

ASSESSING THE NETWORK NEUTRALITY DEBATE IN THE UNITED STATES

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I. INTRODUCTION

Over the last decade in the United States, network neutrality has evolved from a primarily technical concern to a national debate about the future of American communications regulation, as well as technology and innovation policy in general. In October 2009, the U.S. Federal Communications Commission (FCC) issued a notice of proposed rulemaking (NPRM) to codify six principles of network neutrality.¹ This proceeding, which is unlikely to be completed before mid-2010, could have profound economic consequences for consumers, content and applications providers, and network operators.

Network neutrality is a shorthand for a series of policy prescriptions that would restrict the ability of broadband Internet service providers (ISPs) to manage network traffic. These restrictions include barring network operators from charging content and applications providers (as opposed to end users) for entering into business-to-business transactions for quality-of-service (QoS) enhancements for packet delivery. Although the initial objective for advocates of network neutrality regulation was to secure regulation of wireline networks, the debate has expanded since its inception to include wireless networks.

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1. Preserving the Open Internet; Broadband Industry Practices, Notice of Proposed Rulemaking, GN Dkt. No. 09-191, WC Dkt. No. 07-52, ¶¶ 60-80 (2009) [hereinafter *Network Neutrality NPRM*].

II. THE EVOLUTION OF THE ARGUMENTS SUPPORTING AND OPPOSING NETWORK NEUTRALITY REGULATION IN THE UNITED STATES

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.” Based on theories that innovation in Internet content and applications is threatened by ISPs’ network management practices, proponents of network neutrality have called for the implementation of network neutrality regulations that would ban network operators from blocking certain content and from charging content and applications providers for prioritized delivery over their networks. The issue has sparked a decade-long debate involving top industry players and scholars in law and economics. The FCC has responded by issuing a Notice of Proposed Rulemaking that would codify its four Internet Policy Principles along with an added proposed “nondiscrimination” rule, which would ban business-to-business transactions for QoS between network operators and content and applications providers, and a transparency rule. The FCC’s proposed “nondiscrimination” rule has become the center of the network neutrality debate in the United States. According to the FCC, the proposed rule is part of an effort to keep the Internet open.

A. The Rise of Network Neutrality

“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.”² Lawrence Lessig’s assessment in November 2001 was perhaps the first marker in the network neutrality movement. Much has been said about network neutrality since creativity supposedly died in 2001. The early work by those advocating network neutrality regulation—primarily Lessig³ and Tim Wu⁴—posited dire outcomes for the future of the Internet. Mainly, early proponents of network neutrality regulation have claimed that, without network neutrality policies restricting the network management and business practices of network operators, innovation in Internet content and applications would be choked off. This argument is sometimes presented in terms of: Will there be “the next Google” if there is not network neutrality regulation imposed to preserve the Internet as the open platform that network neutrality proponents say that it has been for several decades?

To address those theorized harms, proponents of network neutrality have sought to implement rules that would prohibit (1) blockage of content or applications over a network and (2) business-to-business transactions for enhanced QoS—or prioritized delivery—between network operators and content and

2. Lawrence Lessig, *The Internet Under Siege*, 127 FOREIGN POL’Y 56, 56 (2001).

3. *See id.*; LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD (Random House 2001) [hereinafter LESSIG, THE FUTURE OF IDEAS]; Lawrence Lessig, *Congress Must Keep Broadband Competition Alive*, FIN. TIMES, Oct. 18, 2006; Lawrence Lessig & Robert W. McChesney, *No Tolls on the Internet*, WASH. POST, June 8, 2006, at A23; Net Neutrality, Hearing before the Sen. Comm. on Commerce, Science, & Transportation, 109th Cong., 2d Sess. 59 (2006) (testimony of Lawrence Lessig, C. Wendell & Edith M. Carlsmith), available at http://www.lessig.org/blog/archives/Lessig_Testimony_2.pdf [hereinafter *Lessig Testimony on Net Neutrality*].

4. Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. TELECOMM. & HIGH TECH. L. 141 (2003).

applications providers. Currently, Internet networks use packet technology under a “best-effort” delivery standard. “Quality of service” is the phrase that is used to describe something superior to best-effort delivery of packets. The proposed ban on business-to-business transactions for QoS would prohibit the telephone or cable company from directly contracting with the provider of content or applications for speedier delivery of its content on the local access network. This ban boils down to a ban on charging different prices that reflect different levels of QoS.

Although proponents of network neutrality have cast network neutrality as a means to preserve creativity, innovation, and the openness of the Internet, network neutrality relates to the technical question of how to address network congestion. Electronic communications are converging onto a single platform, the Internet Protocol (IP) platform. In their seminal 1974 paper, Vinton Cerf and Robert Kahn presented a protocol design that would evolve into the now ubiquitous TCP/IP.⁵ Convergence to the IP platform is beneficial in several ways. The IP platform allows heterogeneous content to travel across a common architecture. Unlike circuit-switched networks, the IP platform sends information in packets—thus, an IP network is a packet-switched network. The transportation of data in packets entails that, rather than needing to remain open for one stream of data for the entire duration of the data transmission, a given portion of bandwidth can accommodate numerous streams of data simultaneously.

At the same time, this convergence to IP makes combating congestion and maintaining efficient Internet traffic flows much more challenging. Different content and applications have different QoS needs. For example, real-time content is far less tolerant of latency or jitter than email is. Increasingly diverse traffic is intermingled in broadband Internet networks, and the sharing of infrastructure means that congestion created by one type of traffic can impair the QoS of other traffic.

The question is how best to address those challenges. Network operators have long used packet prioritization mechanisms to manage the traffic flow of data packets over their networks.⁶ Nonetheless, some proponents of network neutrality regulation would ban packet prioritization altogether, claiming that the prioritization of one packet of information over another in the context of a capacity constraint is a “zero-sum” game. Google makes this argument in comments that it filed with the FCC in January 2010.⁷ This argument asserts simplistically—and incorrectly—that prioritizing one packet necessarily degrades another. Consequently, it is argued, there is no net gain in social welfare.

Other proponents of network neutrality regulation would ban network operators from charging content and applications providers for prioritized delivery. Although such supporters of network neutrality regulation acknowledge the benefits of packet prioritization and support only a ban on *charging* content and applications providers for enhanced delivery, they ignore that the most efficient

5. Vinton G. Cerf & Robert E. Kahn, *A Protocol for Packet Network Intercommunication*, 22 IEEE TRANSACTIONS ON COMM. 637 (1974).

6. One example of enhanced end-to-end delivery is virtual private networks (VPN) service, which businesses commonly use to enable employees to connect to the enterprise’s network from offsite. *See, e.g.*, Connect:Direct® Over a VPN Connection, <http://www22.verizon.com/wholesale/lsp/connguide/1,5133,4-East-Billing-dialup,00.html>; AT&T Virtual Private Networks, <http://www.business.att.com/enterprise/Portfolio/vpn-services-enterprise/>.

7. Comments of Google Inc., In the Matter of Preserving the Open Internet, Broadband Industry Practices, GN Dkt. No. 09-191, WC Dkt. No. 07-52, at 35 (filed with the FCC Jan. 14, 2010) [hereinafter *Google Comments*].

way to determine which packets should receive priority in congestion situations (and how much) is to allow network operators to elicit such information in market transactions by offering paid prioritization to those content and applications providers that value it. In market settings, the most efficient means of communicating information is through price signals.⁸ Nonetheless, proponents of such a ban have discounted the benefits of differential pricing and focused on theories of harm, explained in detail below, frequently used to attempt to justify a ban on optional business-to-business transactions for QoS.

B. The Economic Debate Over Network Neutrality Regulation

The work by law professors Lessig, Wu, Barbara van Schewick,⁹ and other proponents of network neutrality regulation propounded several key assumptions or theories about network neutrality to justify proposed prohibitions on network operators' network management and business practices. First was the assumption that monopoly power exists in broadband Internet access service. Early arguments in favor of network neutrality regulation have relied on the assumption of monopoly power to conclude that network operators have the incentive and ability to discriminate against competing content and applications by blocking content or imposing high prioritization fees that discourage content and applications providers from developing new products.

A second assumption of the early proponents of network neutrality regulation was the normative judgment that innovation "at the edges" of the network is more virtuous than innovation within the core of the network. This assumption led proponents to reason that regulation was justified at any cost to promote innovation at the edges.

Third, the early proponents of network neutrality regulation suggest that the use of optional business-to-business transactions for QoS could lead to anticompetitive discrimination, or that network operators would use the threat of degraded best-effort service quality to force content and applications providers to pay for enhanced priority services. A common variant of this argument is the so-called "dirt road" metaphor, coined by Lessig and a co-author. Lessig claimed that the broadband ISP would "force" content and applications providers to purchase enhanced QoS delivery by threatening to intentionally degrade the delivery of their packets if they did not do so, effectively relegating them to an Internet "slow lane," which would be the equivalent of a winding "dirt road."¹⁰ Although offering content providers QoS enhancement for a fee is not necessarily "discriminatory" in any economically meaningful sense of the term—just as it is not discriminatory for Honda to charge more for an Accord than a Civic—the ability of network operators and suppliers of content or applications to enter into voluntary QoS transactions emerged as a central issue in the debate over network neutrality regulation.

The economic rebuttal to the theories of harm posited by early proponents of network neutrality since 2003 has been rigorous. The first extended legal or economic critiques of proposals for network neutrality regulation appeared in 2005

8. See Friedrich A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519 (1945).

9. See Barbara van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, 5 J. TELECOMM. & HIGH TECH. L. 329 (2007).

10. Lessig & McChesney, *supra* note 3, at A23.

and 2006 in congressional testimony and academic articles by Christopher Yoo¹¹ and Gregory Sidak.¹² “The problem,” Yoo contended, “is that—as even network neutrality proponents concede—deviations from network neutrality may well be motivated by legitimate concerns about network management and that it can be difficult, if not impossible for experts to predict which architectural approach will eventually prevail.”¹³ Sidak observed that network neutrality regulation would harm social welfare by slowing broadband adoption and innovation.¹⁴ Of particular relevance to the current debate on optional business-to-business QoS transactions, he stressed that, at its foundation, “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.”¹⁵ Sidak criticized the proponents of network neutrality regulation for ignoring the consequences for consumers if regulation were imposed.¹⁶

Scholarly opposition to network neutrality regulation has grown quickly. There is now a robust body of literature that considers network neutrality regulation with respect to its effect on investment and innovation, competition, speech and civic participation, and congestion management. Leading economists, technologists, and legal scholars who have considered this issue include William Baumol,¹⁷ Gary Becker,¹⁸ Dennis Carlton,¹⁹ Richard Epstein,²⁰ David Farber,²¹ Gerald

11. Christopher S. Yoo, *Beyond Network Neutrality*, 19 HARV. J.L. & TECH. 1 (2005); Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 95 GEO. L.J. 1847 (2006).

12. See J. Gregory Sidak, *A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet*, 2 J. COMPETITION L. & ECON. 349, 349 (2006), available at http://www.criterioneconomics.com/pdfs/A_Consumer_Welfare_Approach_to_Network_Neutrality_Regulation_of_the_Internet.pdf; Net Neutrality, Hearing before the Sen. Comm. on Commerce, Science, & Transportation, 109th Cong., 2d Sess. 59 (2006) (testimony of J. Gregory Sidak) [hereinafter *Sidak 2006 Senate Testimony*] (listing six essential characteristics of communications networks that rendered regulation unnecessary and likely harmful to investment and innovation incentives among network operators: the substantial sunk investments required to build networks, economies of scale, economies of scope, differential pricing, two-sided demand, and the susceptibility of networks to congestion); see also J. Gregory Sidak, *Consumer Welfare and Network Neutrality*, Presentation at the Federal Trade Commission Broadband Connectivity Competition Policy Workshop (Feb. 13, 2007), available at <http://www.ftc.gov/opp/workshops/broadband/presentations/sidak.pdf> (cited in FEDERAL TRADE COMMISSION STAFF REPORT, BROADBAND CONNECTIVITY COMPETITION POLICY (June 2007), available at <http://www.ftc.gov/reports/broadband/v070000report.pdf>).

13. Yoo, *Network Neutrality and the Economics of Congestion*, *supra* note 11, at 1851.

14. Sidak, *A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet*, *supra* note 12.

15. *Id.* at 350.

16. *Id.* at 474 (“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.”).

17. See, e.g., William J. Baumol, Martin Cave, Peter Cramton, Robert Hahn, Thomas W. Hazlett, Paul L. Joskow, Alfred E. Kahn, Robert Litan, John Mayo, Patrick A. Messerlin, Bruce M. Owen, Robert S. Pindyck, Scott J. Savage, Vernon L. Smith, Scott Wallsten, Leonard Waverman & Lawrence J. White, *Economists’ Statement on Network Neutrality Policy* (AEI-Brookings Joint Center Working Paper No. RP07-08, Mar. 2007), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=976889#PaperDownload (last visited Mar. 10, 2010) [hereinafter *Economists’ Statement*].

18. See Declaration of Gary S. Becker & Dennis W. Carlton, In the Matter of Preserving the Open Internet, Broadband Industry Practices, GN Dkt. No. 09-191, WC Dkt. No. 07-52 (filed with the FCC on behalf of Verizon Jan. 14, 2010).

19. See *id.*

20. See Richard A. Epstein, *Net Neutrality at the Crossroads*, FT.COM, Oct. 27, 2009, available at http://www.ft.com/cms/s/0/d9611768-c310-11de-8eca-00144feab49a.html?nclck_check=1.

Faulhaber,²² Thomas Hazlett,²³ Scott Hemphill,²⁴ Paul Joskow,²⁵ Alfred Kahn,²⁶ Robert Kahn,²⁷ Michael Katz,²⁸ Bruce Owen,²⁹ Robert Pindyck,³⁰ Gregory Rosston,³¹ Richard Schmalensee,³² Marius Schwartz,³³ Vernon Smith,³⁴ Daniel Spulber,³⁵ and Leonard Waverman.³⁶ These scholars have demonstrated that arguments in favor of network neutrality regulation lack empirical support; fail to account for the impacts of customer choice, two-sided markets, competition, and innovation; rest on a misguided focus on only one component of social welfare—content provider welfare—rather than total welfare; and disregard the obvious costs of regulation, in the form of social welfare losses resulting from reduced investment and innovation by both network operators and content and applications providers, reduced product differentiation, and higher end-user prices to broadband access.

21. See Gerald Faulhaber & David J. Farber, *The Open Internet: A Consumer-Centric Framework*, GN Dkt. 09-191, WC Dkt. 07-52 (filed with the FCC on behalf of AT&T Jan. 14, 2010); David Farber & Michael Katz, *Hold Off on Net Neutrality*, WASH. POST, Jan. 19, 2007, at A19.

22. See Faulhaber & Farber, *supra* note 21.

23. See Thomas W. Hazlett, *Broadbandits*, WALL ST. J., Aug. 12, 2006, at A9, available at <http://online.wsj.com/article/SB115533922506533851-search.html>.

24. See C. Scott Hemphill, *Network Neutrality and the False Promise of Zero-Price Regulation*, 25 YALE J. ON REG. 135 (2008).

25. *Economists' Statement*, *supra* note 17.

26. See Alfred E. Kahn, Statement of Alfred E. Kahn, Robert Julius Thorne Professor of Political Economy, Emeritus, Cornell University, before the FTC Workshop on Broadband Connectivity Competition Policy, (delivered Feb. 13, 2007), available at <http://www.ftc.gov/opp/workshops/broadband/presentations/kahn.pdf> (Feb. 21, 2007 rev.) (last visited May 11, 2010).

27. See Robert Kahn, Remarks at An Evening with Robert Kahn in Conversation with Ed Feigenbaum, Computer History Museum (Jan. 9, 2007), available at <http://www.computerhistory.org/events/index.php?id=1162920599> (last visited May 11, 2010); see also Andrew Orlowski, *Father of the Internet Warns Against Net Neutrality*, THE REGISTER, Jan. 18, 2007, http://www.theregister.co.uk/2007/01/18/kahn_net_neutrality_warning/ (last visited Mar. 10, 2010) (“Robert Kahn, the most senior figure in the development of the internet, has delivered a strong warning against ‘Net Neutrality’ legislation.”).

28. See Michael L. Katz, *Maximizing Consumer Benefits from Broadband*, GN Dkt. No. 09-191, WC Dkt. No. 07-52 (filed with the FCC on behalf of Verizon Jan. 14, 2010); Farber & Katz, *supra* note 21.

29. See Bruce M. Owen, *Antecedents to Net Neutrality*, 30 REG. 14 (2007); Bruce M. Owen & Gregory L. Rosston, *Local Broadband Access: Primum Non Nocere or Primum Processi? A Property Rights Approach*, in NET NEUTRALITY OR NET NEUTERING: SHOULD BROADBAND INTERNET SERVICES BE REGULATED? 163 (Thomas M. Lenard & Randolph J. May eds., 2006).

30. *Economists' Statement*, *supra* note 17.

31. See Gregory L. Rosston & Michael D. Topper, *An Antitrust Analysis of the Case for Wireless Network Neutrality* (Stanford Inst. for Econ. Policy Research, Discussion Paper No. 08-040, July 2009); Owen & Rosston, *supra* note 29.

32. *Economists' Statement*, *supra* note 17.

33. See Declaration of Marius Schwartz, In the Matter of Preserving the Open Internet, Broadband Industry Practices, GN Dkt. No. 09-191, WC Dkt. No. 07-52 (filed with the FCC on behalf of AT&T Jan. 14, 2010) [hereinafter *Schwartz Declaration*].

34. *Economists' Statement*, *supra* note 17.

35. See DANIEL F. SPULBER & CHRISTOPHER S. YOO, NETWORKS IN TELECOMMUNICATIONS: ECONOMICS AND LAW (Cambridge Univ. Press 2009).

36. See Leonard Waverman, *Comments on Network Neutrality*, 2 J. COMPETITION L. & ECON 475 (2006). This list is only partial. See, e.g., Michael D. Topper, *Broadband Competition and Network Neutrality Regulation*, GN Dkt. No. 09-191, WC Dkt. No. 07-52 (filed with the FCC on behalf of Verizon Jan. 14, 2010); Gerald Faulhaber, David Farber, Michael Katz & Christopher Yoo, *Common Sense on Net Neutrality* (2006) available at <http://www.interesting-people.org/archives/interesting-people/200606/msg00014.html> (last visited Mar. 10, 2010); William E. Kennard, *Spreading the Broadband Revolution*, N.Y. TIMES, Oct. 21, 2006, at A13; Robert Pepper, *Net Neutrality Debate Sets Out a False Choice*, NETWORK WORLD, June 12, 2006, available at <http://www.networkworld.com/columnists/2006/061206-net-neutrality-no.html> (last visited Mar. 10, 2010).

Lessig and Wu, in particular, have been criticized for failing to explain why their theorized outcomes are likely to occur under real-world conditions, or how they are consistent with settled economic understandings of the remarkably dynamic markets that had produced the Internet. Lessig and Wu, among the other early proponents of network neutrality regulation, have not provided empirical evidence to support claims that monopoly power exists in broadband markets, a key assumption on which their theories of harm hinge. Further, they failed to demonstrate how network neutrality regulation would remedy those theorized harms.

Scholars note that preemptive regulation is unjustified because there is no market failure in the provision of broadband access.³⁷ They have presented empirical evidence that the market for broadband access is competitive.³⁸ They reject the FCC's proposed regulation of wireless networks, as the wireless industry is both demonstrably competitive and subject to spectrum constraints.³⁹ Additionally, opponents of network neutrality regulation observe that antitrust law is sufficient to remedy any anticompetitive behavior that might arise.⁴⁰

C. The Progression of the FCC's Notice of Proposed Rulemaking

The progression of FCC policy that led up to the FCC's issuance of the Notice of Proposed Rulemaking, *In the Matter of Preserving the Open Internet and Broadband Industry Practices*,⁴¹ began, effectively, on September 23, 2005, when the FCC released a Policy Statement containing four principles (the Internet Policy Principles).⁴² In explaining its purpose in adopting the four principles, the FCC cited the national Internet policy that Congress established in its revision of the Communications Act of 1934:

Congress states that it is the policy of the United States to “preserve the vibrant and competitive free market that presently exists for the Internet” and “to promote the continued development of the Internet.” In section 706(a) of the [Communications Act], Congress charges the Commission with “encourage[ing] the deployment on a reasonable and timely basis of advanced telecommunications capability”—broadband—“to all Americans.”⁴³

37. Faulhaber and Farber observe that, “during ten years of experience without network neutrality regulations, there are just two incidents (the tiresomely familiar Madison River and Comcast cases) of any actual misbehavior by broadband ISPs.” Faulhaber & Farber, *supra* note 21, at 1.

38. Topper, *supra* note 36, at 5; *Schwartz Declaration*, *supra* note 33, at 31-34; Becker & Carlton, *supra* note 17, at 7.

39. Faulhaber & Farber, *supra* note 21, at 31; *see also* Jeffrey H. Reed & Nishith D. Tripathi, *The Application of Network Neutrality Regulations to Wireless Systems: A Mission Infeasible*, GN Dkt. No. 09-191, WC Dkt. No. 07-52, at 5 (filed with the FCC on behalf of AT&T, Jan. 14, 2010).

40. *See, e.g.*, Faulhaber & Farber, *supra* note 21, at 33; Katz, *supra* note 28, at 5.

41. *Net Neutrality NPRM*, *supra* note 1.

42. In the Matters of Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services, Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services; 1998 Biennial Regulatory Review—Review of Computer III and ONA Safeguards and Requirements, Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, Internet Over Cable Declaratory Ruling, Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities, Policy Statement, CC Dkt. No. 02-33, 01-337, 95-20, 98-10, GN Dkt. No. 00-185, CS Dkt. No. 02-52, 20 F.C.C.R. 14,986 ¶ 4 (2005) [hereinafter *Internet Policy Statement*].

43. *Id.* ¶ 2 (citing 47 U.S.C. § 230(a)(1); 47 U.S.C. § 230(a) (3); 47 U.S.C. § 157 nt. (incorporating section 706 of the Telecommunications Act of 1996, Pub. Law No. 104-104, 110 Stat. 56 (1996))).

To be “consistent with these Congressional directives,”⁴⁴ the FCC sought to establish policies that would “ensure that broadband networks are widely deployed, open, affordable, and accessible to all consumers.”⁴⁵ Thus the FCC adopted the Internet Policy Principles, which are as follows:

- *To encourage broadband deployment and preserve and promote the open and interconnected nature of the Internet*, consumers are entitled to the lawful Internet content of their choice.
- *To encourage broadband deployment and preserve and promote the open and interconnected nature of the Internet*, consumers are entitled to run applications and use services of their choice, subject to the needs of law enforcement.
- *To encourage broadband deployment and preserve and promote the open and interconnected nature of the Internet*, consumers are entitled to connect their choice of legal devices that do not harm the network.
- *To encourage broadband deployment and preserve and promote the open and interconnected nature of the Internet*, consumers are entitled to competition among network providers, application and service providers, and content providers.⁴⁶

Although not officially codified as regulations, the FCC’s Internet Policy Principles indicated the Commission’s growing concern with preserving the potential for innovation that the Internet had offered up to the release of the Internet Policy Principles and which some feared would decrease if network operators were permitted to prohibit end users from viewing certain content or using certain applications, services, or devices.

The FCC’s investigation into allegations against Madison River Communications, LLC in February 2005 likely influenced its decision to adopt the four Internet Policy Principles in September 2005.⁴⁷ Madison River was accused of blocking ports used for VoIP applications and therein impeding its customers’ ability to use VoIP applications.⁴⁸ Although the investigation was resolved in March 2005 after Madison River agreed to make a payment of \$15,000 to the U.S. Treasury, the case has been frequently cited among proponents of network neutrality regulation as an example of the type of anticompetitive network practices that could become prevalent if not limited by *ex ante* regulation.

Between the release of its policy statement in 2005 and the release of the NPRM in 2009, the FCC addressed only one other case of alleged blocking, when, in 2008, it investigated allegations that Comcast was interfering with consumers’ use of peer-to-peer Internet applications over its cable network.⁴⁹ Comcast claimed that its conduct was “necessary to ease network congestion,” but the FCC

44. *Id.*

45. *Id.* ¶ 4.

46. *Id.* (emphasis in original).

47. *In the Matter of Madison River Communications, LLC and Affiliated Companies*, Consent Decree, File No. EB-05-IH-0110, Acct. No. FRN: 0004334082, 20 FCC Rcd. 4,295, 4,296 ¶ 3.

48. *Id.*

49. *In the Matters of Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications and Broadband Industry Practices Petition of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC’s Internet Policy Statement and Does Not Meet an Exception for “Reasonable Network Management”*, Memorandum Opinion and Order, File No. EB-08-IH-1518, WC Dkt. No. 07-52, 23 F.C.C.R. 13,028 (Aug. 20, 2008).

disagreed.⁵⁰ The FCC concluded instead that “the company’s discriminatory and arbitrary practice unduly squelches the dynamic benefits of an open and accessible Internet and does not constitute reasonable network management.”⁵¹ In its memorandum and order released on August 20, 2008, the FCC required Comcast to disclose its practices to its customers, submit a “compliance plan” describing how it would stop those practices, and “disclose to both the Commission and the public the details of the network management practices that it intends to deploy following termination of its current practices.”⁵² Similarly to the *Madison River* case, the *Comcast* decision has been frequently cited by network neutrality advocates as evidence of the need for more stringent network neutrality regulation.⁵³

Slightly more than a year after it ruled against Comcast, the FCC released its NPRM. In the Notice, the FCC proposed to codify the four existing Internet Policy Principles as well as two new principles: a “nondiscrimination” rule and a transparency rule that “would require a broadband Internet access service provider to disclose such information concerning network management and other practices as is reasonably required for users and content, application, and service providers to enjoy the protections specified in this rulemaking.”⁵⁴ The Commission sought comment on the proposed codification of these six network neutrality principles as well as on the extent to which the principles should be applied to managed or specialized services.⁵⁵ The FCC also sought comment on whether and the extent to which the principles should be adopted for “non-wireline forms of Internet access, including, but not limited to, terrestrial mobile wireless, unlicensed wireless, licensed fixed wireless, and satellite.”⁵⁶

The first round of comments on the NPRM was completed as scheduled on January 14, 2010. The second round of reply comments was completed on April 26, 2010, following the decision by the U.S. Court of Appeals for the D.C. Circuit on April 6, 2010 in *Comcast Corp. v. FCC*.⁵⁷ In the decision, the D.C. Circuit granted Comcast’s request for review of the FCC’s 2008 order and, upon review, vacated it.⁵⁸ The D.C. Circuit ruled that the FCC has no direct authority over Comcast’s network practices and that it had failed to show that “barring Comcast from interfering with its customers’ use of peer-to-peer networking applications—is ‘reasonably ancillary to the . . . effective performance of its statutorily mandated responsibilities.’”⁵⁹ Thus, the D.C. Circuit rejected the claim of “ancillary authority” by which the FCC had asserted jurisdiction to regulate Comcast’s traffic management practices.

In response to the D.C. Circuit’s decision, the chairman and general counsel of the FCC proposed a new legal theory—a “third way”—to justify the Commission’s exercise of jurisdiction over broadband access providers’ network management

50. *Id.* ¶ 1.

51. *Id.*

52. *Id.*

53. *See, e.g., Google Comments, supra* note 7, at 39 (“The FCC already has encountered *Internet Policy Statement* violations in the Comcast-BitTorrent and the Madison River-Vonage cases.” (citations omitted)).

54. *NPRM* ¶ 16.

55. *Id.*

56. *Id.*

57. *Id.* ¶ 2.

58. *Comcast Corp. v. FCC*, No. 08-1291 (D.C. Cir. Apr. 6, 2010).

59. *Id.* at 3 (quoting *American Library Ass’n v. FCC*, 406 F.3d 689, 692 (D.C. Cir. 2005)).

practices.⁶⁰ The “third way” would reclassify “the transmission component of broadband access service” as a telecommunications service,⁶¹ which supposedly would give the FCC jurisdiction to regulate broadband ISPs’ network management practices under Title II of the Communications Act.⁶² As of May 11, 2010, the FCC has not yet announced whether it will invite a third round of comments in the existing docket to examine the “third way” proposal.

D. The FCC’s Proposed “Nondiscrimination” Rule

The FCC’s proposed “nondiscrimination” rule banning a charge on enhanced QoS is now the center of controversy in the network neutrality debate. The FCC has proposed⁶³ that: “Subject to reasonable network management, a provider of broadband Internet access service must treat lawful content, applications, and services in a nondiscriminatory manner.”⁶⁴ The FCC would define “nondiscriminatory” in this context to be synonymous with “no priority delivery fees.” The agency states: “We understand the term ‘nondiscriminatory’ to mean that a broadband Internet access service provider may not charge a content, application, or service provider for enhanced or prioritized access to the subscribers of the broadband Internet access service provider.”⁶⁵ Curiously, denying network operators and businesses supplying content and applications the ability to enter into voluntary transactions—unless the transaction occurs at a zero price—is the supposed means to achieve “nondiscrimination.”

In the FCC’s first round of comments filed in the rulemaking proceeding, supporters of network neutrality regulation attempted to provide economic support for the proposed “nondiscrimination” rule.⁶⁶ Three such papers are by Nicholas Economides,⁶⁷ Christiaan Hogendorn,⁶⁸ and Inimai Chettiar and J. Scott Holladay.⁶⁹ Their advocacy has coalesced around three basic theories. The first is the theory that, if permitted to charge suppliers of content or applications for prioritized delivery, network operators will ignore positive spillover effects produced

60. Press Release, FCC, FCC Releases Chairman Video Address, New Media Resources on Third Way Legal Approach (May 7, 2010), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-297976A1.pdf (last visited May 11, 2010).

61. Statement of Julius Genachowski, Chairman, FCC, *The Third Way: A Narrowly Tailored Broadband Framework*, at 5 (May 6, 2010), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-297944A1.pdf (last visited May 11, 2010).

62. *Id.*

63. *Internet Policy Statement*, *supra* note 42, at 986 ¶ 4 (2005). Seeking to “encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet,” the FCC declared that consumers possess entitlements “to access the lawful Internet content of their choice,” “to run applications and use services of their choice, subject to the needs of law enforcement,” “to connect their choice of legal devices that do not harm the network,” and to benefit from “competition among network providers, application and service providers, and content providers.” *Id.* But see *Comcast Corp.*, No. 08-1291 (depriving FCC of authority to enforce Internet policy statement).

64. *Network Neutrality NRPM*, *supra* note 1, at 41 ¶ 104.

65. *Id.* ¶ 105.

66. The “nondiscrimination” rule can best be regarded as a “no priority access fee” rule. Nevertheless, in what follows, we will use the FCC’s “nondiscrimination” language.

67. Nicholas Economides, *Why Imposing New Tolls on Third-Party Content and Applications Threatens Innovation and Will Not Improve Broadband Providers’ Investments*, GN Dkt. No. 09-191, WC Dkt. No. 07-52 (filed with the FCC on behalf of Google Jan. 14, 2010).

68. Christiaan Hogendorn, *Spillovers and Network Neutrality*, GN Dkt. No. 09-191, WC Dkt. No. 07-52 (filed with the FCC on behalf of Google Jan. 2010).

69. Inimai M. Chettiar & J. Scott Holladay, *Free to Invest, The Economic Benefits of Preserving Net Neutrality* (N.Y.U. Sch. of Law Institute for Policy Integrity, Report No. 4, Jan. 2010).

by Internet content and applications and will set prices for priority delivery above socially optimal levels, leading to the undersupply of content and applications. The second is the theory that vertically integrated network operators will foreclose or discriminate against independent providers of Internet content and applications, particularly those that compete with the network operator's own complementary service offerings. Economides also echoes a third theory that the broadband Internet access provider will intentionally degrade the quality of best-effort delivery of Internet packets—transforming, in Lessig's colorful imagery, the quality of best-effort delivery to that of a "dirt road"⁷⁰—as a means of coercing suppliers of content or applications into purchasing superior QoS.

Opponents of the proposed "nondiscrimination" rule posit that those three theories of harm lack proper grounding in economic principles and conflict with the real-world experience of competition and innovation over the Internet. Proponents of network neutrality regulation ignore that spillovers are common in competitive markets and that their mere presence does not establish the existence of market failure that warrants regulatory intervention. Although proponents of network neutrality regulation claim that innovation is threatened by transactions between ISPs and content providers for QoS enhancements, it is more plausible that the option of purchasing enhanced QoS will promote *greater* innovation among content and applications producers, who will benefit from the assurance that a customer will enjoy a more consistent and better experience when accessing their products.⁷¹ Moreover, if the concern underlying the proposed ban on optional business-to-business QoS transactions is insufficient funding for Internet content and applications, there are existing, effective market mechanisms to fund Internet content innovation, which obviate government intervention.

Proponents of the foreclosure theory ignore the reality that many network operators are vertically integrated only in very limited respects into content or applications production or their substitutes, and thus lack even theoretical incentives to foreclose customer-valued content or applications from their networks outside those limited areas.

In response to the "dirt road" theory, opponents of network neutrality regulation have indicated that it is not credible that a network operator would intentionally degrade its best-effort delivery of packets in hopes of inducing suppliers of content and applications to buy prioritized delivery of packets. The empirical evidence confirms that broadband ISPs have, in fact, been investing billions of dollars annually to *increase* the speed and *improve* the quality of best-effort Internet service, even while many broadband ISPs also provide prioritized delivery of video and voice packets over the same physical infrastructure. The FCC has recently recognized in its *National Broadband Plan* that the substantial investment undertaken by network operators has led to 20 percent annual increases in download speeds for the last ten years.⁷² That outcome is exactly what economics would predict under real-world conditions of platform competition and complementarity between content availability and performance and demand for broadband Internet access services. Put differently, there is neither empirical evidence nor support in economic theory that incentives for network operators to degrade best-effort traffic exist or are sufficiently strong as to outweigh countervailing incentives.

70. See Lessig & McChesney, *supra* note 3, at A23.

71. See, e.g., Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 101 COLUM. L. REV. 257, 258 (2007).

72. See FCC, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN 38 (2010).

Opponents of network neutrality regulation note that the FCC’s proposed “nondiscrimination” rule, in particular, relies on an assumption that traffic is not treated differently in the Internet.⁷³ Different applications have different QoS requirements, and, in the interest of optimizing traffic, network operators treat—and have always treated—different types of traffic differently.⁷⁴ These scholars emphasize that network operators must continue to have the flexibility to manage traffic on their networks efficiently to ensure a high quality experience for end users.⁷⁵ As Becker and Carlton observe, there is no reason to assume that the FCC is better equipped than network operators to determine the optimal business practices in response to the demands of rapidly changing technologies and consumer tastes.⁷⁶ Opponents of network neutrality regulation also express concern that the FCC misunderstands the likely effects of its proposals on consumer welfare. My view is that the proposed “nondiscrimination” regulation is likely to make *both* broadband ISPs and content and application providers—as well as consumers—worse off.

Even scholars who have reserved judgment on the possibility that some targeted Internet regulation might be appropriate under some conditions, including the FCC’s chief technology officer, have cautioned against sweeping limits on optional QoS transactions.⁷⁷ Indeed, even vocal *proponents* of network neutrality regulation have acknowledged that the optional QoS arrangements that the FCC proposes to ban may hold great promise for both content providers and consumers.⁷⁸ For example, in a 2008 hearing before the FCC on network neutrality, Lessig testified against a broad ban on QoS tiering, on the grounds that zero-price regulation “blocks productive discrimination—discriminations that actually help facilitate the spread of broadband and growth without risking a threat to network neutrality.”⁷⁹

From an economic perspective, the FCC’s proposed definition of “nondiscriminatory” would permit a situation where Company X is supplied one level of QoS at a zero price and Company Y is supplied a superior level of QoS at the same price—zero. To an economist, it would be discriminatory to charge the same price for two products having different levels of performance. Yet, the FCC’s zero-price rule for ISP-content provider transactions appears to mandate this result. Under the FCC’s zero-price rule vis-à-vis content providers, broadband ISPs would be left to recover costs associated with whatever QoS enhancements they would

73. See, e.g., Katz, *supra* note 28, at 2.

74. *Id.* at 8; Faulhaber & Farber, *supra* note 21, at 17 (citing Roger Bohn, Hans-Werner Braun, Kimberly C. Claffy & Stephen Wolff, *Mitigating the Coming Internet Crunch: Multiple Service Levels via Precedence*, 3 J. HIGH SPEED NETWORKS 2 (1994)); SPULBER & YOO, *supra* note 35, at 405-32.

75. Becker & Carlton, *supra* note 17, at 5-6.

76. *Id.* at 22.

77. See, e.g., Jon M. Peha, *The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy*, 1 INT’L J. COMM. 644 (2007); Howard A. Shelanski, *Network Neutrality: Regulating with More Questions than Answers*, 6 J. TELECOMM. & HIGH TECH. L. 23 (2007); Joseph Farrell & Phil Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J.L. & TECH. 85 (2003).

78. See, e.g., Robin S. Lee & Tim Wu, *Subsidizing Creativity Through Network Design: Zero Pricing and Net Neutrality*, 23 J. ECON. PERSPECTIVES 61, 73-74 (2009) (“network management and quality of service inherently requires some form of packet discrimination or content co-location, and are practices with which we do not necessarily take issue”); Second En Banc Hearing on Broadband Network Management Practices before the FCC, Dkt. 07-52 (Apr. 17, 2008) (testimony of Lawrence Lessig), available at Testifying @ FCC @ Stanford, Lessig Blog (posted Apr. 18, 2008), http://lessig.org/blog/2008/04/testifying_fcc_stanford.html [hereinafter *Lessig 2008 FCC Testimony*]

79. *Lessig 2008 FCC Testimony*, *supra* note 78, at 2.

make solely from end-user consumers, assuming that a consumer-focused mechanism for distinguishing between QoS-sensitive and QoS-insensitive traffic could even be developed. The reality, of course, is that the proposed zero-price rule would likely discourage ISP participation in the optional business-to-business market for QoS.

The nondiscrimination rule is especially puzzling because numerous entities already provide Internet-based QoS enhancements for a fee to content providers. They include Akamai Technologies, BitGravity, Level 3 Communications, Limelight Networks, and other third-party content delivery networks (CDNs). CDNs store content and applications in multiple, dispersed servers located relatively close to end users, which reduces the latency that end users might otherwise experience if the content and applications were stored in a single, centrally located server. Thus, although traffic is often handled on a nonprioritized best-effort basis between a CDN and an end user, the use of a CDN can significantly enhance the service quality experienced by the end user. Moreover, a number of large content providers such as Google self-provide QoS-enhancing facilities (for example, by locating data centers at various locations around the world to reduce the distance that data must travel from its facilities to end-users). Firms apparently retain the freedom to negotiate and set the terms of such offerings and arrangements.

E. Politicizing the Debate

Core to the debate over network neutrality regulation are differing beliefs relating to Internet architecture. The conceptual basis for network neutrality derives substantially from the “end-to-end” design principles introduced in the 1980s, when the Internet was converted from a closed network used solely by academics engaged in defense research to one available to the public.⁸⁰ End-to-end system design, whereby “intelligence” is concentrated at the endpoints of the network rather than at its core, was originally adopted for flexibility, in the belief that such a design would best foster innovation *at that time*. Since then, although some members of the network engineering community have remained dogmatic supporters of end-to-end design, many others have reversed their opinions.

Acknowledging the profound transformation that the Internet has undergone in the years since its inception, many former proponents favor a more intelligent network core, capable of organizing and prioritizing data packets for optimal efficiency. Early Internet applications and content were primitive, compared with those that exist today. End-to-end architecture enabled easy experimentation, which fostered innovation. However, technological advancement in content and applications, contemporaneous with significant hardware innovation, has reduced the costs of and increased the demand for Internet access. The result has been a large increase in traffic and a greater demand for bandwidth. Recognizing the limited capacity of an end-to-end system to handle large and diverse amounts of traffic, the network engineering community now regards end-to-end design as impractical and inefficient.

80. Barry M. Leiner, Vinton G. Cerf, David D. Clark, Robert E. Kahn, Leonard Kleinrock, Daniel C. Lynch, Jon Postel, Larry G. Roberts & Stephen Wolff, *A Brief History of the Internet*, Internet Society (Dec. 10, 2003), available at <http://www.isoc.org/internet/history/brief.shtml> (last visited Oct. 26, 2009).

In contrast, popular arguments for network neutrality regulation continue to espouse end-to-end design principles, a problem exacerbated by the fact that the current debate is dominated by political interest groups that often lack sufficient understanding of network architecture. Politicians and celebrity advocates have largely ignored the problems of bandwidth overload; they frame network neutrality as a right analogous to freedom of expression, neglecting considerations of network constraints in their arguments for neutrality regulation—turning network neutrality into an ideology.⁸¹ The use of politically charged language in support of network neutrality obscures the immediate issue of organizing traffic to maximize consumer welfare. Such language may be rhetorically powerful and therefore politically effective, but it does nothing to elucidate how the Internet should be regulated—if at all—to foster innovation and maximize consumer welfare.

Most proponents of network neutrality regulation do not recognize that the dynamic nature of Internet innovation requires the simultaneous evolution of *both* content and network infrastructure. In defending network neutrality regulation as essential to the preservation of positive incentives among applications and content developers, advocates of network neutrality regulation have ignored the equal necessity of maintaining incentives to innovate among network operators. Advocates of network neutrality regulation frequently claim that, if regulation were not imposed, ISPs would suppress edge innovation by blocking content and applications.⁸² The extensive innovation that content and applications providers have achieved in the absence of network neutrality regulation is evidence that this argument is false.

Supporters of network neutrality regulation have also manifested hostility to core innovation, promoting the belief that ISPs will curtail freedom of speech if permitted to manage network content.⁸³ Although one incident has occurred since 2007 that could have been construed as network-imposed censorship,⁸⁴ it was singular. In the absence of network neutrality regulation, competitive network providers have not restricted content. The assertion that they would do so in the future, risking a decline in their customer base, is not persuasive.

Despite the frequent invocation of First Amendment rights, the practical stakes of network neutrality have little to do with freedom of expression. As the Internet has evolved, it has accommodated applications and content for which the original architecture was not equipped. Active management, as well as investment at the core of the network, has always been necessary for the Internet to handle new

81. Evidence of this fact is obvious on sites like wearetheweb.org, savetheInternet.com, and freepress.net, which frame the debate over net neutrality as a fight for “freedom” against “discrimination.” [SaveTheInternet.com](http://www.savetheInternet.com), FreePress Presents: Save the Internet, Frequently Asked Questions, <http://www.savetheInternet.com/faq> (last visited Oct. 9, 2009).

82. *See, e.g.*, FreePress Presents: Save the Internet, Frequently Asked Questions, <http://www.savetheInternet.com/faq> (last visited Oct. 9, 2009) (“The big phone and cable companies that control access to the Internet for most Americans want to get rid of Net Neutrality, the rule that prevents them from discriminating against online content. They want to become the Internet’s gatekeepers, deciding which sites go fast or slow and which won’t load at all—based on who pays them the most....If they get their way, the Internet as we know it—as a democratic platform for free speech and innovation—will disappear.”).

83. *See, e.g.*, FreePress.net, Save the Internet, <http://www.freepress.net/savetheInternet> (last visited Oct. 9, 2009) (“The stakes could not be higher. This is a political fight with consequences for everyone who uses the Internet for information, free expression, politics or business—or just to connect with others. Its outcome will decide not just who gets to have a voice in America’s democracy, but what that democracy looks like.”).

84. Marguerite Reardon, *AT&T Calls Censorship of Pearl Jam Lyrics a Mistake*, CNET NEWS, Aug. 9, 2007, http://news.cnet.com/8301-10784_3-9757841-7.html (last visited Oct. 16, 2009).

generations of content. The prioritization of certain data packets over others serves to increase network efficiency, resulting in better performance for all applications and enhanced consumer welfare. Too great a reliance on endpoint innovation to solve the problems created by increasing and more diverse network traffic would result in greater costs, reduced efficiency, and lower consumer welfare.

III. THE ECONOMICS OF NETWORK NEUTRALITY

The nature of broadband networks has significant implications for how network neutrality regulation would affect innovation and consumer welfare. The broadband market is largely driven by innovation in a dynamically competitive setting. The two-sided demand for broadband delivery implies that services such as prioritized delivery—which would be prohibited under a network neutrality regime—provide Pareto improvements to consumer welfare. Together, demand for broadband, product differentiation, and technological progress foster competition among providers. A virtuous cycle continues as competition spurs further innovation. As the U.S. broadband market has demonstrated, consumers ultimately reap the benefits of lower prices and a widening variety of services. Network neutrality regulation would diminish the extent to which these benefits may be enjoyed.

A. Cost Characteristics of Broadband Networks

Broadband networks require significant sunk investments. Private investors will continue to fund these investments only if they can expect to earn a reasonable return. Regulation can create uncertainty, raising the level of risk, and consequently increasing the return that investors will demand before choosing to invest. This increase in the cost of capital in turn reduces the magnitude of broadband investments. Additionally, because the incremental cost of adding a new subscriber to an existing network is low, marginal cost pricing is insufficient to recover a firm's sunk costs. To recover its sunk investment with a usage-based fee, the firm, or its regulator, must set prices above the marginal cost, seeking as its goal the "optimal departures from marginal cost pricing" associated with Ramsey pricing and other inverse-elasticity pricing rules. Broadband network providers also exploit economies of scope to recoup the sunk costs of building broadband infrastructure.

A significant source of value, which is often ignored by regulators, are the positive network effects that accumulate to a broadband network as it grows in size and diversity. In particular, the value of the network to each user increases with the size of the network. The benefit an individual consumer receives from using email increases with the number of other individuals whom he can contact, for example. Such effects accrue based on the amount of use, as well as the number of users. Regulators should therefore encourage policies that, all else being equal, increase the size of the network.

In addition to these positive network effects, which are also common to telecommunications networks, broadband networks are subject to unique *negative* network effects. Network capacity is limited, and new applications, such as peer-to-peer software and video streaming, increase demand for bandwidth. If users each pay the same (low) price for all levels of consumption, the demand for

broadband may exceed the network's capacity, leading to congestion and slower transmission speeds. Proper price signals are needed so that those who consume the network's capacity also bear the costs of generating it.

B. Two-Sided Demand for Broadband Delivery of Information

The market for broadband service is multi-sided. Both content providers and end users benefit from, and thus have complementary demand for, use of the network. When a consumer uses broadband access to search on Google, the search is valued by both the user, who gains information, and by Google, which earns advertising revenues. Both sides of the market exhibit positive demand for broadband use, and both sides should therefore pay a positive price. The same principle applies to specific network features, such as priority delivery. If the quality of an application such as video conferencing would improve from priority delivery, both the user (who enjoys a superior broadband experience) and the application provider (who, as a result of the improved consumer experience, benefits from increased demand for its product) are willing to pay for this service. If, as a consequence of network neutrality regulation, only end-users are permitted to pay for priority delivery, then end-users will purchase only a limited quantity of prioritized packets. If the content provider is allowed to pay, then a higher quantity of prioritized packets will be purchased, which results in a larger consumer benefit. Additionally, allowing content providers to pay for service will help contribute to covering the sunk costs borne by service providers, thus increasing incentives to innovate and invest.

Moreover, content providers are in a better position to pay for priority delivery than end-users. First, network operators can achieve lower transactions costs by contracting with content providers, rather than end-users, because there are significantly fewer content providers than end-users, and therefore fewer negotiations required. Second, end-users have high uncertainty regarding which applications they will use and which applications will require priority delivery. In contrast, network operators have a better understanding of whether the applications they offer require real-time delivery. Third, Ramsey pricing indicates that the price (more precisely, the markup above marginal cost) for products sharing common cost should be based on the inverse elasticity of demand. If content providers are less price-sensitive than end users, it is optimal to charge content providers a higher share of the common cost for priority delivery. There is no economic reason why end users should cover all the costs of the network when both parties benefit from its use. By charging content providers for prioritized delivery, a broadband service provider could recover sunk costs, reduce prices to consumers, and subsidize access to more price-sensitive customers, thereby increasing overall broadband penetration.

Though proponents of network neutrality regulation often argue that broadband providers would limit or block access to innovative applications and content,⁸⁵ this concern is unfounded. Broadband access and broadband content are complementary products. The demand for broadband and wireless access necessarily depends on demand for their uses. For example, email initially created demand for dial-up Internet access. Graphic-intensive applications, such as

85. See, e.g., Tim Wu, *Network Neutrality, Broadband Discrimination*, *supra* note 4, at 142; van Schewick, *supra* note 9, at 329; *Lessig Testimony on Net Neutrality*, *supra* note 3, at 7.

streaming video and gaming, generated the need for broadband. Consumers value choice, and, if a provider were to block competing content on its network, it would risk losing customers to providers that offered greater choice. Even in the unlikely circumstance that an integrated provider possessed market power such that it could block content without reducing its customer base, contract law and competition law may provide adequate *ex post* remedies for unlawful exercises of market power. It would be unwise to stifle the development of innovative content and applications *ex ante*, based solely on unwarranted concerns about blocking. The plain fact is that stifling demand for content would harm broadband providers just as greatly as it would content providers.

In fact, it is more likely that broadband providers stimulate demand for applications and content. One example can be found in the wireless industry, where providers attract customers to their network by promoting the latest technology in wireless devices and the applications that run on them. Another example—voice over Internet protocol (VoIP) service—shows that application providers also have a strong incentive to create applications that provide substitutes for many of the existing services offered by network providers. Although these substitutes are not the original breakthrough applications, follow-on providers can capture revenue from network providers by finding lower cost methods to deliver similar services. Network providers in turn may determine that various considerations—for example, the threat to their revenues, network security concerns, and bandwidth constraints—justify an effort to suppress substitute services. However, network providers have largely concluded that the financial benefits of providing robust and open broadband services to customers have outweighed any incentive to block substitute services. Moreover, network operators have offered bundles of services at lower prices to retain existing revenue streams and to capture new, marginal customers.

C. The Benefits of Product Differentiation

Optional business-to-business transactions for QoS are fundamentally a form of product differentiation. Such transactions increase economic welfare because they increase choice. Moreover, such optional transactions for QoS will foster product differentiation on both the production and consumption sides of the market for content and applications, thereby increasing welfare both for consumers and for producers of content and applications.

Consider first the producer side of the market. Enabling a supplier of content or applications to choose from a range of QoS tiers, based on the specific requirements of its product, enhances producer welfare. Increased producer welfare translates into increased investment and innovation in the production of content and in the development of applications. Enhanced innovation and investment result in increased diversity and quality of content and applications, enabling consumers to enjoy the benefits of product differentiation—which enhances consumer welfare. For those producers whose content depends on the quality of delivery—such as producers of real-time video applications—QoS transactions help to ensure high product quality and continuing viability in the market. In contrast, a content provider whose product exhibits high tolerance for latency and jitter may choose to continue to rely upon cheaper best-effort delivery.

Quality-of-service offerings also result in product differentiation for consumers—who should be the primary focus of this regulatory debate. Allowing

content and applications providers to contract for priority delivery ensures continued innovation in real-time and other QoS-dependent applications. Moreover, 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 will be unequivocally better off as a result of greater choices in real-time applications on the Internet.⁸⁶

Even proponents of regulation concede that QoS tiers are beneficial forms of product differentiation. Chettiar and Holladay, for example, acknowledge that product differentiation is beneficial “because it allows buyers to choose among different options and it increases the chance of consumers finding a good that more accurately meets their needs.”⁸⁷ Nonetheless, Chettiar and Holladay oppose optional business-to-business QoS transactions, evidently in the belief that *some* network operators *might* behave anticompetitively—perhaps, for example, by promising to deliver a certain level of service but then actually delivering a lower quality. However, these speculative fears cannot justify the overbroad prohibition embodied in the FCC’s proposed “nondiscrimination” rule.

D. Incentives for Innovation Within the Network and at Its Edges

Notwithstanding claims to the contrary by proponents of network neutrality regulation,⁸⁸ the broadband industry is a dynamic and competitive market, where consumers can choose among access substitutes. Consumers perceive cable modem service to be a close substitute to digital subscriber line (DSL) Internet access,⁸⁹ and both infrastructures are available on a near-ubiquitous basis in the United States. Other than in some rural areas, there are generally at least two forms of high-speed Internet available to a household or business, while other forms of high-speed Internet service exist as well.⁹⁰ A third substitute is wireless access: wireless local area networks (WLAN) provide users with high-speed Internet connections at “hot spots,” such as Starbucks coffee shops, restaurants, hotels, universities, airports, and parks.⁹¹ In light of these competitive alternatives, there is no market failure that could justify regulation.

Regulation that impedes the competitive process will in turn retard the development of new technology, applications, and content. Technical progress within the network supports innovation at the network’s edges, and vice versa. The positive network externalities associated with the Internet ensure that the benefits

86. Sidak, *A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet*, *supra* note 12, at 442.

87. Chettiar & Holladay, *supra* note 69, at 40.

88. See, e.g., *Lessig Testimony on Net Neutrality*, *supra* note 3, at 5 (asserting that there is “increasing concentration in broadband provision,” such that “an effective duopoly controls access to high speed Internet”).

89. See, e.g., *Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities*, Report and Order, 20 F.C.C.R. 14,855, ¶ 56 (2005); Robert W. Crandall, J. Gregory Sidak & Hal J. Singer, *The Empirical Case Against Asymmetric Regulation of Broadband Internet Access*, 17 BERKELEY TECH. L.J. 973 (2002).

90. See Federal Communications Commission, *High-Speed Services for Internet Access: Status as of June 30, 2008*, at tbl. 1 (2008), available at http://www.fcc.gov/Daily_Releases/Daily_Business/2009/db0723/DOC-292191A1.pdf (last visited Oct. 15, 2009).

91. 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).

of innovation at any point in the network redound to users at all levels—network operators, application providers, and customers alike. The converse of this virtuous cycle is also true—deterring innovation within the network through regulation will harm innovation at the edges, a fact that is largely ignored by the proponents of network neutrality regulation. Moreover, considering that customer satisfaction is likely to be enhanced through managed network services, the imposition of regulatory constraints would lower customer satisfaction and hamper the growth of consumer demand, which stimulates competition and innovation.

Deregulation of broadband Internet access in the United States has led to substantial investment, higher broadband speeds, greater broadband deployment, lower pricing, and increased broadband usage by customers. Kagan Research estimated that the cable industry alone invested (U.S.) \$14.6 billion in construction and upgrading expenditures in 2008.⁹² Broadband service is increasingly supplied by mobile wireless service providers.⁹³ Mobile carriers have continued to grow rapidly and have expanded their wireless data offerings to include television-like services on wireless telephones.⁹⁴

Network operators have invested tens of billions of dollars in upgrades in fat and fast pipes, fiber, DOCSIS, and other recent network innovations that network operators have undertaken to improve QoS on their networks.⁹⁵ The hundreds of billions of dollars invested in the past decade to improve Internet connection speeds⁹⁶—which both opponents and advocates of network neutrality regulation recognize⁹⁷—are powerful empirical evidence that there is no real threat of broadband operators purposely degrading the quality of their best-effort services.

Advertising among network operators affirms that they compete largely on Internet delivery speeds and other service quality characteristics. Indeed, broadband providers' advertising is heavily focused on the benefits they claim to offer in terms of speed and reliability. Network operators also frequently use comparative advertising to highlight the superiority of their service offerings over those of their competitors.⁹⁸ For example, beginning in 2006, Comcast launched an advertising campaign in which two turtles are devoted to DSL, because they feel

92. See National Cable & Telecommunications Association (NCTA), Cable Industry Capital Expenditures 1996-2008, available at <http://www.ncta.com/Stats/InfrastructureExpense.aspx> (last visited Oct. 15, 2009).

93. See, e.g., Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Tenth Report, 20 F.C.C.R. ¶ 142 (2005).

94. See, e.g., Brooks Barnes, *Studios' Quest for Life After DVDs*, N.Y. TIMES, Oct. 25, 2009; Walter S. Mossberg, *Watching TV on Your Cellphone*, WALL ST. J., Sept. 1, 2004, at D7.

95. See, e.g., Press Release, AT&T, AT&T to Invest More Than \$17 Billion in 2009 to Drive Economic Growth (Mar. 10, 2009), available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26597&mapcode=> (last visited May 11, 2010); Press Release, Verizon, Verizon's \$17 Billion Network Investment in 2009 Pays Off (Dec. 29, 2009), available at <http://newscenter.verizon.com/press-releases/verizon/2009/verizons-17-billion-network.html> (last visited May 11, 2010). In addition, AT&T's triple-play platform is all-IP and already involves prioritization of voice and video packets.

96. See, e.g., FCC Fifth Report, Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, 23 F.C.C.R. 9,651 ¶ 74 (2008) (telecommunications industry planned to spend \$50 billion in capital expenditures in 2008 and 2009); NCTA, Industry Data, <http://www.ncta.com/Statistics.aspx> (citing that more than 120 million homes have access to cable broadband service and industry capital investments of \$161.2 billion since 1996).

97. See, e.g., *Google Comments*, *supra* note 7, at n.120 (citing that AT&T has invested \$38 billion over the past two years and plans on investing \$17 to \$18 billion in 2009 to enhance its wireline and wireless networks, with approximately two-thirds of the additional investment allocated to supporting broadband).

98. See, e.g., *Schwartz Declaration*, *supra* note 33, at 32.

that “cable-modem service is just too fast.”⁹⁹ More recently, Verizon and Comcast have engaged in an advertising battle that, on Verizon’s side, pits a smart, likeable FiOS installer against a dull and lazy cable installer.¹⁰⁰ Comcast’s response was a campaign headed by the slogan, “Don’t fall for FiOS.”¹⁰¹

Those advertising campaigns highlight the significant improvements that network operators have made and continue to make to their broadband service offerings. According to a survey released in February 2010, average broadband download speeds rose 28 percent in the United States in 2009 compared with 2008, with cable offering slightly less than 10 Mbps on average.¹⁰² As of February 2010, Verizon offered connection speeds via FiOS of 15, 25, and 50 Mbps,¹⁰³ and AT&T offered connection speeds at 24Mbps. Cable companies too have invested in higher speeds. Even cable companies with core video businesses—those with the most incentive to relegate content to a hypothetical “dirt road”—have invested in improved best-effort delivery. Comcast has released its XFINITY offerings with Internet speeds of 50 to 100 Mbps.¹⁰⁴

The deregulation of broadband Internet access has also coincided with substantial innovation at the edges of the network. Facebook (launched in 2004), YouTube (launched in 2005), and Twitter (launched in 2006) are important examples of the significant investment in broadband-dependent applications over the last five years. Since Facebook became available to the general public in December 2008, over 15,000 websites, devices, and applications have implemented Facebook Connect.¹⁰⁵ In 2006, Facebook launched its development platform, leading to the development of more than 350,000 applications currently active on Facebook Platform.¹⁰⁶ In May 2009, Facebook reached a \$10 billion valuation with Digital Sky Technologies’ \$200 million investment in its preferred stock.¹⁰⁷ In September 2009, Twitter reached a value of \$1 billion.¹⁰⁸ From its 2005 launch, YouTube surpassed 100 million U.S. viewers in March 2009.¹⁰⁹ Despite the absence of codified network neutrality regulations, innovation at the edges of the network has continued to thrive from 2004 to the present.

On wireless communications platforms, the number of applications available to wireless service customers—offered by handset manufacturers, wireless service providers, and third-party operators—has increased dramatically over the last

99. See Linda Haugsted, *Turtles that Win the Race: Comcast’s ‘Slowskys’ Back Cable Modems Via TV Spots*, MULTICHANNEL NEWS, June 22, 2006, available at <http://www.multichannel.com/article/CA6336326.html>.

100. *Schwartz Declaration*, supra note 33, at 32.

101. *Id.* (citing Johnny Diaz, *Comcast, Verizon Duke It Out; Ad Blitz Gets Personal as Firms Spar for Cable Customers*, BOSTON GLOBE, Sept. 1, 2009).

102. Lance Whitney, *U.S. Broadband Speeds Rise in 2009*, CNET NEWS, Feb. 10, 2010, http://news.cnet.com/8301-1023_3-10450784-93.html?tag=mncol (last visited May 11, 2010).

103. Verizon, FiOS Internet Plans, <http://www22.verizon.com/Residential/FiOSInternet/Plans/Plans.htm> (last visited Feb. 18, 2010).

104. See Chloe Albanesius, *Comcast Rolling Out ‘Xfinity’ Brand to 11 Markets*, PCMAG.COM, Feb. 4, 2010, <http://www.pcmag.com/article2/0,2817,2358807,00.asp> (last visited May 11, 2010).

105. Facebook, Statistics, <http://www.facebook.com/press/info.php?statistics> (last visited Oct. 23, 2009).

106. *Id.*

107. Facebook, Company Timeline, <http://www.facebook.com/press/info.php?timeline> (last visited Oct. 23, 2009).

108. Michael Arrington, *Twitter Closing New Venture Round At \$1 Billion Valuation* (Sept. 16, 2009), <http://www.techcrunch.com/2009/09/16/twitter-closing-new-venture-round-with-1-billion-valuation/>.

109. YouTube Statistics, *YouTube Reaches 100 Million U.S. Viewers* (Mar. 5, 2009), <http://youtubereport2009.com/category/youtube-statistics/> (last visited Oct. 27, 2009).

decade, notwithstanding the absence of legally binding and enforceable network neutrality rules. For example, Apple launched its application store in July 2008 with 500 third-party applications available for download. By the end of May 2009, the Apple store offered more than 45,000 applications. As of March 2010, the app store included more than 150,000 applications.¹¹⁰ The Apple Store provides a model for market-based competition and innovation. Apple and AT&T provide developers with software development kits. AT&T also offers its AT&T Universal Design guidelines. Other resources that network operators have made available to developers include testing tools, white papers, reference information, best practices, technical information, and distribution tools.¹¹¹ Considering the evidence of thriving innovation under the relatively unregulated state of affairs in broadband and wireless services, the assertion that network neutrality regulation is necessary to “preserve innovation at the edges of the network” does not withstand scrutiny.

E. The Consumer-Welfare Effects of Network Neutrality Regulation

Network neutrality regulation would harm consumers. In the absence of regulation, revenue from prioritized delivery could be used to subsidize broadband in households that would not otherwise purchase access. It is straightforward to estimate the savings to current broadband subscribers by multiplying the number of broadband households and the monthly savings in end-user broadband prices from the subsidy.¹¹² In addition, marginal broadband households—that is, the last consumers to subscribe to broadband service at the current prices—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.¹¹³ By preventing network operators from subsidizing broadband access with revenues from content providers, network neutrality proponents would harm existing broadband subscribers by preventing a reduction in monthly prices, as well as marginal broadband subscribers, who forgo the service altogether in absence of subsidies.¹¹⁴

A ban on vertical integration between network operators and content providers would also harm consumer welfare. Vertical integration reduces costs, the savings of which integrated firms pass along to the consumer. Moreover, because vertical integration intensifies competition among content providers, consumers also benefit from having a wider range of applications and content options.

Because network capacity—particularly in wireless networks—is a scarce resource, active network management is necessary to preserve high quality of service. Bandwidth-intensive users downloading videos may reduce the quality of service for other users who are making voice calls.¹¹⁵ Managing the use of certain

110. See Press Release, Apple Inc., iPad Available in U.S. on April 3 (Mar. 5, 2010), <http://www.apple.com/pr/library/2010/03/05ipad.html> (last visited Mar. 22, 2010).

111. iPhone Dev Center, <http://developer.apple.com/iphone/>.

112. See, e.g., Larry Darby, *Consumer Welfare, Capital Formation and Net Neutrality: Paying for Next Generation Broadband Networks*, 2006 AM. CONSUMER INST. 12.

113. This benefit corresponds to the “deadweight triangle” below the demand curve bounded by the old and the new monthly prices. See, e.g., MICHAEL L. KATZ & HARVEY S. ROSEN, *MICROECONOMICS* 114 (McGraw-Hill/Irwin, 3rd ed. 1998).

114. See PEW INTERNET AND AMERICAN LIFE PROJECT, *Online News and User Generated Content* (Dec. 2005), available at <http://www.pewinternet.org/Shared-Content/Data-Sets/2005/December-2005-Online-News-and-Usergenerated-Content.aspx> (last visited Oct. 15, 2009).

115. Gregory Rosston & Michael Topper, *An Antitrust Analysis of the Case for Wireless Net Neutrality*, SIEPR Discussion Paper No. 08-840 14, 11 (Aug. 2009), available at

bandwidth-heavy applications (streaming video or audio, webcam posts, automated data feeds, or VoIP) can help preserve a high quality of service on primary services—particularly, wireless voice calls.¹¹⁶ Management of network resources allows a greater number of consumers to be able to access scarce broadband resources while being assured of receiving an acceptable quality of service. Further, there is evidence that a significant number of consumers prefer a user experience that is more actively managed, for reasons such as ease of use and quality of service. A notable example of this trend is the iPhone; another is Amazon's Kindle, for which customers purchase the device and downloads, but do not pay for wireless network usage (provided by Sprint). In return, customers must agree not to use the Kindle for anything other than its intended purpose.¹¹⁷ A 2006 customer satisfaction survey by J.D. Powers¹¹⁸ ironically ranked many of the carriers who engaged in practices challenged by network neutrality advocates¹¹⁹ as providing the highest call quality, which could be attributed to more vigorous policing of network activity.

IV. CONCLUSION

The FCC's proposed rulemaking to codify six principles of network neutrality could have profound economic consequences for consumers, content and applications providers, and network operators. Network management services are increasingly in demand as bandwidth-intensive applications and content are produced and as more data are transported over lower-capacity wireless platforms. Network neutrality regulation would prohibit optional business-to-business transactions for prioritized delivery services between network operators and content and applications providers. This restriction would discourage innovation and product differentiation in content and applications, and it would impose further costs on end users by precluding subsidization of broadband access through ancillary revenue streams, such as advertising.

Proponents of network neutrality regulation have ignored the adverse incentives that network neutrality regulation would impose on network operators and content and applications providers. They have arbitrarily designated the value of innovation in content and applications as greater than the value of innovation at the core of the network, not recognizing that innovation must occur in both sectors to maximize consumer welfare. Proponents of network neutrality regulation have also failed to account for the adverse effects that a reduction in core investment would have on innovation in content and applications. Most popular arguments supporting network neutrality regulation as necessary for the protection of

<http://www.stanford.edu/group/siepr/cgi-bin/siepr/?q=system/files/shared/pubs/papers/pdf/08-040.pdf> (last visited Oct. 26, 2009).

116. *Id.* at 13.

117. Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless Including Commercial Mobile Services, WT Doc. No. 09-66, at 36-37 (Sept. 30, 2009).

118. J.D. Power and Associates Reports: The Number of Call Quality Problems Experienced with a Wireless Service Has Declined for a Second Consecutive Year, Mar. 16, 2006, *available at* <http://www.jdpower.com/corporate/news/releases/pressrelease.aspx?ID=2006037> (last visited Oct. 15, 2009).

119. See Tim Wu, *Wireless Net Neutrality: Cellular Carterfone and Consumer Choice in Mobile Broadband*, New America Foundation Wireless Future Program Working Paper No. 17 (Feb. 2007), *available at* http://www.newamerica.net/files/WorkingPaper17_WirelessNetNeutrality_Wu.pdf (last visited Oct. 15, 2009).

consumer freedom are political in nature and lack proper grounding in economic principles and the technical facts of network optimization.

A regime of network neutrality regulation would harm innovation at both the core and the edges of the network. Consumer welfare would suffer in the short term as a result of increased delays and higher end-user costs. In the longer term, network neutrality regulation would reduce incentives among service providers to invest in network infrastructure, thereby reducing consumer welfare.