale economies: large, up-front, capital investments.[61] The presence of large, up-front capital investments gives the largest firms a decisive economic advantage. The ability to spread those investments over a larger customer base allows them to underprice their smaller competitors.[62] This allows them to capture a still larger share of the market, which in turn causes the cost advantage to widen still further. Eventually, the cost advantage enjoyed by the largest player widens to the point where it is able to drive all of its competitors out of the market.[63] In that case, even markets that are initially competitive are doomed to collapse into monopolies.

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[61] For more formal discussions of the impact of large, up-front costs on market concentration, see Yoo, *supra* note 16, at 226-27, 232-33; Yoo, *supra* note 25, at 1596-98. As the theory of contestable markets demonstrates, large, up-front investments are not economically problematic unless they are "sunk," i.e., unrecoverable upon exit. Firms that are able to recoup their up-front investments if forced to exit the market will not be deterred from entering in the first place. The ongoing prospect of potential entry can discipline price in much the same manner as direct competition. *See* WILLIAM J. BAUMOL ET AL., CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE 288-93 (rev. ed. 1987). Historically, investments in network infrastructure have not been transferable to other uses upon exit and thus were properly regarded as sunk. The emergence of spectrum-based transmission technologies has the potential of converting the investments needed to enter the local telephone market from sunk costs into fixed costs, a development that promises to revolutionize the telephone industry. *See* Christopher S. Yoo, The Death of the Telephone Model of Regulation (forthcoming 2005).

[62] For example, if a producer must incur $1,000 in up-front costs to enter the market, the up-front costs would contribute the following amounts toward unit (i.e., average) cost:

Quantity	Contribution to Unit Cost	Quantity	Contribution to Unit Cost
100	$10.00	600	$1.67
200	$5.00	700	$1.43
300	$3.33	800	$1.25
400	$2.50	900	$1.11
500	$2.00	1000	$1.00

If the impact from the amortization up-front costs is large compared to variable costs, average cost will tend to decline. Note that the impact tends to decay exponentially as the quantity over which the up-front costs are spread increases.

[63] When a single firm will be able to serve the entire market at a lower cost than could two producers, a market is said to be "subadditive." *See* BAUMOL ET AL., *supra* note 61, at 17-19.

Although the issue is not free from dispute,[64] the high up-front investments needed to establish of the wires and central offices needed to establish telephone service have historically been regarded as turning local telephony into a natural monopoly.[65]

Natural monopoly does not necessarily imply that entry will never occur. A smaller rival can try to enter by dropping its price so low that it is able to generate sufficient volume to leapfrog over the largest player and become the low-cost producer. Such gambits are difficult to execute, since pricing below cost requires incurring substantial economic losses, and the dominant player can match any such price cuts while incurring smaller economic losses.[66] It makes no difference from the standpoint of competition policy which player emerges. *Horizontal competition*, in which multiple producers vie with each other *within* a market, is unsustainable. The best that one could hope for is a form of *vertical competition*, in which a succession of monopolists competes *for* the market.[67]

What has been largely overlooked is how allowing networks to differentiate themselves can also alleviate the economies of scale associated with declining average costs.[68] It is the fact that price is the only dimension along which firms can compete that gives the largest players

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[64] *See* Yoo, *supra* note 61 (reviewing the dispute over whether local telephone service has historically been and currently remains a natural monopoly).

[65] *See, e.g.*, HUBER ET AL., *supra* note 6, at 2; JEAN-JACQUES LAFFONT & JEAN TIROLE, COMPETITION IN TELECOMMUNICATIONS 3 (2000).

[66] *See* WILLIAM W. SHARKEY, THE THEORY OF NATURAL MONOPOLY _ (1982). If anything, the supracompetitive rents may give the incumbent greater incentive and a greater ability to fight to protect its monopoly. *See* Bresnahan, *supra* note 28, at 163; Richard J. Gilbert & David M.B. Newbery, *Preemptive Patenting and the Persistence of Monopoly*, 72 AM. ECON. REV. 514 (1982); Stephen C. Salop et al., *A Bidding Analysis of Special Interest Regulation: Raising Rivals' Costs in a Rent Seeking Society*, *in* THE POLITICAL ECONOMY OF REGULATION: PRIVATE INTERESTS IN THE REGULATORY PROCESS 102 (Edward T. Rogowsky & Bruce Yandle eds., 1984).

[67] Indeed, some commentators have proposed using periodic franchise bidding to induce a form of vertical competition. The hope is that iterated franchise bidding would effectively make sunk cost investments more like recoupable fixed costs. *See* Harold Demsetz, *Why Regulate Utilities?*, 11 J.L. & ECON. 55, 63 (1968); Richard A. Posner, *The Appropriate Scope of Regulation in the Cable Television Industry*, 3 BELL J. ECON. 98, 113-16 (1972). These proposals have been criticized for requiring as extensive government intervention as conventional rate regulation. *See* Oliver E. Williamson, *Franchise Bidding for Natural Monopolies--in General and with Respect to CATV*, 7 BELL J. ECON. 73 (1976).

[68] *See* Yoo, *supra* note 16, at 248-49; Yoo, *supra* note 25, at 1603.

their decisive advantage. A different equilibrium can obtain if competitors are allowed to compete along dimensions other than price. If so, a smaller player may be able to survive notwithstanding lower sales volumes and higher unit costs (and thus higher prices) by tailoring its network towards services that a subsegment of the market values particularly highly. The greater value provided by the differentiation of the network allows a specialized provider to generate sufficient revenue to cover its up-front costs even though its volume is significantly smaller than that of the leading players.

How network diversity can mitigate the tendency towards natural monopoly caused by significant fixed costs is most easily understood through the theory of "monopolistic competition" pioneered by Edward Chamberlin.[69] Monopolistic competition adopts the same assumptions as the standard natural monopoly model except for one: it relaxes the assumption that competing products constitute perfect substitutes.

In the short run, firms engaged in monopolistic competition set price in exactly the same manner as monopolists. Should the resulting equilibrium price exceed average cost, the producer may earn short-run supracompetitive profits. Were products undifferentiated, this short-run equilibrium would be stable. Because competition would be restricted to a single dimension—price—further entry would be futile, since scale economies would allow the producer with the highest volume to seize the entire market.

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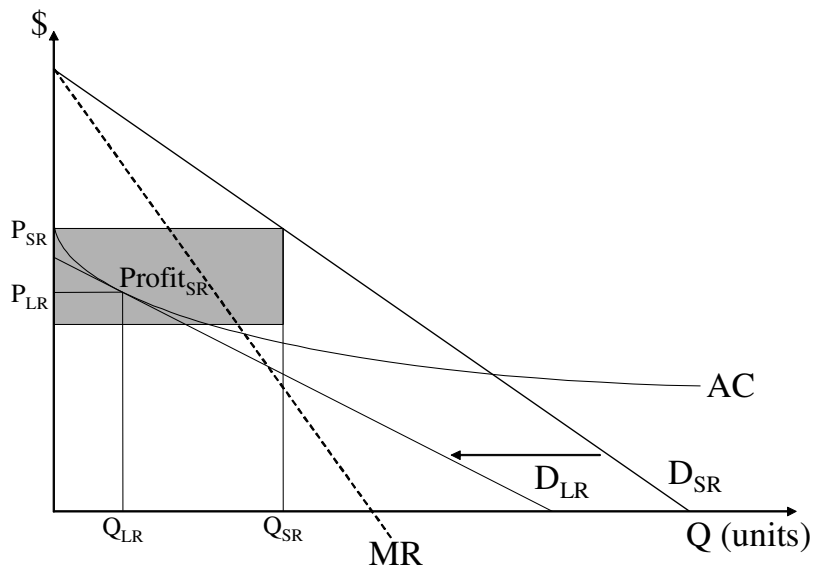
[69] EDWARD HASTINGS CHAMBERLIN, THE THEORY OF MONOPOLISTIC COMPETITION (8th ed. 1962). For a more complete discussion of the literature on monopolist competition, see Yoo, *supra* note 16, at 236-41, 246-48, 252-64; Yoo, *supra* note 25, at 1602-18.

Figure 1: Short-Run and Long-Run Equilibrium Under Monopolistic Competition



Allowing for the possibility of product differentiation causes the short-run equilibrium to become unstable. New producers can enter despite cost disadvantages by offering a product with attributes that differ from those offered by the incumbent. Entry by a new product causes the demand curve confronting existing products to shift inwards, as some customers shift their purchases to the new product. Under classic Chamberlinian monopolistic competition, entry by other variants continues until all of the supracompetitive returns have been dissipated, which occurs when the demand curve becomes tangent to the average cost curve.[70]

The result is an equilibrium in which multiple players co-exist despite the presence of unexhausted economies of scale. Even though entrants may operate at a cost disadvantage vis-à-

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[70] *See* CHAMBERLIN, *supra* note 69, at 194-95. The indivisibility of fixed costs may lead to an exception known as the "integer problem" in which *n* firms might earn small profits while *n* +1 firms would run losses. Any such profits should not be particularly significant if the economy is sufficiently "large," i.e., fixed costs are small relative to the size of the overall market,. *See* Yoo, *supra* note 16, at 239-40.

vis their larger rivals, they are able to survive by offering products designed to appeal to a smaller subsegment of the customer base. Conversely, preventing product differentiation would cause the market to devolve into a natural monopoly. Note also the key role played by short-run supracompetitive profits in this model. It is the presence of these profits that stimulates entry in the first place.

How could such differentiation occur in the context of broadband? One way is through protocol nonstandardization, such as through the adoption of a different routing protocol. As discussed at some length above, all protocols necessarily favor certain applications over others.[71] If discrete subgroups of end users place sufficiently different valuations on different types of applications, multiple networks will be able to coexist simply by targeting their networks towards the needs of different subgroups. If demand is sufficiently heterogeneous, the greater utility derived from allowing consumers to consumer services that they value more highly can more than compensate for any cost disadvantages resulting from the reduction in volume. Indeed, it is conceivable that network diversity might make it possible for three different last-mile networks to coexist: one optimized for traditional Internet applications such as e-mail and website access, another incorporating security features to facilitate e-commerce and to guard against viruses and other hostile aspects of Internet life, and a third that prioritizes packets in the manner needed to facilitate time-sensitive applications such as streaming media and VoIP.

Entering into exclusivity arrangements with respect to content represents another possible means for differentiating one's network.[72] One of the best current examples is the manner in which direct broadcast satellite (DBS) provider DirecTV is using an exclusive programming

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[71] *See supra* Part II.A.1.

[72] *See* Carl Shapiro, *Exclusivity in Network Industries*, 7 GEO. MASON L. REV. 673, 678 (1999) (nothing how exclusivity "can serve to differentiate products and networks").

package known as "NFL Sunday Ticket" to enhance its ability to compete with cable television. Indeed, it appears that exclusive access to NFL Sunday Ticket constitutes one of the major factors helping DBS emerge as a viable competitor to cable. If regulators were to view this exclusivity arrangement solely in static terms, they might be tempted to appease cable customers who have expressed frustration at their inability to purchase NFL Sunday Ticket by requiring that the package also be made available on both platforms. Doing so would reduce DBS's ability to compete by eliminating one of the primary inducements to shift from cable to DBS.[73] In other words, banning exclusivity would only serve to entrench the dominant position that local cable operators have historically enjoyed over multichannel video distribution that has long represented one of the central policy problems confronting the television industry.

Another example that should be familiar to practicing lawyers is Lexis's efforts to differentiate itself from Westlaw. In past years, Lexis attempted to distinguish its services by obtaining exclusive access to the full-text version of the *New York Times*.[74] More recent efforts include Lexis's by obtaining the exclusive rights to the Shepard's citator system.[75] This exclusivity arrangement is doubtless a source of some frustration to those who previously accessed Shepard's through Westlaw. That said, these exclusivity rights have helped Lexis to survive despite the significant advantages West enjoys by virtue of its role in publishing case reporters. It also has forced Westlaw to develop a new product called Key Cite to compete with Shepard's.

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[73] Interestingly, the current situation may be disputed by the NFL's decision to start its own cable network.

[74] *See* Marydee Ojala, *Online, Past, Present and Future: Repetition, Reinvention, or Reincarnation*, ONLINE, Jan. 11, 1997, at 63.

[75] *See* Robert C. Berring, *Legal Information and the Search for Cognitive Authority*, 88 CAL. L. REV. 1673, 1700 n.87 (2000); Tobe Liebert, *The New Generation of Citators*, EXPERIENCE, Fall 1999, at 28, 29.

These examples illustrate how using nonstandardized protocols and exclusive access to content—the precise practices that network neutrality would condemn—can in fact facilitate competition in the last mile. The implication is that public policy may well be better served if Congress and the FCC were to reject network neutrality in favor of a network diversity principle that would allow networks to differentiate their services in precisely this manner.

b. Demand-Side Causes of Market Failure: Network Economic Effects

The other force typically regarded as driving markets for telecommunications services towards concentration is *network economic effects*.[76] Network economic effects exist when the value of a network is determined by the number of people connected to it. The more people that are part of the network, the more valuable the network becomes.[77] Network economic effects are thus often described as creating demand-side economies of scale that tend to favor the largest networks. Because the value of telecommunications networks increase with the number of people attached to them, they have long been regarded as a paradigmatic case in which network economic effects arise.[78] If significant enough, these demand-side scale economies can give rise to a form of vertical competition that is quite similar to the one that can be created by supply-side

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[76] *See, e.g.*, Bresnahan, *supra* note 28, at 159-61; Jerry A. Hausman et al., *Residential Demand for Broadband Telecommunications and Consumer Access to Unaffiliated Internet Content Providers*, 18 YALE J. ON REG. 129, 161-64 (2001); Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985); Lemley & Lessig, *supra* note 5, at 942; Glen O. Robinson, *The "New" Communications Act: A Second Opinion*, 29 CONN. L. REV. 289, 323-25 (1996).

[77] One oft-cited example of network economic effects is the battle between Beta and VHS formats for video cassettes. Consumers choosing between the two formats cared less about each format's technical capabilities and more about which format would be adopted by other consumers. *See, e.g.*, W. Brian Arthur, *Positive Feedbacks in the Economy*, 262 SCI. AM. 92, 92 (1990). Interestingly, close analysis of the historical record contradicts that VHS's emergence as the prevailing format for videocassettes was the result of network economic effects. *See* STAN J. LIEBOWITZ & STEPHEN E. MARGOLIS, WINNERS, LOSERS AND MICROSOFT 120-27 (rev. ed. 2001).

[78] *See, e.g.*, Katz & Shapiro, *supra* note 76, at 424; Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479, 546 (1998); S. J. Liebowitz & Stephen E. Margolis, *Network Externality: An Uncommon Tragedy*, 8 J. ECON. PERSP. 133, 139-40 (1994).

economies of scale.[79] The presence of network economic effects means that an individual's decision to change networks creates costs and benefits for other network users that the person making the adoption decision does not capture. Many economists argue that the increase in the network's value to other users represents a *network externality* and that the inability of internalize all of the costs and benefits end users create by switching networks can lead to inefficient outcomes.[80]

The claim that that network economic effects can be a source of market failure is subject to a number of caveats and criticisms that I have addressed in detail in other work and will not address at length here.[81] The most important point for our purposes is the fact that differentiation can ameliorate the demand-side economies of scale created by network economic effects.[82] If the smaller network is optimized for particular functions that that a particular group of end users value particularly highly, those end users may be willing to join the smaller network

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[79] *See* Bresnahan, *supra* note 28, at 166-73.

[80] *See, e.g.*, Joseph Farrell & Garth Saloner, *Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation*, 76 AM. ECON. REV. 940, 941 (1986); Katz & Shapiro, *supra* note 26, at 100.

[81] *See* Yoo, *supra* note 16, at 278-85; Daniel F. Spulber & Christopher S. Yoo, *Access to Networks: Economic and Constitutional Connections*, 88 CORNELL L. REV. 885, 921-33 (2003). A few brief comments will suffice to demonstrate my concerns. First, arguments that network externalities can lead to market failure are misplaced in the context of physical networks that can be owned, such as wireline telecommunications networks. Even if individual users may not be in a position to internalize all of the costs and benefits created by their network adoption decisions, the network owner will almost certainly be in a position to do so.

Second, network externalities can plausibly cause market failure only when the relevant markets are highly concentrated. As I will subsequently demonstrate, once the relevant geographic markets are properly defined, this is not the case with respect to last-mile broadband providers. *See infra* notes 205-206 and accompanying text. Furthermore, dominant market shares are less significant in markets like broadband, which are undergoing explosive growth, when it is the network that will exist in the future, not the one that exists today, that determines consumer choice.

Third, network neutrality advocates overlook the fact that any decision to switch networks necessarily involves two offsetting externalities. On the one hand, a person adopting a new technology increases the value of the new network. The inability to capture this benefit may make network users too reluctant to switch networks. At the same time, any decision to switch network necessarily reduces the value of the old network. The fact that the end user switching networks does not bear these costs may make it too eager to switch. Whether end users switch networks too frequently or not frequently enough depends upon which of these two effects dominates. Indeed, the ambiguity of this balance is demonstrated dramatically by the contradictory positions taken by network neutrality proponents. Some have focused the concern that an existing standard may become inefficiently locked in. *See* Lemley, *supra* note 5, at 1045-54. Others have argued that network owners will be too eager to deviate from the existing standard. *See* LESSIG, *supra* note 5, at 48, 168, 171, 176; Solum & Chung, *supra* note 5, at 818-19.

[82] *See* Yoo, *supra* note 16, at 271-72.

notwithstanding the presence of network economic effects. The increase in value provided by network diversity can more than compensate from any reductions in value resulting from market size.[83] Conversely, network neutrality threatens to preempt this potential solution by narrowing the dimensions along which firms can compete. Mandating the use of standardized protocols threatens to commodify bandwidth and force providers to compete solely on the basis of price and network size, which would in turn reinforce the advantages enjoyed by the largest players. There is thus a real danger that network neutrality could short circuit one of the most sensible market-based solutions to the problems of market concentration.

This dynamic is illustrated nicely by a simple, formal model put forth by Joseph Farrell and Garth Saloner.[84] The model hypothesizes the existence of two groups of network users, one with a preference for standard *A* and another with a preference for standard *B*. To reflect the value of network economic effects, the model includes a variable to represent the increase in utility that would be generated if both groups adopted the same standard. To reflect the value of diversity, it includes variables to represent the utility that each group would derive if permitted to use its preferred standard rather than the other standard.

This simple model permits the comparison of three different states: standardization on group *A*'s preferred standard, standardization on group *B*'s preferred standard, and incompatibility. The utility parameters make it possible to determine whether each possible outcome represents a stable equilibrium or whether a group can increase its utility by deviating

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[83] *See* Katz & Shapiro, *supra* note 26, at 106 ("Customer heterogeneity and product differentiation tend to . . . sustain multiple networks. If the rival systems have distinct features sought by certain customers, two or more systems may be able to survive by catering to consumers who care more about product attributes than network size.").

[84] Joseph Farrell & Garth Saloner, *Standardization and Variety*, 20 ECON. LETTERS 71 (1986).

from the status quo. The model also allows for some basic welfare comparisons by determining which of these three possible outcomes provided the greatest utility.[85]

The results under this model depend on whether the value created by the network economic effects exceeds the value of product diversity or vice versa. For example, suppose that both groups begin by adopting the standard preferred by group *A*. Group *B* users will shift to their preferred standard depends only if the utility they would derive from adopting their preferred standard exceeds the decrease in utility from being part of a smaller network. Whether such a shift will be efficient depends on the magnitude of the utility group *B* derives from network diversity relative to the magnitude of returns to scale created by network economic effects. The same logic applies to the reciprocal case in which both groups begin by adopting the standard preferred by group *B*. In short, standardization is an equilibrium only if the utility created by network economic effects exceeds the utility created by network diversity for both groups.

Furthermore, the possible equilibria have different welfare characteristics. When incompatibility is optimal, it is necessarily a stable equilibrium. Standardization, on the other hand, may be a stable equilibrium even when it is not optimal. In this way, the model highlights the tradeoff inherent in the choice between standardization and variety. Indeed, it shows that circumstances exist under which there is too much standardization in equilibrium and where society would be better off if the networks were permitted to deviate from the standard.[86]

This model operationalizes the intuitions about how network diversity can overcome the demand-side economies of scale created by network economic effects. So long as consumer preferences are sufficiently heterogeneous, network diversity can mitigate whatever demand-side

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[85] *Id.* at 72.
[86] *Id.* at 73.

economies of scale exist by virtue of network economic effects in much the same manner as it mitigates the supply-side economies of scale created by fixed costs. In addition, to the extent that different groups of end users derive utility from adopting one standard over another, network diversity can increase welfare by allowing end users to consume network services that lie closer to their ideal preferences. The presence of multiple, incompatible networks may thus reflect nothing more than the network owners' attempts to satisfy the underlying heterogeneity in consumer demand.[87] Indeed, a more elaborate formal model compares competition between nonproprietary standards with competition between proprietary standards. When the competing standards are nonproprietary, the market invariably tends to collapse into a natural monopoly centered on the first mover. The equilibria are more indeterminate when the competing standards are proprietary, with some scenarios favoring the first mover and some scenarios favoring the second. Equally importantly, this model shows that competition between proprietary standards may be more likely to lead to the adoption of the socially optimal technology.[88]

3. Implementation Difficulties Caused by the Decommodification of Network Usage

While implementing this regime, the FCC discovered that mandating interconnection and standardizing interfaces were not sufficient by themselves to induce competition in complementary services. A recalcitrant local telephone company could effectively turn interconnection and standardization into a dead letter simply by providing affiliated providers of

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[87] *See* Katz & Shapiro, *supra* note 26, at 106 (noting that "market equilibrium with multiple incompatible products reflects the social value of variety"); S.J. Liebowitz & Stephen E. Margolis, *Should Technology Choice Be a Concern of Antitrust Policy?*, 9 HARV. J.L. & TECH. 283, 292 (1996) ("Where there are differences in preference regarding alternative standards, coexistence of standards is a likely outcome.").

[88] Michael L. Katz & Carl Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 J. POL. ECON. 822 (1986).

complementary services with interconnections that were cheaper or substantially better in quality than those provided to unaffiliated providers. As a result, when mandating interconnection the FCC has invariably found it necessary to prohibit local telephone companies from discriminating against unaffiliated providers of CPE,[89] long distance services,[90] and enhanced services.[91] The 1996 Act similarly forbids ILECs from discriminating in the rates charged for interconnection.[92] It also requires that the interconnections provided to unaffiliated complementary service providers be equal in quality to those the ILEC provides to its own affiliates.[93]

Even the addition of a nondiscrimination mandate proved insufficient to prevent local telephone companies from using their bottleneck position to harm competition. The local telephone companies could simply by charge everyone interconnection fees that were

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[89] The FCC initially prohibited AT&T from discriminating against independently provided CPE so long as it satisfied certain minimum standards of safety. *See* Proposals for New or Revised Classes of Interstate and Foreign Message Toll Telephone Service (MTS) and Wide Area Telephone Service (WATS), First Report and Order, 56 F.C.C.2d 593 (1975)), *aff'd sub nom.* N.C. Utils. Comm'n v. FCC, 552 F.2d 1036 (4th Cir. 1977), *repealed by* 2000 Biennial Regulatory Review of Part 68 of the Commission's Rules and Regulations, Report and Order, 15 F.C.C.R. 25944 (2000). The FCC also required the BOCs to file nondiscrimination compliance plans confirming their adherence to the nondiscrimination criteria negotiated with CPE vendor and customer groups. *See* Furnishing of Customer Premises Equipment and Enhanced Services by the Bell Operating Telephone Companies and the Independent Telephone Companies, Report and Order, 2 F.C.C.R. 143, 155 ¶¶ 80-84, *on reconsideration*, 3 F.C.C.R. 22, 26 ¶ 29 (1987), *aff'd sub nom.* Ill. Bell Tel. Co. v. FCC, 883 F.2d 104 (D.C. Cir. 1989).

[90] As part of its efforts to promote competition in long distance prior to divestiture, the FCC required that AT&T interconnect with all long distance carriers on a nondiscriminatory basis. *See* MTS and WATS Market Structure, Report and Third Supplemental Notice of Inquiry and Proposed Rulemaking, 81 F.C.C.2d 177 (1980); Lincoln Tel. & Tel. Co., 72 F.C.C.2d 724 (1979), *aff'd*, 659 F.2d 1092, 1094 (D.C. Cir. 1981). During the breakup of AT&T, the court guarded against any lingering BOC favoritism towards AT&T by ordering the BOCs to provide non-Bell long distance carriers with interconnections that are equal in type, quality and price to those offered to AT&T. *MFJ*, 552 F. Supp. at 165, 195-96, 227.

[91] The first and second *Computer Inquiries* concluded that the tariffing process was sufficient to ensure that interconnection was nondiscriminatory; at the same time, it explicitly reserved the enforcement authority to remedy any problems that may arise. *See* Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), Tentative Decision and Further Notice of Inquiry and Rulemaking, 72 F.C.C.2d 358, 435 ¶ 153 (1979) ("*Computer II Tentative Decision*"); Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities, Final Decision and Order, 28 F.C.C.2d 267, 282-83 ¶ 42 (1971) ("*Computer I Final Decision*"). The third *Computer Inquiry* similarly prohibited favoring particular customers and required local telephone companies to provide unaffiliated enhanced service providers with interconnections that were equal in quality to those offered to the services used by their affiliates. *See Computer III* Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services, Report and Order, 14 F.C.C.R. 4289, 4299 ¶ 13 (1999) ("*CEI Further Rulemaking*").

[92] 47 U.S.C. § 251(c)(2)(D); *see also* § 251(c)(3) (requiring that access to unbundled network elements be nondiscriminatory).

[93] *Id.* § 251(c)(2)(C).

prohibitively expensive. As noted earlier in the discussion on vertical integration, so long as the local telephone company remained free to charge monopoly prices, compelling access to the bottleneck facility would not yield any consumer benefits.[94] Charging the monopoly price would be nondiscriminatory, in that it would apply equally to affiliated and unaffiliated providers alike. Overcharging its affiliate would not affect the local telephone company's bottom line, however, since any losses incurred by the affiliate would be offset dollar-for-dollar by higher profits earned by the local telephone operations. As a result, regulations mandating interconnection with independent providers of CPE, long distance, and enhanced services have invariably been accompanied by direct regulation of the rates local telephone companies charge for interconnection.[95] This culminated in the provision of the 1996 Act specifically requiring that rates charged by ILECs for interconnection be just, reasonable[96] and "based on the cost . . . of providing the interconnection or network element."[97]

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[94] *See supra* Part I.B.

[95] For example, during the proceedings provided the initial regulatory basis for the emergence of competition in long distance, the FCC required that interconnection charges be reasonable and indicated its willingness to take additional steps to enforce this requirement. *See* Establishment of Polices and Procedures for Consideration of Application to Provide Specialized Common Carrier Services in the Domestic Public Point-to-Point Microwave Radio Service and Proposed Amendments to Pars 21, 43, and 61 of the Commission's Rules, First Report and Order, 29 F.C.C.2d 870, 940 ¶ 157 (1971), *aff'd sub. nom.* Wash. Utils & Transp. Comm'n v. FCC, 513 F.2d 1142 (9th Cir. 1975). The court overseeing the breakup of AT&T also implicitly recognized the problem when it required that access tariffs be based on cost. *See MFJ*, 552. F. Supp. at 233.

The first and second *Computer Inquiries* required that the rates charged for interconnection be reasonable and embodied in a tariff. *See Computer II Tentative Decision*, 72 F.C.C.2d at 435 ¶ 153; *Computer I Final Decision*, 28 F.C.C.2d at 269 ¶ 8, 269-70 ¶ 10. The third *Computer Inquiry* created an elaborate pricing scheme to ensure the reasonableness interconnection rates under CEI and ONA. Amendment of Sections 64.702 of Commission's Rules and Regulations (Third Computer Inquiry), Report and Order, 104 F.C.C.2d 958, 1046-53 ¶¶ 171-186 (1986) (CEI), *vacated and remanded sub nom.* California v. FCC, 905 F.2d 1217 (9th Cir. 1990); Filing and Review of Open Network Architecture Plans, Memorandum Opinion and Order, 4 F.C.C.R. 1 (1988) (ONA).

[96] *See* 47 U.S.C. § 251(c)(2)(D), *see also id.* § 251(c)(3) (requiring that rates for access to unbundled network elements (UNEs) be just and reasonable).

[97] *See id.* § 252(d)(1)(A)(i). The statute further required that cost be "determined without reference to a rate-of-return or other rate-based proceeding" *Id.* The FCC implemented this provision by basing rates on replacement cost, rather than historical cost. *See* Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, First Report and Order, 11 F.C.C.R. 15499, 15857-58 ¶¶ 701-707 (1996).

It is arguable that another corollary to interconnection exists: unbundling. *See* Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1340-43, 1356 (1998); Weiser, *supra* note 5, at 69-70. I regard unbundling as an extension of the approach to interconnection

The fact that the regime of interconnection and standardization favored by network neutrality proponents inevitably also requires mandating nondiscrimination and rate regulation dramatically lowers the likelihood that it will be successful. Not only are the regulatory tools needed to implement nondiscrimination and rate regulation problematic; they are particularly ineffective in a world in which communications are becoming increasingly decommodified.

a. The Limitations of the Regulatory Tools

Consider first the methodology for implementing rate regulation. The difficulties in determining the appropriate rate base and rate of return and the perverse incentives created by the existing approaches to rate regulation are well documented.[98] Ratemaking inevitably devolved into disputes over the proper measure of costs, the proper rate of return, and whether particular investments were "prudent." In addition, the classic ratemaking regime eliminates incentives to economize on costs and induces biases in the decision between capital and operating expenditures.[99] Although price caps were supposed to solve these problems, they have become bogged down in problems of their own.[100] Indeed, some empirical studies have suggested that price cap regulation may have discouraged last-mile entry.[101]

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that can be traced back to *Carterfone*, rather than a necessary component. In any event, the fact that the leading network neutrality proposals do not include an unbundling requirement obviates the need to address it further.

[98] *See, e.g.*, JAMES C. BONBRIGHT, PRINCIPLES OF PUBLIC UTILITY RATES 547-622 (2d ed. 1988); 1 ALFRED E. KAHN, THE ECONOMICS OF REGULATION 27-54 (1971); 2 *id.* at 47-94, 345-47; W. KIP VISCUSI ET AL., ECONOMICS OF REGULATION AND ANTITRUST 364-74 (3d ed. 2000); George J. Stigler & Claire Friedland, *What Can Regulators Regulate?: The Case of Electricity*, 5 J.L. & ECON. 1 (1962).

[99] *See* Harvey Averch & Leland Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV. 1052 (1962).

[100] *See* U.S. Tel. Ass'n v. FCC, 188 F.3d 521, 524-27 (D.C. Cir. 1999) (invaliding price cap scheme as arbitrary and capricious); Gregory J. Vogt, *Cap-Sized: How the Promise of the Price Cap Voyage to Competition Was Lost in a Sea of Good Intentions*, 51 FED. COMM. L.J. 349 (1999).

[101] *See* Jaison R. Abel, *Entry into Regulated Monopoly Markets: The Development of a Competitive Fringe in the Local Telephone Industry*, 45 J.L. & ECON. 289 (2002).

Ensuring that charges for interconnection are reasonable and nondiscriminatory is all the more difficult when the product being regulated is not a commodity and instead varies in terms of quality.[102] When product attributes are well defined and do not vary and the interface is relatively simple, interconnection and nondiscrimination can focus on availability and price. When products vary in terms of their quality and reliability and the interface is complex, policing interconnection and nondiscrimination becomes complicated by the myriad nonprice-related ways that network owners can provide discriminatory or substandard interconnection.[103]

The implication is that regulators who wish to mandate interconnection must do more than just regulate price. They must also create an elaborate number of secondary regulations to police quality of service and other nonprice terms. In short, it forces the regulatory authorities to regulate almost all aspects of the business relationship.[104] While quality regulation is intrusive and hard to administer under the best of circumstances, it becomes almost insuperable when quality varies widely. Indeed, as the diversity of uses to which users are putting the Internet has increased, quality and reliability often becomes a product feature rather than a minimum standard that all providers must meet.[105] This in turn makes it much more difficult to regulate quality of service without harming consumers.

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[102] *See* 1 KAHN, *supra* note 98, at 21-25; Eli M. Noam, *Towards an Integrated Communications Market: Overcoming the Local Monopoly of Cable Television*, 34 FED. COMM. L.J. 209, 219 (1982).

[103] *See* Verizon Communications, Inc. v. Law Offices of Curtis V. Trinko, L.L.P., 540 U.S. 398, 414 (2004) (recognizing that interconnections disputes are "highly technical" and multifaceted "given the incessant, complex, and costly changing interaction of competitive and incumbent LECs implementing the sharing and interconnection obligations"); *Iowa Utils. Bd.*, 525 U.S. at 429 (Breyer, J., concurring in part and dissenting in part) ("The more complex the facilities, the more central their relation to the firm's managerial responsibilities, the more extensive the sharing demanded, the more likely that [the administrative and social costs of compulsory sharing] will become serious.").

[104] *See* Yoo, *supra* note 16, at 244-46; *accord* LAFFONT & TIROLE, *supra* note 65, at 54-55; Gerald R. Faulhaber, *Policy-Induced Competition: The Telecommunications Experiments*, 15 INFO. ECON. & POL'Y 73, 81-82 (2003).

[105] *See, e.g.*, Christopher S. Yoo, *The Unfulfilled Promise of Korean Telecommunications Reform*, *in* LEGAL REFORM IN KOREA 169, 185-86 (Tom Ginsburg ed., 2004) (describing how network providers can compete on quality and reliability as well as price).

The FCC's experience in attempting to implement interconnection regimes attests to these difficulties. Consider the history of the FCC's attempt to foster competition in long distance. Early attempts to force AT&T to connect its local telephone systems with MCI and other independent long distance providers became embroiled in protracted disputes over the reasonableness of AT&T's rates.[106] The early antitrust cases against AT&T similarly involved extensive allegations that AT&T had discriminated against its competitors when providing interconnection.[107] Following the breakup of AT&T, attempts to implement the equal access requirement were marked by extended controversies over the speed and diligence with which the BOCs were deploying this standardized interface.[108]

The regulatory history of the Telecommunications Act of 1996 is no more comforting. The validity of the regime that the FCC developed to set interconnection rates under the 1996 Act, known as Total Element Long Run Incremental Cost (TELRIC), was not resolved until the Supreme Court's 2002 decision in *Verizon Communications, Inc. v. FCC*.[109] And the FCC's failure to established rules for defining the scope of the interconnection requirements that have passed legal muster has been a source of growing frustration for the courts.[110] In the meantime,

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[106] *See* HUBER ET AL., *supra* note 6, at 136-40.

[107] *See MCI*, 708 F.2d at 1131-32 (alleging that AT&T's interconnection procedures "utilized materials inadequate for the volume of business MCI was doing . . . and involved unduly complex and ineffective installation and maintenance procedures"); United States v. AT&T Co., 524 F. Supp. 1336, 1354-56 (D.D.C. 1981) (describing how AT&T used interconnection to discriminate against foreign CPE and long distance competitors); *cf.* United States v. AT&T, 552 F. Supp. 131, 188, 189-90 & n.238 (D.D.C. 1982) (noting the ease with which local telephone companies can design their networks to discourage competitors in long distance and information services), *aff'd mem. sub nom.* Maryland v. United States, 460 U.S. 1001 (1983).

[108] *See* United States v. W. Elec. Co., 569 F. Supp. 1057, 1062-69 (D.D.C. 1983); Investigation into the Quality of Equal Access Services, Memorandum Opinion and Order, 60 Rad. Reg. 2d (P&F) 417 (rel. May 23, 1986); MTS and WATS Market Structure, Phase III: Establishment of Physical Connections and Through Routes among Carriers, Report and Order, 100 F.C.C.2d 869 (1985); MTS and WATS Market Structure, Phase III: TDX Petition for Rulemaking, Memorandum Opinion and Order, 50 Fed. Reg. 4792 (F.C.C. Feb 1, 1985). *See generally* Faulhaber, *supra* note 104, at 81-83.

[109] 535 U.S. 467 (2002).

[110] *See* U.S. Telecom Ass'n v. FCC, 359 F.3d 554, 595 (D.C. Cir. 2004) (criticizing the FCC for its failure to develop lawful unbundling rules some eight years after the enactment of the Telecommunications Act of 1996). The

complaints have mounted about the slow pace with which ILECs are fulfilling interconnection requests.[111] Dispute over the quality of interconnection also provided the basis for the dispute that gave rise to the Supreme Court's *Trinko* decision.[112]

A similar pattern is seen in the regulatory experience with cable television.[113] Because local distribution of cable programming required the deployment of an extensive network of wires, it was regarded as a natural monopoly and subject to rate regulation. Subsequent empirical studies indicate that this effort was largely a failure. The evidence suggests that even though regulation caused nominal rates to drop, once quality-related characteristics—such as the total number and quality of channels offered—are taken into account, rate regulation appears to have caused quality-adjusted rates to increase. Deregulation, conversely, caused quality-adjusted rates to fall.[114] Congress's and the FCC's attempt to give unaffiliated programmers the right to carriage on cable systems by enacting the so-called "leased access" requirements similarly failed

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courts have repeatedly invalidated the FCC's attempts to implement the interconnection requirements of the 1996 Act. *See* AT&T Corp. v. Iowa Utils. Bd., 525 U.S. 366, 388-92 (1999); *U.S. Telecom Ass'n*, 359 F.3d at 564-77; United States Telecom Ass'n v. FCC, 290 F.3d 415 (D.C. Cir. 2002); GTE Serv. Corp. v. FCC, 205 F.3d 416, 422-24, 425-26 (D.C. Cir. 2000).

[111] The most recent example of these disputes is the controversy surrounding "hot cuts," which is the point when the line of a customer who is changing from one local telephone company to another is disconnected from the old company's switch and is reconnected to the new company's switch. Until the line is reconnected, the telephone line will be out of service. Hot cuts are necessarily performed by the ILEC. The FCC initially ruled that the incumbent LECs' ability to delay completing hot cuts represented a sufficient impairment to justify treating switching as a UNE, only to see that determination rejected on judicial review. *See* Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 F.C.C.R. 16978, 17263-78 ¶¶ 459-475 (2003), *rev'd sub nom.* U.S. Telecom Ass'n v. FCC, 359 F.3d 554, 568-71 (D.C. Cir. 2004). On remand, the FCC abandoned its position and ruled that the incumbent LECs' control of hot cuts was not sufficient to constitute impairment. *See* Unbundled Access to Network Elements, Order on Remand, 20 F.C.C.R. 2533, 2647-56 ¶¶ 210-221 (2005).

[112] *See* Verizon Communications, Inc. v. Law Office of Curtis V. Trinko, L.L.P., 540 U.S. 398, 403-05 (2004).

[113] For an overview, see Christopher S. Yoo, *Architectural Censorship and the FCC*, 78 S. CAL. L. REV. 669, 685-87 (2005).

[114] *See* THOMAS W. HAZLETT & MATTHEW L. SPITZER, PUBLIC POLICY TOWARD CABLE TELEVISION 2, 69-177, 208 (1997); Gregory S. Crawford, *The Impact of the 1992 Cable Act on Household Demand and Welfare*, 31 RAND J. ECON. 422, 444-45 (2000).

miserably amid accusations of excessive prices, poor quality of service, and bad faith.[115] In the absence of comprehensive quality regulation, such problems appear to be intractable.[116]

Finally, the tools needed to implement interconnection, standardization, nondiscrimination, and rate regulation do not function well in industries that are technologically dynamic. The existing approaches for regulating the reasonableness of interconnection rates are based on historical data. Furthermore, regulatory intervention requires that policymakers anticipate and plan for change. It is for these reasons that regulation is thought to place a premium on predictability and continuity.[117] Such an approach is nonsensical when the industry being regulated is undergoing rapid technological change. The problem is compounded all the more by the fact that improvements in technology can render an interconnection point that was once a natural boundary between market players obsolete.

Consider further what might happen after regulatory authorities compel interconnection. The forces of competition naturally cause firms operating on either side of the interconnection interface to try expand to into territory occupied by other firms. To the extent that network neutrality forecloses this from occurring, it can stifle an important source of competition.[118] Furthermore, more sweeping technological change that can cause the interface between two levels to shift or collapse. Requiring network owners to maintain standardized interfaces would have the inevitable effect of locking the existing interfaces into place despite these changes,

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[115] *See* S. REP. NO. 102-92, at 30- 32 (1991), *reprinted in* 1992 U.S.C.C.A.N. 1133, 1163-65; H.R. REP. NO. 102-628, at 39-40 (1992); *Time Warner*, 93 F.3d at 968-70; Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992: Rate Regulation, Order on Reconsideration of First Report and Order and Further Notice of Proposed Rulemaking, 11 F.C.C.R. 16933, 16937 ¶ 6 (1996); Donna M. Lampert, *Cable Television: Does Leased Access Mean Least Access?*, 44 FED. COMM. L.J. 245, 266-67 & n.122 (1992).

[116] *See* LAFFONT & TIROLE, *supra* note 65, at 54-55; Faulhaber, *supra* note 104, at 81-82.

[117] *See* 2 KAHN, *supra* note 98, at 11-14; Noam, *supra* note 102, at 219-20.

[118] *See* Bresnahan, *supra* note 28, at 166-68.

which would in turn have the unfortunate effect of inhibiting the emergence of new technologies that transcend the boundaries that previously separated different segments of the industry.[119]

The voice messaging services example discussed above provide one example of a technological change that reorganized the network's natural interfaces.[120] Another example is provided by the debate over "multiple ISP access" that represented the first round in the network neutrality debate.[121] What has been largely overlooked is that the move towards proprietary ISPs is largely the result of an exogenous change in the underlying technology. In the original narrowband world, in which end users connected to the Internet through analog transmissions sent over conventional telephone lines. As a result, the telephone company providing the end user connection did not need to maintain its own packet-switched network. It could simply connect the end users' calls to the offices maintained by the ISP in the same manner as a conventional voice call. This is no longer true, however, after the transition to broadband. Both DSL and cable modem providers must maintain equipment, either a DSL access multiplexer (DSLAM) or a cable modem termination system (CMTS), to separate the stream of data packets from other types of communications. In this environment, last-mile providers no longer serve as mere pass-throughs. Instead, they must necessarily maintain a data network to hold the packet-switched traffic once it has been segregated from the other traffic. They must also negotiate

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[119] I therefore disagree with proposals advocating regulation to keep existing interfaces open. *See* Cooper, *supra* note 5, at 180; Solum & Chung, *supra* note 5, at 849-54; Werbach, *supra* note 2, at 65-66; Whitt, *supra* note 17, at 653-54.

[120] *See supra* note 50 and accompanying text.

[121] This debate was originally framed in terms of "open access" to cable modem systems. *See* Lemley & Lessig, *supra* note 5. The FCC has since changed the terminology to "multiple ISP access." Inquiry Concerning High-Speed Access to Internet over Cable & Other Facilities, Declaratory Ruling and Notice of Proposed Rulemaking, 17 F.C.C.R. 4798, 4839 ¶ 72 (2002).

some type of interconnection agreement with another carrier so that this traffic can be routed to its final destination.[122]

Given that they are already performing many of the functions traditionally performed by ISPs, the logical next step was for last-mile broadband providers to negotiate their own agreements with backbone providers. The efficiency of this arrangement is eloquently demonstrated by the experience under the AOL-Time Warner merger, which remains the only instance in which multiple ISP access has been mandated. Contrary to the original expectations of the FTC, the unaffiliated ISPs that have obtained access to Time Warner's cable modem systems have not created their own packet networks within Time Warner's cable headends. Instead, traffic bound for these unaffiliated ISPs exits the headend via Time Warner's backbone and is handed off to the unaffiliated ISP at an external location.[123] The fact that these unaffiliated ISPs have found it more economical to share Time Warner's existing ISP facilities rather than build their own strongly suggests that integrating ISP and last-mile operations does in fact yield real efficiencies. More importantly for our purposes, it demonstrates how technological change can collapse a natural interface between what were once two different levels of production.

In short, the complexity of the interface, the increasing heterogeneity of end users' demands, and the pace of technological change are reducing the utility of the regulatory tools upon which policymakers have traditionally relied to manage interconnection, nondiscrimination, rate regulation, and standardization. It is particularly telling that two

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[122] *See* Yoo, *supra* note 18, at 33-34.
[123] *See id.* at 55-56.

distinguished scholars of network industries not particularly noted for deregulatory views have suggested that access regimes have proven so unworkable that they should be abandoned.[124]

b. Content and the Need for Editorial Discretion

The effectiveness of the existing regulatory tools is further limited by the fact that they were developed with respect to the person-to-person communications associated with common carriage; as a result, they are not well suited to regulating networks used for conveying media content.[125] When content is involved, policymakers have long recognized the importance of giving the conduit editorial control over the information being conveyed.

A moment's reflection will confirm the critical role played by editorial discretion when content is involved. For example, consider what would occur if freelance writers were given a right of nondiscriminatory access to a prominent news magazine, such as *Time* or *Newsweek*. Doing so would deprive readers of any guarantee that the articles contained in any issue would avoid redundancy and cover all of the leading stories. It would also eliminate the magazine's ability to exercise quality control. Modern Internet users can also attest to the benefits of having filters to help sift through the avalanche of content available on the World Wide Web.

Congress recognized the key role that editorial discretion plays when content is being transmitted when enacting the seminal statutes with respect to broadcasting. During consideration of both the Radio Act of 1927 and the Communications Act of 1934, Congress

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[124] *See* Paul L. Joskow & Roger G. Noll, *The Bell Doctrine: Applications in Telecommunications, Electricity, and Other Network Industries*, 51 STAN. L. REV. 1249 (1999).

[125] *See* Howard A. Shelanski, *The Bending Line Between Conventional "Broadcast" and Wireless "Carriage"*, 97 COLUM. L. REV. 1048, 1050-62 (1997) (tracing the origins of the regulatory distinction between broadcasting and common carriage).

considered and rejected proposals to provide a limited right of nondiscriminatory access.[126] Instead, it included a provision prohibiting regulating broadcasters as common carriers.[127] In so doing, "Congress specifically dealt with—and firmly rejected—the argument that the broadcast facilities should be open on a nonselective basis."[128] Since then, the Supreme Court has repeatedly reiterated the importance of preserving broadcasters' editorial discretion.[129] Exercise of such discretion inevitably privileges some communications over others, but as a plurality of the Supreme Court has acknowledged, "For better or worse, editing is what editors are for; and editing is selection and choice of material."[130]

The regulation of cable television followed a similar pattern. In accordance with early calls for regulating cable as a common carrier,[131] the FCC initially embraced turning cable into a common carrier with respect to at least some of its channels,[132] only to see the Supreme Court

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[126] *See* FCC v. Midwest Video Corp, 440 U.S. 689, 702-05 (1979) (reviewing the legislative history of the Radio Act of 1927 and the Communications Act of 1934 with respect to whether they should be treated as common carriers); Columbia Broad. Sys., Inc. v. Democratic Nat'l Comm., 412 U.S. 94, 105-10 (1973) (plurality opinion) (same); Lili Levi, *The FCC, Indecency, and Anti-Abortion Political Advertising*, 3 VILL. SPORTS & ENT. L.J. 85, 140-48 (1996) (same).

[127] Communications Act of 1934, ch. 652, § 3(h), 48 Stat. 1062, 1066 (codified as amended at 47 U.S.C. § 153(10)); Radio Act of 1927, ch. 169, § 17, 44 Stat. 1162, 1169-70 (superseded by the Communications Act of 1934).

[128] *See* Columbia Broad. Sys., Inc. v. Democratic Nat'l Comm., 412 U.S. 94, 105 (1973) (plurality opinion).

[129] *See* Ark. Educ. Television Comm'n v. Forbes, 523 U.S. 666, 673-75 (1998); FCC v. League of Women Voters of Cal., Inc. 468 U.S. 364, 378-80 (1984); *Columbia Broad. Sys.*, 412 U.S. at 105 (plurality opinion); *id.* at 140 n.9 (Stewart, J., concurring); *id.* at 151-53 & n.2 (Douglas, J., concurring in the judgment).

[130] *Columbia Broad. Sys*., 412 U.S. at 124 (plurality opinion).

[131] *See, e.g.*, Memorandum from the General Counsel, Chief of the Common Carrier Bureau, Chief Engineer; and Chief of the Broadcast Bureau to the FCC on the Status of So-Called Community Antenna Television Systems under the Communication Act of 1934 as Amended (Mar. 25, 1952), *reprinted in Television Inquiry, Review of Allocation Problems, Special Problems of TV Service to Small Communities: Hearings on S. 376 Before the Senate Comm. on Interstate and Foreign Commerce*, 85th Cong. 3490 (1958); CABINET COMM. ON CABLE COMMUNICATION, CABLE: REPORT TO THE PRESIDENT 29-30 (1974); W.K. JONES, REGULATION OF CABLE TV BY THE STATE OF NEW YORK, REPORT TO THE COMMISSION 199-201 (1970); RESEARCH AND POLICY COMMITTEE OF THE COMMITTEE ON ECONOMIC DEVELOPMENT, BROADCASTING AND CABLE TELEVISION 70 (1975); SLOAN COMMISSION ON CABLE COMMUNICATIONS, ON THE CABLE: THE TELEVISION OF ABUNDANCE 142 (1971); ITHIEL DE SOLA POOL, TECHNOLOGIES OF FREEDOM 168 (1983); Bruce M. Owen, *Public Policy and Emerging Technology in the Media*, 18 PUB. POL'Y 539, 546, 551 (1970).

[132] *See* Amendment of Part 76 of the Commission's Rules and Regulations Concerning the Cable Television Channel Capacity and Access Channel Requirements of Section 76.251, Report and Order, 59 F.C.C.2d 294 (1976);

strike down that regulation as inconsistent with the policy embodied in the Communications Act of 1934 in favor of preserving editorial control over content.[133] In the process, the Court emphasized "Congress' stern disapproval . . . of negation of the editorial discretion otherwise enjoyed by broadcasters and cable operators alike."[134] In later cases, the Court repeatedly reemphasized the importance of protecting cable operators' editorial discretion.[135] Indeed, when Congress and the FCC attempted to bar telephone companies from entering the cable television industry, courts struck the ban down for placing an impermissible burden on the telephone companies' First Amendment rights.[136] Congress would later change course and sanction limiting cable operators' editorial control over a portion of its channel capacity when it required cable companies to provide leased access to unaffiliated programmers.[137] Leased access effectively turned cable operators into common carriers with respect to a portion of their networks.[138] A majority of the Court recognized that leased access represented a substantial

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Amendment of Part 74, Subpart K, of the Commission's Rules and Regulations Relative to Community Antenna Television Systems, Notice of Proposed Rulemaking and Notice of Inquiry, 15 F.C.C.2d 417, 422 ¶ 26 (1968).

[133] *See* FCC v. Midwest Video Corp, 440 U.S. 689, 699-707 (1979).

[134] *Id.* at 708.

[135] *See* Turner Broad. Sys, Inc. v. FCC, 512 U.S. 622, 636 (1994); City of Los Angeles v. Preferred Communications, Inc. 476 U.S. 488, 494 (1986); *cf.* Leathers v. Medlock, 499 U.S. 439, 444 (1984) ("Cable television provides to its subscribers news, information, and entertainment.").

[136] *See* US West, Inc. v. United States, 48 F.3d 1092 (9th Cir. 1995), *vacated and remanded*, 516 U.S. 1155 (1996); Chesapeake & Potomac Tel. Co. v. United States, 42 F.3d 181 (4th Cir. 1994), *vacated*, 516 U.S. 415 (1996); S. New England Tel. Co. v. United States, 886 F. Supp. 211 (D. Conn. 1995); BellSouth Corp. v. United States, 868 F. Supp. 1335 (N.D. Ala. 1994); Ameritech Corp. v. United States, 867 F. Supp. 721 (N.D. Ill. 1994); NYNEX Corp. v. United States, Civ. 93-323-P-C, 1994 WL 779761 (D. Me. Dec. 8, 1994). The issue had already been briefed and argued before the Supreme Court when it was rendered moot by a provision of the Telecommunications Act of 1996 eliminating the rule. *See* Telecommunications Act of 1996, Pub. L. No. 104-104, § 302(b)(1), 110 Stat. 56, 124 (repealing 47 U.S.C. § 533(b) (1994)).

[137] Cable Communications Policy Act of 1984, Pub. L. No. 98- 549, sec. 2, § 611, 98 Stat. 2779, 2782 (codified as amended at 47 U.S.C. § 532).

[138] *See, e.g.*, Denver Area Educ. Telecomms. Consortium, Inc. v. FCC, 518 U.S. 727, 796 (1996) (Kennedy, J., concurring in part, concurring in the judgment in part, and dissenting in part); *Midwest Video*, 440 U.S. at 701.

intrusion into the cable operators' editorial discretion.[139] And as noted earlier, implementation of regulations designed to guarantee access to content have proven quite cumbersome.[140]

The fact that telecommunications networks now serve as the conduit for media content and not just person-to-person communications greatly expands the justification for allowing them to exercise editorial control over the information they convey. In the process, it further weakens the case in favor of network neutrality.

B. Network Diversity and Dynamic Efficiency

Not only would network neutrality threaten to reduce static efficiency; it also poses a serious risk to dynamic efficiency. I draw on the literature exploring the impact that mandating interconnection have had on dynamic efficiency in the context of antitrust,[141] UNE access,[142] and multiple ISP access to cable modem systems[143] to show how the regime of mandatory interconnection and standardization can discourage entry into the last mile. As a result, network neutrality would appear to conflict directly with the goals of dynamic efficiency and would instead be the source of, rather than the solution to, market failure. Conversely, embracing a network diversity principle promises to promote competition in the last mile and thereby alleviate the central issue confronting broadband policy.

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[139] *See Denver Area Educ. Telecomms. Consortium*, 518 U.S. at 761 (plurality opinion); *id.* at 796 (Kennedy, J., concurring in part, concurring in the judgment in part, and dissenting in part).

[140] *See supra* note 115 and accompanying text.

[141] *See* 3A AREEDA & HOVENKAMP, *supra* note 13, ¶ 771b, at 174-76, ¶ 773a, at 201; Glen O. Robinson, *On Refusing to Deal with Rivals*, 87 CORNELL L. REV. 1177, 1190-94, 1209-12 (2002).

[142] *See* Jerry A. Hausman & J. Gregory Sidak, *A Consumer-Welfare Approach to the Mandatory Unbundling of Telecommunications Networks*, 109 YALE L.J. 417, 457-61 (1999); Thomas Jorde et al., *Innovation, Investment and Unbundling*, 17 YALE J. ON REG. 1 (2000).

[143] *See* Yoo, *supra* note 16, at 246-47, 268-69; Robert W. Crandall & Jerry A. Hausman, *Competition in U.S. Telecommunications Service: Effects of the 1996 Legislation*, *in* DEREGULATION OF NETWORK INDUSTRIES: WHAT'S NEXT? 73, _ (Sam Peltzman & Clifford Winston eds., 2000); Lopatka & Page, *supra* note 5.

The reasons why mandating interconnection is potentially problematic from the standpoint of dynamic efficiency can best be explained in terms of the hypothetical example based on *Terminal Railroad* discussed above. Suppose that access to the bridge was not compelled and that rates were not regulated. The supracompetitive returns earned by the owner of the existing bridge would signal that the market was in disequilibrium and would provide the incentive for anyone interested in building another bridge to do so. In addition, the railroads that were unable to obtain access to the existing bridge would be clamoring for an alternative. They would thus represent the natural strategic partners for any would-be builder of another bridge.

The situation changes dramatically if access to the bridge is compelled. Granting access lets the customers who would otherwise stand ready to invest in a new bridge off the hook, rescuing them from having to undertake the risks associated with investing in alternative capacity. At the same time, the would-be bridge entrant also finds entry less attractive. Knowing that it would be forced to share the new bridge with all comers at regulated prices weakens the incentives for it to construct another bridge. Indeed, rate regulation can deprive the new entrant of the returns it needs to survive.[144] Granting access thus threatens to frustrate the appearance of alternative bridge capacity that remains the central goal of competition policy in this situation. In so doing, it threatens to entrench the existing bridge monopolist into place.

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[144] The FCC's experience with a broadcast regulation known as the financial interest and syndication rules ("finsyn") illustrates how imposing rate regulation discourages investment in alternative networks. Finsyn attempted to curb the dominant positions held by ABC, CBS, and NBC by limiting the extent to which networks could take ownership stakes in the programming that they televised. Reducing the profitability of networking had the inevitable consequence of deterring entry by new networks. This is confirmed by the fact that the Fox network was unable to enter successfully until it obtained a waiver from finsyn. *See* Fox Broadcasting Co. Request for Temporary Waiver of Certain Provisions of 47 C.F.R. § 73.658, Memorandum Opinion and Order, 5 F.C.C.R. 3211 (1990); Jim Chen, *The Last Picture Show (On the Twilight of Federal Mass Communications Regulation)*, 80 MINN. L. REV. 1415, 1457 (1996). The courts eventually struck down finsyn as arbitrary and capricious. *See* Schurz Communications, Inc. v. FCC, 982 F.2d 1043 (7th Cir. 1992); Capital Cities/ABC, Inc. v. FCC, 29 F.3d 309 (7th Cir. 1994). The rules were eliminated shortly thereafter. *See* Review of the Syndication and Financial Interest Rules, Sections 73.659-73.663 of the Commission's Rules, Report and Order, 10 F.C.C.R. 12165 (1995).

The same dynamics can be illustrated by considering a hypothetical town in which there is a single department store. Much like a broadband network, a department store is simply a conduit for goods and services produced by others. Upon reflection, it becomes clear that imposing a rule requiring all department stores to make space available to all manufacturers on a reasonable and nondiscriminatory basis would discourage entry by a second department store. Although entrants often find it profitable to enter into competition with a monopolist earning monopoly rents, this incentive is dampened if rate regulation precludes any such rents from being earned. In addition, the frustrated manufacturers who would otherwise be eager to support construction of a second department store would also lose their enthusiasm for the project. Furthermore, compelling access to the department store shelves would also limit the ability of stores to control whether an appropriate mix of goods was represented or to assure that the goods satisfied certain quality standards. Preventing consolidation with manufacturers can preclude the achievement of real efficiencies by using tighter integration through inventory management and electronic data interchange to reduce costs. Department stores often try to promote their popularity by entering into exclusivity arrangements with key manufacturers, sometimes even establishing boutiques in portions of their stores. Requiring department stores to provide nondiscriminatory access to all manufacturers would thus prevent them from pursuing one of the best entry strategies available to new entrants.[145] Indeed, this type of strategic partnership between manufacturers and retailers appears to have played a critical role in promoting the growth of the cable industry.[146] This mechanism for promoting entry would be frustrated by regulations mandating open access to the retail platform.

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[145] *See* Shapiro, *supra* note 72, at 678 (noting how exclusivity can "to encourage investment in . . . networks").

[146] *See* OWEN & ROSSTON, *supra* note 5, at 3.

This underscores the extent to which mandating access to a bottleneck facility represents surrender to the monopoly. The normal response of competition policy when it encounters monopolies is to break them up. Mandating interconnection deviates from this tradition by addressing the symptoms of monopoly power without treating its causes. Instead of breaking up the monopoly, access leaves it in place and only requires that it be shared. Furthermore, approaches that break up monopolies, which necessarily have built-in exit strategies embedded within them. Mandated sharing of a bottleneck facility, in contrast, implicitly envisions that the monopoly, and thus the regime of regulatory oversight, will persist indefinitely.

Such an approach might be appropriate if entry by a competitor to the bottleneck were impossible, as was arguably the case when the FCC and the courts relied on interconnection and standardization to promote competition in CPE, long distance, and enhanced services. In that event, any dampening of incentives to invest in alternative network capacity would be beside the point, because such entry would be impossible. The situation is quite different when entry by alternative network capacity is feasible. In that case, the reduction in investment incentives may short-circuit the natural process by which markets diffuse bottlenecks. In the worst case scenario, mandating interconnection can itself have the perverse effect of entrenching the existing monopolies into place. Indeed, empirical studies indicate that the provisions mandating access to local telephone facilities have dampened investment incentives in precisely this manner.[147] Additional empirical studies indicate that unbundling of broadband facilities has had a similar adverse effect.[148]

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[147] *See* Jerry A. Hausman & J. Gregory Sidak, *Did Mandatory Unbundling Achieve Its Purpose? Empirical Evidence form Five Countries*, 1 J. COMPETITION L. & ECON. 173 (2005); Augustin J. Ros & Karl McDermott, *Are Residential Local Exchange Prices Too Low?*, *in* EXPANDING COMPETITION IN REGULATED INDUSTRIES 149 (Michael A. Crew ed., 2000); James Zolnierek et al., *An Empirical Examination of Entry Patterns in Local Telephone Markets*, 19 J. REG. ECON. 143 (2001); Robert W. Crandall et al., Do Unbundling Policies Discourage

By now, the implications for broadband policy should be manifest. The central focus in deciding whether to mandate network neutrality should be on its effect on stimulating competition in the last mile. If subject to mandatory interconnection, standardization, nondiscrimination, and rate regulation, any would-be last-mile entrant would realize that even if it were successful, it would be forced to make its platform available to all content and application providers under rates that would limit it to ordinary returns. In addition, the would-be builder would not find a group of content and applications providers clamoring for additional access, since mandating interconnection to the existing platform would rescue them from having to invest in alternative distribution arrangements. In the process, network neutrality risks dampening incentives to invest in new last-mile technologies to the extent that it cements the existing last-mile oligopoly into place. Although such a policy might be justifiable if entry by alternative network capacity were impossible, it is indefensible when 3G, WiFi, powerline, and other technologies are actively searching for capital to support their deployment and when what represents the state of the art in transmission is undergoing rapid technological change. At best, the inevitable lag in enacting new regulations will cause economic losses. At worst, by destroying incentives to build new technologies, regulation might itself be the cause, rather than the consequence, of market failure. Under these circumstances, mandating network neutrality would appear to pose a serious threat to dynamic efficiency. Embracing network diversity as a

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CLEC Facilities-Based Investment? (unpublished manuscript), *available at* http://papers.ssrn.com/abstract_id=387421.

[148] *See* Debra J. Aron & David E. Burnstein, *Broadband Adoption in the United States: An Empirical Analysis*, *in* DOWN TO THE WIRE: STUDIES IN THE DIFFUSION AND REGULATION OF TELECOMMUNICATIONS TECHNOLOGIES (Allan Shampien ed., 2003); Martha Garcia-Murillo & David Gabel, *International Broadband Deployment: The Impact of Unbundling*, _ COMM. & STRATEGIES _ (2005); Bronwyn Howell, *Infrastructure Regulation and the Demand for Broadband Services: Evidence for OECD Countries*, 47 COMM. & STRATEGIES 33 (2002); Yoo, *supra* note 105, at 195-96; Jung Hyun Kim et al., Broadband Uptake in OECD Countries: Policy Lessons form Comparative Statistics Analysis (unpublished manuscript presented at the 31st Annual Telecommunications and Policy Research Conference, Sept. 20, 2003), *available at* http://tprc.org/papers/2003/203/Kim-Bauer-Wildman.pdf.

policy, in contrast, would provide substantial incentives to support the build out of new last-mile facilities.

C. Noneconomic Justifications for Network Neutrality

In addition to the economic rationales discussed above, some commentators have invoked noneconomic rationales to justify network neutrality.[149] Drawing inspiration from the Supreme Court's admonition that "it has long been a basic tenet of national communications policy that the widest possible dissemination of information from diverse and antagonistic sources is essential to the welfare of the public,"[150] some of these scholars argue that the central rationale is that to promote political discourse, even if it might be more economical to limit access.[151] Indeed, there is a long legacy for regulating network industries in order to protect small producers that dates back to the initial regulation of the railroads in the late 19th Century.[152] Following the landmark Supreme Court decision in *Munn v. Illinois*,[153] other scholars justify the

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[149] *See, e.g.*, Lance Liebman, *Foreword: The New Estates*, 97 COLUM. L. REV. 819, 833 (1997) ("Should the populist ancestry of the Sherman Act be revisited to contend with telecommunications giants?").

[150] *Turner I*, 512 U.S., at 663-64 (internal quotation marks omitted) (quoting United States v. Midwest Video Corp., 406 U.S. 649, 668 n. 27 (1972) (plurality opinion) (quoting Associated Press v. United States, 326 U.S. 1, 20 (1945))); *accord Turner II*, 520 U.S., at 192.

[151] *See* Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J., 561, 565-68, 578 (2000); Cooper, *supra* note 5, at 191-99; *cf. Turner II*, 520 U.S. at 227 (Breyer, J., concurring) (noting that the purpose of the policy of promoting "the widest possible dissemination of information from diverse and antagonistic sources" is "to facilitate the public discussion and informed deliberation, which, as Justice Brandeis pointed out many years ago, democratic government presupposes").

[152] *See* Herbert Hovenkamp, *Regulatory Conflict in the Gilded Age: Federalism and the Railroad Problem*, 97 YALE L.J. 1017, 1044-54 (1988); Robert L. Rabin, *Federal Regulation in Historical Perspective*, 38 STAN. L. REV. 1189, 1197-1208, 1219-20 (1986).

[153] 94 U.S. 113, 126 (1876); *accord* Brass v. Stoeser, 153 U.S. 391 (1894) ("[I]t is the public nature and not the monopolistic character which justifies control of a business as a public utility."); Budd v. New York, 143 U.S. 517, 532 (1892) ("[T]he right of the legislature to regulate the charges for services in connection with the use of property did not depend in every case upon the question whether there was a legal monopoly.").

imposition of interconnection, standardization, nondiscrimination, and rate regulation requirements because telecommunications networks are "affected with a public interest."[154]

There is noting incoherent about imposing regulation to promote values other than economic welfare. The problems with this approach are more practical than conceptual.[155] Unless protecting the widest possible diversity of sources is a virtue in and of itself that trumps all other values, such a theory must provide a basis for quantifying the noneconomic benefits and for determining whether those benefits justify the economic costs. Our nation's experience with antitrust law has revealed that network industries are often subject to economies of scale, including, as discussed above, telecommunications networks.[156] This means that forcing communications enterprises to remain small can exact a price. At some point, the marginal benefit associated with protecting another small voice will fall short of the marginal costs of preventing network firms from realizing the available economies of scale.

The problem is that arguments in favor of protecting small customers and speakers have historically failed to reflect any sense of optimality and have instead regarded additional diversity as an absolute good.[157] But the presence of scale economies underscores the basic fact that promoting diversity exacts a cost that must be traded off against the benefits of additional producers. As the D.C. Circuit has noted in a related context, "Everything else being equal, each additional 'voice' may be said to enhance diversity. . . . But at some point, surely, the marginal value of such an increment in 'diversity' would not qualify as an 'important' governmental

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[154] *See* Speta, *supra* note 5, at 261 & n.185, 270-71.

[155] For a more general critique of attempts to build theories of media regulation on democratic principles, see Christopher S. Yoo, *The Rise and Demise of the Technology-Specific Approach to the First Amendment*, 91 GEO. L.J. 245, 306-46 (2003).

[156] *See supra* note 65 and accompanying text.

[157] *See, e.g.*, Multiple Ownership of Standard, FM and TV Broadcast Stations, First Report and Order, 22 F.C.C.2d 306, 311 ¶ 21 (1970) ("A proper objective is the maximum diversity of ownership that technology permits in each area. We are of the view that 60 different licensees are more desirable than 50, and even that 51 are more desirable than 50."); Cooper, *supra* note 5, at 197 ("There is no such thing as 'enough' democratic discourse.").

interest. Is moving from 100 possible combinations to 101 'important'?"[158] More recent pronouncements have begun to acknowledge the need to balance these opposing considerations,[159] but the approach has remained decidedly ad hoc. As a result, those who take seriously the admonition that it takes a model to beat a model will be decidedly reluctant to embrace such an indeterminate approach. The open-endedness of the approach leaves it vulnerable to being redirected towards political purposes.

In this regard, the fate of the "Populist" School of antitrust provides a useful object lesson.[160] This School embraced a noneconomic vision of competition policy that promoted small players in order to promote democratic values associated with Brandeisian pluralism even when doing so was economically costly.[161] Over time, courts and commentators began to recognize that because many industries are subject to economies of scale, preserving small producers has a price. The problem was that Populism failed to provide a notion of optimality for determining when the costs outweighed the benefits. By the end of the 1980s, even those sympathetic to the Populist School were forced to concede that the economic approach to

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[158] Time Warner Entmt. Co. v. FCC, 240 F.3d 1126, 1135 (D.C. Cir. 2001).

[159] *See* 2002 Biennial Regulatory Review – Review of the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996, Report and Order and Notice of Proposed Rulemaking, 18 F.C.C.R. 13620, 13631 ¶ 31 (2003) ("Our conclusion should not be read to suggest that each and every incremental increase in the number of outlet owners can be justified as necessary in the public interest. To the contrary, there certainly are points of diminishing returns in incremental increases in diversity.").

[160] For overviews of the conflict between the Chicago and the Populist Schools that manifest distinctly different sympathies, see 1 AREEDA & HOVENKAMP, *supra* note 13, ¶ 100b, at 4-6, ¶ 111, at 97-115; Michael S. Jacobs, *An Essay on the Normative Foundations of Antitrust Economics*, 74 N.C. L. REV. 219, 227-40 (1995); Alan J. Meese, *Farewell to the Quick Look: Redefining the Scope and Content of the Rule of Reason*, 68 ANTITRUST L.J. 461, 466-67 (2000).

[161] For a classic statement of this position, see *United States v. Brown Shoe Co*., 370 U.S. 294, 344 (1962) (Congress intended to "promote competition through the protection of viable, small, locally owned business" even when "occasional higher costs and prices might result from the maintenance of fragmented industries and markets"). For other similar statements, see*, e.g.*, United States v. Topco Assocs., Inc., 405 U.S. 596, 610-11 (1972); Albrecht v. Herald Co., 390 U.S. 145, 152-54 (1968), *overruled by* State Oil Co. v. Khan, 522 U.S. 3 (1997); Klor's, Inc. v. Broadway-Hale Stores, Inc., 359 U.S. 207, 212-13 (1959); Fashion Originators' Guild of Am., Inc. v. FTC, 312 U.S. 457, 467 (1941) (holding group boycotts illegal and that evidence of procompetitive benefits inadmissible).

antitrust had prevailed.[162] The debate shifted away from the merits of noneconomic considerations and towards a more careful and complete elaboration of a purely economic analysis.[163] The hostility toward vertical integration associated with the Populist School gave way to a more nuanced approach that recognized that vertical integration can yield substantial economic benefits.[164]

Arguments justifying the regulation of telecommunications networks because they are "affected with the public interest" are similarly unlikely to prove a satisfactory basis for regulation. This doctrine was developed during the *Lochner* era as a means for reconciling the intrusive regulation imposed on public utilities with the Court's willingness to strike down economic regulation as impermissible interference with the freedom of contract.

The category was notoriously slippery, being subject to a multifactor balancing test, with no one factor being dispositive.[165] Specifically Courts rejected the notion that exercise of the power of eminent domain[166] or operation under a state franchise[167] was by itself sufficient to

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[162] *See, e.g.*, Robert H. Lande, *Implications of Professor Scherer's Research for the Future of Antitrust*, 29 WASHBURN L.J. 256, 258 (1990) (recognizing that "the dominant paradigm today is that the only goal of the existing antitrust laws is to increase economic efficiency"); Eleanor M. Fox, *The Modernization of Antitrust: A New Equilibrium*, 66 CORNELL L. REV. 1140, 1140 (1981) (conceding that "regard for efficiency is in the ascendancy"); Henry S. Gerla, *A Micro-Microeconomic Approach to Antitrust Law: Games Managers Play*, 86 MICH. L. REV. 892, 892 (1988) (observing that "[c]lassical microeconomic theory . . . has become the dominant tool for contemporary antitrust analysis."); *accord* Jacobs, *supra* note 160, at 239 ("The victory of a purely economic analysis over . . . the Modern Populist School could hardly seem more complete.").

[163] *See* Jonathan B. Baker, *Recent Developments in Economics that Challenge Chicago School Views*, 58 ANTITRUST L.J. 645, 646 (1989) (acknowledging that "economics has become the essence of antitrust" and that current debates within antitrust come from "within the efficiency paradigm"); Jacobs, *supra* note 160, at 222 (recognizing that the both sides of the current debates over antitrust policy accept that "protecting consumer welfare, conceived in allocative efficiency terms, should be the exclusive goal of competition law"); Oliver E. Williamson, *Delimiting Antitrust*, 76 GEO. L.J. 271, 302 (1987) (rejecting the "inhospitality excesses of the 1960s" in favor of "treating economizing as the main case"). As one leading post-Chicago theorist so colorfully put it, "If 'Post-Chicago Economics' stands for the notion that ... antitrust should move away from promoting efficiency and consumer welfare, count me out." Carl Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of* Kodak, 63 ANTITRUST L.J. 483, 484 (1995) (footnote omitted).

[164] *See* Yoo, *supra* note 23, at 186-202.

[165] *See* F.P. HALL, THE CONCEPT OF A BUSINESS AFFECTED WITH A PUBLIC INTEREST 17-55, 90-145 (1940).

[166] *See id.* at 96-97. In addition, courts have repeatedly rejected the notion that private property was initially obtained via eminent domain and is currently used to serve the public is somehow entitled to less dignity under the

render an industry "affected with the public interest." Criticism mounted that the category was analytically empty. Eventually, the Supreme Court rejected the entire framework as unworkable in its landmark decision in *Nebbia v. New York*,[168] and the concept was thereafter regarded as "discarded."[169]

This is not to say that a coherent theory couldn't be built on Brandeisian principles. It is only to say that no one has yet articulated such a theory with sufficient clarity to be coherent. That said, the populist vision rests in uneasy tension with the modern economy. Brandeisian populism aspires to the type of small scale economic activity typically associated with Jeffersonian democracy.[170] It also tends to value economic stability for its own sake, since instability tends to break down the citizenry.[171] As such, it rests in uneasy tension with industries like broadband, in which large scale and rapid and often disruptive change are prominent features.

III. THE AMBIGUOUS POLICY IMPLICATIONS OF NETWORK DIVERSITY

The economic considerations discussed above suggest that adopting network neutrality would be a mistake and that encouraging network diversity may well cause economic welfare to

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law. *See* W. Union Tel. Co. v. Pa. R.R. Co., 195 U.S. 540, 569-70, 573 (1904) (noting that a right of way obtained through condemnation remains private property even when devoted to a public use); United Rys. & Elec. Co. v. West, 280 U.S. 234, 249 (1930) (holding that "the property of a public utility, although devoted to the public service and impressed with a public interest, is still private property"), *overruled in part on other grounds by* Fed. Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944); Gulf Power Co. v. United States, 187 F.3d 1324, 1329-30 (11th Cir. 1999) ("A property owner is entitled to expect that the property it acquired via eminent domain . . . came with the right all property has.").

[167] *See* Nebbia v. New York, 291 U.S. 502 534 (1934).

[168] *Id.* at 536; *accord* Olsen v. Nebraska *ex rel*. W. Reference & Bond Ass'n, 313 U.S. 236, 245 (1941) (quoting the above-quoted language form *Nebbia* with approval); Tyson & Bros. v. Banton, 273 U.S. 418, 446 (1927) (Holmes, J., dissenting); *id.* at 451 (Stone, J., dissenting).

[169] *Olsen*, 313 U.S. at, 245; *accord* RONALD A. ANDERSON, GOVERNMENT AND BUSINESS 225 (4th ed. 1981) (arguing that *Nebbia* "destroyed that concept").

[170] *See* Rabin, *supra* note 152, at 1219-20.

[171] *See* Spulber & Yoo, *supra* note 81, at 909 n.66.

increase. I must acknowledge, however, that this conclusion is subject to a number of caveats that make the determination of whether network diversity would constitute good policy quite complex.

This Part takes a closer look at the complexities of the welfare calculus. It begins by debunking the common misperception that endorsing network diversity would be tantamount to embracing the Schumpeterian vision of competition. On closer inspection, it becomes clear that the two approaches are quite distinct. I then examine the welfare implications of network diversity, concluding that whether or not network diversity would promote economic welfare is an empirical question that cannot be determine *a priori*. I then review the institutional considerations regarding the likely benefits of administrative intervention. In so doing, I also explore the relative merits of leaving redress of such matters to antitrust law. I conclude by offering a tentative case in favor of the network diversity approach. The key insight is that network diversity is not the mirror image of network neutrality, as would be the case if network diversity envisioned mandating the use of proprietary or incompatible protocols. Instead, network diversity is best implemented through nonregulation. As such, it appears to be the most appropriate course of action when faced with an economically ambiguous situation and a technologically uncertain future.

A. The Misunderstood Relationship Between Network Diversity and Schumpeterian Competition

The emphasis on permitting network owners to earn short-run economic profits is sometimes mistakenly compared to the type of competition proposed by Joseph Schumpeter.[172]

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[172] *See* Yochai Benkler, *Some Economics of Wireless Communications*, 16 HARV. J.L. & TECH. 25, 73 (2002); Cooper, *supra* note 5, at 202-05; Lemley & Lessig, *supra* note 5, at 960-62; Wu, *supra* note 5, at 80-82.

Schumpeter suggested that the classic model of perfect competition, which envisions multiple competitors vying for the same consumers, was passé. In the modern era, it had been replaced by a model in which firms compete by vying to discover the next breakthrough innovation that "commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives."[173] The innovator would retain its dominant position until the next frame-breaking innovation displaces it. Schumpeter's vision thus rejects the classic model of *horizontal competition within the market* in favor of competition among a succession of monopolists engage in winner-take-all, *vertical competition for the market*. Supracompetitive returns play a key role in this model. It is the prospect of sustainable supracompetitive returns that constitutes "the baits that lure capital on to untried trails."[174]

Although Schumpeterian competition and network diversity do bear some superficial similarities, upon close analysis it becomes clear that the theories are quite different. Schumpeterian competition envisions a form of vertical competition, in which at any particular time the market is dominated by a succession of monopolist. The network diversity approach, in contrast, envisions horizontal competition in which firms compete directly with one another in a manner more reminiscent of conventional economic analyses. Producers do derive some limited market power from their ability to differentiate their products, but the magnitude of this effect falls far short of the type of dominant advantage envisioned by Schumpeter. Indeed, it is the ability to differentiate networks that prevents the market from devolving into the type of winner-

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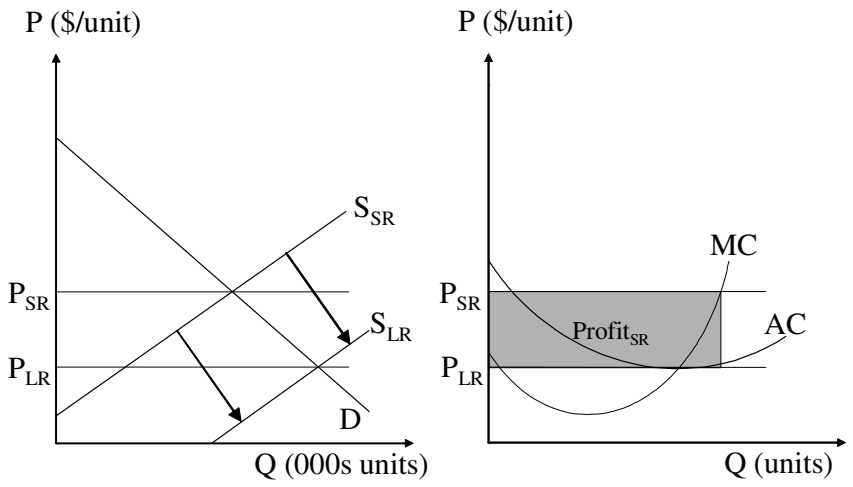
[173] SCHUMPETER¸ *supra* note 12, at 84.
[174] *Id.* at 90.

take-all regime associated with Schumpeter and that characterizes natural monopoly. In this sense, network diversity is quite anti-Schumpeterian.[175]

Figure 2: The Role of Short-Run Profits under Perfect Competition



The only similarity between these two approaches is that fact that both rely on supracompetitive returns to push competition forward. In the case of Schumpeterian competition, these supracompetitive returns are long-lived and sustainable. The network diversity model, in contrast, envisions these economic profits to be transient and quickly dissipated.[176] In this sense, the proper analog for the supracompetitive returns in the network diversity approach is the role that short-run profits play in stimulating entry under the model of perfect competition (depicted in Figure 2). The primary difference is that entry is modeled in the

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[175] Network diversity also eliminates the rent dissipation problems that occur when many parties undertake up-front, fixed-cost investments, but only one can prevail. *See* Jennifer F. Reinganum, *The Timing of Innovation: Research, Development, and Diffusion*, *in* 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 849, 853 (Richard Schmalensee & Robert D. Willig eds., 1989) (reviewing literature on patent races).; Aditya Bamzai, Comment, *The Wasteful Duplication Thesis in Natural Monopoly Regulation*, 71 U. CHI. L. REV. 1525 (2004) (applying rent dissipation to natural monopoly).

[176] *See supra* note 70 and accompanying text.

case of perfect competition by an outward shift of the supply curve and modeled in the case of monopolistic competition by an inward shift of the demand curve.

Indeed, this shows the inherent flaw in approaches that attempt to regulate away supracompetitive returns when entry is possible. As noted in the discussion on dynamic efficiency doing so would eliminate the primary impetus for competitive entry, and the supply curve would never shift.[177] Network neutrality thus indeed represents a surrender to the monopoly that is unjustified unless entry is truly infeasible. It also depends on having confidence that regulatory authorities would do a better job of dissipating rents than would private ordering and that the authorities would be able revise the regime to eliminate mandatory interconnection as soon as technological progress makes entry by alternative networks feasible.[178]

B. The Complexity of the Welfare Analysis

Acknowledging that products compete on more dimensions than simply price greatly complicates the welfare analysis. When products compete solely on price, welfare analysis is simply a matter of determining total surplus. The multidimensionality of competition under network diversity depends on certain factual assumptions and inevitably requires a complex tradeoff among a number of different considerations.

1. The Structure of Demand

Whether network diversity would enhance or impair economic welfare depends on the structure of demand. The network diversity model is based on the assumption that customer

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[177] *See supra* Part II.B.

[178] *See infra* Part III.C (discussing the institutional considerations surrounding network diversity).

preferences are heterogeneous. Small players survive by targeting different market segments. The success of this approach presumes that there are different product segments to target. To the extent that consumer preferences are homogeneous, multiproduct equilibria will not be sustainable and simply waste resources without yielding any welfare benefits. The success of the network diversity model thus depends on assumptions about the distribution of preferences.[179]

Monopolistic competition further assumes that consumer preferences are symmetric with respect to each of the competing group. The primary effect of this assumption is to place each work in equal competition with all other products in the group rather than in localized competition with a smaller subset of near neighbors. It is quite possible that this assumption is false. If so, a new entrant will not steal business uniformly from all incumbents. Instead, the entrant will disproportionately take sales from some incumbents and not others. In addition, it is quite possible that consumer preferences may not be not uniformly distributed across all product possibilities. Both of these factors may have the effect of creating localized monopolies similar to the one enjoyed by a lone gas station along a desert highway when the overall volume of traffic is not sufficient to support a second station.[180]

The Chamberlinian result thus depends on a number of empirical assumptions about the structure of demand. It cannot be determined *a priori* whether the market will reach equilibrium with multiple players or if so, whether that equilibrium will be superior to the network neutrality equilibrium in terms of economic welfare.

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179 *See* Yoo, *supra* note 16, at 243-46 & n.100.

180 *See id.* at 237, 242, 245-46, 278-79.

2. The Multidimensionality of Welfare Under Network Diversity

Monopolistically competitive markets reach equilibrium where the demand curve and the average cost curve are tangent to one another. Because demand curves are downward sloping, this will necessarily be a point where the average cost curve is downward sloping as well. This also implies that equilibrium will occur at a point where the average cost curve lies above the marginal cost curve.[181] This dictates that any sustainable price will necessarily exceed marginal cost and thus that some degree of deadweight loss is endemic under monopolistic competition. In addition, the fact that monopolistically competitive markets reach equilibrium at volumes that do not minimize average cost led Chamberlin the conclusion about the pervasiveness of market failure[182] that made him the *bête noire* of Chicago School economists.[183]

Later theorists pointed out that such conclusions failed to reflect the full dimensions of the welfare calculus under monopolistic competition. When products are differentiated, they can contribute to welfare not only by offering better prices, but also by incorporating attributes that better satisfy particular customers' ideal preferences. The multidimensionality of competition makes simple price-cost comparisons an incomplete way to determine social welfare. It is possible, but not definite, that the reduction in welfare associated with the deadweight losses might be offset by increase in welfare made possible by greater product diversity.[184]

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[181] *See* William J. Baumol & Daniel G. Swanson, *The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power*, 70 ANTITRUST L.J. 661, 668 n.14 (2003) (reproducing a well-known and simple mathematical proof of this proposition) .

[182] *See* CHAMBERLIN, *supra* note 69, at 104-09.

[183] *See* MILTON FRIEDMAN, *The Methodology of Positive Economics*, *in* ESSAYS IN POSITIVE ECONOMICS 3, 38-39 (1953); GEORGE J. STIGLER, *Monopolistic Competition in Retrospect*, *in* FIVE LECTURES ON ECONOMIC PROBLEMS 12 (1949), *reprinted in* GEORGE J. STIGLER, THE ORGANIZATION OF INDUSTRY 309-21 (1968).

[184] *See* Yoo, *supra* note 16, at 252-53.

3. The Possibility of Excess Entry

Since the earliest days of natural monopoly theory, commentators have suggested that entry by more than one network provider might be excessive.[185] The argument is that even if two companies made the fixed cost investment needed to enter, only one would survive. The result would force society to bear the fixed costs of building two networks even thought it was clear from the outset that only one set of wires would ever be used. The network diversity approach reveals why duplication of fixed costs might yield social benefits. It raises the possibility that the higher costs incurred by each producer might be offset by the welfare benefits resulting from enabling consumers to consume network services that better satisfy their preferences.

That said, it is not necessarily given that the multiple entry associated with network diversity is always be welfare enhancing. In some cases, the sales generated by a new entrant may consist of incremental customers who were not previously being served by one of the incumbents (an effect sometimes called "demand creation"). When a new network's customers are entirely the result of demand creation, its entry is certain to be welfare enhancing. In other cases, its sales may consist in whole or in part of customers who were previously being served by one of the incumbents (an effect sometimes called "demand diversion"), in which case the welfare calculus is more complex. Even though the new entrant must incur fixed costs in order to enter, those costs are potentially offset by the welfare benefits associated with allowing customers who were previously served by the incumbent network to consumer services that

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[185] *See* 1 JOHN STUART MILL, PRINCIPLES OF POLITICAL ECONOMY 132-54 (London: John W. Parker 1848) (observing that allowing monopolists to produce and distribute water and gas in London would reduce the costs of production by obviating the need for duplicative machinery, works, and pipes). For a more modern statement of the wasteful duplication thesis, see 2 KAHN, *supra* note 98, at 121-23.

represent a better fit with their preferences. On the other hand, few such benefits would exist if the products are too similar, and it is far more likely that such duplicative entry would be socially wasteful.[186]

The net impact of entry under network diversity is thus quite complex, depending on whether the customers result from demand creation or demand diversion and the magnitude of the welfare gains resulting from providing network services that better satisfy the customers cannibalized from the incumbent network. Again, this is not a question that can be answered *a priori*.

4. The Transaction Costs of Network Diversity

Adoption of network diversity would necessarily require the incurrence of transaction costs. Some would be transitional, such as the costs incurred when network owners voluntarily retool their networks to accommodate different standards. Other transaction costs would be more enduring. For example, if multiple standards were to exist, end users and providers of applications and content would have to expend significant resources to verify compatibility with respect to different networks. It is theoretically possible that the resulting friction might be so severe that it more than offsets the benefits of shifting to another standard. When that is the case, society would be better off had network diversity were not permitted.

At the same time, mandating network neutrality would involve transaction costs as well. The costs of adopting, disseminating, maintaining, and updating a standardized interface are

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[186] *See* Yoo, *supra* note 16, at 260-64.

considerable. A full analysis would require a comparison of these two countervailing considerations.[187]

5. Long-Run Dynamic Efficiency Gains versus Short-Run Static Efficiency Losses

Entry by providers of differentiated networks will not be instantaneous. Thus, even if monopolistic competition is likely to yield dynamic efficiency benefits over the long-run, the inevitable delays in entry may force the market to incur short-run static efficiency losses. Some scholars have categorically asserted that because the dynamic efficiency gains will be compounded over time, they will invariably exceed the short-run static efficiency losses.[188] Clearly this approach seems too simplistic. Whether the dynamic efficiency gains will dominate the static efficiency losses depends on a myriad of factors, including the magnitude of the gains and losses, the speed of entry, and the appropriate discount rate. Simply put, whether network diversity will enhance welfare is a multifaceted inquiry that is not susceptible to a simple policy inference.

C. Institutional Considerations

In addition to the theoretical economic considerations identified above, the choice between network diversity and network neutrality should also be informed by institutional considerations. These considerations raise doubts as to the advisability of having the FCC impose network neutrality.

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[187] *See* Daniel F. Spulber & Christopher S. Yoo, Network Regulation: The Many Faces of Access 55-56 (Vanderbilt Public Law Research Paper No. 05-19, June 8, 2005), *available at* http://ssrn.com/abstract=740297.

[188] *See* WALTER G. BOLTER ET AL., TELECOMMUNICATIONS POLICY FOR THE 1980'S, at 360 (1984); Janusz Ordover & William Baumol, *Antitrust Policy and High-Technology Industries*, 4 OXFORD REV. ECON. POL'Y 13, 32 (1988).

1. Fact Specificity

As noted above, the welfare calculus depends on a wide variety of contextual factors. The complexity of the welfare calculus renders it difficult to determine *a priori* whether universal adoption of the network diversity principle would promote or harm economic welfare. Determining whether or not that will be the case requires a context-specific inquiry that turns on a myriad of factors. The problem is that regulation tends to take the form of an *ex ante* rule, and such rules tend to be ill-suited to such factually nuanced determinations. Simply put, regulation is inherently a blunt instrument that necessarily acts in a categorical, non-fact specific manner. It is less well suited to resolving issues that demand detailed inquiry into the circumstances of individual cases.

2. Technological Dynamism

Regulation poses particularly grave risks in industries that are undergoing rapid technological change. When that is the case, even the most conscientious regulator will find it hard to keep up with the pace of technological change. Worse yet, reliance on *ex ante* regulation often has the effect of foreclosing practices that are ambiguous or about which there is too little information. This is why scholars from across the political spectrum have warned of the dangers of regulatory lag in industries that are technologically dynamic.[189] The task confronting policymakers is made all the more difficult by the fact that making any difference would require policy makers to intervene at a fairly early stage in the technology's development, since

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[189] *See, e.g.*, *See* STEPHEN BREYER, REGULATION AND ITS REFORM 286-87 (1982); 2 KAHN, *supra* note 98, at 127; John C. Panzar & Robert D. Willig, *Free Entry and the Sustainability of Natural Monopoly*, 8 BELL J. ECON. 1, 21 (1977); Richard A. Posner, *Natural Monopoly and Its Regulation*, 21 STAN. L. REV. 548, 636 (1969).

governmental intervention after the market has settled on the optimal technology would serve little purpose.[190]

3. Bureaucratic Considerations

Agencies have long been criticized as imperfect assimilators of the public interest. Regulatory decisions are all too often shaped by political goals and public interest pressure in ways that are not always consistent with good policy.[191] In addition, policymakers may also find it tempting to give too little weight to the future benefits associated with the entry of alternative network capacity, which will no doubt seem uncertain and contingent, and to overvalue the more immediate and concrete benefits of providing consumers with more choices in the here and now. Indeed, the FCC has allowed short-term considerations override longer-term benefits in the past.[192] Public choice theory strongly suggests that the bias in favor of the former over the latter is no accident.

Administrative agencies are also often thought to exhibit a tendency to enlarge their jurisdiction even when the proper response would be to contract it.[193] Consider, for example, the emergence of a technological alternative to a network that had previously been a natural monopoly. The proper policy response would be deregulation of the previously regulated industry, since the emergence of competition would vitiate the justification for regulation in the first place. An agency, however, has bureaucratic incentives to do precisely the opposite. Rather than deregulate the old industry, all too often agencies respond by asserting jurisdiction over the new industry and extending the same restrictive, legacy regulation applied to the old industry to

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190 *See supra* note 28 and accompanying text.

191 *See, e.g.*, BRUCE OWEN & RON BRAEUTIGAM, THE REGULATION GAME (1978); 2 KAHN, *supra* note 98, at 325-26; Bresnahan, *supra* note 28, at 201-03.

192 *See* Yoo, *supra* note 155, at 272-75.

193 *See* WILLIAM A. NISKAANEN, JR., BUREAUCRACY AND REPRESENTATIVE GOVERNMENT (1971).

the new industry as well. This is exactly what happened in the Interstate Commerce Commission (ICC) when the emergence of the trucking industry eliminated whatever natural monopoly power enjoyed by the railroad. Rather than deregulating railroads, the ICC extended the regulatory regime governing railroads to the new competitor. A similar pattern emerged when cable television eliminated the supposed scarcity of the electromagnetic spectrum that justified intrusive regulation of broadcasting.[194]

The reaction is understandable. Agency personnel have every reason to be reluctant to eliminate the justification for their continued employment. In addition, they no doubt grow to identify with the regulatory regimes that they administer and are likely to resent and to try to control anything that disrupts them. But the emergence of competition in a previously uncompetitive industry is precisely the type of disruption that should be embraced. Committing decisions about network neutrality to regulatory resolution necessarily puts network policy in the crosshairs of this tension.

4. Antitrust as a Possible Alternative

It would thus appear that regulation is poorly institutionally situated to act in this area. Might antitrust law serve as a basis for redressing these problems?[195] Antitrust is well designed to the fact-specific, case-by-case determinations that the foregoing analysis suggests is appropriate. Because federal judges have life tenure and because the courts have general rather than industry-specific jurisdiction, antitrust courts are also more likely to be less susceptible to

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[194] For my critique of the broadcast model of regulation, see Yoo, *supra* note 155.

[195] *See* HUBER ET AL., *supra* note 6, at 401-04; Richard A. Posner, *Antitrust in the New Economy*, 68 ANTITRUST L.J. 925, 925 (2001); Howard A. Shelanski, From Sector-Specific Regulation to Antitrust Law for U.S. Telecommunications: The Prospects for Transition (UC Berkeley Public Law Research Paper No. 80, 2002) *available at* http://ssrn.com/abstract=300600.

agency capture and bureaucratic empire building than agencies. The Supreme Court also recently made clear that interconnection disputes are not immune from antitrust scrutiny.[196]

Despite the confidence that some have voiced in antitrust courts' ability to address issues surrounding the new economy, others have warned that courts lack the institutional capability and expertise to make the kind of determinations needed to implement the regime of interconnection, standardization, nondiscrimination, and rate regulation implicit in network neutrality.[197] The Supreme Court recently agreed, explicitly acknowledging that the FCC is better situated than courts to provide the degree of supervision required to implement a sharing regime.[198] Thus, if network neutrality is to be enforced, it must come from the FCC.

D. Putting It All Together

Given the complexity of the welfare analysis and the institutional considerations, how should the debate between network diversity and network neutrality be resolved? Interestingly, Lessig acknowledges some of the arguments that I raise[199] and even concedes that the final resolution is ultimately indeterminate,[200] and yet nonetheless comes down squarely on the side of network neutrality. I review the justifications Lessig offers for preferring network neutrality before offering my own conclusions.

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[196] *See* Verizon Communications, Inc. v. Law Offices of Curtis V. Trinko, L.L.P., 540 U.S. 398, 415 (2004).

[197] *See* 3A AREEDA & HOVENKAMP, *supra* note 13, ¶ 774e, at 223-27; Philip E. Areeda, *Essential Facilities: An Epithet in Need of Limiting Principles*, 58 ANTITRUST L.J. 841, 853 (1989); Jonathan E. Nuechterlein & Philip J. Weiser, First Principles for an Effective Rewrite of the Telecommunications Act of 1996, at 23-39 (AEI-Brookings Joint Center, Working Paper No. 05-03, Mar. 2005), *available at* http://ssrn.com/abstract=707124.

[198] *Trinko*, 540 U.S. at 415; *accord* AT&T Corp. v. City of Portland, 216 F.3d 871, 876 (9th Cir. 1999) (noting that courts are ill suited to imposing access requirements on the Internet).

[199] *See* LESSIG, *supra* note 5, at 46-48, 167-75.

[200] *See id.* at 47 (recognizing that "[w]e don't know enough yet to know whether or not implementing a pricing system for allocating bandwidth would do more harm than good); *id.* at 174 (conceding that his argument "cannot begin to resolve" whether proprietary control of cable modem systems is necessary to stimulate investment in network infrastructure); *id.* at 175 (admitting that in determining whether to give network owners power over the network, "we have no good way to make sure that the gains outweigh the losses").

First, Lessig suggests that congestion problems can be solved by increasing capacity rather than by giving network owners more control over network flows. Although Lessig recognizes that this vision contradicts the basic economic notion that all commodities are inherently scarce, he nonetheless states, "I'm willing to believe in the potential of essentially infinite bandwidth. And I am happy to imagine the scarcity-centric economist proven wrong."[201] As noted earlier, there is no compelling reason to believe that bandwidth will necessarily increase faster than demand, especially in light of the fact that the number of potential connections goes up exponentially with the number of computers added to the system.[202] Relying on capacity expansion to solve the problems related to congestion is made all the more problematic by the fact that capacity cannot be expanded instantaneously. Even when capacity expansion is feasible in the long run, any underestimation of projected demand will necessarily create short-run scarcity that cannot be addressed through increased bandwidth. In addition, adding bandwidth and using network management techniques that reduce the transparency of the network represent alternative ways to solve the problems of congestion. Given that the relative attractiveness of each alternative should vary depending on the situation, it would seem to be a mistake to precommit to one approach over the other. Lastly, the nonstandardization and exclusivity inherent in network diversity are often designed to improve security or increase functionality wholly apart from the desire to reduce congestion. When that is the case, the possibility of adding bandwidth is not responsive to the problem.[203]

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201 *Id.* at 47.
202 *See supra* note 33 and accompanying text.
203 *See supra* notes 30-53 and accompanying text.

Lessig also suggests that network neutrality might be justified by the growing level of concentration in network ownership.[204] It is far from clear that concentration represents the threat that Lessig suggests once the precise markets that network neutrality is designed to protect have been identified.[205] The concentration is most acute in the market in which last-mile broadband providers bargain with end users. As noted earlier, preventing owners of last-mile technologies from entering into exclusivity arrangements and forcing them to employ nonproprietary protocols that permit complete interoperability would not affect this market one iota. The economic relationship between last-mile providers and end users is largely determined by the fact that most end users only have two options in terms of last-mile providers: the cable company and the telephone company. This remains the case even if network neutrality were imposed.[206]

Imposing network neutrality would, however, have a significant impact on the upstream market in which last-mile providers bargain with providers of applications and content. Major web-based providers, such as Amazon.com or eBay, are focused more on the total customers they are able to reach nationwide than they are on their ability to reach customers located in any specific metropolitan area. They would, of course, prefer to be able to reach every possible potential customer. The fact that they may be unable to reach certain customers is of no greater concern, however, than the fact manufacturers of particular brands of cars, shoes, or other

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[204] LESSIG, *supra* note 5, at 173-74. Lessig is quite candid about his bias against incumbent network owners:

> Dinosaurs should die. . . . And innovators should resist efforts by dinosaurs to keep control. Not because dinosaurs are evil; not because they can't change but because the greatest innovation will come from those outside these old institutions. Whatever the scientists at Bell Labs understood, AT&T didn't get it. Some may offer a theory to explain why AT&T wouldn't get it. But this is a point most understand without needing to invoke a fancy theory.

Id. at 176.

[205] The following discussion is based on Yoo, *supra* note 16, at 253-54; and Yoo, *supra* note 18, at 51-52

[206] *See supra* Part I.B.

conventional goods are not always able to gain distribution in all parts of the country. Manufacturers who are cut off from consumers served by a particular cable or telephone company should not face significant problems so long as they are able to obtain access to a sufficient number of customers located elsewhere. The proper question is thus not whether the broadband transport provider wields market power vis-à-vis broadband users in any particular city, but rather whether that provider has market power in the national market for obtaining broadband content. In short, it is national reach, not local reach, that matters.

When the relevant market is properly defined, it becomes clear that this market is too unconcentrated for vertical integration to pose a threat to competition. The concentration levels in the broadband industry fall far below the thresholds identified by the Vertical Merger Guidelines promulgated by the Federal Trade Commission and the Justice Department for determining when vertical integration is the cause for anticompetitive concern.[207] Indeed, Lessig's concerns about concentration seem better suited to the network of the past than the network of today. His arguments seem to stem from the manner in which AT&T was able to stem innovation during the time in which it was the dominant network player.[208] They are considerably less compelling in a universe in which the largest player controls roughly twenty percent of all broadband customers and the levels of concentration fall below levels traditionally thought necessary to threaten competition.

Indeed, the ambiguity inherent in the issues surrounding concentration is underscored by comparing Lessig's concern, which is that portions of the network will be too eager to deviate from the established standard,[209] with the concern associated more frequently with network

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[207] *See* Yoo, *supra* note 16, at 254-58; Yoo, *supra* note 18, at 52-53.
[208] *See* LESSIG, *supra* note 5, at 26-34; Lemley & Lessig, *supra* note 5, at 933-35, 937-38.
[209] *See* LESSIG, *supra* note 5, at 48, 168, 171, 176.

economic effects, which is that users will be too reluctant to deviate from the established standard, thereby allowing an obsolete technology to become locked in.[210] When the latter is the primary concern, the presence of large players is a potential boon, rather than a bane. Because larger players are able to internalize a greater share of the benefits created by their own technology choices, they are logical candidates to mitigate the lock-in effects caused by network externalities by becoming the sponsor of a new technology.[211] In other words, to the extent that network economic effects create excess inertia rather than excess momentum, attempts to deviate from the existing standard should be embraced, rather than rebuffed.

In the end, Lessig's primary concern is that network diversity would hurt the environment for innovation, which he believes stems from the existence of an "innovation commons" in which applications and content providers can have access to the entire universe of potential customers without having to obtain permission from any gatekeeper. Network owners, Lessig argues, are too eager to fracture the interoperability of the Internet because they fail to internalize the benefits from innovation associated with network neutrality.[212] As noted earlier, a close reading of the economic literature reveals that the impact of network economic effects on innovation is ambiguous and that such concerns appear to be misplaced in the context of a physical network that can be owned and in industry undergoing exponential growth.[213] Indeed, the use of the term "commons" creates some degree of irony, since the accepted solution to the tragedy of the commons is the creation of well-defined property rights,[214] which would be more

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[210] *See* Farrell & Saloner, *supra* note 80, at 941-43; Katz & Shapiro, *supra* note 26, at 108; *see also supra* note 81.

[211] *See* Yoo, *supra* note 23, at 281-82; Spulber & Yoo, *supra* note 81, at 929.

[212] *See* LESSIG, *supra* note 5, at 8, 168, 171, 173, 175. This is a point that is more important to him than even the end-to-end argument. Indeed, Lessig acknowledges that even if discrimination is imposed by end users in a manner consistent with end-to-end, he would still be concerned. *See id.* at 171, 173.

[213] *See* Yoo, *supra* note 16, at 278-85; Spulber & Yoo, *supra* note 81, at 921-33.

[214] *See* Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

consistent with network diversity than network neutrality. Indeed, more recent scholarship on the anticommons has underscored the fact that property rights can be too small as well as too large.[215] The presence of innovation externalities thus more properly implies some notion of a property right's optimal size rather than a blanket presumption in favor of an innovation commons.

As such, little insight is gained by trying to elevate that preservation of the innovation commons into a rhetorical trump. The most plausible justification resembles a version of the "precautionary principle," which argues that certain harms are so potentially catastrophic that regulators should guard against them even when it is uncertain whether they will ever come into fruition. Such an argument would claim that the potential harm to innovation associated with deviating from the transparency that now characterizes the Internet is so great as to justify imposing network neutrality prophylactically.[216] The problem with this argument is that because there are risks in both adhering and deviating from the status quo, the precautionary principle is incoherent as an *a priori* principle. As a result, it should be reserved for circumstances in which the adverse consequences are truly catastrophic and in which deviations from the status quo are irreversible.[217] Neither precondition would appear to be satisfied in the case of network neutrality. As the experience in reconfiguring local telephone switches for independent long distance providers demonstrates, allowing networks to become noninteroperable should not be irreversible.[218] Furthermore, as important as innovation on the Internet is, reduced innovation

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[215] *See, e.g.*, Michael Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998).

[216] *See* Lemley & Lessig, *supra* note 5, at 929, 943-46, 971-72.

[217] *See* CASS R. SUNSTEIN, LAWS OF FEAR: BEYOND THE PRECAUTIONARY PRINCIPLE _ (2005).

[218] *See supra* note 108 and accompanying text.

does not constitute the type of catastrophic harm that would justify regulatory intervention in the absence of a concrete showing of competitive harm.

In the end, Lessig fails to provide a determinative resolution to the question. At the same time, I acknowledge that in the absence of a clearer picture of the contextual details, my own resolution is necessarily no more definitive. Short of swapping *ipse dixit* claims about better policy, how should decisionmakers resolve disputes in the face of uncertainty?

Fortunately, competition policy offers a potential way out of this analytical limbo. It suggests that when policymakers cannot determine whether a new institutional form would help or hinder competition, the proper response is to forbear prohibiting the practice *per se* and to instead undertake a case-by-case analysis of its impact on competition. Forbearing from either forbidding or mandating any particular solution leaves the room for the experimentation upon which markets depend.[219]

Nonintervention is particularly appropriate where, as here, regulators will struggle to distinguish anticompetitive from procompetitive behavior. As network neutrality advocates have candidly acknowledged, deviations from network neutrality are often the result of benign attempts to meet the increasingly varied demands that end users are placing on the network, and policymakers will be hard pressed to determine when a particular practice raises anticompetitive concerns.[220] When that is the case, placing the burden of proof on those who would regulate represents the proper way for regulators to show technological humility. Placing the burden of proof on those favoring regulatory intervention accords with our notions of liberty and the classic vision of the proper relationship between the individual and the state.[221] It also allows

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[219] *See supra* notes 9-10 and accompanying text.
[220] *See supra* note 11 and accompanying text.
[221] *See* Yoo, *supra* note 155, at 317-18, 331-34.

decisionmaking about technology adoption to be decentralized. It also avoids the risks of locking the existing technological boundaries between firms into place in industries undergoing dynamic technological change.[222] In the most extreme case, regulation can itself become the source of natural monopoly, in which case intervention would have the perverse effect of reinforcing the market failure that regulation was designed to redress.

My intuitions are also informed by the practical problems associated with mandating interconnection, standardization, nondiscrimination, and rate regulation. Experience with cable leased access and UNE access has shown how difficult such regimes are to administer when interfaces are complex and the underlying technology is changing rapidly.[223] Viewing the history of FCC regulation through the cautionary lens of public choice theory provides additional reason to disfavor regulatory intervention. As noted earlier, it is quite possible that regulators will give preference to the concerns of static efficiency, which have concrete impact in the here and now, over the concerns of dynamic efficiency, which involve contingent benefits to parties who often have yet to be identified.[224] The FCC's history in this regard is not promising. Even James Landis, the leading proponent of expertise-driven public interest regulation and one of the key architects of the New Deal, acknowledged that the FCC has been a public choice disaster.[225]

The bias in favor of existing technologies has unfortunate implications for the permanence of regulatory intervention. Compelled sharing of the existing network by mandating interconnection, standardization, nondiscrimination, and rate regulation implicitly presumes that regulatory supervision will continue indefinitely. In short, it represents a surrender to the monopoly that is only justifiable if entry by alternative network capacity is impossible. In

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222 *See supra* notes 49-51, 119-123 and accompanying text.
223 *See supra* Part II.A.3.a.
224 *See supra* note 192 and accompanying text.
225 JAMES M. LANDIS, REPORT ON REGULATORY AGENCIES TO THE PRESIDENT-ELECT (1960).

contrast, solutions that focus on dynamic efficiency have embedded within them built-in exit strategies. Once a sufficient number of broadband network platforms exist, regulatory intervention will no longer be necessary. Fostering entry and then deregulating once it has occurred seems to me a better ambition for regulatory policy than committing to the ongoing supervision of both the price and nonprice terms of business relationships that network neutrality implies.

In the end, however, network diversity does not depend upon a definitive resolution of the best substantive outcome. It adopts a humbler stance towards policymakers ability to appreciate and anticipate technological change. In this sense, network diversity is not simply the mirror image of network neutrality in that it does not call for the imposition of a diametrically opposed set of protocols. Instead, it adopts the more modest position and instead permits the experimentation in response to changing conditions that is the natural response of competitive forces to proceed.

CONCLUSION

There can be no question that network neutrality holds considerable allure. The vision of a world in which every end user can obtain access to every available application and piece of information is quite compelling. It is thus quite understandable that so many commentators have endorsed network neutrality as a concept. The economic advantages of interoperability are considerable, and I would expect interoperability to play a central role the business plans of the vast majority of Internet-based businesses.

The question that must be asked is not whether network neutrality yields benefits, but rather whether forbidding deviations from network neutrality might impose harms. My exploration of the arguments underlying network neutrality provides substantial reason for

caution. Standardization can reduce welfare both by reducing diversity and by biasing he market against certain types of applications. It can have the perverse effect of reinforcing the sources of market failure used to justify regulatory intervention in the first place. It can further entrench monopoly power by dampening incentives to invest in alternative network neutrality.

Instead, my analysis suggests that public policy might be better served if policymakers were instead to embrace network diversity. Doing so would permit end users to enjoy the benefits of product variety. Network diversity also has the potential to mitigate the supply-side and demand-side scale economies that concentrate telecommunications markets and to make it easier for multiple networks to coexist. The more restrained approach inherent in network diversity is also more consistent with the current understanding of the institutional capabilities of courts and agencies. It also accommodates technological dynamism and humility by providing maximum room for experimentation and development. This is not to say that policymakers should reject network neutrality once and for all. What is called for is a sense of balance and optimality that can adjust with the circumstances. But in the face of technological uncertainty, the more appropriate and humble approach would appear to favor forbearing from mandating any particular architecture.