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THE FABLE OF THE PACKETS: A NEW INSTITUTIONAL/ MARKET PROCESS APPROACH TO NETWORK NEUTRALITY

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Abstract
On February 26, 2015, the Federal Communications Commission (FCC) voted to adopt the 2015 Open Internet Order enforcing "network neutrality," the principle that all data packets traveling across a network must be treated equally by broadband providers in the United States. This paper uses market process theory and new institutional economics to examine the justifications for and effects of the FCC's network neutrality regulations. The analysis shows that the regulations will, in fact, negatively affect entrepreneurship in broadband and content provision in the United States and ultimately harm consumer welfare. I discuss the history of the network neutrality debate and basic technical realities of network management, and review theories of the market process and entrepreneurship and how they apply to the US broadband industry. The main drivers of the network neutrality debate are the various frictions and disputes between broadband providers and internet content providers. I use new institutional economics to discuss how broadband providers and content providers can resolve these frictions and disputes through private, vertical arrangements, including nonneutral network management practices. I review some case studies of nonneutral network management covering each of the four practices that the 2015 Open Internet Order bans or limits, examining the entrepreneurial actions taken by broadband providers and content providers alike to resolve disputes. I contrast the "precautionary principle" approach to network neutrality that is embodied in the 2015 Open Internet Order with a "permissionless innovation" approach to regulation, whereby regulators must prove that particular instances of nonneutral network management are both harmful and not ancillary to a legitimate network management or business practice.

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> In each case, it is true that costs involved in enforcement of property rights and in the formation of contracts will cause the market to function differently than it would without such costs. And few will deny that government does afford economic advantages. But it is equally true that any government action can be justified on efficiency grounds by the simple expedient of hypothesizing high enough transaction costs in the marketplace and low enough costs for government control. Thus to assume the state of the world to be as one sees fit is not even to compare the ideal with the actual but, rather, to compare the ideal with a fable.[1]

> If we use only sterilized models of markets, or ignore the vitality of the rivalry that confronts institutions, we should not be surprised that the historical [interpretations] that result are not graced with the truth that Cicero asks of historians.[2]

> The ultimate irony of the [Federal Communications] Commission's unreasoned patchwork [of network neutrality regulations] is that, refusing to inquire into competitive conditions, it shunts broadband service onto the legal track suited to natural monopolies. Because that track provides little economic space for new firms seeking market entry or relatively small firms seeking expansion through innovations in business models or in technology, the Commission's decision has a decent chance of bringing about the conditions under which some (but by no means all) of its actions could be grounded—the prevalence of incurable monopoly.[3]

I. Introduction

In the course of two decades, the internet has become the preferred technology for personal and commercial telecommunications across the world. Its "accidental emergence"[4] was a revolution in telecommunications from both a technological and a social standpoint. Technologically, the internet is the first commercial application of the concept of "packet switched" networking. In this system, information is divided into small pieces of data (known as "packets") and transmitted between nodes in a network through a process that allocates bandwidth *dynamically*, rather than allocating the same amount of bandwidth for each transmission, as the "circuit switched" telephone network does.[5] Socially, the internet is a uniquely decentralized,

[1] Steven N. S. Cheung, *The Fable of the Bees*, *16* J.L. & ECON. 11, 33 (1973).
[2] Stan J. Liebowitz & Stephen E. Margolis, *The Fable of the Keys*, *33* J.L. & ECON. 1, 23 (1990).
[3] U.S. Telecom Ass'n v. F.C.C., 825 F.3d 674, 778 (D.C. Cir. 2016) (Williams, J., concurring in part, dissenting in part).
[4] MILTON L. MUELLER, NETWORKS & STATES 4 (2010).
[5] *See* Lawrence G. Roberts, *The Evolution of Packet Switching*, *66* PROC. IEEE 1307, 1307 (1978).

heterogeneous ecosystem: service providers, content creators, and users are all coproducers of the underlying technology and infrastructure, the content that makes the internet valuable and useful, and the governance structures that make the internet work.[6]

For the most part, governments have stayed out of the way and allowed private actors to discover for themselves what rules and arrangements are best suited for the short- and long-term governance of the internet. The US Congress, for example, declared in the Telecommunications Act of 1996[7] that "[i]t is the policy of the United States . . . to preserve the vibrant and competitive free market that presently exists for the Internet . . . *unfettered by Federal or State regulation*."[8] The Clinton administration's "Framework for Global Electronic Commerce" outlined a similarly market-oriented approach to governing the internet, affirming such principles as "[t]he private sector should lead [development of internet governance]," "[g]overnments should avoid undue restrictions on electronic commerce," and "[w]here governmental involvement is needed . . . governments should establish a predictable and simple legal environment based on a decentralized, contractual model of law rather than one based on top-down regulation."[9] In the early days of the internet, policymakers embraced these principles because they understood the dynamic and innovative nature of this new medium of communication. As the Clinton administration's Framework noted, "Business models must

[6] *See* MUELLER, *supra* note 4, at 9.
[7] Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1997).
[8] 47 U.S.C. § 230(b) (2013) (emphasis added). Congress intended the Telecommunications Act of 1996 to reduce regulation in the telecommunications sector, as evidenced by the act's preamble, which calls it "An Act [t]o promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies," *id.*; *see also* Harold Furchtgott-Roth, *In Search of a Captive Audience: Susan Crawford's* CAPTIVE AUDIENCE, *65* FED. COMM. L.J. 312, 329 (2013) (reviewing SUSAN CRAWFORD, CAPTIVE AUDIENCE (2013)).
[9] *Id.*

evolve rapidly to keep pace with the break-neck speed of change in the technology; government attempts to regulate are likely to be outmoded by the time they are finally enacted."[10]

Soon, however, some policymakers began to argue that "network neutrality," which is generally defined as ensuring that "all data packets on an information network are treated equally,"[11] is an essential principle of the internet that needs to be enshrined in regulation and enforced by public regulators.[12] This principle, they argue, is rooted in another principle, the "end-to-end" design of the internet:[13] users at the end nodes of the network (i.e., content creators and individual users) are given control over which applications (e.g., World Wide Web—"www"—and email) will be developed and used, while the intermediary nodes of the network (i.e., service providers) offer a neutral network that gives end users freedom to use and experiment with the internet.[14] From a legal and policy perspective, network neutrality principles rely on two distinct rules: a nondiscrimination rule, which forbids internet service providers (ISP) from unduly discriminating against certain packets on the basis of content or origination, and a "zero-price" rule, which forbids ISPs from charging or accepting payments from edge

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[10] *Id.*

[11] Florian Schuett, *Network Neutrality: A Survey of the Economic Literature*, REV. NETWORK ECON., Jun. 2010, at 1. This definition is somewhat simplified; some of the earliest network neutrality proponents noted that the concept of neutrality itself is "finicky" and that "[n]etwork design is an exercise in tradeoffs," and also recognized that different applications may need different quality of service levels. *E.g.*, Timothy Wu, *Network Neutrality, Broadband Discrimination*, *2* J. ON TELECOMM. & HIGH TECH. L. 141, 147–49 (2003). However, this simplified definition also reflects what has become a highly politicized policy debate. *E.g.*, Jon M. Peha, William H. Lehr, and Simon Wilkie, *The State of the Debate on Network Neutrality*, *1* INT'L J. COMM. 709, 710 (2007).

[12] *See, e.g.*, Wu, *supra* note 14, at 142–43 *passim*.

[13] *See generally* Jerome H. Saltzer, David P. Reed, and David D. Clark, *End-to-End Arguments in System Design*, *2* ACM TRANSACTIONS ON COMPUTER SYSTEMS 277 (1984).

[14] *See, e.g.*, Wu, *supra* note 14, at 145–46. The "end-to-end principle" is largely aspirational and does not actually resemble how the internet works. Indeed, the principle's original authors said that "the end-to-end argument is not an absolute rule, but rather a guideline that helps in application and protocol design analysis." Saltzer, Reed, and Clark, *supra* note 16, at 285. Building legal requirements off this principle therefore misses the mark. As David Clark, the chief protocol architect of the internet, noted, "The network is not neutral and never has been." Greg Piper, *Internet Architect Suggests 'Futures Market' to Avoid Policy Disputes*, COMM. DAILY, Feb. 5, 2009, http://iep.clemson.edu/wp-content/uploads/2009/02/Internet_Architect_Suggests.Feb2009.pdf.

providers (i.e., content creators or distributors) for transmitting their packets to end users.[15] Both of these rules strongly resemble requirements for "common carriers," a special class of service providers who meet certain distinguishing characteristics,[16] and must, among other things, refrain from "unjust or unreasonable discrimination"[17] and charge rates that are "just and reasonable."[18] Proponents of network neutrality have argued that the preservation of the principles of network neutrality requires enforcing these rules through the sort of top-down regulatory scheme that policymakers initially sought to avoid.[19] But, as the "Framework for Global Electronic Commerce"[20] presciently warned, imposing such regulations from the top down may disrupt a constantly evolving industry.[21] Indeed, many new internet applications, such as video streaming or live gaming, are posing congestive issues for broadband networks, leading to disputes

[15] *See* Schuett, *supra* note 14, at 1; Nicholas Economides & Benjamin E. Hermalin, *The Economics of Network Neutrality*, *43* RAND J. ECON. 602, 603 (2012).
[16] *See* Christopher Yoo, *Is There a Role for Common Carriage in an Internet-Based World?*, 51 HOUS. L. REV. 545, 552–69 & nn.22, 24, 39, 75 & 103 (2013).
[17] *Id.* at 570 (quoting 47 U.S.C. § 202(a) (2012)) (internal quotation marks omitted).
[18] Yoo, *supra* note 19, at 571 (quoting 47 U.S.C. § 201(b)) (internal quotation marks omitted). It is true that the obligation of common carriers to charge just and reasonable rates does not require common carriers to charge all customers the same rate. *See, e.g.*, Johnson v. Pensacola & Perdido R.R. Co., 16 Fla. 623, 663–64 (1878); *see also* Cowden v. Pacific Coast S.S. Co., 29 P. 873, 874–75 (Cal. 1892). Thus, the zero-price rule does not quite map to traditional common carriage rate regulation (it is much stricter). In its 2010 Open Internet Order, Preserving the Free and Open Internet, *Report and Order*, FCC 10-201, 25 FCC Rcd. 17905 (2010) [hereinafter 2010 Open Internet Order], *aff'd in part, vacated in part sub nom*., Verizon Commc'ns Inc. v. FCC, 740 F.3d 623 (D.C. Cir. 2014), the FCC did not explicitly outline a zero-price rule but did declare that (a) "[t]o the extent that a content, application, or service provider could avoid being blocked only by paying a fee, charging such a fee would be prohibited under [the order]," 2010 Open Internet Order, *supra*, at para. 67, and (b) "it is unlikely that pay for priority would satisfy the 'no unreasonable discrimination' standard [set out by the order]," *id.* at para. 76. In reviewing the 2010 Open Internet Order, a three-judge panel of the US Court of Appeals for the D.C. Circuit found that the order's prohibitions on payments between ISPs and edge providers gave "no room at all for individualized bargaining," *Verizon*, 740 F.3d at 657 (quoting Cellco P'ship v. FCC, 700 F.3d 534, 548 (D.C. Cir. 2012)) (internal quotation marks omitted). And they "appear on their face to impose *per se* common carrier obligations," *Verizon*, 740 F.3d at 658. Thus, while they do not map perfectly to traditional common carriage rate regulation, they resemble such obligations, *see id.* at 657. Furthermore, the 2015 Open Internet Order, Protecting & Promoting the Open Internet, GN Docket No. 14-28, *Report & Order on Remand, Declaratory Ruling, & Order*, FCC 15-24, 30 FCC Rcd. 5601 (2015) [hereinafter 2015 Open Internet Order], *aff'd sub nom.*, U.S. Telecom Ass'n v. FCC, 825 F.3d 674 (D.C. Cir. 2016), explicitly cites § 201(b) of the Communications Act of 1934, 47 U.S.C. § 201(b), as an authority for enacting the zero-price rule in its latest iteration of network neutrality regulations, 2015 Open Internet Order, *supra*, at para. 284.
[19] Wu, *supra* note 14, at 154–56; see also the discussion *supra* pp. 5–6.
[20] CLINTON & GORE, *supra* note 9.
[21] *See* discussion *supra* pp. 5–6.

between edge providers (i.e., content creators and distributors) and ISPs.[22] Furthermore, these new applications also generally require low "latency" connections (i.e., quick, near-simultaneous delivery of packets) to maintain quality for the end users.[23] In other words, the real-time transmission demands of these new applications mean that bandwidth is no longer the only relevant constraint for modern telecommunications networks; "schedulability" presents a new constraint for ISPs who want to maintain a certain level of quality for their customers.[24] These new applications are leading the internet into a new era, in which discrimination among packets based on origin or type of data by ISPs and the creation of business arrangements between edge providers and ISPs that prioritize certain applications may provide benefits for everyone who uses the internet.

Since 2005, the Federal Communications Commission (FCC) has sought to enforce network neutrality norms under the authority given to it by Congress in the Communications Act of 1934.[25] Before 2015, the FCC classified broadband service as an "information service"[26] governed by Title I of the Communications Act,[27] the lightest-touch regulatory regime under the act, as opposed to a "telecommunications service" governed by Title II,[28] which has the most

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[22] *See, e.g.*, In the Matters of Formal Compl. of Free Press & Public Knowledge against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications, File No. EB-08-IH-1518, Broadband Industry Practices, Pet. of Free Press et al. for Decl. Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management," WC Docket No. 07-52, *Memorandum Opinion & Order*, 23 FCC Rcd. 13028 (2008) [hereinafter Comcast Order], *vacated sub nom.*, Comcast Corp. v. FCC, 600 F.3d 642 (D.C. Cir. 2010).

[23] *See* Martin Geddes, *The Third Epoch of Telecoms*, GEDDES, (2016) http://www.martingeddes.com/think-tank/third-epoch-telecoms/.

[24] Martin Geddes, Founder & Principal, Geddes Consulting Inc., "Economics of Bandwidth," Presentation at FTTH [fiber to the home] in the UK—A Detailed Analysis at FTTH Conference, London (February 19, 2013), http://www.martingeddes.com/think-tank/economics-bandwidth/.

[25] 47 U.S.C. §§ 201–76 (2013).

[26] *See generally* Inquiry Concerning High-Speed Access to the Internet over Cable and Other Facilities, Declaratory Ruling and Notice of Proposed Rulemaking, 17 FCC Rcd. 4798 (2002), *aff'd in part, vacated in part, remanded sub nom.*, Brand X Internet Servs. v. FCC, 345 F.3d 1120 (9th Cir. 2003), *rev'd sub nom*., Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967 (2005).

[27] §§ 151–62.

[28] §§ 201–76.

stringent regulatory regime under the act and allows the FCC to impose requirements of "common carriage"[29] onto those services regulated by it. Twice the FCC tried to enforce these network neutrality norms while still classifying broadband as an information service,[30] and twice the courts ruled that information services cannot be regulated like common carriers, striking down network neutrality regulations as unauthorized under Title I.[31] On February 26, 2015, the FCC voted 3–2[32] to reclassify the provision of broadband service, both wireline and wireless, as a telecommunications service and to enforce network neutrality regulation through certain sections of Title II.[33] Although the FCC used its forbearance powers to limit the application of most elements of Title II common carriage regulation to internet service providers,[34] the 2015 Open Internet Order relies on Sections 201 and 202 of the Communications Act[35] to impose both a nondiscrimination rule and a zero-price rule, respectively, as described above, on broadband service providers.[36] On June 14, 2016, a three-judge panel of the US Court of Appeals for the D.C. Circuit voted 2–1 to uphold the FCC's reclassification of broadband service providers as telecommunications services, allowing the commission's third attempt at imposing network

[29] *See supra* notes 20–21.
[30] *See generally* In the Matters of Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, CC Docket No. 02-33, Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services, CC Docket No. 01-337, 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, CC Docket Nos. 95-20, 98-10, Inquiry Concerning High-Speed Access to the Internet over Cable and Other Facilities, GN Docket No. 00-185, Internet over Cable Declaratory Ruling Appropriate Regulatory Treatment for Broadband Access to the Internet over Cable Facilities, GN Docket No. 02-52, *Policy Statement*, 20 FCC Rcd. 14986 (2005) [hereinafter Internet Policy Statement]; 2010 Open Internet Order, *supra* note 21.
[31] *See* Comcast Corp. v. FCC, 600 F.3d 642 (D.C. Cir. 2010); Verizon Commc'ns Inc. v. FCC, 740 F.3d 623 (D.C. Cir. 2014).
[32] *See, e.g.*, Rebecca R. Ruiz & Steve Lohr, *F.C.C. Approves Net Neutrality Rules, Classifying Broadband Internet Service as a Utility*, N.Y. TIMES, February 26, 2015, www.nytimes.com/2015/02/27/technology/net-neutrality-fcc-vote-internet-utility.html; *see also* 2015 Open Internet Order, *supra* note 21, at 5921 *passim* (Pai, Comm'r, dissenting); *id.* at 5985 *passim* (O'Rielly, Comm'r, dissenting).
[33] *See* 2015 Open Internet Order, *supra* note 21, at para. 5.
[34] *See id.* at paras. 51–58.
[35] 47 U.S.C. §§ 201–2 (2013); 2015 Open Internet Order, *supra* note 21, at para. 29.
[36] §§ 201–2.

neutrality regulations to stand.[37] The reclassification of broadband providers as common carriers has been controversial,[38] and it has rekindled debates over (a) whether the eight-decade-old Communications Act is ill-equipped to regulate a 21st century technology and (b) what effects network neutrality regulations will have on both broadband service provision and the internet writ large.

This paper attempts to answer these questions from an economic perspective by examining how network neutrality regulations may affect entrepreneurship and competition in the provision of broadband and other aspects of the internet in the United States. The economic analysis in this paper relies on two schools of economic thought—market process theory and new institutional economics—whose insights have thus far been largely undervalued in discussions of network neutrality regulation. As the name suggests, market process theory views competition as a process, rather than an end state, emphasizing the role that entrepreneurial discovery plays in competition and innovation.[39] Given the role that entrepreneurship—defined simply as "alertness [and] . . . receptiveness to available (but hitherto overlooked) [profit] opportunities"[40]—plays in both competition and innovation, market process theory captures the dynamic nature of the US broadband industry. One particular implication of the theory is that government regulation can alter or impede the entrepreneurial discovery process, leading to effects that are perhaps less desirable than the original market outcomes that the regulation intended to fix, such as less innovation and redirection of entrepreneurial activities toward

[37] U.S. Telecom Ass'n v. FCC, 825 F.3d 674 (D.C. Cir. 2016).
[38] *See, e.g.*, Timothy B. Lee, *What Is Reclassification, and Why Is It Controversial?*, VOX, May 21, 2015, http://www.vox.com/cards/network-neutrality/why-did-the-court-rule-the-fccs-network-neutrality-rules-illegal; *see also*, U.S. Telecom, 825 F.3d 674, 744–78 *passim* (Williams, J., concurring in part, dissenting in part).
[39] *See* ISRAEL M. KIRZNER, COMPETITION & ENTREPRENEURSHIP 7–13, 20–23 (Peter J. Boettke & Frédéric Sautet eds., Liberty Fund 2013) (1973) [hereinafter COMPETITION & ENTREPRENEURSHIP]; *see generally* Israel M. Kirzner, *Entrepreneurial Discovery & the Competitive Market Process: An Austrian Approach*, 35 J. ECON. LITERATURE 60 (1997) [hereinafter *Entrepreneurial Discovery*].
[40] Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 72.

unproductive ends.[41] New institutional economics is fundamentally concerned with comparing the relative efficiencies of "alternative real institutional arrangements"[42] in organizing economic activity and resolving disputes among economic actors.[43] Instead of comparing "existing 'imperfect' institutional arrangement[s]" with an ideal institutional arrangement that does not exist,[44] new institutional economics attempts to discover why such imperfect institutional arrangements exist in the first place, and "what would in fact happen in the world as it exists if they were made illegal."[45] With the rise in bandwidth-intensive applications that require near-simultaneous transmission of packets, the nondiscrimination requirements and zero-price rate regulation enshrined in the 2015 Open Internet Order's network neutrality mandates will stifle entrepreneurship in broadband provision and application development by limiting broadband service providers' and edge providers' ability to discover new network management and business arrangements that have the potential to increase the value of the internet for all users.

The insights that market process theory and new institutional economics have for the 2015 Open Internet Order suggest that the FCC has wrongly adopted a "precautionary principle"[46] approach toward the issue of network neutrality not simply because they have failed to demonstrate that a significant problem has arisen in the absence of network neutrality regulation (or that the broadband market is concentrated even according to standard antitrust

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[41] *See generally* ISRAEL M. KIRZNER, DISCOVERY & THE CAPITALIST PROCESS 119–49 (1985) [hereinafter DISCOVERY & THE CAPITALIST PROCESS]. This should not be interpreted to be a case for a broad-stroke laissez-faire economic policy. It merely suggests that the market has particular institutional qualities that *tend* to provide incentives and knowledge to coordinate economic and social activity in a mutually beneficial way, while government intervention *tends* to disrupt this process in unforeseen, possibly negative, ways. *See id.* at 149; Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 81–82.

[42] Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 J.L. & ECON. 1, 1 (1969).

[43] *See, e.g.*, Ronald Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 15–19, 42–44 (1960) [hereinafter *Social Cost*].

[44] Demsetz, *supra* note 45, at 1.

[45] Ronald Coase, *Payola in Radio and Television Broadcasting*, 22 J.L. & ECON. 269, 319 (1979) [hereinafter *Payola*].

[46] *See* ADAM THIERER, PERMISSIONLESS INNOVATION: THE CONTINUING CASE FOR COMPREHENSIVE TECHNOLOGICAL FREEDOM 1, 26–29 (rev. and expanded ed. 2016), for a description of the precautionary principle.

analysis), but also because the order may "retard rather than enhance the 'virtuous cycle.'"[47] In a dynamic, evolving industry, requiring entrepreneurs to receive permission from regulators before trying new products or business arrangements (or worse, not even allowing them to experiment in the first place) will stifle the very competition and innovation that allows the industry to grow and better serve the needs of consumers. Regulators ought to instead adopt policies that allow for "permissionless innovation"[48] on the part of entrepreneurs who want to experiment with new products and business models. A policy of permissionless innovation would not imply a laissez-faire approach to network neutrality but would rather limit regulatory action to instances where a clear, "substantial" harm exists that is not "outweighed by any countervailing benefits to consumers or competition that the practice produces."[49]

The paper will proceed as follows. Section II discusses the basic aspects of the network neutrality debate, including arguments for and against network neutrality, with a particular emphasis on the technical realities behind network management on broadband networks. Section III explores the theory of the market process as laid out by Israel Kirzner, as well as related theories from other economists who studied markets from a dynamic perspective. Particular emphasis is given to the implications of these theories for government intervention through regulation. This section also uses insights from new institutional economics to examine why broadband providers engage in nonneutral network management and why broadband providers and edge providers might arrange for prioritization of certain packets over others. Section IV examines what effects the 2015 Open Internet Order will have on entrepreneurship in broadband service provision and application development through an examination of several cases studies

[47] U.S. Telecom Ass'n v. FCC, 825 F.3d 674, 756 (D.C. Cir. 2016) (Williams, J., concurring in part, dissenting in part).
[48] *See* THIERER, *supra* note 49, at 1–3, 105–6.
[49] *Id.*

involving nonneutral network management practices. Because the order has not been in place for long, few cases have been directly affected, so this section relies on case studies that demonstrate the productive entrepreneurial aspects of different forms of nonneutral network management in a variety of contexts. Section V compares the ex ante regulatory scheme for network neutrality embodied in the order with an ex post regulatory regime based in the principles of permissionless innovation. Section VI concludes.

II. What We Talk about When We Talk about Network Neutrality

Understanding the concerns that underlie the basic arguments for network neutrality, as well as the technical realities of network management, is a necessary precursor to any economic analysis of the issue. Whereas economists have given much attention to the issue of network neutrality,[50] the origins of the network neutrality debate lie in the sphere of legal scholarship.[51] Many such scholars were, of course, excited by the advent of a new platform for communications and the innovation that would be unleashed by the internet, yet they also expressed mild to moderate apprehension about the changing landscape of the telecommunications industry after the deregulatory actions taken by Congress and the FCC in the mid- to late-1990s.[52] As both the industry and the policy debate over network neutrality have evolved, the particular justifications given for network neutrality mandates have changed as well, but the fundamental concerns have largely remained the same.

[50] *See generally* Schuett, *supra* note 14.
[51] *See, e.g.*, Wu, *supra* note 14.
[52] *See, e.g.*, Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925, 926–27 (2001).

There is no shortage of academic work on network neutrality. Much of the literature, though, focuses on higher-level principles[53] and tends to avoid discussion of the technical realities of network management, despite the ever-increasing need for policymakers to understand such realities.[54] To be sure, advocates of network neutrality regulation recognize the necessity of network management,[55] and the 2015 Open Internet Order allows for "reasonable" forms of network management that might otherwise violate network neutrality (although it has given very little guidance as to what is reasonable and what is not).[56] But, as legal scholar Christopher Yoo notes, the relative lack of discussion about and seeming "[u]nfamiliarity with the Internet's architecture has allowed some [network neutrality] advocates to characterize the prioritization of network traffic as an aberration when, in fact, it is a central feature designed into the network since its inception."[57] This section focuses both on the standard arguments in favor of network neutrality, as well as important technical aspects of network management that are often glossed over by network neutrality proponents.

A. From Open Access to Network Neutrality

The network neutrality debate is almost as old as commercial broadband itself. Broadband became commercially feasible in 1999, when telephone and cable companies began offering "always on" internet connections through digital subscriber lines (DSL) and Data Over Cable Service Interface Specification (DOCSIS), respectively, at speeds that, at the time, were "about

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[53] *See, e.g.*, *id.*
[54] Christopher Yoo, *Network Neutrality & the Need for a Technological Turn in Internet Scholarship*, *in* ROUTLEDGE HANDBOOK OF MEDIA LAW 539, 539 (Monroe E. Price et al. eds., 2012).
[55] *See, e.g.*, Wu, *supra* note 14, at 147–49; Comments of Public Knowledge at 29–31, In the Matter of Protecting & Promoting the Open Internet, GN Docket No. 14-28, Framework for Broadband Internet Service, GN Docket No. 10-127, Preserving the Open Internet, GN Docket No. 09-191, Broadband Industry Practices, WC Docket No. 07-52 (rel. July 15, 2014) [hereinafter Comments of Public Knowledge on 2015 Open Internet Order], https://www.publicknowledge.org/documents/official-comments-for-fcc-net-neutrality-proceeding.
[56] 2015 Open Internet Order, *supra* note 21, at paras. 214–24.
[57] Yoo, *supra* note 58, at 539.

10–30 times higher than dial-up access."[58] As these new ISPs and the broadband technology they were deploying were opening doors to new uses for the internet, legal scholars and policymakers expressed concern that the end-to-end principle of the internet would be harmed by unregulated ISPs.[59] To these scholars, the end-to-end principle's stipulations that end users should retain as much control over the network as possible and that ISPs should act as mere conduits for information were necessary for continued innovation and growth of the internet.[60] But with increasing vertical integration,[61] the perception of market power on the part of "legacy monopolies,"[62] and the advent of new technology that transformed "dumb pipes" into intelligent systems,[63] many became concerned that the advent of the broadband era would bring about the end of the end-to-end principle absent some form of government intervention.

1. Network Neutrality as a Remedy for Discrimination

Many scholars had initially focused on "open access" mandates, whereby ISPs would be (and in the case of DSL, were) required to "unbundle" their network and allow service competitors to have access to their infrastructure, as a solution to these problems.[64] Legal scholar Timothy Wu took a different approach in a 2003 law review article where he coined the term "network neutrality": instead of enforcing potentially costly structural remedies that would still permit discrimination by any of these new competitors, regulators should address the problem of

[58] *See* Jerry A. Hausman, J. Gregory Sidak, and Hal J. Singer, *Cable Modems and DSL: Broadband Internet Access for Residential Customers*, 91 AM. ECON. REV. 302, 302 (2001).
[59] *See, e.g.*, Lemley & Lessig, *supra* note 55, at 926–27, 930–31.
[60] *See id.* at 930–31 ("[The end-to-end principle] counsels that the 'intelligence' in a network should be located at the top of a layered system—at its 'ends,' where users put information and applications onto the network. The communications protocols themselves (the 'pipes' through which information flows) should be as simple and as general as possible.").
[61] *See id.* at 927.
[62] *See id.* at 936–38.
[63] *See id.* at 939 ("Dumb pipes" simply carry information, while more intelligent systems can "determine the content and origin of packets and discriminate between packets").
[64] *See, e.g.*, *id.* at 926–27.

discrimination head-on.[65] According to Wu, it is in the long-term interest of end users, edge providers, and ISPs to have "a neutral platform that supports the emergence of the very best applications."[66] This claim is not particularly controversial, as legal scholars[67] and economists[68] both recognize the vast network externalities that the internet creates. Those externalities present a strong incentive for ISPs not to discriminate if they can help it. The value of the internet for end users (who, incidentally, are also the customers of ISPs) comes from the ability to access as much content and/or as many applications as they need or want.[69] Consistently engaging in deliberate discrimination would reduce the value of the internet for consumers immensely, rendering it of much less value to ISPs as well.[70] ISPs would thus be incentivized to "internalize complementary externalities"[71] (i.e., they would take into account the social benefits and costs of discrimination before engaging in it) and only discriminate when doing so presented net benefits to customers. But Wu also pointed to evidence that many ISPs were occasionally sacrificing the long-term interest of all for their own short-term interests, such as when they banned virtual private networks (VPN) or similar applications from their network.[72] These deviations from neutrality, which Wu claimed were often undertaken "out of suspicion or an (often futile) interest in price-discrimination,"[73] represented a harm that deserved attention from regulators who could

[65] *See* Wu, *supra* note 14, at 142 *passim*.
[66] *See id.* at 142.
[67] *See, e.g.*, James B. Speta, *Handicapping for the Last Mile?: A Critique of Open Access Rules for Broadband*, 17 YALE J. ON REG. 39, 76 (2000).
[68] *See, e.g.*, Joseph Farrell & Philip J. 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, 97–105 (2003); *cf.* Yanis Bakos & Eric Brynjolfsson, *Bundling Information Goods: Pricing, Profits, and Efficiency*, 45 MGMT. SCI. 1613, 1613 (1999).
[69] *See* Farrell & Weiser, *supra* note 72, at 97–105; *cf.* Bakos & Brynjolfsson, *supra* note 72, at 1613.
[70] *See* Speta, *supra* note 71, at 79.
[71] Timothy Wu, *The Broadband Debate, a User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69, 85 (2004) (quoting Farrell & Weiser, *supra* note 72, at 101) (internal quotation marks omitted).
[72] *See* Wu, *supra* note 14, at 143 (2003).
[73] *Id.*

"challenge broadband operators to ask whether applications restrictions are a good long-term policy."[74]

Whereas Wu recognizes that ISPs have a responsibility to manage their network for their customers,[75] he wanted to limit the ways in which ISPs could engage in discriminatory network management to remove an ISP's temptation to "protect itself" by actively "resisting to new ways in an effort to prevent its own inevitable demise"[76] and prevent "distort[ions to] secondary markets"[77] (namely, the market for applications). He argued that ISPs would not always "internalize complementary externalities"[78] (internalizing complementary externalities, or ICE; e.g., taking into account the social costs of discrimination among applications), noting that there are scenarios in which the logic of ICE might break down.[79] Wu cites price discrimination, potential competition, and "incompetent incumbents"[80] as exceptions to ICE that apply to ISPs in particular. It is important to note that anticompetitive concerns arising from these issues are really only acute in platform markets with true monopolies (i.e., one and only one provider), and that it is often better to enact policy that would increase competition rather than regulate broadband providers directly.[81] In response to these potential breakdowns in ICE, however, Wu

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[74] *Id.*
[75] *Id.* at 166; *see also* discussion *infra* section II.B.
[76] Wu, *supra* note 75, at 86–87 (quoting JOSEPH A. SCHUMPETER, THE THEORY OF ECONOMIC DEVELOPMENT 86 (1961)) (internal quotation marks omitted).
[77] Wu, *supra* note 14, at 167.
[78] Wu, *supra* note 75, at 85 (quoting Farrell & Weiser, *supra* note 72, at 101) (internal quotation marks omitted).
[79] Wu, *supra* note 75, at 86 & n.48 (citing Farrell & Weiser, *supra* note 72, at 105–19) (discussing various ways in which the logic of ICE may break down).
[80] Wu, *supra* note 75, at 86 & n.49 (quoting Farrell & Weiser, *supra* note 72, at 114–17).
[81] *See* Farrell & Weiser, *supra* note 72, at 133–34; Christopher Yoo & Timothy Wu, *Keeping the Internet Neutral?: Tim Wu and Christopher Yoo Debate*, 59 FED. COMM L.J. 575, 584–85 (2007) (citing Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 414–15 (2004)); see also *infra* section II.A.2 for a discussion of why outright platform monopoly in last-mile broadband provision is perhaps not as common as thought in the United States. It is also important to note, as Farrell & Weiser have, that the existence of price discrimination per se is not a sign of a breakdown in ICE, but rather that monopolist broadband providers *might* not internalize the complementary externalities *if* it would limit their ability to engage in price discrimination. Farrell & Weiser, *supra* note 72, at 107–9.

proposed regulations that would have banned discrimination on the part of ISPs (with several notable technologically based exceptions that do not appear in the vague language of the FCC's 2015 Open Internet Order).[82]

2. Network Neutrality as a Remedy for Market Concentration

Since publication of Wu's paper, the number and diversity of justifications for network neutrality regulation have grown somewhat. Cable broadband has always held the largest share of the overall broadband market in the United States as far back as the FCC has been keeping records.[83] Cable companies, hardly a favorite of American consumers, have been cited by some legal scholars as the heralds of a "New Gilded Age"[84] because of their supposed status as the new monopolists of the 21st century.[85] To scholars like Susan Crawford, there is no meaningful difference between the short-term and long-term interests of ISPs (in particular, cable providers): all of them seek to dominate the broadband market and then "manage[], monetize[], prioritize[], filter[], and package[]"[86] the internet, "much like traditional cable television [is] today."[87] Network neutrality regulation isn't just necessary to correct the errant ISPs who seek their short-term interest over their long-term interest (as is Wu's view in his 2003 article);[88] rather, it is necessary because of ISPs' ominous long-term interests.

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[82] Wu, *supra* note 14, at 166–67.
[83] *See* FED. COMMC'N COMM'N, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2007, at Table 3 (January 2009), https://apps.fcc.gov/edocs_public/attachmatch/DOC-287962A1.pdf; FED. COMMC'N COMM'N, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2009, at 24 (December 2010), https://apps.fcc.gov/edocs_public/attachmatch/DOC-303405A1.pdf; FED. COMMC'N COMM'N, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2013, at 24 (October 2014), https://apps.fcc.gov/edocs_public/attachmatch/DOC-329973A1.pdf.
[84] *See, e.g.*, SUSAN CRAWFORD, CAPTIVE AUDIENCE: THE TELECOM INDUSTRY AND MONOPOLY POWER IN THE NEW GILDED AGE (2013) [hereinafter CAPTIVE AUDIENCE].
[85] *See id.* at 9, 17; Susan Crawford, *Response to Harold Furchtgott-Roth*, 65 FED. COMM. L.J. 333, 336–37 (2013) (reviewing SUSAN CRAWFORD, CAPTIVE AUDIENCE (2013)) [hereinafter *Response*].
[86] Susan Crawford, The Looming Cable Monopoly, 29 YALE L. & POL'Y REV. INTER ALIA 34, 38 (2009).
[87] *Id.*
[88] Wu, *supra* note 14, at 143 *passim*.

These justifications, popular as they are, are not quite as well grounded as those originally offered by Wu. The issue of network neutrality is not particularly one of competition, at least in the sense that the "New Gilded Age" scholars present it. Indeed, some economists have suggested that more competition may actually make violations of network neutrality more prevalent, as a market with many competitors may encourage said competitors to differentiate themselves on service (including through practices that favor some uses of the network over others).[89] Wu himself notes in his original 2003 article on network neutrality that "[c]ompetition among ISPs does not necessarily mean that broadband operators will simply retreat to acting as passive carriers in the last mile."[90]

Furthermore, when taking into account potential competition,[91] standard antitrust analysis suggests there is not much evidence that ISPs have the sort of market power that the "New Gilded Age" scholars claim. Judge Stephen Williams of the US Court of Appeals for the District of Columbia Circuit, in his concurrence and dissent in US Telecom v. FCC, calculated a Herfindahl-Hirschman Index, a standard measure of market concentration, for wireline broadband providers in the United States, finding that the nationwide market (accounting for potential competitors) is "unconcentrated" (i.e., "no firm has market power").[92] Looking at actual competitors that the typical American consumer can choose from, 89 percent of Americans have access to five or more broadband providers (including wireline, wireless, and satellite), while 85

[89] *See, e.g.*, Sébastian Broos & Axel Gautier, "Competing One-Way Essential Complements: The Forgotten Side of Net Neutrality," (February 26, 2015), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2570924.
[90] Wu, *supra* note 14, at 149.
[91] *See* discussion *infra* section III.A.2.
[92] *See, e.g.*, U.S. Telecom Ass'n v. F.C.C., 825 F.3d 674, 751–52 (D.C. Cir. 2016) (Williams, J., concurring in part, dissenting in part).

percent have access to at least two wireline broadband providers.[93] And none of these statistics take into account the dynamic nature of the US telecommunications industry generally or the US broadband market specifically; indeed, these markets are perhaps even more competitive than a static snapshot of the market would suggest.[94]

Elements of both the antidiscrimination and procompetitive justifications for network neutrality regulations were present in the policy discussions leading up to the FCC's 2015 Open Internet Order.[95] With the convergence of many previously distinct telecommunications and information services onto the internet,[96] many public interest groups and regulators today are concerned that broadband providers with too much market power will violate network neutrality in an attempt to disrupt the "virtuous cycle" of innovation that serves consumers best.[97] Therefore, they say, rules enforcing both nondiscrimination among applications and rate regulation of certain agreements with edge providers—core tenants of network neutrality[98]—are necessary to preserve the "Free and Open Internet."[99] The FCC's broad mandates in the 2015 Open Internet Order are grounded in the very ideas that gave rise to the network neutrality debate just as the broadband industry was taking off. Yet, for all the discussion of these principles, relatively little attention has been paid to either the technical realities of network management or the technological changes and innovation that have occurred in the sphere of the internet since these debates began.

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[93] Richard Bennett, Luke A. Stewart, and Robert D. Atkinson, *The Whole Picture: Where America's Broadband Networks Really Stand*, 20 (Info. Tech. & Innovation Found., Report, February 12, 2013), http://www2.itif.org/2013-whole-picture-america-broadband-networks.pdf.
[94] *See* discussion *infra* section III.A.
[95] *See generally* 2015 Open Internet Order, *supra* note 21.
[96] *See* MUELLER, *supra* note 4, at 9.
[97] *See* Comments of Public Knowledge on 2015 Open Internet Order, *supra* note 59, at 13.
[98] *See* discussion *supra* pp. 7–8 & notes 14–20.
[99] *See, e.g.*, Comments of Public Knowledge on 2015 Open Internet Order, *supra* note 59, at 13.

B. Some Basics of Network Management

Network management practices such as prioritization have been essential features of the internet from the beginning.[100] This is because internet service provision, particularly on shared networks such as those operated by cable and mobile ISPs,[101] shares some similarities with club goods. At low levels of use, "subtractability" (how much of the good is left after consumption) of use of bandwidth is low, but when overall use ticks up, congestion sets in and subtractability of use of bandwidth becomes noticeably higher, reducing the value of individual connections.[102] Some level of nonneutral network management becomes desirable to maintain quality of connections during peak demand periods.[103] Transmission Control Protocol/Internet Protocol (TCP/IP), the primary system of protocols that runs the internet, performs traffic control functions that increase reliability and utility of connections.[104] Whereas the default prioritization

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[100] *See* Yoo, *supra* note 57, at 540.

[101] *See* Daniel A. Lyons, *Net Neutrality & Nondiscrimination Norms in Telecommunications: A Historical Perspective*, 54 ARIZ. L. REV. 1029, 1057–58 (2012); Roslyn Layton & Michael Horney, *Innovation, Investment, and Competition in Broadband and the Impact on America's Digital Economy*, 36 (Mercatus Working Paper No. 14-22, Mercatus Center at George Mason University, Arlington, VA, 2014), http://mercatus.org/sites/default/files/Layton-Competitionin-Broadband.pdf.

[102] *Cf.* James M. Buchanan, *An Economic Theory of Clubs*, 32 ECONOMICA (n.s.) 1 (1965), *reprinted in* EXTERNALITIES AND PUBLIC EXPENDITURES THEORY 193, 201–2 (2001).

[103] *See* 2015 Open Internet Order, *supra* note 21, at para. 215.

[104] BOB ZELNICK & EVA ZELNICK, THE ILLUSION OF NET NEUTRALITY 76–77 (2013). TCP is one protocol used at the "transport layer" of the internet. *Id.* at 78; see also Scott Jordan, *A Layered Approach to Network Neutrality*, 1 INT'L J. COMM. 427, 432–33 (2007), for a brief description of the Open System Interconnection (OSI) model and where the transport layer fits in it. The other major protocol used at the transport layer is User Datagram Protocol (UDP), which differs from TCP in some important ways, namely in that it does not seek to confirm that all packets arrive successfully at their destination. ZELNICK & ZELNICK, *supra*, at 10 & n.20. At a technical level, TCP relies on a "handshake" system called "SYNACK" to establish a connection. A rather simplified way of explaining how this handshake works is this: the computer initiating the connection first sends a "SYN" to the receiving computer, the receiving computer then responds with an "ACK," which the first computer must receive before it starts sending packets. If the handshake is successful, then the connection is established, and the first computer sends packets until either it has completed the transmission or a packet is dropped. If a packet is dropped, then the first computer will resend it and resume the transmission, though with lower throughput (i.e., not as fast) to attempt to prevent further packet loss. *Id.* UDP does not care as much about the integrity of the connection and so does not employ the SYNACK handshake, or slow or stop transmission for dropped packets or even attempts to resend them. *Id.* This makes UDP better suited in some ways for latency-sensitive applications, as UDP is able to maintain more consistent throughput (though this does occasionally lead to garbled packets, which can affect the quality of, say, video streaming or a VoIP call). *See id.*; Nicholas Weaver, *This One Clause in the New Net Neutrality Regs Would Be a Fiasco for the Internet*, VALLEY VOICES (February 27, 2015), www.forbes.com/sites/valleyvoices/2015/02/27/this-one-clause-in-the-new-net-neutrality-regs-would-be-a-fiasco-

mechanism is to send packets "first in, first out" on a "best efforts" basis,[105] different applications may function better (both on their own and as a part of the network as a whole) under different prioritization rules.[106] In other words, a one-size-fits-all approach to network management may preclude network management practices that benefit the heterogeneous ecosystem of the internet.[107]

Furthermore, with the advent of internet applications such as media streaming that demand a certain low level of "latency," or response time, for full enjoyment, "schedulability" places another constraint besides congestion on networks.[108] Telecommunications expert Martin Geddes argues that these new applications and the technological challenges they present have led us into a "third epoch" of telecommunications.[109] Whereas the first two epochs focused on solving the geographic and then "serialisation" (speed, essentially) constraints, respectively, the third epoch is concerned with solving the problem of "variable contention delay," or managing the buffer of packets from applications with bulk data traffic, such as media streaming.[110] Building out more bandwidth capacity will do little to solve this constraint; ISPs will have to learn how to "take loss and delay away from packet flows that can't withstand them, and re-allocate this impairment to those which can."[111] In other words, nonneutral network management will need to become a necessary aspect of routine operations for any ISP. Far from the

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for-the-internet/; *see also* discussion *infra* section IV.C. However, while UDP offers an alternative transport protocol that can benefit latency-sensitive applications, it does so without many of the congestion control features that TCP has. *See* ZELNICK & ZELNICK, *supra*, at 197; Richard Bennett, *Bittorrent Declares War on VoIP, Gamers*, REGISTER, December 1, 2008, www.theregister.co.uk/2008/12/01/richard_bennett_utorrent_udp/; *see also* Iljitsch van Beijnum, *?Torrent's Switch to UDP and Why the Sky Isn't Falling*, ARSTECHNICA, December 1, 2008, https://arstechnica.com/uncategorized/2008/12/utorrents-switch-to-udp-and-why-the-sky-isnt-falling/.

[105] ZELNICK & ZELNICK, *supra* note 108, at 80.

[106] *See* Yoo, *supra* note 58, at 552.

[107] *See id.*

[108] Geddes, "Economics of Bandwidth," *supra* note 27.

[109] *See* Geddes, *The Third Epoch of Telecoms*, *supra* note 26.

[110] *See id.*

[111] *See id.*

occasional implementation of nonneutral network management necessary for bandwidth constraints at peak demand periods, ISPs will have to be using such nonneutral protocols constantly in the case of applications that require tight scheduling constraints such as media streaming.[112]

As discussed in section II.A.1, Timothy Wu acknowledges both of these realities in his original article on network neutrality from 2003. In particular, he notes,

> As the universe of applications has grown, the original conception of IP neutrality has dated: for IP was only neutral among *data* applications. Internet networks tend to favor, as a class, applications insensitive to latency (delay) or jitter (signal distortion). . . . In a universe of applications that includes both latency-sensitive and insensitive applications, it is difficult to regard the IP suite as truly neutral as among all applications.[113]

Wu states that the reason for this emergent, unintended nonneutrality at the application level is that IP "lacks any universal mechanism to offer a quality of service (QoS) guarantee."[114] As "[n]etwork design is an exercise in tradeoffs,"[115] maintaining "upward" neutrality, or equal treatment of applications, may require sacrificing "downward" neutrality, or equal treatment of connections.[116] Ultimately, Wu recognized both that "[t]rue application neutrality may, in fact, sometimes require a close vertical relationship between a broadband operator and Internet service provider" and that "a total ban on network discrimination is counterproductive."[117] Obviously, this is all quite consonant with Wu's concern, discussed in section II.A.1, that discrimination on the part of ISPs is largely unnecessary and presents harms by "distorting

[112] *Id.*
[113] Wu, *supra* note 14, at 148.
[114] *Id.*
[115] *Id.*
[116] *Id.*
[117] *Id.*

secondary markets."[118] Yet, as the uses of the internet (and the market for applications) have grown more diverse, it seems that the costs of his proposed antidiscrimination regulations,[119] or indeed most forms of network neutrality regulation (including the 2015 Open Internet Order), have risen as well. By insisting on a policy that seeks to maximize application neutrality in an increasingly heterogeneous environment, these regulations run the risk of preventing ISPs and edge providers from seeking solutions to the network management and QoS issues that this new environment presents, owing to fear that *some* of them may be discriminatory enough to distort the market for applications in irreversibly anticompetitive ways. The costs are unseen but real: forgone network management arrangements and vertical business relationships that could have served consumers by overcoming various QoS dilemmas in novel ways, even if they are discriminatory.

With the transformation of the internet into "a unified platform for all forms of information and media,"[120] including (but not limited to) "plac[ing] phone calls, watch[ing] live or recorded video, brows[ing] libraries, and download[ing] or play[ing] music,"[121] the growing diversification of internet applications, and the corresponding increase in demand for bandwidth (and low latency), the necessity of "intelligent" network management is certainly not fading.[122] Even the 2015 Open Internet Order and its proponents[123] say that some level of certain kinds of network management is "reasonable" to maintain optimum network function and quality.[124] But

[118] *Id.*
[119] *Id.*
[120] MUELLER, *supra* note 4, at 9.
[121] *Id.*
[122] *See* Yoo, *supra* note 58, at 540; Zeke J. Miller & Hayley Sweetland Edwards, *Former Obama Tech Czar: "Fast Lanes" Consistent with Net Neutrality*, TIME, May 19, 2014, www.time.com/105058/net-neutrality-fast-lanes-barack-obama-aneesh-chopra/.
[123] *See* Comments of Public Knowledge on 2015 Open Internet Order, *supra* note 59, at 29–31.
[124] 2015 Open Internet Order, *supra* note 21, at paras. 214–24.

while some blocking or throttling would be permitted,[125] the order in fact bans most blocking and throttling, as well as all paid prioritization, as inherently anticompetitive[126] and places limits on the practice of sponsored data.[127] In light of the technical realities of network management and the recent technological advances on the internet that have created new challenges for not only ISPs but also for all internet users, the FCC's actions seem to be entirely counterproductive. Understanding just how the FCC's actions are counterproductive, and the likely effects they will have on entrepreneurship, is a task for economic theory.

III. Network Neutrality and Entrepreneurship: A Theoretical Examination

This section applies economic theory to better understand the relationship between the 2015 Open Internet Order's network neutrality rules and entrepreneurship in broadband and related industries. Whereas there is certainly a robust economic literature on the issue of network neutrality,[128] comparatively little of the literature has examined the issue of network neutrality from a dynamic or institutional perspective. This section seeks to fill that gap, offering dynamic theories of the market as a process, as well as a new institutional perspective on why such nonneutral network management practices exist.

But why must we consider theory in our policy analysis? Theory, as the political scientist Vincent Ostrom said, "is like a pair of spectacles. We see and order events in the world by looking through our spectacles and by using intellectual constructs to form pictures in our mind's 'eye'—an intellectual vision."[129] Theories that do not properly account for real-world phenomena present a poor picture of the world, much like the wrong prescription for one's

[125] *Id.*
[126] *Id.* at paras. 14–19.
[127] *Id.* at para. 151.
[128] *See generally* Schuett, *supra* note 14.
[129] VINCENT OSTROM, THE INTELLECTUAL CRISIS IN AMERICAN PUBLIC ADMINISTRATION 18 (3d ed. 2008).

glasses make it difficult to perceive our physical surroundings. Because of the way theory shapes how we perceive the world, it indirectly influences the actions policymakers take and the policies they enact. Getting theory right is a prerequisite for getting policy right. These theories offer a unique insight into the network neutrality debate, shining light on issues that are not often considered in the literature. First, this section explores dynamic theories of the market process and entrepreneurship, with some emphasis on both what constitutes dynamic competition and the way regulation affects entrepreneurship in a dynamically competitive world. Then it reviews insights from new institutional economics that may explain the existence of nonneutral network management practices and the purpose they serve in the modern internet.

A. Entrepreneurship and the Market Process

To understand the complex, dynamic nature of the US broadband market and related industries, policymakers need a theoretical lens that properly accounts not only for dynamic change in the market across time and location, but also how this dynamic change is catalyzed. The standard neoclassical view of competition and the market falls short of addressing either of these issues.[130] The theory of the market process, as articulated by the economist Israel Kirzner, provides just such a lens by "help[ing] us understand how the decisions of individual participants in the market interact to generate the market forces which compel *changes* in prices, in outputs, and in methods of production and the allocation of resources."[131] The central player in Kirzner's theory of the market process is the entrepreneur, a character who, in a world of uncertainty, possesses "alertness [and] . . . receptiveness to available (but hitherto overlooked) [profit] opportunities."[132] Such opportunities do not have to take the form of starting a new business or developing a new

[130] *See* KIRZNER, COMPETITION & ENTREPRENEURSHIP, *supra* note 42, at 4.
[131] *See id.* at 5.
[132] Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 72.

technology; they can also be the development of new "methods of production, or [methods of] organization not hitherto in use" or even simply corrections of perceived price discrepancies.[133] While Kirzner's theory provides the main lens for this paper, Joseph Schumpeter's theory of economic development, developed before Kirzner's theory of the market process, also emphasizes dynamic change from an individual decision-making standpoint[134] and contains elements that complement Kirzner's theory.[135] Additionally, James Buchanan and Viktor Vanberg's theory of the market as a creative process adds additional dimensions to Kirzner's initial conception of the market as a dynamic process by removing the constraints imposed by the linear neoclassical models that Kirzner retains in his critique.[136]

1. The Neoclassical View of Competition and the Market

The neoclassical view of the market relies on assumptions of perfect competition and perfect contestability. Such a view is overly-simplified and does not leave room for the process of entrepreneurial discovery.

a. *Perfect competition*. The standard treatment of the market offered by 20th century neoclassical economics, and implicitly engrained in many of the justifications for common carriage regulation, presumes, among other things, that robust competition only occurs under equilibrium conditions with many firms and consumers.[137] This view means that one market

[133] Israel M. Kirzner, *The Entrepreneurial Process*, *in* THE ENVIRONMENT FOR ENTREPRENEURSHIP 41, 52 (Calvin A. Kent ed., 1984) [hereinafter *The Entrepreneurial Process*].
[134] *See* JOSEPH A. SCHUMPETER, THE THEORY OF ECONOMIC DEVELOPMENT 65–66, 86–90 (Redvers Opie trans., Transaction 1983) (1934) [hereinafter THE THEORY OF ECONOMIC DEVELOPMENT]; JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY 132 (3d ed. 1950) [hereinafter CAPITALISM, SOCIALISM AND DEMOCRACY].
[135] *See* Israel M. Kirzner, *Creativity and/or Alertness: A Reconsideration of the Schumpeterian Entrepreneur*, 11 REV. AUSTRIAN ECON. 5, 5–6 (1999) [hereinafter *Creativity and/or Alertness*]; *but see, e.g.*, KIRZNER, COMPETITION & ENTREPRENEURSHIP, *supra* note 42, at 100–5.
[136] *See generally* James M. Buchanan & Viktor J. Vanberg, *The Market as a Creative Process*, 7 ECON. & PHIL. 167 (1991), *reprinted in* FEDERALISM, LIBERTY, & THE LAW 289 (2001).
[137] *See* Harold Demsetz, *Why Regulate Utilities?*, 11 J.L. & ECON. 55, 55 (1968).

participant cannot, or at least should not be able to, affect the relevant conditions of price and quantity (not to mention, quality) in equilibrium.[138] Additionally, all market participants are presumed to have perfect knowledge, or, at least, enough knowledge to be able to calculate known risk probabilities.[139] Any real-world deviations from these assumptions are typically deemed to be market failures, often in need of government intervention to correct the failure.[140] In particular, utilities such as telecommunications are often singled out as needing regulation, owing to the large economies of scale and capital-intensive business models that limit the number of rivals in a market at any given point in time.[141]

However, the neoclassical paradigm paints a simple, static picture of a complex, dynamic world. This static picture is the result of the paradigm's focus on prices and quantities in the equilibrium state of the market.[142] Despite the extreme unlikelihood that any given market in any given time or location, even one with many producers and many consumers, is in perfect equilibrium, the theory fails to provide any consideration of why this may be the case (beyond labeling such deviations as "market failures") or even how the market moves toward or away from equilibrium.[143] Without any ability to consider the market as a *process* through which individual economic decisions are mutually coordinated through repeated iterations of social interaction, there is no need for any consideration of an individual agent, the entrepreneur, who catalyzes the change that drives this process.[144] Indeed, because the neoclassical paradigm presumes that perfect competition only takes place under conditions of equilibrium, there is no longer room for any entrepreneurial action, as any changes would move the market out of

[138] *See* Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 63.
[139] *See id.* at 62–63.
[140] *See* KIRZNER, DISCOVERY & THE CAPITALIST PROCESS, *supra* note 44, at 119–20; Demsetz, *supra* note 141.
[141] *See* Demsetz, *supra* note 141, at 55.
[142] *See* KIRZNER, COMPETITION & ENTREPRENEURSHIP, *supra* note 42, at 4.
[143] *See* Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 64–66.
[144] *See* KIRZNER, COMPETITION & ENTREPRENEURSHIP, *supra* note 42, at 21.

equilibrium.[145] All of this leads regulators to mistake dynamic competition for monopolistic behavior and causes policymakers to ignore the possibility of yet unknown innovations in technology and business practices changing the landscape of a market.[146]

b. *Perfect contestability*. Some neoclassical economists have attempted to account for the possibility that the "pressures of potential competition"[147] can serve as an effective check on the market power of incumbent firms, even when there is only one monopolist.[148] The basic theoretical foundations of what became known as "the theory of contestable markets" or "perfect contestability" had been around since the 19th century[149] but had not been fully reconciled with modern neoclassical economics until 1982.[150] The theory starts with a simple conjecture, namely "that any inefficient industry structure must be unsustainable."[151] The contrapositive of this conjecture, that sustainable industry structures must be efficient, implies that the standard neoclassical assumption that efficiency requires many price-taking producers is unnecessary.[152] Different industries have different cost-minimizing structures, and the relative sustainability of different industries depends on maintaining a cost-minimizing configuration.[153] Under contestability theory, sustainably concentrated industries, even monopolies, have incentives to behave efficiently, earning no more than a "normal rate of return," because extra-normal returns

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[145] *See id.* at 21.
[146] *See id.* at 20–23.
[147] William J. Baumol, *Contestable Markets: An Uprising in the Theory of Industry Structure*, 72 AM. ECON. REV. 1, 2 (1982) [hereinafter *Uprising*].
[148] *See* WILLIAM J. BAUMOL, JOHN C. PANZAR, & ROBERT D. WILLIG, CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE 6 (1982) [hereinafter CONTESTABLE MARKETS].
[149] *See* Baumol, *Uprising*, *supra* note 151, at 2; see also BAUMOL ET AL., CONTESTABLE MARKETS, *supra* note 152, at 4–5 & n.2, for additional discussion of mid-20th century work that contributed to the theory of contestable markets.
[150] See generally Elizabeth E. Bailey, *Foreword* to BAUMOL ET AL., CONTESTABLE MARKETS, *supra* note 152, at xii–xxii (1982), for a history of the development of perfect contestability through the 1970s and early 1980s.
[151] Bailey, *supra* note 154, at xix; *see also* BAUMOL ET AL., CONTESTABLE MARKETS, *supra* note 152, at 97–98 *passim*.
[152] *See* Bailey, *supra* note 154, at xix.
[153] *See* BAUMOL ET AL., CONTESTABLE MARKETS, *supra* note 152, at 5–6.

would attract entrants that would push the market back into equilibrium.[154] For this to work, perfect contestability requires the assumption of "reversible entry—that is, [entry] with costless exit."[155] In other words, the potential entrants that make incumbents behave efficiently must be able to recoup any costs from actually entering the market.[156] Even when a potential entrant faces the possibility of losing, or "sinking," some of their costs, an "almost contestable"[157] market can still exist if, for example, the potential entrant is able to contract with potential customers to guarantee that they can recoup any sunk costs associated with entering the market.[158]

All perfectly competitive markets are perfectly contestable, but by introducing the threat of potential competition and relaxing the assumption requiring many price-taking firms for efficiency, perfect contestability is able to show that markets without perfect competition may still be efficient given reversible entry.[159] Entry into telecommunications markets typically does involve significant investments in fixed capital (usually a sunk cost), thus making exit (and by implication, entry) costly.[160] But entrants into telecommunications markets have used contracting as a way to recover sunk costs from entry,[161] lending some support to the notion that telecommunications markets are "almost contestable."

The theory of contestable markets has been described as focusing on market *process* rather than structure.[162] Indeed, the theory makes reference to entrepreneurs who are able and

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[154] *Id.*
[155] *Id.*
[156] *Id.* at 7.
[157] William J. Baumol, John C. Panzar, & Robert D. Willig, *Contestable Markets: An Uprising in the Theory of Industry Structure: Reply*, 73 AM. ECON. REV. 491, 493 (1983) [hereinafter *Reply*].
[158] *See id.* at 494.
[159] *See* Baumol, *Uprising*, *supra* note 151, at 4.
[160] *See, e.g.*, Thomas W. Hazlett, *Duopolistic Competition in Cable Television: Implications for Public Policy*, 7 YALE J. ON REG. 65, 104 & n.146 (1990).
[161] *See, e.g.*, *id.*
[162] *E.g.*, *id.* at 100 n.130.

willing to enter markets where unsustainable market structures exist.[163] But like perfect competition, perfect contestable markets are still assumed to be efficient only in equilibrium.[164] Furthermore, whereas theory has been applied to situations in which innovation has decreased sunk costs associated with entry,[165] it still assumes a "given state of technology"[166] and thus cannot explain how the innovation that changes the sustainability of particular market structures and creates *new* profit opportunities comes about.[167] Perfect contestability provides neoclassical economics with a theory of competition that accounts for the possibility that many small firms simultaneously producing may not be necessary for competitive efficiency, but it still falls short of explaining how entrepreneurs may discover new profit opportunities that change the market in unforeseen ways.

2. Entrepreneurship and the Market Process: Three Views

The literature on entrepreneurship reflects three views of the role of the individual creator in the market and the importance of the process of discovering new market opportunities.

a. *Israel Kirzner's entrepreneurial discovery process*. Israel Kirzner's critique of the neoclassical paradigm turns that model's very idea of competition on its head by developing a role for the entrepreneur as an equilibrating force—an entrepreneur who is alert to profit opportunities in today's market and acts to change the market, correcting the mistakes of past market participants who missed those opportunities.[168] These opportunities are not found through

[163] *See* BAUMOL ET AL., CONTESTABLE MARKETS, *supra* note 152, at 25, 349–50.
[164] *See id.* at 9–12, 269–71.
[165] *See, e.g.*, Elizabeth E. Bailey & William J. Baumol, *Deregulation and the Theory of Contestable Markets*, 1 YALE J. ON REG. 111, 135–36 (1983).
[166] Jerry Ellig, "Dynamic Competition, Online Platforms, and Regulatory Policy," Statement submitted to the House of Lords Select Committee on the European Union, EU Internal Market Sub-Committee, Call for Evidence: Online Platforms and the EU Digital Single Market, 2, (December 9, 2015), http://mercatus.org/sites/default/files/Ellig-House-Lords-evidence-Dynamic-Competition.pdf.
[167] *See id.*
[168] *See* Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 70.

a deliberate process of systematic search, nor are they the product of pure luck. Rather, they are the outcome of a discovery process that reveals our sheer ignorance of the world and the future.[169] Opportunities for entrepreneurship can present themselves in a variety of forms with a wide range of magnitudes: they can be as small as arbitrage opportunities, where entrepreneurs correct small price discrepancies in one time period, or they can be innovations that create new "outputs, methods of production, or [methods of] organization not hitherto in use" that can affect the market process for the indefinite future.[170] No matter what form the opportunity takes, entrepreneurs must act to realize profit opportunities through the competitive market process, where freedom of entry and exit allows entrepreneurs to compete to "outdo their rivals in offering goods to consumers."[171] The double-edged sword of profit-and-loss offers incentives both to remain vigilant for gaps in the market and to avoid making errors in discovering such gaps.[172]

To Kirzner, competition is an iterative learning and discovery process that takes place over multiple time periods, wherein producers and consumers are constantly revising their beliefs and actions in a quest to coordinate their economic activity with that of others.[173] In each period, errors made by individual market participants are exposed; these errors represent opportunities for entrepreneurial action.[174] The neoclassical conception of perfect competition is not really competition, because it describes an end state, a point in time when all opportunities for entrepreneurship have been exhausted.[175] Conceptualizing competition as an iterative process

[169] *See id.* at 72.
[170] Kirzner, *The Entrepreneurial Process*, *supra* note 137, at 52.
[171] KIRZNER, COMPETITION & ENTREPRENEURSHIP, *supra* note 42, at 73.
[172] *Id.* at 178–79; Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 73.
[173] *See* KIRZNER, COMPETITION & ENTREPRENEURSHIP, *supra* note 42, at 8–9.
[174] *See id.* at 11.
[175] *See id.* at 87 ("As soon as we draw the cost and revenue curves facing the firm, no matter what their shape, we have created a theoretical case in which all competitive behavior has by definition been ruled out.").

no longer requires many producers operating in the same time period for robust competition; as long as entrepreneurs are able to freely enter and exit the market, competition will be robust.[176] While perfect contestability also emphasizes the importance of free entry and exit and allows for some intertemporal change, it still assumes a relatively static market with no innovation or endogenous mechanism for change.[177] Furthermore, while Kirzner notes that "most of the insights of contestable market theory [are] . . . consistent with entrepreneurial discovery theory,"[178] inability to recoup costs is not a barrier to entry or entrepreneurship—only arbitrary obstacles to participation in the discovery process (usually erected by government) or inability to access necessary resource inputs without close substitutes pose barriers to free entry in the market process.[179] Finally, whereas the neoclassical paradigm relies on the concept of an industry to determine how much competition a particular producer faces at any given point in time, the iterative and competitive nature of the market process means that any producer with dominance in a particular niche of today's market still faces the threat of competition not only from potential competitors producing the same good or service but also from other producers in the current period who provide close substitutes.[180]

Kirzner's conception of competition as an entrepreneurial discovery process, rather than a state of equilibrium, naturally implies that the indicators of healthy, robust competition under the theory of the market process will differ from those under the neoclassical paradigm. Static measures of industry concentration or entry and exit costs cannot lend evidence one way or the other as to the health and vigor of the competitive process. Evidence of robust competition can

[176] *See* Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 74.
[177] *See id.*
[178] See *id.*
[179] See KIRZNER, COMPETITION & ENTREPRENEURSHIP, supra note 42, at 78–86 *passim*.
[180] See *id.* at 87–88.

be found in how firms seek to differentiate themselves from their competitors.[181] The introduction of new products or business plans by firms indicates that they are, in fact, discovering gaps in the market and attempting to fill those gaps with new products or new ways of producing and selling.[182] Firms may compete on price, but they may also compete on "durability, selection, service, support, and other valued qualities."[183] When competing firms "tailor their products to satisfy the variety of preferences among their buyers,"[184] firms are likewise robustly engaged in this discovery process, each attempting to better serve the specific needs of more consumers. If these discoveries are especially valued by consumers or they greatly improve the efficiency of firms or markets, then firms will accrue potentially large entrepreneurial profits.[185] The presence of one or more of these signs in an industry or group of related industries indicates that the market process is working well and that competition is robust.

b. *James Buchanan and Viktor Vanberg's creative market process*. Since Kirzner offered his critique of the neoclassical paradigm, other economists have attempted to build on his work, by either expanding and operationalizing his theory for applied research,[186] or critiquing his approach as incomplete.[187] A 1991 article by economists James Buchanan and Viktor Vanberg—on how the use of nonlinear analysis of complex and open-ended systems could enrich economics—falls into the latter camp.[188] They criticize Kirzner thusly: in his attempt to straddle

[181] *See* Jerry Ellig & Daniel Lin, *A Taxonomy of Dynamic Competition Theories*, *in* DYNAMIC COMPETITION & PUBLIC POLICY 16, 29 (Jerry Ellig ed., 2001).
[182] *See id.*
[183] *Id.*
[184] *Id.*
[185] *Id.*
[186] *See generally* Peter G. Klein & Per Bylund, *The Place of Austrian Economics in Contemporary Entrepreneurship Research*, 27 REV. AUSTRIAN ECON. 259 (2014).
[187] *See* Kirzner, *Entrepreneurial Discovery*, *supra* note 42, at 78–80.
[188] *See generally* Buchanan & Vanberg, *supra* note 140.

the fence between the teleological, equilibrium-focused neoclassical models and the nonteleological conceptions of the market as a creative process, his use of the neoclassical equilibrium framework in explicating the theory of the market process implies a subtle acceptance of a teleology of the market.[189] In other words, whereas Kirzner has replaced the neoclassical paradigm's treatment of entrepreneurship as a theoretical black box with an actual working theory of entrepreneurship, his retention of the neoclassical equilibrium apparatus limits his theory by presuming a benchmark (tomorrow's market) by which today's errors can be judged.[190] Buchanan and Vanberg argue that this is a mistake because "'the future is not given,' but is created in an unfolding evolutionary process."[191] As Buchanan put it elsewhere, the order of the market does not exist without and cannot be separated from the process within which it is generated.[192] Any future market equilibrium cannot be known until after the market process has taken place in that time period.[193] Furthermore, there is no "*external, independently defined* objective against which the results of market processes can be evaluated."[194]

The implication, of course, is that the market has no "telos," or end (e.g., equilibrium), toward which it is moving.[195] Rather, the complex evolutionary nature of the market "allows participants to pursue that which they value, subject to the preferences and endowments of others, and within the constraints of general rules of the game that allow, and provide incentives for, individuals to try new ways of doing things."[196] The choices individual participants make

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[189] *See id.* at 298, 300.
[190] *See id.* at 300–1.
[191] *Id.* at 290–91 (footnote omitted) (quoting Ilya Prigogine, *Science, Civilization & Democracy*, 18 FUTURES 493, 493 (1986)).
[192] *See* James M. Buchanan, *Order Defined in the Process of Its Emergence*, LITERATURE LIBERTY, Winter 1982, at 5, *reprinted in* THE LOGICAL FOUNDATIONS OF CONSTITUTIONAL LIBERTY 244, 244–45 (1999).
[193] *See* Buchanan & Vanberg, *supra* note 140, at 301.
[194] *Id.* at 307 (emphasis added) (internal quotation marks omitted).
[195] *See id.* at 306–7.
[196] *Id.* at 307 (internal quotation marks omitted).

cannot be known ahead of time because they emerge as part of the process, not beforehand.[197] When the market process is conceived as an open-ended evolutionary process, the entrepreneurial function requires more than just alertness to errors; entrepreneurship requires creative *imagination* to come up with new products that will appeal to consumers.[198] No predefined consumer preferences or equilibrium points (i.e., points at which gains from trade or potential trading prospects could be exhausted) constrain entrepreneurs.[199] By defining the entrepreneurial function as discovery and correction of previous errors relative to some ideal equilibrium point, rather than creative imagination of new opportunities, Kirzner misses some of these boundless opportunities that entrepreneurs can create, rather than merely discover, through the market process.[200]

c. *Joseph Schumpeter's gale of creative destruction*. Long before Kirzner made his mark on economics and the entrepreneurship literature, Joseph Schumpeter was challenging the neoclassical approach to understanding competition, entrepreneurship, and the market in a manner comparable to, although decidedly distinct from, Kirzner. Schumpeter's conception of the entrepreneur derives not from a theory of the market, but rather from his theory of economic development.[201] Schumpeter defines development as "the carrying out of new combinations,"[202] including the introduction of new products, new methods of production, new markets, new sources of raw materials or intermediate production goods, and new organizational structures.[203]

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[197] *See* Buchanan, *supra* note 196, at 245; *see generally* JAMES M. BUCHANAN, COST AND CHOICE (Liberty Fund 1999) (1969).
[198] Buchanan & Vanberg, *supra* note 140, at 307.
[199] *Id.* at 308.
[200] *See id.* at 303.
[201] *See generally* SCHUMPETER, THE THEORY OF ECONOMIC DEVELOPMENT, *supra* note 138.
[202] *Id.* at 65.
[203] *Id.* at 66.

The catalysts of change, in Schumpeter's theory, are entrepreneurs, who distinguish themselves by

> reform[ing] or revolutioniz[ing] the pattern of production by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on.[204]

Schumpeter refers to the process of this reform and revolution as a "perennial gale of creative destruction."[205] He sees the competition qua innovation that arises from this gale as "much more effective [than price competition] . . . [it is] the powerful lever that in the long run expands output and brings down prices. . . ."[206]

There has been much debate as to whether or not Kirzner's and Schumpeter's theories of entrepreneurship and the market process (or economic development) are complementary or exclusive. In his earlier writings, Kirzner emphasizes the differences between the Kirznerian entrepreneur and the Schumpeterian entrepreneur.[207] For instance, while the Kirznerian entrepreneur is an equilibrating force, the Schumpeterian entrepreneur, who is actively engaged in "creative destruction," can be thought of as a disequilibrating force.[208] But in his more recent work, Kirzner has found similarities and complementarities between Schumpeter and his own work.[209] While Schumpeter's entrepreneur is not an arbitrageur, in the limited sense described in section III.A.2.a, both the Kirznerian and Schumpeterian entrepreneurs can (and in the latter case, must) engage in innovation that "propel[s] the engine of long run economic growth and

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[204] SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY, *supra* note 138, at 132.
[205] *Id.* at 84.
[206] *Id.* at 84–85.
[207] *See* KIRZNER, COMPETITION & ENTREPRENEURSHIP, *supra* note 42, at 100–5.
[208] *See id.* at 102.
[209] *See, e.g.*, Kirzner, *Creativity and/or Alertness*, *supra* note 139, at 5–6.

development."[210] Kirzner even suggests that the equilibrating nature of his entrepreneur and the disequilibrating nature of Schumpeter's entrepreneur are, in fact, two sides of the same coin.[211]

Given the similarities between the Kirznerian and Schumpeterian conceptions of entrepreneurship, it is not surprising that each of them imply the existence of similar indicators of healthy, robust dynamic competition. One such similarity can be found with regard to the differing strategies that firms may take when innovating in the market. In Schumpeterian competition, firms, unaware of what innovations will survive the market test and the gale of creative destruction, will often "choose different innovation strategies."[212] As with Kirznerian entrepreneurship, Schumpeterian entrepreneurship yields "dramatic departures from previous practices, products, and technologies."[213] This "discontinuous change" is also visible in the determination of which firms are leaders: older, more dominant firms must continue to innovate or risk losing their position.[214] Firms that innovate successfully will likely capture "supranormal profits" in the wake of their innovation, although over time, those profits will diminish as other firms imitate their strategy.[215] One minor difference between Schumpeter and Kirzner is that, whereas Kirzner is largely agnostic as to the effect of market power on competition and entrepreneurship, Schumpeter views monopoly or market power as an affirmative sign of healthy competition and innovation in a market. In addition to large firms' better ability to pool resources for research and development, spread risk, and hire the most productive human capital, the allure of market power that successful innovation brings is itself an incentive to engage in

[210] Kirzner, *The Entrepreneurial Process*, *supra* note 137, at 41.
[211] *See* Kirzner, *Creativity and/or Alertness*, *supra* note 139, at 14.
[212] Ellig & Lin, *supra* note 185, at 19.
[213] *Id.* at 20.
[214] *Id.*
[215] *Id.*

innovation.[216] Of course, this does not imply that the government should explicitly grant monopolies or otherwise allow unchecked market power to accrue in such a way that would discourage or place a damper on innovation.[217] But it does suggest that policymakers should allow innovators to enjoy the rewards of entrepreneurship (usually extranormal profits) if they wish to encourage innovation.[218]

3. Regulation and the Market Process

All of the above theories have implications for regulatory policy, especially within industries that have few incumbents at any given point in time. Kirzner, in particular, highlighted the implications that his theory of the market process had for understanding government intervention into the market process. To Kirzner, any alteration of the market process through government regulation, whether "imposed price ceilings and floors, . . . mandated quality specifications, [or] . . . other restraints or requirements imposed in interpersonal market transactions,"[219] threatens to distort entrepreneurial discovery, either stifling it or redirecting it toward unproductive activities.[220] Kirzner points to four distortions of the discovery process that occur because of government regulation—two that indirectly affect the market process by way of their impact on regulators, and a further two that directly affect the market process and entrepreneurship.

First, misunderstandings of how the discovery attributes of the market process work drive demand for regulation.[221] Because of the potentially slow nature of the iterative process of

[216] *Id.* at 19.
[217] *See id.* at 21.
[218] *See id.* at 20.
[219] KIRZNER, DISCOVERY & THE CAPITALIST PROCESS, *supra* note 44, at 139.
[220] *Id.* at 137.
[221] *Id.* at 137–39.

learning and discovery, regulators may perceive a market failure and seek to correct it without recognizing that, left to their own devices, entrepreneurs may discover their own solution to the failure.[222] Likewise, regulators may perceive market failures when the discovery process has already exhausted all profit opportunities, suggesting that any corrections to the failure are more costly than the failure itself.[223] Second, because regulators lack a profit-and-loss (or equivalent) signal, they lack the feedback and knowledge necessary to correct any errors *they* may have made in issuing particular regulations.[224] Not only are they ignorant of current and future economic conditions, but they are also unable to discover their own errors and correct them.

The regulations that arise from these distortions provide two direct distortions of entrepreneurship and the market process on their own. First, such regulations stifle entrepreneurial discovery in the market process by erecting barriers to entry, forbidding the pursuit of particular profit opportunities, or imposing requirements to pursue certain activities at the expense of others.[225] Second, these prohibitions and requirements may open up new, unanticipated, otherwise nonexistent, profit opportunities that may not be desired by consumers or even the regulators themselves.[226]

Buchanan and Vanberg's conception of the market process as a complex, open, nonlinear system magnifies these critiques. Because the market is not bound by one equilibrium point toward which entrepreneurs are moving the market, the potential for distortion by regulators is perhaps several magnitudes of order greater than under even Kirzner's approach, owing to the forestalling and redirection of the *creative* entrepreneurial activity brought about by human

[222] *Id.*
[223] *See id.*; *cf.* Coase, *Social Cost*, *supra* note 46, at 17–18.
[224] KIRZNER, DISCOVERY & THE CAPITALIST PROCESS, *supra* note 44, at 139–41.
[225] *Id.* at 141–44.
[226] *Id.* at 144–45.

imagination.[227] Likewise, Schumpeter's emphasis on innovation as the function of entrepreneurship makes this critique all the more relevant to the US broadband market. Because the US broadband market is characterized by large economies of scale and capital-intensive business models, the primary channel of competition in these industries is innovation.[228] If the innovative discovery process is impeded or otherwise misdirected through regulation, then competition and entrepreneurship in the US broadband industry will suffer, ultimately harming consumers and the broader economy.

B. A New Institutional Approach to Network Management

Whereas the general effect of network neutrality regulation on entrepreneurship in broadband and related industries is now clear, it remains to be seen how nonneutral network management came about and what economic purposes it serves. Many network neutrality proponents have started from the presumption that nonneutral network management serves little purpose beyond being a tool for price discrimination or suppressing competition.[229] Far from being per se anticompetitive or anticonsumer, though, nonneutral network management as a business practice has the potential to improve consumers' broadband experience, both directly and indirectly. Consumers can benefit directly from blocking or throttling when certain applications place too much strain on a network, hampering the use of other applications,[230] or when certain applications that would benefit from special prioritization (such as Voice-over-Internet Protocol

[227] *See* Buchanan & Vanberg, *supra* note 140, 309–10.
[228] *See* David J. Teece, *Favoring Dynamic over Static Competition: Implications for Antitrust Analysis & Policy*, *in* COMPETITION POLICY & PATENT LAW UNDER UNCERTAINTY: REGULATING INNOVATION 203, 211 (Geoffrey A. Manne & Joshua D. Wright eds., 2011); *see also* SCHUMPETER, CAPITALISM, SOCIALISM & DEMOCRACY, *supra* note 138, at 84–85; *cf.* Geoffrey A. Manne & Joshua D. Wright, *Innovation and the Limits of Antitrust*, 6 J. COMPETITION L. & ECON. 153, 164 (2010).
[229] *See, e.g.*, Wu, *supra* note 14, at 143 *passim*; Susan Crawford, *Response*, *supra* note 90, at 338 *passim*.
[230] *Cf.* Yoo, *supra* note 58, at 547.

[VoIP] or streaming media) are given such prioritization.[231] Where these gaps in the market exist, opportunities for profitable, mutually beneficial arrangements exist as well.

New institutional economists such as Ronald Coase[232] and Oliver Williamson[233] have recognized the clever alternative arrangements that market participants have the potential to devise in the face of unique social problems within complex institutional arrangements like the internet. In Coase's classic treatment of the problem of social costs, when a dispute arises over external costs (e.g., those involved in club or network goods such as the internet), these costs are reciprocal,[234] and transaction costs for solving the dispute are nontrivial,[235] so assigning property rights to the affected resource matters.[236] But, generally, policymakers and other outsiders to the dispute will have difficulty assigning this right for the parties.[237] Relying on private arrangements, rather than government mandates, is usually the better solution.[238]

Oliver Williamson points out that one such private arrangement among firms of different but related industries, such as broadband providers and edge providers, is a vertical arrangement, wherein two firms producing complementary goods can contract, exclusively or not, to economize on production costs.[239] These arrangements are particularly useful in cases involving what Williamson refers to as "asset specificity," that is, assets "specialized to a specific

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[231] *See* Lyons, *supra* note 105, at 1032.
[232] *See generally* Coase, *Social Cost*, *supra* note 46; *see also* Ronald Coase, *The Federal Communications Commission,* 2 J.L. & ECON. 1, 18 (1959) [hereinafter *FCC*].
[233] *See generally* Oliver E. Williamson, *The Vertical Integration of Production: Market Failure Considerations*, 61 AM. ECON. REV. 112 (1971) [hereinafter *Vertical Integration*]; Oliver E. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 J.L. & ECON. 233 (1979) [hereinafter *Transaction-Cost Economies*].
[234] *See* Coase, *Social Cost*, *supra* note 46, at 2.
[235] *See id.* at 15–19.
[236] *See id.* at 42–44.
[237] *See id.* at 17–18; Coase, *FCC*, *supra* note 236, at 18.
[238] *See* Coase, *FCC*, *supra* note 236, at 18; *see also* 2010 Open Internet Order, *supra* note 21, at 18056 (McDowell, Comm'r, dissenting).
[239] *Cf.* Williamson, *Transaction-Cost Economies*, *supra* note 237, at 234, 245–47. The logic, of course, is applicable to external costs as well.

transaction."[240] Asset specificity can be thought of as existing on a gradient, with high specificity, intermediate specificity, and nonspecificity as three major sections along the gradient.[241] How specific an asset is to particular transactions dictates what kind of contracting is most efficient—highly specific assets (i.e., assets used for "idiosyncratic" transactions that are "not transferable to other uses")[242] are likely to be vertically integrated into a single firm, while assets with decreasing levels of specificity can be dealt with by contractual arrangements of decreasing complexity.[243] Factors that determine how specific an asset is and what contracting arrangement firms may choose to use include uncertainty surrounding the transaction, frequency of recurring transactions, and how much each firm has to invest in the transaction.[244]

In the context of the internet, it is difficult to imagine how an edge provider, such as Netflix, would be able to reach its customers without an intermediary (an ISP). Likewise, an ISP is not particularly useful to its customers if it cannot (or will not) connect them to the content or applications they want.[245] Edge providers and ISPs are, in a way, specialized to particular transactions with each other (and their customers). Although not fully specialized in the way that, say, car parts are to car manufacturing, the elements of complementarity and coproduction between their respective products are strong enough to suggest that at least a minimum degree of asset specificity exists between the two. For most content on the internet, negotiating vertical arrangements between edge providers and ISPs would be far more costly than beneficial,[246] and given the massive network externalities that exist on the internet, ISPs would happily allow the

[240] Oliver E. Williamson, *The Economics of Organization: The Transaction Cost Approach*, 87 AM. J. SOC. 548, 555 (1981) [hereinafter *Economics of Organization*].
[241] *Id.* at 569.
[242] Williamson, *Transaction-Cost Economies*, *supra* note 237, at 252.
[243] *See* Williamson, *Economics of Organization*, *supra* note 244, at 569; Williamson, *Transaction-Cost Economies*, *supra* note 237, at 245–53.
[244] Williamson, *Transaction-Cost Economies*, *supra* note 237, at 239.
[245] *Cf.* James B. Speta, *supra* note 71, at 80.
[246] *Cf.* Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 348 (1967).

traffic without any harm. However, especially in the case of bandwidth-intensive or time-sensitive applications, both edge providers and ISPs may find that they could benefit from a vertical arrangement.[247] For example, a deal to prioritize packets from a video streaming service, which enhances the quality of the video streaming experience for end users, would increase the value of both the video streaming service and the ISP for those users. Sometimes, these arrangements take the form of outright vertical integration,[248] which is ironically (and perhaps unintentionally) favored under the 2015 Open Internet Order over other forms of vertical arrangements.[249] However, given the heterogeneity of the internet, policy should not favor one form of vertical arrangement over another. So long as an agreement can be reached, any economies from such a deal can be realized, and consumers can enjoy the benefits as well.[250] Consumers, broadband providers, and edge providers alike may benefit indirectly from a new cost-sharing structure that places appropriate costs on more bandwidth-intensive and time-sensitive applications,[251] allows these same applications to enjoy special prioritization,[252] and creates new incentives for broadband service providers to invest in improving their networks.[253]

Furthermore, these arrangements have the potential to benefit new entrants far more than incumbents. In his 1979 article on "payola," the now-banned music industry practice whereby

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[247] *See* Williamson, *Economics of Organization*, *supra* note 244, at 555.
[248] *See generally* Brent Skorup & Adam Thierer, *Uncreative Destruction: The Misguided War on Vertical Integration in the Information Economy*, 65 FED. COMM. L.J. 157 (2013).
[249] Hal Singer, *Oral Arguments Expose the Open Internet Order's Weak Underbelly*, FORBES, December 17, 2015, http://www.forbes.com/sites/halsinger/2015/12/17/oral-arguments-expose-the-open-internet-orders-weak-underbelly/.
[250] *Cf.* Oliver E. Williamson, *Economies as an Antitrust Defense: The Welfare Tradeoffs*, 58 AM. ECON. REV. 18, 21–23, 32, 34 (1968).
[251] *See* Gary S. Becker, Dennis W. Carlton, & Hal S. Sider, *Net Neutrality & Consumer Welfare*, 6 J. COMPETITION L. & ECON. 497, 513, 517 (2010).
[252] *See id.* at 511–12.
[253] *See* Daniel A. Lyons, *supra* note 105, at 1037–38.

record labels paid disc jockeys on radio stations to play their music on the air,[254] Coase noted that it was

> the new [record] companies . . . [who] relied on payola to obtain "exposure" for their records. . . . These companies lacked the name-stars and the strong marketing organization of the major companies, and payola enabled them to launch their new records in a local market and, if success there was achieved, to expand their sales by making similar efforts in other markets.[255]

These vertical arrangements between content creators (record companies) and content distributors (radio stations) represented opportunities for productive entrepreneurial profit to both parties, including upstarts in the record label business (which, in turn, increases long-run dynamic competition), and benefited consumers by exposing them to new music they might not have otherwise heard. After payola was effectively banned in 1960, the record labels began to consolidate, with six labels controlling 85 percent of the market by 1979.[256] This result should not have been surprising: with the loss of payola, these companies had "vastly increas[ed] promotional expenses, while the most powerful form of advertising—radio play—remain[ed] free."[257] Alternative promotional activities, including the use of "promoters" by the large record labels, cost more than smaller labels could afford;[258] the ban on payola, far from encouraging a "virtuous cycle," may well have put a damper on it. Likewise, banning or limiting nonneutral network management arrangements, such as paid prioritization or "zero-rating" of data, threatens to choke off the virtuous cycle rather than aid it, as new edge providers and application

[254] *See* Coase, *Payola*, *supra* note 48, at 270–74, 286–87.
[255] *Id.* at 315–16.
[256] *Id.* at 317 (quoting Peter W. Bernstein, *The Record Business: Rocking to the Big-Money Beat*, FORTUNE, April 23, 1979, at 59, 61).
[257] Coase, *Payola*, *supra* note 48, at 317 (quoting Bernstein, *supra* note 260, at 61).
[258] *See* Peter J. Alexander, *The Music Recording Industry*, *in* 12 THE STRUCTURE OF AMERICAN INDUSTRY 183, 194–97 (James Brock ed., 2009); Coase, *Payola*, *supra* note 48, at 317–18.

developers lose the ability to negotiate deals that would allow broadband users to access their applications and use them to their full potential.

IV. Entrepreneurship in Network Management: Four Cases

Taking away the ability of broadband service providers to use "intelligent" network management stifles the entrepreneurial discovery process in two ways. First, preventing broadband service providers from negotiating with providers of bandwidth-intensive, time-sensitive applications, which put the most strain on the network and often require the latest technology, diminishes broadband providers' ability to recoup their investments, discouraging future innovation and investment in their networks.[259] Second, development of bandwidth-intensive, time-sensitive applications will be harmed, both directly through the inability of edge providers to negotiate with broadband providers for prioritization,[260] and indirectly through the lack of investment on the part of broadband providers into technologies and infrastructure that could handle such applications.[261]

A few cases have arisen around the United States and the world that demonstrate the mutually beneficial opportunities of entrepreneurship that nonneutral network management practices and arrangements offer. This section covers one example from each nonneutral network management practice that the 2015 Open Internet Order regulates (a close, hypothetical example in the case of paid prioritization). Careful attention has been paid to pick arrangements that clearly run afoul of the vague language of the order, [262] or at least have the strong potential to, and would be applicable to the US broadband market today. Each example shows the potentially

[259] *See* Becker et al., *supra* note 255, at 513.
[260] *Id.* at 511–12 (2010); Yoo, *supra* note 58, at 551–52.
[261] *See* Becker et al., *supra* note 255, at 511–12.
[262] 2015 Open Internet Order, *supra* note 21, at 5923 (Pai, Comm'r, dissenting).

harmful disruption to the entrepreneurial discovery process that the order's regulatory intervention threatens.

A. Blocking: MetroPCS and Video Streaming

In January 2011, MetroPCS, then the fifth-largest wireless carrier in the United States, announced that it would offer two unlimited 4G data plans for $40 and $50 per month that blocked all video streaming services except YouTube.[263] At the time, MetroPCS had only a 3 percent market share in the wireless carrier market and was known for serving primarily lower-income Americans.[264] In an attempt to alleviate congestion on its older 2G network, it became the first US wireless carrier to offer 4G service.[265] Although MetroPCS was the first US wireless carrier to rollout a 4G network, its small size meant that it did not have much spectrum at the time; while today's larger carriers offer 4G on spectrum bands of 20 megahertz (MHz), MetroPCS's 4G bands were, at the time, as small as 1.4 MHz.[266] With limited spectrum bandwidth for 4G, too much bandwidth-intensive, time-sensitive use by just a few of their customers would have slowed down the network dramatically for everyone, decreasing the value of the network for customers and likely not attracting enough to switch. Additionally, because it had previously offered unlimited YouTube streaming on its 2G network, MetroPCS attempted to

[263] *See* Ryan Singel, *MetroPCS 4G Data-Blocking Plans May Violate Net Neutrality*, WIRED, January 7, 2011, http://www.wired.com/2011/01/metropcs-net-neutrality/. The second plan offered more than the first, but it still blocked all non-YouTube video streaming. *See id.* Some public interest groups also claimed that MetroPCS also blocked over-the-top (OTT) VoIP application (e.g., Skype), *see id.*, but the company did not so much block these applications as simply not offer any phones that supported such applications, *see* Yoo, *supra* note 58, at 551 & n.352. Within a month of the announcement, it had added a phone with such capabilities. *See id.*

[264] *See* Brent Skorup, *If You're Reliant on the Internet, You Loathe Net Neutrality*, REAL CLEAR MARKETS, February 12, 2014, http://www.realclearmarkets.com/articles/2014/02/12/if_youre_reliant_on_the_internet_you_loathe_net_neutrality_100893.html.

[265] *See id.*

[266] *See* Yoo, *supra* note 58, at 551.

incentivize customers to switch to the new plan by continuing to offer the same service.[267] Offering only YouTube had an additional advantage for MetroPCS as well: because they had already been offering unlimited YouTube over their 2G network, MetroPCS already had compression software specifically designed for YouTube that would allow them to offer unlimited streaming over their small 4G network.[268] MetroPCS also offered a more expensive 4G data plan for $60 per month that did not block other video streaming services.[269]

Fortuitously, MetroPCS announced this new plan just weeks after the FCC adopted the 2010 Open Internet Order,[270] which many public interest groups thought MetroPCS was now violating by offering the plan.[271] By the end of the month, Free Press, a public interest group, had filed a complaint with the FCC,[272] alleging violations of the new network neutrality rules. MetroPCS filed suit in the D.C. Circuit, challenging the legality of the same.[273] MetroPCS eventually dropped the case and stopped offering the plan after it sought to merge with T-Mobile, then the fourth-largest US wireless carrier, a deal that required review from the FCC.[274] Nonetheless, the company's entrepreneurial efforts still deserve some attention.

MetroPCS, the first US carrier to offer 4G service of any kind, is also a low-cost carrier, offering payment plans that typically appeal to less well-off Americans.[275] The Pew Research Center has consistently found in its surveys of broadband adoption in the United States that

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[267] *See id.*
[268] *See id.*
[269] *See* Skorup, *supra* note 268.
[270] *See generally* 2010 Open Internet Order, *supra* note 21.
[271] *See* Singel, *supra* note 267.
[272] *See generally* Letter from M. Chris Riley, Gen. Counsel, Free Press, for Julius Genachowski, Chairman, FCC (January 10, 2011), http://www.freepress.net/sites/default/files/resources/MetroPCS_Letter_1_10_11.pdf.
[273] *See* Ryan Singel, *Accused of Violating Net Neutrality, MetroPCS Sues FCC*, WIRED, January 25, 2011, http://www.wired.com/2011/01/metropcs-net-neutrality-challenge/.
[274] *See* Skorup, *supra* note 268.
[275] *See* Letter from Carl W. Northrop, Att'y, Paul Hastings, for Julius Genachowski, Chairman, FCC, 4 (February 14, 2011) [hereinafter MetroPCS Letter], http://assets.fiercemarkets.net/public/mdano/metropcsresponse.pdf.

adults living in poor households are less likely to have internet access than their peers.[276] At the same time, those adults rely on mobile phones as their main source of internet connection.[277] MetroPCS's cheap, unlimited 4G offering likely meant that many of their customers had access to speeds measured in the millions of bits per second (megabits per second) for the first time ever, at a price lower than their competitors who only offered 3G service.[278] By limiting some of the higher-intensity uses of the network for customers who opted for the lowest-priced plan, MetroPCS was also able to ensure that its network retained its value for all of its customers. In doing so, MetroPCS filled a gap in the market that had not been met by any other producer and distinguished itself from its competitors, all signs of healthy competition according to the theory of the market process.[279] Furthermore, its choice of YouTube as the one exception to its policy of blocking streaming video was the result of a preexisting asset specificity. And if MetroPCS had been allowed to continue its nonneutral network management practices, that choice might have induced other video streaming services to work with MetroPCS to develop their own compression software so as to reach more consumers over MetroPCS's network.[280]

B. Throttling: Comcast and Peer-to-Peer Networks

Back in 2007, Comcast, then the second largest broadband service provider in the United States, was accused by several of its subscribers and the Associated Press of blocking or throttling uploads to peer-to-peer (P2P) networks like BitTorrent, eDonkey, and Gnutella.[281] P2P networks are essentially applications that facilitate the exchange of files such as documents,

[276] *See* Kathryn Zickuhr & Aaron Smith, *Digital Differences*, 4 (Pew Research Ctr., April 13, 2012), http://www.pewinternet.org/files/old-media//Files/Reports/2012/PIP_Digital_differences_041312.pdf.
[277] *See id.* at 2.
[278] *See* MetroPCS Letter, *supra* note 279, at 12 & n.42.
[279] *See* discussion *supra* section III.A.2.
[280] It should be noted that at no point did YouTube make any payments to MetroPCS during this arrangement, nor did MetroPCS seek any payment from them. *See* Yoo, *supra* note 58, at 551.
[281] *See* Peter Svensson, *Comcast Blocks Some Internet Traffic*, WASH. POST, October 9, 2007, http://www.washingtonpost.com/wp-dyn/content/article/2007/10/19/AR2007101900842.html.

music, or movies between two end users on the internet.[282] While these networks are typically used for exchanging very large files like music or movies, which require a lot of bandwidth to upload or download, they are also used to disseminate smaller files, like legal documents.[283] Within weeks of the initial reports of the throttling, public interest groups filed petitions at the FCC,[284] claiming that Comcast was violating the 2005 Internet Policy Statement[285] by throttling certain content carried over its network. In August 2008, the FCC agreed[286] and ordered Comcast to stop the practice by the end of the year.[287] Comcast initially complied but then filed suit in the US Court of Appeals for the D.C. Circuit, winning the appeal in 2010.[288] Currently, regardless of any other regulatory interventions or court cases, Comcast is bound to uphold the principles of network neutrality, including no unreasonable throttling, by its voluntary agreement to conditions attached to its merger with NBC Universal.[289]

While the controversy raged on in the press and the FCC, little attention was paid to the actual technical details of Comcast's actions and whether or not they were justified, or perhaps even beneficially entrepreneurial. Comcast was accused of throttling P2P applications because they represented a threat to the cable business; after all, much of what was being shared over these networks included movies.[290] But Comcast did not throttle video streaming services like

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[282] *See id.*
[283] *See id.*
[284] *See generally* Formal Compl. of Free Press & Public Knowledge against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications, File No. EB-08-IH-1518 (November 1, 2007); Pet. of Free Press et al. for Decl. Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management," WC Docket No. 07-52 (November 1, 2007).
[285] *See generally* Internet Policy Statement, *supra* note 33.
[286] *See* Comcast Order, *supra* note 25, at para. 43.
[287] *See id.* at para. 54.
[288] *See* Comcast Corp. v. FCC, 600 F.3d 642 (D.C. Cir. 2010).
[289] *See* In the Matter of Applications of Comcast Corp., General Electric Co., & NBC Universal Inc., MB Docket No. 10-56, For Consent to Assign Licenses and Transfer Control of Licensees, *Memorandum Opinion & Order*, FCC 11-4, 26 FCC Rcd. 4238, para. 94 & n.213 (2011).
[290] *See* Comcast Order, *supra* note 25, at para. 5.

YouTube, nor did it throttle P2P networks like Joost that were more efficient in bandwidth.[291] This point lends some support to the idea that throttling particular applications in a discriminatory way may have a legitimate purpose. And because the "shared" architecture of cable broadband is such that "a relatively small number of customers in a neighborhood place disproportionate demands on network resources,"[292] use of inefficient P2P applications "can cause congestion that degrades their neighbors' Internet experience,"[293] reducing the value of the network for users. A gap in the market appears; if Comcast is alert to this discrepancy (as it was), it can act to correct it to improve the overall value of the network for its customers (as it did). Furthermore, the FCC even acknowledged in the Comcast Order that, after the initial dispute and a private agreement,[294] Comcast had worked in conjunction with Pando and BitTorrent to create a "Proactive network provider participation for P2P," or "P4P Protocol," which promised to improve the efficiency of P2P networks during times of network congestion, ultimately eliminating the need to throttle them in the first place.[295] Indeed, the initial dispute over throttling led to a working partnership between Comcast and P2P networks, and ultimately an entrepreneurial discovery that improved the internet for broadband providers, P2P edge providers, and consumers.[296]

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[291] *See* Comcast Order, *supra* note 25, at 13092 (McDowell, Comm'r, dissenting).
[292] COMCAST CORP., ATTACHMENT B: DESCRIPTION OF PLANNED NETWORK MANAGEMENT PRACTICES TO BE DEPLOYED FOLLOWING THE TERMINATION OF CURRENT PRACTICES 1, http://downloads.comcast.net/docs/Attachment_B_Future_Practices.pdf.
[293] *Id.*
[294] *See* Comcast Order, *supra* note 25, at 13094 (McDowell, Comm'r, dissenting).
[295] *See* Comcast Order, *supra* note 25, at para. 49; Nate Anderson, *Comcastic P4P Trial Shows 80% Speed Boost for P2P Downloads*, ARSTECHNICA, November 3, 2008, http://arstechnica.com/uncategorized/2008/11/comcastic-p4p-trial-shows-80-speed-boost-for-p2p-downloads/. See also Info. Tech. & Innovation Found., *Comcast Ruling: Now What?* (June 1, 2010), https://www.youtube.com/watch?v=Cv9qwChwzek , for comments from then-BitTorrent CEO Eric Klinker on a panel jointly hosted by the Information Technology & Innovation Foundation and the Free State Foundation on BitTorrent's preferred approach to resolving the issue, which was not through policy but rather by working with ISPs to develop a solution to the congestion problem (from 27:30 to 30:26).
[296] Some may object that this outcome was only possible because of the initial complaint filed before the FCC pursuant to the 2005 Internet Policy Statement. *See* Comcast Order, *supra* note 25, at 13094 (McDowell, Comm'r,

C. Paid Prioritization: Quality Assurance of Video Services for the Hearing-Impaired

Network neutrality proponents sometimes describe network neutrality regulations as "a solution in search of a problem,"[297] usually because of the relative rarity (or nonexistence) of nonneutral network management arrangements. Whereas the previous cases (and the case in section IV.D) show that these arrangements have occurred (although still not problematic), paid prioritization is a phenomenon that has not. Rules against paid prioritization are, perhaps quite literally, a solution in search of a problem (really, any activity whatsoever). However, the idea of prioritizing certain packets over others for the purpose of "quality assurance" is not new (although, of course, it is quite controversial among network neutrality advocates). For example, AT&T's fiber-to-the-node U-Verse service, which offers the traditional cable "triple play" of television, internet, and phone, actually uses the internet connection to deliver all of these services (services like traditional cable and Verizon's FiOS use reserved portions of their "pipe" to transmit their television services).[298] To maintain quality for Internet Protocol television (IPTV), as this arrangement is known, AT&T gives priority to its own video service packets.[299] The 2015 Open Internet Order carves out an exception for this particular arrangement, but only because it is an "*existing* facilities-based . . . Internet Protocol-video offering[]"[300] provided

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dissenting). But Comcast was already experiencing substantial public backlash, and even false advertising lawsuits from customers, that may also have pressured them to seek an alternative arrangement with BitTorrent and other P2P networks. *See* Jacqui Cheng, *Comcast Settles P2P Throttling Class-Action for $16 Million*, ARSTECHNICA, December 22, 2009, http://arstechnica.com/tech-policy/2009/12/comcast-throws-16-million-at-p2p-throttling-settlement/. It is not unreasonable to conclude that public backlash and a substantial body of consumer protection law already on the books (which would have dealt not with throttling per se, but false advertising or potential violations of terms of service on Comcast's part) may have been enough to convince Comcast to collaborate with P2P networks—though such collaboration may also not have been possible had Comcast not first identified and attempted to rectify the network congestion problem through throttling. *See, e.g.*, 2010 Open Internet Order, *supra* note 21, at 18055–57 (McDowell, Comm'r, dissenting); *see also* discussion *infra* section V, for a discussion of how a more circumspect network neutrality rule managed by the FCC may also provide such protections.

[297] *See, e.g.*, Daniel Brenner, *Net Neutrality: A Solution in Search of a Problem*, FORBES, September 25, 2012, http://www.forbes.com/sites/ciocentral/2012/09/25/net-neutrality-a-solution-in-search-of-a-problem/.

[298] *See* Yoo, *supra* note 58, at 546.

[299] *See id.* at 547.

[300] 2015 Open Internet Order, *supra* note 21, at para. 208 (emphasis added).

directly by AT&T (i.e., not provided through another edge provider).[301] But what about applications that aren't "existing facilities-based" applications offered directly by the broadband provider? The order makes clear that any such arrangement would be suspect, particularly those that involve prioritizing certain "over-the-top" services over others.[302]

As stated earlier, the advent of new, bandwidth-intensive, time-sensitive applications, such as video streaming or VoIP, means that some level of "quality assurance" (such as prioritization) may be desirable. In the mid-2000s, the National Assembly for Wales commissioned the creation of a two-way video service for its hearing-impaired residents that would rely on a quality-assured connection that prioritized packets for the video service over all others.[303] As one of the leaders of the project, Neil Davies, put it, "Around 3% of people are hearing impaired and need video cues additional to sound. . . . This was not seen as a 'nice to have' thing, but rather as a vital service that citizens could rely on, for example to make healthcare appointments, or to summon emergency services."[304] The project had many hurdles to overcome, including infrastructural limits that would in turn limit the bandwidth the service could consume, and the reliance of hearing-impaired individuals on the visual cues provided by the video more than the auditory clues provided by the audio.[305] To solve these problems, project leaders conducted tests to determine the maximum level of packet loss and delay that would still allow hearing-impaired individuals to effectively communicate using the service.[306] With the data in hand, they were able to develop "contention management" technology that would prioritize the packets used for this two-way video service over other packets, creating a "fast

[301] *See id.*
[302] *See id.* at para. 210.
[303] *See* Martin Geddes, *How Wales Got the First Internet "Fast lane."* GEDDES, July 8, 2015, http://www.martingeddes.com/how-wales-got-the-first-internet-fast-lane/ [hereinafter *Wales*].
[304] *Id.*
[305] *See id.*
[306] *See id.*

lane" for this service that maintained the minimum level of quality necessary for it to still be valuable to its users.[307] Of course, this technology was not just useful for two-way video services, but for any application that has a minimum level of "latency" for it to remain useful to its users.[308] The project leaders also calculated the cost of this prioritization for the network as a way to charge a "toll" for any service that wished to access the fast lane, finding, for example, that with their contention management technology, their two-way video service for the hearing-impaired cost £0.01 per minute to ensure the minimum level of quality necessary to remain useful.[309] They even signed a deal with British Telecom, the United Kingdom's largest broadband provider, to begin offering the service using their contention management technology.[310] Unfortunately, the project never got off the ground for other reasons, including, notably, the then prohibitive cost of the end-user's equipment (£700 for each video phone).[311] Still, it serves as an example of the potential for entrepreneurship that nonneutral network management, in this case paid prioritization, presents to both edge providers and broadband providers, and how entrepreneurship and opportunity for vertical arrangement has the potential to benefit consumers, especially those with disabilities who might benefit from quality-assured fast lanes on the internet for certain services. With a rule that bans outright such arrangements, the FCC is preventing the entrepreneurial discovery process from proceeding; entrepreneurs who wish to start services that *require* prioritization will be severely curtailed from pursuing these opportunities.

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[307] *See id.*
[308] *See id.*
[309] Martin Geddes, *The Future of Internet "Fast Lanes"—Quality Assured ISPs*, GEDDES, July 8, 2015, http://www.martingeddes.com/the-future-of-internet-fast-lanes-quality-assured-isp/.
[310] *See* Geddes, *Wales*, *supra* note 307.
[311] *See id.*

D. Sponsored Data: iiNet and iView

In the United States, most wireline broadband providers charge a set, flat monthly rate for a particular bandwidth with no limits on the amount of data they can upload or download.[312] Some wireline providers also set monthly data caps, whereby customers are limited to a consuming a certain amount of data per period before encountering additional charges or other network management practices such as throttling. But this practice is more often seen in the wireless broadband market in the United States.[313] In Australia, however, every wireline broadband provider employs data caps as part of its business model.[314] Some wireline data caps are as small as 5 gigabytes (GB) per month, a cap easily exceeded by those who like to stream video.[315] This model primarily arose because of the way Australia connects to the rest of the world via the internet: much of the data Australians consume comes from the United States through a limited number of cables under the Pacific Ocean, dramatically increasing the cost of data transmission for broadband providers. As a result, broadband providers developed an alternate pricing strategy sometimes referred to as the "user-pays model."[316] Instead of getting an unlimited amount of content at a set bandwidth for a flat rate, users' payments vary depending on the amount of content they download each month.[317] Second, this model primarily arose because of the way Australia connects to the rest of the world through the internet: much of the data Australians consume comes from the United States through a limited number of cables going under the

[312] *See* Daniel A. Lyons, *Internet Policy's Next Frontier: Usage-Based Broadband Pricing*, 66 FED. COMM. L.J. 1, 3 (2014).
[313] GOV'T ACCOUNTABILITY OFFICE, FCC SHOULD TRACK THE APPLICATION OF FIXED INTERNET USAGE-BASED PRICING AND HELP IMPROVE CONSUMER EDUCATION, 10 (November 2014), http://gao.gov/assets/670/667164.pdf.
[314] *See* Duncan Riley, *Australia Isn't the U.S., Netflix Isn't a Net Neutrality Hypocrite with iiNet Deal*, SILICONANGLE, March 4, 2015, http://siliconangle.com/blog/2015/03/04/australia-isnt-the-united-states-and-netflix-is-not-a-net-neutrality-hypocrite-with-iinet-deal/.
[315] *See id.*
[316] *See* Lyons, *supra* note 316, at 1.
[317] *See id.* at 4–5 *passim*; Gary McLaren, What the US Can Learn from Australia on Net Neutrality, AUSTL. BUS. REV., March 6, 2015, http://www.businessspectator.com.au/article/2015/3/6/technology/what-us-can-learn-australia-net-neutrality .

Pacific Ocean, dramatically increasing the cost of data transmission on the backhaul for their broadband providers.[318]

But these caps also limit the value of high-bandwidth, low-latency applications such as video streaming, in turn limiting the value of internet connections in Australia. Interestingly, this situation has led to the creation of a homegrown video streaming market in Australia: companies both new and old have set up servers *in Australia* to reduce the cost of data transmission and improve quality of service for Australian broadband consumers.[319] Major television networks, including the Australian Broadcasting Corporation and the Seven Network, also host their own video streaming services within the country.[320] With the servers now located in the country, the cost of data transmission has been reduced dramatically, and almost all of these streaming services have deals with at least one broadband provider in Australia to exempt their traffic from the data caps, a business practice known as "zero-rating."[321] One deal, between the Australian Broadcasting Corporation's iView and the broadband provider iiNet, has been in place for more than a decade.[322] Netflix, a proponent of network neutrality in the United States, even signed deals with iiNet and Optus, another broadband provider, when it entered the Australian market in 2015. (Netflix later backed out after network neutrality proponents in the United States called the move "hypocritical").[323] Regardless of Netflix's politically motivated move, these arrangements are beneficially entrepreneurial. As all of these examples show, a gap in the market motivated entrepreneurs to devise a solution to a problem, in this case, the high cost of data transfer in Australia which was limiting possibilities for video streaming. Once a solution was devised, edge

[318] *See* Riley, *supra* note 318.
[319] *See id.*
[320] *See id.*
[321] *See id.*
[322] *See id.*
[323] *See* Jon Brodkin, *Netflix Will Stop Asking ISPs to Exempt Its Videos from Data Caps*, ARSTECHNICA, April 16, 2015, http://arstechnica.com/business/2015/04/netflix-will-stop-asking-isps-to-exempt-its-videos-from-data-caps/.

providers were able to approach broadband providers with their cost-saving innovations and devise a vertical arrangement that benefited both providers, as well as consumers. Had a rule been in place in Australia that limited ISPs' and edge providers' ability to make such arrangements, the expansion of video streaming in Australia likely would have been slower (at best) or even stalled. Entrepreneurial video streaming services would have had little incentive to invest in their own product if consumers, bound by data caps necessitated by high transmission costs for data originating outside of Australia, would be unable to fully enjoy their offerings.

Not many wireline broadband providers in the United States follow the user-pays model, but the increasing prominence of bandwidth-intensive, low-latency applications in the internet ecosystem is leading many to consider just such a move. Wireless broadband providers, whose capacity is much more restricted, already use this model as a way to manage their network. When edge providers with bandwidth-intensive, low-latency applications devise solutions that reduce the cost of transporting their data across the broadband providers' networks, there should be room for them to create deals with providers to allow their traffic to flow more freely. Unfortunately, the FCC's rules on sponsored data make the legality of this proposition unclear. Before issuing the 2015 Open Internet Order, then–FCC Chairman Tom Wheeler stated that the commission did not wish to discourage such innovative practices, and the order itself says that sponsored data should be handled on a case-by-case basis.[324] The commission has since been "exploring" the sponsored data practices of three major US wireless carriers.[325] However, as the

[324] Doug Brake, *Mobile Zero Rating: The Economics and Innovation Behind Free Data*, 2 (Info. Tech. & Innovation Found., Report, May 23, 2016), http://www2.itif.org/2016-zero-rating.pdf (quoting Tom Wheeler, chair, FCC, Prepared Remarks at the Computer History Museum, January 9, 2014), https://apps.fcc.gov/edocs_public/attachmatch/DOC-325054A1.pdf; John Eggerton, *Wheeler: Binge On Is Pro-Competitive, Pro-Innovation*, BROADCASTING & CABLE, November 19, 2015), http://www.broadcastingcable.com/news/washington/wheeler-binge-pro-competitive-pro-innovation/145940.

[325] Cecilia Kang, *F.C.C. Asks Comcast, AT&T and T-Mobile about "Zero-Rating" Services*, BITS (December 17, 2015), https://bits.blogs.nytimes.com/2015/12/17/f-c-c-asks-comcast-att-and-t-mobile-about-zero-rating-services.

Australian example shows, zero-rating is entrepreneurially beneficial, allowing ISPs to differentiate themselves (a sign of healthy competition) and allowing edge providers and ISPs to enter into vertical arrangements that benefit consumers by lowering prices.[326]

In each of these examples, a gap in the market or a problem to be solved existed in some aspect of broadband provision. When alert to these gaps, broadband providers and edge providers acted entrepreneurially, devising ways to solve the problems and fill the gaps in the market. In some cases, over time, these entrepreneurial actions evolved as entrepreneurs in the market worked together to overcome potential frictions caused by the initial act of entrepreneurship. This evolution is exactly how the discovery process is supposed to work. Disrupting it by banning certain business practices ex ante will lead to less entrepreneurship and competition within the US broadband market, ultimately harming broadband providers, edge providers, and consumers.

V. Ex Ante vs. Ex Post Regulation of Network Neutrality

While the discriminatory aspects of network management have the potential to encourage new, consumer-friendly product and business practice innovation, the possibility of *purely* anticompetitive outcomes from discrimination in network management deserves some attention.[327] But because opportunities exist for discriminatory network management that benefit edge providers, ISPs, and consumers, banning all such network management practices is overkill. In the name of quashing truly anticompetitive or otherwise harmful practices, ex ante rules threaten to forestall beneficial entrepreneurship in the form of new business and network management practices that benefit producers and consumers. Ex post regulation—along with a

[326] *See also* Brake, *supra* note 328, at 10–11.
[327] *See, e.g.*, Daniel A. Lyons, *supra* note 105, at 1069–70.

method for distinguishing anticompetitive behavior that is both harmful and not "ancillary to the main purpose of a lawful contract [or legitimate network management/business practice]"[328] from beneficial entrepreneurship that nonetheless may be viewed as having anticompetitive aspects—is a better tool for ensuring that harmful discrimination is curtailed, while still allowing for entrepreneurship.

A. Precautionary Principle vs. Permissionless Innovation

The debate over whether ex ante or ex post rules are better suited for solving this problem is rooted in a paradigmatic disagreement between supporters of the "precautionary principle" and the idea of "permissionless innovation." The former essentially places the burden of proving whether or not any new innovation (e.g., a new business or network management practice) is beneficial on the entrepreneur carrying out the new innovation.[329] Often, such a standard means, in practice, embracing a static, "regulated, engineered world."[330] In contrast, permissionless innovation places the burden of proof on the regulator (or, generally, the opponent) of the activity to show that the "new invention will bring serious harm to society."[331] This paradigm promotes "a world of constant *creation, discovery, and competition*."[332] One manifestation of the precautionary principle is ex ante "anticipatory regulation," such as in the 2015 Open Internet Order.[333] Permissionless innovation offers some scope for regulation, but in placing the burden of proof on the regulator to show harm, this approach typically involves ex post actions.[334]

[328] United States v. Addyston Pipe & Steel Co., 85 F. 271, 282 (6th Cir. 1898), *aff'd*, 175 U.S. 211 (1899).
[329] *See* THIERER, *supra* note 49, at 1.
[330] VIRGINIA POSTREL, THE FUTURE & ITS ENEMIES: THE GROWING CONFLICT OVER CREATIVITY, ENTERPRISE, & PROGRESS, at xiv (1998).
[331] THIERER, *supra* note 49, at 1.
[332] POSTREL, *supra* note 334, at xiv (emphasis added).
[333] *Cf.* THIERER, *supra* note 49, at 105–7.
[334] *See id.* at 124.

The permissionless innovation approach to regulation policy is most consistent with the analysis of network neutrality presented in sections III and IV. Permissionless innovation "provides breathing space for future entrepreneurialism and innovation."[335] Its proponents understand the importance of "dynamic competition" and openness to change as key drivers of progress,[336] in much the same way that Israel Kirzner and Joseph Schumpeter do.[337] For this reason, proponents are typically skeptical of traditional ex ante regulation because it tends to "preempt[] or prohibit[] the beneficial experiments that yield new and better ways of doing things."[338] They also recognize private arrangements as superior methods for governing and resolving disputes because such arrangements are flexible and adaptable.[339] When government intervention is necessary to resolve a problem that cannot be resolved effectively through private arrangements alone, permissionless innovation calls for regulation via "simple rules" that can evolve and adapt to changing circumstances, as well as target *actual* harms created by specific actions taken by companies or individuals.[340] Examples of regulatory schemes along those lines include tort actions that must prove actual harm in specific instances and the Federal Trade Commission's (FTC) process for investigating and punishing "unfair or deceptive practices."[341] The FTC requires that an action be "substantial; . . . not be outweighed by any countervailing benefits to consumers or competition that the practice produces; and . . . be an injury that consumers themselves could not reasonably have avoided."[342]

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[335] *Id.* at 2.
[336] *See id.* at 47–48.
[337] *See* discussion *supra* section III.A.2.
[338] *See* THIERER, *supra* note 49, at 120 (footnote omitted) (citing AARON WILDAVSKY, SEARCHING FOR SAFETY 183 (1988)); *see also* discussion *supra* section III.A.3.
[339] *See* THIERER, *supra* note 49, at 3; *see also id.* at 122.
[340] *Id.* at 120–25.
[341] *Id.* at 122–24.
[342] *Policy Statement on Unfairness*, *supra* note 52, at 1070. Interestingly, according to the Communications Act of 1934, 48 Stat. 1064, as amended, 47 U.S.C. § 151 et seq., when it comes to "new technologies and services," the

Ex ante rules, such as common carriage regulations, banning *all* (or at least most) instances of a particular activity, require "significant knowledge about the present state and future trends of a very complex and rapidly evolving industry"[343] if they are to avoid the unintended consequence of chilling innovation.[344] Unfortunately, such knowledge is rarely available to regulators, not least because of the complexity and fast-paced change that is the hallmark of innovative industries.[345] Indeed, section IV has demonstrated that the ex ante approach to network neutrality regulation that the FCC adopted in the 2015 Open Internet Order is likely to quash innovations that are beneficial to consumers and the internet as a whole. Thus, ex ante rules are rarely (if ever) consonant with a permissionless innovation approach to public policy and regulation.[346]

Instead of using the FCC's ex ante approach to regulation to ban all potentially harmful network management practices, some scholars have proposed using an ex post regulatory approach to policing those instances of nonneutral network management that present actual harm to consumers or competition. One proposal, from legal scholar James Speta, calls on the FCC to adopt network neutrality rules that focus just on anticompetitive discriminatory practices rather

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FCC is required to place the burden on *opponents* of the new technology or service to prove that "such proposal is inconsistent with the public interest," 47 U.S.C. § 157 (2013). However, the vagueness of the "public interest" standard, *see* discussion *infra* pp. 62–63, renders this burden somewhat meaningless.

[343] Maureen K. Ohlhausen, *The FCC's Knowledge Problem: How to Protect Consumers Online*, 67 FED. COMM. L.J. 203, 209 (2015).

[344] *Id.* at 212.

[345] *See* discussion *supra* section III.A.3; *see also* F. A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519, 524 (1945) ("[T]he economic problem of society is mainly one of rapid adaptation to changes in the particular circumstances of time and place. . . . [T]he ultimate decisions must be left to the people who are familiar with these circumstances, who know directly of the relevant changes and of the resources immediately available to meet them. We cannot expect that this problem will be solved by first communicating all this knowledge to a central board which, after integrating *all* the knowledge, issues its orders.").

[346] One possible exception to this would be rules that require transparency on the part of the regulated industry. *See* THIERER, *supra* note 49, at 125. These rules, like other ex ante rules, require the regulated entrepreneur to comply with certain requirements (in this case, public disclosure of certain practices) regardless of the *actual* harm caused by the behavior the regulation seeks to affect. However, transparency and disclosure rules are much less onerous than other ex ante rules because they do not directly impede the regulated entrepreneur's ability to experiment and discover new products, services, or methods. *See id.*

than all discriminatory behavior.[347] Speta prefers to keep enforcement of network neutrality at the FCC for a number of reasons, including the FCC's "relevant technical and industry expertise"[348] and its ability to tailor an "antitrust-like" approach to specific network neutrality concerns.[349] Speta also deviates from the permissionless innovation approach; specifically, his plan highlights the FCC's ability to adopt ex ante rules, including "predictive judgments concerning practices that might result in foreclosure"[350] and more stringent burdens on ISPs to avoid "abuse of [market] dominance,"[351] an adaptation from the European Union's antitrust law. In addition to the use of ex ante rules, this plan suffers from a number of other shortcomings. The FCC's authority under the Communications Act of 1934[352] and the subsequent Telecommunications Act of 1996[353] is exceedingly vague.[354] Its ability to enforce its own policy rests on an ambiguous "public interest" standard and regulatory "kludges" that courts rarely limit.[355] Furthermore, very little in the FCC's history suggests that, absent an act of Congress, the agency would limit any newfound authority to address only discriminatory behavior on the part of ISPs that presented *actual* harm to consumers or competition.[356]

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[347] *See generally* James B. Speta, *Unintentional Antitrust: The FCC's Only (& Better) Way Forward with Net Neutrality after the Mess of* Verizon v. FCC, 66 FED. COMM. L.J. 491 (2014).
[348] *Id.* at 493.
[349] *Id.* at 493–94, 503–4.
[350] *Id.* at 504 (internal quotation marks omitted).
[351] *Id.* (internal quotation marks omitted).
[352] Communications Act of 1934, 48 Stat. 1064, as amended, 47 U.S.C. § 151 et seq.
[353] Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1997).
[354] *See* AT&T Corp. v. Iowa Utilities Board, 525 U.S. 366, 397 (1999) ("It would be gross understatement to say that the 1996 [Telecommunications] Act is not a model of clarity. It is in many important respects a model of ambiguity or indeed even self-contradiction.").
[355] *See* Brent Skorup, *Who Needs the FCC?*, NAT'L AFF., Winter 2016, at 36, 38–40; *see also* Speta, *supra* note 351, at 506–7 (citing NBC v. United States, 319 U.S. 190, 204 (1943)).
[356] *See* Brent Skorup & Joseph Kane, "The FCC and Quasi-Common Carriage: A Case Study of Agency Survival," (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, 2016), 34–40 *passim*, https://www.mercatus.org/system/files/mercatus-skorup-quasi-common-carriage_v1.pdf; *see also* discussion *supra* section IV.D.

A better solution, more aligned with the permissionless innovation approach to public policy and regulation, would be to transfer enforcement of network neutrality violations to the FTC under the FTC Act, as current FTC Commissioner Maureen Ohlhausen has suggested.[357] As already discussed, the FTC's case-by-case approach requires it to find "actual, or at least specifically alleged, [deceptive or unfair] harms" before a complaint can be adjudicated and enforced.[358] Most important, the FTC's approach recognizes that some practices—which may be considered to have unfair or otherwise harmful effects—can have beneficial effects that outweigh the harm.[359] And whereas the FTC possesses less "technical or industry knowledge"[360] than the FCC does, its lack of specialized industry jurisdiction actually renders it less susceptible to capture by industry or other interest groups seeking to guide the regulatory agenda.[361] Contrary to what some critics have suggested, the FTC's lack of industry-specific knowledge or more general jurisdiction does not mean that it will pay "less attention to broadband markets."[362] Indeed, before the 2015 Open Internet Order, the FTC had already investigated and enforced judgments against ISPs for violating the terms of service they offered their customers, as when AT&T throttled data speeds for customers with "unlimited data" plans if they exceeded a certain amount of data consumption per month.[363] Empowering the FTC, rather than the FCC, to handle the issue of network neutrality on a case-by-case basis under its authority to investigate and prosecute "unfair or deceptive practices" is more likely to allow innovation that is beneficial to

[357] *See generally* Ohlhausen, *supra* note 347.
[358] Ohlhausen, *supra* note 347, at 212 (interpreting 15 U.S.C. § 45(b) (2012)).
[359] *See Policy Statement on Unfairness*, *supra* note 52, at 1070.
[360] Speta, *supra* note 351, at 493.
[361] *See* Ohlhausen, *supra* note 347, at 213 (citing JAMES Q. WILSON, BUREAUCRACY: WHAT GOVERNMENT AGENCIES DO AND WHY THEY DO IT 82 (1989)); *see also* Skorup, *supra* note 359, at 50.
[362] *E.g.*, Speta, *supra* note 351, at 504.
[363] *See* Ohlhausen, *supra* note 347, at 214 (citing Complaint at 4, paras. 15–16, FTC v. AT&T Mobility LLC, No. 14-cv-04785 (N.D. Cal. October 28, 2014).

consumers to proceed, while still providing a safeguard against nonneutral network management practices that threaten to foreclose competition.

B. The Limits of Ex Post Regulation

For all the virtues of a case-by-case, ex post approach to regulation, there is a danger that it too can chill innovation. Entrepreneurship and the discovery process that results from it occur in an uncertain world, where entrepreneurs are trying out new business practices through a process of trial and error based on imitation and evolution.[364] At best, entrepreneurs can make educated guesses as to which innovations will succeed and which will not. They can look to the past as guidance, but outside events and even random luck can influence which practices survive and which do not.[365] Trained outside observers (namely, economists) may be able to pick out patterns and provide limited explanations as to why those patterns of evolution exist,[366] but they cannot presume that the entrepreneurs are undertaking actions with full foresight and knowledge of what outcomes their actions will generate.[367] In this uncertain world we live in, if we cannot expect entrepreneurs to fully understand or foresee the outcomes of their actions, we can hardly expect regulators or courts to make well-reasoned "assumptions based on inferences about the anticompetitive consequences of unexplained, novel economic behavior."[368] Condemning certain practices "per se" for perceived potential competitive harms, as ex ante rules do, is difficult to justify when there is uncertainty about the actual competitive effects of certain business (or nonneutral network management) practices.[369] Yet at the same time, asking regulators and courts

[364] *See generally* Armen Alchian, *Uncertainty, Evolution, and Economic Theory*, 58 J. POL. ECON. 211 (1950), *reprinted in* COST AND CHOICE UNDER UNCERTAINTY 3 (Daniel K. Benjamin ed., 2006).
[365] *See id.* at 4–8.
[366] *See id.* at 8, 10, 16.
[367] *See id.*
[368] Manne & Wright, *supra* note 232, at 170.
[369] *See* Frank Easterbrook, *The Limits of Antitrust*, 63 TEX. L. REV. 1, 10 (1985); Yoo & Wu, *supra* note 85, at 579.

to carefully weigh and consider the *actual* anticompetitive or otherwise harmful effects of a new business or network management practice in each case is fraught with difficulty. In the course of examining cases of alleged harm from "unfair or deceptive practices" in nonneutral network management by ISPs, the FTC (just like courts dealing with antitrust suits) will likely make errors, prosecuting cases when there is no actual harm, and missing cases when actual harm has occurred.[370]

In a 1985 law review article, Judge Frank Easterbrook of the US Court of Appeals for the Seventh Circuit highlighted the problem of false positives and false negatives in antitrust enforcement, citing a Supreme Court opinion arguing that such errors are likely because "Courts are of limited utility in examining difficult economic problems. . . . [They are] ill-equipped and ill-suited for such decision-making [and cannot] analyze, interpret, and evaluate the myriad of competing interests and the endless data that would surely be brought to bear on such decisions."[371] He argues that courts tend to err on the side of "inhospitality" toward business practices viewed as imposing restraints on trade, thus preferring false positives over false negatives.[372] Easterbrook points out that this gets it all backwards. Whereas errors that involve not prosecuting actual harms (i.e., false negatives) have the potential to be rectified by the market in the long run,[373] errors that punish entrepreneurs for innovating in a way that has, on net, beneficial outcomes (i.e., false positives) have the effect of discouraging behavior that, although found to be harmful by the FTC or a court, does not pose anticompetitive or "unfair or deceptive" harm in reality.[374] There is value to investigating and punishing those practices that

[370] *See* Easterbrook, *supra* note 373, at 2.
[371] *Id.* at 12 (1985) (alteration in original) (quoting United States v. Topco Assocs., 405 U.S. 596, 609, 612 (1972)) (internal quotation marks omitted).
[372] *See* Easterbrook, *supra* note 373, at 4–9 *passim*.
[373] *See id.* at 2–3.
[374] *See id.* at 15–16.

have demonstrable harm without any countervailing benefit,[375] but erring on the side of preferring false positives will, ultimately, lead to the very same problems presented by ex ante regulation.[376] In the same way that ex ante rules run the risk of reducing entrepreneurship, innovation, and competition, using ex post regulation as a pretext for punishing behavior that is actually beneficial can be much costlier than allowing some undesirable practices to continue.[377]

Over the years, legal scholars have attempted to address the issues presented by the possibility of false positives and false negatives by offering "filters" that help minimize antitrust punishment of beneficial practices.[378] In that same vein, filters designed to minimize punishment of beneficial nonneutral network management practices and arrangements can help minimize any costs associated with an ex post regulatory regime. Indeed, some of the filters designed for antitrust can apply to an FTC-enforced network neutrality rule as well. Note that none of the filters in the following list should be interpreted as per se rules that determine the outcome of the case, but they should at least guide regulators and judges as to which cases are more likely to cause harm than others.

1. Is the application being blocked, throttled, or prioritized bandwidth intensive or latency sensitive or both?

   As discussed throughout the paper, many of the benefits from nonneutral network management are likely to be realized when applied to applications that consume a lot of bandwidth, such as P2P networks, or are sensitive to when packets arrive, such as video streaming or conferencing services. If ISPs are applying nonneutral network management

[375] *See id.* at 2.
[376] *See* discussion *supra* section III.A.3.
[377] Easterbrook, *supra* note 373, at 15.
[378] *Id.* at 17–39; Manne & Wright, *supra* note 232, at 196–201.

to less-intensive uses of the internet, such as basic web browsing or email, there may be reason to suspect that the benefits from such practices are small. Note that sponsored data (zero-rating) are likely to be beneficial even when the application is not bandwidth intensive or latency sensitive.[379]

2. Is the ISP that is blocking or throttling an application relying on a "shared network" architecture?

   Blocking and throttling are primarily used to ease congestion on a "shared network" (i.e., a network on which one or a few users can easily use a disproportionate share of bandwidth from a "common pool" that many users have to draw from).[380] This describes how many, but not all, ISPs structure their network. For example, wireless ISPs and even cable ISPs rely on shared networks, but services like Verizon FiOS provide their customers with dedicated lines that do not pose the same common pool problems.[381] This does not mean that services like Verizon FiOS should never be allowed to engage in nonneutral network management (especially paid prioritization, which deals more with latency than bandwidth issues), but it does suggest that the benefits of blocking or throttling on such networks will be limited.

3. Are any of the ISPs or edge providers new entrants to a market, existing but smaller participants in a market, or serving a niche market?

   Smaller ISPs or edge providers may decide they want to enter a new market or expand their current footprint. In that case, nonneutral network management practices may give

[379] *See* Brake, *supra* note 328, at 5–6.
[380] Lyons, *supra* note 105, at 1057–58.
[381] *Id.*

them a leg up against incumbents by allowing them to differentiate their product offerings, thereby attracting new customers who may feel underserved by the incumbents.[382] Prosecuting instances of nonneutral network management that involve newer, smaller market participants is far more likely to punish innovation than to punish actually harmful anticompetitive behavior.[383] This is not to suggest that large incumbent ISPs or edge providers employing nonneutral network management practices should be treated with such scrutiny that presumes they *are* engaging in harmful anticompetitive behavior. But punishing incumbents' new competition will likely yield the greatest harm to consumers and innovation.

4. Have disputing ISPs and edge providers sought to resolve their dispute through private negotiation or settlement?

   In cases of disputes between ISPs or edge providers over a nonneutral network management practice, the FTC should first encourage the parties to resolve their differences privately without regulatory intervention.[384] Not all of these disputes will involve issues of anticompetitive harms, and asking the FTC to investigate and adjudicate the disputes would be a waste of resources. If the parties cannot resolve their differences on their own and the FTC has reason to suspect that, based on one or more of the above filters, the practice or arrangement in question *does* present anticompetitive harms, only then should it move forward with an investigation. Obviously, this should not preclude the FTC from investigating other possible "unfair or deceptive" harms related to the

[382] *See* discussion *supra* sections III.A.1. & III.B.
[383] *Cf.* Easterbrook, *supra* note 373, at 19–23; Manne & Wright, *supra* note 232, at 196–97.
[384] *See, e.g.*, 2010 Open Internet Order, *supra* note 21, at 18055–57 (McDowell, Comm'r, dissenting); *see also* discussion *supra* p. 52 & note 300.

practice, such as violations of terms of service, that, although not strictly anticompetitive, nonetheless pose harms to consumers.[385]

This list of filters is not meant to be exhaustive, nor does it suggest that following these filters alone will help regulators or courts reach a decisive conclusion in all cases, but it should serve as a starting point for determining which instances of nonneutral network management are truly harmful, and which are and are not worth prosecuting.

VI. Conclusion

New institutional economist Steven Cheung studied the private arrangements between beekeepers and apple farmers, a practice that was previously thought to be impossible because of transaction costs and therefore in need of government intervention. He noted, "it appears evident that some economists have been distilling their policy implications from fables."[386] Network neutrality proponents appear to be relying on fables for their policy analysis as well. The fable of the packets is that all packets are the same and must therefore be treated the same by broadband providers; therefore, any network management practices that unreasonably discriminate between packets, advantaging or disadvantaging them according to origin or to what data they are carrying, must inherently be anticompetitive. Few network neutrality proponents appear to have given serious consideration to *why* such practices, and attendant arrangements between broadband providers and edge providers, may exist and what potential benefits they may create for all internet users. Therefore, by implication, in considering the potential harms that nonneutral network management may cause, they have given little consideration to "what would

[385] *See, e.g.*, discussion *supra* p. 52 & note 300, p. 45.
[386] Cheung, *supra* note 1, at 32.

in fact happen in the world as it exists if they were made illegal."[387] This paper remedies that. Using market process theory and new institutional economics to study cases of nonneutral network management, this paper shows that new network neutrality regulations that impose strict rate regulation and nondiscrimination requirements threaten to disrupt the heterogeneous ecosystem of the internet, preventing the discovery and creation of network management principles that could be beneficial for broadband providers, edge providers, and consumers. There may be some room for appropriate enforcement of nondiscrimination principles, insofar as particular instances may be *purely* anticompetitive. But ex post, antitrust-style regulations—for all their faults—are relatively better equipped to regulate purely anticompetitive behavior while minimizing harm to the creative discovery process than are ex ante common carriage regulations.

[387] Coase, *Payola*, *supra* note 48, at 319.