

Essay

Common Carriage’s Domain

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The judicial decision invalidating the Federal Communications Commission’s first Open Internet Order has led advocates to embrace common carriage as the legal basis for network neutrality. In so doing, network neutrality proponents have overlooked the academic literature on common carriage as well as lessons from its implementation history. This Essay distills these learnings into five factors that play a key role in promoting common carriage’s success: (1) commodity products, (2) simple interfaces, (3) stability and uniformity in the transmission technology, (4) full deployment of the transmission network, and (5) stable demand and market shares. Applying this framework to the Internet suggests that common carriage is not particularly well suited as a basis for regulating broadband Internet access.

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Introduction

The concept of common carriage has played an increasingly important role over the course of the debate over network neutrality. Network neutrality supporters were initially quite hesitant to equate network neutrality with common carriage.¹ Over time, however, proponents became more amenable to drawing a connection between the two concepts.² Interest in common carriage intensified further following the D.C. Circuit’s 2014 decision in *Verizon v. FCC* striking down portions of the Federal Communications Commission’s (FCC’s) 2010 Open Internet Order on the grounds that it attempted to mandate restrictions that could be imposed only on common carriers.³ Although the

1. See, e.g., Tim Wu, *Why Have a Telecommunications Law? Anti-Discrimination Norms in Communications*, 5 J. ON TELECOMM. & HIGH TECH. L. 15, 16-17, 32-35 (2006) (noting the heavy criticism of common carriage and proposing the substitution of a simple antidiscrimination rule); see also Hance Haney, *Eric Schmidt and Laurence Tribe on Common Carriage and Net Neutrality Regulation*, TECH. LIBERATION FRONT (Aug. 24, 2007), <http://techliberation.com/2007/08/24/eric-schmidt-and-laurence-tribe-on-common-carriage-and-net-neutrality-regulation> [<http://perma.cc/A6BD-JZAU>] (quoting Google Chairman and CEO Eric Schmidt during a discussion of network neutrality as stating that common carriage would be a mistake and expressing hope that any common carrier obligations would be applied “pretty narrowly” (internal quotation marks omitted)); *Part 2: Uses for Devices of Multiple Capabilities Cannot Always Be Predicted or Channeled*, COOK REP. ON INTERNET PROTOCOL, TECH., ECON., & POL’Y 71, 91-92 (2006), <http://cookreport.com/newsletter-sp-542240406/pdf?download=61.pdf> [<http://perma.cc/F7KK-S3MD>] (quoting Vint Cerf as “hesitat[ing]” to characterize “neutrality as the 21st C[entury] version of common carriage”); John Windhausen, Jr., *Good Fences Make Bad Broadband: Preserving an Open Internet Through Net Neutrality*, PUB. KNOWLEDGE 38 (Feb. 6, 2006), <http://www.publicknowledge.org/pdf/pk-net-neutrality-whitep-20060206.pdf> (rejecting arguments that network neutrality would replicate common carriage).

2. See TIM WU, *THE MASTER SWITCH: THE RISE AND FALL OF INFORMATION EMPIRES* 311 (2010); Susan P. Crawford, *Transporting Communications*, 89 B.U. L. REV. 871 (2009); Sascha D. Meinrath & Victor W. Pickard, *The New Network Neutrality: Criteria for Internet Freedom*, 12 INT’L J. COMM. L. & POL’Y 225, 229, 238 (2008); Christian Sandvig, *Network Neutrality Is the New Common Carriage*, 9 INFO 136 (2007); Moran Yemini, *Mandated Network Neutrality and the First Amendment: Lessons from Turner and a New Approach*, 13 VA. J.L. & TECH. 1, 7 (2008).

3. *Verizon v. FCC*, 740 F.3d 623, 656-57 (D.C. Cir. 2014).

FCC appeared initially inclined to base its second Open Internet Order on another statutory basis,⁴ a speech by President Barack Obama endorsing common carriage as the best statutory basis for implementing network neutrality changed the political calculus.⁵ After some hesitation, the FCC embraced common carriage as the statutory basis for network neutrality in its 2015 Open Internet Order, and the D.C. Circuit upheld that decision on judicial review.⁶

Network neutrality proponents tend to regard common carriage as a well-established and accepted baseline for regulating network industries. It is true that common carriage regulation has long operated successfully in sectors such as water, natural gas, and electric power.⁷ At the same time, uncritical invocations do not adequately reflect the extensive commentary and regulatory proceedings that identify the problems and limitations associated with common carriage in the telecommunications sector. These problems include definitional difficulties, the lack of incentives to economize, the systematic biases it induces, its tendency to stifle innovation and facilitate collusion, and its vulnerability to opportunism.⁸ Indeed, the FCC has recognized the flaws in common carriage since at least 1979 and has taken steps to limit its scope.⁹

The goal of this Essay is to use historical examples and the commentary analyzing common carriage to identify the points of commonality between common carriage and network neutrality, as well as the circumstances under which common carriage is likely to be an appropriate regulatory intervention. Rather than creating a grand theory of common carriage, the analysis follows the approach taken by the Supreme Court's decision in *Trinko* by taking into

4. Protecting and Promoting the Open Internet, Notice of Proposed Rulemaking, 29 FCC Rcd. 5561, 5647-48 (2014) (statement of Chairman Tom Wheeler).

5. Obama White House, *President Obama's Statement on Keeping the Internet Open and Free*, YOUTUBE (Nov. 10, 2014), <http://www.youtube.com/watch?v=uKcJQPvWfDk> [<http://perma.cc/5KY5-LGCD>].

6. Protecting and Promoting the Open Internet, Report and Order on Remand, Declaratory Ruling, and Order, 30 FCC Rcd. 5601, 5724-25 ¶¶ 283-87, 5757-90 ¶¶ 355-408 (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).

7. See, e.g., JEFFREY CHURCH & ROGER WARE, *INDUSTRIAL ORGANIZATION: A STRATEGIC APPROACH* § 26.2.3, at 853-54 (2000); Eli M. Noam, *Towards an Integrated Communications Market: Overcoming the Local Monopoly of Cable Television*, 34 FED. COMM. L.J. 209, 219 (1982).

8. Christopher S. Yoo, *Is There a Role for Common Carriage in an Internet-Based World?*, 51 HOUS. L. REV. 545, 573-605 (2013).

9. See Policy and Rules Concerning Rates for Competitive Carrier Services and Facilities Authorizations Therefor, Notice of Inquiry and Proposed Rulemaking, 77 F.C.C.2d 308, 309-10 ¶¶ 1-3 (1979); see also John Haring & Evan Kwerel, *Competition Policy in the Post-Equal Access Market* 5-11 (FCC Office of Plans & Pol'y Working Paper, 1987), http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp22.pdf [<http://perma.cc/6ZQZ-AM4F>]; NTIA REGULATORY REV. STAFF, U.S. DEPT. OF COMM., *NTIA REGULATORY ALTERNATIVES REPORT* 13-31 (1987), http://www.its.bldrdoc.gov/publications/download/87-222_ocr.pdf [<http://perma.cc/2MG6-6A2A>]. See generally Scott M. Schoenwald, *Regulating Competition in the Interexchange Telecommunications Market: The Dominant/Nondominant Carrier Approach and the Evolution of Forbearance*, 49 FED. COMM. L.J. 367, 375-83 (1997) (reviewing the regulatory history).

account the effectiveness of the proposed remedies when determining the scope of liability.¹⁰ This Essay recovers this literature evaluating the efficacy of common carriage¹¹ as well as the insights from the history of enforcing nondiscrimination mandates under the antitrust laws to synthesize a framework for identifying the circumstances under which common carriage is most likely to be effective. The analysis suggests that common carriage is most effective when five circumstances are met:

1. The product being regulated is a commodity.
2. The interfaces between the product being regulated and related products are simple.
3. The transmission technology is uniform and stable.
4. The transmission network is fully built out.
5. The demand for each firm producing the regulated product is relatively stable.

This framework provides a basis for evaluating whether common carriage is an appropriate regulatory device to govern the modern Internet both in terms of network neutrality and the regulation of cloud computing.

Part I provides an overview of the difficulty identifying a coherent theoretical basis for common carriage, traces the regulatory development of network neutrality, and identifies the points of commonality between the two concepts. Part II analyzes the five factors identified above and evaluates how they affect the key aspects of common carriage regulation.

I. Common Carriage and Its Relationship with Network Neutrality

This Part lays out the concepts of common carriage and network neutrality and analyzes the connection between them. The linkage between the two concepts underscores how the practical limitations identified with respect common carriage can help inform the network neutrality debate.

A. *The Elusive Definition of Common Carriage*

Over the years, scholars and courts have repeatedly attempted to devise a coherent framework for determining when common carriage should apply,

10. *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 414-15 (2004).

11. For textbook discussions of the problems associated with the regulatory tools used to implement common carriage, see, for example, DENNIS W. CARLTON & JEFFREY M. PERLOFF, *MODERN INDUSTRIAL ORGANIZATION* 672-78 (3d ed. 2000); CHURCH & WARE, *supra* note 7, § 26.2.2, at 847-52; 1 ALFRED E. KAHN, *THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS* 27-32 (1970) [hereinafter 1 KAHN]. See generally 2 ALFRED E. KAHN, *THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS* 11-59, 93-94, 108-12, 325-27 (1971) [hereinafter 2 KAHN]; W. KIP VISCUSI ET AL., *ECONOMICS OF REGULATION AND ANTITRUST* 431-36, 560-71 (4th ed. 2005).

without much success.¹² Although some early cases suggested that common carriage was appropriate for industries “affected with the public interest,” the Supreme Court “discarded” that test, concluding that “there is no closed class or category of businesses affected with a public interest”¹³ and that the phrase was “not susceptible of definition and form[ed] an unsatisfactory test.”¹⁴

Other commentators have argued that natural monopoly represents the defining characteristic of common carriers.¹⁵ Such arguments are contradicted by the fact that common carriage mandates have often been applied to firms that lacked monopoly power, such as taxis, inns, trucks, and long-haul railroad routes served by multiple providers.¹⁶ The lack of centrality of market power is further underscored by the fact that the statute defines “telecommunications service,” which in turn determines the scope of common carriage,¹⁷ in purely technological terms without any reference to market power.¹⁸

Another theory is that common carriers are those companies that hold themselves out as being open to the public.¹⁹ Not only is this interpretation questionable as a matter of history.²⁰ It allows firms who wish to avoid common carriage treatment to do so simply by declaring that it did not purport to serve all comers.²¹

12. For an excellent survey of this literature, see Thomas Nachbar, *The Public Network*, 17 *COMMLAW CONCEPTUS* 67, 79-109 (2008).

13. *Nebbia v. New York*, 291 U.S. 502, 536 (1934).

14. *Jackson v. Metro. Edison Co.*, 419 U.S. 345, 353 (1974). See generally Yoo, *supra* note 8, at 554-59.

15. For the seminal argument, see Bruce Wyman, *The Law of the Public Callings as a Solution of the Trust Problem*, 17 *HARV. L. REV.* 156, 161 (1904). For a modern restatements of this position, see *U.S. Telecom Ass'n v. FCC*, 825 F.3d 674, 749-54 (D.C. Cir. 2016) (Williams, J., concurring in part and dissenting in part); *Verizon v. FCC*, 740 F.3d 623, 664 (D.C. Cir. 2014) (Silberman, J., concurring in part and dissenting in part).

16. For the seminal statement of this critique, see Edward A. Adler, *Business Jurisprudence*, 28 *HARV. L. REV.* 135, 148 (1914). For modern restatements, see HERBERT HOVENKAMP, *ENTERPRISE AND AMERICAN LAW, 1836-1937*, at 131-48 (1991); Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 *COLUM. L. REV.* 1323, 1388-89 (1998); Thomas B. Nachbar, *The Public Network*, 17 *COMMLAW CONCEPTUS* 67, 96-100 (2008); James B. Speta, *A Common Carrier Approach to Internet Interconnection*, 54 *FED. COMM. L.J.* 225, 259 (2002).

17. 47 U.S.C. § 153(51) (2018) (“A telecommunications carrier shall be treated as a common carrier under this chapter only to the extent that it is engaged in providing telecommunications services.”).

18. *Id.* §§ 153(53) (defining “telecommunications service” as “the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used”); *id.* § 153(50) (defining “telecommunications” as “the transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.”).

19. For the seminal statement of this argument, see Charles K. Burdick, *The Origin of the Peculiar Duties of Public Service Companies*, 11 *COLUM. L. REV.* 514, 518-25 (1911). For a modern restatement, see Joseph William Singer, *No Right to Exclude: Public Accommodations and Private Property*, 90 *NW. U. L. REV.* 1282 (1996).

20. Nachbar, *supra* note 12, at 86-93.

21. Yoo, *supra* note 8, at 553-54.

Still other commentators have attempted to base a definition of common carriage on the fact that it has historically been tied to the transportation and communications industries.²² Not only are these definitions not specified clearly enough to provide a basis for determining which transportation and communication business fall inside the definition and which ones fall outside.²³ Moreover, assuming that the historical pedigree somehow legitimizes the classification violates Hume's basic precept that one cannot get an "ought" from an "is."²⁴

The definition of common carriage has proven elusive as a matter of positive law as well. The statute contains an unhelpfully circular definition of "common carrier" that includes "any person engaged as a common carrier for hire."²⁵ The judicial decision upholding the 2010 Open Internet Order turned to definitions synthesized by the court in the landmark decisions in *NARUC I* and *NARUC II*.²⁶ *NARUC II* concluded that "the primary *sine qua non* of common carrier status is a quasi-public character, which arises out of the undertaking to carry for all people indifferently."²⁷ *NARUC I* held that "a carrier will not be a common carrier where its practice is to make individualized decisions, in particular cases, whether and on what terms to deal" as opposed to "holding oneself out to serve the public indiscriminately."²⁸

The judicial definition of common carriage provides the foundation for two defining characteristics of common carriage. Undertaking to carry all people is often called the duty to serve and is reflected in statutory language obligating common carriers to provide "communication service upon reasonable request."²⁹ Serving the public indiscriminately is the equivalent of nondiscrimination and is enshrined in the statutory language prohibiting common carriers from "mak[ing] any unjust or unreasonable discrimination in charges."³⁰ Indeed, when reviewing the FCC's 2010 Open Internet Order, the D.C. Circuit characterized nondiscrimination as "the basic characteristic that distinguishes common carriers from 'private' carriers."³¹

22. Crawford, *supra* note 2, at 885, 915; Nachbar, *supra* note 12, at 81-84, 109; Speta, *supra* note 16, at 252-53, 255, 257; Richard S. Whitt, *Evolving Broadband Policy: Taking Adaptive Stances to Foster Optimal Internet Platforms*, 17 *COMMLAW CONSPPECTUS* 417, 491-92 (2009); Wu, *supra* note 1, at 30-31.

23. Yoo, *supra* note 8, at 558-59.

24. *Id.* at 558.

25. 47 U.S.C. § 153(11) (2018).

26. *Verizon v. FCC*, 740 F.3d 623, 651 (D.C. Cir. 2014).

27. Nat'l Ass'n of Reg. Util. Comm'rs v. FCC (*NARUC II*), 533 F.2d 601, 608 (D.C. Cir. 1976) (internal quotation marks omitted), *quoted in Verizon*, 740 F.3d at 651.

28. Nat'l Ass'n of Reg. Util. Comm'rs v. FCC (*NARUC I*), 525 F.2d 630, 641, 642 (D.C. Cir. 1976), *quoted in Verizon*, 740 F.3d at 651.

29. 47 U.S.C. § 201(a) (2018).

30. *Id.* § 202(a).

31. *Verizon*, 740 F.3d at 651; *accord id.* at 652 (holding that "[i]f a carrier is forced to offer service indiscriminately and on general terms, then that carrier is being relegated to common carrier status" (quoting *Celloco P'ships v. FCC* 700 F.3d 534, 547-49 (D.C. Cir. 2012))).

In addition, common carriers typically are subject to rate regulation, reflected in the statutory requirement that all charges be “just and reasonable.”³² Courts and commentators have characterized rate regulation as one of the essential characteristics of common carriage.³³

In essence, the judicial definition and the statute suggest that the core elements of common carriage are the duty to serve, nondiscrimination, and rate regulation. Indeed, advocates of network neutrality have acknowledged as much.³⁴

B. Network Neutrality as Reflected in FCC Agency Actions

The structure of the governing federal statute establishes a deep connection between network neutrality and common carriage. Title II of the statute defines “telecommunications carrier” as “any provider of telecommunications services” and provides that “[a] telecommunications carrier shall be treated as a common carrier under this chapter only to the extent that it is engaged in providing telecommunications services.”³⁵ “Telecommunications service” is defined as “the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.”³⁶ “Telecommunications” is defined as “the transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.”³⁷

Telecommunications service stands in contrast with an alternative statutory definition known as “information service,” which the statute defines as “the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via

32. 47 U.S.C. § 201(b).

33. See, e.g., *MCI Telecomms. Corp. v. AT&T Co.*, 512 U.S. 218, 229-32 (1994) (calling the tariff-filing requirement “the heart of the common-carrier section of the Communications Act” and essential to ensuring reasonable rates); *ABC, Inc. v. FCC*, 643 F.2d 818, 821 (D.C. Cir. 1980) (noting that the statutory requirement of just and reasonable rates drew on “the common-law doctrines respecting common carriers”); H.W. Chaplin, *Limitations upon the Right of Withdrawal from Public Employment*, 16 HARV. L. REV. 555, 556-57 (1903) (identifying charging reasonable rates as one of the three fundamental duties imposed on common carriers); Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1330-31 (1998) (“For almost a century, public utility companies and common carriers had one common characteristic: All were required to offer their customers service under rates and practices that were just, reasonable, and non-discriminatory.”). See generally Yoo, *supra* note 8, at 571 (examining the historical and conceptual ties between common carriage and rate regulation).

34. WU, *supra* note 2, at 57 (recognizing that common carriage “was a promise to serve any customer willing to pay, charge fixed rates, and carry his or her traffic without discrimination”).

35. 47 U.S.C. § 153(51) (2018).

36. *Id.* § 153(53).

37. *Id.* § 153(50).

telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service.”³⁸ The FCC’s 2017 Restoring Internet Freedom Order recently confirmed its longstanding recognition that telecommunications service and information service are mutually exclusive categories,³⁹ an interpretation that is confirmed by the legislative history,⁴⁰ agency practice,⁴¹ and was reflected in the *Cable Modem Declaratory Ruling* that the Supreme Court affirmed in *Brand X*.⁴²

As the Supreme Court acknowledged in its 2005 *Brand X* decision, when enacting the definitions of telecommunications service and information service, Congress incorporated the regulatory definitions of “basic service” and “information service” the FCC created in the *Computer II* proceeding to regulate data-processing services offered over telephone wires.⁴³ The FCC had characterized basic service as “a pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer supplied information.”⁴⁴ The Supreme Court has held that the *Computer II* definitions are similar and analogous to the statutory definitions⁴⁵ and relied upon the regulatory interpretation of basic service as “pure” and

38. *Id.* § 153(24).

39. Restoring Internet Freedom, Declaratory Ruling, Report and Order, and Order, WC Docket 17-108 (adopted Dec. 14, 2017), http://transition.fcc.gov/Daily_Releases/Daily_Business/2018/db0104/FCC-17-166A1.pdf [<http://perma.cc/XX8C-764A>] [hereinafter 2017 Restoring Internet Freedom Order].

40. S. REP. NO. 104-23, at 1-2, 18, 23, 98 (1995)

41. Appropriate Regulatory Treatment for Broadband Access to the Internet over Wireless Networks, Declaratory Ruling, 22 FCC Rcd. 5901, 5909-11 ¶¶ 19-27 (2007); United Power Line Council’s Petition for Declaratory Ruling Regarding the Classification of Broadband over Power Line Internet Access Service as an Information Service, Memorandum Opinion and Order, 21 FCC Rcd. 13281, 13285-86 ¶¶ 8-10 (2006); Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities, Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd. 14853, 14862-65 ¶¶ 12-17, 14909-12 ¶¶ 102-106 (2005), *petition for review denied sub nom.* Time Warner Telecom, Inc. v. FCC, 507 F.3d 205 (3d Cir. 2007); Petition for Declaratory Ruling That AT&T’s Phone-to-Phone IP Telephony Services Are Exempt from Access Charges, Order, 19 FCC Rcd. 7457, 7460-61 ¶ 6 (2004); Implementation of the Non-Accounting Safeguards of Section 271 and 272 of the Communications Act of 1934, as Amended, Order on Remand, 16 FCC Rcd. 9751, 9755 ¶ 8, 9770 ¶ 36 (2001); Federal-State Joint Board on Universal Service, Report to Congress, 13 FCC Rcd. 11501, 11520-26 ¶¶ 39-48, 11536-40 ¶¶ 73-82 (1998).

42. Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, Internet Over Cable Declaratory Ruling, 17 FCC Rcd. 4798, 4821-23 ¶¶ 37-38 (2002), *aff’d sub nom.* Nat’l Cable & Telecomm. Ass’n v. Brand X Internet Servs., 545 U.S. 967, 987-91, 1000 (2005).

43. *Brand X*, 545 U.S. at 992.

44. Amendment of Section 64.702 of the Commission’s Rules and Regulations (Second Computer Inquiry), Final Decision, 77 F.C.C.2d 384, 420 ¶ 96 (1980) [hereinafter *Computer II* Final Decision].

45. *Brand X*, 545 U.S. at 976; *see also id.* at 995 (calling “telecommunications service” under the statute and “basic service” under *Computer II* “parallel term[s]”).

“transparent” transmission when evaluating the proper regulatory classification for last-mile broadband access.⁴⁶

As the D.C. Circuit has recognized, the statute permits regulating last-mile broadband providers as common carriers only if they are providing telecommunications services governed by Title II of the statute.⁴⁷ Simply put, regulations that impose common carrier treatment on providers who are not offering telecommunications services “cannot stand.”⁴⁸ The applicable regulatory definition thus plays a key role in determining whether a last-mile broadband provider is regarded as a common carrier, which in turn determines whether the agency may subject it to the type of regulation associated with common carriage.

1. Michael Powell’s 2004 Four Freedoms and the 2005 Policy Statement

The modern debate on network neutrality began with a speech given by then-FCC Chairman Michael Powell in February 2004, in which he laid out four “Internet freedoms” that he encouraged companies to embrace.⁴⁹ Specifically, consumers should have the freedom to (1) access content of their choice, (2) use applications of their choice, (3) attach personal devices of their choice, and (4) obtain meaningful information about their service plans.⁵⁰

Powell’s vision was not regulatory in focus. His speech was subtitled, “Guiding Principles for the Industry,”⁵¹ and a section was subtitled, “Empowering Consumers Without Regulating the Internet.”⁵² Moreover, in the body of his speech, he warned that “the case for government imposed regulations regarding the use or provision of broadband content, applications and devices is unconvincing and speculative.”⁵³ Instead, he favored “giv[ing] the private sector a clear road map by which it can avoid future regulation on this issue by embracing unparalleled openness and consumer choice.”⁵⁴ He argued that “if we secure a reasonable balance between the needs of network providers and internet freedom, consumers will reap the benefits of broadband *without intrusive regulation*.”⁵⁵ Rather than proposing regulation, Chairman

46. *Id.* at 976, 988, 990-91, 993, 998, 1000.

47. *Verizon v. FCC*, 740 F.3d 623, 650 (D.C. Cir. 2014).

48. *Id.* at 650.

49. Michael K. Powell, Chairman, Fed. Commc’ns Comm’n, Remarks at the Silicon Flatirons Symposium on “The Digital Broadband Migration: Toward a Regulatory Regime for the Internet Age”: Preserving Internet Freedom: Guiding Principles for the Industry 5 (Feb. 8, 2004), http://apps.fcc.gov/edocs_public/attachmatch/DOC-243556A1.pdf [<http://perma.cc/A3BC-H9QM>].

50. *Id.*

51. *Id.* at 1.

52. *Id.* at 3.

53. *Id.* at 4.

54. *Id.* at 5.

55. *Id.* at 6 (emphasis in original).

Powell was trying to get the industry to act on its own. As such, it did not need to invoke any particular statutory basis for its actions.

The four Internet freedoms extolled by Chairman Powell were echoed in the 2005 Policy Statement that the FCC issued in conjunction with its decision classifying DSL as an information system.⁵⁶ Specifically, the FCC adopted four principles that it planned to “incorporate . . . into its ongoing policymaking activities.”⁵⁷ These principles stated that consumers are entitled to (1) “access the lawful Internet content of their choice,” (2) “run applications and use services of their choice, subject to the needs of law enforcement,” (3) “connect their choice of legal devices that do not harm the network,” and (4) ensure “competition among network providers, application and service providers, and content providers.”⁵⁸ The Policy Statement noted in a footnote, “The principles we adopt are subject to reasonable network management.”⁵⁹

The 2004 Four Freedoms speech and the 2005 Policy Statement exhibit the initial outlines of modern network neutrality. In focusing on guaranteeing consumers’ right to access content, run applications and services, and attach devices, the first three principles provide the foundation for what will become the non-blocking rule. The fourth freedom in Chairman Powell’s speech is clearly the precursor to the modern transparency rule.

The Policy Statement was ambiguous as to whether it is treating last-mile broadband access as a telecommunications service or an information service, discussing both potential bases for authority rather noncommittally.⁶⁰ Determining the precise statutory basis was not that important because, as the Policy Statement explicitly acknowledged, the agency was “not adopting rules in this policy statement”⁶¹ and was simply announcing principles that it would “incorporate . . . into its ongoing policymaking activities.”⁶² The FCC attempted to sanction Comcast in 2008 for violating the Policy Statement only to see that action overturned by the D.C. Circuit in 2010 for being outside the agency’s authority.⁶³

2. The 2010 Open Internet Order

The loss in the Comcast case and the change in administration prompted the FCC to engage in formal rulemaking procedures that culminated in the

56. Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, Policy Statement, 20 FCC Rcd. 14986 (2005).

57. *Id.* at 14988.

58. *Id.*

59. *Id.* at 14988 n.15.

60. *Id.* at 14987.

61. *Id.* at 14988 n.15.

62. *Id.* at 14988.

63. Formal Complaint of Free Press & Public Knowledge Against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications, Memorandum Opinion and Order, 23 FCC Rcd. 13028 (2008), *vacated sub nom.* Comcast Corp. v. FCC, 600 F.3d 642 (D.C. Cir. 2010).

2010 Open Internet Order.⁶⁴ The 2010 Order implemented network neutrality by adopting three basic rules to fixed broadband providers: (1) The transparency rule required them to “disclose the network management practices, performance characteristics, and terms and conditions of their broadband services,” offering guidance as to nine types of information that should be disclosed.⁶⁵ (2) The “no blocking” rule prohibited them from “block[ing] lawful content, applications, services, or non-harmful devices, subject to reasonable network management,” which included impairing or degrading websites or applications so as to make them “effectively unusable.”⁶⁶ (3) The “no unreasonable discrimination” rule forbids them from “unreasonably discriminat[ing] against transmitting lawful network traffic” and identified four considerations to serve as guidance as to what constitutes reasonable, including transparency, end-user control, use-agnosticism, and compliance with industry standards.⁶⁷

The three rules embodied in the 2010 Open Internet Order capture the primary outline of modern network neutrality. The addition of nondiscrimination had the vocal support of Commissioner Michael Copps, who argued for adding nondiscrimination to transparency and nonblocking in a series of speeches between 2006 and 2009.⁶⁸

The 2010 Order recognized three exceptions. First, the rules were subject to reasonable network management, informed by the considerations offered to guide what constituted an unreasonable discrimination rule plus two additional considerations: ensuring network security and integrity and managing network congestion.⁶⁹ Second, mobile broadband was subject to the transparency rule, but was exempt from the no unreasonable discrimination rule and was subject to the no blocking rule only with respect to applications that competed directly

64. Preserving the Open Internet, Report and Order, 25 FCC Red. 17905 (2010).

65. *Id.* at 17906 ¶ 1, 17936-41 ¶¶ 53-61.

66. *Id.* at 17906 ¶ 1, 17941-44 ¶¶ 62-67.

67. *Id.* at 17906 ¶ 1, 17944-51 ¶¶ 67-79.

68. *See, e.g.*, Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications, Memorandum Opinion and Order, 23 FCC Red. 13028, 13080 (2008) (statement of Copps, Comm’r); Broadband Industry Practices, Notice of Inquiry, 22 FCC Red. 7894, 7903 (2007) (Copps, Comm’r, concurring); Applications for Consent to the Assignment and/or Transfer of Control of Licenses, Memorandum Opinion and Order, 21 FCC Red. 8203, 8368 (2006) (Copps, Comm’r, dissenting); Michael J. Copps, Acting Chairman, Fed. Commc’ns Comm’n, Remarks at the Free Press Summit: Changing Media (May 14, 2009), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-290735A1.pdf [<http://perma.cc/UMR8-GRCH>]; Michael J. Copps, Comm’r, Fed. Commc’ns Comm’n, Remarks at Pike & Fischer’s Broadband Policy Summit IV (June 12, 2008), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-282890A1.pdf [<http://perma.cc/NP9N-E3FM>]; Michael J. Copps, Comm’r, Fed. Commc’ns Comm’n, Remarks at En Banc Hearing on Broadband Network Management Practices, Stanford University (Apr. 17, 2008), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-281625A1.pdf [<http://perma.cc/R5XA-GNMM>]; Michael J. Copps, Comm’r, Fed. Commc’ns Comm’n, Remarks at En Banc Hearing on Broadband Network Management Practices, Cambridge, Massachusetts (Feb. 25, 2008), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-280440A1.pdf [<http://perma.cc/HW9V-3HFY>].

69. *Id.* at 17908 ¶ 6, 17951-56 ¶¶ 80-92.

with their voice or video telephony services.⁷⁰ Finally, the Order acknowledged an exception for specialized services, described as video and voice services that share capacity with broadband service.⁷¹

In terms of statutory authority, the 2010 Order treated last-mile broadband access as an information service instead of a telecommunications service.⁷² The D.C. Circuit accepted the statutory basis asserted by the FCC, but held that because nondiscrimination was the quintessential common carriage obligation, the agency could mandate nondiscrimination only with respect to providers it had classified as providing telecommunications services.⁷³ In essence, common carriage and the nondiscrimination mandate that the 2010 Order began treating as an essential aspect of network neutrality were inexorably linked, although the court clearly signaled that the FCC could implement a similar regime based around the commercial reasonableness standard upheld with respect to data roaming.⁷⁴

3. The 2015 Open Internet Order

The FCC responded to the partial reversal of its 2010 Open Internet Order by promulgating a new Open Internet Order in 2015 to govern last-mile broadband access (now called broadband Internet access service or BIAS). The FCC established three new bright-line rules that mandated (1) no blocking of lawful content, applications, services, or nonharmful devices, subject to reasonable network management, (2) no throttling of Internet traffic on the basis of content, application, or service, or use of a non-harmful device, and (3) no paid prioritization unless the provider receives a waiver from the FCC.⁷⁵ The Order backed up these bright-line rules with a general conduct standard prohibiting unreasonable interference and disadvantage, to be evaluated on a case-by-case basis.⁷⁶ The first two bright-line rules and the general conduct standard are subject to reasonable network management, although the bright-line rule against paid prioritization is not.⁷⁷

In addition, the 2015 Order enhanced the transparency rule⁷⁸ and retained the exception for specialized services (now renamed non-BIAS services),⁷⁹ but

70. *Id.* at 17908 ¶ 8, 17956-58 ¶¶ 93-96.

71. *Id.* at 17908 ¶ 7, 17964-66 ¶¶ 112-114.

72. *Id.* at 17967-81 ¶¶ 117-137.

73. *Verizon v. FCC*, 740 F.3d 623, 655-57 (D.C. Cir. 2014).

74. *Id.* at 652, 657 (citing *Cellco P'ships v. FCC* 700 F.3d 534, 547-49 (D.C. Cir. 2012)).

75. 2015 Open Internet Order, *supra* note 6, at 5607-08 ¶¶ 14-18, 5645-58 ¶¶ 104-107, 110-132.

76. *Id.* at 5608-09 ¶¶ 20-22, 5647 ¶ 108, 5659-60 ¶¶ 133-137. The Order offered guidance for determining what constitutes unreasonable interference and disadvantage, including end-user control, competitive effects, consumer protection, free expression, application agnosticism, and standard practices. *Id.* at 5661-64 ¶¶ 138-145

77. *Id.* at 5611 ¶¶ 32-34, 5699-704 ¶¶ 214-224.

78. *Id.* at 5609 ¶¶ 23-24, 5647 ¶ 109, 5669-82 ¶¶ 154-185.

abolished the differential treatment of mobile broadband, choosing to make technical differences a consideration to be taken into account when determining what constitutes reasonable network management.⁸⁰ The Order made a significant extension by asserting jurisdiction over the terms under which networks interconnect with each other, which it planned to regulate on a case-by-case basis.⁸¹

In terms of legal authority, the FCC broke with the approach it had followed since 2002, no longer treating BIAS as an information service and instead reclassifying it as a telecommunications service.⁸² Rather than apply the entire regime governing telecommunications services, which was largely developed for traditional voice telephony, the FCC chose to apply only six of the statutory provisions and forego from all other requirements.⁸³ The D.C. Circuit upheld both the change in statutory authority and the substantive provisions on judicial review.⁸⁴

Although the names attached to the rules changed slightly, the basic outlines of the substantive regulations remained the same. The 2015 Order retained the transparency and no blocking rules. The nondiscrimination principle added in 2010 was embodied into rules against throttling, paid prioritization, and a general conduct standard barring unreasonable interference and disadvantage. Once reclassified as a telecommunications service, requiring BIAS providers to provide the quintessential common carriage obligation of nondiscrimination became unproblematic. The addition of interconnection represented a new development, but in terms of legal authority, it fell naturally from the reclassification of BIAS as a telecommunications service, since the statute gives the FCC jurisdiction over how telecommunications service providers interconnect with one another.⁸⁵

4. The 2017 Restoring Internet Freedom Order

On December 14, 2017, the FCC voted to replace the 2015 Open Internet Order with the Restoring Internet Freedom Order.⁸⁶ The Order retained a

79. *Id.* at 5611 ¶ 35, 5696-98 ¶¶ 207-213.

80. *Id.* at 5650-51 ¶¶ 116-18, 5634-43 ¶¶ 86-101, 5664-65 ¶ 146-149.

81. *Id.* at 5610 ¶ 28, 5686-96 ¶¶ 194-206.

82. *Id.* at 5612-16 ¶¶ 37-50, 5757-77 ¶¶ 355-387. The FCC effected the same outcome for wireless broadband by reclassifying it as from a Private Radio Service to a Commercial Radio Service. *Id.* at 5778-90 ¶¶ 388-408.

83. *Id.* at 5616-17 ¶¶ 51-59, 5804-67 ¶¶ 434-542.

84. *U.S. Telecom Ass'n v. FCC*, 825 F.3d 674 (D.C. Cir. 2016).

85. *See* 47 U.S.C. § 201(a) (2018) (giving the FCC the authority to require common carriers “to establish physical connections with other carriers” and “to establish [the] routes and charges applicable thereto” when it “finds such action necessary and desirable in the public interest”); *id.* § 251(a)(1) (placing on telecommunications carriers the general duty “to interconnect directly or indirectly with the facilities and equipment of other telecommunications carriers”).

86. 2017 Restoring Internet Freedom Order, *supra* note 39.

refined version of the transparency rule,⁸⁷ but abolished the bright-line rules prohibiting blocking, throttling, and paid prioritization along with the general conduct standard.⁸⁸ The Restoring Internet Freedom Order also renounced FCC oversight over interconnection⁸⁹ and preempted inconsistent state regulation.⁹⁰ In terms of legal authority, the Restoring Internet Freedom Order reversed the decision of the 2015 Open Internet Order embracing common carriage and returned to the original classification of BIAS as an information service.⁹¹ The Senate voted on May 16, 2018, to invoke Congressional Review Act to block this Order from taking effect.⁹² The House of Representatives has yet to act on the resolution.

5. The Tacit Need for Rate Regulation

Although Chairman Wheeler repeatedly claimed that the 2015 Open Internet Order did not involve rate regulation,⁹³ his later statements made clear that he regarded the authority to regulate rates as an essential component of network neutrality. For example, in a March 2016 interview, he acknowledged that regulators enforcing network neutrality “still want to have rate authority” enforced through ex post review of complaints.⁹⁴ He also testified before the Senate Appropriations Committee that eliminating ex post review of rates would “gut[] the Open Internet Order.”⁹⁵

A moment’s reflection makes clear the reasons underlying the FCC’s insistence that some form of rate regulation is necessary to make nondiscrimination effective. Without some restriction on overall rates, nondiscrimination would not prevent a vertically integrated provider from excluding unaffiliated providers of complementary services. Instead of singling

87. *Id.* at 125-40 ¶¶ 209-238.

88. *Id.* at 140-78 ¶¶ 239-296.

89. *Id.* at 99-106 ¶¶ 163-173.

90. *Id.* at 117-23 ¶¶ 194-204.

91. *Id.* at 8-98 ¶¶ 20-161.

92. 164 CONG. REC. S2698 (daily ed. May 16, 2018)

93. 2015 Open Internet Order, *supra* note 6, at 5915 (statement of Chairman Tom Wheeler); Tom Wheeler, Chairman, Fed. Commc’ns Comm’n, Remarks at the International Institute of Communications Annual Conference 3 (Oct. 7, 2015), http://apps.fcc.gov/edocs_public/attachmatch/DOC-335877A1.pdf [<http://perma.cc/TJ7W-EA28>]; Tom Wheeler, Chairman, Fed. Commc’ns Comm’n, Remarks at the Broadband Communities Summit 3 (Apr. 14, 2015), http://apps.fcc.gov/edocs_public/attachmatch/DOC-332988A1.pdf [<http://perma.cc/X53A-H4Q2>]; Tom Wheeler, Chairman, Fed. Commc’ns Comm’n, Remarks at the Ohio State University Moritz College of Law Symposium on “The Future of Internet Regulation” 8 (Mar. 27, 2015), http://apps.fcc.gov/edocs_public/attachmatch/DOC-332731A1.pdf [<http://perma.cc/SFGW-Q67E>].

94. See Jon Brodtkin, *Why Tom Wheeler Rejected Broadband Price Caps and Last-mile Unbundling*, ARS TECHNICA (Mar. 16, 2016, 8:47 AM), <http://arstechnica.com/information-technology/2016/03/why-tom-wheeler-rejected-broadband-price-caps-and-last-mile-unbundling> [<http://perma.cc/XL3H-ZCAD>].

95. *Financial Services and General Government Appropriations for Fiscal Year 2017: Hearing Before the Subcomm. on Fin. Servs. & Gen. Gov’t of the S. Comm. on Appropriations*, 114th Cong. 35 (2016) (testimony of Tom Wheeler, Chairman, Fed. Commc’ns Comm’n).

out unaffiliated complementary service providers by charging them higher prices, a vertically integrated company could simply charge the same high price to both affiliated and unaffiliated complementary service providers. The nondiscriminatory high price would have the same exclusionary effect on unaffiliated complementary service providers as would discriminatory prices. At the same time, the uniform higher price would have no adverse effect on the vertically integrated company, as any losses resulting in higher prices paid by the affiliated complementary service provider would simply appear as gains earned by the regulated part of the business. Nondiscrimination mandates simply reallocate profits from the complementary service subsidiary to the regulated subsidiary. Parent companies care only about the total profit earned and are agnostic about which part of the company earns profits. A regulator could ban vertical integration altogether, but in doing so would run counter to considerable evidence that vertical integration is often beneficial to consumers.⁹⁶

Thus nondiscrimination without rate regulation will not prevent vertically integrated companies from engaging in exclusionary conduct.⁹⁷ In short, nondiscrimination would at most address some of the symptoms of whatever market power exists without having any impact on the sources of that market power.⁹⁸ That is why there is reason to be skeptical of claims that a simple nondiscrimination mandate without rate regulation would be sufficient to prevent vertical exclusion.⁹⁹

It is true that the 2015 Open Internet Order avers at some points that its terms did not involve rate regulation,¹⁰⁰ as did Chairman Wheeler in his separate statement.¹⁰¹ However, the later part of the Order clearly indicates that it eschewed only *ex ante* rate regulation,¹⁰² as the dissenting Commissioners

96. For surveys of the empirical literature on vertical integration, see Francine Lafontaine & Margaret Slade, *Vertical Integration and Firm Boundaries: The Evidence*, 45 J. ECON. LIT. 629, 680 (2007) (finding that “under most circumstances, profit-maximizing vertical-integration decisions are efficient, not just from firms’ but also from the consumers’ points of view” and calling on “government agencies to reconsider the validity of . . . restrictions” on vertical integration).

97. W. KIP VISCUSI ET AL., *ECONOMICS OF REGULATION AND ANTITRUST* 238-40 (3d ed. 2000); Christopher S. Yoo, *Vertical Integration and Media Regulation in the New Economy*, 19 YALE J. ON REG. 171, 192-93 (2002).

98. 3A PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW* ¶ 773 (1996); RICHARD A. POSNER, *ANTITRUST LAW: AN ECONOMIC PERSPECTIVE* 208 (1976); Noam, *supra* note 7, at 219.

99. See, e.g., Kevin Werbach, *Is Uber a Common Carrier?*, 12 I/S: J.L. & POL’Y FOR INFO. SOC’Y 135, 148-51 (2015); Wu, *supra* note 1, at 43-44.

100. The FCC first asserted its claim that the 2015 Open Internet Order would not constitute rate regulation in an op-ed published in *Wired* prior to the adoption of the Order. Tom Wheeler, *FCC Chairman Tom Wheeler: This Is How We Will Ensure Net Neutrality*, WIRED (Feb. 4, 2015, 11:00 AM), <http://www.wired.com/2015/02/fcc-chairman-wheeler-net-neutrality> [<http://perma.cc/Y7PH-JR3N>]. The Order also repeatedly emphasized the lack of rate regulation. 2015 Open Internet Order, *supra* note 6, at 5603 ¶ 5, 5612 ¶ 37, 5775 ¶ 382.

101. See *supra* note 93 and accompanying text.

102. 2015 Open Internet Order, *supra* note 6, at 5809 ¶¶ 441-443, 5814 ¶ 445, 5814 ¶ 452, 5842 ¶ 499, 5846-47 ¶ 508, 5854-55 ¶ 519.

pointed out¹⁰³ and one of the majority Commissioners conceded.¹⁰⁴ Claims that ex post review does not constitute rate regulation ignores the Supreme Court's recognition in the landmark case of *New York Times v. Sullivan* that ex post liability can be just as restrictive as ex ante prohibitions.¹⁰⁵ They also ignore the fact the FCC has used ex post review as the standard tool for evaluating the reasonableness of rates of all telecommunications services since the demise of tariffing in 1996.¹⁰⁶

C. The Connection Between Common Carriage and Network Neutrality

The foregoing reveals the extent to which the concepts of common carriage and network neutrality are tied at both a statutory and a conceptual level. In terms of the governing statute, the FCC may treat a last-mile broadband provider as a common carrier only if it is providing telecommunications services. Because nondiscrimination is the quintessential common carriage remedy, the agency may not subject a provider to a nondiscrimination mandate unless it classifies it as a telecommunications carrier.

The similarity of the two categories at the conceptual level makes it unsurprising that the statute treats them as interrelated. The duty to serve identified by the courts as one of the defining aspects of common carriage is the equivalent of the no blocking obligation that was the heart of the 2005 Policy Statement and the 2010 and 2015 Open Internet Orders. The no unreasonable discrimination rule of the 2010 Open Internet Order and its various renamed incarnations in the 2015 Open Internet Order (including also the ban on throttling and paid prioritization and the general conduct standard against unreasonable interference or disadvantage) are the equivalent of the obligation to provide indiscriminate service that the courts have identified as one of the signature characteristics of common carriage. In addition, regulators implementing common carriage and the FCC implementing network neutrality both regard some degree of at least ex post rate regulation as essential to both regulatory approaches. That is why commentators on both sides of the network

103. *Id.* at 5922 (dissenting statement of Commissioner Ajit Pai); *id.* at 6000 (dissenting statement of Commissioner Michael O'Rielly).

104. *Id.* at 5918 (implicitly acknowledging the presence of ex post rate regulation by pointing out "how high the bar is when it comes to the FCC intervening on rates and charges" and emphasizing that the agency has rarely overturned rates outside the context of inmate calling or a tariff investigation).

105. 376 U.S. 254 (1964).

106. Policy and Rules Concerning the Interstate, Interexchange Marketplace, Implementation of Section 254(g) of the Communications Act of 1934, as Amended, Second Report and Order, 11 FCC Rcd. 20730, 20743 ¶ 21, 20746 ¶ 26 (1996) (discussing FCC's ability to use its ex post complaint authority to resolve discrimination claims, even in the absence of filed tariffs), *aff'd sub nom.* MCI Worldcom, Inc. v. FCC, 209 F.3d 760 (2000).

neutrality debate have regarded common carriage and network neutrality as equivalent.¹⁰⁷

II. Factors that Make Common Carriage More Appropriate

The recognition of the connection between common carriage and network neutrality suggests that the implementation of network neutrality would likely benefit from an appreciation of the circumstances under which common carriage has proven more likely to benefit consumers. Rather than repeat past efforts to identify a grand foundational theory of common carriage and apply it from the top down, this Essay offers a more pragmatic, bottom-up approach that examines the limits of the instruments used to implement common carriage and the circumstances under which it is more likely to succeed and more likely to fail. The critique of common carriage appearing in the scholarly literature suggests the existence of five conditions that must be satisfied if common carriage is to be given the best chance of success.

A. *The Commodity Nature of the Regulated Product*

The first consideration that makes common carriage more effective is whether the product being regulated is a commodity. The nature of the product has an impact on both the implementation of nondiscrimination as well as the effectiveness of rate regulation.

1. Nondiscrimination

Nondiscrimination is considerably harder to enforce when the regulated product is not a commodity. In essence, nondiscrimination requires providers to charge the same price to all customers buying the same product. Stated somewhat more formally, the textbook definition of price discrimination is a price differential that is not justified by variations in cost or product quality and is instead based on buyers' willingness to pay.¹⁰⁸ Thus, the nondiscrimination mandate of common carriage "is not concerned with price differentials between qualitatively different services or service packages."¹⁰⁹

107. For statements of network neutrality proponents drawing the equivalence between network neutrality and common carriage, see, for example, SUSAN CRAWFORD, CAPTIVE AUDIENCE: THE TELECOM INDUSTRY AND MONOPOLY POWER IN THE NEW GILDED AGE 36, 53-56, 61-62, 94, 121, 160, 162, 186-87, 230, 270 (2013); Sandvig, *supra* note 2, at 143-45. For statements on the other side of the debate drawing similar conclusions, see, for example, Randolph J. May, *Net Neutrality Mandates: Neutering the First Amendment in the Digital Age*, 3 I/S: J.L. & POL'Y FOR INFO. SOC'Y 197, 209 (2007); Bruce M. Owen, *Antecedents to Net Neutrality*, REGULATION, Fall 2007, at 14.

108. See, e.g., F.M. SCHERER & DAVID ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 489 (3d ed. 1990); Hal Varian, *Price Discrimination and Social Welfare*, 75 AM. ECON. REV. 870, 870-75 (1985).

109. *Competitive Telecomms. Ass'n v. FCC*, 998 F.2d 1058, 1064 (D.C. Cir. 1993); see also 15 U.S.C. § 13(a) (2018) (prohibiting price discrimination only among "different purchasers of

Every agency enforcing a nondiscrimination mandate must thus face the threshold inquiry whether or not the products being sold to two different customers are the same product or different products, whether a price difference exists between the two products, and if so whether that price difference is reasonable,¹¹⁰ as differences in the products being sold may justify different prices. Likeness is determined by “functional equivalence,” measured by whether “consumers view them as performing the same functions.”¹¹¹ Price differences can be justified by higher levels of service, which are functionally equivalent to a price discount.¹¹² When quality varies, nondiscrimination requires regulators to determine whether services are “functionally equivalent” from the perspective of the customer.¹¹³

This inquiry is relatively simple when the product is well defined and uniform. Complexity in the product makes this exercise more complex. For example, in *Competitive Telecommunications Association*, the D.C. Circuit found that selling packaged bundles of services at lower rates was justified because permit customers with “a business reason, such as security or service quality, for wanting to avoid satellite or microwave communications paths” received higher provisioning services by virtue of their ability to control the path taken.¹¹⁴ Also, products that were the product of extensive negotiations between the network provider and a large commercial customer that reflected that customer’s particular needs were also properly regarded as different products.¹¹⁵

The applications that dominated the early Internet—email and web browsing—were relatively modest in terms of the quality of services that they demanded from the network. Because both were essentially file transfer programs, their performance was determined exclusively by the timing of when the last packet arrived.¹¹⁶ In this era, broadband quality was largely determined by bandwidth.

Modern broadband Internet access services are much more diverse. Computer scientists now regard the quality of broadband service as varying along at least four dimensions:

commodities of like grade and quality”); Daniel A. Lyons, *Net Neutrality and Nondiscrimination Norms in Telecommunications*, 54 ARIZ. L. REV. 1029, 1047-48 (2012) (“The Act does not prohibit all differences in price between consumers. Rather, it only prohibits discrimination among ‘like’ services.”).

110. *MCI Telecomms. Corp. v. FCC*, 917 F.2d 30, 39 (D.C. Cir. 1988).

111. *Competitive Telecomms. Ass’n*, 998 F.2d at 1061 (citing *MCI Telecomms. Corp.*, 917 F.2d at 39); *Ad Hoc Telecomms. Users. Comm. v. FCC*, 680 F.2d 790, 795 (D.C. Cir. 1982)).

112. *Id.* at 1062.

113. *Am. Broad. Co., v. FCC*, 663 F.2d 133, 138-39 (D.C. Cir. 1980).

114. *Competitive Telecomms. Ass’n*, 998 F.2d at 1062-63.

115. *Id.* at 1063-64.

116. CHRISTOPHER S. YOO, *THE DYNAMIC INTERNET: HOW TECHNOLOGY, USERS, AND BUSINESS ARE TRANSFORMING THE NETWORK* 23 (2012).

1) *Bandwidth* is the carrying capacity of the network connection, typically measured in megabits per second (Mbps).

2) *Latency/delay* is the amount of time an application takes to begin operating following the initiation of the service.

3) *Jitter* is instability in the pattern in which packets arrive, typically characterized by variations in the temporal spacing between consecutive packets.

4) *Reliability* is determined by the percentage of packets that are transmitted that successfully arrive at their destination.¹¹⁷

The applications that are emerging on the modern Internet are more demanding in terms of these other dimensions of quality of service than email and the World Wide Web (see Table 1). For example, streaming video and audio are quite sensitive to jitter, but are less sensitive to reliability. Interactive video and audio are similarly sensitive to jitter, but are also more sensitive to latency than are streaming media services.¹¹⁸

Table 1: Quality of Service Demands of Traditional Internet Applications¹¹⁹

Application	Bandwidth	Reliability	Delay	Jitter
E-mail	Low	High	Low	Low
File transfer	Medium	High	Low	Low
Streaming audio	Medium	Low	Low	High
Streaming video	High	Low	Low	High
Voice over IP	Low	Low	High	High
Interactive video	High	Low	High	High

Waiting in the wings are a host of applications associated with the emerging Internet of Things (IoT), such as smart meters, smart grids, video surveillance, and smart homes. These applications are demanding still different combinations of services from the network (see Table 2). The variations in service constitute one reason that the FCC had long declined to impose common carriage regulation on enhanced services.¹²⁰ These considerations seem even more important today.

117. *Id.* at 23-24; ANDREW S. TANENBAUM, *COMPUTER NETWORKS* § 5.4.1, at 397 (4th ed. 2003).

118. YOO, *supra* note 116, at 24-27.

119. *Id.* at 26 tbl.2-2

120. Computer II Final Decision, *supra* note 44, at 428-30 ¶¶ 115-118.

Table 2: Quality of Service Demands of Emerging Internet Applications¹²¹

Application	Bandwidth	Reliability	Delay	Jitter
Smart metering	Low	Medium	High	Low
SCADA	High	High	Low	Low
Video surveillance	High	High	Medium	High
Mobile workforce	Low	High	Low	Low
Smart homes	Low	Medium	Low	Low

It is thus unsurprising that network providers are increasingly exploring different forms of prioritized service. Many video and VoIP services employ protocols such as Differentiated Services (DiffServ) and MultiProtocol Label Switching (MPLS) to deploy voice and video services.¹²² Indeed, such services have been part of the Internet's central design from the outset, as demonstrated by the inclusion of the *type of service* field in the Internet Protocol version 4 (IPv4) specifically to accommodate prioritization of services.¹²³ These capabilities were retained and even augmented in the transition to Internet Protocol version 6 (IPv6), which retained a *traffic class* field to provide the functionality associated IPv4's type of service field and added a *flow label* field to accommodate the types of routing policies associated with MPLS.¹²⁴ Organizations that have traditionally been quite skeptical of previous attempts to offer services with differential quality of service have begun to offer virtual circuit services on a set-up and take-down basis, such as Internet2's Interactive On-demand Network (ION).¹²⁵ The need for more sophisticated services also explains the widespread belief that common carriage regulation would be

211. Kenneth C. Budka et al., *Communication Network Architecture and Design Principles for the Smart Grid*, 15 BELL LABS TECH. J. 205 212 tbl.1 (2010).

122. See Steven Blake et al., *An Architecture for Differentiated Services* (Network Working Group Request for Comments 2475, 1998), <http://www.rfc-editor.org/rfc/pdf/rfc2475.txt.pdf> [<http://perma.cc/W9H8-T4G9>]; Eric C. Rosen et al., *Multiprotocol Label Switching Architecture* (Network Working Group Request for Comments 3031, 2001), <http://www.rfc-editor.org/rfc/pdf/rfc3031.txt.pdf> [<http://perma.cc/6CQX-7TRP>].

123. Info. Sci. Inst., *Internet Protocol: DARPA Internet Program Protocol Specification 2*, 12-13, 29-30 (Request for Comments 791, 1981), <http://tools.ietf.org/pdf/rfc791> [<http://perma.cc/DBF9-3UDN>].

124. Stephen E. Deering & Robert M. Hinden, *Internet Protocol, Version 6 (IPv6) Specification 2*, 25-26, 30-31 (Network Working Group Request for Comments 2460, 1998), <http://tools.ietf.org/pdf/rfc2460> [<http://tools.ietf.org/pdf/rfc2460>].

125. Christopher S. Yoo, *The Changing Patterns of Internet Usage*, 63 FED. COMM. L.J. 67, 87 (2010).

harmful to cloud computing.¹²⁶ The need for higher quality of service also animates much of the planning around 5G deployments.¹²⁷

In addition, it has long been recognized that wireless connections drop packets much more frequently than fixed-line connections.¹²⁸ Thus, the quality of service provided via wireless networks are less reliable. Moreover, to the extent that recovery from reliability relies on the traditional requirement that the host resends the packet, lower reliability will lead to greater delay.¹²⁹ In addition, satellite broadband is irreducibly subject to greater latency. The increasing practice of network providers to combine different transmission technologies in ways that are opaque to consumers causes quality of service to vary across different dimensions.

The limitation and standardization of service classes associated with common carriage regulation would represent significant impediments to these developments. History has shown that customers are demanding increasingly diverse solutions.¹³⁰ Indeed, the lack of common carriage provided new entrants in traditional voice services known as Competitive Access Providers (CAPs) with a key competitive advantage that gave them greater flexibility in providing what consumers needed.¹³¹ Regulators evaluating nondiscrimination claims would have to decide not only if the products are the same, but also whether any price differentials are reasonable in light of differences in quality or cost.

The literature also reveals that the standardization associated with common carriage can have the unintended consequence of facilitating collusion.¹³² Collusion performs best when products are standardized, prices

126. See Ergin Bayrak et al., *The Economics of Cloud Computing*, 27 KOREAN ECON. REV. 203, 211-12 (2011); Erik Brynjolfsson et al., *Cloud Computing and Electricity: Beyond the Utility Model*, COMM. ACM, May 2010, at 32, 34; Kenji E. Kushida et al., *Diffusing the Cloud: Cloud Computing and Implications for Public Policy*, 11 J. INDUS. COMPETITION & TRADE 209, 212 (2011).

127. See Alaa Al-Shaikhli & Amir Esmailpour, *Quality of Service Management in 5G Broadband Converged Networks*, PROC. 36TH IEEE SARNOFF SYMP. 56 (2015); Valery Tikhvinskiy & Grigory Bochechka, *Quality of Service in 5G Networks*, in OPPORTUNITIES IN 5G NETWORKS: A RESEARCH AND DEVELOPMENT PERSPECTIVE 97, 97 (Fei Hu ed., 2016).

128. Christopher S. Yoo, *Wireless Network Neutrality: Technological Challenges and Policy Implications*, 31 BERKELEY TECH. L.J. 1409, 1447 (2016).

129. *Id.* at 1435-47.

130. See, e.g., YOO, *supra* note 116, at 27-35; Peter K. Pitsch & Arthur W. Bresnahan, *Common Carrier Regulation of Telecommunications Contracts and the Private Carrier Alternative*, 48 FED. COMM. L.J. 447, 473-75 (1996) (citing Allocation of Frequencies in the Bands Above 890, Preliminary Statement, 27 F.C.C. 359, 369-71 ¶¶ 24-27 (1959)); Schoenwald, *supra* note 9, at 401, 414-15 (citing Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, Sixth Report and Order, 99 F.C.C.2d 1020, 1032 ¶ 18 (1985)).

131. Daniel F. Spulber & Christopher S. Yoo, *Access to Networks: Economic and Constitutional Considerations*, 88 CORNELL L. REV. 885, 962 (2003).

132. CARLTON & PERLOFF, *supra* note 11, at 135, 137; HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE § 4.1a2, at 150-52 (3d ed. 2015); SCHERER & ROSS, *supra* note 108, at 279-80, 348; Andrew F. Daughety & Robert Forsythe, *The Effects of Industry-Wide Price Regulation on Industrial Organization*, 3 J.L. ECON. & ORG. 397, 428-29 (1987).

are visible, and secret discounting is impossible, while cartels are most effectively destabilized by unsystematic price discrimination. Requiring providers to adhere to defined products and a posted, uniform rate schedule provides the type of standardization and information sharing that has long been recognized as a facilitating practice for collusion.¹³³ Preventing providers from charging less than as well as more than posted prices can harm consumers by displacing any discounts they may be able to negotiate¹³⁴ and can even turn the agency into a cartel enforcer.¹³⁵ In addition, posting requirements allows providers to sit back and receive advance notice of competitors' price cuts and any innovations in their business models.¹³⁶ That is why "an antidiscrimination law rigidly imposed on a cartelized market provides the means for effective cartel control."¹³⁷

Lastly, nondiscrimination can turn uniform pricing into both a price floor as well as a price ceiling that can harm consumers. Exemplified by the fixed rate doctrine, in which the tariffed price constitutes the entire contract that brooks no deviations in either direction, this vision of nondiscrimination that prevents individualized discounts as well as high prices hurts consumers. As a result, it can turn nondiscrimination into a sword that hurts consumers as well as a shield that protects consumers.¹³⁸

2. Rate Regulation

Rate regulation also faces serious challenges when the product being regulated is complex instead of simply being a commodity.¹³⁹ When the product is a commodity, regulators need only oversee a single dimension—price—in order to limit the regulated firm's ability to extract surplus. The situation is quite different when the regulated product varies in quality and where the provider has the incentive to avoid rate regulation by skimping on

133. Competition in the Interstate Interexchange Market, Notice of Proposed Rulemaking, 5 FCC Rcd. 2627, 2644 ¶ 143 (1990) [hereinafter IXC Competition NPRM]. For Supreme Court decisions identifying information sharing as a practice that facilitates collusion, see *United States v. Container Corp. of America*, 393 U.S. 333 (1969); *Sugar Institute v. United States*, 287 U.S. 553, 598 (1936); *United States v. American Linseed Oil Co.*, 262 U.S. 371 (1923); and *American Columb & Lumber Co. v. United States*, 257 U.S. 377, 410 (1921). For a general discussion on how information sharing facilitates collusion, see SCHERER & ROSS, *supra* note 108, at 348.

134. See Daniel F. Spulber & Christopher S. Yoo, *Toward a Unified Theory of Access to Local Telephone Networks*, 61 FED. COMM. L.J. 43, 84-85 (2008).

135. Yoo, *supra* note 8, at 604.

136. Pitsch & Bresnahan, *supra* note 130, at 482-83 (citing IXC Competition NPRM, *supra* note 133, at 2644 ¶ 143); Schoenwald, *supra* note 9, at 415-16 (citing Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, Further Notice of Proposed Rulemaking, 84 F.C.C.2d 445, 453 ¶ 26 (1981)).

137. PAUL W. MACAVOY, *THE ECONOMIC EFFECTS OF REGULATION: THE TRUNK-LINE RAILROAD CARTELS AND THE ICC BEFORE 1900*, at 204 (1965).

138. Jim Rossi, *Lowering the Filed Rate Shield: Judicial Enforcement for a Deregulatory Era*, 56 VAND. L. REV. 1591 (2003).

139. This discussion is adapted from Christopher S. Yoo, *Architectural Censorship and the FCC*, 78 S. CAL. L. REV. 669, 686-87 (2005).

quality.¹⁴⁰ The initial models suggest that regulating maximum prices reduces the quality for customers with low willingness to pay, but increases the quality for customers with high willingness to pay, which makes the welfare implications ambiguous.¹⁴¹ Later extensions showed that when providers offer a higher tier of unregulated services in addition to the lower tier of rate regulated services, rate regulation on the lower tier can cause the provider to remove products from the bundle of products subject to price regulation and the increase in prices on the unregulated tier.¹⁴²

The commentary on common carriage has recognized that rate regulation is more problematic when the regulated product exhibits significant variations in quality.¹⁴³ The difficulties associated with imposing rate regulation on non-commodity products are also illustrated by the empirical literature studying the U.S. experience with regulating the rates charged for basic cable television service. These studies have found that while rate regulation caused nominal cable prices to fall, it also induced differences in quality, reflected in the total number and quality of channels offered. Once rates are adjusted for quality, the empirical evidence indicates that rate regulation actually caused quality-adjusted rates to rise. Conversely, rate deregulation caused quality-adjusted rates to fall.¹⁴⁴

Simply put, the welfare implications of rate regulation for non-commodity products are complex and ambiguous. The potential to vary quality allows the regulated provider to avoid rate regulation by degrading its product. In theory, these degradations could be avoided if the regulator engages in comprehensive regulation of minimum quality. Such quality standards are difficult to implement and struggle to account for endogenous changes in the quality of higher-tier services.

This is why common carriage regulation works best when the product is a commodity and where the quality of the product does not vary. This has historically been true for water, natural gas, and electric power.¹⁴⁵ It is also true for traditional telephone calling, which simply requires latencies of less than 300 milliseconds under the quality guidelines established by the International

140. JEAN-JACQUES LAFFONT & JEAN TIROLE, COMPETITION IN TELECOMMUNICATIONS 54-55 (2000).

141. David Besanko, Shabtai Donnenfeld & Lawrence J. White, *Monopoly and Quality Distortion: Effects and Remedies*, 102 Q.J. ECON. 743, 744, 758-59 (1987); David Besanko et al., *The Multiproduct Firm, Quality Choice, and Regulation*, 36 J. INDUS. ECON. 411, 419 (1988).

142. Kenneth S. Corts, *Regulation of a Multi-Product Monopolist: Effects on Pricing and Bundling*, 43 J. INDUS. ECON. 377 (1995).

143. See, e.g., Noam, *supra* note 7, at 219 (“Historically, rate regulation is easiest to administer where the product can be clearly defined and quantified Rate regulation is much more difficult when it deals with complex and variable mixtures of services”).

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

145. Noam, *supra* note 7, at 219.

Telecommunications Union.¹⁴⁶ It is less true for modern Internet services, in which quality varies in multiple dimensions.

B. *The Simplicity of the Interfaces Surrounding the Regulated Product*

The performance of common carriage regulation also depends on the nature of the interface between the product being regulated and related products. Both nondiscrimination and rate regulation function best when such interfaces are simple and struggle when such interfaces are complex.

1. Nondiscrimination

The tractability of disputes over what constitutes nondiscriminatory access depends in no small part on the relative complexity of the interface between the company seeking access and the company providing access.¹⁴⁷ The parties are likely to disagree not only about access prices, but also about nondiscrimination with respect to a wide range of non-price terms and conditions as well.¹⁴⁸ The more complex the interface, the more problematic and protracted these disputes will be.

The impact of the complexity of the interface on the implementation of a nondiscrimination mandate is demonstrated eloquently by the FCC's experience attempting to require AT&T to provide nondiscriminatory access to unaffiliated long distance providers. The complexity and information-richness of the interface of the boundary between long distance service and the local service needed to connect to that service "permitted a thousand ways in which a reluctant Bell System local access provider could hamper and restrict potential long distance competitors."¹⁴⁹ The result is that long distance access was plagued by complaints that about non-price terms, such as delays by the incumbent in provisioning lines for new subscribers signed up by competitors and the number of digits required to access long distance services.¹⁵⁰

Similar problems plagued the implementation of the provision of the Telecommunications Act of 1996 that required incumbent local exchange carriers to provide nondiscriminatory access to all elements of their networks at any technically feasible point.¹⁵¹ Mandating access to unbundled network

146. Int'l Telecomm. Union [ITU], ITU Recommendation G. 114 (2003), <http://www.itu.int/rec/T-REC-G.114-200305-I/en> [<http://perma.cc/5C2R-TWF2>].

147. See Yoo, *supra* note 97, at 244-45.

148. 3A AREEDA & HOVENKAMP, *supra* note 98, ¶ 773, at 216-17, ¶ 774e, at 227-28, ¶ 787, at 281-82 (1996); POSNER, *supra* note 98, at 211; Keith N. Hylton, *Economic Rents and Essential Facilities*, 1991 BYU L. REV. 1243, 1283-84; Bruce M. Owen, *Determining Optimal Access to Regulated Essential Facilities*, 58 ANTITRUST L.J. 887, 890, 893 (1990); Gregory J. Werden, *The Law and Economics of the Essential Facility Doctrine*, 32 ST. LOUIS U. L.J. 433, 460-61 (1987).

149. Gerald R. Faulhaber, *Policy-Induced Competition: The Telecommunications Experiments*, 15 INFO. ECON. & POL'Y 73, 81 (2003).

150. *Id.* at 80.

151. 47 U.S.C. § 251(c)(3) (2018).

elements (UNEs) deep inside a network that the provider was not offering as a separate service ensured that interface would be quite complex. Justice Breyer's dissent in *AT&T v. Iowa Utilities Board* noted that the administrative and social costs of overseeing such a mandate are likely to be considerable.¹⁵²

These concerns were later embraced by the full Supreme Court in *Trinko*, which also arose from complaints that the incumbent was provisioning competitors' lines too slowly.¹⁵³ The Court noted that "the means of illicit exclusion, like the means of legitimate competition, are myriad."¹⁵⁴ Distinguishing between the two is particularly difficult to evaluate when disputes are "highly technical" and "extremely numerous, given the incessant, complex, and constantly changing interaction" between the parties seeking connection and the network.¹⁵⁵ The resulting complexity can lead to "death by a thousand cuts" that regulators will be hard pressed to oversee.¹⁵⁶

Changes in the Internet's architecture mean that the interconnection of different networks is becoming increasingly complex. Internet Service Providers (ISPs) that used to connect only through a single network are now connecting through multiple networks through practices such as multi-homing, secondary peering, and other creative arrangements. In addition, the growing use of third-party and proprietary data centers, content distribution networks (CDNs), and other solutions that use storage in innovative ways to reduce the burden on the network are requiring new interfaces, complete with ways to provision and meter the services provided.¹⁵⁷

Furthermore, the Law of Requisite Variety teaches that the growing demand for increasingly diverse services will create the need for increasingly complex interfaces to provide the needed functionality, because the number of levers in the interface must necessarily match the number of potential disturbances if the system is to maintain homeostasis.¹⁵⁸ These pressures in turn create pressure for the interfaces and the distribution of functions to change.¹⁵⁹ In addition, the growing variety of network topologies makes the problems even more complex.¹⁶⁰ The net result is to make the nondiscrimination mandate associated with common carriage even more difficult to implement. To the extent that variations in the interfaces exist, enforcement of nondiscrimination

152. 525 U.S. 366, 429 (1999) (Breyer, J., concurring in part and dissenting in part).

153. *Verizon Comm'ns, Inc. v. Law Offices of Curtis V. Trinko*, 540 U.S. 398, 403-04 (2004).

154. *Id.* at 414.

155. *Id.*

156. *Id.*

157. Christopher S. Yoo, *Innovations in the Internet's Architecture that Challenge the Status Quo*, 8 J. ON TELECOMM. & HIGH TECH. L. 79 (2010).

158. Christopher S. Yoo, *Modularity Theory and Internet Policy*, 2016 U. ILL. L. REV. 1, 9-17.

159. *Id.* at 33-36.

160. Yoo, *supra* note 116, at 55-69.

requires determining how much of a disparity in price those differences would justify.

2. Rate Regulation

The complexity of the interface is also likely to have an adverse impact on rate regulation. Common carriage applies in a meaningful way only when one of the parties does not want to enter into a business relationship with the other party. The relationship is thus likely to be plagued by disputes over the reasonableness of prices.¹⁶¹ As noted earlier, such disputes are likely to extend to a wide variety of non-price conditions as well.¹⁶²

In this regard, the FCC's experience in enforcing leased access to cable television systems is instructive. The service has gone largely unused, with the parties disagreeing over whether prices are excessive and whether restrictions on non-price terms and conditions are too restrictive.¹⁶³ It also provides a largely unappreciated explanation of why unbundled access to local telephone networks proved unsuccessful: The statute analyzed access entirely in terms of the economics of replicability without taking into account the complexity of the interfaces and the interdependencies that for technical reasons made certain clusters of tasks into transaction-free zones.¹⁶⁴

Similar concerns are likely to arise with respect to network neutrality. The complexity of the interface is likely to require fairly comprehensive oversight of the entirety of the business relationship between the companies seeking access and the companies providing it.¹⁶⁵ The growing intensity and heterogeneity of the demands on the network and the inevitable increase in the complexity of the interface makes this aspect of common carriage increasingly challenging to oversee.

C. Stability and Uniformity in the Transmission Technology

Commentators have long recognized that common carriage functions best when the transmission technology is relatively static and uniform. Conversely, common carriage faces considerable difficulties when different providers use different technologies and when those technologies are in a state of flux.

161. 3A AREEDA & HOVENKAMP, *supra* note 98, ¶ 774e, at 227-28; *see also id.* ¶ 765c, at 103-04, ¶ 772, at 197.

162. *See supra* note 148 and accompanying text.

163. *See* S. REP. NO. 102-92, at 30-32 (1991), *reprinted in* 1992 U.S.C.C.A.N. 1133, 1163-65; H.R. REP. NO. 102-628, at 39-40 (1992); *Time Warner Entm't Co. v. FCC*, 93 F.3d 957, 968-70 (D.C. Cir. 1996); *Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992*, 11 FCC Rcd. 16933, 16937 ¶ 6 (1996); Donna M. Lampert, *Cable Television: Does Leased Access Mean Least Access?*, 44 FED. COMM. L.J. 245, 266-67 & n.122 (1992).

164. Yoo, *supra* note 158, at 39-42.

165. Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEO. L.J. 1847, 1896-97 (2006).

1. Nondiscrimination

Consider first how non-uniformity and dynamism in transmission technologies make nondiscrimination hard to implement. Recall that the textbook definition of price discrimination is a variation in price that is not justified by differences in cost or product quality.¹⁶⁶ This requires not only a comparison of the relevant products. It also requires a comparison of the underlying production technologies used to create the products or services. Such comparisons are relatively simple when production technologies are uniform and stable and when the costs of providing service do not vary customer to customer or from provider to provider. They become considerably more difficult when production technologies differ or when the costs of serving different customers varies.

In the case of water, natural gas, and electric power, the transmission technologies have long been relatively stable and uniform.¹⁶⁷ The same is not true with the Internet. Different providers employ a wide array of technologies, such as cable modems, digital subscriber lines (DSL), fiber-to-the-home, and wireless broadband.¹⁶⁸ Increasingly, providers are also combining different technologies together. For example, wireless broadband providers are increasingly shedding load from their cellular broadband networks by configuring their networks to seamlessly migrate traffic to WiFi supported by fixed-line connections.¹⁶⁹ In addition, AT&T's acquisition of DirecTV has permitted it to provide over-the-top distribution for video content that used to be carried exclusively on DirecTV's satellite network.¹⁷⁰

Moreover, the cost of providing service can vary from customer to customer even when they are employing the same transmission technology. As an initial matter, rate averaging means that urban and rural consumers pay the same prices despite the fact that the real costs of providing rural service are much higher than the costs of providing urban service. Charging consumers the same price when their real costs differ represents another, less obvious, form of discrimination.¹⁷¹ This is why the Supreme Court has explicitly recognized that charging urban and rural customers the same price in the name of promoting universal service represents "state-sanctioned discrimination."¹⁷²

166. See *supra* note 108 and accompanying text.

167. See Noam, *supra* note 7, at 219.

168. Yoo, *supra* note 116, at 37-50.

169. Adnan Aijaz et al., *A Survey on Mobile Data Offloading: Technical and Business Perspectives*, IEEE WIRELESS COMM., Apr. 2013, at 104; Richad Maallawi et al., *A Comprehensive Survey of Offload Techniques and Management in Wireless Access and Core Networks*, 17 IEEE COMM. SURV. & TUTORIALS 1582 (2015); Filippo Rebecchi et al., *Data Offloading Techniques in Cellular Networks: A Survey*, 17 IEEE COMM. SURV. & TUTORIALS 580 (2014).

170. Marguerite Reardon & Dara Kerr, *AT&T CEO Makes the Case for Acquiring Time Warner*, CNET (Oct. 4, 2017, 3:32 PM), <http://www.cnet.com/news/at-t-ceo-makes-the-case-for-time-warner-megamerger> [<http://perma.cc/MT4X-XSLH>].

171. SCHERER & ROSS, *supra* note 108, at 489.

172. Verizon Commc'ns Inc. v. FCC, 535 U.S. 467, 480 (2002).

Another source of cost variation is congestion.¹⁷³ The design of many broadband networks requires end users to share bandwidth locally.¹⁷⁴ This allows a small number of super-heavy users to impose significant congestion costs on the other users sharing the same node.¹⁷⁵ Charging customers the same price despite the fact that the congestion costs caused by their activities differs is a form of discrimination.¹⁷⁶ Techniques to remediate such behavior, such as data caps, are often greeted with claims that they are a form of discrimination designed to harm streaming video services in an attempt to protect legacy cable revenues.¹⁷⁷ Given that Netflix and YouTube by themselves occupy more than 50% of the available primetime downstream bandwidth makes it inevitable that any attempt to curb congestion will have a limiting effect on online video.¹⁷⁸ Moreover, such efforts are cost-justified measures that comply with the principles of nondiscrimination.¹⁷⁹ Indeed, the differences in cost suggest that the failure to impose usage-sensitive pricing would be more properly regarded as discriminatory than would the imposition of such measures.

Differences in transmission technology thus imply that charging customers different prices for what appears to be the same service may be reasonable. Regulators charged with enforcing nondiscrimination must be able to discern the nature of the differences and assess what price differentials might be justified.

2. Rate Regulation

Dynamic change in the transmission technologies greatly complicates the process of rate regulation as well.¹⁸⁰ One of the longest standing disputes under common carriage is over whether rates should be based on historical cost or replacement cost.¹⁸¹ Commentators have long recognized that replacement cost better reflects the state of the art technology and provides more appropriate

173. Christopher S. Yoo, *Network Neutrality Consumers, and Innovation*, 2008 U. CHI. LEGAL F. 179189-90, 194-95, 201-02, 206-11.

174. *Id.* at 194-95, 201-02.

175. James J. Martin & James M. Westall, *Assessing the Impact of BitTorrent on DOCSIS Networks*, 2007 PROC. 4TH INT'L CONF. ON BROADBAND COMM., NETWORKS & SYS. (BROADNETS) 423.

176. Yoo, *supra* note 174, at 203-05.

177. *Id.* at 206-12; Yoo, *supra* note 125, at 94-95.

178. *2016 Global Internet Phenomena: Latin America and North America*, SANDVINE 4 tbl.1 (2016), <http://www.sandvine.com/hubfs/downloads/archive/2016-global-internet-phenomena-report-latin-america-and-north-america.pdf> [<http://perma.cc/RRE8-TGC3>].

179. There is one sense in which data caps are misleading: they typically measure aggregate traffic over the course of a month, while true congestion pricing is determined only by usage during peak times when the network is near saturation.

180. For an example in another industry where changes in production technology caused common carriage regulation to fail, see Paul L. Joskow, *Cartels, Competition and Regulation in the Property-Liability Insurance Industry*, 4 BELL J. ECON. 375 (1973).

181. Spulber & Yoo, *supra* note 131, at 902-03; Spulber & Yoo, *supra* note 134, at 83-84.

signals of when companies should self-provision their facilities instead of seeking access to the existing network. The problem has long been that replacement cost is hard to implement, requiring extended battles between experts disputing over the costs of a hypothetical network comprised of the best available technology. Historical cost has the advantage of being easier to implement and has been more widely employed.¹⁸² When technology is relatively static, the wedge between replacement cost and historical cost remains relatively narrow. The more technology changes, the bigger the wedge between historical cost and replacement cost becomes.¹⁸³

All of this was on full display when the FCC was developing rules to implement the 1996 amendments to the Pole Attachments Act. The FCC recognized that it had used replacement cost methodologies when it was important to provide accurate cost signals about whether new entrants should build their own networks or rely on those of incumbents.¹⁸⁴ However, such considerations were less important when the transmission technology is relatively static. Indeed, when that is the case, historical and replacement cost methodologies are likely to yield similar results.¹⁸⁵

The FCC's reasoning thus recognizes that the tools of common carriage are considerably easier to apply when the transmission technology is stable. That is not the case with the modern Internet, in which multiple transmission technologies are vying for customers and in which there have been dramatic shifts in the technologies used to access the Internet over time.¹⁸⁶ This will intensify further as fiber-to-the-home, 4G LTE, and 5G continue to deploy.

D. Whether the Transmission Network Is Fully Built Out

Another critical determinant of the efficacy of common carriage regulation is the extent to which the transmission network is already built out and fully amortized. Common carriage is less well suited when the network requires significant capital expenditures to extend or upgrade it.

1. Nondiscrimination

Requirements of nondiscriminatory access can have a dramatic impact on the incentives to invest in new infrastructure. The theoretical arguments of how network sharing requirements can create a tragedy of the commons that

182. For the classic statement, see *Mo. ex rel. Sw. Bell Tel. Co. v. Pub. Serv. Comm'n*, 262 U.S. 276, 292-302, 308-10 (1923) (Brandeis, J., concurring).

183. Stephen A. Siegel, *Understanding the Lochner Era: Lessons from the Controversy over Railroad and Utility Rate Regulation*, 70 VA. L. REV. 187, 227-28, 251-52 (1984).

184. Amendments of the Commission's Rules and Policies Governing Pole Attachments, Consolidated Partial Order on Reconsideration, 16 FCC Rcd. 12103, 12117-18 ¶ 23 (2001) [hereinafter Consol. Reconsideration Order].

185. *Id.* at 12118 ¶ 24.

186. Yoo, *supra* note 116, at 37-50.

dampens investment incentives are well rehearsed¹⁸⁷ and supported by a burgeoning empirical literature.¹⁸⁸ Although the empirical literature on the subject is the most extensive with respect to unbundling,¹⁸⁹ the basic intuitions apply to all forms of infrastructure sharing.

The Supreme Court has similarly recognized that compelling network owners to share their networks “may lessen the incentive for the monopolist, the rival, or both to invest in those economically beneficial facilities.”¹⁹⁰ What is less well recognized is the extent to which access mandates create adverse selection problems. Competitors can avoid making any investments and instead simply obtain access to resources that have proven to be economically viable. Access regimes thus allow competitors to make decisions *ex post* after the *ex ante* risks have been validated one way or the other.¹⁹¹ Access regimes can also increase sorting costs by allowing competitors to wait and see which geographies prove viable. The reality that access regimes require those making initial investments to share access to those areas that prove successful while bearing all of the losses on those regions that prove unsuccessful further dampens investment.¹⁹²

More fundamentally, all industries with high fixed costs and low marginal costs face a long-recognized pricing problem that can adversely affect investment incentives.¹⁹³ If a product facing low or zero marginal costs is to break even, every unit must be priced to recover some share of the fixed cost as well as the marginal cost. The problem is that by forcing prices above marginal cost, any allocation of fixed cost necessarily creates some deadweight loss. On the other hand, pushing prices closer to marginal cost reduces incentives to invest.¹⁹⁴ As Frank Ramsey recognized nearly a century ago, such problems can be eliminated if a higher proportion of the fixed costs are allocated to price insensitive customers, whose consumption will not drop significantly even if

187. See Robert W. Crandall & Jerry A. Hausman, *Competition in U.S. Telecommunications Service: Effects of the 1996 Legislation*, in DEREGULATION OF NETWORK INDUSTRIES: WHAT’S NEXT? 73, 107-10 (Sam Peltzman & Clifford Winston eds., 2000); Thomas M. Jorde et al., *Innovation, Investment, and Unbundling*, 17 YALE J. ON REG. 1 (2000); Yoo, *supra* note 97.

188. Carlo Cambini & Yanyan Jiang, *Broadband Investment and Regulation: A Literature Review*, 33 TELECOMM. POL’Y 559, 569, 571 (2009); Christopher S. Yoo, *Deregulation vs. Reregulation: The Clash of Conflicting Paradigms*, 36 J. CORP. L. 847, 860-61 & nn.104-105 (2011).

189. See Cambini & Jiang, *supra* note 188, at 568-72 (surveying the unbundling literature).

190. Verizon Commc’ns, Inc. v. Law Offices of Curtis V. Trinko, 540 U.S. 398, 407-08 (2004).

191. Yoo, *supra* note 97, at 196-97.

192. *Id.* at 264.

193. See *supra* note 182.

194. For the seminal statement, see Harold Hotelling, *The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates*, 6 ECONOMETRICA 242, 242 (1938); accord Benjamin Klein & John Shepard Wiley, Jr., *Competitive Price Discrimination as an Antitrust Justification for Intellectual Property Refusals to Deal*, 70 ANTITRUST L.J. 599, 611-15 (2003); Michael E. Levine, *Price Discrimination Without Market Power*, 19 YALE J. ON REG. 1, 9-17 (2002) (showing how Ramsey pricing and other forms of price discrimination can promote economic efficiency in industries in which fixed costs are shared by multiple consumers).

charged higher prices, and a lower proportion of the fixed costs are allocated to price sensitive customers.¹⁹⁵

This is why economists generally recognize that demand-side price discrimination is a necessary condition to efficient market provision of intellectual property.¹⁹⁶ Commentators have drawn similar conclusions with respect to network industries.¹⁹⁷ A broad nondiscrimination mandate would prevent this solution from being realized. Such considerations are less relevant if the relevant networks are fully built out and entry by subsequent competitors is infeasible. They play a key role, however, when investment in new network capacity represents a key policy goal.

2. Rate Regulation

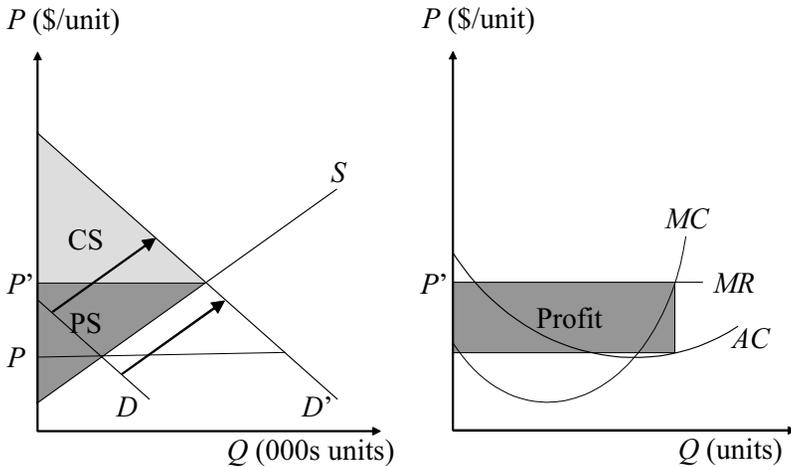
Rate regulation can also have a negative impact on investment incentives and thus pose significant problems if the network is not yet built out. Simply put, short-run supra-competitive prices play a critical positive role in signaling to industry actors that the relevant markets are in disequilibrium and attract the investment that shifts out the supply curve to bring the market back into equilibrium.

195. The seminal analysis in the context of taxation is Frank J. Ramsey, *A Contribution to the Theory of Taxation*, 37 *ECON. J.* 47 (1927). Ramsey's insights were extended to regulated industry by William J. Baumol & David Bradford, *Optimal Departures from Marginal Cost Pricing*, 60 *AM. ECON. REV.* 265 (1970).

196. See, e.g., William J. Baumol & Daniel G. Swanson, *The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power*, 70 *ANTITRUST L.J.* 661, 671-73 (2003) (showing how price discrimination is essential in high fixed cost industries and occurs even when those industries are competitive).

197. See, e.g., JEAN-JACQUES LAFFONT & JEAN TIROLE, *COMPETITION IN TELECOMMUNICATIONS*, at xv (2000) ("Marginal-cost pricing for all services is not viable in telecom industries.").

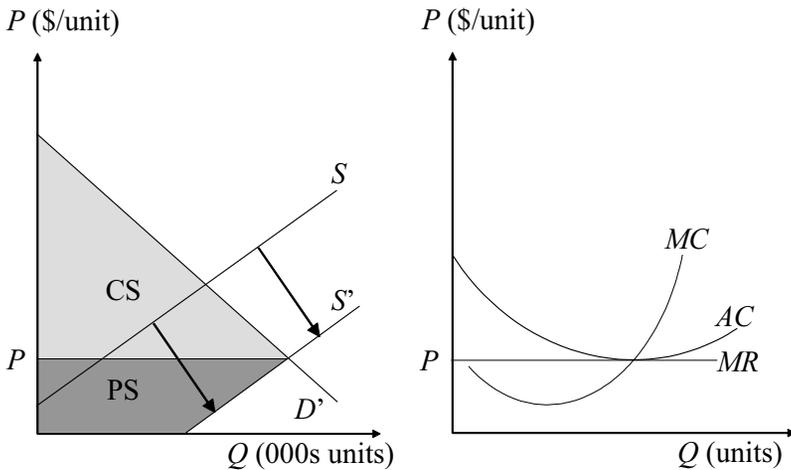
Figure 1: Short-Run Disequilibrium from an Exogenous Shock



The reasons for this tradeoff are familiar to anyone who has taken Economics 101. The basic equilibrium dynamics are depicted in Figures 1 and 2, with the industry-level dynamics depicted in the left-hand graph and the firm-level dynamics depicted in the right-hand graph. Assume that a market finds itself in disequilibrium, perhaps because a change in demand causes the demand curve to shift outwards.

The result in the short run is that prices will rise, as the market attempts to allocate supply that has become all-too scarce. Maintaining the previous price would simply induce shortages, as the new demand at that price would far outstrip the available supply. The higher price also allows the competing firms to earn above-cost returns. If entry is infeasible, the new equilibrium will be stable. If entry is feasible, however, the resulting profits attract investments in new production capacity that shifts the supply curve outward until the profits are dissipated and the market once again returns to long-run equilibrium.

Figure 2: Return to Long-Run Equilibrium Through Outward Shift in the Supply Curve



Consider the critical role played by supra-competitive prices and supra-competitive returns. These prices and returns signal other actors that the market is in disequilibrium, and the desire to share in the supra-competitive profits provides the incentive for producers to make the additional investments in production capacity that causes the supply curve to shift outward. Moreover, if entry is feasible, such supra-competitive prices and profits should not persist. Conversely, if prices are not permitted to rise, such investments will not occur, and the shortages will become persistent. On the other hand, if entry is infeasible, investments in additional capacity will never occur, and protecting investment incentives serves little use.

This is why Justice Breyer recognized in *AT&T v. Iowa Utilities Board* that “a sharing requirement may diminish the original owner’s incentive to keep up or to improve the property by depriving the owner of the fruits of value-creating investment, research, or labor.”¹⁹⁸ He further observed that one cannot “guarantee that firms will undertake the investment necessary to produce complex technological innovations knowing that any competitive advantage deriving from those innovations will be dissipated by the sharing requirement.”¹⁹⁹ He similarly noted in *Verizon v. FCC* that compelling

198. 525 U.S. 366, 428-29 (1999) (Breyer, J., concurring in part and dissenting in part).

199. *Id.* at 429.

incumbents to share the cost-reducing benefits of a successful innovation destroys the incumbent's incentives to innovate in the first place.²⁰⁰

The entire Supreme Court later embraced Justice Breyer's concerns about access requirements' impact on the incumbents' incentives to reinvest in their network in its 2004 *Trinko* decision, which recognized, "The mere possession of monopoly power, and the concomitant charging of monopoly prices, is not only not unlawful; it is an important element of the free-market system. The opportunity to charge monopoly prices—at least for a short period—is what attracts 'business acumen' in the first place; it induces risk taking that produces innovation and economic growth," including through investments in infrastructure. Because of that, "[c]ompelling such firms to share the source of their advantage . . . may lessen the incentive for the monopolist, the rival, or both to invest in those economically beneficial facilities."²⁰¹

The dampening of investment incentives matters less when the network is already built out. When that is the case, employing rate regulation that dampens investment signals is less important. Moreover, if further entry is impossible, then short-run high prices will not stimulate new entry sufficient to shift out the supply curve and dissipate the supra-competitive returns.

Again, the implementation of the 1996 amendments to the Pole Attachments Act illustrates the issue. As noted earlier, the issue was whether to employ the more market-oriented methodology based on replacement cost or the more easily implemented methodology based on historical cost. The FCC recognized that even though replacement cost would have provided more accurate signals about whether new entrants should invest in their own networks instead of relying on the incumbents', such considerations were less important in the context of pole attachments because local regulation and prohibitive cost make construction of a second network of poles infeasible. When "attachers . . . do not face a realistic 'make or buy' decision, the benefits of giving proper cost signals to new entrants are less pronounced."²⁰²

The propriety of rate regulation thus turns in part on whether the network has already been constructed or requires additional investment. When the central problem is stimulating additional capital expenditures, short-run supra-competitive prices play a critical role in stimulating the necessary investment. On the other hand, if rate regulation succeeds in ratcheting down prices to competitive levels when entry is possible, it risks substantially dampening both competitors' and the incumbent's incentive to invest in expanding or improving its network infrastructure.

200. *Verizon Commc'ns Inc. v. FCC*, 535 U.S. 467 (2002) (Breyer, J., concurring in part and dissenting in part).

201. *Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko*, 540 U.S. 398, 408 (2004).

202. *Consol. Reconsideration Order*, *supra* note 185, at 12118 ¶ 24, 12119 ¶ 25.

E. Stability in the Demand for Each Firm's Production

Lastly, common carriage functions best when the demand for each firm's production remains relatively stable. Unit prices are traditionally set by determining a firm's overall revenue requirement and then dividing that requirement by the expected quantity demanded for that firm's services. Firms can enjoy substantial windfalls or suffer from drastic shortages should the sales volume deviate from expected levels.²⁰³

The problem is demonstrated aptly by the recent disputes over *traffic pumping*, in which small carriers negotiated rates for terminating calls based on their historical call volumes, which were quite low, and then radically increasing their terminating call volume by advertising free services that only terminate calls, such as conference calling or free adult chat-line services. These customers then advertise their conference calling or chat-line services on the Internet as free services. In one case, traffic pumping caused terminating traffic to surge from 15,000 minutes to 6.4 million minutes in a five-month span, which resulted in a \$10-\$15 million increase in revenue above expected levels.²⁰⁴

This example underscores the difficulty in setting rates when sales volumes are faced with considerable uncertainty. This includes both variability around market share as well as uncertainty regarding the size of the overall market. The dynamic nature of the Internet industry thus provides some reason to believe that policymakers will find it challenging to apply common carriage principles to the Internet.

Conclusion

The judicial decision holding that including a nondiscrimination rule would be proper only if broadband Internet access were classified as a common carrier sparked strong interest among policymakers and network neutrality advocates in embracing common carriage as the basis for the Open Internet Order. Unfortunately, they have often done so without taking into account common carriage's limitations revealed in the academic commentary and its implementation history.

This Essay seeks to fill this void by suggesting a five-part framework for analyzing when common carriage is most likely to succeed. The factors suggest that the modern Internet constitutes a poor candidate for successful common carriage regulation. Assigning relative weights to each factor and determining

203. Noam, *supra* note 7, at 219 (noting that "rate regulation is easiest to administer . . . where the industry is relatively stable" and is "more difficult . . . where the regulated industry is extremely dynamic in its development").

204. See Virgil Larson, *Big Phone Carriers Say Small Firms Bleed Them*, OMAHA WORLD-HERALD, May 16, 2007, at 1D.

how likely common carriage is to be successful if some, but not all, of the criteria are met is left to future research.

The fact that history suggests that common carriage remedies are unlikely to be difficult to administer when imposed on the Internet raises what at first might appear to be a conundrum. The Supreme Court's decision in *Trinko* suggests that antitrust law is also poorly suited to oversee such access remedies.²⁰⁵ This raises the possibility that neither antitrust law nor regulation could address any potential problems.

On reflection, such a possibility should not be surprising. *Trinko* reminds us that intervention under the antitrust laws is not costless and that liability should be imposed only when the benefits of doing so exceed the costs.²⁰⁶ This means that the costs of antitrust enforcement may counsel in favor abstaining from intervention even when the unregulated market would not perform in a perfectly competitive manner. Instead, the imperfections of the remedies necessarily require policymakers to engage in a comparative second-best analysis and tolerate imperfect market performance when the would-be cure would be worse than the disease.

The same is true for regulation. The fact that telecommunications regulation is costly similarly requires a comparison of second-best outcomes. It may well be that the unregulated market would perform so badly that intervention would be better for consumers notwithstanding the costs associated with imposing that regulation. Oligopolistic markets similarly fall short of the competitive ideal, but as the number of competitors increases, the economic performance of the unregulated market improves. Eventually, the improvement in performance reaches the point where the balance between unregulated oligopoly and regulated oligopoly tips the other way and policymakers find that the benefits of regulation no longer exceed the costs.²⁰⁷ It is important to bear in mind that at this point, the market still does not perform perfectly. The comparative second-best analysis teaches us that sometimes there will be imperfections that the law is unable to remediate.

The recognition that the law cannot necessarily right every wrong is part of the growing humility over the past few decades about what the law can do. Tempting as it might be to try to use the law to fix every problem that regulators can identify, a clear recognition the types of remedies that courts and regulators can manage effectively provides new insights into the proper limits of common carriage's domain.

205. Verizon Commc'ns Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 414-15 (2004).

206. *Id.* at 414.

207. Howard A. Shelanski, *Adjusting Regulation to Competition: Toward a New Model for U.S. Telecommunications Policy*, 24 YALE J. ON REG. 55, 101-05 (2007).