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A CONSUMER-WELFARE APPROACH TO NETWORK NEUTRALITY REGULATION OF THE INTERNET

*J. Gregory Sidak**

ABSTRACT

"Network neutrality" is the shorthand for a proposed regime of economic regulation for the Internet. Because of the trend to deliver traditional telecommunications services, as well as new forms of content and applications, by Internet protocol (IP), a regime of network neutrality regulation would displace or subordinate a substantial portion of existing telecommunications regulation. If the United States adopts network neutrality regulation, other industrialized nations probably will soon follow. As a result of their investment to create next-generation broadband networks, network operators have the ability to innovate inside the network by offering both senders and receivers of information greater bandwidth and prioritization of delivery. Network neutrality regulation would, among other things, prevent providers of broadband Internet access service (such as digital subscriber line (DSL) or cable modem service) from offering a guaranteed, expedited delivery speed in return for the payment of a fee. The practical effect of banning such differential pricing (called "access tiering" by its critics) would be to prevent the pricing of access to content or applications providers according to priority of delivery. To the extent that an advertiser of a good or service would be willing to contract with a network operator for advertising space on the network operator's affiliated content, another practical effect of network neutrality regulation would be to erect a barrier to vertical integration of network operators into advertising-based business models that could supplement or replace revenues earned from their existing usage-based business models. Moreover, by making end-users pay for the full cost of broadband access, network neutrality regulation would deny broadband access to the large number of consumers who would not be able to afford, or who would not have a willingness to pay for, what would otherwise be less expensive access. For example, Google is planning to offer broadband access to end-users for free in San Francisco by charging other content providers for advertising. This product offering is evidently predicated on the belief that many end-users demand discounted or free broadband access that is paid for by parties other

* Visiting Professor of Law, Georgetown University Law Center. Email: jgsidak@aol.com
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than themselves. Proponents of network neutrality regulation argue that such restrictions on the pricing policies of network operators are necessary to preserve innovation on the edges of the network, as opposed to innovation within the network. However, recognizing that network congestion and real-time applications demand some differential pricing according to bandwidth or priority, proponents of network neutrality regulation would allow broadband Internet access providers to charge higher prices to end-users (but not content or applications providers) who consume more bandwidth or who seek priority delivery of certain traffic. Thus, the debate over network neutrality is essentially a debate over how best to finance the construction and maintenance of a broadband network in a two-sided market in which senders and receivers have additive demand for the delivery of a given piece of information—and hence additive willingness to pay. Well-established tools of Ramsey pricing from regulatory economics can shed light on whether network congestion and recovery of sunk investment in infrastructure are best addressed by charging providers of content and applications, broadband users, or both for expedited delivery. Apart from this pricing problem, an analytically simpler component of proposed network neutrality regulation would prohibit a network operator from denying its users access to certain websites and Internet applications, such as voice over Internet protocol (VoIP). Although some instances of blocking of VoIP have been reported, such conduct is not a serious risk to competition. To address this concern, I analyze whether market forces (that is, competition among access providers) and existing regulatory structures are sufficient to protect broadband users. I conclude that economic welfare would be maximized by allowing access providers to differentiate services *vis-à-vis* providers of content and applications in value-enhancing ways and by relying on existing legal regimes to protect consumers against the exercise of market power, should it exist.

I. INTRODUCTION

After one decade, the Telecommunications Act of 1996[1] has become an anachronism. The new battle in American telecommunications regulation—said by some to decide the future of the Internet—centers on an arcane notion dubbed "network neutrality." The network neutrality controversy, however, is in no way confined to the United States. Canada, the Netherlands, Japan, and other nations in the Organization for Economic Cooperation and Development (OECD) have begun studying the issue.[2]

[1] Telecommunications Act of 1996, Pub. L. No. 104–104, 110 Stat. 56 (codified in scattered sections of 47 U.S.C.).

[2] *See* TELECOMMUNICATIONS POLICY REVIEW PANEL, CANADA, FINAL REPORT 187–90 (2006), *available at* http://www.telecomreview.ca/epic/internet/intprp-gecrt.nsf/vwapj/report_e.pdf/$FILE/report_e.pdf; Viktória Kocsis & Paul W.J. de Bijl, Network Neutrality and the Nature of Competition Between Network Operators (TILEC Report Sept. 15, 2006) (prepared for Directorate General for Energy and Telecommunications, Ministry of Economic Affairs, The Hague); DRAFT REPORT OF THE STUDY GROUP ON A FRAMEWORK FOR COMPETITION RULES TO ADDRESS THE TRANSITION TO IP-BASED NETWORKS, NEW

It appears that the network neutrality debate will unfold first in the United States, where the House of Representatives passed a bill in June 2006 addressing the matter,[3] and that the outcome will significantly influence the debate in Europe and elsewhere. Throughout the world, there does not appear to be another controversy in telecommunications regulation with larger ramifications for consumer welfare.

Network neutrality regulation would constrain the behavior of a downstream broadband Internet access provider *vis-à-vis* its users and upstream providers of Internet content and applications. The most familiar access providers that would be affected by network neutrality regulation are telephone companies offering digital subscriber line (DSL) service and cable television system operators offering cable modem service. Soon, however, network neutrality regulation would affect wireless carriers as well, although virtually none of the current debate has considered the implications of regulating wireless services in this manner.

Network neutrality regulation would prevent an access provider from charging higher prices to suppliers of content and applications that require priority delivery. Proponents of network neutrality regulation call this form of differential pricing "access tiering." Nonetheless, proponents of network neutrality regulation would tolerate differential pricing *vis-à-vis* broadband end-users to address congestion on the network. Apart from addressing this pricing problem, network neutrality regulation would also prohibit an access provider from denying its users access to a specific website or Internet application, or from degrading the quality of such access.

Relatively speaking, the access-blocking issue turns out not to be the conceptually difficult or controversial component of network neutrality. Consequently, the more significant effect of network neutrality regulation would be to require an access provider to recover the full cost of its broadband network through disproportionately higher charges imposed on all end-users, with the possibility that high-intensity users pay a surcharge based on the volume of content downloaded or on the priority of delivery for specific traffic. By making end-users pay for the full cost of broadband access,

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Competition Promotion Program 2010, at 16–17, Annex 2, at 23–35 (July 2006) (study group recommendations to Japanese Ministry of Internal Affairs and Communications), *available at* http://www.soumu.go.jp/joho_tsusin/eng/Releases/Telecommunications/pdf/news060719_1_02.pdf. Organization for Economic Cooperation and Development, Network Neutrality: A Policy Overview (2006) [hereinafter OECD Network Neutrality Study]; Mark Odell & Richard Waters, *Move to Levy New Online Charges*, Fin. Times, Mar. 28, 2006, *available at* http://www.ft.com/cms/s/f0f2e74a-be9a-11-da-b10f-00007 79e2340. html.

[3] *See* H.R. 5252, 109th Cong. (2006); Final Vote Results for Roll Call 239 on H.R. 5252, *available at* http://clerk.house.gov/evs/2006/roll239.xml; Stephen Labaton, *House Backs Telecom Bill Favoring Phone Companies*, N.Y. Times, June 9, 2006, at C3.

network neutrality regulation would deny broadband access to the large number of consumers who would not be able to afford, or who would not have the willingness to pay for, what would otherwise be less expensive access. That result would compromise the inclusiveness of the network, which has been a goal of telecommunications policy for more than a century. The result also would be contrary to the observed business models of (unregulated) providers of Internet content and applications. For example, Google intends to offer broadband access to end-users for free in San Francisco by charging other content providers for advertising. This product offering is evidently predicated on the belief that many end-users demand discounted or free broadband access that is paid for by parties other than themselves. The natural question to ask is: Why would it advance consumer welfare to exclude particular categories of firms from entering into transactions with third parties in a manner that would make broadband access available to the price-sensitive or income-sensitive consumers who currently forgo the service?

Given what is at stake in terms of consumer welfare, the arguments offered in favor of network neutrality regulation have, to date, exhibited a staggering lack of economic rigor. Even the most respected academic proponents of network neutrality have resorted to slogans. For example, in testimony before the Senate in April 2006, Professor Timothy Wu of Columbia Law School analogized access tiering to the business tactics of the Mafia.[4] In June 2006, Professor Lawrence Lessig of Stanford Law School wrote, with a co-author, that content providers who refrain from purchasing priority delivery would be relegated "to the digital equivalent of a winding dirt road."[5]

To address the current intellectual deficit in the network neutrality debate, I begin, in Section II of this article, by explaining the salient cost and demand characteristics of telecommunications networks. I explain how economic welfare relates to the optimal pricing of bandwidth and priority of delivery. I then explain how the common law foundations of property in broadband networks— possession, use, and disposition—shed light on the network neutrality debate. Fundamental principles of network economics and welfare economics imply several rights that, as a normative matter, owners of broadband networks should possess if our objective is to elevate economic welfare, as measured in consumer and producer surplus. As a positive matter, these rights of network ownership already exist, if one simply examines and applies established

[4] *See Hearing on Network Neutrality: Telecommunications Competition, Innovation, and Nondiscriminatory Access Before the H. Comm. on the Judiciary Antitrust Task Force*, 109th Cong. (2006) (statement of Timothy Wu, Professor, Columbia Law School) ("a firm like AT&T .... can, through implicit threats of degradation, extract a kind of protection money for those with the resources to pay up. It's basically the Tony Soprano model of networking ...."); *see also* Lawrence Lessig & Robert W. McChesney, *No Tolls on the Internet*, WASH. POST, June 8, 2006, at A23 (repeating Wu's analogy to the Mafia).

[5] Lessig & McChesney, *supra* note 4.

doctrines and principles from the common law, telecommunication law, and antitrust law. Recognition of that fact has eluded policy makers. So far, regulators have articulated the rights, or "freedoms," of end-users of the Internet but have failed to articulate what rights that are relevant to the network neutrality debate belong to a network operator that invests private capital to build a broadband network. I respond to this conspicuous omission by proposing that the owner of a broadband network has at least six fundamental rights, consisting of the rights to:

- innovate on its network;
- unilaterally price the use of its network in any way that does not violate antitrust law;
- refuse to carry content or applications that present a legitimate risk to the security or performance of its network or of the devices that the network operator's subscribers attach to the network;
- prioritize packets of data for delivery on its network;
- reserve capacity on its network;
- use capacity on its network to vertically integrate into the provision of content or applications.

The reason that these six rights have not previously been articulated in the network neutrality debate may rest in the fundamental difference between engineering and economic perspectives on how the transmission of information over the network creates value to society. When faced with a capacity constraint on transmission, an engineer might be inclined to regard the prioritization of one packet of information over another as a zero-sum game. The reasoning is that moving one randomly assigned packet to the front of the queue moves at least one other packet back one slot. To an economist, however, that reasoning is fallacious, because not all bits of information are created equal: some information is more valuable to its human sender or receiver (or both) than other bits of information. It increases the economic welfare of society to deliver highly valued, time-sensitive packets more quickly than low-valued or time-insensitive packets. In this sense, the implicit theme of advocates of network neutrality regulation—that the random delivery of packets enhances social welfare relative to prioritized delivery because it preserves something akin to a Rawlsian veil of ignorance that fairly and unknowingly allocates capacity on the Internet—fails to take advantage of the most elemental lessons that economics teaches about the allocation of scarce resources, including the scarce resources that are necessarily consumed to produce and operate telecommunications networks.

Proposals for network neutrality regulation are grounded in a smorgasbord of alleged market failures, the most significant of which concerns innovation. In Section III, I analyze the innovation within the network and at the edges of the network that has occurred since the deregulation of broadband Internet

access in the United States. That deregulation was the catalyst for substantial innovation within the network, leading to improvements in investment, broadband penetration, broadband pricing, and broadband deployment. The deregulatory environment has also fostered innovation at the edges of the network, resulting in increased investment, applications, and subscribership. Given the amount of innovation within the network and at the edges of the network, it seems improbable that the current deregulatory regime has produced a socially suboptimal level of innovation. Yet even if one assumes, counterfactually, that the actual amount of innovation is less than socially optimal, it is doubtful that telecommunications law would be the most efficacious instrument to address the alleged market failure.

In Section IV, I analyze how proposed network neutrality regulation would alter the current regulatory regime to remedy the principal allegations of market failure. Despite there being considerable inconsistency and vagueness among the various proponents of network neutrality, three normative themes emerge. The first is that access providers should not deny or degrade access to specific content and applications on the Internet and to specific hardware that attaches to the user's computer. Second, network operators should not condition the quality of service for delivery of content upon the payment of a fee—the business practice (not yet practiced) known as access tiering. The third main theme is that network operators should not vertically integrate into the production of content or applications, including advertiser-supported services.

In Section V, I examine the first normative theme—that network operators should be prohibited from denying end-users access to specific content or applications, and from degrading the quality of such access. Although the competitive effects of such conduct, if it were to occur, would be significant, the likelihood that any network operator facing a modicum of downstream competition would engage in such conduct is remote. Because compelling content increases the demand for broadband access, and because network operators are not yet vertically integrated into the production of interactive broadband content, a network operator would not choose to sacrifice its downstream profits from the sale of broadband connections by denying its users access to a particular website. Because they weigh so heavily in the arguments made by proponents of network neutrality regulation, I analyze the extent to which the four anecdotes of discrimination provided by Professors Lessig and Wu are still applicable, given the current state of competition for broadband access. I find no evidence that blocking of content or applications has increased since Wu surveyed the conditions contained in the service agreements of network operators in 2002. To the contrary, one observes voluntary pledges by the largest telephone and cable companies not to block access to lawful content or applications. Clearly, those network operators would not unilaterally forgo the right to deny access unless they considered it to be worthless. Moreover, both the Federal Communications Commission (FCC) and the

Federal Trade Commission have stated that they have the jurisdiction and the tools under existing law to protect unaffiliated content providers from having customers' access to their content blocked or degraded. Finally, I address the concerns that specialized regulatory rules are necessary to ensure that end-users have unfettered access to political websites and that political action groups, as diverse as MoveOn.org and the Swift Boat Veterans for Truth, are not relegated to the "slow lane" of the Internet, thus raising their cost of political advocacy. Although the portrayal of network neutrality as a competition issue concerning blockage of content may have visceral appeal to legislators and journalists, the true impetus to enact network neutrality regulation may relate more closely to the business models of advocacy groups that use the Internet to advance their political causes or to raise funding.

In Section VI, I examine the second normative theme—that network operators should be prohibited from offering access tiering. I first analyze whether a network operator's level of market power affects the pricing of bandwidth differently than the pricing of priority of packet delivery. Contrary to the conventional wisdom, unfettered access tiering would not harm a content provider who does not contract for priority delivery. Because access speeds will continue to increase, the default quality of service will continue to improve. Hence, a content provider who does not contract for priority delivery cannot be harmed in any *absolute* sense—his content will be delivered in fewer nanoseconds a year from now than it is delivered today. Rather than being forced down Lessig's "digital equivalent of a winding dirt road," these content providers would be relegated to something more like a business-class seat on a flight to Paris. Moreover, because few Internet applications currently require real-time functionality, and because the incremental effect of prioritization on quality in the face of ever-increasing access speeds is decreasing, a content provider who does not contract for priority delivery is not likely to be harmed in a *relative* sense to any extent great enough to be commercially significant. Apart from producing no benefits to consumers of content, a ban on access tiering would decrease social welfare for at least five reasons. First, a ban would decrease the quantity of prioritized delivery, given the differences in demand for priority among advertisers and end-users. Second, upstart content providers would be discouraged from developing real-time applications by virtue of the uncertainty over their ability to contract for priority with access providers. Third, contracting for priority delivery between end-users and access providers would generate greater transaction costs than would contracting between advertisers and access providers. Fourth, content providers are better positioned to price for priority according to application-specific price elasticities of demand, which is consistent with socially optimal pricing under Ramsey principles. Fifth, even under the weak form of a ban on access tiering, which would create classes of customers across which differential pricing could be employed, the costs of administering the regulatory

price-setting apparatus would be significant. Despite having these net costs to social welfare, network neutrality regulation that prohibited access tiering would privately benefit incumbent providers of content or applications—which explains their support for it.

In Section VII, I analyze the third normative theme—that network operators should be prevented from vertically integrating into the production of content or applications. This kind of ban on vertical integration would decrease social welfare for two reasons. First, network operators would not be able to capture significant economies of scope, which could be shared with end-users through lower prices for broadband access. Second, network operators would not be able to derive advertising revenues, which they could use (and, given competitive pressures, would be compelled to use) to subsidize access prices charged to end-users. Again, despite having these net costs to social welfare, network neutrality regulation that prohibited a network operator from vertically integrating into content or applications would privately benefit incumbent providers of content or applications.

The call for network neutrality regulation is an endorsement of ex ante regulation rather than reliance on ex post liability rules. In Section VIII, I evaluate the respective costs and benefits of ex ante regulation versus ex post liability rules. This analysis implicates the familiar problem of type I and type II errors. As is well recognized in the literature on optimal regulation, consumer welfare is greatest under the rule that minimizes the sum of the costs generated by each type of error. The rapid technological change surrounding the Internet, combined with the nascent state of development of applications that can commercially exploit real-time delivery, makes it implausible that ex ante prohibitions would minimize the sum of type I and type II errors. Ex ante regulation in the name of network neutrality would be a costly mistake that policy makers still have the ability to avoid.

II. DEFINING THE RIGHTS OF OWNERS OF BROADBAND NETWORKS: LEGAL AND ECONOMIC PRINCIPLES

The public dialogue over network neutrality regulation is full of rhetoric about the rights or "freedoms" of Internet users. Yet the same debate has little explicit recognition that such networks come into existence only as a result of investment in risky activities that entail substantial sunk costs. Consequently, the network neutrality debate is devoid of analysis of the rights that accrue to the owners of broadband networks. I examine here what those rights might be. To do so, it is necessary to understand the salient cost and demand characteristics of telecommunications networks and the Internet. That economic analysis suggests, as a normative matter, what rights a network owner should have. Then, after considering how the common law elements of property law relate to networks, it is possible to articulate, as a positive matter, six specific rights that network operators

already possess subject to certain principles and constraints additionally imposed by telecommunications law and antitrust law. The normative and positive conclusions concerning the rights of network owners dovetail with an ease that policy makers and combatants involved in the network neutrality controversy certainly have not acknowledged.

A. The Salient Cost and Demand Characteristics of Telecommunications Networks and the Internet

Few industries studied by economists have received such intensive theoretical and empirical analysis as telecommunications. Today, regulators in the United States and other OECD nations understand very well how the unique cost characteristics and demand characteristics of telecommunications networks affect market outcomes and the efficacy of regulatory intervention. To understand how network neutrality regulation would affect economic welfare, one must first appreciate the salient economic features of telecommunications networks.[6]

1. Sunk Costs and Economies of Scale and Scope

A broadband network requires substantial sunk investment.[7] Private investors will fund the construction of a broadband network only if they have a reasonable expectation that the company making that investment will recover the cost of its investment, including a competitive (risk-adjusted) return on capital. Sunk investment is not a one-shot deal; sunk investment is made continuously over time. Therefore, as soon as the capital markets understand that a new regulatory obligation or regime like network neutrality will jeopardize a firm's recovery of its sunk costs, they will demand a higher return. As the cost of capital rises to compensate for this new regulatory risk, incremental sunk investment in the network will be more costly for its owner, and the likelihood that the network will be completed according to its originally intended scale will diminish.

A broadband network also exhibits economies of scale. The large sunk costs of building a broadband network imply that the marginal cost of providing service to one more consumer is very low. However, marginal cost pricing is insufficient to recover even the average variable cost of the network, much less the average total cost, which would be necessary to recover the sunk costs of building the network. In economic theory, the solution to this problem is to charge consumers a lump sum fee to recover the sunk costs and to price usage at marginal cost. In a regime of regulated pricing,

[6] *Hearing on Net Neutrality Before the S. Comm. on Commerce, Science, and Transp.*, 109th Cong. (2006) (statement of J. Gregory Sidak).

[7] *See, e.g.*, Jerry A. Hausman & J. Gregory Sidak, *A Consumer-Welfare Approach to the Mandatory Unbundling of Telecommunication Networks*, 109 YALE L.J. 417 (1999).

however, this solution is impossible for political reasons because the lump sum fee could be enormous. So firms or regulators attempt to identify prices for usage that reflect what has become known as the "optimal departure from marginal cost pricing."[8]

A broadband network exhibits economies of scope. In other words, there are synergistic "common costs" to producing multiple products over the same network. The products may have substantially different demand characteristics, including different own-price elasticities of demand. A multiproduct firm can earn contributions to the recovery of the sunk costs of its broadband network from each of its services. In the case of a regulated monopoly, economic welfare is maximized when the pricing of each such product makes a contribution to the recovery of sunk costs that is inversely proportional to its own-price elasticity of demand, such that the firm's total revenues equal its total costs. Courts, regulators, and scholars refer to this familiar pricing rule as Ramsey pricing.[9]

2. Network Externalities

One of the most important results from the literature on network economics is the creation, in some product markets, of network externalities.[10] Positive network externalities are benefits to society that accrue as the size of a network grows. For example, an individual consumer's demand to use (and hence her benefit from) the telephone network increases with the number of other users on the network whom she can call or from whom she can receive calls.[11] Some telecommunications regulations, such as policies promoting

[8] *See* WILLIAM J. BAUMOL & J. GREGORY SIDAK, TOWARD COMPETITION IN LOCAL TELEPHONY 35–40 (MIT Press & AEI Press 1994); William J. Baumol & David F. Bradford, *Optimal Departures from Marginal Cost Pricing*, 60 AM. ECON. REV. 265 (1970); *see also* JEAN-JACQUES LAFFONT & JEAN TIROLE, COMPETITION IN TELECOMMUNICATIONS 60–65 (MIT Press 2000).

[9] Frank Ramsey, *A Contribution to the Theory of Taxation*, 37 ECON. J. 47 (1927). The relevance of Ramsey's seminal article to public utility pricing was first enunciated in Marcel Boiteux, *Sur la Gestion des Monopoles Publics Astreints à l'Equilibre Budgétaire*, 24 ECONOMETRICA 22 (1956), *republished in English as* Marcel Boiteux, *On the Management of Public Monopolies Subject to Budgetary Constraints*, 3 J. ECON. THEORY 219 (1971).

[10] The seminal paper in the literature on network effects is Jeffrey Rohlfs, *A Theory of Interdependent Demand for a Communications Service*, 5 BELL. J. ECON. & MGMT. SCI. 16 (1974). For subsequent contributions to the literature, see Joseph Farrell & Garth Saloner, *Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation*, 76 AM. ECON. REV. 940 (1986); Michael L. Katz & Carl Shapiro, *Product Compatibility Choice in a Market with Technological Progress*, 38 OXFORD ECON. PAPERS 146 (1986); Joseph Farrell & Garth Saloner, *Standardization, Compatibility, and Innovation*, 16 RAND J. ECON. 70 (1985); Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985).

[11] *See*, *e.g.*, MASSIMO MOTTA, COMPETITION POLICY: THEORY AND PRACTICE 82 (Cambridge Univ. Press 2004); LESTER D. TAYLOR, TELECOMMUNICATIONS DEMAND IN THEORY AND PRACTICE 9 (Kluwer Academic Press 1994); BRIDGER M. MITCHELL & INGO VOGELSANG, TELECOMMUNICATIONS PRICING: THEORY AND PRACTICE 11 (Cambridge Univ. Press 1991); JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 405 (MIT Press 1988);

universal service, are justified as a means to capture, for consumers as a whole, the benefits of network externalities that accrue as the size of the network grows.[12] Such externalities will vary with both the number of consumers having access to the network and the amount by which each consumer uses the network. Network externalities become less important as more and more subscribers are connected to the network. This economic relationship has substantial public policy implications, as it is essential that legislators adequately consider the positive network effects that could be eliminated by potential regulatory actions. In terms of proposed network neutrality regulation, as explained below, pricing policies that produce Pareto improvements that increase the size of the broadband Internet access network should be encouraged, not prohibited.

When economists speak of network externalities, they usually refer, as the paragraph above does, to positive spillovers that arise from higher levels of network access and usage. Economists have given less attention to the negative externalities from higher levels of telecommunications network usage. Nonetheless, negative network externalities relating to congestion plainly arise, notwithstanding the conventional view that networks have such expansive economies of scale that capacity is seemingly unlimited. Telecommunications networks are certainly susceptible to congestion. For that reason, correct price signals must be used at every possible point in the network so that users who congest the network bear the social cost of their behavior.[13] If, instead, the owner of a broadband network were constrained to charge the same price to every end-user, regardless of the amount of network congestion that the user created, the result would be excess demand and reduced supply—which is to say, shortages of bandwidth and slower transmission speeds.

Internet users are increasingly straining the capacity of broadband networks. For example, peer-to-peer applications first were used to share music files, but have since expanded into other applications. Peer-to-peer software does not use a central server or location to store or route information.[14] In its first iteration, Napster relied on central servers to keep real-time lists of files available

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Stanley J. Liebowitz & Stephen E. Margolis, *Network Effects*, 1 HANDBOOK OF TELECOMMUNICATIONS ECONOMICS 76 (Martin E. Cave, Sumit K. Majumadar & Ingo Vogelsang eds., 2002); Nicholas Economides, *The Economics of Networks*, 16 INT'L J. INDUS. ORG. 673 (1996).

[12] *See, e.g.*, MILTON L. MUELLER, JR., UNIVERSAL SERVICE: COMPETITION, INTERCONNECTION, AND MONOPOLY IN THE MAKING OF THE AMERICAN TELEPHONE SYSTEM (MIT Press & AEI Press 1997).

[13] *See* Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 95 GEO. L.J. 1847 (2006); Christopher S. Yoo, *Beyond Network Neutrality*, 19 HARV. J.L. & TECH. 1 (2005); Christopher S. Yoo, *Would Mandating Broadband Network Neutrality Help or Hurt Competition? A Comment on the End-to-End Debate*, 3 J. TELECOM. & HIGH TECH. L. 23 (2004); J. Gregory Sidak & Daniel F. Spulber, *Cyberjam: The Law and Economics of Internet Congestion of the Telephone Network*, 21 HARV. J.L. & PUB. POL'Y 327 (1998).

[14] *See* Metro-Goldwyn-Mayer Studios, Inc. v. Grokster, Ltd., 545 U.S. 913, 915 (2005).

for downloading, but later iterations removed this requirement by shifting listing duties to a distribution of users.[15] Gnutella, Freenet, KaZaA, Morpheus, and Grokster are all music sharing software networks that do not use centralized servers.[16] KaZaA, Morpheus, and Grokster all relied on Fast-Track software to connect to users who, using one application, could access files on other applications if they both shared the Fast-Track software.[17]

Within one year of its release, Napster had 20 million users.[18] Before Napster was shut down, its users numbered over 60 million and had shared over one billion songs.[19] Napster was shut down in its free peer-to-peer format by the Ninth Circuit on February 12, 2001.[20] Grokster achieved the same kind of sudden popularity before being shut down on November 7, 2005 after losing its copyright infringement case in the Supreme Court.[21]

In March 2006, the European Center for Nuclear Research (CERN) in Geneva, the world's largest particle physics laboratory and birthplace of the World Wide Web, banned the use of the Skype voice over Internet protocol (VoIP) service.[22] Among CERN's reasons for blocking Skype were (1) Skype's procedure of relying on users' computers for processor speed and Internet bandwidth to route traffic to store database information, and transforming some computers into so-called "supernodes" that carry disproportionately large burdens, (2) the potential security risks associated with Skype's ability to pass calls through firewalls, and (3) the existing or potential legal ramifications for passing a large amount of telecommunications traffic.[23] Other large institutions and corporations around the world—including the multinational pharmaceutical company Novartis, universities in the United Kingdom and the United States, and European government agencies—have barred Skype for similar reasons.[24] CERN's decision to block Skype suggests that network owners may have legitimate reasons to block certain services,

[15] *See* Peter Jan Honigsberg, *The Evolution and Revolution of Napster*, 36 U.S.F. L. REV 473, 475–76 (2002).
[16] *Id.* at 476.
[17] *Id.*
[18] *Id.* at 474.
[19] *Id.* at 474–75.
[20] A&M Records, Inc. v. Napster, Inc., 239 F.3d 1004 (9th Cir. 2001).
[21] *Grokster*, 125 S. Ct. 2764. The Court rejected Grokster's *Sony* "safe-harbor" defense under which "the sale of copying equipment, like the sale of other articles of commerce, does not constitute contributory infringement if the product is widely used for legitimate, unobjectionable purposes. Indeed, it need merely be capable of substantial non-infringing uses." *Id.* at 2783 (quoting Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 442 (1984)). In *Grokster*, the Court held that "one who distributes a device with the object of promoting its use to infringe copyright, as shown by clear expression or other affirmative steps taken to foster infringement, is liable for the resulting acts of infringement by third parties." *Id.*
[22] Bruno Giussani, *The Fine Print*, WALL ST.J. EUR., Mar. 29, 2006.
[23] *Id.*
[24] *Id.*

such as peer-to-peer applications, based solely on their effect on computer performance and network integrity.

3. Multisided Markets

Telecommunications services have joint demand. For example, a telephone call is valued by both the caller and the recipient, and a visit to a website is valued by both the consumer doing the browsing and the owner of the website. In a "two-sided" market of this sort, the demand that one party has for the product is complementary to the demand that the other party has.[25] Over-the-air television programs are free to the viewer because advertisers pay broadcasters to assemble audiences to receive advertisements. Google searches are free to Internet users because Google sells highly focused advertising that responds to the interests revealed by the Internet user's search request. The owner of a broadband network faces a multisided market because it needs content providers to supply content and applications on the Internet, and it also needs end-users to demand access to the Internet content. In this way, a network operator can be considered an intermediary who brings together two parties (the end-user and the content provider) to an exchange that occurs over the Internet.

A multisided market has significant implications for achieving Pareto improvements. That is clearly the case with respect to Internet content and applications. Conditional on advertisers having a greater willingness to pay for priority delivery than end-users, the ability to charge content providers (and their advertisers) for priority delivery of data packets will generate a greater quantity of prioritization and a correspondingly greater level of consumer surplus. This economic insight is hardly new. Robert Crandall and I made this identical point in 1995 concerning universal service policy for (then-unbuilt) interactive broadband networks:

> [P]olicymakers should consider that advertisers are, in a manner of speaking, a potential source of subsidies for access to, and usage of, interactive broadband networks. Advertisers, of course, have long subsidized the consumption of "free" programming offered by radio broadcasters and over-the-air television stations. Similarly, the presence of advertising on cable television enables consumers to pay a lower subscription fee than they otherwise would be charged. Moreover, the interests of advertisers are closely aligned with those of consumers of programming in the sense that both groups seek policies that expand output and reduce prices for telecommunications services of all kinds, irrespective of the technological mode of signal delivery. Regulation that restricts output in telecommunications markets impairs the welfare of both viewers and advertisers. This commonality of interests arises from the fact that the demand for broadcast programming—and, by extension, the demand for interactive broadband services—is the vertical summation of two demand curves: the viewers' demand for

[25] *See, e.g.*, David S. Evans, *The Antitrust Economics of Multi-Sided Platform Markets*, 20 YALE J. ON REG. 325 (2003); Jean-Charles Rochet & Jean Tirole, *Platform Competition in Two-Sided Markets*, 4 J. EUR. ECON. ASS'N 990 (2003). The seminal article on two-sided markets is William F. Baxter, *Bank Interchange of Transactional Paper: Legal and Economic Perspectives*, 26 J.L. & ECON. 541 (1983).

> programming and the advertisers' demand for audiences. As in the case of any multiproduct firm, the provider of interactive broadband services will likely have common fixed costs of production that are high relative to the incremental costs of programming or infrastructure deployment. Those common fixed costs are optimally distributed in inverse relation to the elasticity of demand. Access charges and usage charges can be borne either by the advertiser or the subscriber. If, however, the advertiser has the more price-inelastic demand, it is optimal from the perspective of economic efficiency for the advertiser to bear the disproportionate share of those costs. This result may also be considered equitable in the sense that it advances the goal of universal service by keeping the prices of access to, and usage of, interactive broadband networks lower than they would be in the absence of advertiser support.[26]

In short, each party in a two-sided market can contribute to the recovery of the sunk costs required to build a broadband network. There is certainly no basis in economic theory to presume that it would be socially optimal for end-users to pay for all of the cost of building a high-speed broadband network while the companies that deliver content or applications to those same end-users over that network—and therefore derive substantial economic advantage from its use—pay nothing. The ability to charge content providers for priority delivery would also increase economic welfare by increasing broadband penetration, because it would enable network operators to subsidize access prices for income-constrained or price-sensitive end-users who currently forgo broadband entirely.

4. Complementarity of Demand Among the Network, Content, Applications, and Devices

Complementarity of demand exists among the network, content, applications, and devices. Network operators rely on Internet content, applications, and devices to attract end-users to subscribe to Internet access. Email was the "killer-application" that generated the demand for dial-up Internet access. Without email, there would have been significantly less need for dial-up Internet access. Downloading graphics-intensive images and videos was made possible by broadband connections, but broadband penetration did not really accelerate in the United States until the price of broadband access approached the price of dial-up access and a second telephone line.

It is a well-established economic principle that, if the demand for A increases with the demand for B, then even a monopoly provider of A would have absolutely no incentive to harm the demand for B. Given the strong complementarity of demand for broadband access and broadband content, network operators have no incentive to harm the demand for Internet content, applications, or devices, because to do so would harm the demand for broadband access. Network operators in the United States recently invested billions of dollars to build third-generation Internet access

[26] Robert W. Crandall & J. Gregory Sidak, *Competition and Regulatory Policies for Interactive Broadband Networks*, 68 S. CAL. L. REV. 1203, 1219–20 (1995).

networks.[27] One feature of these "core" networks is to allow for priority delivery for real-time applications, whatever they eventually might be.[28] It would be foolish for a network to stymie the development of, and the demand for, real-time applications. Doing so would squander billions of dollars in sunk investments.

5. *Quality of Service*

An access provider's network consists of two components: (1) a multi-purpose backbone network used to carry traffic within and between regions and (2) an access network such as DSL, cable, or fiber-to-the-home (FTTH) that connects to end-users. All exchange of traffic over backbone networks is commercially negotiated between access providers without regulatory oversight.[29] The relationship between backbones takes one of two forms, peering or transiting.[30] In a peering relationship, two backbone providers contract to provide service to their own end-users at no cost.[31] Transit arrangements involve payment from one backbone to another.[32] A peering backbone provider will not provide delivery to its peering providers, but a backbone provider with a transit agreement must provide service to its peering partners.[33] Packets that enter the backbone network destined for broadband customers are typically treated equally on a best-efforts basis within the logical portion of the network reserved for broadband data.[34] A content provider can transmit data to an end-user by either purchasing backbone from the end-user's access provider directly (higher quality) or by purchasing backbone from another access provider that has a peering relationship with the end-user's access provider (lower quality). The quality differential between the two options can be lessened through a process known as local or dynamic caching, in which the content provider's content is replicated on a server

[27] As of January 2006, Verizon had spent $2 billion on its fiber-to-the-home "FiOS" network. *See* John Dix, *Verizon Counting on FiOS Advantage*, NETWORK WORLD, Jan. 23, 2006, *available at* http://www.networkingsmallbusiness.com/columnists/2006/012306edit.html.

[28] HSBC GLOBAL RESEARCH, NET NEUTRALITY: TELECOMS MUST MONETISE THE NET RATHER THAN BE TRAPPED IN IT—WE SET OUT OUR 'ABC' PATH TO FREEDOM 25 (2006).

[29] *See*, *e.g.*, Michael Kende, The Digital Handshake: Connecting Internet Backbones, OPP Working Paper No. 32, at 4, *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp32.pdf.

[30] *Id.*

[31] *Id.* at 5.

[32] *Id.*

[33] *Id.* at 7.

[34] *Id.* at 6. Best-efforts delivery of data packets provides no error checking or tracking, and no guarantee of delivery. *See* BEHROUZ A. FOROUZAN, TCP/IP PROTOCOL SUITE 33 (McGraw Hill 2d ed. 2003). Forouzan analogizes best-efforts delivery of data packets to the physical delivery of mail:

> The post office does its best to deliver the mail but does not always succeed. If an unregistered letter is lost, it is up to the sender or would-be recipient to discover the loss and rectify the problem. The post office itself does not keep track of every letter and cannot notify a sender of loss or damage.

that resides within the service territory of the end-user's access provider.[35] Finally, a backbone network may carry other traffic (for example, enterprise traffic) in addition to broadband Internet traffic. Such traffic might be separated from broadband Internet traffic to mitigate congestion problems.

Like the backbone network, the access network may be designed to logically separate and support other traffic, such as voice or video service. Suppose an access provider requires a path to support 100 Mbps of broadband Internet traffic in support of a data offering and 100 Mbps of traffic in support of a video service. Instead of designing and funding two separate networks, the access provider can create one underlying infrastructure with enough capacity (200 Mbps) to support both services. The access provider can reserve half of the available bandwidth (100 of 200 Mbps) for broadband Internet service and the other half for video service (100 of 200 Mbps). In a multi-service architecture, video traffic will be unaffected by congestion in the broadband Internet portion. Indeed, the network could be designed such that, if some of the video capacity is not being used for video, then the broadband Internet traffic could use that extra capacity. This potential for sharing capacity creates another benefit compared to building two physically separate networks.

The ability of a network to discriminate with respect to service type is not new. From a very early point, Internet designers recognized a need for the prioritization for certain types of Internet data. Most of the early writings on Transfer Communication Protocol/Internet Protocol (TCP/IP) are contained in a series of informal papers known as Requests for Comments (RFC).[36] Several RFCs indicate that prioritization has always been considered an important design characteristic for TCP/IP. In a 1974 RFC, Vinton Cerf, Yogen Dalal, and Carl Sunshine argued that certain packets should be given priority over other packets to prevent congestion: "From the standpoint of controlling buffer congestion, it appears better to *treat incoming packets with higher priority than outgoing packets*."[37] In RFC 791 in September 1981, precedence was included as a means of differentiating high priority traffic from low priority traffic.[38] In a June 1994 RFC, research scientists David Clark, Scott Shenker, and Robert Braden predicted that bandwidth constraints

[35] *See*, *e.g.*, AKAMAI TECHNOLOGIES, INC., ANNUAL REPORT (S.E.C. FORM 10-K), at 13 (Mar. 16, 2006) ("In 2005, we began commercial sales of our Web Application Accelerator service, which is designed to improve the performance of Web- and IP-based applications through a combination of dynamic caching, compression of large packets, routing and connection optimization.").

[36] The RFC document series is a set of technical and organizational notes about the Internet that was first published at UCLA in 1969. *See* 30 Years of RFCs, Apr. 7, 1999, *available at* ftp://ftp.rfc-editor.org/in-notes/rfc2555.txt.

[37] Vinton Cerf, Yogen Dalai & Carl Sunshine, RFC 675-Specifications of Internet Transmission Control Program, Dec. 1974, *available at* http://www.faqs.org/rfcs/rfc675.html (emphasis in original).

[38] Information Sciences Institute, Internet Protocol Darpa Internet Program Protocol Specification, RFC 791, Sept. 1981, *available at* http://www.ietf.org/rfc/rfc0791.txt.

would eventually harm the delivery of real-time applications.[39] They suggested that an arrangement for some traffic to receive different treatment than other traffic was advisable and that "simple priority"—such as that described in RFC 791—was not enough.[40]

Routers can be programmed to inspect packets to give priority. In particular, packet headers use three precedence bits to specify a packet's priority for routing purposes.[41] The three bits of precedence correlate to seven levels of priority (seven being the highest priority).[42] Although some routers ignore the type of service specified through precedence bits, prioritization remains an important TCP/IP tool.[43] Many routers use a precedence value of six or seven for routing traffic so that routers can exchange routing information when networks are congested.[44] Even when networks are not congested, prioritization can be used for real-time applications. Indeed, the needs of real-time applications presented a challenge to TCP/IP as early as 2000. For example, the handling of real-time applications was cited as the second most important reason for the update of TCP/IP v4.[45]

Modern networks support quality-of-service (QoS), which can label some traffic as higher priority than other traffic. During times of congestion, the lower priority traffic would be dropped first. In a 1998 training textbook, Cisco Systems explained that information in packet headers can be used to control QoS.[46] In addition to the three bits used for precedence, packet headers contain four more bits known as Type Of Service (TOS) bits.[47] According to Cisco's textbook, TOS bits are seldom used in modern internetworking, but precedence bits are frequently used for QoS applications.[48] Cisco's textbook presents an example of code that would implement QoS using TOS and precedence bits.[49]

If there is congestion at routers along the path, then packets are randomly dropped. This process is known as Random Early Discard (RED).[50] Dropping packets only when buffer memory is full—known as a tail-drop

[39] Robert Braden, David Clark & Scott Shenker, Integrated Services in the Internet Architecture: An Overview RFC 1633, Jun. 1994, at 3, *available at* http://www.ietf.org/rfc/rfc1633.txt.

[40] *Id.* at 3–4 ("In the case of simple priority, the issue is that as soon as there are too many real-time streams competing for the higher priority, every stream is degraded. Restricting our service to this single failure mode is unacceptable.").

[41] *See* DOUGLAS E. COMER, INTERNETWORKING WITH TCP/IP VOL I: PRINCIPLES, PROTOCOLS, AND ARCHITECTURE 99 (Prentice Hall 4th ed. 2000).

[42] *Id.* In binary, three digits are required to count to the number seven.

[43] *Id.*

[44] *Id.*

[45] *Id.* at 601.

[46] *See* JEFF DOYLE, CCIE PROFESSIONAL DEVELOPMENT: ROUTING TCP/IP 820 (Cisco Press 1998).

[47] *Id.*

[48] *Id.* at 820.

[49] *Id.* at 822.

[50] *See* COMER, *supra* note 41, at 236.

policy—can cause global traffic synchronization.[51] Routers employ RED to avoid synchronized delays. A RED router uses a minimum and maximum value to randomly drop packets before buffer memory is actually constrained.[52] When a RED router's buffer queue exceeds a minimum value, the router will randomly drop new packets according to a set probability distribution.[53] Packets can also be dropped for deliberate reasons. At the edge location where access providers enforce the bandwidth for the service tier that a customer has paid for, the mechanism used to limit a customer's bandwidth (usually called traffic shaping) involves dropping packets. The packets are randomly dropped within a customer's traffic when it reaches the limit unless there are different levels of QoS. It is also possible for packet loss to occur because of packet collision. Two computers can transmit data simultaneously because both sense that the network is idle.[54]

Some access providers use packet inspection to put limits on the amount of bandwidth that a certain kind of traffic (such as peer-to-peer traffic) can consume, so as to prevent that traffic (often coming from a small percentage of customers) from overwhelming the network and reducing performance for a majority of customers who are doing simple things such as web surfing and e-mail. Such limits would be enforced by dropping packets of that particular kind of traffic. Alternatively, an access provider could use packet inspection to limit the amount of bandwidth a given customer consumes if he or she exceeds some quota.

B. Welfare Economics and the Pricing of Broadband Delivery

In the absence of externalities, the voluntary exchange inherent in market transactions enhances social welfare because it makes both buyer and seller better off. The transaction constitutes a Pareto improvement in welfare. This result holds even when the seller is a monopolist. In a world of scarce resources, the selection of one transaction implies a decision to reject and forgo others. Unless both the buyer and the seller agree to terms, no transaction will occur. By its very nature, voluntary exchange increases social welfare.

Welfare economics finds that regulatory action is justified only when a specific market imperfection is evident and when the benefit from correcting that market imperfection exceeds the cost of properly regulating the market.[55] If a market imperfection is not apparent, or if the benefits of correcting that imperfection are small, then intervention risks causing more harm

[51] *Id.*
[52] *Id.*
[53] *Id.*
[54] *Id.* at 28.
[55] *See, e.g.*, Michael Katz & Harvey Rosen, Microeconomics 398–99 (McGraw-Hill 3d ed. 1998).

than good to social welfare. A basic objective of economics is the pursuit of welfare improvements, especially those that can be obtained without causing any offsetting welfare losses. Differential pricing and non-linear pricing of access to a network can be means to achieve those ends.

1. Differential Pricing and Pareto Improvements in Social Welfare

Differential pricing can increase economic welfare because it enables a firm to lower the price to consumers who would otherwise be priced out of the market if the firm were constrained to charge a higher uniform price. Specifically, when a firm engages in third-degree price discrimination—that is, when a firm charges different prices to consumers based on their willingness to pay—total social welfare will increase as long as total output increases.[56] Differential pricing is commonplace in competitive markets (such as airlines, hotels, retailing, package delivery, personal computers, and book publishing) because competition *compels* firms to adopt rival strategies to lower, to the maximum extent possible, the prices that they charge price-sensitive consumers.[57] William Baumol and Daniel Swanson have explained that "it is competition, rather than its absence, that in many cases serves to impose discriminatory pricing."[58] In particular, if a firm faces substantial fixed costs and trivial marginal costs, if its customers differ in demand patterns, and if entry and exit are relatively inexpensive, then it is straightforward to show that the firm must adopt prices that are discriminatory and exceed marginal costs to survive financially. This framework resembles a Schumpeterian "competition for the market" story: Everyone has an equal opportunity to sink costs to create a new product. However, once there are competing new products with sunk costs, all the competitors must resort to price discrimination to break even. Contrary to traditional antitrust beliefs that discriminatory pricing implies market power, Baumol and Swanson explain that "firms may be able to indulge persistently in uniform pricing only if they possess the sort of monopoly power that forecloses such competition and enables them to obtain abundant earnings."[59] They note that their framework is applicable to most innovative firms facing antitrust scrutiny, as these firms are forced by competition to sink large sums continually into research and development. Applied to the network neutrality debate, the Baumol–Swanson analysis implies that it would be perverse to prohibit owners of broadband networks,

[56] *See* Richard Schmalensee, *Output and Welfare Implications of Monopolistic Third-Degree Price Discrimination*, 71 AM. ECON. REV. 242 (1981); Marius Schwartz, *Third-Degree Price Discrimination and Output: Generalizing a Welfare Result*, 80 AM. ECON. REV. 1259 (1990); Hal R. Varian, *Price Discrimination and Social Welfare*, 75 AM. ECON. REV. 870 (1985).

[57] *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 (2003).

[58] *Id.* at 662.

[59] *Id.*

who must make significant sunk investments both initially and subsequently, from employing the same differential pricing methodology that is routinely used by firms in competitive markets. Indeed, their analysis suggests that such a prohibition on discriminatory pricing could force these firms into financial ruin.[60]

Moreover, the classic Ramsey pricing rule demonstrates that a multiproduct firm engaged in third-degree price discrimination can maximize total social welfare by pricing its products based on consumers' different price elasticities of demand—or willingness to pay—for the different products.[61] If the objective is to choose prices that maximize social welfare subject to a breakeven constraint for the firm, then the socially optimal price for a given service can be shown to depend on (1) the marginal cost of providing that service, and (2) the price elasticity of demand for that service. Introducing an additional constraint that the products shall be treated "neutrally"—that is, the prices for two different products must be equal to each other regardless of whether the price elasticities of demand for the two products differ—will necessarily decrease total social welfare.

2. Nonlinear Pricing and Self-Selecting Tariffs

Optional tariffs, also known as self-selecting tariffs, allow customers to choose between an established tariff and an alternative outlay schedule.[62] Robert Willig's seminal article in 1978 showed how optional tariffs can be used to achieve allocations that improve the welfare of the firm and all of its customers.[63] Optional tariffs therefore have had great theoretical and practical appeal. That appeal is not surprising, because the economic logic behind optional tariffs is quite intuitive.

[60] An interesting question—which I posed to Baumol at a conference in September 2005—is whether the vector of prices chosen by a multiproduct firm that was compelled by competition to resort to price discrimination would be identical to the vector of prices that would result from a regulated multiproduct monopolist setting Ramsey prices. (As noted earlier, Ramsey prices are the vector of prices that maximize the sum of consumer and producer surplus, subject to the constraint that the firm breaks even.) On further reflection, that conjecture requires modification. Owing to economies of scale, a multiproduct monopolist supplying the entire market for a given product would presumably have lower marginal costs than would one of several competing firms supplying the same market. Therefore, the monopolist's revenue requirement to break even would be lower than the sum of the revenue requirements of the several competing firms. Intuitively, however, it would seem to be the case that, if the regulated monopolist and each of the competing firms had the same cost structure,the vector of Ramsey *markups* of price over marginal cost would be identical in the two situations.

[61] *See, e.g.*, JEAN-JACQUES LAFFONT & JEAN TIROLE, A THEORY OF INCENTIVES IN PROCUREMENT AND REGULATION 172–73 (MIT Press 1993).

[62] This section draws from John C. Panzar & J. Gregory Sidak, *When Does an Optimal Tariff Not Lead to a Pareto Improvement? The Ambiguous Effects of Self-Selecting Nonlinear Pricing When Demand Is Interdependent or Firms Do Not Maximize Profit*, 2 J. COMPETITION L. & ECON. 285 (2006).

[63] Robert D. Willig, *Pareto Superior Nonlinear Outlay Schedules*, 11 BELL J. ECON. 56 (1978).

Consider the relationship between a vendor and any of its large customers. The customer makes his purchase decision on the basis of the vendor's established tariff, but before the customer reveals his decision, the vendor makes the following offer: "You may select a quantity and pay the corresponding outlay specified by my established tariff schedule. However, you may, instead, choose a quantity and pay the outlay from an alternative, specially designed tariff." If the customer chooses to use the alternative tariff, he does so because he expects to be better off. That is, the customer expects that the surplus he obtains from the specified combination of quantity and outlay chosen from the alternative tariff is higher (or at least as high) as the surplus resulting from the combination of quality and outlay that he *would have chosen* from the established tariff.

What about the vendor? Presumably, he would not introduce the alternative tariff option unless he expected that any choice the consumer might make would be more profitable for the vendor than what the consumer would have chosen under the established tariff. Finally, how are the vendor's other customers affected by the introduction of the optional tariff? With respect to their purchases, they can be no worse off *as long as the established tariff option remains available*. This result follows from the fact that consumers retain the option to select the same combination of quantity and outlay (and obtain the same level of surplus) that they would have selected had the alternative tariff never been introduced. The possibility of making the vendor and at least one consumer better off, without making any other consumer worse off, makes optional tariffs appealing to both economists and regulators. In economic terms, the introduction of an optional tariff makes possible a Pareto improvement in the allocation of resources.[64]

The analysis of optional tariffs sheds light on the network neutrality debate. A network operator could offer content providers one tariff schedule for priority delivery of data packets and another tariff schedule for unprioritized delivery. The content providers that choose to pay for priority delivery expect the surplus from the combination of the priority delivery and the additional tariff to be higher (or at least as high) as the surplus resulting from the combination of unprioritized delivery and the established tariff. The network operator is presumably better off by offering the two options to content providers. Therefore, in the absence of externalities (an assumption whose significance I examine at length in Section III in connection with arguments concerning innovation), differential pricing for content providers for the priority delivery of packets is a Pareto improvement over a "neutrality" regime that required that a single price be charged.

[64] *See, e.g.*, WILLIAM J. BAUMOL, SUPERFAIRNESS 7–9 (MIT Press 1986).

C. Common Law Foundations of Property in Broadband Networks: Possession, Use, and Disposition

At common law, ownership of property encompasses the rights to use the property, to possess it and exclude others from using it, and to dispose of it. The Supreme Court has repeatedly called the right to exclude "one of the most essential sticks in the bundle of rights that are commonly characterized as property,"[65] because a stranger's physical invasion of property "effectively destroys the owner's rights to possess, use, and dispose of the property."[66] The right to exclude, however, would have limited value if not accompanied by the right to use.[67]

With respect to personal property, the doctrine of trespass to chattels protects the rights to exclude and to use. It prohibits using or intermeddling with a chattel without its owner's authorization.[68] This intentional tort doctrine now extends to servers and networks, as courts have accepted the proposition that sending electronic signals through another's network or server can constitute an unauthorized use of it.[69] Although the public is generally invited to use these networks and servers, they remain private property under common law, and access therefore requires the owner's consent.[70] The common law rule for a public utility is not so broad, on the rationale that the public is entitled to make reasonable use of the utility's chattels and other private property that the utility has dedicated to a public purpose.[71] Broadband networks, however, are not regulated as public utilities. To the contrary, as Section III below explains, the FCC has explicitly removed such networks from federal regulation and preempted the ability of the states to impose traditional

[65] Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 433 (1982) (quoting Kaiser Aetna v. United States, 444 U.S. 164, 176 (1979)); *see also* Phillips v. Wash. Legal Found., 524 U.S. 156, 167 (1998); Ruckelshaus v. Monsanto Co., 467 U.S. 986, 1003 (1984).

[66] *Loretto*, 458 U.S. at 420.

[67] *See, e.g.*, Manufactured Hous. Cmtys. of Wash. v. State, 13 P.3d 183, 191 (Wash. 2000) ("The substantial value of property lies in its use, and if the right of use is denied, the value of the property is annihilated and ownership is rendered a barren right."); *see also* Richard Epstein, *Property and Necessity*, 13 HARV. J.L. & PUB. POL'Y 2, 3 (1990) ("If we stopped with possession, we would have a system of property rights that worked up to a grand blockade. . . . The world would remain a tundra, in which I could keep my own place on the barren square of the checkerboard. To fill in the gaps, a system of use rights is associated with property. Now more than blockade is at stake; you get production as well—a vast improvement.").

[68] RESTATEMENT (SECOND) OF TORTS § 217 (1965).

[69] *See* eBay v. Bidder's Edge, Inc., 100 F. Supp. 2d 1058 (N.D. Cal. 2000); Register.com, Inc. v. Verio, Inc., 126 F. Supp. 2d 238 (S.D.N.Y. 2000), *aff'd*, 356 F.3d 393 (2d Cir. 2004); America Online, Inc. v. IMS, 24 F. Supp. 2d 548 (E.D. Va. 1998); America Online, Inc., v. LCGM, Inc., 46 F. Supp. 2d 444 (E.D. Va. 1998); Hotmail Corp. v. Van Money Pie Inc., 47 U.S.P.Q.2d 1020, 1998 WL 388389 (N.D. Cal. 1998); CompuServe Inc. v Cyber Promotions Inc., 962 F. Supp. 1015 (S.D. Ohio 1997).

[70] *eBay*, 100 F. Supp. 2d at 1070; *America Online v. LCGM*, 46 F. Supp. 2d at 453; *CompuServe*, 962 F. Supp. at 1024.

[71] RESTATEMENT (SECOND) OF TORTS § 259 (1965).

public utility regulation. So the public utility qualification to the general common law right to exclude another from using one's property does not apply to broadband networks.

Telephone companies, cable operators, and wireless operators invite the public to use their networks, but the same could be said of nearly every good or service offered for sale in the marketplace. By commercial necessity, therefore, "[p]roperty does not lose its private character merely because the public is generally invited to use it for designated purposes."[72] Access remains conditional on the owner's consent, and the owner may define the scope of such consent for each user by imposing conditions on access to, and use of, the property. The scope of consent to use a broadband network is specified in a user agreement. When a user agreement prohibits a particular use, or when the use exceeds the agreement's scope, the use is unauthorized and can provide the owner the basis for a tort claim for trespass.[73] Even if the user agreement does not prohibit a specific use, the use will be unauthorized if the owner informs a particular user that the specific use is unwelcome.[74]

To establish a trespass to chattels, the use or intermeddling must dispossess the owner of the chattel; or impair its condition, quality, or value; or deprive the owner of the chattel's use for a substantial time; or cause harm to something in which the possessor has a legally protected interest.[75] Courts have recognized in cyberlaw cases that an unauthorized use that hurts system performance, profits, or customer goodwill impairs the value of the property to the owner.[76] Indeed, courts have construed the tort of trespass to chattels more broadly in the case of telecommunications or information networks, suggesting that any unauthorized use of bandwidth or capacity is a *per se* impairment to the value of the chattel because it deprives the owner of the ability to use a portion of his property for his own purposes. For example, in *Compuserve Inc. v. Cyber Promotions, Inc.*, a federal district court in Ohio reasoned that, "[t]o the extent that defendants' multitudinous electronic mailings demand disk space and drain the processing power of plaintiff's computer equipment, those resources are not available to serve CompuServe subscribers. Therefore, the value of that equipment is diminished even though it is not physically damaged by defendant's conduct."[77] Similarly, in *eBay v. Bidder's Edge*, a federal district court in California concluded that the unauthorized use of eBay's system capacity injured eBay notwithstanding

[72] Lloyd Corp., v. Tanner, 407 U.S. 551, 569 (1972).

[73] *See eBay*, 100 F. Supp. 2d at 1070; *America Online v. LCGM*, 46 F. Supp. 2d at 448; *CompuServe*, 962 F. Supp. at 1024.

[74] *See eBay*, 100 F. Supp. 2d at 1070; *Register.com*, 126 F. Supp. 2d at 249; *America Online v. IMS*, 24 F. Supp. 2d at 550; RESTATEMENT (SECOND) OF TORTS § 217 comment (f) (1965).

[75] RESTATEMENT (SECOND) OF TORTS § 218 (1965).

[76] *See eBay*, 100 F. Supp. 2d at 1066; *America Online v. IMS*, 24 F. Supp. 2d at 550; *America Online v. LCGM*, 46 F. Supp. 2d at 449.

[77] *CompuServe*, 962 F. Supp. at 1022.

the fact that eBay could show no reduction in system performance or harm to customer goodwill.[78] The court said that "eBay's server and its capacity are personal property," and that an outsider's "searches use a portion of this property" even if they "use only a small amount of eBay's computer system capacity."[79] Put in economic terms, eBay still incurred an opportunity cost: the intrusion "deprived eBay of the ability to use that portion of its personal property for its own purposes."[80] In this respect, eBay appeared to have suffered injury, as "[t]he law recognizes no such right to use another's personal property."[81] At least two other federal district courts have cited *eBay* for this proposition.[82]

The willingness of courts to interpret the doctrine of trespass to chattels broadly in cases concerning telecommunications and information networks may arise from the difficulty that owners of networks and servers encounter in protecting their property from unauthorized use. The Restatement (Second) of Torts provides that a chattel owner has an interest in the inviolable possession of the chattel, but it suggests that protection from minor interferences is supplied by an owner's privilege to use reasonable force "to protect his possession against even harmless interference."[83] Technological realities make it difficult to keep individuals from making unauthorized use of a network or server connected to the Internet. If circumstances were otherwise, hacking and computer viruses would be rare and inconsequential. Perhaps recognition of this heightened vulnerability of networks to unwanted use by strangers has inclined courts toward permitting owners of network infrastructure to invoke the doctrine of trespass to chattels liberally to remedy even minor interferences.

Implicit in the doctrine is the idea that the owner of private personal property has the right to use her property as she sees fit, without interference from others. That right includes the right to deny access to anyone who does not agree to the owner's conditions on use or whose use would exceed the scope of the owner's consent. Once courts recognize networks and network capacity to be property that entitles their owners to such rights, it follows that a network owner also has the right under common law to prioritize packets of data, deny certain uses, and generally manage its network to reduce congestion and increase performance. The doctrine of trespass to chattels also recognizes the owner's right to employ reasonable means to prevent others from using her chattel in unauthorized ways. If a network owner may forbid certain uses entirely, then, consistent with the canon that the greater includes the

[78] *eBay*, 100 F. Supp. 2d at 1071.
[79] *Id.*
[80] *Id.*
[81] *Id.*
[82] Oyster Software, Inc. v. Forms Processing, Inc., No. C-00-0724 JCS, 2001 WL 1736382 at 13 (N.D. Cal. 2001); *Register.com*, 126 F. Supp. 2d at 250–51.
[83] RESTATEMENT (SECOND) OF TORTS § 218 comment (e) (1965).

lesser, the owner surely has the right to employ the lesser restriction implied by unilaterally setting prices to discourage particular types of uses of the network and network capacity by particular types of users. A network owner's use of differential pricing in the sale of a differentiated product—prioritized data delivery—also seems to reify "a fundamental maxim of property law," emphasized by the Supreme Court, that the "owner of [a] property interest may dispose of all or part of that interest as he sees fit."[84] A more detailed analysis of the positive rights of broadband network operators confirms these initial impressions and is the topic to which we now turn.

D. The Normative and Positive Basis for Rights that Broadband Network Operators Possess

The cost and demand characteristics of the telecommunications industry, along with fundamental principles of welfare economics and the common law, imply at least six rights that the owner of a broadband network may be recognized to possess. They are the rights to (1) innovate on one's network, (2) unilaterally price the use of one's network in any way that does not violate antitrust law, (3) refuse to carry content or applications that present a legitimate risk to the security or performance of one's network or of the devices that the network operator's subscribers attach to the network, (4) prioritize packets of data for delivery on one's network, (5) reserve capacity on one's network, and (6) use capacity on one's network to vertically integrate into the provision of content or applications. This assertion of rights has both normative and positive dimensions. As a normative matter, these rights should be recognized because they increase social welfare, for the reasons to be discussed. As a positive matter, these rights may be inferred to exist already—either explicitly or by reasonable interpolation or extrapolation of established law.

1. The Right to Innovate on One's Network

As a normative matter, a network operator should have the right to innovate on its own network. The right to innovate should extend to network management, including pricing, deployment, and packet switching. Innovation generally leads to increased economic welfare. Because end-users and content providers can operate only on existing networks, network operators should be

[84] Phillips v. Wash. Legal Found., 524 U.S. 156 (1998). For representative statements to the same effect by state supreme courts, see Rush v. State, Dept. of Natural Res., 98 P.3d 551, 555 (Alaska 2004) (quoting O'Conner v. City of Moscow, 202 P.2d 401, 404 (Idaho 1949) ("A property right consists not merely in its ownership and possession, but in the unrestricted right of disposal."); Harris v. Harris, 493 P.2d 407, 408 (N.M. 1972) ("Subject to certain limitations and restrictions, an owner may dispose of his real and personal property . . . in such manner as he sees fit."); Gilbreath v. Gilbreath, 177 So.2d 915, 918 (Ala. 1965) (One should not be deprived of sacred right to dispose of his property without urgent reason and courts must be extremely careful not to interfere with right of free disposal which inheres in ownership of property.).

encouraged to implement innovations at the network level—rather than be prohibited from doing so or subjected to invasive regulation of the funding, research, and development of such innovations.[85] To borrow a line from Lessig, "The freedom to tinker is . . . an important freedom."[86]

Broadband networks have economic properties that make innovation essential. As explained in the earlier section on salient costs and demand characteristics, because a broadband network requires substantial sunk investment, private investors will fund the innovations on a broadband network only if there is a reasonable expectation of cost recovery and a (risk-adjusted) competitive return on capital. Broadband networks require innovation in managing the evolving state of network usage. Broadband network providers need the right to innovate to minimize negative externalities and to maximize positive ones. For example, they need the right to increase the number of broadband users and to decrease the amount of network congestion. Network innovation has led to increased economic welfare in the past. One example is the implementation of unequal download and uploads speeds. This innovation better reflected the actual usage of end-users, because they typically download far more than they upload. This asymmetric design—hence the abbreviation ADSL for "asymmetric digital subscriber line" service—increased economic welfare by shifting network resources to areas with greater value. In short, to increase the value of the network and maximize economic welfare, network operators should, as a normative matter, have the right to innovate on their networks.

As a positive matter, a network owner already possesses the right to innovate. That right is naturally ancillary to, and therefore subsumed within, the network owner's common law right to use. The right to use encompasses the owner's full exploitation of the potential revenues that an asset will generate. Innovation is one means to increase the commercial value of the network. More generally, of course, other bodies of positive law—concerning patents, copyright, and trade secret—expressly exist to protect and reward innovation.

2. *The Right to Price One's Network in Any Way That Does Not Violate Antitrust Law*

As a normative matter, a network operator should have the right to price access to its network in any way that does not violate antitrust law. The rationale for this right is derived directly from economic welfare theory. As explained above, a variety of economic theories imply pricing techniques that increase economic welfare. Prohibiting a network operator from employing certain competitive pricing techniques will reduce the chance of maximizing social welfare. For

[85] I have made the same argument with respect to antitrust intervention into the innovative activities of a firm possessing market power. *See* J. Gregory Sidak, *Debunking Predatory Innovation*, 83 COLUM. L. REV. 1121 (1983).

[86] LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD 61 (Random House 2001).

example, an operator may wish to subsidize the price of access to end-users through prioritization fees charged to content providers. For the reasons explained earlier, such pricing would increase broadband penetration and thereby increase the network's value to all participants in the market. Because priority delivery is a different product from non-priority delivery, and because the own-price elasticity of demand for priority delivery is different from the own-price elasticity of demand for non-priority delivery, the Ramsey framework dictates that the two services be priced differently. A network operator may also wish to offer self-selecting tariffs to certain customers. If these transactions do not make any other network participant worse off, then this pricing policy would also unambiguously increase economic welfare. Any attempt through regulation to limit these (or other) unilateral pricing policies would introduce constraints on market transactions, which would induce economic inefficiency.

As a positive matter, the common law elements of property provide several alternative rationales for finding an existing right to unilateral pricing freedom. First, as noted earlier, the owner's right to exclude others entirely implies the existence of the lesser included right to exclude others unless they satisfy a condition of use consisting of a payment to the owner that is sufficient for him willingly to part with the right to use his property. That reasoning is simply a roundabout way of saying that the right to exclude encompasses the owner's right to deny access to the property if commercial negotiation does not result in a price being struck between a willing seller (the network owner) and a willing buyer (the access seeker). Put in more economic terms, the right to exclude implies the guaranty that the network owner will be able to condition access on terms that reflect voluntary exchange. Unless modified by regulation (as in the case of mandatory network unbundling at regulated prices[87]), the common law right to exclude implies that the property owner will not be compelled to submit to involuntary exchange. The common law does recognize some exceptions to this general rule, as in the tort doctrine of private necessity.[88] In addition, of course, the most obvious exception to the property owner's protection against involuntary exchange is the government's taking of property. However, even in that case, it is particularly illuminating that the pricing rule that the Supreme Court has used to define "just compensation"—succinctly enunciated in the *Kimball Laundry* decision written by Justice Frankfurter—is the very definition of voluntary exchange: the price that would be struck in a hypothetical transaction between a willing buyer and a willing seller.[89] If the property owner has this much

[87] *See* Hausman & Sidak, *supra* note 7.

[88] Vincent v. Lake Erie Transp. Co., 124N.W. 221 (Minn. 1910); Ploof v. Putnam, 71 A. 188 (Vt. 1908). There is, of course, a powerful justification for this exception to trespass that is rooted in economic efficiency. *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 174 (Little, Brown & Co. 4th ed. 1992) (discussing *Ploof* and *Vincent*).

protection in the pricing of an involuntary transaction compelled by the government pursuant to its exercise of eminent domain, then it is implausible that his right to exclude other (nongovernmental) parties from using his property could be defeated by some common law qualification or exception that permitted the access seeker to secure access to the property at a price less than that which would obtain from voluntary exchange. The cases applying the tort doctrine of trespass to chattels to networks and servers support that conclusion. As explained earlier, *eBay v. Bidder's Edge* equates the injury from an electronic trespass to chattel to the network owner's opportunity cost from the incursion—not the network owner's demonstration of the diminution in network performance or customer goodwill.[90] By definition, voluntary exchange necessarily compensates a property owner for the full value of the best opportunity that he would forgo by parting with his property; otherwise, the property owner would not willingly agree to the sales price, and no exchange would result. Instead, he would pursue his best alternative opportunity. A trespass to chattel is an involuntary exchange. If the trespasser were to offer to pay the property owner a price of zero for the use of his property, the property owner would refuse. At that price, the property owner would not be a "willing seller," because, assuming no offsetting positive externality of

[89] Kimball Laundry Co. v. United States, 338 U.S. 1 (1949). *Kimball Laundry* established that the correct measure of just compensation is the property owner's opportunity cost. Where income-generating business facilities are appropriated on an ongoing basis for government use, or where the government grants third parties mandatory rights of access to and use of that property, compensation for that involuntary exchange is "just" if it equals the price to which a willing buyer and a willing seller would agree. Justice Frankfurter wrote for the Court:

> The value compensable under the Fifth Amendment . . . is only that value which is capable of transfer from owner to owner and thus of exchange for some equivalent. Its measure is the amount of that equivalent. But since a transfer brought about by eminent domain is not a voluntary exchange, this amount can be determined only by a guess, as well informed as possible, as to what the equivalent would probably have been had a voluntary exchange taken place.

338 U.S. 5–6; *accord*, Olson v. United States, 292 U.S. 246, 255 (1934); United States v. Reynolds, 397 U.S. 14, 16 (1970). Subsequent scholarship has further explained the economic reasoning behind this insight that just compensation should replicate the outcome of voluntary exchange. *See* J. Gregory Sidak & Daniel F. Spulber, Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States 273–81 (Cambridge Univ. Press 1997); Richard A. Epstein, Takings: Private Property and the Power of Eminent Domain 182 (Harvard Univ. Press 1985). The voluntary-exchange standard corresponds to the concept of opportunity cost, which Professor Armen Alchian classically defined as follows: "the cost of an event is the highest-valued opportunity necessarily forsaken." Armen A. Alchian, *Cost*, in David L. Sills, ed., 3 International Encyclopedia of the Social Sciences 404 (Macmillan Co. & The Free Press 1968).

[90] eBay v. Bidder's Edge, Inc., 100 F. Supp. 2d 1058, 1071 (N.D. Cal. 2000). *But see* Intel Corp. v. Hamidi, 71 P.3d 296 (Cal. 2003) (rejecting trespass to chattel theory in the case of mass emails sent to Intel employees over Intel's email system by a former employee critical of the company's employment practices).

sufficient magnitude flowing to the property owner, a price of zero would necessarily be less than the property owner's opportunity cost, defined by his best alternative use of the property.

A second rationale provides a more direct proof of the current existence of the network owner's common law right to unilateral pricing freedom. The right to dispose of property includes the right to sell, lease, or otherwise subdivide the use of the property over space, time, and any other feasibly defined dimension. If the network owner could not unilaterally price access to his network as he saw fit, his right to dispose of his property would be hollow.

The caveat that the network owner's pricing freedom is a right exercised *unilaterally*, rather than collectively, is recognition that the common law[91] and section 1 of the Sherman Act[92] forbid competitors to fix prices (or at least make their agreement legally unenforceable). Put in economic terms, network ownership entitles the network operator to capture consumer surplus through unilateral—but not collusive—pricing policies.[93] This entitlement is the same as in markets for virtually every other good or service.

3. *The Right to Refuse to Carry Content or Applications that Present a Legitimate Risk to the Security or Performance of One's Network*

As a normative matter, a network operator should have the right to refuse to carry content or applications that present legitimate threats to the stability, security, or performance of its network. The rationale for this normative proposition is simply the economic goal of maximizing social welfare. It is therefore hardly surprising that, as a positive matter, this right is already well established in legal and regulatory precedent set in the FCC's *Hush-a-Phone* decision, *Carterfone* decision, and Part 68 Rules, as well as antitrust decisions—discussed separately in Section III.E below—affirming that a firm (even a monopolist) may unilaterally refuse to deal.

In 1948, the Hush-a-Phone Corporation filed a complaint with the FCC, requesting that AT&T's tariffs be revised to allow the customer's use of a small plastic device that attached to the mouthpiece of a telephone to provide quieter conversations in crowded environments.[94] AT&T claimed

[91] *See, e.g.*, RICHARD A.POSNER & FRANK H. EASTERBROOK, ANTITRUST LAW: CASES AND MATERIALS 1–18 (West Publishing 2d ed. 1981) (discussing common law of restraint of trade).

[92] 15 U.S.C. § 1 (2004).

[93] One can regard antitrust law as a system of rights permitting producers to undertake noncollusive strategies to extract consumer surplus. *See* J. Gregory Sidak, Note, *Rethinking Antitrust Damages*, 33 STAN. L. REV. 329 (1981). In most situations, competitive constraints on market power will frustrate those strategies, such that consumers retain consumer surplus. *See, e.g.*, Baumol & Swanson, *supra* note 57. For regulators to ban all such unilateral strategies, however, would dull the incentives for firms to undertake such welfare-increasing strategies in the first place.

[94] *See, e.g.*, ROBERT W. CRANDALL, AFTER THE BREAKUP: U.S. TELECOMMUNICATIONS IN A MORE COMPETITIVE ERA 88 (The Brookings Institution 1991); MICHAEL K. KELLOGG, JOHN THORNE & PETER W. HUBER, FEDERAL COMMUNICATIONS LAW 501 (Little, Brown & Co. 1992).

that the FCC lacked the jurisdiction to revise the tariff because the device could harm AT&T's network. Initially, the FCC upheld AT&T's right to prohibit the device on the grounds that it "would be deleterious to the telephone system and injure the service rendered by it" and that "telephone equipment should be supplied by and under the control of the carrier itself."[95] The U.S. Court of Appeals for the D.C. Circuit reversed the FCC's decision and declared that it was the customer's "right reasonably to use his telephone in ways which are privately beneficial without being publicly detrimental."[96] The FCC revised its rules to comply with the court's standard and directed AT&T to permit the use of the Hush-a-Phone and other devices that would not "injure defendants' employees, facilities, or the public in its use of defendants' services or impair the operation of the telephone system."[97] It bears emphasis that the D.C. Circuit and the FCC (on remand) announced a rule that sounds like an application of Pareto efficiency: an end-user may attach any device to the network that she likes, as long as her doing so does not degrade the value of the network for anyone else.

Since *Hush-a-Phone*, the FCC has continued to apply a de facto Pareto efficiency standard to network attachments. In 1968, Carterfone filed a complaint with the FCC regarding AT&T's refusal to allow a device that directly connected a mobile radio to the landline network.[98] The FCC applied the *Hush-a-Phone* standard for customer premises equipment (CPE) and concluded that AT&T had not adequately demonstrated that Carterfone's device would harm AT&T's network.[99] The Pareto efficiency standard is even clearer in the FCC's Part 68 rules, which expanded *Carterfone* by allowing users to connect any type of CPE to the telephone network as long as the equipment meets certain technical criteria. To be classified as CPE—and to attain the associated rights of network attachment—the equipment must not present a risk of any one of four specified harms: (1) electrical hazards to operating company personnel, (2) damage to network equipment, (3) malfunction of billing equipment, and (4) degradation of service to customers other than the user of the CPE and that person's calling and called parties.[100]

The network attachment cases arose when telecommunications occurred primarily person-to-person rather than computer-to-computer, the Internet was nascent or nonexistent, and incumbent telephony providers held the only means of transmission. Those conditions no longer exist. To the extent that the Bell System network attachment cases have any relevance at all to the current network neutrality debate, they support both the normative and

[95] Hush-a-Phone Corp., 20 F.C.C. 391, 420 (1955).
[96] Hush-a-Phone Corp. v. United States, 238 F.2d 266, 269 (D.C. Cir. 1956).
[97] Hush-a-Phone Corp., 22 F.C.C. 112, 113 (1957).
[98] Use of the Carterfone Device in Message Toll Telephone Services; Thomas F. Carter v. AT&T, Dkt. Nos. 16942 and 17073, 14 F.C.C.2d 571 (1968).
[99] *Id.* at 571.
[100] 47 C.F.R. 68.3.

positive arguments in favor of the network owner's having the right to refuse to carry content or applications that threaten the security or performance of the network. The direct implication of the FCC's restatement of its network attachment principles following the D.C. Circuit's decision in *Hush-a-Phone* is that the end-user lacks any right to attach a device to the network if it would injure the network owner's employees or facilities, or injure the public in its use of the network owner's services, or impair the operation of the network.[101] Put differently, under existing law that was established nearly half a century ago, the network owner has the right to refuse access to an end-user under any of these circumstances. Consequently, if (as Lessig and Wu assert) it is apt to analogize Internet applications and content over competitive broadband networks today to the customer premises equipment being attached to the infrastructure of the Bell System monopoly of the 1950s, then the network attachment cases are actually more supportive of the rights of network owners than they are supportive of the expansive rights that Lessig and Wu claim (as a positive matter) for the end-user to use the network to receive or send any Internet applications or content that he or she desires.

The network owner's right to refuse to carry content or applications that present legitimate threats to the network's stability, security, or performance is entirely consistent with the Pareto criterion that, as a positive matter, is inherent in *Hush-a-Phone*. That is why we see no objection to usage restrictions in customer service agreements that would obviously violate the Pareto principle. There is a general consensus that, as a positive matter, a network operator has the right to block viruses and purely malicious content. That is one of *Hush-a-Phone*'s clear implications. Viruses are designed to harm networks and reduce social welfare.

The much more difficult question arises from applications and content that offer large utility for some end-users but create some amount of harm for many other end-users. Clearly, in the absence of compensatory side payments from winners to losers, these uses of the network are not Pareto improvements. For example, network congestion (from peer-to-peer applications, for example) may degrade network quality for other users. Such a case complicates the idea of what constitutes malicious applications or content, and thus what a network operator has the right, on both normative and positive grounds, to refuse to carry. There is no assurance that every kind of application or content that a user desires in the Lessig–Wu vision of network neutrality is Pareto-improving in the absence of side payments from winners to losers.

If the sum of the harm (disutility) that a particular type of content or application inflicts on a subset of a network's population exceeds the sum of the utility that it provides for another subset of a network's population, then, even if payments are feasible, that form of network usage is Pareto-inefficient.

[101] *Hush-a-Phone*, 22 F.C.C. at 113.

As a normative matter, it should be a network operator's right to refuse to carry that content or application. The network operator is in the best position to make this judgment. End-users and content providers have strong incentives to maximize their own welfare at the expense of the network as a whole. They do not internalize the costs of the externalities that they impose on other users of the network. Only the network operator has the proper incentive to maximize the value of the network. For example, a relatively small subset of network users is responsible for a large amount of network traffic generated from peer-to-peer applications, such as Skype. Although that small subset may benefit greatly from the use of Skype, other network users may be negatively affected to an aggregate degree that outweighs the benefit to the few. The winners may be unwilling to compensate the loser, and, even if winners are willing to make such side payments, the transaction costs of doing so may be prohibitively high. The network operator is the party most able to solve this collective action problem. Therefore, to maximize social welfare, it should be the network operator's right to determine the optimal usage of its network, which includes the right to refuse to carry any content or application that threatens to degrade the value of the network. If its rule on customer premises equipment is one day considered by the courts to be precedent for Internet applications and content, *Hush-a-Phone* turns this normative proposition into a positive expression of binding law.

4. The Right to Prioritize Packets of Data on One's Network

On normative grounds, a network operator should have the right to prioritize one type of content over others on its networks. This argument again flows directly from the concept of economic welfare. The loss of welfare associated with delayed delivery of data packets is not uniformly distributed across all types of content or applications. Although all firms would prefer to have faster delivery of their content, the welfare gain of prioritized delivery is greater for a real-time application like VoIP than it is for a less time-sensitive application like email. To achieve a Pareto-efficient usage of the network, a network operator must have the right to prioritize content to maximize economic welfare and minimize the aggregate welfare losses associated with best-efforts delivery.

This need to prioritize usage of infrastructure is necessary in many other industries as well, such as the delivery of perishable goods versus non-perishable goods by train. By analogy, consider that railroad cars are packets of data and railroad tracks are bandwidth. Some railroad cars are refrigerated and carry perishable food that must arrive in a certain amount of time, lest the food spoil and lose its value; other cars carry cargo that is far less time-sensitive, such as coal or steel. The food companies that are transporting perishable goods pay the railroad a surcharge to receive priority delivery. Even though both shipments move at the same speed, the cargo cars of coal or steel allow the refrigerated railroad cars to be switched from the yard to the tracks first,

before the food spoils. This algorithm, known in operations research as the queue discipline,[102] increases total social welfare. In contrast, a regulated queue discipline predicated on "railroad neutrality," under which railroads were prohibited from charging meat companies a surcharge for priority delivery, would result in the substantial loss of entire railroad cars of perishable goods and thus a reduction in social welfare. Hence, substantial consumer welfare would be lost if railroads were prohibited from using a queue discipline for prioritizing the delivery of certain train cars over others. In the name of neutrality, the queue discipline would, in effect, be a table of random numbers. Likewise, a policy that prohibited network operators from offering a surcharge for prioritization to content providers for real-time applications would reduce social welfare.

The positive argument for the right of the network owner to prioritize data packets on its network flows from either of two independent lines of reasoning. To the extent that *Hush-a-Phone* is relevant, the first positive argument is an implication from the FCC's language in its remand order that the end-user's use of the network may not "injure ... the public in its use of the [network owner's] network."[103] The absence of prioritization of packets would cause a loss in social welfare as described above and thus diminish the public's benefit from using the network relative to what would obtain under a regime of differential pricing based on priority of delivery. Alternatively, to the extent that *Hush-a-Phone* is simply irrelevant to the debate over prioritization of delivery, the attempt to articulate a positive statement of telecommunications law returns us to the perennial question in this traditionally regulated sector: Is all that is not authorized, forbidden; or is all that is not forbidden, authorized? Clearly, in the current regime of competing broadband network operators that have been expressly deregulated, the default rule for prioritization of data packets—or any other unilaterally chosen business practice, for that matter—is the latter. In the absence of any legislation or regulation explicitly addressing prioritization of packets over broadband networks, network owners have the right, as a positive expression of telecommunications law, to offer higher priority delivery for higher prices paid by content providers or end-users—subject only to ex post liability rules of general application (if one is plausibly implicated by this particular business practice).

A second path that leads to the same positive conclusion is to reason from the fundamental common law rights to use and to dispose of property. The right to use property implies the right to maximize its value to its owner. Similarly, the right to dispose of property would be vacuous if it denied the owner the ability to attempt to maximize the proceeds from disposing of the

[102] Frederick S. Hillier & Gerald J. Lieberman, Introduction to Operations Research 767 (McGraw Hill 8th ed. 2005). The first applications of queuing theory, in the early twentieth century, were in the design of telephone networks. *Id.* at 772.

[103] *Hush-a-Phone*, 22 F.C.C. at 113.

property. Differential pricing achieves that goal of value maximization for the network operator. It is icing on the cake that such pricing simultaneously increases social welfare by making the network more affordable to marginal consumers. Indeed, given the output expansion that is associated with differential pricing, it is difficult to see how any pricing policy designed to prioritize the delivery of packets in accordance with the aggregate utility that they generate for users of the network could violate any positive expression of existing law whose purpose is to advance consumer welfare or the public interest.

5. The Right to Reserve Capacity on One's Network

The normative case for the network owner's right to reserve capacity on its own network closely relates to the network owner's right to vertically integrate into the provision of content or applications, discussed below. The network owner has made a substantial sunk investment to build its network, and it must return to its investors the amount of that sunk investment, plus a competitive (risk-adjusted) return on it, if investors are to continue supplying the firm with capital at its existing cost of capital. The opportunity cost to the network operator of reserving capacity is the expected profit on the transaction for the increment of capacity that is necessarily forgone. The network owner will therefore reserve capacity for its own use only if the expected return from doing so exceeds the expected return from selling the last increment of capacity to an outside buyer. That calculation may tilt in favor of reserving capacity because the capacity transaction necessarily forgone is, by definition, the potential sale to the marginal customer of access. The network owner quite conceivably will have a higher expected return on its own use of capacity than will the marginal purchaser of capacity. In particular, the network owner could use the reserved capacity to offer its own content or applications, whose costs could be paid in whole or part by advertisers whose demand for bandwidth and priority of delivery are greater and more price-inelastic than is the corresponding demand of the network owner's subscribers. In other words, for a network owner to vertically integrate into the supply of Internet content or applications—and thus compete against firms such as Google or Yahoo—it first must reserve the amount of capacity that it expects to use for that purpose. A regulation that prohibited a network owner from reserving capacity on its own network would be tantamount to a rule suppressing competitive entry by network owners into vertically adjacent markets for Internet content and applications.

As a positive matter, the network owner's right to use its property encompasses the right to refrain from using it. The network owner's right to possess its property, and to exclude outsiders from possessing it, encompasses the right to possess the property in unused form for however long the network owner wishes. (Whether or not the network owner would actually leave capacity idle is a separate question, related to the economic analysis of the normative case discussed above.) Finally, the network owner's right to dispose of

property encompasses the right to refrain from disposing of it, as well as the right to dispose of the property at a future date on prices, terms, and conditions that the network owner deems acceptable.

Antitrust law does not change this conclusion. If two or more network owners competing in the same geographic area agree to withhold broadband capacity from the market, section 1 of the Sherman Act would apply, but if a network owner unilaterally decides to withhold some of its broadband capacity, no antitrust issue arises. If two or more network operators each unilaterally decide to reserve broadband capacity, there is no contract, combination, or conspiracy in restraint of trade—and thus no antitrust issue.

6. *The Right to Use Capacity on One's Network to Vertically Integrate into the Provision of Content or Applications*

Finally, as a normative matter, a network operator should have the right to use capacity on its network to vertically integrate into the provision of content or applications. Like the right to reserve capacity on one's network, this right helps ensure that end-users benefit from a competitive supply of content and applications. For example, a network operator may choose to use the capacity on its own network to provide applications, such as VoIP or VPN services; it may also choose to provide content, such as portal services. As a general matter, vertical integration into the provision of content or applications increases economic welfare by reducing transaction costs and increasing consumer surplus.[104] The burden should therefore be on proponents of network neutrality regulation to prove that the same kinds of benefits do not accrue to vertical integration by network owners into the provision of content and applications.

The positive argument for the network owner's right to use its capacity to vertically integrate into the provision of content or applications rests, at the most fundamental level, on the right to use one's property. As noted earlier, the right to use encompasses the right to deploy one's property in the manner that maximizes its value. It goes without saying that the property owner may use only lawful means to pursue a lawful purpose, but beyond that obvious caveat, which pertains to the use of any property, there is no general common law or statutory prohibition against a firm's entry into other markets through vertical integration. Antitrust law imposes a system of ex post liability rules that apply when competitive harm arises from such vertical integration, but the instances of a prophylactic prohibition on vertical integration being imposed under antitrust law are exceedingly rare.

[104] *See* Ronald H. Coase, *The Nature of the Firm*, 4 ECONOMICA (N.S.) 386 (1937). For a subsequent overview of the field, see OLIVER E. WILLIAMSON, THE MECHANISMS OF GOVERNANCE (Oxford Univ. Press 1996).

The line-of-business restrictions in the Modification of Final Judgment (MFJ),[105] and the statutory provisions succeeding them in the Telecommunications Act of 1996, did impose, through an antitrust consent decree, certain restrictions on vertical integration by any Bell operating company (BOC)—most notably, vertical integration by any of these local exchange carriers into the provision of long-distance service across local access and transport area (LATA) boundaries within a geographic region in which the BOC provided local exchange service.[106] Those interLATA restrictions on vertical integration, however, offer no useful analogy for the network neutrality debate for two reasons. First, they did not address broadband networks, which are competitively supplied and consequently unregulated by the FCC. Their overriding concerns in 1996 were the markets for local and long-distance voice telephony—services that today are only two of the many applications that broadband networks can support. Second, in all states containing the BOCs' various local exchange service territories, the BOCs eventually satisfied the "competitive checklist" required by section 271 of the Telecommunications Act as a condition of entry into the interLATA market.[107] In other words, the former local exchange monopolists were deemed to have opened their markets to competition such that their entry into the interLATA market presented no anticompetitive threat.[108] In contrast, as Section III will explain, facilities-based competition (principally between cable modem and DSL services) has been sufficiently robust that the FCC decided in 2005 to deregulate broadband networks. Even before such deregulation, the cable multiple system operators (MSOs) that supply cable modem service had long since vertically integrated into the production of their own multichannel video programming.

The common law of property implies a right of vertical integration, and nothing in telecommunications law negates that right in the particular case of owners of broadband networks. Moreover, far from undercutting those conclusions, the Bell System network attachment cases are consistent with them. In the FCC's order in *Hush-a-Phone* following the remand from the D.C. Circuit, it is striking that the Commission spoke of injury to the public in its use of the network owner's *services*, not the network owner's network facilities.[109] Fifty years later, that language has particular saliency for the

[105] For detailed economic and legal analyses of the MFJ's line-of-business restrictions, see PAUL W. MACAVOY, THE FAILURE OF ANTITRUST AND REGULATION TO ESTABLISH COMPETITION IN LONG-DISTANCE TELEPHONE SERVICES 35–81, 175–200 (MIT Press & AEI Press 1996); SIDAK & SPULBER, *supra* note 89, at 55–99; KELLOGG, THORNE & HUBER, *supra* note 94, at 291–342.

[106] *See* 47 U.S.C. §§ 271–72 (1996) (specifying conditions for BOC entry into interLATA market).

[107] *See* J. Gregory Sidak, *The Failure of Good Intentions: The WorldCom Fraud and the Collapse of American Telecommunications After Deregulation*, 20 YALE. J. ON REG. 207, 257–58 (2003).

[108] *See* Verizon Communications, Inc. v. Law Offices of Curtis V. Trinko, 540 U.S. 398, 411–12 (2004).

[109] *Hush-a-Phone*, 22 F.C.C. at 113.

network neutrality debate: Those who cite *Hush-a-Phone* in support of network neutrality regulation (such as Lessig and Wu) must somehow distinguish away this critical passage, which presupposes that the network owner will be vertically integrated into the provision of services (as the Bell System clearly was in the 1950s). In other words, when applied to competitive broadband networks today, the FCC's implementation of the D.C. Circuit's decision in *Hush-a-Phone* presupposes that the network owner is not relegated to the role of merely supplying access to a network of "dumb pipes," as proponents of network neutrality regulation would have Congress mandate.

E. Does the Duty to Deal Under Antitrust Law Circumscribe the Rights of the Network Owner?

Under the principles of modern antitrust economics, do providers of DSL and cable modem service have a duty to provide the same quality of service to unaffiliated content or applications as they afford their own services? In particular, do high-speed Internet providers have a duty to deal with unaffiliated VoIP providers? The short answer to these questions is that broadband Internet access providers are very unlikely to have a duty to deal, absent regulation beyond antitrust.

1. The Potential Legal Difficulty with VoIP

VoIP is a technology that allows individuals to make telephone calls over the Internet, generally at lower prices than traditional telephone calls. Various companies provide VoIP service, including both vertically integrated high-speed access providers and stand-alone VoIP providers. The problem with VoIP is that the calls may suffer from problems like "latency" and "jitter" unless the data are specially processed.[110] When a customer uses VoIP, her voice is broken into numerous packets of data that are sent over the Internet and then reassembled at the destination. Latency or jitter can occur if the VoIP data are delayed or the transmission stream of the data varies—events that might occur because VoIP data are transmitted along with other data that may be interspersed with the VoIP data or because the data may be transmitted in bursts.[111] However, these problems can be avoided if the network operator processes VoIP data differently than other data by giving them priority over the other data that are being sent or that are arriving.

To give their own VoIP data priority, instead of sending their VoIP data over the Internet, high-speed Internet providers use proprietary systems to send their VoIP data. Because their VoIP data stay within the providers' own networks, the providers are able to process that data more quickly and without

[110] *See, e.g.*, OECD NETWORK NEUTRALITY STUDY, *supra* note 2, at 12 (discussing "jitter" caused by delay in VoIP service).

[111] *See, e.g., id.*

interference, thus eliminating delay and jitter for their VoIP subscribers. In contrast, the VoIP data from unaffiliated providers that do not own Internet transmission lines generally do not travel on a proprietary network (leased lines with a proprietary network is possible) and instead travel over the public Internet. The result is that these other companies may have lower quality VoIP performance than the VoIP performance available from high-speed Internet providers because of how data are transmitted over the Internet.

The potential legal difficulty with this situation is that VoIP companies that do not own Internet transmission lines may claim that high-speed Internet providers have a duty to deal with them and must provide them with access to the proprietary transmission systems that the providers use to eliminate the delay and jitter with their own VoIP data. Typically, of course, businesses may choose with whom they deal and with whom they do not, but rarely a refusal to deal with rivals by a firm that has monopoly market power may violate section 2 of the Sherman Act.[112] However, not all monopolists have a duty to deal. So does the refusal of high-speed Internet providers to deal with VoIP competitors trigger the duty-to-deal doctrine? The answer is no, for two independent reasons. First, high-speed Internet providers lack market power, which is a prerequisite for finding a duty to deal. Second, even if high-speed Internet providers were monopolists, their refusal to deal with VoIP competitors does not discriminate against rivals in the way both modern antitrust economics and judicial precedent require for a court to find a duty to deal.

2. Are High-Speed Internet Providers Monopolists?

The duty to deal comes under section 2 of the Sherman Act and thus applies only to monopolists.[113] As far as the antitrust laws are concerned, non-monopolists are free to deal with whom they please: The refusal by a non-monopolist company to enter into profitable business deals will not harm the refused company (who can simply go to a competitor of the non-monopolist and enter into the profitable deal) but instead will only harm the refusing company (who has given up profits and is worse off in the market vis-à-vis a competitor who did not refuse the deal). However, when monopolists are involved, some argue that refusals to deal can be used to further or maintain monopoly power by keeping rivals out of the market by depriving them of something that they need to compete effectively with the monopolist.

[112] *See* Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585 (1985); Otter Tail Power Co. v. United States, 410 U.S. 366 (1973); Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, 540 U.S. 398 (2004)

[113] *See, e.g., Trinko*, 540 U.S. at 407 ("It is settled law that this offense [violation of the duty to deal] requires . . . the possession of monopoly power in the relevant market . . . ").

In the case of VoIP, providers of high-speed Internet service are not monopolists. Indeed, the proper market definition for assessing whether high-speed Internet providers should have a duty to deal with VoIP competitors could reasonably include dial-up Internet services because VoIP works at that speed as well as on high-speed connections.[114] It is not necessary for purposes of antitrust analysis that all consumers regard dial-up access to be a substitute for broadband access; only a sufficient share of *marginal* consumers need to have that preference.[115] Including dial-up access providers in the market definition reduces the market shares of high-speed Internet providers from what they would be if only the high-speed market were examined; such a market definition thereby makes it less likely that any high-speed Internet provider would be considered a monopolist under section 2.[116]

However, even if a narrower market definition of only high-speed Internet is adopted to be generous to the potential claims of VoIP competitors, it is not plausible in any metropolitan area that any high-speed Internet provider is a monopolist. The reason is that, other than in some rural markets,[117] there are generally at least two forms of high-speed Internet available to a household or business—DSL service and cable modem service.[118] The prevalence of

[114] VoIP providers themselves recommend a minimum transmission speed of only 90 Kbps. *See* Vonage Website, Vonage Basics, www.vonage.com. However, even speeds as low as 56Kbps may be used for VoIP. *See* Marguerite Reardon, *Beware of Broadband Speed Overkill*, CNET NEWS, May 17, 2006, http://news.com.com/2102-1034_3-6073081.html?tag=st.util.print [hereinafter Reardon].

[115] *See, e.g.*, Hausman & Sidak, *supra* note 7, at 477–79 (discussing critical share of marginal customers required to defeat an attempted exercise of market power); Dennis L. Weisman, *When Can Regulation Defer to Competition for Constraining Market Power?: Complements and Critical Elasticities*, 2 J. COMPETITION L. & ECON. 101 (2006) (formalizing critical-share analysis in the presence of demand complementarities).

[116] At the end of 2005, dial-up service comprised 41.5% of the market for Internet services. *See* Bernstein Research, *Broadband Update: "Value Share" and "Subscriber Share" Have Diverged*, Apr. 7, 2006, at 7. This number leaves 59.5% of the market for which various types of high-speed Internet providers may compete, making it extremely unlikely that any one type of high-speed Internet provider would have monopoly power that could be relied upon as a basis to impose upon it a duty to deal with competitors who supply VoIP service. To be sure, dial-up's share of the market is decreasing, but it nevertheless makes up a significant share of the market at the present time.

[117] As I explain in Section IV.B.1.a *infra*, discrimination against an unaffiliated provider of VoIP service is more plausible in the case of a rural telephone company serving an area that lacks a digital cable television system.

[118] Other forms of high-speed Internet service exist as well, including fiber, satellite or other wireless access, and even access over power lines. *See* Federal Communications Commission, High-Speed Services for Internet Access: Status as of June 30, 2005, at tbl.1 (2006). DSL and cable are, however, the two primary technologies in the high-speed Internet market, collectively having about 95 percent of the market in the most recent FCC data. *See id.* Some differences exist between these technologies in terms of how much they cost or how fast the connection they provide is and thus they may appeal to different segments of the population, but all of them provide services that can be used for VoIP. These differences would only be relevant if VoIP were specifically trying to target one segment of individuals who are more likely to use one type of high-speed Internet service rather than another. If instead the

these two types of technology precludes VoIP competitors from claiming that either a DSL provider or a cable modem provider has a duty to deal because neither has a monopoly in high-speed Internet service. Consider, first, the market shares of these technologies. In the U.S. market overall, neither technology has a dominant share of the market: cable has approximately 55 percent and DSL has approximately 40 percent of the high-speed Internet market.[119] These market shares are below those that would be necessary to bring a claim under section 2 for abuse of monopoly power, as the Supreme Court has indicated that a market share of two-thirds or greater is necessary to find monopoly power.[120] One might argue, though, that even if nationwide the market shares are similar, in individual areas one service might have a monopoly.[121] The data belie this claim, however, as only 5.6 percent of zip codes have access to only one high-speed Internet provider and 93.3 percent of zip codes have access to two or more high-speed Internet providers.[122] Moreover, state-by-state data show that both DSL and cable have substantial market shares in most if not all states.[123] Nationwide, 76 percent of individuals who receive local telephone service can receive DSL service, and 95 percent of individuals who receive cable television service can receive cable Internet

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assumption is that all users of high-speed Internet are viewed by VoIP competitors as being in the same market for VoIP services, then differences between the specific packages offered by high-speed Internet providers should matter little.

[119] *See* Federal Communications Commission, High-Speed Services for Internet Access: Status as of June 30, 2005, at tbl.1 (2006).

[120] *See* Eastman Kodak Co. v. Image Technical Servs., Inc., 504 U.S. 451, 481 (1992) (describing a prior case as holding that "over two-thirds of a market is a monopoly"); United States v. Grinnell Corp., 384 U.S. 563, 571 (1966) (finding monopoly power with 87 percent of the market); United States v. E.I. du Pont de Nemours & Co., 351 U.S. 377, 379 (1956) (finding that 75 percent market share can be assumed to be monopoly power). Even focusing exclusively on high-speed Internet, neither cable nor DSL meets this two-thirds threshold. And if one includes dial-up Internet providers in the market as well, cable and DSL's market shares are both cut by approximately 0 percent. *See* Bernstein Research, *Broadband Update, supra* note 116.

[121] One might also argue that each high-speed Internet provider is a monopolist with regard to the customers that it already has, even if it is not a monopolist in the competition for new customers, because customers who choose a high-speed Internet service are locked-in to it. *Cf.* Eastman Kodak Co. v. Image Technical Servs., Inc., 504 U.S. 451 (1992) (holding that Kodak had market power in the parts for its copy machines even though Kodak lacked market power in the market for copy machines itself). However, any lock-in effects with a certain type of Internet service are relatively brief, and thus will not suffice to sustain a claim of monopoly power over incumbent customers.

[122] *See* Federal Communications Commission, High-Speed Services for Internet Access: Status as of Dec. 30, 2005, at tbl.15. The remaining one percent of zip codes have no access to high speed Internet providers.

[123] *See id.* at tbl.9. There may be some exceptions to this general statement because the FCC has redacted the state-by-state data on DSL and/or cable usage for some states and territories (including Massachusetts, Connecticut, Rhode Island, and Delaware), making comparisons difficult. In general, though, the statement is apt.

service.[124] All these data show that neither DSL nor cable has a dominant market share such as would be required for VoIP competitors to bring a duty-to-deal claim against them that could survive a motion to dismiss.

Perhaps VoIP competitors could argue that DSL and cable Internet providers have colluded to act as a monopolist in the high-speed Internet market and to foreclose VoIP competitors from accessing their proprietary networks.[125] No such collusion has been alleged to date in the debate over network neutrality.

3. Is Discrimination Against a VoIP Provider Cognizable Under Modern Antitrust Jurisprudence on the Duty to Deal?

A claim under the section 2 of the Sherman Act requires more than merely showing monopoly power. A plaintiff must also show some improper conduct.[126] In *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko*, the Supreme Court noted that, although it has recognized that, "[u]nder certain circumstances, a refusal to cooperate with rivals can constitute anticompetitive conduct and violate §2," the Court has also "been very cautious in recognizing such exceptions [to the general rule that a firm may deal with whomever it chooses], because of the uncertain virtue of forced sharing and the difficulty of identifying and remedying anticompetitive conduct by a single firm."[127] *Trinko* is the most recent Supreme Court case on the duty to deal. It involved a claim against Verizon, an incumbent local exchange carrier (ILEC), for failing to treat customer orders filed by a competitive local exchange carrier (CLEC) as well as it treated its own customers' orders. The Court held that Verizon did not have a duty to deal with its rivals because, as explained further below, Verizon did not discriminate against its rivals in favor of non-rivals but rather discriminated against everyone else in favor of itself. The Court recognized that the "uncertain virtue" of imposing a duty to deal results for two primary reasons. First, imposing a duty to deal can be socially undesirable because the prospect of forced sharing ex post may foster ex ante inefficiency by discouraging a company from investing in the development of "economically beneficial facilities" or other advantages that might lead that company to obtain market power.[128]

[124] *See id.* at tbl.14.

[125] *Cf.* United States v. Terminal R.R. Ass'n, 224 U.S. 383 (1912) (imposing a duty to deal on a cartel of railroad companies that discriminated against its rivals). For an analysis of *Terminal Railroad*, see Abbott B. Lipsky, Jr. & J. Gregory Sidak, *Essential Facilities*, 51 STAN. L. REV. 1187 (1999).

[126] *See, e.g.*, *Trinko*, 540 U.S. at 407 ("To safeguard the incentive to innovate, the possession of monopoly power will not be found unlawful unless it is accompanied by an element of anticompetitive conduct.").

[127] *Id.* at 408.

[128] *Id.* at 407–08.

Second, imposing a duty to deal can impose large administrative burdens on courts and generates a high potential for remedial error.[129]

Recognizing these same problems, Professor Einer Elhauge argues that duty-to-deal claims should be limited to cases in which a monopolist discriminates against rivals by refusing to deal with them on the same terms that it deals with others.[130] This rule prevents ex ante inefficiency because, if the monopolist deals with others on a set of terms, those terms cannot be ex ante inefficient. The rule also obviates the court's crafting and administering of a remedy, because the remedy is non-discrimination.[131] Additionally, under this rule, a court can easily determine when a duty to deal should be imposed. Rather than having to weigh a number of complicated and often vacuous factors, Elhauge's approach simply requires the court to determine whether discrimination is occurring.[132] (It is worth emphasizing that although discrimination is a necessary condition for successfully bringing a duty-to-deal claim, discrimination is not by itself sufficient to sustain such a claim.[133])

The Court in *Trinko* adopted a similar approach to determining when it is appropriate to impose a duty to deal on a monopolist firm.[134] The Court first observed that there was no indication of whether Verizon's actions were motivated by "competitive zeal" or by "anticompetitive malice," whereas previous cases where defendants discriminated against their rivals by refusing to sell "at [their] own retail price" clearly fell into the latter category.[135] The Court then emphasized that in prior cases the product or service that was to be shared with the rival was already offered to others, whereas here "the services allegedly withheld are not otherwise marketed or available to the public."[136] This unavailability meant that any access to rivals would only be possible after the exertion of "considerable expense and effort" and that, indeed, "[n]ew systems must be designed and implemented simply to make that access possible."[137] Moreover, the Court was reluctant to impose an antitrust

[129] *Id.*

[130] *See* Einer Elhauge, *Defining Better Monopolization Standards*, 56 STAN. L. REV. 253, 308–10 (2003).

[131] *Id.* at 308.

[132] *Id.*

[133] For example, monopoly power would still need to be proved, as would the fact that the sharing is efficient in the ex post world. *See id.* at 310–11.

[134] *See Trinko*, 540 U.S. at 409–10. At one point, the Court in *Trinko* suggested that a prior course of dealing with the now-discriminated-against rival may be an important prerequisite to assert a duty to deal claim. *Id.* at 409. However, this rule would neither be consistent with prior cases—*Otter Tail*, for example, involved discrimination against a new entrant that did not have past dealings—nor be wise as a matter of antitrust economics. *See* Elhauge, *supra* note 130, at 314 (discussing how this rule would create perverse incentives to prevent monopolists from ever dealing with rivals and noting how this rule could freeze into place inefficient business relationships). Thus, a better approach would be to focus on whether there is discrimination, not on whether there is past dealing.

[135] *Trinko*, 540 U.S. at 409.

[136] *Id.* at 410.

duty to deal on Verizon because it was operating in a regulated industry, and regulation reduces the added benefit of antitrust enforcement and means that any duty to deal can better be imposed by the regulator instead of the courts.[138]

These insights of modern antitrust economics and the logic of *Trinko* apply to the question of whether high-speed Internet providers would have a duty to deal with VoIP competitors (assuming counterfactually that the providers are somehow monopolists). Most basically, the high-speed Internet providers have not discriminated against VoIP competitors. Of course, prioritization is available to the high-speed Internet providers themselves, but *Trinko* shows that "favoritism" toward oneself is not problematic under the antitrust laws because it does not demonstrate "anticompetitive malice" rather than just "natural competitive zeal."[139]

VoIP competitors would have a difficult argument that the high-speed Internet providers should have a duty to deal with them. One reason that this argument would be difficult is that VoIP competitors probably could not prove that the high-speed Internet providers' refusal to deal with them is, in fact, anticompetitive. Instead, the high-speed Internet providers could simply be acting in a way that provides them with efficient rewards for their ex ante investments, and, without discrimination, a court is unable to ascertain whether a duty to deal would undermine ex ante incentives. A second reason that VoIP competitors' argument would be difficult is that, without discrimination, the court would face the imposing challenge of fashioning a remedy in favor of the VoIP competitors without any market guidance. Imposing a duty to deal on the high-speed Internet providers here would require the design of new systems to grant access to VoIP competitors, precisely one of the Supreme Court's fears in *Trinko*. Moreover, the court would have to establish a way to compensate the high-speed Internet providers for granting the VoIP competitors access. Without the benefit of market pricing, choosing the right level of compensation would be a daunting task.[140] Worse, a court imposing the duty to deal would constantly need to monitor and adjust its terms as the rapidly changing Internet market evolves.

For these reasons, even if high-speed Internet providers were deemed to be monopolists, efforts to impose a duty to deal on them would almost certainly fail under the approach of modern antitrust economics and of *Trinko*, which focuses on whether the monopolist has discriminated against its rivals.

[137] *Id.*
[138] *Id.* at 411–15.
[139] *Id.* at 410.
[140] *See* Lipsky & Sidak, *supra* note 125, at 1231.

III. INNOVATION WITHIN THE NETWORK AND AT THE EDGES OF THE NETWORK UNDER THE CURRENT REGULATORY REGIME

In recent years, a shift toward deregulation of broadband Internet access has occurred in the United States. In 2003, the FCC outlined significant steps for deregulation of broadband Internet access services in its *Triennial Review.*[141] The ruling had a major impact on network operators, particularly for DSL services, which use a subset of frequencies on the local telephone loop. As a result of the deregulatory action, incumbent local exchange carriers were no longer required to give their rivals both access and discounted rates for broadband facilities, such as fiber-optic networks, that the ILECs planned to build.[142] Moreover, the ILECs were no longer required to lease the high-frequency portions of their copper lines to unaffiliated DSL providers under line-sharing arrangements.[143] More deregulation followed in 2005, when the FCC released its *Broadband Order*, which ruled that facilities-based wireline broadband Internet access service offered by telephone companies are information services and should be regulated in a similar manner to broadband Internet access service offered by cable modem providers.[144] The order prevented the imposition of traditional telecommunications regulation for the ILECs' fiber networks.[145] Moreover, DSL providers were no longer required to offer DSL transport service to unaffiliated Internet service providers (ISPs).[146] Existing wholesale customers of DSL transport would continue to receive service for a twelve-month transition period.[147] Thereafter, DSL providers and unaffiliated ISPs could contract for transmission service on a commercial basis.[148] In August 2006, the D.C. Circuit rejected Earthlink's assertion that the FCC erred in its decision to end the ILEC unbundling requirement for broadband Internet services.[149] The court found that the FCC's *Triennial Review* was not arbitrary or inconsistent with FCC precedent and was supported by the record.[150] The court also determined that regulators did not have to impose a rigorous analysis of market conditions, as Earthlink insisted.[151]

[141] Review of the Section 251 Unbundling Obligations of Local Incumbent Exchange Carriers, Report and Order, CC Dkt. No. 01-338, 18 F.C.C.R 16,978 (2003).
[142] *Id.* at 16984 ¶4.
[143] *Id.* at 16988.
[144] Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities, Report and Order, CC Dkt. No. 02-33, 20 F.C.C.R. 14,853 (2005).
[145] *Id.* at 14858 ¶¶ 5–7.
[146] *Id.* at 14899 ¶ 86.
[147] *Id.* at 14905–14907 ¶¶ 98–99.
[148] *Id.* at 14899–14901 ¶¶ 87–89. For further analysis of the *Broadband Order*, see J. Steven Rich, Brand X *and the* Wireline Broadband Report and Order: *The Beginning of the End of the Distinction Between Title I and Title II Services*, 58 FED. COMM. L.J. 221 (2006).
[149] Earthlink v. FCC, No. 05-1087, at 2 (D.C. Cir. Aug. 15, 2006).
[150] *Id.* at 15.
[151] *Id.* at 27.

The FCC also promulgated rules that exempted cable modem providers from many forms of regulation. In 2005, the Supreme Court decided *Brand X*, which addressed the appropriate classification of cable modem service providers with respect to the Communications Act of 1934 and the Telecommunications Act of 1996, and which challenged the FCC's decision issued in its *Triennial Review*.[152] Specifically, the Court focused on whether a cable company provides "telecommunications services" or "information services." If characterized as providers of information services rather than telecommunications services, cable modem providers would not be required to lease lines to competitors or meet certain service standards and state public utility requirements. In *Brand X*, the Court held that "cable companies that sell broadband Internet service do not provide telecommunications service as the Communications Act defines that term, and hence are exempt from mandatory common-carrier regulation under Title II."[153] The Court upheld the FCC's decision, which had exempted cable modem service from regulation as a telecommunications service on the rationale that keeping cable companies exempt from line-sharing rules would spur investment and lead to greater long-run consumer welfare.[154] In the following sections, I explain how this deregulation stimulated innovation both within the network (by network operators) and at the edge of the network (by content and application providers).

A. Innovation within the Network

Significant competition exists in the provision of broadband Internet access. Consumers perceive cable modem service to be a close substitute to DSL Internet access,[155] and both infrastructures are available on a near-ubiquitous basis in the United States.[156] The FCC reported in July 2005 that cable modems accounted for 60 percent of residential and small business high-speed Internet access lines in December 2004, down from nearly 80 percent in December 1999.[157] More importantly, prices for broadband

[152] National Cable & Telecomm. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 974 (2005).

[153] *Id.*

[154] *Id.*

[155] For an estimate of the cross-price elasticity of demand for cable modem service and DSL service, see Robert W. Crandall, J. Gregory Sidak & Hal J. Singer, *The Empirical Case Against Asymmetric Regulation of Broadband Internet Access*,17 BERKELEY TECH. L.J. 954, 973 (2002).

[156] According to the National Cable and Telecommunications Association (NCTA) estimates for 2006, cable modem service was available to 96 percent of U.S. households. *See* NCTA, 2006 INDUSTRY OVERVIEW (2006), http://i.ncta.com/ncta_com/PDFs/NCTAAnnual%20Report4-06FINAL.pdf.

[157] INDUSTRY ANALYSIS AND TECHNOLOGY DIVISION, FEDERAL COMMUNICATIONS COMMISSION, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2004 TABLE 1 (2005), http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0705.pdf.

access have declined significantly over this period. In 1999, the average price for a broadband connection was nearly $80 per month,[158] whereas the price for broadband access in 2005 was no higher than the price of a dial-up connection, or roughly $25 per month.[159] Put in 1999 dollars, the price of broadband Internet access in 2005 was only $21.33 per month. In other words, the price of broadband access in 2005 had fallen to nearly one-fourth of its inflation-adjusted price in 1999. In addition to competing on price, providers of broadband Internet access compete on the basis of service quality and innovation. Deregulation of Internet access has served as a catalyst for innovation within the network, leading to improvements in investment, broadband penetration, broadband pricing, and broadband deployment.

1. Investment

Substantial investment has occurred in the network, particularly by ILECs, since deregulation of broadband. For example, in 2006 Verizon planned to make $16 billion in capital expenditures, much of it for wireline and wireless broadband.[160] Kagan Research estimates that the cable industry will invest $11.1 billion in construction and upgrading expenditures in 2006.[161]

Broadband service is increasingly supplied by carriers other than DSL and cable modem providers. During 2004, satellite or terrestrial wireless broadband connections increased by 50 percent.[162] Mobile wireless service providers also are beginning to offer high-speed Internet access. Wireless local area network (WLAN) users can access high-speed Internet connections at "hot spots," such as Starbucks coffee shops, restaurants, hotels, airports, and parks.[163] Intel estimates that there were 40,236 public hot spots in the United States as of July 2006.[164] In light of growing facilities-based competition, neither cable modem nor DSL providers could engage in discriminatory conduct *vis-à-vis* certain applications without prompting large customer defection.

Mobile networks have continued to grow rapidly, and wireless providers have expanded their wireless data offerings to include television-like services on wireless telephones. NTT DoCoMo, the largest wireless carrier in Japan,

[158] The Strategis Group, High Speed Internet Access, 1998–99, at tbl. 9.5 (1999).

[159] Consumer Search, ISPs Review (2005), http://www.consumersearch.com/www/internet/isp/index.html.

[160] *See* Verizon Communications Inc., Annual Report (Form 10-K), at 19 (Mar. 14, 2006).

[161] NCTA, Cable's Private Investment, http://www.ncta.com/ContentView.aspx?contentId=55 (citing Kagan Research).

[162] Industry Analysis and Technology Division, Federal Communications Commission, *supra* note 157, at 2.

[163] Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Seventh Report, 17 F.C.C.R. 12,985, 13,062–63 (2002) [hereinafter *Seventh CMRS Report*].

[164] *See* Intel, Hotspots by Region, http://intel.jiwire.com/hot-spot-directory-browse-by-state.htm?country_id=1 (last visited on July 6, 2006).

has offered such services for several years, first using an advanced form of second-generation cellular telephony technology (called "2-1/2 G") and subsequently using third-generation (3G) technology.[165] In the United States, Sprint PCS was the first wireless provider to offer a live video programming service for wireless phones, called MobiTV.[166] The service streams programs onto wireless phones via the Internet from servers that first convert the television signals into digital files, which enables wireless subscribers to watch real-time sports, news, and other video programming from a variety of cable television channels.[167] Sprint has also improved its wireless television service by adding new channels to its current offering of live television programming,[168] and by introducing Sprint TV, which provides short clips of content from the major networks.[169] AT&T Wireless also launched MobiTV as a part of its mMode data service in late 2004, before the company's acquisition by Cingular; in early 2005, Cingular began offering MobiTV as a part of its Media Net service.[170]

In late 2003, Verizon Wireless launched its EV-DO network to provide wireless Internet access service for business customers and other data-intensive users.[171] Verizon Wireless has expanded the services provided over the EV-DO network, including video-on-demand and other multimedia services. In early 2005, Verizon Wireless launched VCAST, the nation's first wireless multimedia service to be provided over a third-generation (3G) network using EV-DO technology.[172] Using 3G wireless devices, VCAST customers can browse Verizon's "Mobile Web" and access the EV-DO network for content such as news programming, 3-D games, music videos, and made-for-mobile episodes of television programs.[173]

The FCC recognizes that significant intermodal competition already exists between wireline and wireless broadband access providers.[174] As wireless technology improves video and download capability and quality, wireline and

[165] *See* NTT DoCoMo, Annual Report (Form 20-F), at 4–5 (June 27, 2006); NTT DoCoMo, Company Overview, http://www.nttdocomo.com/about/company/index.html (2006).

[166] Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Ninth Report, 19 F.C.C.R. 19,597, 20,660 (2004) [hereinafter *Ninth CMRS Report*].

[167] Walter S. Mossberg, *Watching TV on Your Cellphone*, Wall St. J., Sept. 1, 2004, at D7.

[168] *Sprint Offers Fox News To Channel Lineup*, Wireless Week., Apr. 19, 2005.

[169] Walter S. Mossberg, *Verizon Devices Use High-Speed Network for Voice, Web, E-Mail*, Wall St. J., Dec. 16, 2004, at B1.

[170] Press Release, Cingular, Cingular Goes Live With MobiTV (Jan. 25, 2005).

[171] Mossberg, *supra* note 169.

[172] *Id.*; Press Release, Verizon Wireless, On-Demand in the Palm of Your Hand: Verizon Wireless Launches "VCAST"—Nation's First and Only Consumer 3G Multimedia Service (Jan. 7, 2005); Press Release, Verizon Wireless, Now Playing on a Cell Phone Near You: Video Clips, Music Videos and 3D Games (Jan. 31, 2005).

[173] Press Release, Verizon Wireless, Now Playing, *supra* note 172.

[174] Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Tenth Report, 20 F.C.C.R. 15, at ¶142 (2005) [hereinafter *Tenth CMRS Report*].

wireless broadband Internet access will become even closer substitutes. That increased substitutability will further constrain a wireline Internet access provider's ability to engage in discriminatory conduct.

2. Broadband Deployment

Broadband deployment has experienced significant growth during the period of deregulated broadband Internet access. From June 2000 to June 2004, the number of high-speed Internet lines increased from 4.4 million to 32.5 million.[175] From June 2004 to June 2005, the number of high-speed Internet lines increased by 32 percent to 42.9 million, with the addition of 10.4 million lines.[176] As of June 2005, broadband Internet service was available in all 50 states, the District of Columbia, American Samoa, Guam, Puerto Rico, and the Virgin Islands.[177] As of the same date, 99 percent of the U.S. population lived in the 98 percent of American zip codes having at least one broadband Internet access provider.[178] In June 2000, 23.0 percent of the least densely populated zip codes[179] had at least one broadband Internet subscriber;[180] by June 2005, that figure had risen to 84.3 percent.[181]

According to the National Cable and Telecommunications Association (NCTA), the number of homes passed by cable modem service increased from 112.8 million in 2003 to 117.8 million in 2005.[182] As a nationwide average, the FCC estimated that as of June 30, 2005, broadband DSL service was available to 76 percent of the households to which ILECs could provide local telephone service, and broadband cable modem service was available to 91 percent of the households to which cable operators could provide cable television service.[183]

Satellite service is an additional platform for broadband access. The Government Accountability Office (GAO) reported in May 2006 that, "[e]ven though broadband over satellite may not be seen by some as highly substitutable for other broadband technologies because of certain technical characteristics or because of its higher cost, satellite broadband service is *deployed*: Three companies have infrastructure in place to provide service to

[175] Wireline Competition Bureau, Federal Communications Commission, High-Speed Services for Internet Access: Status as of June 30, 2005, at tbl. 1 (2006).

[176] *Id.*

[177] *Id.* at tbl. 10.

[178] *Id.* at 1.

[179] Zip codes were divided into deciles as of the 2000 Census. The least densely populated zip codes (the lowest decile group) contained fewer than six persons per square mile. The most densely populated zip codes (the highest decile group) contained more than 3,147 persons per square mile. *Id.*

[180] *Id.* at tbl. 18.

[181] *Id.*

[182] NCTA, Cable Broadband Availability, http://www.ncta.com/ContentView.aspx?contentId=60 (citing Morgan Stanley Equity Research).

[183] Wireline Competition Bureau, Federal Communications Commission, *supra* note 175, at tbl. 14.

most of the country."[184] Even without considering satellite broadband Internet service, the GAO found that "substantial" progress had been made toward achieving "universal availability of broadband" by 2007.[185]

In addition to broadband deployment though DSL service, cable modem service, and satellite service, several other technologies for broadband Internet access have emerged in the deregulatory period:

- Broadband over power lines (BPL), though still in the trial stage, can currently provide 3 Mbps.[186] Next-generation equipment will increase BPL's speed to 100 Mbps.[187]
- Using unlicensed spectrum, Wi-Fi broadband technology provides a signal reach of approximately 300 feet at speeds of up to 54 Mbps.[188] As noted earlier, Wi-Fi has expanded in the deregulatory period to more than 40,000 hot spots in diverse locations.[189] If Wi-Fi were not currently considered to be a satisfactory technology for supplying broadband Internet access, cities like San Francisco and Philadelphia would not be contracting with Google and Earthlink to build Wi-Fi networks blanketing their areas.[190]
- Worldwide Interoperability for Microwave Access (WiMAX) technology provides wireless broadband Internet service with speeds up to 75 Mbps with non-line-of-sight service in a radius of approximately 3 miles, and it provides speeds up to 155 Mbps in line-of-sight service in a radius of approximately 30 miles.[191] WiMAX is being rapidly deployed, and more than 150 pilot deployments were in use as of May 2006.[192] In August 2006, Sprint announced it was building a nationwide WiMAX network at a cost of $3 billion.[193] Sprint expected to reach 100 million customers by

[184] Gov't Accountability Office, GAO-06-426, Broadband Deployment Is Extensive Throughout the United States, But It Is Difficult to Assess the Extent of Deployment Gaps in Rural Areas 15 (2006) (emphasis in original).

[185] *Id.* at 37.

[186] *Id.* at 59.

[187] *Id.*

[188] *Id.* at 60; Cisco Systems, Capacity, Coverage, and Deployment Considerations For IEEE 802.11g (2006), http://www.cisco.com/en/US/products/ hw/wireless/ps4570/products_white_paper09186a00801d61a3.shtml.

[189] See Intel, Hotspots by Region, http://intel.jiwire.com/hot-spot-directory-browse-by-state.htm?country_id=1 (last visited on July 6, 2006).

[190] Press Release, Earthlink, Earthlink and Google Submit Joint RFP For City of San Francisco Wireless Broadband Network (Feb. 21, 2006), http://www.earthlink.net/about/press/pr_san_francisco_network/.

[191] Gov't Accountability Office, *supra* note 184, at 60.

[192] *Id.*

[193] Amol Sharma & Don Clark, *Sprint to Spend Up to $3 Billion To Build Network Using WiMAX—New Wireless-System Plan Shows Belief in Demand For Mobile Internet Services*, Wall St. J., Aug. 9, 2006, at B2.

2008.[194] Sprint planned to offer speeds ranging from 2 to 4 Mbps—faster than many DSL offerings—with a latency advantage over other wireless networks.[195] Intel, Motorola, and Samsung are backing Sprint's new service by supplying the required hardware.[196] In response to Sprint's announcement, the *Wall Street Journal* editorialized that DSL and cable modem services could no longer plausibly be characterized as a broadband duopoly.[197]

- 3G cellular broadband Internet service provides speeds of 400–700 Kbps and has been extensively deployed.[198] As of May 2006, Verizon Wireless broadband Internet service was available in 181 major cities in the United States covering approximately 150 million people, while Sprint and Cingular covered 140 million and 35 million people, respectively.[199] Wireless broadband has been extremely successful in other countries, and there is no evident reason why U.S. carriers will not duplicate that success. Japan's NTT DoCoMo launched the world's first commercial 3G service over a WCDMA network in October 2001, which it calls Freedom of Multimedia Access (FOMA).[200] In a nation of 127 million persons,[201] FOMA has continued to increase subscribership rapidly, surpassing 22.0 million subscribers by February 2006, up from 10.2 million in February 2005.[202]

The significance of these alternative technologies for broadband Internet access is not that all consumers might one day regard them as perfect substitutes for DSL service or cable modem service, but rather that sufficient numbers of *marginal* consumers will have that preference in the near future, so as to make it even more implausible that a provider of DSL or cable modem service could exercise market power by profitably discriminating against unaffiliated Internet content or applications.

[194] Arshad Mohammed, *Sprint Nextel to Build $2.5 Billion Wireless Network; Internet Access Expected to Cover More Distance Than WiFi at Speeds Similar to DSL*, WASH. POST, Aug. 9, 2006, at D04.

[195] John Markoff & Ken Belson, *Sprint Will Build an Intel Backed Network*, N.Y. TIMES, Aug. 8, 2006, at 7.

[196] Amol Sharma & Don Clark, *Two Technology Giants Clash In Battle for Wireless Internet*, WALL ST. J., Aug. 24, 2006, at A1.

[197] *Wi-Fi to the Max*, WALL. ST. J., Aug. 9, 2006, at A10 ("Those who want to regulate broadband providers are saying that the phone and cable networks are too valuable and too hard to replicate for anyone to break up the duopoly. We guess Sprint did not get the memo.").

[198] GOV'T ACCOUNTABILITY OFFICE, *supra* note 184, at 60.

[199] *Id.* at 61.

[200] *Ninth CMRS Report*, *supra* note 166, at 20,681.

[201] CIA, THE WORLD FACTBOOK—JAPAN, http://www.cia.gov/cia/publications/factbook/geos/ja.html (June 29, 2006).

[202] Telecommunications Carriers Association, TCA Japanese Subscriber Statistics, http://www.tca.or.jp/eng/database/daisu/index.html (last visited on Mar. 13, 2006).

3. Broadband Pricing

Telecommunications network operators have substantially lowered DSL prices.[203] AT&T (the former SBC) has reduced its monthly price of 1.5 Mbps DSL access from $45 in February 2000 to $12.99 in February 2006.[204] Bernstein Research estimated in March 2006 that, although the cable modem service average revenue per user (ARPU) has remained close to $41 from 2002 to 2006, DSL ARPU has fallen substantially from $40 in 2002 to $31 in 2006.[205] Between May 2005 and April 2006, AT&T (the former SBC) reduced the monthly price of 1.5 Mbps DSL access from $19.95 to $12.99, and it reduced the monthly price of 3.0 Mbps DSL access from $29.95 to $17.99.[206] Figure 1 shows the decrease in Verizon's monthly price of 1.5 Mbps DSL access from May 2001 to May 2006.

As Figure 1 shows, Verizon decreased the monthly price of 1.5 Mbps DSL access four times from May 2001 to May 2006. Similarly, between May 2005 and April 2006, BellSouth reduced the monthly price of 1.5 Mbps DSL access from $42.95 to $32.95, and it reduced the monthly price of 3.0 Mbps DSL access from $54.95 to $37.95.[207]

Although cable operators have been able to keep their ARPU relatively stable from 2002 to 2006, they have significantly increased speed. From 2003 to 2006, most cable operators increased the speed of their flagship broadband offering from 1 to 4 to 6 Mbps, and many now offer speeds exceeding 10 Mbps.[208] The result has been that cable operators have positioned themselves as "premium" broadband Internet access providers, while telecommunications operators have positioned themselves as "economy" broadband Internet access providers.[209]

4. Broadband Penetration

Broadband penetration has steadily increased since the deregulation of broadband Internet access. Internet penetration as a whole (including dial-up

[203] BEAR STEARNS, MARCH BROADBAND BUZZ: A MONTHLY UPDATE ON CRITICAL BROADBAND ISSUES 6 (2006).

[204] Press Release, AT&T, New AT&T Offers Customers $12.99 Online Promotion for High Speed Internet (Feb. 3, 2006), http://att.sbc.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=22076.

[205] BERNSTEIN RESEARCH, BROADBAND UPDATE, *supra* note 116, at 4.

[206] BEAR STEARNS, MARCH BROADBAND BUZZ, *supra* note 203, at 6.

[207] *Id.*

[208] BERNSTEIN RESEARCH, BROADBAND UPDATE, *supra* note 116, at 4.

[209] *Id.* The positioning of cable as the premium (fast) Internet option is demonstrated in Comcast's "Slowsky" advertising campaign. Bill and Karolyn Slowsky are turtles who are devoted to DSL because they feel "cable-modem service is just too fast." *See* Linda Haugsted, *Turtles that Win the Race: Comcast's 'Slowskys' Back Cable Modems Via TV Spots*, MULTICHANNEL NEWS, Jun. 22, 2006, *available at* http://www.multichannel.com/article/CA6336326.html.

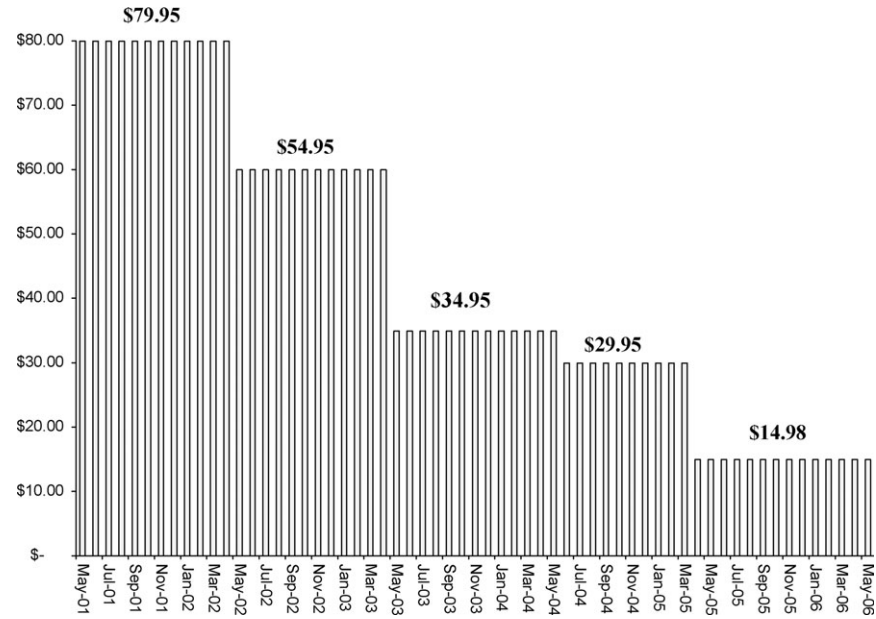

Figure 1. Verizon's monthly price for 1.5 Mbps DSL access, May 2001 to May 2006. *Source*: BEAR STEARNS, MARCH BROADBAND BUZZ: A MONTHLY UPDATE ON CRITICAL BROADBAND ISSUES 6 (2006). Note: In April 2005, Verizon began offering 3.0 Mbps DSL access for the same price that it had been offering 1.5 Mbps DSL access, thus doubling the performance of its entry-level DSL product. The figure treats this repricing as halving the price of 1.5 Mbps DSL access. *See* Press Release, Verizon, Verizon Online Offers Twice the Speed of Its Basic Consumer DSL Service For the Same Price (April 4, 2005), http://newscenter.verizon.com/proactive/newsroom/release.vtml?id=90158.

Internet access and broadband Internet access) has increased from 60.1 percent of U.S. households in the fourth quarter of 2002 to 64.0 percent in the fourth quarter of 2005.[210] The number of broadband access lines has increased from 19.9 million in 2002 to 50.2 million in 2005.[211] In this same timeframe, dial-up access penetration has decreased from 44.6 percent to 26.6 percent.[212] The share of Internet users who use broadband has increased from 38 percent in 2003 to 71.2 percent in 2006.[213] In other words, almost three out of four Americans who have Internet access, have *broadband* Internet access. Further,

[210] BERNSTEIN RESEARCH, BROADBAND UPDATE, *supra* note 116, at 7.

[211] WIRELINE COMPETITION BUREAU, FEDERAL COMMUNICATIONS COMMISSION, *supra* note 175.

[212] BERNSTEIN RESEARCH, BROADBAND UPDATE, *supra* note 116, at 7.

[213] Q4 *2003 NetRatings Earnings Conference Call—Final*, FAIR DISCLOSURE WIRE, Feb. 26, 2004 [hereinafter *NetRatings*]; Carol Wilson, *Nielson: Broadband Use Nears 75%*, PRISM INSIGHT, Jun. 22, 2006 [hereinafter *Nielson*].

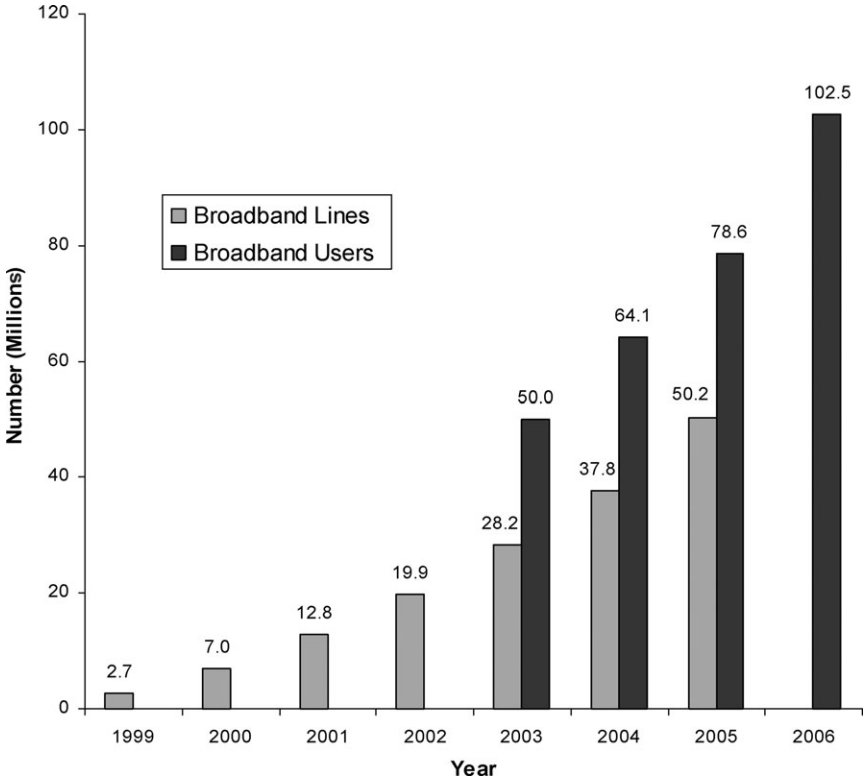

Figure 2. Broadband lines and broadband users, 1999–2006. *Source*: WIRELINE COMPETITION BUREAU, FCC, HIGH SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DEC. 31, 2005 (2006); 2003 NetRatings Earnings Conference Call—Final, FAIR DISCLOSURE WIRE, Feb. 26, 2004; *U.S. Broadband Penetration Tops 40%*, EDITOR AND PUBLISHER, Sept. 28, 2005; Carol Wilson, *Nielson: Broadband Use Nears 75%*, PRISM INSIGHT, Jun. 22, 2006.

total broadband users increased from 50 million in 2003 to 102.5 million in 2006.[214] The large increase in broadband adoption invites the question: At what level of broadband growth will network neutrality proponents be satisfied? Figure 2 shows the growth in broadband lines (typically one per household) and broadband users (typically more than one per household) from 1999 through 2006. As Figure 2 shows, 23.9 million new users adopted broadband access between 2005 and 2006, which represents a growth rate of 30 percent.

B. Innovation at the Edges of the Network

The current regime of deregulated broadband Internet access does not contain the government-imposed regulations that network neutrality proponents

[214] *NetRatings*, *supra* note 213; Wilson, *Nielson*, *supra* note 213.

advocate. The justification that they offer for adding such regulation is the preservation of innovation at the edges of the network, including investments in new content or applications. However, what evidence exists that content providers are producing too few innovations at the edges of the network under the current regime of deregulation? Put differently, under the status quo, is there any compelling evidence of insufficient investment, development of applications, or subscribership to online content? The data suggest not. To the contrary, innovation among content applications is robust.

1. Investment

The acquisition of Skype by eBay is a prime example of how investment in Internet applications has thrived in the period of Internet deregulation. Skype is a VoIP service that offers steeply discounted per-minute charges for international calling. In October 2005, Skype was adding approximately 150,000 users per day and had over 178 million total downloads of its free software (which is to say, potential subscribers).[215] Actual usage is also high. At a given moment on July 9, 2006, for example, more than 6.57 million Skype subscribers were online, making VoIP calls.[216]

In September 2005, eBay agreed to acquire Skype for approximately $2.6 billion.[217] eBay has since enabled Skype users to purchase prepaid blocks of minutes through their accounts at PayPal, the online payment service that eBay also owns. Thus, eBay has linked three highly successful Internet applications: an online auction site (eBay), a virtual bank (PayPal), and a virtual international long-distance telephone company (Skype). Moreover, in May 2006, Skype announced that calls to all landline and mobile phones in the United States and Canada would be *free* until at least the end of 2006.[218]

Amid the hyperbole over network neutrality, eBay's purchase of Skype offers a reality check. If the concerns about blocking of content and applications and about access tiering were well-founded, the expectation would be that Skype might have to pay network operators a fee to have its packets delivered quickly enough to avoid latency in callers' conversations. If eBay actually held that expectation, would it really have paid $2.6 billion for a startup company? Clearly, no. The more plausible assessment is that eBay—a company with proven expertise in introducing innovative Internet

[215] Internet users downloaded Skype 178,575,586 times by October 7, 2005. *See* http://www.skype.com/. Since its acquisition by eBay, Skype no longer posts the number of downloads on its website.

[216] Skype, http://www.skype.com/ (last visited Aug. 21, 2006). When a subscriber is using Skype, the website indicates how many Skype subscribers are using the service at that moment.

[217] Press Release, Skype, eBay to Acquire Skype (Sept. 12, 2005), http://about.skype.com/2005/09/ebay_to_acquire_skype.html.

[218] Press Release, Skype, Free Calls to All Landline and Mobile Phones within the US and Canada (May 15, 2006), http://share.skype.com/sites/en/2006/05/free_calls_to_all_landlines_an.html.

applications—continued to make investments and introduce innovative combinations of Internet applications from the edge of the network.

2. Applications

Internet applications have proliferated since the deregulation of broadband Internet access, particularly in the offering of video content. For example, Apple offers television shows on its website from many networks, including NBC Universal, Comedy Central, the Sci-Fi Channel, USA Network, MTV, Disney, and ABC. These programs can be downloaded to a computer or an iPod in a high-quality H.264 QuickTime format that does not stutter, unlike streaming video.[219] Apple currently offers episodes of many popular television shows, including *Saturday Night Live*, *The Office*, *Monk*, *X-Games Highlights*, *Desperate Housewives*, *South Park*, and *Lost*.[220] Each video costs $1.99, and a given episode is available one day after it originally airs on network television. Because the videos can be synched with an iPod, consumers can watch the shows anytime, anywhere.[221] This new Internet content has been extraordinarily successful. Apple CEO Steve Jobs announced in January 2006 that Apple had sold over eight million television show downloads since launching the video service only several months earlier in mid-October 2005.[222]

In addition to innovative content, new businesses are emerging to facilitate the delivery of this new content. Akamai Technologies, for example, provides services that improve and accelerate the delivery of content and applications over the Internet.[223] Akamai's software takes content that popular websites want to make readily available, and it sends that content to servers around the world so that the content is more quickly available to end-users.[224] Akamai was incorporated in 1998, achieved profitability in 2004, and had revenues of $283 million in 2005.[225] Its clients include Apple Computers, Yahoo, E*Trade, Land's End, Reebok, Foot Locker, and BestBuy.[226] IBM, Cisco Systems, Microsoft, and Apple Computers are all partial owners of Akamai.[227] Premium Internet and application hosting companies represent

[219] *See* Apple, iPod+iTunes, http://www.apple.com/itunes/videos/ (last visited July 7, 2006).
[220] *Id.*
[221] *Id.*
[222] Peter Cohen, *Macworld Expo Live Keynote Coverage*, MACWORLD.COM, Jan. 10, 2006, *available at* http://www.macworld.com/news/2006/01/10/livekeynote/index.php.
[223] AKAMAI TECHNOLOGIES, INC., ANNUAL REPORT (FORM 10-K), at 1 (Mar. 16, 2006) [*hereinafter* AKAMAI 2005 ANNUAL REPORT].
[224] Dan Frommer, *Shifting Out of Neutral?*, FORBES, Mar. 17, 2006, *available at* http://www.forbes.com/2006/03/16/telcos-network-neutrality-cx_df_0317neutral_print.html.
[225] AKAMAI 2005 ANNUAL REPORT, *supra* note 223, at 15.
[226] Akamai Technologies, Our Customers, http://www.akamai.com/en/html/about/customers.html (last visited July 7, 2006).
[227] Tony Smith, *Microsoft buys $15 Stake in Akamai*, THE REGISTER.COM, Sept. 28, 1999, http://www.theregister.co.uk/1999/09/28/microsoft_buys_15 m_stake/.

a significant form of network innovation by enabling faster real-time downloads by end-users by providing all types of content at significantly faster speeds. For example, four of the fastest 19 websites, as measured by Keynote, are identified as Akamai customers.[228] These hosting companies have responded to the needs of customers for faster downloads in the face of congestion, and such firms are growing because of frustration with slow Internet access.[229] With Akamai's help, Apple Computers broke the speed record for streaming video in 2000 by broadcasting a keynote address by Steve Jobs at 4.3 Gbps to 21,000 viewers.[230] Thus, Akamai is an example of a newer, smaller company that is innovating at the edge of the network. The value of its innovative application is evident to its impressive list of corporate clients and to the established companies in network equipment and computing that have invested in this startup.

3. Subscriptions

The amount of subscriber-based online content has grown significantly since the deregulation of broadband Internet access. For example, a baseball fan could watch almost any live baseball game in the 2005 season on his computer by subscribing to Major League Baseball's MLB.TV.[231] In 2001, there were only 125,000 subscribers to MLB.com's Internet "radio" broadcast of baseball games; in 2003, 550,000 consumers subscribed to MLB.TV's live Internet streaming video broadcasts of baseball games; and in 2004, MLB.TV subscribers grew to 850,000.[232] In 2005, MLB.com offered MLB.TV for $79.95 per season or $14.95 per month.[233] Moreover, MLB.TV subscribers were able to access a video archive that included every game of the entire season, as well as condensed versions of each game, each of which takes approximately 10 minutes to watch.[234]

C. Has the Current Regulatory Regime Produced a Socially Suboptimal Level of Innovation at the Edges of the Network?

A standard principle of welfare economics is that government should not intervene with regulation unless a market failure is present and optimal (attainable) levels of economic performance have not been reached. Recognizing that

[228] Frommer, *supra* note 224. Keynote is a firm specializing in Internet speed measurement, with over 1,600 measurement computers in 144 locations worldwide. *See* Keynote, http://www.keynote.com/about_us/about_us_tpl.html (last visited July 7, 2006).

[229] Alec Klein, *Akamai Arranges Financing, Attracts Apple as Customer*, WALL ST. J., May 14, 1999, at B4.

[230] *Apple Webcast Appears to Break Speed Records*, NEWSBYTES NEWS NETWORK, July 24, 2000.

[231] Don Steinberg, *Welcome to a Mad, Mad Multimedia World; There's More than One Way to Watch or Listen to a Game These Days*, PHILA. INQ., Oct. 18, 2005, at D1.

[232] Alana Semuels, *Tech Me Out to the Ballgame*, PITTSBURGH POST-GAZETTE, May 9, 2005, at E1.

[233] *Id.*

[234] Steinberg, *supra* note 231, at D1.

network neutrality regulation is indefensible in the absence of a documented market failure, proponents of network neutrality regulation often claim that there is insufficient competition in the market for broadband access. For example, in Senate testimony in February 2006, Lessig asserted that there is "increasing concentration in broadband provision," such that "an effective duopoly controls access to high speed Internet."[235] By the criteria regularly used in antitrust cases and regulatory proceedings, the assertion by Lessig and others that the market for broadband Internet access has not produced competitive outcomes is factually unsupportable. As Section III.A shows, prices have fallen substantially for DSL and cable modem service. Measured by either number of lines or number of users, the output of broadband Internet access is substantially higher today than even in 2004, before the FCC and Supreme Court effectively deregulated broadband Internet access. Falling prices and expanding output are prima facie evidence of competition, not the absence of it. Lessig's claim of "increasing concentration in broadband provision" is also false. As Figure 3 shows, the market for residential broadband access experienced a substantial decline in the nationwide Herfindahl–Hirschman Index (HHI) from 1999 to 2005. Again, a falling HHI is prima facie evidence of increasing competition.

Because the facts contradict the lack-of-competition story about broadband Internet access, proponents of network neutrality regulation need to resort to a second market-failure argument: that the mere possibility of discriminatory treatment has stymied innovation among providers of Internet content and applications.[236] According to Lessig and Wu, investment in broadband applications is "far riskier" than investment in non-Internet products, such as

[235] *Hearing on Net Neutrality Before the S. Comm. on Commerce, Science, and Transportation*, 109th Cong. (2006) (statement of Lawrence Lessig). Vinton Cerf, representing Google, similarly asserted in prepared Senate testimony in February 2006 that "consumers already have little to no choice of broadband providers." *Id.* (statement of Vinton G. Cerf). In Canada, which has a market structure for broadband Internet access that closely resembles that of the United States, Professor Michael Geist has argued that "the lack of broadband competition and insufficient transparency" justify network neutrality regulation. *See* Michael Geist, *Geist: Dangers in ISPs' Bid for New Tolls*, TORONTO STAR, Dec. 19, 2005, *available at* http://www.thestar.com/NASApp/cs/ContentServer?pagename=thestar/Layout/Article_Type1&c=Article&cid=1134946211708&call_pageid=968350072197&col=969048863851.

[236] Wu offers a hypothetical example of positive externalities that would be forgone if network operators banned IP "chat" programs. Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. TELECOMM. & HIGH TECH. L. 141, 152 (2003). Although Wu acknowledges that this hypothetical is merely a thought experiment, he does not explain why network operators would have incentives to block this kind of content in the first place. Wu argues that, if IP chat programs were blocked, existing consumers who value chat, as well as the creators of chat programs, would suffer economic harm. *Id* at 152. Further, he argues, there would be negative externalities from the blocking, which would affect the marginal broadband subscribers who would not otherwise subscribe, the programs that rely on chat programs as middleware, and the social benefits of communicating through chat. *Id* at 152–53. It bears repeating, however, that these effects are purely hypothetical, as no network operator of which I am aware bans IP chat programs.

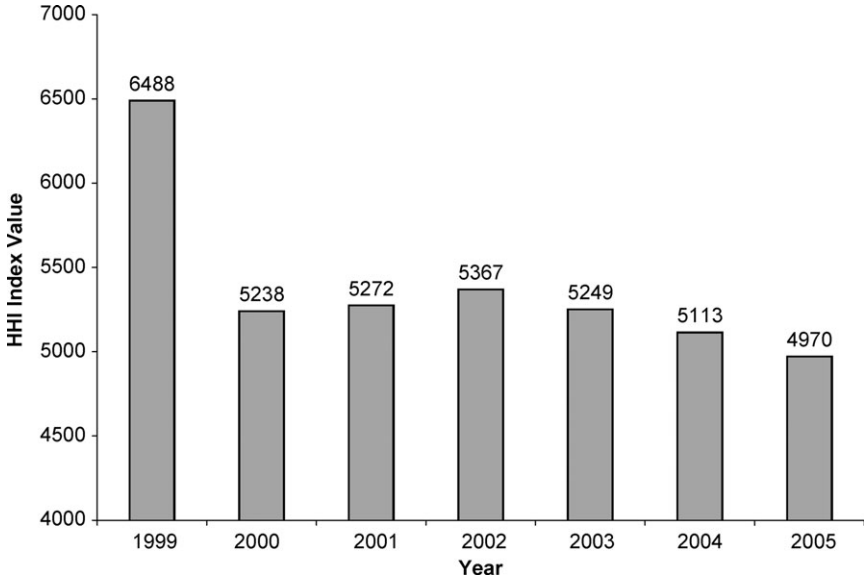

Figure 3. Nationwide concentration for residential broadband access (cable, DSL, fiber, wireless, and satellite), 1999–2005. *Source*: FCC, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2005, at table 3.

toasters.[237] Notwithstanding anecdotal evidence of edge-of the-network investment and innovation of the kind described above in Section III.B, Lessig and Wu claim that the edges of the network have experienced under-investment because of complicated contractual restrictions demanded by broadband Internet access providers.[238] In their joint letter to Congress in August 2003, Lessig and Wu claimed that broadband providers in general, and cable modem providers in particular, "have imposed a confusing patch-work of contractual and technical restrictions, enforced in an unpredictable manner."[239] They argued that, by failing to prohibit such conduct, the FCC and Congress harm future innovation by causing uncertainty among innovators and entrepreneurs: "The question an innovator, or venture capitalist, asks when deciding whether to develop some new Internet application is not just whether discrimination is occurring today, but whether restrictions might be imposed when the innovation is deployed."[240] In short, the central argument upon which Lessig and Wu justify network neutrality regulation is that, because regulation will eliminate uncertainty over possible discrimination

[237] Letter by Timothy Wu & Lawrence Lessig, Ex Parte Submissions, CS Dkt. No. 02-52, Aug. 22, 2003, at 3 [hereinafter *Wu-Lessig 2003 Ex Parte Submission*].
[238] *Id.*
[239] *Id.* at 4.
[240] *Id.*

by network operators against unaffiliated content and applications, entrepreneurs will produce more innovative content and applications than we currently observe.[241]

When he shifts from the lack-of-competition rationale for network neutrality regulation to the innovation-at-the-edges-of-the-network rationale, Lessig shifts from a false rationale to one that is nonfalsifiable, for it virtually impossible *today* to measure increased innovation in Internet applications *in the future*—and, in any case, Lessig does not purport to provide empirical evidence on the question. Lessig wrote in *Foreign Policy* in late 2001: "The Internet revolution has ended just as surprisingly as it began. None expected the explosion of creativity that the network produced; few expected that explosion to collapse as quickly and profoundly as it has."[242] Lessig suggests no empirical methodology for measuring how much innovation in independent applications is occurring, let alone whether the level of innovation has changed over a period in which Lessig believes the Internet has lost its neutrality. In essence, Lessig is presenting a testable hypothesis, yet his argument is anecdotal and rhetorical rather than empirical. Indeed, he has presented the same argument since 2001, despite the fact that neither the business cycle nor the growth of the Internet or of broadband penetration has remained constant from then until now. To properly address Lessig's hypothesis that the "end of neutrality" stifled innovation among content

[241] Barbara Van Schewick makes a similar argument in explicitly economic terms. *See* Barbara Van Schewick, *Towards an Economic Framework for Network Neutrality*, 5 J. TELECOMM. & HIGH TECH. L. (forthcoming 2007). Van Schewick argues that the threat of discriminatory behavior by access providers would reduce the amount of innovation in the markets for applications, content, and portals. *Id.* at manuscript 40. She concedes that discrimination by a network operator against unaffiliated content and applications would increase the network operator's incentive to engage in application-level innovation. *Id.* Consequently, her analysis recognizes (in a manner that Lessig's and Wu's noneconomic argument does not) that there is a tradeoff between innovation in the network and innovation at the edges of the network. On balance, Van Schewick argues, this increased incentive to innovate in the network does not offset the decreased innovation by independent producers of content and applications, and that the result is a net reduction in application-level innovation. *Id.*

[242] Lawrence Lessig, *The Internet Under Siege*, FOREIGN POL'Y, Nov.–Dec. 2001, at 56. Evidently, the Internet revolution ended sometime between January 1, 2001 and the publication of Lessig's article in *Foreign Policy* in November 2001, for he wrote in *The Future of Ideas*, which bears a 2001 copyright:

> All around us are the consequences of the most significant technological, and hence cultural, revolution in generations. This revolution has produced the most powerful and diverse spur to innovation of any in modern times. Yet a set of ideas about a central aspect of this prosperity—"property"—confuses us. This confusion is leading us to change the environment in ways that will change the prosperity. Believing we know what makes prosperity work, ignoring the nature of the actual prosperity all around, we change the rules within which the Internet revolution lives. *These changes will end the revolution.*

LESSIG, THE FUTURE OF IDEAS, *supra* note 86 at 5 (emphasis added).

providers, one would need to conduct an econometric exercise that controlled for other factors besides network neutrality. Is the decline of innovation in broadband applications that Lessig posits a phenomenon that, if it indeed exists, can be causally separated from the general collapse of the market capitalization of Internet startup companies that began in March 2000? In other words, the instances of broadband discrimination to which Lessig and Wu point all supposedly happened *after* the Internet bubble burst. So how can one distinguish between reduced investment in Internet applications that is "caused" by the prospect of broadband discrimination and reduced investment that is caused by reduced availability of capital for Internet ventures generally?

Consider the alternative assessment in 2005 by John Battelle, the Silicon Valley journalist who co-founded *Wired* and founded *The Industry Standard.* Although he writes that, "[b]y the fall of 2001, the Internet industry was in full retreat,"[243] Battelle optimistically describes an empowering "Database of Intentions" created by Internet search technology, which by 2015, he predicts,

> will expand to our televisions, our automobiles, and our public spaces—nearly everything that can have a chip will become a node in humanity's ever-growing Database of Intentions.
>
> This structure will provide the seedbed for scores of new cultural phenomena over the next decade [2005–2015]. We've already seen it flower with services like Yahoo, Napster, eBay, and Google. *And we're just at the beginning: in 2003 and 2004, hundreds of new companies sporting innovative, search-based models emerged—from entirely new forms of expression like blogging to personalized photography sites like Flickr.* And at its core, all of this new growth starts with one person in front of a screen, typing in a query.[244]

Battelle believes that Internet "search is smack in the middle of the Web's second coming, a resurgence driven by companies like Google, eBay, Amazon, Yahoo, and Microsoft."[245] Indeed, that resurgence is so powerful that "Google made [its] first profits in the darkest hours of the dot-com collapse."[246] Coincidentally, these same firms are the major proponents of network neutrality regulation. "These companies," writes Battelle, "are in an all-out war for the market of the future, one where the spoils number in the hundreds of billions of dollars."[247] Clearly, Lessig and Battelle cannot both be correct. Morbidity and vitality cannot simultaneously describe the state of innovation at the edges of the Internet. One of these two Silicon Valley visionaries must be mistaken. Is it the columnist for *Wired* or the co-founder of *Wired*?

[243] John Battelle, The Search: How Google and Its Rivals Rewrote the Rules of Business and Transformed Our Culture 1 (Portfolio Penguin Group 2005).
[244] *Id.* at 7 (emphasis added).
[245] *Id.* at 8.
[246] *Id.*
[247] *Id.*

Even if one ignores the bursting of the Internet bubble, one must ask: If conditions of broadband discrimination are so problematic today, then how did the "first Google" ever manage to survive and grow into a company with a market capitalization comparable to that of the largest telecommunications companies in the United States? The same question applies to eBay and Yahoo. Of course, Google arose in a world of dial-up Internet access. As of August 2006, no broadband carrier is blocking access to Google. So, for all Google users, the speed at which Google content is delivered today equals or exceeds the speed at which it was delivered over dial-up connections in 1998, when Google was a new startup. (Even dial-up speeds are much better now, given the faster dial-up modems that come standard on new personal computers.) So it is implausible that users of Google could be forced into a situation where they are receiving Internet content at a rate slower than when Google was experiencing enormous growth in usage, revenues, and market capitalization. Similarly, eBay and Yahoo were new startup Internet companies in 1995 and 1994, respectively. Like Google, these two companies achieved tremendous growth in usage, revenues, and market capitalization during the dial-up period of Internet access.

Moreover, even if one were to assume for sake of argument that insufficient incentives exist for investment in broadband content and applications, it does not follow that telecommunications law is the proper policy instrument with which to try to increase those incentives at the margin. Granted, there is hortatory language in the preamble to the Telecommunications Act of 1996 about increasing the availability to the consumer of innovative services by employing new technologies,[248] but actual experience shows that FCC implementation of the Telecommunications Act has not been a particularly supple tool for promoting investment that led to long-term gains to consumer welfare. To the contrary, and as Robert Crandall's recent book underscores,[249] during the period of implementation of the local competition provisions of the 1996 legislation, tens of billions of dollars of investment flowed into business models that were neither particularly innovative nor sustainable in the absence of regulatory distortions in their favor. That distortion of investment represented a staggering destruction of wealth.

The connection between telecommunications policy and investment decisions concerning Internet content and applications is certainly more

[248] Telecommunications Act of 1996, Pub. L. No. 104-104, pmbl., 110 Stat. 56, 56 (Telecommunications Act of 1996 was enacted to "promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid development of new telecommunications technologies").

[249] Robert W. Crandall, Competition and Chaos: U.S. Telecommunications Since the 1996 Telecom Act (Brookings Institution 2005).

tenuous than the connection between such policy and investment decisions concerning access-based and facilities-based strategies for competing local exchange carriers. So there is good reason to be even more skeptical of the asserted efficacy of regulatory intervention undertaken in the name of ensuring network neutrality. That should come as no surprise. Federal policy toward innovation primarily manifests itself in patent and copyright law. These areas of law are the logical starting places for someone concerned that too little incentive exists for entrepreneurs to attempt to build (and venture capitalists to attempt to fund) the "next Google." Some proponents of network neutrality regulation, however, may question the legitimacy of private protection of intellectual property. Someone holding that view needs to search somewhere other than the most logical starting point for a federal policy instrument that would affect incentives for investment in edge-of-the-network innovation. Indeed, that predicament suggests a kind of folk theorem of the second-best for government intervention: Once you disable the most precise form of government intervention, you must rely on inferior policies that must be radically transformed to address a purpose other than that for which they were intended.

IV. HOW NETWORK NEUTRALITY REGULATION WOULD ALTER THE CURRENT REGULATORY REGIME TO REMEDY THE ALLEGED MARKET FAILURE

Neutrality is in the eye of the beholder. It is a malleable term that encompasses many forms of proposed regulation of broadband Internet access providers. In general, proponents of network neutrality have embraced three main themes. They would prevent broadband Internet access providers from (1) denying or degrading access of end-users to specific content or applications on the Internet, (2) conditioning the quality of service for the delivery of content upon the payment of a fee, and (3) vertically integrating into the production of content and applications. Proponents of network neutrality would make exceptions for certain content, such as viruses or illegal content. Beyond this similarity, network neutrality proposals differ in significant ways. For example, some proposals seek to prohibit access providers from giving preferential treatment to any content, forcing all data to be delivered without obtaining any information from that data, while other proposals would allow access providers to police traffic that both originates from and terminates on their own network. Still other proposals would allow access providers to levy different prices on customers according to bandwidth consumed or priority requirements, but not with regard to services or content that those customers can access.

Although network neutrality proposals appeared at least as early as 2003, by early 2006 the issue featured prominently in the opinion pages of major

newspapers such as the *Washington Post*[250] and the *New York Times*.[251] The editors of the *Times* wrote:

> If access tiering takes hold, the Internet [access] providers, rather than consumers, could become the driving force in how the Internet evolves. Those corporations' profit-driven choices, rather than users' choices, would determine which sites and methodologies succeed and fail. They also might be able to stifle promising innovations, like Internet telephony, that compete with their own business interests.[252]

Repeating Lessig's argument about the "next Google," the *Times* said that, although incumbent content providers such as Google and Yahoo would be able to pay the price for dedicated bandwidths, the "bright young start-up with the next big innovative idea won't have that option."[253]

A. The Vagueness and Inconsistency of the Intended Goals of Network Neutrality Regulation

Although "network neutrality" is vague and ambiguous, it is nonetheless possible to say with certainty what it is *not*. Various terms of art connote traditional goals of telecommunications policy, but the proposals for network neutrality regulation do not correspond to any of them. Network neutrality is not the same as competition, consumer welfare, universal service, or the public interest. An economist would attempt to define network neutrality by asking, what is such regulation supposed to maximize? If there were a consensus that the uncontroversial goal is to maximize the sum of consumer surplus and producer surplus, subject to the constraint that the network operator break even, then the familiar answer for "neutral" pricing would be the Ramsey solution. In other words, it is well recognized that differential pricing is essential to the constrained maximization of welfare, but such pricing is precisely what the proponents of network neutrality regulation decry.

Network neutrality has a variety of proponents, each touting network neutrality regulation as a necessity for the greatest good, but the stated goals and reasoning behind many proposals conflict with one another. Former FCC Chairman Michael Powell described his network neutrality principles as a means to avoid regulation.[254] Others—including Lessig, Wu, and Senator Ron Wyden of Oregon, the leading proponent of network neutrality regulation

[250] Christopher Stern, *The Coming Tug of War Over the Internet*, WASH. POST, Jan. 22, 2006, at B1.
[251] *Tollbooths on the Internet Highway*, N.Y. TIMES, Feb. 20, 2006, at B01.
[252] *Id.*
[253] *Id.*
[254] Michael Powell, Chairman, Federal Communications Commission, Remarks at Silicon Flatirons Symposium: The Digital Broadband Migration: Toward a Regulatory Regime for the Internet Age (Feb. 8, 2004), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-243556A1.pdf [hereinafter Powell, *Digital Broadband Migration*].

in Congress—have stated that imposing regulation is their end goal.[255] The goals of preventing and imposing regulation are incompatible.

The companies represented by the High Tech Broadband Coalition (HTBC) are all market leaders in Internet content and applications, and they are the companies that Lessig likely expects will face competition from new entrants. Lessig says that access tiering would harm entrants who could not afford to pay a priority-of-delivery surcharge; thus, such pricing would discourage entry by the "next Google." If he is correct, then the incumbent providers of content and applications, such as Google and Yahoo, should oppose network neutrality regulation. Because these incumbents *support* network neutrality regulation, it is difficult to reconcile these two positions. Companies act in their own best interest, and it is hard to believe that any of these companies would elicit regulation that would reduce their profits. Lessig and Wu say that, even though firms like Google and Yahoo favor network neutrality, those firms are the ones that could pay for priority of delivery if necessary—and therefore it is the little firms who really need the government's protection.[256] In other words, the argument advanced by Lessig and Wu is, implausibly, that Google and Yahoo are lobbying hard against their corporate interests.

It is disingenuous for Google to advocate network neutrality legislation prohibiting network operators from charging content providers for the priority delivery of data packets. Google's own business model is predicated on charging Internet advertisers and other content providers for preferential access.[257] As a result of Google's privately managed IP network, Google can provide users with nearly instantaneous searches through private conduits while excluding competitors' traffic. An innovator—the "next Google"—would have to pay extra to replicate Google's advantage, which is precisely the motivation that inspired Google in the first place. Google's ability to price discriminate against advertisers has increased consumer welfare and inspired innovation at the edges of the network. Likewise, a network operator's ability to charge content providers for the priority delivery of data packets will increase consumer welfare and inspire innovation on the edges of the next-generation network. Nevertheless, while Google has built a multi-billion-dollar

[255] David Sarasohn, *Wyden Guards the Net*, THE OREGONIAN, June 25 2006, at F4. In June 2006, Senator Wyden blocked a major telecommunications bill because it would not explicitly enforce network neutrality. Press Release, Office of Senator Ron Wyden, Wyden Blocks Telecom Legislation Over Ineffective Net Neutrality Provision (Jun. 28, 2006), *available at* http://wyden.senate.gov/media/2006/06282006_net_neutrality_holds_release.html. Several weeks later, he threatened to filibuster any future telecommunications legislation that did not contain network neutrality regulation. *Senate Floor Time for Telecom Bill Until Sept.–If Then*, COMM. DAILY, Jul. 17, 2006 (quoting Sen. Wyden as saying, "I'll do everything in my power to block this major communications legislation unless it ensures that net neutrality is preserved.").

[256] *Wu-Lessig 2003 Ex Parte Submission*, *supra* note 237, at 4.

[257] *See* Thomas W. Hazlett, *Neutering the Net*, FIN. TIMES, Mar. 20, 2006, *available at* http://news.ft.com/cms/s/392ad708-b837-11da-bfc5-0000779e2340.html.

empire on the foundation of price discrimination with respect to advertisers in Internet search, Google has inveighed against a network operator's ability to offer content providers priority delivery. This argument is not the only instance of Google's lobbying in an intellectually inconsistent manner. In May 2006, Google appealed to lawmakers in the United States and Europe, claiming that Microsoft's Internet Explorer 7, which has a built-in MSN search tool, is anticompetitive.[258] At the same time, Google continues to heavily promote Internet Explorer's main competitor, Firefox, which defaults to Google's search engine.[259] Google has run advertisements for Firefox on the main Google webpage, and it includes Firefox in the Google Pack, a software bundle of Google and non-Google applications.[260] Google's spokesperson's only response to its contradictory regulatory position was that Firefox users are supposedly more adept than Internet Explorer users at changing the default settings.[261]

"Neutrality" is incredibly vague when one tries to convert Chairman Powell's four principles into legally enforceable standards. Neutrality is more ambiguous, for example, than "cost," the interpretation of which went all the way to the Supreme Court during the implementation of the local competition provision of the Telecommunications Act of 1996.[262] Just as the "impairment" standard for defining network elements subject to mandatory unbundling presumed a market structure containing a permanent fringe of inferior competitors, a key question in the debate over network neutrality regulation is whether the concept of neutrality being considered presumes a particular market structure. The recurring references to nurturing the "next Google" suggest as much. Does the notion of neutrality have the potential to require a Potemkin village of network operators, content providers, and applications providers? If so, then neutrality is no more than a euphemism for managed competition. Although competitive network operators would lack the incentive to block content, it does not follow that a competitive equilibrium requires each firm to act neutrally toward every other firm. As Section II.E explained, antitrust law recognizes that a legitimate efficiency basis may underlie exclusive dealing and differential pricing.

Because the key statutory phrase is so difficult to define, any network neutrality legislation will be challenging to implement and will produce protracted litigation. The legislative strategy underlying the Telecommunications Act of 1996 was to enact provisions having intentional ambiguity and to leave to the FCC or the state public utility commissions (PUCs) the task of

[258] Shankar Gupta, *Google Takes MSN Rivalry to Washington*, ONLINE MEDIA DAILY, May 2, 2006.
[259] *Id.*
[260] *Id.*
[261] *Id.*
[262] Verizon Communications, Inc. v. FCC, 535 U.S. 467 (2002); AT&T Corp. v. Iowa Utils. Bd., 525 U.S. 366 (1999).

interpretation, subject to judicial review under the deferential *Chevron* standard.[263] This implicit bargain is the public choice interpretation of Justice Scalia's lament in *Iowa Utilities Board* that, far from being "a model of clarity," the Telecommunications Act of 1996 "is in many important respects a model of ambiguity or indeed even self-contradiction."[264] No legislation could have been passed if the language had been precise on key concepts (like "cost") and the sections had been rationally designed from an economist's perspective. The interexchange carriers and the RBOCs had differing expectations as to whether state or federal regulators would exercise the prerogative to interpret key statutory provisions. Without vagueness and asymmetric expectations among stakeholders, there could have been no enactment of a statute. The legislative deal implicitly struck was that the ambiguity of the statute would ultimately be resolved by regulators and the courts. Because of the vagueness and inconsistency of the goals of proposed network neutrality legislation, such legislation would likely follow a similar path of protracted litigation.

B. The Three Essential Themes of Network Neutrality Regulation

As noted earlier, three basic ideas represent the core of proposals for network neutrality regulation: (1) preventing access providers from denying end-users access to specific applications on the Internet, (2) preventing access providers from conditioning the quality of service for the delivery of content upon the payment of a fee, and (3) preventing access providers from vertically integrating into the production of content and applications. I examine each in detail.

1. *Access Providers may not Deny Users Access to Specific Content or Applications on the Internet, or to Specific Hardware that Attaches to the User's Computer*

Of all the elements included in the network neutrality agenda, the one that receives the most attention is blocking of access. On February 8, 2004, Chairman Powell of the FCC, outlined four "Internet Freedoms" to serve as a basis for network neutrality: the freedom to access content, to use applications, to attach personal devices, and to obtain service plan information.[265] Specific allegations of blocking of access fall into two broad categories. The first is the blocking of VoIP service by a provider of DSL service. The second is the blocking, by a provider of cable modem service, of access to virtual private networks (VPNs), home networking, and online gaming services. The facts show that these allegations have been unfounded, grossly exaggerated, or inadequately explained by the FCC when taking enforcement

[263] *See* Chevron U.S.A., Inc. v. Natural Res. Def., 467 U.S. 837 (1984).
[264] 525 U.S. at 397.
[265] Powell, *Digital Broadband Migration, supra* note 254.

action. Consequently, the proponents of network neutrality regulation fail to carry the burden of persuasion on the proposition that, absent legislation, major network operators will engage in widespread blocking of access to content or applications.

a. DSL provider blocking VoIP service

In response to a complaint that it was blocking a customer's access to a VoIP service, Madison River Communications LLC entered into a consent decree with the FCC on or around March 3, 2005, which included the company's agreement to make a $15,000 "voluntary" payment to the U.S. Treasury.[266] The public documents in the case consist of only a four-page consent decree[267] and a perfunctory, one-page order approving the decree.[268] Nevertheless, in the first half of 2006, one could scarcely read a newspaper story, industry speech, or piece of congressional testimony about network neutrality without encountering reference to the notorious *Madison River* case. It was quickly the conventional wisdom that *Madison River* exemplified a network operator blocking an end user's access to Internet content or applications. Yet, despite this notoriety, the public record is devoid of explanation of what actually occurred. In the absence of such evidence, even a responsible body like the OECD has repeated incorrect descriptions of the case—such as its characterization that the FCC "fined" the network operator.[269]

Until March 3, 2005, Madison River was an unfamiliar company even among persons who worked in the telecommunications industry. The company was formed two months after passage of the Telecommunications Act of 1996 by a management team led by a businessman who had been the president of two significant local telephone companies—Centel Corporation and Sprint Corporation.[270] Madison River boasts that "[t]he company's six managing directors have over 180 years of combined experience in the telecommunications industry."[271] In addition to having this managerial expertise, Madison River has sophisticated owners that include the world's leading

[266] Madison River Communications, L.L.C. and Affiliated Companies, Order, File No. EB-05-IH-0110, 20 F.C.C.R. 4295 (Enforcement Bureau, Mar. 3, 2005) [hereinafter *Madison River Order*].

[267] Madison River Communications, L.L.C. and Affiliated Companies, Consent Decree, File No. EB-05-IH-0110, 20 F.C.C.R. 4295 (Enforcement Bureau, Mar. 3, 2005) [hereinafter *Madison River Consent Decree*].

[268] *Madison River Order, supra* note 266.

[269] *See* OECD NETWORK NEUTRALITY STUDY, *supra* note 2, at 24. *See also* Catherine Yang, *At Stake: The Net as We Know It*, BUSINESSWEEK ONLINE, Dec. 15, 2005 ("the Federal Communications Commission fined the company $15,000"); Philip J. Weiser, *The Relationship of Antitrust and Regulation in a Deregulatory Era*, 50 ANTITRUST BULL. 549, 571 (2005) (describing the FCC enforcement action as "requiring Madison River to enter into a consent decree that, among other things, fined the company for its actions").

[270] Madison River Communications, About Us, http://www.madisonriver.net/about_us/companies.php (last visited July 8, 2006).

[271] *Id.*

investment bank and a private equity fund that manages $9 billion of investments in telecommunications and media companies. Madison River's parent company is owned by affiliates of Madison Dearborn Partners, Goldman, Sachs & Co., and Providence Equity Partners, among others.[272]

Madison River describes itself as a holding company "founded to acquire, integrate and improve the operations of rural telephone providers."[273] In its annual report filed with the Securities and Exchange Commission three weeks after its March 3, 2005 consent decree with the FCC, Madison River said, in the description of its business, that "[o]ur rural telephone companies benefit from limited competition and a favorable regulatory environment, which we believe leads to stable operations."[274] The company explained:

> Competition is typically limited in areas served by rural telephone companies because they primarily are sparsely populated and rural, with predominantly residential customers. Accordingly, the cost of operations and capital investment requirements for new entrants is high. At the same time, existing state and federal regulations permit us to charge rates that enable us to recover our operating costs plus a reasonable rate of return on our invested capital (as determined by relevant regulatory authorities). In addition, we benefit from federal policies establishing the principle that rates in rural areas should be reasonably comparable to rates in urban areas. These policies have resulted in state and federal universal service funding payments to assist in the recovery of costs in high-cost rural areas, such as those served by our operating companies.[275]

These facts invite the question of whether the behavior of rural LECs on matters of network neutrality provide a reliable basis for predicting the behavior of ILECs or cable MSOs in metropolitan markets, which have substantially different competitive and regulatory conditions than rural markets.

The order approving the consent decree in *Madison River* was an act of delegated authority by the FCC's Enforcement Bureau. It was not an agency action resulting from a vote of the full Commission and thus, technically, was not "the Commission" speaking. The full Commission does occasionally reverse decisions of the Enforcement Bureau.[276] As a practical matter, the

[272] *Id.* The parent company is Madison River Telephone Company, LLC.

[273] *Id.*

[274] Madison River Capital, LLC, Annual Report (Form 10-K), at 1 (Mar. 23, 2005).

[275] *Id.* In 2003, Madison River received 6.2% of its total revenue from universal service payments. *Id.* In 2004, that share rose to 6.6%. *Id.*

[276] For example, earlier in Chairman Powell's tenure, the Enforcement Bureau ruled that an exclamation uttered by U2 singer Bono during a live television broadcast was not, when taken in context, indecent speech in violation of 18 U.S.C. § 1464. *See* Complaints Against Various Broadcast Licensees Regarding Their Airing of the "Golden Globe Awards" Program, Memorandum Opinion and Order, 18 F.C.C.R. 19,859, 19,861 ¶ 5 (2003) (decision by the Chief, Enforcement Bureau). The full Commission reversed that ruling. *See* Complaints Against Various Broadcast Licensees Regarding Their Airing of the "Golden Globe Awards" Program, Memorandum Opinion and Order, 19 F.C.C.R. 4975 (2004). It reached a different result under the same legal standard, *id.* at 4978–80 ¶¶ 8–9, and also articulated and applied an additional theory of liability, which the Enforcement Bureau had not considered. *Id.* at 4981 ¶¶ 13–14.

chief of the Enforcement Bureau (or any other of the FCC's bureaus) reports to the chairman; thus, the Enforcement Bureau's order in *Madison River* most likely was not even circulated to the other FCC commissioners before the Bureau issued it. Despite this process suggesting that the Enforcement Bureau's order was mundane, Chairman Powell, in his final month at the FCC, took the unusual step of simultaneously issuing his own press release.[277] An FCC chairman rarely gives such a degree of personal attention and association to an action that has not resulted from a vote of all the commissioners. Two months later, Lessig wrote in *Wired* that Powell "defend[ed] network freedom" through the *Madison River* enforcement, an action so important in Lessig's view that it deserves to be dubbed "the Powell Doctrine."[278]

On the one hand, *Madison River* proves that regulators believe that they already have adequate tools to address blocking or degradation of access to content or applications. However, on the other hand, the specific boundaries of the duty that the FCC is enforcing against network operators under the Powell Doctrine are breathtakingly vague. Consider the unanswered "who, what, when, where, and why" of *Madison River*:

- Who complained about the blocking? Did the complaint concern the origination or termination of VoIP calls?
- Which VoIP provider was being blocked? Which of Madison River's operating companies committed the blocking? Where in the United States did the blocking occur? How many customer lines were affected?
- When did the blocking begin, how long did it last, and how was it detected? Did the customer or VoIP provider ask Madison River to end the blocking before contacting the FCC?
- What did Madison River say in its initial and supplemental responses to the Enforcement Bureau's letter of inquiry, which initiated the action against the company? Did Madison River explain why it was blocking access to the VoIP provider or offer any business justification for the blocking? What did the FCC conclude was Madison River's motive? What was the extent of competition from cable modem service in the areas affected by the blocking?
- How did the FCC construe the statute cited, section 201(b) of the Communications Act of 1934, to reach a broadband Internet access provider's blockage of access to a VoIP provider?

[277] Press Release, FCC, Chairman Michael K. Powell Commends Swift Action to Protect Internet Voice Services, Doc-25715A (Mar. 3, 2005) [hereinafter *Powell Press Release on Madison River*].

[278] Lawrence Lessig, *Voice-Over-IP's Unlikely Hero: On his way out, Michael Powell defends four fundamental freedoms of the Net*, WIRED, Issue 13.05 (May 2005), *available at* http://www.wired.com/wired/archive/13.05/view.html?pg=4.

The consent decree, the order approving it, and Chairman Powell's press release answer none of these questions. They explain only that there was a blocking of ports used for VoIP, thereby affecting customers' ability to use VoIP through one or more VoIP service providers. The order and consent decree do not even identify the complaining provider of VoIP service, even though Vonage would be the obvious candidate because it had the most VoIP customers. In a telephone interview the day that the *Madison River* consent decree was announced, Vonage CEO Jeffrey Citron said that his company was "very pleased by the FCC's swift action" because "[i]t sends a clear and strong message that [VoIP] blocking is not going to be tolerated by the government."[279] Although the word "Vonage" does not appear anywhere in the *Madison River* order or consent decree, when the full Commission approved the Verizon-MCI and SBC-AT&T mergers (subject to network neutrality conditions) on October 31, 2005, it described *Madison River* as a consent decree "concerning the company's practice of port blocking, such that all of the communications generated by Vonage customers were blocked."[280]

Equally puzzling is why, if the *Madison River* consent decree was as important to Vonage as Citron's remarks suggested, the company's website does not contain any press release or other mention of it.[281] By comparison, Vonage's amended registration statement filed with the SEC on May 24, 2006 states that "[i]t is not clear whether suppliers of broadband Internet access have a legal obligation to allow their customers to access and use [Vonage VoIP] service without interference."[282] In point of fact, a document subsequently

[279] *See* Paul Kapustka, *FCC Fines N. Car. Provider $15K for Blocking Vonage: Madison River Agrees to Pay Fine for Blocking VoIP Service*, NETWORKING PIPELINE, Mar. 3, 2005, *available at* http://www.networkingpipeline.com/60405195 (quoting Jeffrey Citron, CEO, Vonage).

[280] SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control, Memorandum Opinion and Order, WC Dkt. No. 05–65, 20 F.C.C.R. 18,290, 18,366 n.415 (2005) (summarizing comments of Vonage); Verizon Communications Inc. and MCI, Inc. Applications for Approval of Transfer of Control, Memorandum Opinion and Order, WC Dkt. No. 05–75, 20 F.C.C.R. 18,433, 18,508 n.412 (2005) (summarizing comments of New York Attorney General). As the Commission used identical language to summarize arguments made by two different parties in two different mergers, the agency was clearly giving its own description of *Madison River*, including the fact that Vonage was the VoIP provider.

[281] Vonage's website lists numerous press releases on or shortly after March 3, 2005, but none of them concerns blockage of VoIP. *See* Vonage, Press Releases, http://pr.vonage.com/releases.cfm?Year=&ReleasesType=&DisplayPage=11 (last visited July 16, 2006). Vonage's press releases on legislative and regulatory matters also have no mention in or around March 2005 of the *Madison River* case or of VoIP blockage generally. *See* Vonage, Press Releases, http://pr.vonage.com/releases.cfm?Year=&ReleasesType=Legislative/Regulatory&DisplayPage=2 (last visited July 16, 2006). At one point, Vonage reprinted a news story of the *Madison River* decision on its website. Vonage, http://www.getvonage.net/corporate/press_news.php?PR=2005_03_03_0. Sometime between February and July of 2006, however, the link ceased to work.

[282] VONAGE HOLDINGS CORP., REGISTRATION STATEMENT (AMENDMENT NO. 8 TO FORM S-1), at 17 (May 24, 2006).

released by the FCC in September 2006 pursuant to a Freedom of Information Act request confirmed that Vonage, acting through its outside law firm, was the party that had filed a complaint with the FCC on February 9, 2005.[283] Vonage claimed that Madison River "has been preventing its broadband access customers in Illinois and Alabama from using Vonage's and other VoIP services" and "has told its customers that it blocks access to Vonage's service ... because Vonage competes with Madison River's legacy telephone service."[284]

Vonage's 26-page complaint included extensive legal analysis in support of its request that the FCC issue a notice of apparent liability against Madison River. Nonetheless, the FCC's *Madison River* order and consent decree contain no legal analysis of the application of existing statutory provisions of the Communications Act to blockage of VoIP. Paragraph 10 of the consent decree says that the decree does not constitute "an adjudication on the merits *or a factual or legal finding* regarding any compliance or noncompliance with the requirements of the Act and the Commission's orders and rules,"[285] and, under paragraph 16 of the decree, Madison River reserves its right to contest the disclosure of any facts concerning the case under the Freedom of Information Act.[286] The Enforcement Bureau asserted that the legal basis for its investigation was section 201(b) of the Communications Act of 1934,[287] but the Bureau did not explain how a statute enacted during the New Deal applies to broadband networks and Internet applications and content seven decades later. The uncertainty surrounding the relevance of section 201(b) to blockage of an Internet application became all the more consequential once the Supreme Court and the FCC effectively deregulated broadband Internet access in the summer of 2005. In particular, assuming counterfactually that *Madison River* had been an agency decision having the force of law with respect to third parties, did it survive the deregulation of DSL? It is too much to ask whether its *reasoning* survived, because there was none to begin with.

Madison River reminds one of the litigator's cliché: "If the law is against you, argue the facts; if the facts are against you, argue the law." In *Madison River*, the FCC explains neither the facts nor the law, yet the FCC's chairman proclaimed the decree to be a significant precedent. In his press release, Chairman Powell spoke of industry's newfound adherence to "certain consumer protection norms," such that the consent decree embodied "hypothetical

[283] Memorandum re Blocking of Vonage's Service by Madison River to Christopher D. Libertelli & David H. Solomon (FCC) from William B. Wilhelm, Jr., Russell M. Blau, Ky E. Kirby & Michael C. Sloan (Swidler Berlin LLP), Feb. 9, 2005 [hereinafter *Vonage Complaint*].

[284] *Id.* at 1.

[285] *Madison River Consent Decree*, 20 F.C.C.R. at 4298 ¶ 10 (emphasis added).

[286] *Id.* at 4298 ¶ 16.

[287] *Madison River Order*, 20 F.C.C.R. at 4295 ¶ 1 (citing 47 U.S.C. § 201(b)).

worriers[’] giv[ing] way to concrete facts.”[288] What facts did Chairman Powell have in mind? Typically in cases involving attempted monopolization, the antitrust enforcers or court wishes to elucidate the critical evidentiary questions of incentive and opportunity. However, the FCC declined to give any such guidance in *Madison River*.

Madison River has other oddities. Madison River evidently did not issue a press release or otherwise disclose anything about the enforcement action on the investor page of its website. According to a March 3, 2005 article posted on the Internet, Madison River’s CEO declined to comment on the consent decree, saying: “We are in a quiet period due to our S-1 on file with the SEC, [and] we will have no comment.”[289] If, as Chairman Powell claimed, the decree was a watershed event for the future of the Internet, some disclosure by the alleged miscreant might seem appropriate, considering that Madison River was poised to make an initial public offering. Perhaps, Madison River’s attorneys advised that, because its $15,000 contribution to the U.S. Treasury was so insubstantial, the company’s nondisclosure of the fact that it had entered into a consent decree with the FCC to terminate an enforcement proceeding would not be deemed to be material as a matter of securities law.

Virtually all of the facts that the conventional wisdom attributes to the *Madison River* case can be traced to a front-page story on network neutrality published by the *Wall Street Journal* in August 2005 and a substantially similar story on the *BusinessWeek Online* website in December 2005.[290] According to the two stories, the facts of *Madison River* are these. Doug Herring, a 48-year-old General Electric sales manager, was on business trip in Tennessee and tried to call his wife in their rural hometown of Elberta, Alabama using Vonage’s VoIP service. Herring apparently could not complete the call and said that his DSL provider, a unit of Madison River named GulfTel, informed him that it was blocking calls from Internet telephone companies. In response, Herring and Vonage filed a complaint with the FCC against Madison River. The *Wall Street Journal* said that “Madison River’s action affected only a small number of customers,” but it did not say where they were located.[291]

This account of VoIP blockage raises a number of questions from an economic perspective. Madison River would naturally prefer that its DSL subscribers continue to make long-distance calls using Madison River’s own services rather than Vonage’s VoIP service. The opportunity cost to Madison River of losing a long-distance customer to an unaffiliated provider of VoIP service is substantial because rural carriers typically charge end-users much higher

[288] *Powell Press Release on Madison River, supra* note 277.

[289] *See* Kapustka, *supra* note 279.

[290] Amy Schatz & Anne Marie Squeo, *Neutral Ground: As Web Providers’ Clout Grows, Fears over Access Take Focus FCC’s Ruling Fuels Debate between Broadband Firms and Producers of Content Blocking out Vonage Service*, WALL ST. J., Aug. 8, 2005, at A1; Yang, *supra* note 269.

[291] Schatz & Squeo, *supra* note 290, at A1.

rates for long-distance calls than do the large ILECs that serve more densely populated areas. However, that concern only relates to calls that *originate* on Madison River's rural local exchange networks, and those networks are located only in Alabama, Georgia, Illinois, and North Carolina.[292] *BusinessWeek Online* quoted Mr. Herring as saying, "For me to get the Internet *where I live*, [Madison River] is the only provider."[293] However, nothing in the *Wall Street Journal* or *BusinessWeek Online* stories indicates that Mr. Herring was trying to use Vonage over Madison River DSL service to originate the call to his wife *from Tennessee*. So it is therefore an incomplete explanation for the *Wall Street Journal* to say that Mr. Herring found "the culprit: His Internet provider, a unit of Madison River Communications, had blocked Vonage's phone service, which competed with Madison's service."[294] On the facts given, in Elberta, Alabama, Vonage VoIP over DSL is a competitive alternative to Madison River telephone service in the origination of long-distance calls. However, Vonage does not compete with Madison River in Tennessee in the origination of long-distance calls, for the simple reason that Madison River does not own local exchange networks in Tennessee and therefore cannot provide Vonage customers the DSL platform on which to use the VoIP service.

The facts reported by the *Wall Street Journal* and *BusinessWeek Online* relate to the *termination* of VoIP traffic on Madison River's network in Elberta, Alabama.[295] Rural local exchange carriers typically have high, regulated rates for terminating access for long-distance calls. These high access charges reflect a conscious policy decision to make basic telephone access cheaper than it would be in a regime of rebalanced rates. High access charges, of course, provide a strong incentive for bypass—including bypass in the form of callers' switching from traditional telephone service to VoIP. For Madison River, access charges to interexchange carriers accounted for

[292] *See* Madison River Communications, http://www.madisonriver.net/about_us/ locations.php (last visited July 16, 2006).

[293] Yang, *supra* note 269 (emphasis added). Although this statement may be true in Mr. Herring's case in January 2005, Mediacom, the cable television competitor, was projected by Madison River in March 2006 to be able to offer its own VoIP service by mid-year. *See* Madison River Communications, Lehman Brothers 2006 High Yield Bond and Syndicated Loan Conference, at slide 18, Mar. 16–17, 2006 (presentation of Paul Sunu, Chief Financial Officer, Madison River Communications), http://www.madisonriver.net/investor/presentations/2006.03.16.lehman.pdf.

[294] Schatz & Squeo, *supra* note 290, at A1.

[295] *See also* Weiser, *supra* note 269 (describing *Madison River* as a case of a "local telephony . . . [having] blocked a voice-over-Internet provider's ability to deliver telephone calls over Madison River's DSL connections," although providing no factual support for that description). Vonage claimed that Mr. Herring "was unable to place outgoing Vonage calls and all incoming calls were routed to [redacted] Vonage voice mail service." *Vonage Complaint, supra* note 283, at 7. During the period of VoIP blocking, Mr. Herring continued to have a Madison River POTS line connected to his fax machine and could have used that line to make emergency 911 calls, if necessary. *Id.*

18.8 percent of the company's revenue in 2004 and, for that reason, Madison River has warned potential investors that "we are aware that certain interexchange carriers are [bypassing] or are seeking to bypass or avoid access charges by originating traffic on and routing traffic through unregulated Internet facilities."[296]

It is the conventional wisdom that *Madison River* signals that the FCC can act quickly when it receives a complaint of VoIP blockage by a broadband network operator. Beyond that, however, *Madison River* is conspicuously uninformative to the point of peculiarity.

b. Cable modem provider blocking of VPN, home networking, and online gamingservices

In support of their proposals for network neutrality in 2003, Lessig and Wu cited three examples of cable modem providers blocking the access of end-users to specific kinds of content or applications. Their first example was virtual private networks (VPNs), which Lessig and Wu alleged were treated differently by cable modem providers—some providers banning their usage entirely, some charging a fee for VPN usage, and some allowing them.[297] VPNs allow employees to work more efficiently from home by allowing greater productivity through a broadband connection. Lessig and Wu argued that access providers seek to restrict "new and innovative applications that broadband operators see as either unimportant, a competitive threat, or a chance to make money."[298] They further argued that the diversity of VPN policies among cable operators "has imposed unnecessary costs on the developers of VPN technology, the companies who might benefit from VPN technology, and, of course, on workers themselves."[299] According to Lessig and Wu, cable operators relaxed the ban on VPNs "as a result of the publicity stemming from the instant inquiry."[300] The inquiry to which Lessig and Wu referred was a January 8, 2003 complaint filed by the Coalition of Broadband Users and Innovators (CBUI) with the FCC regarding the fees or restrictions imposed by some cable modem providers for VPN usage. However, Lessig and Wu failed to mention that Comcast, the largest cable operator, had already removed the VPN restriction in the fall of 2002.[301] The VPN restriction was a remnant of Comcast's acquisition of the now-defunct @Home, from which Comcast took over cable provisioning in early 2002, and the

[296] MADISON RIVER COMMUNICATIONS CORP., REGISTRATION STATEMENT (AMENDMENT NO. 3 TO FORM S-1), at 22 (Mar. 29, 2005).

[297] *Wu-Lessig 2003 Ex Parte Submission*, *supra* note 237; Tim Wu, *Network Neutrality, Broadband Discrimination*, *supra* note 236, at 151–52.

[298] *Wu-Lessig 2003 Ex Parte Submission*, *supra* note 237, at 3.

[299] *Id.* at 4.

[300] *Wu-Lessig 2003 Ex Parte Submission*, *supra* note 237, at 4.

[301] Letter by Ryan G. Wallach, Ex Parte Submission on behalf of Comcast Corp., CS Dkt. 02-52, May 15, 2003.

elimination of the restriction was a part of the transition from @Home's policies to Comcast's policies.[302] In other words, Comcast removed the VPN restriction as a result of market forces and its own extant corporate policy—not because of any FCC intervention or threat of network neutrality regulation.

The second example that Lessig and Wu offered of blocking by a cable operator concerns home networks. They define home networks as "networks that interconnect several home computers to a single broadband connection, often using WiFi technology."[303] They argued that the one-time banning of home networks by a cable provider shows why network neutrality regulation must be imposed to allow users to attach their own devices to the cable operator's broadband access network.[304] Wu and Lessig did not name the cable provider in question in the body of their 2003 ex parte letter to the FCC. In the letter's footnotes, however, they indicated that they were referring to a 2002 service agreement of AT&T, which had subsequently been purchased by Comcast such that, by the time that Lessig and Wu made their ex parte filing to the FCC, a Comcast service agreement had superseded the AT&T service agreement. In addition to creating this factual confusion in their 2003 letter to the FCC, Wu and Lessig made five claims that have proven to be false. First, they described AT&T's earlier position to be that home networking constituted a "theft of service."[305] This policy had been revoked and was not even in effect when Lessig and Wu submitted their letter to the FCC. To the contrary, Comcast today prominently identifies home networking service as a service choice.[306] Second, Lessig and Wu implied (if they did not explicitly declare) that Comcast tied the sale of home networking equipment to its sale of cable modem service: "Requiring that home networking equipment (like home WiFi) be purchased and installed by the cable operator generates additional revenue."[307] In fact, although consumers can purchase or lease home networking equipment from Comcast, they are free to supply their own networking equipment.[308] Third, Lessig and Wu claimed that such a policy would hurt the manufacturers of home networking equipment.[309] This claim has proven to be false. In fact, Comcast has teamed with Linksys, the leading provider of home networking equipment, to provide home networking service to its customers.[310] Fourth, Lessig and Wu

[302] *Id.*
[303] *Wu-Lessig 2003 Ex Parte Submission, supra* note 237, at 3.
[304] *Id.* at 8.
[305] *Id.*
[306] Comcast Website, http://www.comcast.com/Benefits/CHSIDetails /Slot5PageOne.asp.
[307] *Wu-Lessig 2003 Ex Parte Submission, supra* note 237, at 8.
[308] Comcast, Terms of Service, http://www.comcast.net/terms/subscriber.jsp (Jan. 12, 2006).
[309] *Wu-Lessig 2003 Ex Parte Submission, supra* note 237, at 8.
[310] *Comcast and Linksys Make Sharing a High-Speed Internet Connection Easier New Comcast Home Networking Package Includes Linksys Cable Gateway For Connecting the Entire Household to the Internet*, PR NEWSWIRE, May 3, 2004.

claimed that developers of applications would be hurt "because of the unpredictability of the home network of local restriction."[311] This claim is false because Comcast specifically states that users may connect multiple computers to a home network.[312] Finally, Lessig and Wu claimed that consumers would be harmed because they would forgo service as a result of the restriction and the higher prices charged by the cable operator.[313] This claim is false because Comcast does not charge any additional fees for having a home network.[314]

In addition to making claims that cable operators were blocking VPNs and home networks, Lessig and Wu told the FCC that there were "troubling and well-documented examples of discrimination" against online gaming.[315] Though they gave no such examples, they presumably were referring to the HTBC's complaint to the FCC alleging that broadband providers are issuing "additional charges for access to certain content, such as gaming sites."[316] The HTBC cited as evidence the following statement in Cox's subscriber agreement: "You may incur charges, including without limitation, charges relating to the purchase of premium services, such as additional web space, business class services or access to certain gaming sites in addition to those billed by Cox."[317] The HTBC insinuated that Cox charged customers for accessing certain gaming sites, which was in fact incorrect. The plain meaning of the Cox subscriber provision was to warn customers that they may incur *third-party* charges by accessing certain sites or purchasing certain services. Indeed, Cox had a powerful incentive to give that warning: Because the demand for Cox's broadband access is complementary to the demand for broadband content and applications, it would be harmful to Cox's private economic interests for its customers to be gouged by third-party providers of such content or applications. The purpose of the warning was to advise customers that they, not Cox, are responsible for paying any fees charged by these premium sites or for any of these premium services. The provision could only help customers by informing them that third-party fees would, as a matter of law, be their responsibility.[318]

[311] *Wu-Lessig 2003 Ex Parte Submission, supra* note 237, at 8.
[312] Comcast, Terms of Service, http://www.comcast.net/terms/subscriber.jsp (Jan. 12, 2006).
[313] *Wu-Lessig 2003 Ex Parte Submission, supra* note 237, at 8.
[314] Comcast Home Networking, http://homenetworking.comcast.net/overview.asp (last visited July 8, 2006).
[315] *Wu-Lessig 2003 Ex Parte Submission, supra* note 237, at 8.
[316] Comments of the High Tech Broadband Coaltion, Ex Parte Submissions, CS Dkt. No. 96-45, June 17, 2002.
[317] *Wu-Lessig 2003 Ex Parte Submission, supra* note 237, at 8 (citing Cox Communications, Inc. Response to High Tech Broadband Coalition Allegations of January 28, 2003, Ex Parte Submission, CS Dkt. No. 02-52, Apr. 7, 2003, at 1).
[318] *Id.*

2. No "Access Tiering": Network Operators may not Condition the Quality of Service for Delivery of Content Upon the Payment of a Fee

The second basic goal of network neutrality regulation is to prevent access tiering. It would be unlawful for access providers to enter into transactions with content providers for priority delivery of specific packets of information. In Senate testimony in February 2006, Lessig predicted the following scenario under access tiering:

> Access tiering will create an obvious incentive among the effective duopoly that now provides broadband service to most Americans. By effectively auctioning off lanes of broadband service, this form of tiering will restrict the opportunity of many to compete in providing new Internet service. For example, there are many new user generated video services on the Internet, such as Google Video, YouAre.TV, and youTube.com. The incentives in a world of access tiering would be to auction to the highest bidders the quality of service necessary to support video service, and leave to the rest insufficient bandwidth to compete. That may benefit established companies, but it will only burden new innovators.[319]

Lessig is describing a phenomenon of *any* market allocation of resources. A fundamental tenet of economics is that a consumer's demand for a good X is a function of the price of X, the price of all other products, and the consumer's income.[320] The ability to pay (as measured by income or wealth) is not the sole determinant of consumer demand. The highest bidder is not defined to be the person with the highest income or wealth, but rather the person with the highest willingness to pay. Elsewhere, Lessig recognizes that the price of a good influences its demand. Although Lessig argues against different pricing tiers for content providers, he admits that access providers must ration priority according to some pricing mechanism. Lessig argues that such a pricing schedule for priority delivery should be presented to end-users instead of content providers:

> To oppose access tiering, however, is not to oppose all tiering. I believe, for example, that consumer-tiering should be encouraged. Network providers need incentives to build better broadband services. Consumer-tiering would provide those incentives.[321]

A second dimension related to the access tiering debate is the pricing of bandwidth. Note that adding priority is different from adding speed or bandwidth in that some packets get precedence over other packets delivered *with the same speed*. A content provider can improve the download experience of its customers by purchasing more bandwidth or by adding priority or by doing both. Even most network neutrality proponents do not

[319] *Hearing on Net Neutrality Before the S. Comm. on Commerce, Science, and Transportation*, 109th Cong. (2006) (statement of Lawrence Lessig) [hereinafter *Lessig 2006 Senate Testimony*].

[320] *See, e.g.*, HAL R. VARIAN, MICROECONOMIC ANALYSIS 98–99 (W.W. Norton 3d ed. 1992).

[321] *Lessig 2006 Senate Testimony, supra* note 319.

	Content Provider	End-User
Bandwidth	Allow	Allow
Priority Delivery	Ban	Allow

Figure 4. Lessig's theory of how network operators should charge end-users and content providers for bandwidth and priority.

challenge a network operator's right to charge content providers for bandwidth. In his 2006 Senate testimony, Lessig argued that "no one questions the right of network owners to charge Google for the bandwidth it uses."[322] Moreover, most network neutrality proponents do not challenge a network operator's right to charge end-users for bandwidth. The end-user may choose a dial-up, DSL, or fiber connection and will pay different prices accordingly. Using Lessig's testimony as the representative theory of the goals of network neutrality, Figure 4 depicts the two dimensions of access tiering.

As Figure 4 illustrates, Lessig believes that it is appropriate for network operators to charge both end-users and content providers for bandwidth usage. However, Lessig believes that network operators should only be able to impose a surcharge for priority delivery of data packets on end-users and not on content providers.

In regard to prioritization, proponents of network neutrality regulation have advocated two different variations of access tiering, which can be categorized as the "strong form" and the "weak form." The strong form of a ban on access tiering would prohibit a network operator from charging content providers for prioritization. Under this strong form, a network operator would still be allowed to charge end-users for prioritization, but as explained in greater detail below in Section VI.C.1, this restriction would result in a decreased level of prioritization and decreased social welfare.

The weak form of a ban on access tiering would allow a network operator to charge end-users for prioritization, but it would also allow a network operator to charge content providers under certain conditions. Proponents of network neutrality regulation and a ban on access tiering often advocate a strong form of a ban on access tiering, but when confronted about the pitfalls of such a regime, they revert to a weak form of a ban. For example, in an April 2006 conference at the American Enterprise Institute, Lessig advocated a strong ban on access tiering in his presentation but, when answering a question from the audience, conceded that he would accept a weak ban on access tiering in which a network operator would be allowed to charge content providers for prioritization under the condition that the

[322] *Id.*

network operator did not price discriminate within a category of similar content providers.[323]

3. Network Operators may not Vertically Integrate into the Production of Content and Applications, Including Advertiser-Supported Services

The third basic goal of network neutrality proposals is to prevent access providers from vertically integrating into the production of content and applications, including advertiser-supported services. Lessig has argued for some form of vertical line-of-business restriction (or even structural separation) on network owners. In his testimony before the Senate in October 2002, Lessig argued that "separating control over the use of the network from ownership of the wires that make-up the network is a necessary step to restoring the growth and innovation of the original Internet."[324] In other words, it is not sufficient in Lessig's view that a policy of network neutrality would restrict the ability of network owners to differentially price their priority of delivery of broadband content and applications; it is also necessary to vertically disintegrate network operators.

The debate over network neutrality regulation places subscriber-funded business models on a collision course with a newer generation of advertiser-funded business models. Therefore, one cannot understand the competitive significance of the debate over network neutrality regulation without first understanding how the largest companies involved in Internet commerce are restructuring themselves—through acquisitions, joint ventures, and new service offering—to dominate the market for search-related advertising. These efforts share the common strategy of aggregating different customer bases to offer a larger bundle of advertiser-funded services, much as television networks half a century earlier offered a blend of entertainment, news, sports, and other programming that all was advertiser-funded.

In other words, the objective of Internet portals and other e-commerce firms is to give away or subsidize services to end-users so as to attract larger audiences for search-based advertisers. The era of subscription-based Internet portals is over. Google and Yahoo began by offering free search engines that carried banner ads and customized advertisements tailored to the end-user's search. Later, both firms added free email, which eroded the demand for the email services of subscription-based Internet service providers, including America Online. AOL responded by trying to convert itself into an Internet portal that included instant messaging and a wider range of advertiser-funded content. Finally, AOL stopped competing against Google and

[323] *See* AEI Events, Key Issues in Telecommunications, May 10, 2006, video *available at* http://www.aei.org/events/eventID.1307,filter.all/event_detail.asp.

[324] *Hearing on The Government's Role in Promoting the Future of Telecommunications Industry and Broadband Deployment Before the S. Comm. on Commerce, Science, and Transportation*, 108th Cong. (2002) (statement of Lawrence Lessig) [hereinafter *Lessig 2002 Senate Testimony*].

instead entered into a marketing alliance with it.[325] In August 2006, America Online announced that it would abandon its subscriber-based revenue model for broadband access, which generated over $1 billion in revenues in 2005, in favor of an advertising-based revenue model.[326] Besides email and search engines, the range of services has expanded to include auctions (which require no entry fee to search or bid), payment systems (which require no fee to the sender of funds), and VoIP telephony (which requires no basic subscription fee and may also waive per-minute charges for actual usage). With the exception of VoIP, the demand for each of these services is clearly complementary to the demand for usage of broadband networks that supply access to the Internet.

Like the AOL–Google strategic alliance, Yahoo announced an alliance with eBay in May 2006.[327] Similar to AOL's agreement with Google, eBay agreed to carry advertisements supplied by Yahoo's online advertising network on its U.S. site, and Yahoo agreed to use eBay's online payment service, PayPal, for online transactions.[328] Yahoo and eBay will share revenue from these transactions.[329]

Beyond offering their own content and forming alliances, the largest advertiser-funded companies also serve as de facto advertising agencies for smaller Internet companies. Although some medium-sized web pages handle their own advertising, they can also contract with larger firms, such as Google and Yahoo, for advertising services. Google offers this service through *AdSense*,[330] while Yahoo was offering a beta version of the service through its *Publisher Network* as of June 2006.[331] This is similar to how other advertising-supported industries, such as commercial radio, operate.

V. THE FIRST THEME: PROHIBITING ACCESS PROVIDERS FROM DENYING END-USERS ACCESS TO SPECIFIC CONTENT OR APPLICATIONS

Does evidence exist that network operators have denied broadband access to particular applications? To answer that question, I begin by evaluating the current state of competition for broadband access provision. I analyze the extent to which the four anecdotes of discrimination provided by Lessig and Wu are still applicable given the current state of competition for broadband

[325] Kevin J. Delaney, *Unsung Player Key to Matching Google, AOL*, WALL ST. J., Dec. 20, 2005, at B1.

[326] Catherine Holohan, *AOL Casts Its Fate with Ads*, BUSINESSWEEK ONLINE, Aug. 3, 2006, *available at* http://www.businessweek.com/print/technology/content/aug2006/tc20060803_622074.htm.

[327] Richard Waters, *Ad Trends See Ebay and Yahoo Join Forces*, FIN. TIMES, May 26, 2006.

[328] *Id.*

[329] *Id.*

[330] Google, AdSense, http://www.google.com/services/adsense_tour/ (last visited July 8, 2006).

[331] Yahoo, Publisher Network, http://publisher.yahoo.com/ (last visited June 8, 2006).

access. I find no evidence that blocking of content or applications has increased since Wu conducted his survey.

A. Does the Extant State of Competition Coincide with Lessig's and Wu's Four Anecdotes of Discrimination?

Lessig and Wu cite past examples of discrimination to justify network neutrality regulation. Although Lessig and Wu continue to issue testimony and letters on the topic, they have not been able to generate a single new example of discrimination by an access provider since their original collection of anecdotes were first presented in 2002. It is no accident that the access providers' attitudes towards VPNs and home networking services using WiFi technology have changed. Competition among access providers reduces the incentive for any given access provider to attempt to discriminate. As Figure 5 shows, the supply of broadband access has become increasingly competitive since 1999.

Figure 5 shows that DSL providers more than doubled their market share among residential broadband users from December 1999 (19.4 percent) to December 2005 (41.5 percent). As economic theory would predict in light of this increasing competition, the episodes of discriminatory conduct against certain Internet applications have diminished. A vertically integrated

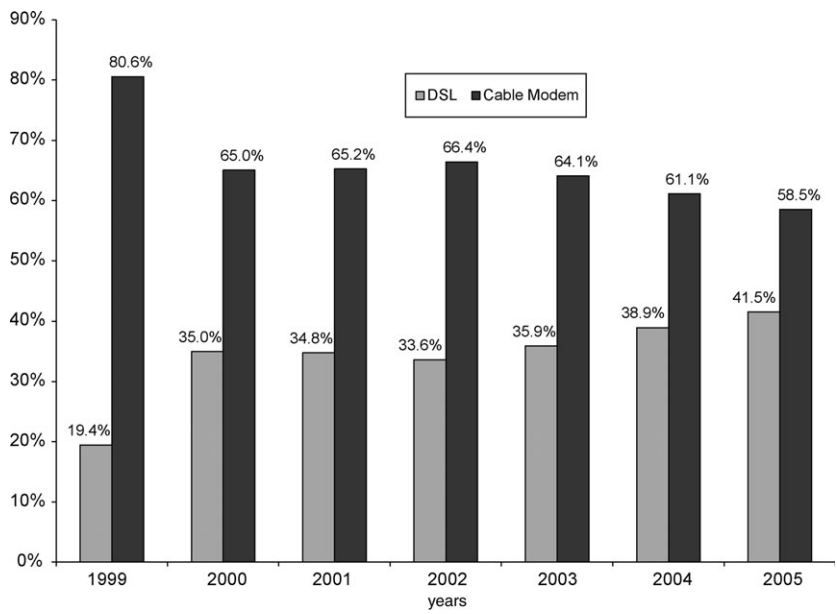

Figure 5. Cable modem and DSL residential market shares, 1999–2005. *Source*: FCC, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2005, at table 3.

access provider lacking market power cannot profitably discriminate against upstream content. So long as application developers can access half of all broadband users through an alternative platform, there is little hope that a foreclosure strategy by one broadband access provider will succeed at inducing unaffiliated content developers to exit or even to operate at a less efficient scale.

Some network neutrality proponents have argued that competition among access providers is undermined by high switching costs.[332] According to this theory, switching costs decrease the ability of consumers to move between competing services and thereby enable access providers to charge higher prices.[333] Low churn rates—the rate at which customers leave an access provider—are often cited as evidence of high switching costs. In 2001, the Strategis Group reported that cable modem service had an industry-wide churn rate of 8 percent and DSL service had an industry wide churn rate of 15 percent.[334] Since 2001, broadband access providers introduced strategies to reduce churn, but it is unclear how successful these strategies have been.[335] Even if they were successful in decreasing churn, such evidence would not justify a network neutrality regime.

Declining churn rates do not imply higher switching costs. For example, higher customer satisfaction and maturing industries can decrease churn rates while leaving switching costs constant.[336] In January 2006, the Yankee Group reported that 76 percent of U.S. households were satisfied with their broadband Internet service provider.[337] Customers who are satisfied with their service are less likely to switch. In addition, churn rates decline over time as the industry matures. The FCC noted in 2002 that churn stabilizes under competitive conditions: "In communities where 'head-to-head' competition has been sustained for a long period of time, customers generally receive lower monthly rates and better service, while operators generally enjoy higher penetration rates and lower churn rates."[338] Increased competition is

[332] *See, e.g.*, Barbara Van Schewick, *Towards an Economic Framework for Network Neutrality*, 5 J. TELECOMM. & HIGH TECH. L. (forthcoming 2007), at 29.

[333] *Id.* Van Schewick cites the price of new equipment, such as DSL modems, as an example of the "high switching costs" associated with changing broadband service providers. *Id.* However, DSL modems are typically included free of charge for new DSL customers. *See, e.g.*, Verizon website, DSL Packages and Pricing, http://www22.verizon.com/forhomedsl/channels/dsl/packages/default.asp?sourceID=vyw&promotion_code=480/Y80,%20480/Y80 (showing that a standard DSL modem is included with monthly service fees and a combined modem/wireless router is included at no extra charge with the premium service).

[334] Roy Mark, *Consumers Choosing DSL Over Cable*, INTERNET NEWS BUREAU, Feb. 2, 2001.

[335] Margo DeBoer, *The Communications Bundle: The Time is Now*, YANKEE GROUP REPORT, Mar. 2006.

[336] Margo DeBoer, *Bundles Improve Customer Satisfaction Ratings for Local Telephone and Cable Companies*, YANKEE GROUP DECISIONNOTE SURVEY ANALYSIS, Jan. 10, 2006.

[337] Steve Donohue & Matt Stump, *Ops Say: Stress VOD, Not PVRs*, MULTICHANNEL NEWSWIRE, Mar. 15, 2004.

[338] Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, CS Dkt. No. 01-129, 17 F.C.C.R. 1244, 1326 ¶ 208 (2002).

consistent with lower churn rates because lower prices and higher service quality, two byproducts of increased competition, induce customers to stay put.

Broadband churn rates should decline in theory as access providers bundle broadband services with other services, such as video and telephony, typically at a deep discount for the end-user.[339] Despite such attempts to reduce churn, broadband customers who purchase broadband service pursuant to a bundle have indicated that their loyalties to existing providers are tenuous.[340] In January 2006, the Yankee Group reported that, although households who subscribe to bundled services are less likely to switch service providers, these households are willing to switch providers in response to small discounts from a rival.[341] The Yankee Group found that households with a bundled offering will switch providers for discounts of 15–20 percent.[342] Households that receive an introductory bundled discount are also willing to switch access providers after the promotional period expires if prices increase by more than 15 percent.[343]

B. Has Blocking of Content or Applications Increased Since 2002?

In 2002, Wu performed a survey of restrictive practices by both DSL and cable modem providers. Wu surveyed 16 companies in total, six DSL and ten cable modem providers.[344] The DSL providers were Verizon, SBC, Qwest, BellSouth, Sprint, and WorldCom. The cable providers were AT&T Broadband, Time Warner Cable, Comcast, Cox, Adelphia, Cable Vision, MediaCom, Insight Communications, and CableOne.

In September 2006, I updated Wu's survey. Due to entry, consolidation, and bankruptcy, a new list of firms was necessary for both DSL and cable providers. I surveyed 18 companies, consisting of seven DSL and 11 cable modem providers. The DSL providers were Verizon, AT&T, Qwest, Sprint, BellSouth, Covad, and Earthlink. The cable modem providers were Adelphia, CableOne, Cablevision, Charter, Comcast, Cox, Earthlink, Insight, MediaCom, RCN, and Time Warner Cable.

[339] DeBoer, *Bundles Improve Customer Satisfaction*, *supra* note 336. Customer discounts from bundling strategies did not represent insignificant price decreases for service providers. Discounts offered by broadband Internet service providers were questioned as unprofitable strategies by many market analysts. Alan Breznick, *Cablevision Scores with Optimum Triple-Play Bundle*, CABLE DIGITAL NEWS, Jan. 1, 2005. Bundling strategies were an investment in lower churn rates by service providers because customers choosing bundled services have lower churn rates. For example, in 2004 Cox Cable reported 50 percent lower churn rates for triple-play customers than for customers subscribing to a single service. Steve Donohue & Matt Stump, *Ops Say: Stress VOD, Not PVRs*, MULTICHANNEL NEWSWIRE, Mar. 15, 2004.

[340] Deboer, *The Communications Bundle*, *supra* note 335.

[341] *Id.*

[342] *Id.*

[343] DeBoer, *Bundles Improve Customer Satisfaction*, *supra* note 336.

[344] Wu, *Network Neutrality, Broadband Discrimination*, *supra* note 236, at 158.

To preserve comparability, my survey uses the same categories of provider restrictions as Wu's initial survey. In particular, Wu used eight categories for DSL providers and 13 categories for cable modem providers. Possible restrictions by a DSL provider include: (1) home networking, (2) operating a server, (3) commercial/enterprise/business use, (4) overuse of bandwidth, (5) resale of bandwidth, (6) spam and consumer fraud, (7) spam/security breaches, and (8) any offensive or immoral purposes. Possible restrictions by a cable modem provider include: (1) virtual private networks, (2) attachment of WiFi equipment, (3) being a network endpoint, (4) home networking, (5) misuse of IP address, (6) commercial business use, (7) operating server/public information, (8) overuse of bandwidth, (9) resale of bandwidth, (10) spam/consumer fraud, (11) hacking/security breaches, (12) any unlawful purpose, and (13) any offensive or immoral purpose. It bears emphasis that Wu's original survey did not address many issues that are relevant to the network neutrality debate, such as whether an operator restricted access to VoIP service or downgraded access to an unaffiliated content provider's website. Tables 1 and 2 summarize the results of both Wu's and my surveys.

Table 1. DSL Provider Summary (Percentage of Carriers Imposing Restriction)

Restriction	2006 result (%)	Wu result (%)
Home networking	0	0
Operating a server	29	40
Commercial/enterprise/business use	57	40
Overuse of bandwidth	57	40
Resale of bandwidth	71	40
Spam/consumer fraud	100	100
Hacking security breaches	100	100
Any offensive or immoral purpose	100	100

Table 2. Cable Provider Summary (Percentage of Carriers Imposing Restriction)

Restriction	2006 result (%)	Wu result (%)
VPN	0	10
Attachment of WiFi equipment	0	10
Being network end point	9	10
Home networking	0	40
Misuse of IP addresses	73	60
Commercial/business use	100	100
Operating server/public info	100	100
Overuse of bandwidth	73	100
Re-distribute bandwidth/act as ISP	100	100
Spam	100	100
Hacking/cracking/security breach	100	100
Unlawful purpose	100	100
Offensive/immoral content	100	100

As Tables 1 and 2 demonstrate, restrictions by broadband access providers have increased in some areas and have decreased in others. The restrictions that are most relevant to network neutrality—in particular, attaching devices to the network—have faded over time. It appears that competition among broadband providers has resulted in the unrestricted attachment of VPN, home networking, and WiFi devices to broadband networks. The categories in which restrictions have increased are less meaningful to the network neutrality debate. Business use is restricted on residential plans, but such use is easily available through business plans offered by the same company. Other restricted uses can be categorized as malicious or illegal in nature. Even network neutrality proponents would allow the blockage of malicious or damaging network traffic.

In summary, an updated survey of broadband providers' terms-of-service agreements shows a trend of removing usage restrictions. The practices that are most relevant to the network neutrality debate—the attachment of VPNs, home networking, and WiFi equipment to broadband networks—are tolerated by all of the major providers of broadband access.

C. The Voluntary Pledges of the Largest Telephone Companies and Cable Operators Not to Block Access to Lawful Content or Applications

In the current debate over network neutrality, several network operators have issued statements pledging not to block any lawful content. Through the National Cable & Telecommunications Association (NTCA), cable providers have voluntarily pledged in Senate testimony not to block any content on the Internet.[345] Although an official list is not published, members of the NCTA represent cable operators serving about 90 percent of the nation's cable television households.[346] The United States Telecom Association (USTA)—whose members include AT&T, Alltel, Verizon, and BellSouth[347]—has also pledged in Senate testimony that its member companies "will not block, impair or degrade consumer access to the Internet."[348]

[345] *Hearing on "Net Neutrality" Before the S. Comm. on Commerce, Science & Transportation*, 109th Cong. (2006) (statement of Kyle McSlarrow, President & CEO, National Cable & Telecommunications Ass'n) ("NCTA's members have not, and will not, block the ability of their high speed Internet service customers to access any lawful content, application, or services available over the public Internet.").

[346] Nat'l Cable & Telecommunications Ass'n, About Us, http://www.ncta.com/ContentView.aspx?contentId=2930 (last visited July 8, 2006).

[347] United States Telecom Association, Carrier Members, http://www.ustelecom.org/index.php?urh=home.join_ustelecom.carrier_members (last visited July 8, 2006).

[348] *Communications Opportunity, Promotion, and Enhancement Act of 2006: Hearing on H.R.5252 Before the H. Energy & Commerce Subcomm. on Telecommunications and the Internet*, 109th Cong. (2006) (statement of Walter B. McCormick, Jr., President & CEO, United States Telecom Association).

Pledges not to block content also have taken the form of conditions to merger approvals. On October 31, 2005, the FCC approved the mergers of SBC Communications with AT&T and Verizon with MCI.[349] Each of the merged companies agreed for two years to "conduct business in a manner that comports with the principles set forth" in the FCC's Internet policy statement, issued September 23, 2005, in which the FCC claimed jurisdiction to enforce provisions regarding neutral Internet access.[350] The relevant provision of the policy statement provides: "To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet, consumers are entitled to access the lawful Internet content of their choice."[351]

D. Assertion of Jurisdiction by the Federal Communications Commission and the Federal Trade Commission

Protection against discriminatory conduct does not depend on whether, as a matter of law, a federal agency has the authority to protect a broadband customer's access to specific applications. Rather, it depends on whether the agencies *believe* they have jurisdiction to prevent such behavior and can exercise it if necessary. At least two federal regulatory agencies have made clear their willingness to protect broadband customers and their access to applications. In *Madison River*, the FCC clearly asserted its jurisdiction over whether a DSL provider could deny access to VoIP service.[352] In February 2006, FCC Chairman Kevin Martin reiterated the agency's authority to police such discriminatory conduct.[353] In particular, he suggested that the FCC would take action against any broadband service provider that blocks consumer access,[354] and he noted that the FCC's action in *Madison River* was not dependent upon any common carrier classification.[355] Indeed,

[349] SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control, Memorandum Opinion and Order, WC Dkt. No. 05–65, 20 F.C.C.R. 18,290, 18,366 n.415 (2005); Verizon Communications Inc. and MCI, Inc. Applications for Approval of Transfer of Control, Memorandum Opinion and Order, WC Dkt. No. 05-75, 20 F.C.C.R. 18,433 (2005).

[350] *Id.* at Appendix G.

[351] Federal Communications Commission, Statement of Broadband Policy, http://www.fcc.gov/broadband (Sept. 30, 2005).

[352] *Madison River Order, supra* note 266.

[353] *Martin Discusses Net Neutrality*, TECHLAWJOURNAL.COM, Feb. 8, 2006, *available at* http://www.techlawjournal.com/topstories/2006/20060208.asp.

[354] *Id.* (stating that the FCC "acted in the past when people were blocking internet access over broadband pipes, and the Commission has already said that broadband pipes by telecommunications companies are the same as cable companies").

[355] *Id.* (stating that the FCC "had never determined that clearly one way or another. We clarified the DSL order, but I don't think that the Commission had ordered that they were under the previous common carrier regime. I think that was still an open question. I think that that was the point of our original notice.").

Lessig acknowledged in his March 2006 testimony to Congress that the FCC has jurisdiction to address discriminatory conduct by an access provider.[356]

In addition to the FCC, the Federal Trade Commission has claimed its jurisdiction to protect broadband customers from discriminatory conduct. For example, in an April 2006 letter from FTC Chairman Deborah Majoras to the House Committee on the Judiciary, the FTC asserted jurisdiction to protect users of "non-common carrier Internet-related services."[357] Majoras reasoned that, in light of *Brand X*, in which the Supreme Court ruled that cable operators are exempt from mandatory common carrier regulation under Title II, the FTC "views the provision of cable modem services as non-common carrier service subject to the FTC Act's prohibitions on unfair or deceptive acts and practices and on unfair methods of competition."[358] According to Chairman Majoras, the FTC has successfully used its power in the past to protect Internet consumers.[359] Although the Department of Justice (DoJ) has not asserted its jurisdiction over such matters, Google threatened in July 2006 to bring an antitrust case to the DoJ in response to any perceived abuse by a network operator.[360]

The courts have not yet had a case in which to accept or reject these assertions of agency jurisdiction. Until then, it is reasonable to expect the agencies to exercise jurisdiction to protect broadband users from any discriminatory conduct, should a plausible case be presented.

E. Access to Websites with Political Messages

To this point, the analysis has considered the calculus of discriminating against unaffiliated content providers from the perspective of profit-maximization. Some proponents of network neutrality regulation, however, argue that a network operator's decision to block certain political content could be

[356] *Lessig 2006 Senate Testimony, supra* 319 ("Those principles were relied upon by the FCC when it stopped DSL provider Madison River Communications from blocking Voice-over-IP services. That enforcement action sent a clear message to network providers that the Internet that they could offer must continue to respect the innovation-promoting design of end-to-end.").

[357] Letter from FTC Commissioner Deborah Majoras to House Committee on the Judiciary (Apr. 14, 2006), at 1, *available at* http://www.house.gov/judiciary_democrats/ responses/ ftcbroadbandnetresp41406.pdf ("The FTC is committed to maintaining competition and to protecting consumers from deceptive or unfair acts or practices relating to products and services within its jurisdiction, including non-common carrier Internet-related services.") [hereinafter *Majoras Letter*].

[358] *Id.* at 2.

[359] *Id.* at 7. Cases in which the FTC has participated that featured Internet access prominently include: America Online, Inc. and CompuServe Interactive Services, Inc., Dkt C-4105 (2004); WebTV Networks, Inc., Dkt. C-3988 (2000); AOL, Inc., Dkt. C-3787 (1998); and CompuServe, Inc., Dkt. C-3789 (1998). *Majoras Letter, supra* note 357, at 3–4.

[360] Ken Fisher, *Google to Congress: We will not tolerate net abuse*, ARSTECHNICA.COM, July 4, 2006, http://arstechnica.com/news.ars/post/20060704.

motivated by factors other than profit-maximization, such as political favoritism. The Media Access Project (MAP) argues that, without network neutrality obligations, network operators might relegate delivery of content from politically controversial websites like MoveOn.org and Swift Boat Veterans for Truth to the "slow lane" on their networks. For example, MoveOn.org's stated purpose is to provide "information and tools to enable individuals to express views to legislators, including email and electronic petitions."[361] As of June 30, 2004 MoveOn.org had compiled an email list of 2.25 million members, and described itself as using "inexpensive internet connectivity techniques to lobby Congress."[362] In MAP's view, the blocking of access to political content would reverse the beneficial effect that the Internet has had on neutralizing the high cost of political campaigns, as fewer voters would be able to see political content (such as streaming video) in a way that resembled paid political advertising on television. In that case, it would be harder for grass roots movements or groups outside the political mainstream to get their messages heard. One could make the same argument about subjecting the delivery of political content to access tiering.

This concern about democratic participation through the Internet deserves serious consideration, unlike many of the economic arguments advanced in support of proposals for network neutrality regulation. However, neither MoveOn.org nor the Swift Boat Veterans for Truth provides a particularly compelling case in support of that concern. MoveOn.org received the financial support of a billionaire, George Soros.[363] So it is debatable whether the group would lack the resources to pay for faster delivery of its packets over the Internet if access tiering were implemented. Similarly, the Swift Boat Veterans for Truth was partly (if not largely) a highly effective fund-raising organization that succeeded in raising millions of dollars within weeks.[364] The day after the November 2004 presidential election, the founder of the Swift Boat Veterans for Truth stated that the group's "national grassroots efforts produced donors in every state in the nation [and] ... raised more than $26 million, with more than $7 million in online contributions."[365] If thousands of persons watching a 30-minute streaming video of the group's

[361] MoveOn.org 2003 I.R.S. Form 990, at 10, *available at* http://www.guidestar.org/FinDocuments/2003/061/553/2003-061553389-1-9.pdf.

[362] *Id.*

[363] Glen Justice, *George Soros Gives, And Republicans React with Fury*, N.Y. Times, Nov. 16, 2003, at 2 ("Mr. Soros ... pledged $2.5 million to match contributions collected by the MoveOn.org Voter Fund, an organization raising money to run television ads against Mr. Bush.").

[364] Glen Justice & Eric Lichtblau, *Windfall for Anti-Kerry Veterans' Group, with Texan Among Those Giving Most*, N.Y. Times, Sept. 11, 2004, at 13 ("Swift Boat Veterans for Truth, an advocacy group that jolted the presidential race with commercials questioning Senator John Kerry's military service, said it had raised $6.7 million in a windfall brought about by the group's high profile in recent weeks.").

[365] *See Statement by Admiral Roy Hoffmann, founder of Swift Vets and POWs for Truth*, http://www.swiftvets.com/article.php?story=20041103104739220) (last visited Aug. 4, 2006).

denunciation of Senator John Kerry would be motivated to donate $20 each, this group clearly would be just as able as MoveOn.org to pay for faster delivery of its packets.[366]

Some proponents of network neutrality regulation cite the treatment of afterdowningstreet.org by access providers as support for the need for government intervention. In a 2005 petition to the FCC attempting to block the acquisition of Adelphia's assets by Comcast and Time Warner Cable, MAP used Comcast's blockage of afterdowningstreet.org, which had attempted to use the Internet to organize a protest against the war in Iraq, as an example of a broadband access provider's blocking of political content.[367] MAP argued in its petition that Comcast's blockage of political content should concern the FCC,[368] and it recommended that some form of network neutrality regulation was necessary.[369] Comcast replied that its network security provider, Symantec, had received 46,000 complaints regarding emails containing a URL link to afterdowningstreet.org.[370] As a result of that high number of complaints, Symantec's Bright Mail spam filter blocked emails containing the afterdowningstreet.org URL. The blocking of emails featuring afterdowningstreet.org does not prove that broadband access providers in the United States have intentionally blocked content on the basis of its political message or that access providers have any incentive to block political content. The afterdowningstreet.org incident appears to have been a content-neutral exercise of spam filtering. And nearly all network neutrality proposals, including those of Lessig and Wu, provide for consumer protection measures such as blocking spam.[371] Nonetheless, MAP asserted that, "[a]t every turn, Comcast

[366] The longest streaming video listed on the website of the Swift Boat Veterans for Truth lasts 2 hours, 1 minute, and 17 seconds. *See* http://horse.he.net/~swiftpow/index.php?topic = Ads (last visited Aug. 4, 2006). Although many of the other streaming videos listed run from only one to eight minutes, some last roughly 24 to 30 minutes. *Id.* Although the website no longer accepts online contributions, these streaming videos can still be downloaded for viewing. *See* https://www.swiftvets.com/swift/ccdonation.php?op=donate&site=SwiftVets (last visited Aug. 4, 2006).

[367] Applications of Adelphia Communications Corporation, Comcast Corporation, and Time Warner Cable Inc., For Authority to Assign and or Transfer Control of Various Licenses, Petition to Deny of Free Press, Center for Creative Voices in Media, Office of Communication of the United Church of Christ, Inc., U.S. Public Interest Research Group, Center for Digital Democracy, CCTV, Center for Media & Democracy, Media Alliance, National Hispanic Media Coalition, the Benton Foundation, and Reclaim the Media, MB Dkt. No. 05–192, at 30, July 21, 2005 [hereinafter *MAP Petition*].

[368] *Id.*

[369] *Id.* at 45.

[370] *Id.*

[371] *See Wu-Lessig 2003 Ex Parte Submission*, *supra* note 237, at 13. Lessig and Wu would permit blocking of content to "[p]revent Broadband users from interfering with other Broadband or Internet Users' use of their Internet connections, including but not limited to neutral limits on bandwidth usage, limits on mass transmission of unsolicited email, and limits on the distribution of computer viruses, worms, and limits on denial-of service-or other attacks on others." *Id.*

delayed resolution of the problem, ultimately blaming the block on an anti-spam measure deployed by a contractor, Symantec."[372] Although MAP argued that Comcast violated the principles of network neutrality, the case can just as easily be interpreted as preserving neutrality. Comcast outsourced its filtering responsibilities to Symantec, which reduces the probability that Comcast would make a blocking decision based on its own preferences. Stated differently, content-neutral regulation of speech is one embodiment of a network neutrality principle that would seem to garner widespread support.

The rapid resolution of the afterdowningstreet.org affair also undercuts the case for ex ante network neutrality regulation. It instead suggests that the market is capable of working efficiently to mediate disputes involving the legitimate concerns of both end-users who dislike spam and content providers who seek to express political speech to as wide an audience as possible. Scenarios involving impaired delivery of political content, or blockage of access to political websites, do not fit neatly within the economic framework for evaluating the incentive and ability of a network operator to block or impair access to content or applications that in some manner compete against its own services. Because a different kind of problem is being diagnosed, it is likely that a different remedy should be prescribed. Indeed, it would be constitutionally necessary to write far more narrowly tailored laws or regulations concerning access to political content so as to pass muster under any elevated standard of judicial scrutiny under the First Amendment.

Moreover, having a political message does not imply that one lacks the ability to pay. Free speech protects the right to express one's viewpoint, but it does not entitle one to use media of communications (paper, ink, spectrum, bandwidth, etc.) for free, or even at some subsidized rate. The fact that emails containing a URL link to afterdowningstreet.org were considered by some to qualify as political speech does not entitle the sender of those emails to immunity from blockage by Symantec's spam filter, which was simply responding to the complaints of 46,000 unhappy end-users.

A second blocking incident—concerning protests against America Online's aborted proposal to charge a penny for the delivery of "Goodmail," which AOL would certify not to be spam—has the hallmarks of a carefully planned maneuver by a network neutrality advocacy group, dearaol.com, to embarrass an Internet service provider by creating a new example of apparent blockage of access to lawful content. The incident indicates that analysis of the network neutrality debate cannot focus solely on conventional antitrust-style scrutiny of the economic effects on such regulation on the horizontal or vertical relationships between existing or potential competitors. The required analysis becomes more complex if one must anticipate and respond to the strategies of influential parties whose motivations concern ideology rather than profit

[372] *MAP Petition*, *supra* note 367, at 45.

maximization. In this respect, understanding the true motivation for network neutrality regulation problem is harder than understanding the strategic behavior of the ILECs, IXCs, and CLECs under the MFJ's line-of-business restrictions or the unbundling and section 271 rules of the Telecommunications Act of 1996.

The AOL incident has several key implications. First, a substantial share of the groups involved in dearaol.com focus on political advocacy, particularly from the far left or far right of the American political spectrum. Some of these groups—such as MoveOn.org—are well funded or have the ability to raise funding quickly. The concern over requiring advertisers to pay for expedited delivery of packets may be motivated by concern over how such differential pricing would limit the functionality of the political advocacy model built on section 527 of the Internal Revenue Code.[373] In the 2004 presidential election, the "527" groups (such as Swift Boat Veterans for Truth) successfully raised substantial amounts of soft money quickly over Internet sites; bypassed the control of existing political parties; and relied on bandwidth-intensive techniques, such as mass emails that could be characterized as spam and free downloads of television-length streaming video "documentaries" that television stations might refuse to broadcast (and, in any case, would treat instead as "infomercials" to be charged commercial advertising rates).

A third incident of blocking of political speech occurred in Canada in July 2005, when Telus, the largest telecommunications company in western Canada, blocked a website run by and for the Telecommunications Workers Union (TWU).[374] During a strike by the TWU, Telus blocked the website because it posted pictures of Telus employees crossing the union's picket lines.[375] Telus justified the blocking of the TWU's "Voices for Change" website "on an overriding need to protect the safety and privacy of our

[373] 26 U.S.C. § 527. Section 527 exempts "political organizations" from federal income tax and gift tax. *Id.* § 527(a). A "political organization" is defined as "a party, committee, association, fund, or other organization (whether or not incorporated) organized and operated primarily for the purpose of directly or indirectly accepting contributions or making expenditures, or both, for an exempt function." *Id.* § 527(e)(1). An "exempt function" is "the function of influencing or attempting to influence the selection, nomination, election, or appointment of any individual to any Federal, State, or local public office or office in a political organization, or the election of Presidential or Vice-Presidential electors, whether or not such individual or electors are selected, nominated, elected, or appointed." *Id.* § 527(e)(2).

MoveOn.org Civic Action is a section 501(c)(3) organization that "primarily focuses on nonpartisan education and advocacy on important national issues." *See* http://www.moveon.org/. MoveOn.org Political Action is a separate entity, not identified as a section 501(c)(3) organization, but instead described as "a federal political committee which primarily helps members elect candidates who reflect our values through a variety of activities aimed at influencing the outcome of the next election." *Id.* In other words, it is a political action committee (PAC). *See* http://www.moveon.org/about.html#political.

[374] *Telus Cuts Subscriber Access to Pro-Union Website*, CBC NEWS, July 24, 2005.

[375] *Id.*

employees who were being targeted and the subject of intimidation."[376] The Court of Queen's Bench of Alberta agreed with Telus and enjoined the TWU and "its members and anyone else having knowledge of the order from posting for public viewing on any website any photographs or identifying features with the intent of intimidating or threatening Telus employees, contractors, customers, suppliers and others."[377] As soon as the injunction was in place and the photographs intended to intimidate employees were removed, Telus re-enabled access to the website.[378]

Concern over political speech provides one explanation for why the blockage component of the network neutrality agenda continues to draw attention, and why it could resonate with members of Congress, notwithstanding that all of the largest telecommunications network operators in the United States have promised not to block access to lawful content. An article in *The Nation*, in February 2006 typified the argument that network neutrality regulation was necessary to protect political speech:

> Without proactive intervention, the values and issues that we care about—civil rights, economic justice, the environment and fair elections—will be further threatened by this push for corporate control. Imagine how the next presidential election would unfold if major political advertisers could make strategic payments to Comcast so that ads from Democratic and Republican candidates were more visible and user-friendly than ads of third-party candidates with less funds. Consider what would happen if an online advertisement promoting nuclear power prominently popped up on a cable broadband page, while a competing message from an environmental group was relegated to the margins. It is possible that all forms of civic and noncommercial online programming would be pushed to the end of a commercial digital queue.[379]

Allegations that politically motivated Internet content is being blocked could galvanize public opinion in favor of network neutrality legislation in the United States and elsewhere. Coalitions in favor of regulation may include groups on the far left and the far right of the political spectrum, as the membership of dearaol.com indicates. In this sense, the countercultural image of many Internet-based political advocacy groups complements the iconoclastic techno-utopianism associated with leading scholars who advocate network neutrality regulation.

Before the AOL incident, one might have thought that the blockage argument had no credibility and was therefore likely to disappear. From this perspective, the continued fixation on the content-blockage issue would suggest that many people do not recognize that what is really at stake in the network neutrality debate is Ramsey-style cost recovery in a two-sided market, and barriers to network operators' entry into content, applications, or

[376] Press Release, Telus, Alberta Court Grants Interim Injunction against Posting Telus Employee Photos (July 28, 2005), http://about.telus.com/cgi-bin/media_news_viewer.cgi?news_id=605&mode=2&news_keywords=website (quoting Janet Yale, spokesperson for Telus).

[377] *Id.*

[378] *Id.*

[379] Jeff Chester, *The Shackles of the Net*, THE NATION, Feb. 2, 2006.

advertising-based revenue models. The AOL incident, however, suggests why this picture is incomplete. If Congress ultimately enacts network neutrality legislation, it is possible that the political traction to do so will be found not in arguments about harm to competition or innovation; rather, it may come from sound bites and 30-second commercials arguing that differential pricing for the expedited delivery of packets over the Internet is an effective means to silence unconventional political speech. In 2004, maverick voices of this kind proved that they had the potential to raise money quickly and lawfully outside the channels regulated by campaign finance laws, to disrupt the ability of traditional political parties to control the message in political campaigns, and ultimately to influence outcomes in elections and important non-electoral political controversies.

VI. THE SECOND THEME: PROHIBITING ACCESS PROVIDERS FROM ENGAGING IN ACCESS TIERING

Pareto improvements occur when one group is made better off without causing another group to be made worse off. Access tiering would be a Pareto improvement relative to the status quo. Pareto improvements should always be encouraged. For that reason, access tiering should be permitted. There are no costs associated with allowing access providers to engage in access tiering, but there are large potential benefits. At a more philosophical level, proponents of network neutrality build their arguments on what might be called an "anti-Pareto principle." They claim that no one should be able to receive faster delivery paid by the supplier of content or applications unless everyone does—federal law should prohibit it. This justification is akin to Aesop's fable of "The Dog in the Manger," in which a dog prevents an ox from eating its hay simply because the dog cannot eat the hay himself.[380] The dog-in-the-manger response to access tiering is intended to prevent a voluntary transaction (which causes no negative externality) from occurring. Network neutrality proponents seem to be implicitly introducing a principle of envy or Schadenfreude: the envy of those who cannot afford (or the Schadenfreude of those who do not value) priority delivery is a legitimate source of negative utility that cancels out the positive utility achieved by the consumption of priority delivery by those who value it and can afford it. However, to regard envy or Schadenfreude as a cognizable source of negative

[380] AESOP, *The Dog in the Manger*, AESOP'S FABLES 1 (Grosset & Dunlap 2000). "A dog looking for a quiet and comfortable place to take a nap jumped into the manger of the ox and lay there on the hay. Some time later the ox, returning hungry from his day's work, entered his stall and found the dog in his manger. The dog, in a rage because he had been awakened from his nap, stood up and barked and snapped whenever the ox came near his hay. The ox is a patient beast, but finally he protested: 'Dog, if you wanted to eat my dinner I would have no objection. However, you will neither eat it yourself nor let me enjoy it, which strikes me as a very churlish way to act.' Moral: Some begrudge others what they cannot enjoy themselves." *Id.*

utility to be weighed in the social welfare calculus would be a strained theoretical argument and an even more barren foundation for making public policy.[381]

The harm that policymakers ultimately should care about is the harm to consumer welfare. However, the fact that one content provider does not contract for priority delivery, and thereby "suffers" a competitive disadvantage *vis-à-vis* some other content provider who opts for priority delivery, does not imply any reduction in consumer welfare. Indeed, consumers would be unequivocally better off as a result of greater choices in real-time applications on the Internet. Moreover, as I will now explain, unfettered access tiering would not harm content providers who did not contract for priority delivery.

A. Can Market Power Affect the Pricing of Bandwidth and Priority Delivery Differently?

Network neutrality proponents seek legislation that would prohibit a network operator from charging content providers for prioritization, while allowing a network operator to charge content providers for bandwidth. This wish begs the following question: Whatever a network operator's level of market power is, why can the network operator be trusted to price bandwidth (that is, extra speed) to content providers, but the same network operator not be trusted to price prioritization to the same content providers? If a network operator intends to abuse its alleged market power, and if it were constrained by a ban on access tiering from contracting for priority delivery with content providers, then nothing would prevent it from increasing the price for bandwidth or from charging higher prices for bandwidth to non-affiliated content providers. It would not make economic sense for legislators to prohibit the pricing of one service to one group of customers while allowing a network provider to price complementary services to that same group.

[381] Economists have suggested a theory of envy. *See* BAUMOL, *supra* note 64; Hal R. Varian, *Distributive Justice, Welfare Economics, and the Theory of Justice*, 4 J. PHIL. & PUB. AFFAIRS 223 (1975). *See also* EDWARD E. ZAJAC, POLITICAL ECONOMY OF FAIRNESS 97–99 (MIT Press 1995) (surveying economic literature on fairness theory and envy). However, Schadenfreude is different. Roughly speaking, economists define fairness as an allocation of resources for which envy is absent from all persons in the economy. In contrast, Schadenfreude implies that one person derives positive utility from another person's disutility: "the malicious enjoyment of the misfortunes of others." OXFORD ENGLISH DICTIONARY (2nd ed. 1989). *See also* JOHN PORTMANN, WHEN BAD THINGS HAPPEN TO OTHER PEOPLE 18 (Routledge 2000) (distinguishing Schadenfreude from envy on philosophical grounds). Thus, Schopenhauer wrote: "Envy, although it is a reprehensible feeling, still admits of some excuse, and is, in general, a very human quality; whereas the delight in mischief [Schadenfreude] is diabolical, and its taunts are the laughter of hell." 2 ARTHUR SCHOPENHAUER, PARERGA AND PARALIPOMENA ch. VIII (On Ethics) § 114 (1851) (T. Bailey Saunders, translator).

Proponents of network neutrality have failed to articulate a theory as to why prioritization deserves special treatment. One possibility is that prioritization is more difficult to monitor than bandwidth. Under this theory, the network operator could abuse its alleged market power by charging a price for a certain quality of service but deliver something less. Although services exist to monitor connection speeds, quality of service is arguably harder to ensure. However, this inability to perfectly monitor prioritization does not imply that contracting between network operators and content providers for priority of delivery should be *banned*. A network operator has incentives to provide every assurance to content providers that a specified level of quality will be achieved. One obvious way to provide such assurance is to contract for third-party verifiers to do the monitoring. Even without third-party verifiers to audit performance, the content provider's customers would complain to the content provider if their applications were not performing effectively. Those complaints could be documented and presented to the network operator. Finally, to the extent that monitoring the quality of service requires particular expertise, content providers are more equipped to perform these functions (and hold a network operator to its performance representations) than are end-users. Under the strong-form prohibition on access tiering, in which contracting for priority delivery would be permitted only between end-users and network operators, end-users would be placed in the undesirable position of policing network operators without having the expertise or lowest transaction costs to do so.

A network operator clearly is not a monopolist in the provision of quality of service. Large websites have been paying for speedier delivery of their data for nearly a decade from third-party providers such as Akamai. Indeed, as of 2004, 15 percent of all Internet traffic went to an end-user's computer not from the website that the end user was visiting, but from Akamai's servers.[382] Akamai stores the contents of its clients' websites on a network of 18,000 servers spread over 69 countries.[383] It continually scans the Internet to determine areas of congestion.[384] Akamai lists large clients such as Apple, Best Buy, CNN, and Microsoft.[385] When a web surfer types in the URL of one of those sites, the request goes straight to Akamai, which calculates which of its servers can provide the fastest delivery of the site's content. Akamai's local caching of content vastly improves the quality of service. As of December 2005, Akamai reported having over 500 peering relationships that provide its customers with a direct path to end-users.[386] As of June 2006, Akamai

[382] Leslie Walker, *Akamai Strives for Safer, Speedier Web*, WASH. POST, Sept. 30, 2004, at E01.
[383] AKAMAI TECHNOLOGIES, INC., ANNUAL REPORT (FORM 10-K), at 37 (Mar. 16, 2006).
[384] *Id.* at 3.
[385] *Id.* at 6.
[386] *Id.* at 3.

had 2,060 customers who had signed long-term contracts.[387] Local caching by Akamai is a competitive substitute to bandwidth and prioritization supplied by the network operator. If a network operator seeks too high a price for prioritization, a content provider can substitute to Akamai's service. Consequently, Akamai's service constrains any market power that would be necessary to make a network operator's attempt to block, degrade, or subordinate delivery of content a profitable anticompetitive strategy.

B. Would Access Tiering Harm Content Providers Who do not Contract for Priority Delivery?

As I noted at the outset, Lessig claims that content providers who do not contract for priority will be relegated "to the digital equivalent of a winding dirt road."[388] That claim is a clever turn of phrase, but it is not factually tenable. In reality, those content providers will be better off in an *absolute* sense, as connection speeds will continue to increase. Even relative to content providers who do contract for priority delivery, those who do not will not be worse off in the short run (when few applications will make use of real-time delivery) or in the long run (when connection speeds will be so fast that prioritization will not make a large difference on the margin).

1. Competitive Effects in the Short Run

In 2006, broadband users did not fully use their broadband connection speeds. Given the nature of their Internet use, most households did not take advantage of the maximum connection speeds in 2005, which were roughly 2 Mbps.[389] Current Internet applications operate efficiently at speeds far slower than the speeds offered by broadband access providers. Streaming video applications consume only 500 to 600 Kbps, and streaming CD-quality audio requires significantly less.[390] Additionally, VoIP does not require exceedingly fast connections to operate. Vonage advertises that an upload speed of only 90 Kbps is recommended to preserve quality.[391] Others say that upload speeds as low as 56 Kbps can be used effectively for VoIP.[392] Even one of the main corporate proponents of network neutrality regulation, Vinton Cerf of Google, has testified that existing capacity does not constrain VoIP.[393]

[387] Press Release, Akamai, Akamai Reports Second Quarter 2006 Results (Jul. 26, 2006), *available at* http://www.akamai.com/en/html/about/press/press578.html.

[388] Lessig & McChesney, *supra* note 4, at A23.

[389] Reardon, *supra* note 114.

[390] *Id.*

[391] *See* Vonage, Vonage Basics, http://www.vonage.com (last visited July 8, 2006).

[392] *See* Reardon, *supra* note 114.

[393] *Hearing on Net Neutrality Before the S. Comm. on Commerce, Science, and Transportation*, 109th Cong. 6 (2006) (statement of Vinton G. Cerf) ("Broadband capacity is not nearly as constrained as the network owners would have us believe. Some applications, such as voice over IP, take up very little bandwidth.").

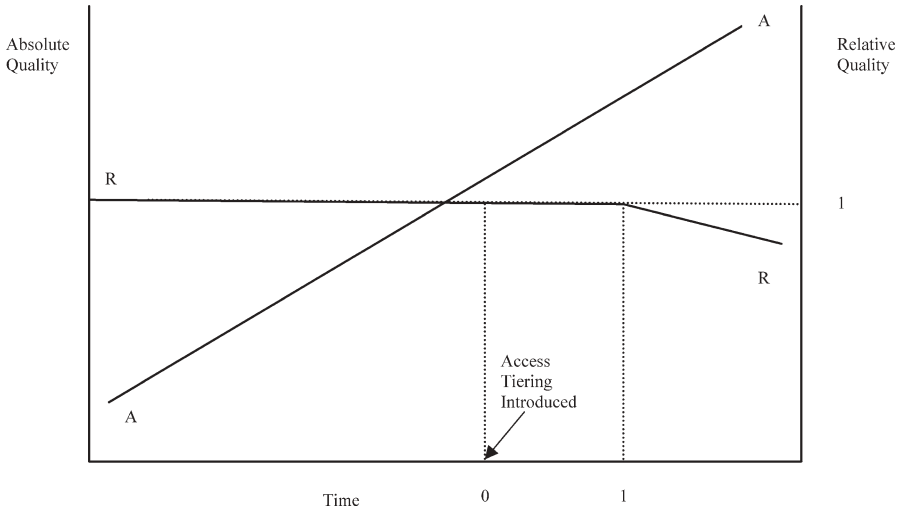

Figure 6. Absolute and relative quality of service for content providers who do not contract for priority delivery.

Even in the "slow lane," most applications will be delivered at a very high quality of service. Hence, in an absolute sense, content providers who do not contract for priority delivery will not be harmed.

Moreover, the "slow lane" is a misnomer because the price-adjusted baseline speed of broadband access continues to improve. As of June 2006, Verizon offered connection speeds via FiOS of 5, 15, and 30 Mbps.[394] Other access providers offered similar speeds. In March 2006, Comcast Communications, the largest broadband access provider in the United States, doubled its connection speeds from 8 to 16 Mbps in four cities, and it increased the speed of its remaining broadband connections in the rest of its territory to 8 Mbps. Cablevision and Time Warner Cable implemented similar increases in connection speeds.[395] As Figure 6 depicts, in an absolute sense, content providers who do not contract for priority delivery will nonetheless enjoy an *increase* in quality of service as connection speeds increase over time.

The line *AA* represents the absolute quality of service enjoyed by content providers who do not contract for priority delivery. The value of the absolute quality of service is measured on the left-hand *Y*-axis. The line *RR* represents the quality of service enjoyed by content providers who do not contract for priority delivery relative to those who do. The value of the relative quality of service for those content providers is measured on the right-hand *Y*-axis. Access tiering is introduced at time 0. At time 1, relative to content providers

[394] Reardon, *supra* note 114.
[395] *Id.*

who opt for priority delivery, those who do not will begin to "suffer" a competitive disadvantage in a relative sense, which is depicted by the *RR* line falling below unity. The horizontal distance between time 0 and time 1 is determined by the number of content providers who demand priority delivery at the price offered by access providers. Given the fact that few applications can make use of priority delivery, and the fact that the default quality of service is so high, it might take several years for any content providers to contract for priority delivery. By way of comparison, the demand for priority delivery of standard mail is caused by the very slow default speed for regular delivery. Hence, content providers who do not opt for priority delivery in the short run will not likely suffer a competitive disadvantage even in a relative sense.

2. Competitive Effects in the Long Run

Even in the long run, when more real-time applications are making use of priority delivery, content providers will experience no competitive disadvantage if they choose not to contract for prioritized delivery. In an absolute sense, content that is not delivered with priority will continue to receive increasing quality of service, as connection speeds approach levels of 100 Mbps. And in a relative sense, future broadband speeds threaten to make prioritization irrelevant. Although it is possible that new applications will emerge to take advantage of increased broadband speeds, limits on human audio and visual perception place limitations on the maximum quality levels that are possible.[396] Figure 7 depicts the marginal effect of priority delivery on the end-user's experience as access speeds increase.

As Figure 7 shows, the end-user's experience is bounded from above by the maximum level perceptible to humans as speeds increase. Adding priority to the delivery at lower speeds (such as 1.5 Mbps) adds a detectable difference to the end-user's experience. As access speeds increase, however, the difference between the end-user's experience with and without prioritization—that is, the marginal effect of priority delivery—approaches zero. The access speeds required to cause this convergence in the end-user's experience have already been announced. In June 2006, Verizon announced "imminent" plans to roll out capacity of 100 Mbps.[397]

To be precise, what matters to a broadband user is the change in the user's *utility* in the presence of prioritization or enhanced quality of service. Using the lens of consumer theory, let the utility from consuming broadband Internet access be written as $U = U(p, b, q)$, where p is the price for broadband access, b is the bandwidth, and q is the quality of service. Applied here, the quality of service can be regarded as the level of priority delivery that a particular application receives. The network neutrality debate over access tiering implicates the marginal utility of bandwidth and the marginal utility of

[396] Reardon, *supra* note 114.
[397] Ron Orol, *House Net-Neutrality Vote Nears*, THE DEAL, Jun. 7, 2006.

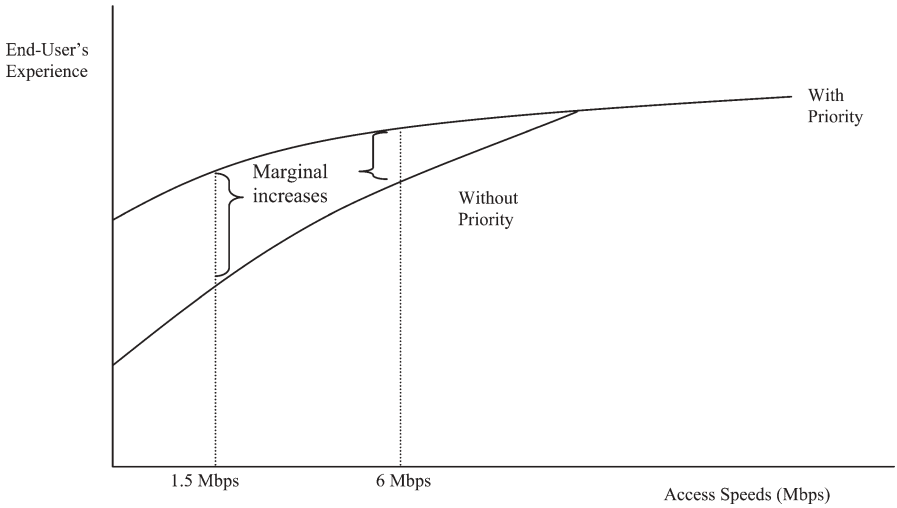

Figure 7. Marginal effect of priority delivery on end-user's experience with increasing access speeds.

prioritization. Under standard preferences, utility decreases in price $\partial U/\partial p < 0$, increases in bandwidth $\partial U/\partial b > 0$, and increases in quality of service $\partial U/\partial q > 0$. That is, the marginal utility of bandwidth and the marginal utility of prioritization are both positive. The relevant question for the access-tiering debate, which is posed by Figure 7, is: What is the marginal effect of greater bandwidth on the marginal utility of prioritization? It seems more likely than not that the marginal effect on utility from greater quality of service (higher prioritization) decreases with faster connection speeds. Expressed more precisely in economic terms, consumer preferences that manifest this particular form of diminishing marginal utility would imply that the relevant cross-partial derivative of the consumer's utility function is negative, $\partial^2 U/\partial q \partial b < 0$.

Can the market for priority delivery on the Internet develop if end-users are not willing to pay much for priority under certain contingencies? Because Internet content and applications are produced and consumed in a two-sided market, the answer to that question depends on how the demand for priority by content providers and their advertisers relates to the demand for priority by end-users. Figure 8 conveys the demand that end-users and content providers have for prioritization in two states of the world—one in which there is a binding constraint on broadband access capacity, and a second in which no such capacity constraint is binding. In the second state of the world, end-users will place no incremental value on prioritized delivery of data packets, as priority will not enhance the ultimate experience of the content being consumed. However, in the state of the world in which broadband access capacity is constrained, the end-user will have a more robust

	Capacity constraint	No capacity constraint
End user	Moderate incremental value	No incremental value
Content provider	High incremental value	Moderate incremental value

Figure 8. Demand for Priority Delivery with and without Capacity Constraints.

experience in his consumption of content or applications that demand real-time delivery of data packets, and therefore would be willing to pay some price for priority delivery.

As Figure 8 shows, content providers and their advertisers always value priority delivery more highly than end-users. The reason is clear: Advertisers are willing to pay for the opportunity to sell their products, whereas consumers are generally not willing to pay for the opportunity to buy a product. If there is a binding constraint on broadband access capacity, in which case priority delivery can enhance the end user's experience, then content providers and their advertisers will derive high incremental value from the ability to contract directly with network operators for priority of delivery.

Even in the case where broadband capacity is abundant, depicted by the southeast cell of the matrix in Figure 8, content providers and their advertisers would be willing to pay some price for priority delivery for at least two reasons. The first is competitor behavior. If other content providers are routinely paying for priority delivery of packets, then a given content provider faces great competitive pressure to do likewise. The second possible reason that prioritization of delivery would create moderate incremental value is the real option that prioritization would provide for ensuring a high quality Internet experience for end users in the event of either a demand shock that soaked up all existing capacity, or a capacity shock (reduction) resulting from some exogenous, unforeseen event (like Hurricane Katrina or a terrorist attack). The value of the real option held by the advertiser, content provider, or applications provider rises, ceteris paribus, as existing levels of utilization near the short-run capacity of broadband access networks. Note also that a technology shock (like the rise of a peer-to-peer application such as Napster, Kazaa, or MySpace) could trigger the demand shock by creating an entirely new product that is bandwidth-intensive, which in turn would increase the value of prioritization.

In summary, the mere fact that end users might not value priority delivery under certain contingencies does not imply that a market for prioritization will not develop. Even when the supply of bandwidth exceeds demand, in which case an end-user's willingness to pay for priority is close to zero, content providers and their advertisers will value the opportunity to provide Internet content with priority. So long as content providers value prioritization under all contingencies, the prospects for such a market are real.

C. The Effect on Social Welfare of a Ban on Access Tiering

Prohibiting network operators from offering tiered services to content providers would decrease social welfare in several ways. To begin, a ban on access tiering would produce less prioritization, which would deprive consumers of the consumer surplus associated with a valuable service. It would also discourage content providers from developing real-time applications by virtue of the uncertainty over contracting for priority with access providers, and, even in its weak form, it would raise transaction costs as access providers would be forced to contract for priority with end-users.

1. Decreased Quantity of Prioritized Delivery

Under the strong form of the proposed ban on access tiering, a network operator would be allowed to charge end-users for priority delivery of data packets, but it would be prohibited from contracting for priority with content providers. Network neutrality proponents fail to recognize that the market for the priority delivery has two-sided demand, consisting of the demand of end-users to receive packets with priority and the demand of content providers to send packets with priority. The aggregate demand for priority delivery is simply the vertical summation of the demand of end-users and the demand of advertisers. Figure 9 represents a simple illustration of the effects of prohibiting a network operator from contracting for priority with a content provider. In this example, the demand for prioritization of end-users is relatively elastic (depicted by a flatter slope), and the demand for prioritization of content providers is relatively inelastic (depicted by a steeper slope). The

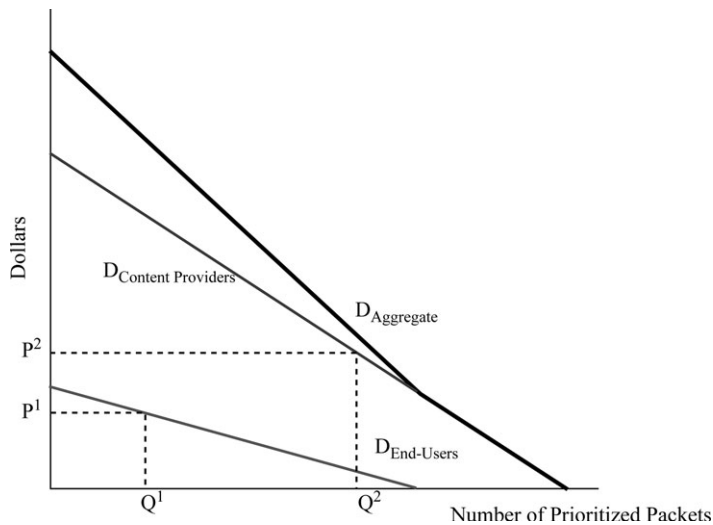

Figure 9. The effect of prohibiting a broadband network operator from charging content providers for priority delivery of packets in a market with two-sided demand.

aggregate demand for prioritization is depicted by the kinked demand curve, which results from the vertical summation of the two individual demand functions.

Suppose network operators are prohibited from charging content providers for prioritization. At a price of P_1, end-users will contract for Q_1 prioritized deliveries. Alternatively, if a network operator could contract for priority with content providers at a higher price, say P_2, content providers would contract for Q_2 prioritized deliveries. End-users are not willing to pay for priority delivery at a price of P_2, but they will enjoy consumer surplus equal to the entire area under their demand curve. When contracting with content providers is prohibited, consumers enjoy surplus equal to the smaller triangle under their demand curve bounded from below by P_1. Although Figure 9 is a stylized example, it illustrates the potentially deleterious effect of forcing a network operator to charge only end-users for the priority delivery of data packets. If contracting for priority with content providers is prohibited, then both consumer welfare and the level of priority delivery will decrease. Any potential gains in edge-of-the-network innovation from prohibiting access tiering would be offset by this *actual* loss in consumer welfare. None of the proponents of network neutrality regulation—including Lessig and Wu—have acknowledged that this consumer welfare loss would occur.

Jerry Hausman and Jeffrey MacKie-Mason have derived a more formal model of differential pricing that reinforces the simple analysis in Figure 9. They demonstrate that price discrimination is Pareto-improving in a static sense whenever such pricing (1) makes a new product possible or (2) allows the producer to achieve greater economies of scale.[398] Under traditional welfare theories of price discrimination, total output must increase sufficiently for the resulting surplus gains to exceed the allocative losses.[399] However, Hausman and MacKie-Mason emphasize that the traditional theories assumed that that all markets have positive demand under both price discrimination and uniform pricing.[400] When this assumption is relaxed, they show that, if there are two different "nonsubstitutable demand functions" for a good (that is, a decrease in the price in one market does not reduce the purchaser's surplus in the other market), if one market is not served under uniform pricing, and if marginal cost is constant or decreasing, then price discrimination will always yield a Pareto improvement (or at least not reduce welfare).[401]

Hausman and MacKie-Mason also show that, if there are two or more demand curves for a product, if marginal cost is decreasing in total output

[398] Jerry A. Hausman & Jeffrey K. MacKie-Mason, *Price discrimination and patent policy*, 19 RAND J. ECON. 253, 254 (1998).

[399] *Id.* at 255 (citing Hal R. Varian, *Price Discrimination and Social Welfare*, 75 AM. ECON. REV. 870 (1985)).

[400] *Id.* at 254.

[401] *Id.* at 255.

(economies of scale), if the profit function under uniform pricing is increasing in some relevant range, and if the uniform price is greater than the maximal discriminatory price, then price discrimination will yield a Pareto welfare improvement over uniform pricing (or at least not reduce welfare).[402] The intuition behind this proposition is best understood through a simple example involving two markets: the first market with elastic demand and a second market with inelastic demand. With price discrimination, the price to the elastic market declines relative to the uniform price, as the firm now prices according to the marginal revenue of the more price-sensitive market (rather than the marginal revenue associated with the joint demand). Even without scale effects, the discriminatory price will not be much higher than the uniform price in the elastic market. In the presence of scale effects, however, marginal cost decreases as output increases, thereby decreasing the discriminatory price in the inelastic market below the uniform price. Hence, price discrimination in the presence of economies of scale results in lower prices in both markets.

The Hausman–MacKie-Mason model sheds light on the market for priority delivery of packets over the Internet. The elastic demand in the above example could represent end users' willingness to pay for priority delivery. The inelastic demand could represent advertisers' willingness to pay for priority delivery. Uniform pricing for priority delivery could result in a price that exceeds the reservation price of end users, thereby foreclosing them from the market. By contrast, discriminatory pricing could result in lower prices for consumers and, assuming constant marginal costs of priority delivery, prices for advertisers roughly equal to the uniform price. However, in the presence of decreasing marginal costs of priority delivery, the discriminatory price for advertisers would also be less than the uniform price. To the extent that the cost of delivering the last packet with priority is less than the price of delivering the first packet with priority, the Hausman–MacKie-Mason analysis indicates that discriminatory pricing for priority delivery would produce lower prices for both advertisers and end users relative to uniform prices.

2. *Will Uncertainty Over Contracting for Priority with Access Providers Discourage Upstart Content Providers from Developing Real-Time Applications?*

Because the ban on access tiering that Lessig and others propose would reduce the demand for priority delivery, content providers would be less willing to develop real-time applications that could make use of priority delivery. Simply put, if end-users were the only parties who could contract for priority with network operators, then less money would flow from advertisers to support their real-time applications. Consequently, edge-of-the-network innovators would expect a lower return to investing in real-time applications. Under the strong form of Lessig's proposed ban on access tiering, resources

[402] *Id.* at 258.

would be diverted from real-time applications to non-real-time applications on the Internet, for which the returns are likely smaller.

The weak form of Lessig's proposed ban on access tiering also would cause these efficiency losses. Under the weak form of the ban, network operators could contract for priority delivery with content providers so long as they charged the same price for all "similar" content. Consequently, the price-setting process would be subjected to regulatory delay. Presumably, it would resemble the halcyon days of the Interstate Commerce Commission, when lengthy proceedings determined what the tariffs would be for a pound of nails and a pound of feathers being transported from Pittsburgh to Kansas City. The uncertainty over whether the regulator would approve the prices, terms, and conditions of the contract for prioritization would cause content providers to divert their resources to less risky applications. Once again, consumers would be denied the full benefits of real-time applications.

3. Increased Transaction Costs

If a network operator were free to contract with content providers for priority delivery, the transaction costs of reaching fee arrangements would be much lower than if the same network operator were constrained to negotiate only with individual end users. Internet users will be reluctant to negotiate for priority delivery in general. Given their greater price sensitivity for priority (relative to content providers who are funded by advertisers), end users would be highly selective in their choices of when and how much to pay for priority delivery. The nascent state of real-time applications implies that a customer could not specify the types of real-time Internet applications he planned to use. Even for customers who knew with certainty that they would demand priority delivery for a certain class of applications, such as real-time gaming, it would be difficult for the network operator to know which of those gaming sites should be delivered with priority. In summary, the increased number of negotiations (involving myriad customers rather than a handful of content providers offering real-time applications), combined with the increased uncertainty over which applications to send with priority, would ensure that the transaction costs resulting from a ban on access tiering would be severe.

4. Are Content Providers Better Positioned to Price for Priority According to Application-Specific Elasticities?

Under classic Ramsey pricing, social welfare is maximized when prices are set in inverse proportion to the demand elasticity for each particular product.[403] Hence, goods for which the demand is extremely price-sensitive have smaller markups over marginal cost, while goods for which the demand is less price-sensitive have higher markups over costs. In the face of varying demand elasticities and constant marginal costs, a uniform pricing regime

[403] *See, e.g.*, HARVEY ROSEN, PUBLIC FINANCE 333 (McGraw-Hill Irwin 7th ed. 2005).

violates the Ramsey solution and thereby decreases consumer welfare relative to the optimal pricing regime. Beginning with uniform prices, by simultaneously decreasing the price of the price-sensitive service and increasing the price of the price-insensitive service, consumer welfare increases on net because the gains enjoyed by users of the price-sensitive service exceed the losses suffered by the users of the price-insensitive service.

In the absence of a ban on access tiering, network operators could impose fees for priority delivery on content providers, who in turn could impose a portion of those fees on their users. Because of its relationships with its subscribers, a content provider is in a much better position than the network operator to know the price elasticity of demand for its own real-time applications. In particular, a content provider observes the reaction of its customers to adjustments in the price of its various real-time applications. Hence, the content provider would likely charge application-specific prices for priority delivery. By contrast, the network operator is not in a position to gauge the price elasticity of demand for a specific real-time application offered by some third party. Hence, if a network operator were forced to contract with end-users for priority delivery, it would most likely impose a uniform surcharge. Examples of a uniform surcharge imposed on end-users would be a per-minute priority delivery fee or a monthly fee that allowed for a fixed volume of minutes for real-time applications. In either case, the Ramsey condition for efficiency would be violated, and consumer welfare would be reduced relative to its attainable level.

5. *Costs of Administering the Regulatory Price-Setting Apparatus Under the Weak Form of a Ban on Access Tiering*

Under the weak form of access tiering, a network operator could contract with a content provider for priority delivery so long as the terms of the agreement were identical to the terms offered to all "similar" content. Presumably, this price-setting process would resemble the tariff-setting process that still constrains the retail pricing of most local exchange service. Applied here, the regulator would have to determine what constitutes similar content. For example, the regulator would have to determine whether the streaming music video offered by content provider *A* should be assessed the same fee for priority delivery as the streaming live sports video offered by content provider *B*. Such a rule would put the regulator in a position of having to make fact-intensive judgments about new Internet content and applications. The administrative cost of adjudicating such decisions would be significant. Of course, the administrative cost is miniscule compared to the distortions in pricing and investment caused by such a rule.[404] The regulatory delay would be extremely detrimental to the Internet industry, a hallmark of which is its rapidity of product development and improvement.

[404] *See* CRANDALL, COMPETITION AND CHAOS, *supra* note 249, at 31–58.

Moreover, the price for priority delivery charged to content providers would be artificially high due to the most-favored-nation (MFN) requirement that almost certainly would attend the regulated pricing regime.[405] The network operator would not be inclined to decrease its price for priority delivery for any single content provider—for example, one that offered a price-sensitive real-time application—for fear that it would have to decrease its price for all content providers. Hence, the network operator would have a strong incentive to petition the regulator for a high price for priority delivery.

D. How Would Network Neutrality Regulation That Prohibits Access Tiering Benefit Incumbent Providers of Content or Applications?

Although Lessig and Wu justify their proposal to ban access tiering as means to promote innovation on the edges of the network, they would accomplish the opposite result: A ban on access tiering would discourage entry by upstart content providers, and it would thereby serve as incumbent protection for the large content providers spearheading the network neutrality movement. Furthermore, a ban on access tiering would, in effect, enable incumbent carriers to coordinate in their refusal to deal with network operators for priority delivery. Finally, the strong form of the ban on access tiering would shift the cost burden of packet prioritization to end-users—to the lesser extent that end-users actually demanded prioritization—and would thereby allow content providers to avoid the cost of providing priority delivery.

1. Increased Entry Barriers

Network effects make the market for Internet portals highly concentrated. Entry is difficult because a critical mass of users has chosen a particular portal (Yahoo or Google) to begin their Internet experience. A critical mass of advertisers has followed. A new portal that simply replicated the non-interactive content on incumbent portals and charged a lower price for advertising would not likely succeed. To entice customers and advertisers away from the incumbent portals, an entrant needs to offer a differentiated and superior Internet experience. One obvious way to do so is to offer consumers and advertisers new real-time applications. As explained above, a ban on contracting between content providers (including entrants) and network operators for priority delivery would thwart such product differentiation. If an entrant that developed a real-time application could not eliminate the uncertainty over delivery status by contracting directly with a network operator for packet prioritization, the entrant would divert its resources to the next-best alternative activity. To the extent that the alternative activity did not

[405] *See* Dennis W. Carlton & Jeffrey M. Perloff, Modern Industrial Organization 141 (Pearson 4th ed. 2005) ("[S]urprisingly, these [MFN] clauses could be associated with high cartel prices rather than the low ones they seem to guarantee.").

allow the entrant to differentiate its product from the incumbent portals, incumbent content providers could foreclose competition. The ban on access tiering would serve as an entry barrier, to the economic benefit of incumbent content providers and to the detriment of consumers.

For example, in March 2006, Amazon began to pursue a business strategy for video downloads patterned after the user experience on Apple's iTunes music store.[406] Amazon's service will require users to download software to their computers and then buy videos à la carte or through a subscription.[407] After being downloaded, the video could be burned to a DVD and watched on any DVD player.[408] Amazon has entered into discussions with major providers of traditional motion picture content, including Paramount, Universal, and Warner Brothers.[409] Because its users will watch videos on their televisions at a later time, Amazon's video offering cannot be considered a real-time application. Hence, Amazon's business strategy is consistent with the foreseeable effect of its regulatory advocacy, if successful: erect barriers to entry for upstart online video content providers (who could benefit from contracting with network operators for priority delivery) and develop video applications that require large economies of scale (but not priority delivery) to succeed.

2. Coordinated Refusals to Deal with Access Providers for Priority Delivery

The most effective cartel is one that the government itself supervises for its members by force of law. A statutory or regulatory ban on access tiering would allow incumbent content providers to coordinate perfectly with one another in their refusals to deal with network operators for priority delivery, and thereby permit them collectively to avoid the costs of priority delivery. Such behavior would resemble the strategy that tobacco companies used to avoid the high cost of television advertising by supporting legislation that simply forbade any of them to advertise on television.[410] A law banning access tiering would be a law forbidding providers of Internet content and applications from using prioritization of packet delivery as a means to differentiate their products. When firms are constrained in their

[406] Joshua Chaffin & Jonathan Birchall, *Amazon Strikes Hollywood Deal*, FIN. TIMES, Jul. 27, 2006.

[407] Abbey Klaassen & Matthew Creamer, *Amazon Readies Launch of Ad-Free Video Download Service*, ADVERTISING AGE, Jul. 23, 2006.

[408] *Amazon's Movie Download To Launch in August: Report*, REUTERS, Jul. 24, 2006.

[409] Richard Siklos, *Amazon Considering Downloads*, N.Y. TIMES, Mar. 10, 2006, at 1.

[410] *See* Stephen J. Farr, Carol H. Tremblay & Victor J. Tremblay, *The Welfare Effects of Advertising Restrictions in the U.S. Cigarette Industry*, 18 REV. INDUS. ORG. 147, 147–60 (2001); E. Woodrow Eckard, Jr., *Competition and the Cigarette TV Advertising Ban*, 29 ECON. INQUIRY 119 (1991); J. Harold Mulherin & Mark Mitchell, *Finessing the Political System: The Cigarette Advertising Ban*, 54 S. ECON. J. 855, 855–62 (1988); Roger H. Porter, *The Impact of Government Policy on the U.S. Cigarette Industry*, *in* EMPIRICAL APPROACHES TO CONSUMER PROTECTION ECONOMICS 447 (Pauline M. Ippolito & David T. Scheffman eds, 1986).

ability to compete through product differentiation, price becomes the principal, perhaps solitary, dimension over which competition can occur. It has long been recognized by antitrust scholars that collusion is more stable among producers of a homogeneous product than producers of differentiated products: "the more important the role of price is in the competition among sellers, the less likely it is that the gains from price fixing will be dissipated in increased expenditures on nonprice competition."[411] The same reasoning applies to oligopolistic industries in which firms do not expressly collude over price, but rather follow strategies of price formation that produce Betrand, Cournot, or other kinds of equilibria.[412] For cigarettes, the economic effect of the television advertising ban was to reduce price competition, stabilize existing market shares, and impede entry.[413] A ban on access tiering would enable incumbent providers of content and applications to mimic the prior success of the tobacco industry in using legislation as a tool to extract supracompetitive returns. If content provider *A* could contract for priority delivery while all other content providers did not, then content provider *A* would enjoy a competitive advantage at a price equal to the network operator's fee for priority delivery. If all content providers were to contract for priority delivery, content provider *A*'s competitive advantage would be neutralized, but it still would incur the price for priority delivery. Hence, the equilibrium in which no content provider contracted for priority delivery is likely to be associated with higher profits for content providers than the equilibrium in which they all contracted for priority delivery.

Two examples, one in Canada and one in the United States, suggest how this collusive objective could motivate the companies advocating network neutrality regulation encompassing a ban on access tiering. In March 2006, Vonage Canada petitioned the Canadian Radio-television and Telecommunications Commission to investigate the conduct of Shaw Communications, a Canadian broadband cable modem service provider, of offering a monthly "VoIP tax" of $10.[414] Although the quality-of-service

[411] *See* RICHARD A. POSNER, ANTITRUST LAW: AN ECONOMIC PERSPECTIVE 145 (Univ. of Chicago Press 1977).

[412] *See, e.g.,* Carl Shapiro, *Theories of Oligopoly Behavior*, in 1 HANDBOOK OF INDUSTRIAL ORGANIZATION (Richard Schmalensee & Robert D. Willig, eds. North-Holland 1989).

[413] *See* Stephen J. Farr, Carol H. Tremblay & Victor J. Tremblay, *The Welfare Effects of Advertising Restrictions in the U.S. Cigarette Industry*, 18 REV. INDUS. ORG. 147, 147–60 (2001); E. Woodrow Eckard, Jr, *Competition and the Cigarette TV Advertising Ban*, 29 ECON. INQUIRY 119 (1991); J. Harold Mulherin & Mark Mitchell, *Finessing the Political System: The Cigarette Advertising Ban*, 54 S. ECON. J. 855, 855–62 (1988); Roger H. Porter, *The Impact of Government Policy on the U.S. Cigarette Industry*, *in* EMPIRICAL APPROACHES TO CONSUMER PROTECTION ECONOMICS 447 (Pauline M. Ippolito & David T. Scheffman eds, 1986).

[414] Tamara Gignac, *Shaw Sued by U.S. Rival over TV Ad*, CALGARY HERALD, Mar. 21, 2006, *available at* http://www.canada.com/topics/technology/story.html?id=157c5ff7-8194-4c6c-87e0-496dc1b9a891&k=58144; Press Release, Vonage Canada, Who Controls How You Use Your Internet Access? Vonage Canada Challenges Shaw "VoIP tax" (Mar. 7, 2006).

enhancement fee was entirely optional, Vonage Canada argued that "Shaw's VoIP tax is an unfair attempt to drive up the price of competing VoIP services to protect its own high-priced service."[415] Unlike traditional VoIP service, all calls receiving Shaw's quality-of-service enhancement travel from its private network directly to the public switched telephone network without ever traveling on the Internet and thus are not subject to the same potential latency problems.[416] Under this framework of cost avoidance, Vonage's lawsuit could be interpreted as a signal to its rival unaffiliated VoIP service providers that Vonage had no intention of contracting with Shaw for priority delivery, which ensured that Vonage would not try to use the degree of call latency as a means to differentiate its product from those of other VoIP service providers.

A second example suggests how a third party's right to petition government could be used as a signaling device to facilitate a coordinated refusal by content providers to deal with network operators for priority delivery. On or around May 2, 2006, MoveOn.org initiated a "Save the Internet" campaign that requested visitors to its website to fill out an electronic form with identifying information about themselves. MoveOn.org would then compile a petition on each person's behalf to send to members of Congress by email. The webpage containing the petition begins with the following message:

> Congress is now pushing a law that would end the free and open Internet as we know it. Internet providers like AT&T and Verizon are lobbying Congress hard to gut Network Neutrality, the Internet's First Amendment and the key to Internet freedom. Net Neutrality prevents AT&T from choosing which websites open most easily for you based on which site pays AT&T more. *So Amazon doesn't have to outbid Barnes & Noble for the right to work more properly on your computer.*[417]

Although there is no public evidence to date that either Amazon or Barnes & Noble (or both) wrote or authorized this statement by MoveOn.org, it would be naïve to think that the two companies did not learn of the statement soon after its publication on MoveOn.org's website. The whole purpose of the petition initiative was to reach as many sympathetic persons as possible, and Amazon had already publicly advocated, through congressional testimony delivered slightly more than one month earlier, the enactment of network neutrality regulation that would ban access tiering.[418] The fact that the message

[415] *Id.*

[416] Press Release, Shaw Communications, Shaw Responds to Vonage Canada's Claims (Mar. 8, 2006), http://www.shaw.ca/NR/rdonlyres/A19222AC-750B-42CC-AC99-136A5C2EA420/0/VonageMar8.pdf.

[417] MoveOn.org Civic Action, Save the Internet, http://www.civic.moveon.org/save_the_internet/(last visited Aug. 5, 2006) (emphasis added).

[418] Communications Opportunity, Promotion and Enhancement Act of 2005: Hearing Before the Subcomm. on Telecomm. and the Internet of the H. Comm. on Energy & Commerce, 109th Cong. at 10 (Mar. 30, 2006) at 2 (statement of Paul Misener, Vice President for

remained on MoveOn.org's website till at least August 2006 suggests acquiescence by Amazon and Barnes & Noble.

As suggested by the final sentence of the passage quoted above, in the absence of efforts (including lobbying efforts) to coordinate their strategies *vis-à-vis* network operators, rival content providers might find themselves in an equilibrium in which everyone pays for priority delivery, yet no one captures a competitive advantage. In contrast, a ban on access tiering would ensure an equilibrium in which both Amazon and Barnes & Noble avoided competing over prioritization of delivery. That outcome would avoid the prisoners' dilemma that would otherwise confront the two companies on whether or not to purchase prioritization for delivery of their packets. For that reason, it is understandable why content providers would pursue a legislative strategy that resembles the successful strategy of the tobacco companies in securing legislation banning tobacco advertising on television three decades earlier.

3. Passing the Entire Increase in Marginal Cost to the End-User

For content providers, the final benefit of a ban on access tiering is that it can shift the cost burden for priority delivery onto end-users. In anything less than a perfectly competitive industry, an increase in marginal cost is absorbed in part by producers. In a perfectly competitive industry with linear demand, each firm will pass on 100 percent of any increase in marginal cost to the consumer. As Jerry Hausman and Gregory Leonard have explained, a monopolist facing linear demand will absorb 50 percent of the increase in marginal cost and pass 50 percent of the increase to consumers.[419] Because the market for Internet content is neither a perfect monopoly nor perfect competition, content providers will pass on between 50 and 100 percent of an increase in marginal cost to consumers. When applied to the debate over access tiering, the Hausman-Leonard analysis indicates that, if network operators were free to contract for priority delivery with content providers, content providers would be forced to absorb some portion of the cost of prioritization. However, if Congress simply outlawed access tiering, content providers would avoid all of those costs. It therefore makes economic sense to content providers like Google and Amazon to support legislation that would have the foreseeable effect of preventing network operators from allocating any portion of the marginal cost of packet prioritization to content providers.

Global Public Policy, Amazon.com), http://energycommerce.house.gov/108/Hearings/03302006hearing1823/Misener.pdf.

[419] *See* Jerry A. Hausman & Gregory K. Leonard, *Efficiencies from the Consumer Viewpoint*, 7 GEO. MASON L. REV. 707 (1999).

VII. THE THIRD THEME: PREVENTING ACCESS PROVIDERS FROM VERTICALLY INTEGRATING INTO APPLICATIONS AND CONTENT

Proponents of network neutrality regulation seek to deny network providers the right to vertically integrate into content and applications. That result would harm economic welfare. It would increase transaction costs and shield incumbent providers of content and applications from entry by network operators.

A. The Effect on Social Welfare of Banning Vertical Integration

Banning vertical integration by network operators would sacrifice two obvious economic benefits. First, vertical integration enables economies of scope, which lowers costs for end-users. Second, a ban on vertical integration would prevent a network operator from providing subsidized broadband access to those consumers who are otherwise priced out of the market.

1. Denying Broadband Access Providers the Opportunity to Capture Economies of Scope

Vertical integration allows firms to combine final services. The question is not whether consumers are incapable of bundling end services on their own. Often, they can do so, but at a cost. The relevant question, rather, is whether firms or consumers are the more efficient integrators of services and functionalities.[420] It would seem self-evident in a technologically dynamic market that firms are the more efficient integrators. If that assumption is correct, then, for similar reasons, a vertically integrated retailer would have an inherent cost advantage over a non-integrated retailer when offering consumers a bundle of complementary telecommunications and Internet functionalities or services. A prohibition on vertical integration (like mandatory structural separation or antitrust divestiture) would erase any cost advantage that broadband Internet service providers can offer as integrators of telecommunications and Internet services.[421] The ability to destroy a rival's opportunity to exploit economies of scope or integration explains the appeal that this category of regulatory intervention holds for content providers.[422]

[420] J. Gregory Sidak, *An Antitrust Rule for Software Integration*, 18 YALE J. ON REG. 1, 15, 30–31, 45–46, 68–69 (2001) (discussing whether the consumer or the producer is the lower-cost integrator of software functionalities).

[421] *Cf.* Robert W. Crandall & J. Gregory Sidak, *Is Structural Separation of Incumbent Local Exchange Carriers Necessary for Competition?*, 19 YALE J. ON REG. 335 (2002) (discussing efficiency losses in telecommunications networks from restrictions on vertical integration); Howard A. Shelanski & J. Gregory Sidak, *Antitrust Divestiture in Network Industries*, 68 U. CHI. L. REV. 1 (2001) (discussing efficiency losses in operating systems and applications software from restrictions on vertical integration).

[422] For a discussion of entry barriers as a method to deny a multiproduct firm the opportunity to reduce costs with respect to the production of goods that would exhibit economies of scope,

It is unlikely that a content provider like Google would enter the broadband access business if it did not expect to achieve significant efficiencies from vertical integration in the provision of broadband access and content.[423] Similarly, many broadband Internet service providers offer email services, which are also offered by web content providers. Forcing broadband Internet service providers to vertically disintegrate their network would sacrifice economic efficiency and consumer welfare. A familiar analogy suggests why. As part of the breakup of the Bell System, the Modification of Final Judgment (MFJ) imposed line-of-business restrictions on the RBOCs, which forbade their entry into long-distance telecommunications and telecommunications equipment manufacturing.[424] Billions of dollars of consumer welfare were forgone each year because these restrictions delayed the introduction of new telecommunications services for which, as it subsequently became painfully obvious, there had been enormous unmet demand. For example, Jerry Hausman found that the price of cellular long-distance service fell by about 25 percent when the MFJ's restrictions were finally removed.[425] His finding suggests the magnitude of the consumer welfare that would be forgone if network operators were forbidden to vertically integrate into the provision of Internet content and applications.

Vertical integration enables a firm to coordinate investment and production decisions across its divisions. A comparison of the costs of contractual exchange with those of internal exchange often reveals vertical integration to be the least-cost method of achieving the desired level of coordination.[426] The minimization of coordination costs is extremely important in a market subject to rapid technical change. Writing in 1994, before the enormous growth of the Internet, Oliver Williamson noted that vertical integration will produce efficiency gains for network operators because the telecommunications industry

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see David E.M. Sappington & J. Gregory Sidak, *Competition Law for State-Owned Enterprises*, 71 ANTITRUST L.J. 479 (2003).

[423] *See* Reuters, *Google Confirms It's Testing Wireless Service* (Sept. 20, 2005), http://www.msnbc.msn.com/id/9406935/.

[424] For detailed economic and legal analyses of the MFJ's line-of-business restrictions, see PAUL W. MACAVOY, THE FAILURE OF ANTITRUST AND REGULATION TO ESTABLISH COMPETITION IN LONG-DISTANCE TELEPHONE SERVICES 35–81, 175–200 (MIT Press & AEI Press 1996); SIDAK & SPULBER, *supra* note 89, at 55–99; KELLOGG, THORNE & HUBER, *supra* note 94, at 291–342.

[425] Jerry A. Hausman, *Valuing the Effect of Regulation on New Services in Telecommunications*, BROOKINGS PAPERS ON ECON. ACTIVITY: MICROECONOMICS 1, 13–24 (1997).

[426] For a review of the vast literature on transaction cost economics, see OLIVER E. WILLIAMSON, THE MECHANISMS OF GOVERNANCE (Oxford University Press 1996). This literature, of course, descends from Ronald H. Coase, *The Nature of the Firm*, 4 ECONOMICA (N.S.) 386 (1937).

> operates on the technological frontier, where the unexpected upsets established ways of doing business. Every firm knows that it must be alert to these events; the more aggressive firms will precipitate major changes. How best to organize production will vary among firms. There is, nevertheless, one verity: firms that do not develop organizational and contracting structures that keep them abreast of current and prospective developments will fall behind. The best way for a player today to survive and qualify as a player tomorrow is to achieve *real-time responsiveness*—the capacity for effective and expeditious adaptation .... When parties operate over long time periods in an uncertain environment, successive adaptations of their contractual relationship will be needed. As the contracts in question become more complex and longer in duration, and as the interdependencies between the parties deepen, contracts give way to common ownership with hierarchical management structures.[427]

Williamson's observations seem even more relevant to the Internet a dozen years later. The complexity of managing a broadband network, along with the content and applications delivered over it, makes it prohibitively costly for parties to write contracts at arm's length that specify all of their rights and obligations in all contingent states of the world. In such circumstances, contracting parties may engage in opportunistic behavior, which undermines the likelihood of their maximizing joint profits.[428] Relative to contracting at arm's length for network management and for delivery of Internet content and applications, vertical integration reduces these costs of specifying, monitoring, and enforcing the rules that direct activities required for the coordinated production of services to end users. This insight from transaction-costs economics complements the insights from agency theory and the organizational-incentive theory of the firm, which emphasize the effects of information on the choice between contracting and vertical integration.[429] Daniel Spulber notes that one motivation for vertical integration is that, "[b]y exercising residual control over the firm's investments, the firm improves monitoring of the performance of the firm's divisions ... [and] can coordinate the activities of its divisions, separating or combining investment projects to take advantage of new information about performance or to realize complementarities."[430] Again, these considerations about transaction costs and imperfect information plainly apply to telecommunications networks and Internet services alike.[431]

[427] Affidavit of Oliver E. Williamson ¶¶ 6–7, United States v. Western Elec. Co., Civil Action No. 82-0192 (filed D.D.C. July 3, 1994) (emphasis in original) (filed on behalf of several regional Bell operating companies to accompany a motion to vacate the line-of-business restrictions in the Modification of Final Judgment).

[428] *See* Victor P. Goldberg, *Regulation and Administered Contracts*, 7 BELL J. ECON. 426 (1976).

[429] *See* Michael H. Riordan & David E.M. Sappington, *Information, Incentives, and Organizational Mode*, 102 Q.J. ECON. 243 (1987).

[430] DANIEL F. SPULBER, MARKET MICROSTRUCTURE: INTERMEDIARIES AND THE THEORY OF THE FIRM 289–306 (Cambridge University Press 1999).

[431] *See* Daniel F. Spulber & Christopher S. Yoo, *Network Regulation: The Many Faces of Access*, 1 J. COMPETITION L. & ECON. 635 (2005).

2. *Denying Broadband Access Providers the Opportunity to Subsidize Access Prices to End-Users with Advertising Revenues*

The major academic and business proponents of network neutrality regulation would prohibit a network operator from charging content providers for priority delivery of data packets. The network operator could potentially use the revenues from this surcharge on prioritization to subsidize the cost of broadband access to end-users. In contrast, by forcing end-users to bear the full cost of broadband access, regulators would essentially be adopting a policy that would be the antithesis of universal service. It would foreclose the opportunity of broadband Internet access for millions of potential end-users who could not afford what otherwise would be inexpensive broadband. By preventing the subsidization of broadband access with prioritization revenues from content providers, network neutrality regulation would cause many potential end-users to be unnecessarily priced out of the market. This policy of exclusion is not degraded access—it is *no* access.

a. Google's strategy to subsidize broadband Internet access in Mountain View and San Francisco

The idea that a network operator could subsidize the price of broadband access to end-users with revenues from content providers is hardly a matter of dispute, because at least one Internet firm is already doing so. In August 2006, Google launched free Wi-Fi access for all residents of Mountain View, California, where Google is headquartered.[432] Google spent $1 million to supply free Wi-Fi access to the 72,000 residents of Mountain View (or just under $14 per potential customer).[433] Google claimed that its Wi-Fi offerings in San Francisco and Mountain View did not signal a larger desire to offer Wi-Fi access nationally.[434] Chris Sacca, Google's executive for special initiatives, claimed that Google's purpose for providing free Wi-Fi access was to demonstrate the low barriers to entry in broadband access.[435] Simiarly, the official Google Blog stated that Google hoped to demonstrate the ease of setting up a Wi-Fi network:

> Another goal of this network is to promote alternative access technologies by using Mountain View as an example for organizations considering investments in the WiFi arena. We think successful mesh wireless deployments will promote competition, create cheaper access alternatives, and (if done correctly) foster open, standards-compliant platforms for content and service providers to showcase their applications without the hassle of the traditional walled-garden approach.[436]

[432] John Markoff, *Google Says It Has No Plans for National Wi-Fi Service*, N.Y. TIMES, Aug. 15, 2006, at 7.

[433] *Id.*

[434] *Id.*

[435] *Id.*

[436] Minnie Ingersoll, *Free Citywide WiFi in Mountain View*, Official Google Blog, Aug. 16, 2006, *available at* http://googleblog.blogspot.com/2006/08/free-citywide-wifi-in-mountain-view.html.

Google's claims about its Mountain View Wi-Fi network contradicts one of its two principal arguments for network neutrality—that the market for broadband Internet access is not competitive. In the same article, Mr. Sacca was quoted as saying that "there wouldn't be a [net neutrality] debate in this country if we really had a competitive environment for access."[437] Apparently, Google does not detect the tension between its demonstration of low entry barriers and its allegation of a lack of competition in broadband access. If wireless providers can easily enter the market for Internet services, as Google has demonstrated, then the price of broadband access is constrained by the mere threat of such entry. Moreover, the mere threat of entry is sufficient to prevent incumbent access providers from engaging in anticompetitive strategies.

Google also proposes to offer end-users free WiFi service in San Francisco based on an advertiser-supported model. Following on the heels of its prototype in Mountain View, Google's business model for San Francisco confirms that the leading provider of one of the most valuable Internet applications—search and search-responsive advertising—believes that many end-users want discounted or free broadband access that would be funded by advertisers. In April 2006, the city of San Francisco selected the municipal Wi-Fi proposal of Google and Earthlink to provide universal wireless broadband service.[438] Under the joint proposal, Google will offer a free 300 Kbps broadband access service.[439] Earthlink will provide a 1 Mbps broadband service for an estimated $20 monthly fee.[440] Google expects to recoup its investment in the broadband network through revenues from advertisements.[441] The companies describe their proposed Wi-Fi system as an "open access" network,[442] but Google and Earthlink will have complete (unregulated) control over wholesale pricing.[443] Indeed, Google admits in the joint proposal that it will set wholesale access prices "to shape the products that will be sold on the network,"[444] which implies that Google may discourage resellers that would compete directly with Google's portal, search engine, or other content and applications (such as Google Maps and Froogle). Resellers on

[437] Markoff, *supra* note 432.

[438] Press Release, City of San Francisco Department of Telecommunications and Information Service, *San Francisco Concludes Evaluation of Proposals to Create Universal Affordable Wireless Broadband Network* (Apr. 5, 2006), *available at* http://www.sfgov.org/site/tech_connect_page.asp?id=38562.

[439] EARTHLINK MUNICIPAL NETWORKS AND GOOGLE PROPOSAL, SAN FRANCISCO TECHCONNECT COMMUNITY WIRELESS BROADBAND INITIATIVE, PUBLIC VERSION, at 15, http://www.sfgov.org/site/uploadedfiles/dtis/tech_connect/EarthLink_SanFrancisco_RFP_200519_PUBLIC.pdf.

[440] *Id.* at 20–21.

[441] *Id.* at 22.

[442] *Id.* at 58.

[443] *Id.* at 22.

[444] *Id.*

the Google-Earthlink Wi-Fi network will face other asymmetric treatment, such as inferior placement on network launch pages[445] and volume-based discounts that will benefit large companies only.[446] Finally, Google's low pricing of access will discourage efficient competing Wi-Fi networks from developing unless they also are predicated on a business model that taps an ancillary revenue stream to subsidize end-user access. By setting a retail price of broadband access at $0, Google will simultaneously discourage resellers (other than Earthlink) and alternative network operators from entering the broadband access market in San Francisco.

If one were to apply Google's business model to the network neutrality debate, a provider of DSL or cable modem service could subsidize the price of its broadband access to end-users through revenue earned from the sale of advertisements. This outcome would clearly be a Pareto improvement. It should be encouraged, not foreclosed by regulation. Likewise, allowing a network operator to subsidize the price of broadband access with revenue from a surcharge to content providers on the priority delivery of content would make possible a Pareto improvement and would allow potential end-users that are currently priced out of the market to enjoy broadband access. To deny broadband access to the marginal consumer—by prohibiting access tiering or vertical integration by network operators into Internet content and applications—is to pursue an anti-Pareto principle. Call it digital Schadenfreude.

b. End-user welfare gains from a subsidy funded by prioritization fees levied on content providers

It is straightforward to estimate the welfare gains to current broadband households that would flow from a subsidy funded by prioritization fees imposed on content providers. In a study that addresses a related question, Larry Darby has estimated the present discounted value of welfare gains to subscribers of AT&T, Verizon, and BellSouth in the top 20 SMSAs over a ten-year period under various simulations in which content providers share a portion of the telephone carriers' common costs to construct a new FTTH network.[447] When carriers are assumed to recover 10 percent of the common costs of building a new FTTH network from content providers, Darby estimates the consumer welfare gains over a ten-year period to be $8 billion.[448] Darby's estimate is small in the early years of his simulation because he considers the welfare effects of FTTH customers, which begin below 1 million in 2006 and grow to 28.3 million by 2015. In this section, I modify Darby's analysis to consider the

[445] *Id.* at 51.
[446] *Id.* at 82.
[447] Larry Darby, Consumer Welfare, Capital Formation and Net Neutrality: Paying for Next Generation Broadband Networks, Working Paper, June 6, 2006.
[448] *Id.* at 38.

welfare gains that would result from an immediate subsidy to all current broadband subscribers (principally, DSL and cable modem subscribers), rather than future FTTH subscribers of AT&T, Verizon, and BellSouth only.

The welfare gains to current broadband users from a subsidy funded by prioritization fees levied on content providers can be decomposed into two parts: (1) savings to existing broadband households and (2) surplus to marginal broadband households. To calculate the savings to current broadband subscribers, one needs an estimate of the number of broadband households in the United States and the monthly savings in end-user broadband prices from the subsidy. The *FCC's High Speed Services Report* released in June 2006 reports that there were 50.2 million broadband households as December 2005.[449] I assume that the subsidy would initially allow broadband access providers to reduce their access prices to end-users by $5 to $10 per month (a discount of between 14 and 28 percent, assuming a $35 monthly fee). Such a subsidy is small in comparison to Google's proposal for a 100 percent subsidy of the end-user fee for access to its broadband wireless network in San Francisco. Given the large base of existing broadband households, the savings from such a modest subsidy would range from $3.012 billion to $6.024 billion per year. Figure 10 depicts the gain in consumer welfare (equal to the savings by current broadband households plus the welfare gains by new broadband households).

The savings for existing broadband households correspond to the rectangular area bounded by the old and the new monthly price for broadband service.

The annual savings to existing broadband households does not capture the full welfare effect from the subsidy. Marginal broadband households also benefit by virtue of consuming a service that they could not previously afford or were not willing to purchase at the pre-subsidy price. These "deadweight triangle gains" correspond to the triangular area below the demand curve bounded by the old and the new monthly price for broadband service. Using an own-price elasticity of demand for broadband access −2.0, which is a composite estimate across several empirical studies,[450] I find that an additional 14.3 million homes would subscribe to broadband access in response to a $5 per month subsidy, and an additional 28.6 million homes

[449] Wireline Competition Bureau, Federal Communications Commission, *supra* note 175.

[450] *See, e.g.*, Hal Varian, *The Demand for Bandwidth: Evidence from the INDEX Project*, in Broadband: Should We Regulate High-Speed Internet Access? 57–83 (Robert W. Crandall & James Alleman, eds., AEI Brookings Joint Center for Regulatory Studies 2002) (estimating an elasticity of demand between −3.1 and −2.0); Gerald R. Faulhaber & Christian Hogendorn, *The Market Structure of Broadband Telecommunications*, 47 J. Indus. Econ. 326 (2000) (estimating an elasticity of demand of −1.533); Robert W. Crandall, J. Gregory Sidak, & Hal J. Singer, *The Empirical Case against Asymmetric Regulation of Broadband Internet Access*, 17 Berkeley Tech. L.J. 954 (2002) (estimating an elasticity of demand of −1.2); Austan Goolsbee, The Value of Broadband and the Deadweight Loss of Taxing New Technology, Working Paper, Jan. 2006 (estimating a demand elasticity between −3.07 and −2.44).

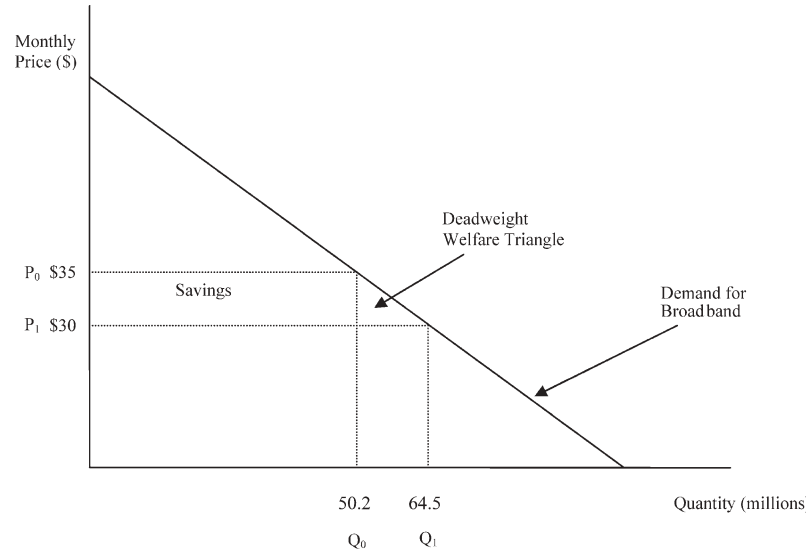

Figure 10. End-user welfare gains from a subsidy funded by prioritization fees levied on content providers. The savings for existing broadband households correspond to the rectangular area bounded by the old and new monthly price for broadband service.

would subscribe to broadband access in response to a $10 per month subsidy. Hence, marginal broadband households would experience an increase in annual surplus between $429 million (in response to a $5 per month subsidy) and $1.716 billion (in response to a $10 per month subsidy). When added to the annual savings to existing broadband subscribers, the annual welfare gains for all broadband households ranges from $3.441 billion (in response to a $5 per month subsidy) to $7.740 billion (in response to a $10 per month subsidy).

c. Who is the marginal consumer of broadband access?

By preventing network operators from subsidizing broadband access with revenues from content providers, network neutrality proponents would prevent the marginal broadband subscribers—that is, the last consumers to subscribe to broadband service at the current prices—from enjoying the benefits of broadband service. Marginal broadband subscribers can best be identified through survey data. In November and December of 2005, the Pew Internet and American Life Project surveyed U.S. households on their decision to subscribe to Internet service, including dial-up Internet service.[451] To identify the marginal broadband subscribers, I consider any broadband subscribers who cited

[451] John Horrigan, *Home Broadband Adoption 2006*, PEW INTERNET AND AMERICAN LIFE PROJECT, May 28, 2006, http://www.pewinternet.org/pdfs/PIP_Broadband_trends2006.pdf, at i.

Table 3. Demographic Information of Marginal Broadband Users

Demographic characteristic	All broadband subscribers	Marginal broadband subscribers	All narrowband subscribers
Income: percentage under $50 K	26.3	36.5	43.7
Education: percentage with some college	69.3	63.4	56.8
Race: percentage Caucasian	75.2	55.5	75.9
Gender: percentage male	54.0	54.0	47.4
Age: percentage over 50	27.0	17.4	35.2
Total number of observations	2170	63	1236

Source: PEW INTERNET AND AMERICAN LIFE PROJECT, *Online News and User Generated Content* (Dec. 2005).

"Price fell to more affordable level/Finally could afford it" as their primary reason for adopting broadband service. Because dial-up Internet service is an inferior substitute to broadband service, economic theory predicts that the average income of broadband subscribers would exceed the average income of narrowband subscribers. Table 3 compares the demographic characteristics of marginal broadband subscribers to those of all narrowband subscribers and all broadband subscribers.

Of the three groups, marginal broadband subscribers were the most likely to be minorities (44.5 percent minority versus 24.8 percent minorities for all broadband users and 24.1 percent minority for narrowband users). Relative to all broadband subscribers, marginal broadband subscribers had less income and less education. Such a finding implies a consumer's willingness to pay for broadband is positively related to his income and education. As predicted by economic theory, broadband subscribers (even marginal broadband subscribers) had more income than narrowband subscribers. The preceding exercise allows one to characterize the class of Internet users who are most vulnerable to network neutrality.

B. How Would Network Neutrality Regulation That Prohibits Vertical Integration Benefit Incumbent Providers of Content or Applications?

It is not surprising that incumbent providers of Internet content and applications support regulation that would prohibit a network operator from vertically integrating into the provision of these services, as this statutory barrier to entry would eliminate several potent competitors in each relevant geographic market in the United States. The entrance of vertically integrated competitors into the Internet content and application industry would surely reduce profits for the incumbent providers of such services. Absent a ban on vertical integration, incumbent providers of content and applications will have to compete with vertically integrated network operators for revenues from

consumers and advertisers. Competition for end-users will force incumbent companies to increase spending on their own advertising and product development to remain competitive. Incumbent providers of content and applications would need to release new services, improve existing services, or offer some other form of inducement for end-users and advertisers. For example, eBay could be forced to charge smaller commissions for selling items if vertically integrated competitors begin offering similar online auction services. Likewise, providers of content and applications will have increased competition in the market for Internet advertisements. Advertisers will have more options and will likely pay lower prices as incumbent and entrant providers compete for revenue. The entry of vertically integrated access providers into Internet content and applications would increase total economic welfare by fostering intensified competition. Consumers would be the beneficiaries. They would pay lower prices for goods that are advertised over the Internet, and they would have more choice of services from content and application providers.

By virtue of their advertiser-funded business models, Internet portals and e-commerce firms are necessarily competing in a two-sided market. They offer competing content and applications to end-user, usually at a zero price, and they offer competing audiences to purchasers of advertising. The debate over network neutrality regulation has largely ignored the development of competition in the second market. That oversight is significant: Stripped of its techno-populist rhetoric, the call for network neutrality regulation can be seen as coordinated effort to petition government to prevent a class of potential competitors from selling advertising aimed at three massive audiences: the existing subscription-based customer bases for landline telephone companies, cable television operators, and wireless carriers. Collectively, these three customer bases consist of roughly 380 million accounts in the United States.[452]

VIII. EX ANTE REGULATION VERSUS EX POST LIABILITY RULES

As Sections V–VII have explained in detail, proponents of network neutrality posit that, unless new legislation constrains network operators, they will engage in three forms of potentially anticompetitive conduct: degradation or blockage of access to content and applications; access tiering; and vertical integration. However, is the potential for anticompetitive conduct and the associated social costs sufficiently high to warrant ex ante regulatory intervention? The answer depends on a proper balancing of the type I and type II errors.

[452] National Cable and Telecommunications Association, http://www.ncta.com/ContentView.aspx?contentId=54 (last visited July 8, 2006); United States Telecom Association, Telecom Statistics, http://www.ustelecom.org/index.php?urh=home.news.telecom_stats (Apr. 4, 2006); Press Release, Cellular Telecommunications and Internet Association, Subscriber Growth Breaks Record Again (Apr. 6, 2006), http://www.ctia.org/news_media/press/body.cfm?record_id=1600.

The goal of sector-specific regulation should be to minimize the sum of the direct costs and the error costs.[453] In the absence of such regulation, such conduct would be restrained only if it is shown to be anticompetitive *after* it has occurred. The government or private plaintiff bears the burden of proving its case. This arrangement describes the operation of monopolization law under the Sherman Act. In contrast, the ex ante approach of network neutrality regulation would impose a remedy *before* any specific finding of illegal conduct. The rationale for this prophylactic approach may be one or more of the following considerations:

- The probability of anticompetitive behavior in the absence of such regulation is high.
- The magnitude of the social harm from anticompetitive behavior would be great.
- The likelihood and magnitude of offsetting efficiency justifications for the behavior are low.
- The danger of false positives is small.

A standard decision rule in statistics is that one weighs the expected cost of a type I error against the expected cost of a type II error. Applied here, a type I (or false positive) happens when ex ante regulation prevents conduct that is actually procompetitive. A type II error (or false negative) happens when ex ante regulation is not imposed even though, in actuality, market forces are not sufficient to constrain the behavior of network operators (in the case of degrading or blocking access) or the conduct is anticompetitive (in the case of vertical integration or access tiering). The expected social costs from imposing regulation that would prohibit a certain type of conduct is equal to the product of (1) the probability that the conduct is procompetitive and (2) the social costs of prohibiting such conduct conditional on the conduct being procompetitive. Similarly, the expected social costs from not imposing regulation

[453] The discussion in this section draws from Damien Geradin & J. Gregory Sidak, *European and American Approaches to Antitrust Remedies and the Institutional Design of Regulation in Telecommunications*, in 2 THE HANDBOOK OF TELECOMMUNICATIONS ECONOMICS 518 (Martin Cave, Sumit Kumar Majumdar & Ingo Vogelsang, eds. North-Holland 2006). Articulation of the Type I/Type II error analysis in the context of antitrust or sector-specific regulatory policy is often credited to Paul L. Joskow & Alvin K. Klevorick, *A Framework for Analyzing Predatory Pricing Policy*, 89 YALE L.J. 213, 223 (1979). Legal and economic scholars have since widely embraced the framework. *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 536 (6th ed. 2002); MACAVOY, *supra* note 105, at 177–78; Richard L. Schmalensee, *On the Use of Economic Models in Antitrust: The* ReaLemon *Case*, 127 U. PA. L. REV. 994, 1018–19 n.98 (1979); Sidak, *Debunking Predatory Innovation, supra* note 85; Frank H. Easterbrook, *Predatory Strategies and Counterstrategies*, 48 U. CHI. L. REV. 1121, 1144–45 (1983); Timothy J. Muris, *The Federal Trade Commission and the Rule of Reason: In Defense of* Massachusetts Board, 66 ANTITRUST L.J. 773, 775–77 (1998); Steven C. Salop, *Exclusionary Conduct, Effect on Consumers, and the Flawed Profit-Sacrifice Standard*, 73 ANTITRUST L.J. 311, 314 (2006).

that would prohibit a certain type of conduct is equal to the product of (1) the probability that the conduct is anticompetitive and (2) the social costs of allowing such conduct conditional on the conduct being anticompetitive. Because the probability that a certain conduct is procompetitive is equal to one minus the probability that the conduct is anticompetitive, the section is organized by the three types of conduct at issue, beginning with vertical integration.

A. Vertical Integration: Type I and Type II Errors

As explained above, vertical integration would allow network operators to achieve large economies of scope associated with providing both access and content, which would be shared with end-users to an increasing extent in an increasingly competitive market for both access and content. To be anticompetitive, vertical integration presumably would be followed by discrimination against unaffiliated content providers. However, vertical integration is not likely to be motivated by anticompetitive reasons here because a network operator would have little chance to foreclose unaffiliated content providers by denying access to its broadband users or by raising its rivals' costs through the pricing of priority delivery. Within its geographic footprint, a network operator would generally serve fewer than 60 percent of broadband customers, given the national market shares of cable modem providers presented earlier in Figure 5. Because the market for Internet content is national in scope, however, a regional network operator would have an even smaller share of all broadband customers nationwide. Even if a network operator were successful at steering broadband users to its own website, it is unlikely that any unaffiliated content provider would be induced to exit the market or to operate at a less efficient scale. Hence, successful foreclosure would be remote. It is thus highly unlikely that an anticompetitive objective would motivate vertical integration—that is, the probability that vertical integration is procompetitive is high.

The social costs associated with prohibiting vertical integration motivated for procompetitive reasons would be large, as consumers would pay higher prices for broadband access (the potential cross subsidy from advertisers to end-users would be foreclosed) and advertisers would have to pay higher prices for advertising on portals (network operators would be prohibited from entering the market for content). Because the probability that vertical integration is motivated for procompetitive reasons is high, and because the social cost associated with prohibiting vertical integration would be large, the expected cost of the type I error would be large. Even assuming, improbably, that vertical integration were motivated by anticompetitive reasons, the resulting social costs would be small. Because network operators lack market power (let alone monopoly power) in the downstream access market, a network operator that vertically integrates into content would have little

chance of monopolizing the upstream content market. Indeed, there is no guarantee that a network provider could thrive in certain upstream submarkets such as Internet search that are highly concentrated due to network effects. Given the small likelihood that vertical integration would be motivated by anticompetitive reasons, and given the small social costs associated with vertical integration motivated for anticompetitive reasons, the expected social costs of a type II error would be trivial.

B. Access Tiering: Type I and Type II Errors

Similarly, access tiering would more likely than not be motivated by procompetitive reasons. Network operators are motivated by the same reasons as successful content providers like Google and Yahoo to embrace advertiser-supported business models. By contracting for priority delivery with content providers, a network operator can decrease the price of priority delivery (to zero if necessary) for end-users or cross subsidize the price of broadband access for end-users, or both. It is highly unlikely that a network operator could foreclose a content provider by charging a fee for priority. As explained above, the social costs associated with prohibiting access tiering would be large for several reasons. First, access tiering would allow advertisers, who are willing to pay more than end-users for priority delivery, to subsidize the cost of such services. The result would be more priority delivery and greater consumer surplus, as end-users would receive more prioritized content at a lower price.[454] Second, banning contracting for priority delivery between end-users and access providers would increase transaction costs. Third, upstart content providers would be discouraged from developing real-time applications by virtue of the uncertainty in execution created by a ban on contracting for priority delivery with access providers. Fourth, content providers are better positioned to price for priority than are access providers, and efficiency demands that prices vary according to application-specific elasticities. Therefore, attempting to recover the cost of prioritization of packet delivery solely in the prices charged end users surely would violate Ramsey pricing principles and thus would ensure that some increment of attainable social welfare would be lost. In summary, for these reasons the expected cost of a type I error is surely quite large.

Even assuming, improbably, that access tiering were motivated by anticompetitive reasons, the resulting social costs would be small. Unaffiliated content providers who could not afford to contract for priority delivery would not be harmed in an absolute sense or in a relative sense, for the reasons discussed

[454] Here, as earlier, I use "cross subsidy" loosely. Strictly speaking, a cross subsidy requires the price of broadband access to fall below its average incremental cost (AIC). The Ramsey solution (which uses marginal cost rather than AIC) would not permit the price of any product to fall below its marginal cost. *See* BAUMOL & SIDAK, *supra* note 8, at 36; Gerald R. Faulbaber, *Cross-Subsidy Analysis with More than Two Products*, 1 J. COMPETITION L. & ECON 441 (2005).

earlier. The availability of substitutes for priority delivery, which include faster access speeds and alternative technologies that provide local caching of content, implies that network operators cannot place unaffiliated content providers at a competitive disadvantage. Because competitor harm is a necessary condition for consumer harm to follow from this type of conduct, there is no plausible reduction in consumer welfare from access tiering. Given the small likelihood that access tiering would be motivated by anticompetitive reasons, and given the small social costs associated with access tiering motivated for anticompetitive reasons, the expected social costs of a type II error would be trivial.

C. Degrading or Blocking Access to Content: Type I and Type II Errors

Unlike access tiering or vertical integration, degrading or blocking access to content could conceivably be motivated by anticompetitive reasons. Hence, one must modify the calculation of the type II error to account for this difference. In particular, the question is not whether degrading or blocking access is in fact anticompetitive, but whether blocking access would occur in light of existing market forces. The expected social costs from not imposing regulation that would prohibit blocking access to unaffiliated websites when market forces are insufficient to constrain the behavior of a network provider is equal to the product of (1) the probability that market forces are insufficient and (2) the social costs of the conduct conditional on market forces not being sufficient. Although the social costs of degrading or blocking access could potentially be significant, the probability that network operators would engage in such overt discrimination is remote given the extant (and growing) competition for residential broadband access. First, my update of Wu's survey of discrimination reveals that notwithstanding *Madison River*—which is clearly an outlier case for the multiple reasons that Section IV.B.1.a explained in detail—no such discrimination by any major telephone company or cable operator serving a metropolitan market has occurred in the United States since 2002. Second, the rapidly decreasing prices of broadband access are not consistent with market power. Third, network operators have no incentives to favor some content over others until they integrate into Internet content and applications, which has yet to occur on *any* level by telephone and has occurred for cable operators only on a limited basis with regard to motion pictures—which, of course, are not interactive content of the sort that distinguishes the Internet from other, one-way media. Fourth, for the same reason that discriminatory pricing would be unsuccessful, no single network operator commands a sufficient share of the downstream access market to foreclose an unaffiliated content provider. As market shares for cable modem and DSL providers each converge to 50 percent, and as new entrants such as Wi-Fi and WiMAX providers emerge, unaffiliated content providers will have access to

the majority of broadband customers even in the unlikely event that any one network operator decides to block access to the content provider's site. For these four reasons, the expected cost of not imposing ex ante regulation that sought to prevent degrading or blocking access would be de minimus because the probability of the conduct occurring is already remote. Even if such an error were to occur—that is, if a network provider degraded or blocked access to a particular website for anticompetitive reasons—the conduct would be quickly detected, and the harm could be remedied through swift intervention by an antitrust enforcer, regulatory agency, or private plaintiff.[455]

IX. CONCLUSION

Proponents of network neutrality ground their arguments for ex ante regulatory intervention in assertions of market failure in the broadband Internet access market. These market failures have allegedly resulted in too little innovation by providers of content and applications. According to this theory, infringing on the rights of network operators—in particular, prohibiting network operators from contracting with content providers for priority delivery of data packets—would not undermine their incentives to invest in next-generation networks, but *would* spur greater investment by nascent providers of content and applications, who, Lessig and Wu tell us, are preoccupied with the risk of a tiered Internet. However, close examination of the relevant data reveals that the market for broadband access is competitively supplied. Cable modem market shares are converging to 50 percent nationwide as DSL providers gain share, and broadband prices have fallen substantially. Given this robust downstream competition for broadband customers, a broadband access provider could not afford to alienate its customers by denying them access to a particular website. My update of Wu's survey reveals that anecdotes of overt discrimination against content providers have become increasingly rare since 2002. As the downstream access market grows more competitive, a content provider's incentives to invest in new content and applications increases. Indeed, there is already robust innovation at the content level—from Akamai's technology to improve download speeds to MLB.TV's streaming videos of major league baseball games. There is no evidence that, under the current regulatory structure, the market is producing too little innovation in content and applications.

Despite this conspicuous lack of evidence, proponents of network neutrality regulation seek to impose ex ante prohibitions that would constrain a network

[455] *See* Tom Evslin, *Net Neutrality at Home: Distributed Citizen Journalism against Net Discrimination*, HARVARD BERKMAN CENTER FOR INTERNET AND SOCIETY, Aug. 8, 2006, *available at* http://ia311543.us.archive.org/1/items/tom_evslin_2006-08-08.mp3/tom_evslin_2006-08-08.mp3 (technology consultant suggesting a prioritization detection system).

operator's behavior vis-à-vis providers of content and applications, with the aim of spurring the latter set of firms to innovate more. In particular, these rules would prohibit a network operator from (1) denying or degrading access to a particular website and to specific hardware that attaches to the user's computer, (2) conditioning the quality of service for delivery of content upon the payment of a fee, and (3) vertically integrating into the production of content and applications. With respect to the first proposed prohibition, all of the largest network operators have already pledged that they would not engage in this conduct, presumably because preserving the right to do so is worthless in a competitive environment.

In contrast, network operators are unwilling to forgo the rights to engage in access tiering or vertical integration. Such behavior could be motivated by either procompetitive or anticompetitive reasons. Under an anticompetitive hypothesis, network operators wish to preserve those rights so that they can extend their alleged market power in broadband access into upstream markets for content or applications. Alternatively, under a procompetitive hypothesis, network operators wish to embrace the very business models—namely, advertiser-funded models that heavily subsidize end-user access—that have benefited Google and other vocal proponents of network neutrality regulation. Vertically integrating into content applications could enable a network operator to subsidize the price that it charges end-users for broadband access. Entry by network operators into the markets for content and applications would also benefit advertisers by decreasing Internet advertising rates. And contracting for priority delivery with content providers directly, which would be prohibited under the strong form of the ban on access tiering, would result in *greater* output of prioritized delivery at *lower* prices for end-users.

The efficiency rationale for such conduct by network operators is compelling; the anticompetitive hypothesis for their engaging in access tiering or vertical integration is weak. The probability that a network operator could successfully foreclose a provider of content or applications through differential pricing of priority delivery of data packets is remote, as any single network operator serves a small share of nationwide broadband households. For this reason, regulators should err in favor of allowing network operators to contract with content providers for priority delivery and to compete in the upstream market for advertiser-supported content and applications. The potential benefits from this injection of competitive entry vastly exceed the potential harm to the incumbent providers of content and applications. In the unlikely event that a network operator engaged in anticompetitive behavior, it could be easily detected by the provider and consumers of the affected content or application, and it could then be swiftly enjoined by an antitrust court or a regulatory agency. It bears repeating that the stakeholders whose interests should weigh most heavily in the deliberations of policy makers are consumers, not any particular constituency of competitors.