

A FRAGILE FOUNDATION—THE ROLE OF “INTERMODAL” AND “FACILITIES-BASED” COMPETITION IN COMMUNICATIONS POLICY

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ABSTRACT

The communications industry is currently experiencing extensive and rapid deregulation. The policies justifying this deregulation have been constructed upon the concepts of “intermodal” and “facilities-based” competition. At both the federal and state level, regulators and courts have increasingly embraced deregulatory policies that promote—and assume the existence of—these forms of competition. In short, these concepts have become the theoretical foundation of modern communications policy. In the rush to either embrace or reject these forms of competition, policymakers and scholars have not paused to ask whether these two concepts are descriptively meaningful. In this Article, I argue that they are not—specifically, I argue that the conceptual foundations of modern policy are inconsistent with the realities of network infrastructure. As a result, the trend toward deregulation is premised upon flawed and unrealistic conceptual foundations. This Article outlines these conceptual inconsistencies along with their regulatory implications.

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INTRODUCTION

The communications industry is experiencing extensive and rapid deregulation. The policies justifying this deregulation have been constructed upon the concepts of “intermodal” and “facilities-based” competition.¹ At both the federal and state level, regulators and courts have increasingly embraced deregulatory policies that promote—and assume the existence of—these forms of competition. In short, these concepts have become the theoretical foundation of modern communications policy. In the rush to

1. See, e.g., George S. Ford, Thomas M. Koutsky & Lawrence J. Spiwak, *Competition After Unbundling: Entry, Industry Structure, and Convergence*, 59 FED. COMM. L.J. 331, 332 (2007) (“In the last few years, the goal of U.S. telecom[] policy has been to promote and rely upon facilities-based ‘intermodal competition’—that is, competition among network platforms.”).

either embrace or reject these forms of competition, policymakers and scholars have not paused to ask whether these two concepts are descriptively meaningful. In this Article, I argue that they are not—specifically, I argue that the conceptual foundations of modern policy are inconsistent with the realities of network infrastructure. As a result, the trend toward deregulation is premised upon flawed and unrealistic conceptual foundations.

“Intermodal” competition involves providing goods through different “modes” of service. For instance, traditional telephone companies compete not only against other telephone companies, but against companies that provide different “modes” of voice service, such as wireless or cable. Facilities-based competition, by contrast, refers to competition among providers who actually own the physical facilities underlying communications networks. In this sense, cable and telephone companies are generally considered “facilities-based” competitors because they each own the underlying network infrastructure through which they provide service.

Parties generally cite both intermodal and facilities-based competition to justify deregulation. The argument is that market competition from other “modes” of service makes regulation unnecessary to prevent anticompetitive behavior. For instance, the rise of wireless service arguably eliminates the need to regulate traditional telephone service. The case for deregulation becomes even stronger, parties argue, when intermodal competitors provide service using their own facilities (rather than relying on competitors’ bottleneck facilities). Indeed, the Federal Communications Commission (FCC, or Commission)—citing these very rationales—has recently adopted far-reaching deregulatory measures on several key issues such as broadband access, media consolidation, telecommunications mergers, local telephone competition, and legacy network deregulation.²

Contemporary scholarship has focused on whether promoting these forms of competition are realistic or appropriate policy goals.³ Surprisingly, however, policymakers and scholars have not examined whether intermodal and facilities-based competition are themselves coherent and descriptively meaningful concepts. Instead, the debates implicitly assume the validity of their underlying conceptual premises. In this Article, I argue that communications network infrastructure defies these conceptual boxes. In particular, I argue that the current concepts of competition ignore the implications of shared, layered network infrastructure and that ignoring these realities has profound regulatory implications.

Part I defines intermodal and facilities-based competition, and further illustrates why these concepts represent the theoretical foundation of com-

2. See *infra* text accompanying notes 41–56.

3. See *infra* text accompanying notes 60–62.

munications policy. Part II examines the conceptual limits of intermodal competition. Adopting a “layers” perspective of communications networks, this part illustrates that “intermodal” can have two quite distinct meanings depending on whether one adopts a technology-based definition (i.e., an application-layer perspective), or a facilities-based one (i.e., an access-layer perspective). Part III examines the conceptual limits of facilities-based competition. Specifically, it shows that conceptions of facilities-based competition erroneously assume that competition in *part* of a network provides competition *throughout* that network. Part IV illustrates how facilities-based competition is further undermined by recent changes in legal doctrine—specifically, the narrowing of interconnection requirements and antitrust remedies. Part V discusses regulatory implications and offers suggestions as to how policymakers should examine infrastructure more closely in deregulatory proceedings. Specifically, it proposes that policymakers adopt stronger interconnection and network access requirements.

I. THE COMPETITIVE FOUNDATIONS OF MODERN COMMUNICATIONS POLICY

This part defines and untangles the leading competition theories underlying modern communications policy, including intermodal, intramodal, and facilities-based competition. It next illustrates that “facilities-based, intermodal” competition has become the theoretical foundation of today’s most important communications policies. While *intramodal* competition is less important to modern policy, this part includes a brief description of it to better illustrate the concept of *intermodal* competition.

A. Competition Theories

Like many regulated industries, the communications industry experienced a “great transformation” during the second half of the twentieth century as policymakers’ regulatory goals shifted from promoting rate regulation to promoting market competition.⁴ The Telecommunications Act of 1996 (the 1996 Act)⁵ marked the culmination of this decades-long transformation within the industry. The shift from rate regulation to competition, however, posed new questions. In particular, it required policymakers to determine the *types* of competition they would promote.

4. See Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1325–26 (1998).

5. Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996) (codified in scattered sections of 47 U.S.C.).

This latter question—*what type of competition?*—is one of the most contentious and consequential debates facing communications policymakers today. The stakes are high given that regulatory policies can be drastically different depending on the particular competitive theory that policymakers ultimately adopt and promote.⁶ Indeed, companies can rise and fall depending on these decisions.

In recent years, policymakers—particularly on the federal level—have relied on at least three forms of competition: (1) intramodal; (2) intermodal; and (3) facilities-based. While I ultimately argue that modern network infrastructure renders these divisions arbitrary, they are nonetheless reflected in both policy and the academic literature. Accordingly, it is important to define each form of competition as each is currently understood.

1. Intra-/Intermodal Competition

The best introduction to modern understandings of intra- and intermodal competition comes from transportation regulation. These terms—and the concepts more generally—featured prominently in transportation policy debates many years before communications policymakers embraced them.⁷ Indeed, by the time the FCC began citing intra- and intermodal competition regularly in the late 1970s and early '80s,⁸ regulatory agencies and academics had long since incorporated the terms into their analyses of railroad regulation and *de*-regulation.⁹

In the railroad context, the distinction between intramodal and intermodal competition was clear. *Intramodal* referred to competition among

6. For instance, promoting intermodal competition often requires adopting policies that reduce or even eliminate intramodal competition.

7. The most logical explanation is that fundamental technological shifts occurred much earlier in the transportation context with the rise of automobiles and airplanes than in the telecommunications industry.

8. The FCC's first explicit use of "intermodal competition" was (according to online databases) in a 1978 proceeding in which a "pay TV" company in New York requested that the FCC preempt state regulation. *See Orth-O-Vision, Inc.*, 69 F.C.C.2d 657, 664 (1978) (mem.). The FCC cited intermodal more regularly beginning in the early 1980s in the context of satellite deregulation. *See, e.g., Comsat Study—Implementation of Section 505 of the International Maritime Satellite Telecommunications Act*, 77 F.C.C.2d 564, 752 (1980) (final report and order) (finding that allowing Comsat to enter retail market will "spur intermodal competition"); Proposed Modifications of the Commission's Authorized User Policy Concerning Access to the International Satellite Services of the Communication Satellite Corp., 90 F.C.C.2d 1394, 1428 (1982) (report and order) ("Rate decompositing will . . . facilitate the development of intermodal competition . . .").

9. Indeed, the concept of intermodal competition played an important role in the Transportation Act of 1940. *See* Henry J. Friendly, *The Federal Administrative Agencies: The Need for Better Definition of Standards*, 75 HARV. L. REV. 1263, 1268 (1962); *see also* E.C.R. Lasher, *The Case for Diversification*, 345 ANNALS AM. ACAD. POL. & SOC. SCI. 109, 109–10 (1963) ("The competition that needs to exist [in the transportation context] is that between the modes as well as that between carriers within a given mode. . . . [I]ntermodal diversification is [possibly] indispensable to achieving the least-cost production of transportation in the economic long run.").

railroads, while *intermodal* referred to competition between railroads and other forms of transportation such as trucking or airline companies.¹⁰

The presence of intermodal competition had important legal and regulatory implications for the railroad industry because it provided the theoretical justification for (1) deregulation and (2) industry consolidation. With respect to the former, and echoing contemporary academic commentary,¹¹ Congress in the 1970s began extensively deregulating the railroad industry through a series of laws culminating in the Staggers Rail Act of 1980.¹² This legislation built upon earlier limited efforts of the ICC to deregulate important aspects of the industry.¹³ In short, both Congress and the ICC explicitly relied upon the growing presence of intermodal competition to justify increased deregulation.¹⁴

In addition, intermodal competition led transportation policymakers to embrace—and even promote—industry consolidation. Professor James Speta writes:

[N]o one expected that deregulation would lead to entry of new railroads. Everyone—on all sides of the deregulation debate—expected that it would cause more consolidation in rail service, with more routes being served by only one railroad, and substantial abandonment of rail routes. These results were consistent with

10. For instance, the Interstate Commerce Commission (ICC) issued guidelines in 1982 defining intramodal competition as “competition between two or more railroads.” See *Market Dominance Determinations & Consideration of Product Competition*, 365 I.C.C. 118, 132 (1981) (notice of decision). “Intermodal competition,” by contrast, referred to “rail carriers and other modes [of] transportation.” *Id.* at 133. The D.C. Circuit likewise explained that, in analyzing mergers, “the [ICC] considers both ‘intramodal’ competition among rail carriers and ‘intermodal’ competition with trucks, barges, pipelines, and ships.” *Lamoille Valley R.R. v. ICC*, 711 F.2d 295, 302 (D.C. Cir. 1983).

11. See, e.g., MARTHA DERTHICK & PAUL J. QUIRK, *THE POLITICS OF DEREGULATION* 35–45 (1985).

12. Pub. L. No. 96-448, 94 Stat. 1895 (codified in scattered sections of 49 U.S.C.). For a general discussion, see Kearney & Merrill, *supra* note 4, at 1335–36. The authors note that the Railroad Revitalization and Regulatory Reform Act of 1976 was a particularly important step in this process. See *id.* at 1335 & n.45 (citing Pub. L. No. 94-210, § 202(b), (c)(i), 90 Stat. 31, 35 (1976) (codified as amended at 49 U.S.C. § 10709(c) (2000))); see also FRANK J. DOOLEY & WILLIAM E. THOMS, *RAILROAD LAW A DECADE AFTER DEREGULATION* 1–13 (1994) (surveying the series of deregulatory statutes).

13. For instance, in 1963, the ICC explained:

While we recognize in general the desirability of preserving intramodal rail competition, it is no longer the all-important factor that it once was in the days when the railroads had a virtual monopoly in all inter-city freight traffic. *With the development of intense competition in recent years from other modes of transport*, the preservation of intramodal rail competition has lost much of its significance in the furtherance of the overall national transportation policy.

Seaboard Air Line R.R. Co., 320 I.C.C. 122, 166 (1963) (emphasis added).

14. James B. Speta, *Deregulating Telecommunications in Internet Time*, 61 WASH. & LEE L. REV. 1063, 1080 (2004) (“[T]he legislation recognized intermodal competition as the appropriate measure of the railroads’ market power.”).

a competitive market because of the intermodal pressures to which railroads were subject. . . .

Congress recognized these competitive pressures and the academic work that had long argued that competition from other types of carriers would constrain the railroads' ability to price above cost.¹⁵

Telecommunications policy experienced a similar evolution and looked to transportation policy for guidance. The rise of new technology, such as satellites and microwave transmissions, led communications policymakers to similarly embrace the concepts of intermodal competition in justifying deregulatory policy.¹⁶ The terms themselves appeared more regularly in the late 1970s and early 1980s as the FCC began deregulating the satellite industry.¹⁷ To justify the partial deregulation, the FCC cited the need to promote "intermodal competition" between satellite and "cable" providers (i.e., wireline companies, particularly AT&T) in the international communications market.¹⁸

By the mid-1980s, the FCC extended this deregulatory rationale to interstate fiberoptic lines,¹⁹ and further extended it in 1999 to broadband access competition.²⁰ In the latter context, the FCC, explicitly invoking the transportation industry, explained that companies offering broadband through different technologies "opens the possibility of intermodal competition, like that between trucks, trains, and planes in transportation."²¹ In short, where intermodal competition existed, deregulation followed.

For purposes here, the most important difference between intra- and intermodal competition is that each implies a different type of regulatory policy. As outlined below, policymakers' decisions on such consequential issues as industry mergers and legacy network deregulation often turn entirely on whether they aim to promote intra- or intermodal competition.

15. *Id.* at 1079 (footnotes omitted).

16. As early as 1968, an FCC Commissioner criticized regulations that "prevent[ed] effective competition . . . between different technical modes of long-distance transmission." AT&T Co. and the Associated Bell System Companies Charges for Interstate & Foreign Communication Service, 11 F.C.C.2d 493, 501 (1968) (memorandum opinion and order).

17. *See supra* note 8.

18. *See* Proposed Modifications of the Commission's Authorized User Policy Concerning Access to the International Satellite Services of the Communication Satellite Corp., 90 F.C.C.2d 1394, 1423 (1982) (report and order) ("[O]ur existing policy has also had the unintended effect of neutralizing what can be healthy intermodal (cable/satellite) competition.").

19. *See* Lightnet, 1985 FCC LEXIS 3289, at *4 (1985) (mem.) (granting request for non-common-carrier status for company justifying deregulation "because there is sufficient intermodal (satellite and terrestrial) and intramodal (wireline) competition in the domestic, interstate communications market").

20. *See* Inquiry Concerning the Deployment of Advanced Telecommunication Capability, 14 F.C.C.R. 2398, 2423-24 (1999) (report).

21. *Id.*

Below, I elaborate on each form of competition, and further discuss the regulatory implications of promoting them.

Intramodal Competition. Intramodal competitors use similar technological “modes” to provide service (e.g., train versus train).²² Critically, intramodal competitors in the telecommunications industry—like those in the transportation industry—often use infrastructure that they do not themselves own. Thus, to promote intramodal competition, policymakers often adopt regulations ensuring that competitors have access to this infrastructure.²³

Consider, for instance, the intramodal competition to offer traditional voice service that occurs among telephone companies. This competition often pits incumbent telephone companies (ILECs) (i.e., the area’s former monopoly provider) against competitive telephone companies (CLECs).²⁴ Because CLECs lack monopoly-era infrastructure, they generally rely on regulations that secure them access to pre-existing ILEC facilities. One example of these regulations is the 1996 Act’s “local competition” provisions, which attempted to stimulate local intramodal competition by requiring ILECs to open (or “unbundle”) their networks to competitors.²⁵

Intramodal-based policies also tend to discourage industry consolidation. The goal is to maximize the number of competitors using the same infrastructure. Policies such as ownership caps in the media context and spectrum caps in the wireless context are designed to increase the number of competitors using the same “mode” of communication.

The rationale underlying intramodal policies is that owners of the underlying legacy, monopoly-era infrastructure (i.e., the access providers) possess market power because entry barriers prevent new competitors

22. The paradigmatic examples are wireline telephone companies competing with other wireline telephone companies, or incumbent cable providers competing with cable overbuilders.

23. Examples of intramodal policies that promote access include line-sharing, resale, and unbundling requirements.

24. Steve Bickerstaff provides a good overview of ILECs and CLECs:

These terms are derived from the Telecommunications Act of 1996, (“local exchange carrier” refers to “any person that is engaged in the provision of telephone exchange services or exchange access” with the exception of mobile phone providers). ILEC refers to the existing local exchange monopoly companies (i.e., the [Bell Operating Companies] and the independent telephone companies). CLEC refers to the new local exchange entrants, offering local exchange services through their own fiber, wireless or cable facilities, or by resale of the ILEC’s facilities.

Steve Bickerstaff, *Shackles on the Giant: How the Federal Government Created Microsoft, Personal Computers, and the Internet*, 78 TEX. L. REV. 1, 46 n.293 (1999) (citation omitted) (quoting 47 U.S.C. § 153(26) (Supp. III 1997)).

25. See 47 U.S.C. § 251(c)(3)–(4) (2000). A second example of intramodal, access-securing policy is “open” broadband access. Presaging today’s network neutrality debate, open access proponents sought (unsuccessfully) to promote intramodal competition by requiring cable providers to allow competing Internet Service Providers (ISPs) to offer service “over the top” of the legacy cable network infrastructure. In essence, open access advocates wanted unbundling rules applied to cable broadband-access facilities. For a good overview of the open access literature, see Kenneth Katkin, *Cable Open Access and Direct Access to INTELSAT*, 53 CASE W. RES. L. REV. 77, 79 nn.1–3 (2002).

from entering at the access level (e.g., it is impossible to build a national duplicative telephone network from scratch).²⁶ Intramodal policies address this concern by reducing entry costs. Unbundling, for instance, allows competitors to provide service without building new network infrastructure. This rationale is consistent with the theory of contestable markets commonly associated with William Baumol, which holds that even monopoly markets are “contestable” with sufficiently low entry costs.²⁷

Intermodal Competition. Intermodal competitors, by contrast, offer similar services using different technological modes.²⁸ Critically, policies that promote intermodal competition look much different than intramodal-based ones. For instance, rather than imposing access requirements, policymakers promote intermodal competition by *deregulating* network owners, giving them greater control over their respective networks. This control includes the power to raise access prices or even to exclude intramodal competitors from the networks altogether. The rationale is that, by granting companies greater control over their networks, those companies will have greater incentives to invest in new technologies and facilities. Network owners will arguably have fewer incentives, by contrast, if the government requires them to share their facilities with competitors.²⁹

Intermodal-based policies also encourage industry consolidation, another sharp break from intramodal-based policies that often impede consolidation. The rationale is that consolidation allows each “mode” of service to exploit their respective efficiencies, thus enhancing overall competition and consumer welfare. For instance, if customers could only obtain video service from cable companies, then cable industry consolidation might threaten competition. However, if customers can purchase video service from multiple providers (e.g., cable, satellite, or phone companies), industry consolidation becomes less problematic. Indeed, this consolidation arguably benefits competition by allowing each competing in-

26. See, e.g., Richard S. Whitt, *A Horizontal Leap Forward: Formulating a New Communications Public Policy Framework Based on the Network Layers Model*, 56 FED. COMM. L.J. 587, 649–50 (2004) (explaining rationale in context of UNE regulations).

27. See generally WILLIAM J. BAUMOL ET AL., *CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE* (1982); Elizabeth E. Bailey & William J. Baumol, *Deregulation and the Theory of Contestable Markets*, 1 YALE J. ON REG. 111 (1984); William J. Baumol, *Contestable Markets: An Uprising in the Theory of Industry Structure*, 72 AM. ECON. REV. 1 (1982).

28. One of the most common examples of intermodal competition is the competition between telephone and cable companies for both voice and video service.

29. See, e.g., Daniel F. Spulber & Christopher S. Yoo, *Mandating Access to Telecom and the Internet: The Hidden Side of Trinko*, 107 COLUM. L. REV. 1822, 1845 (2007) (“Compelled access . . . dampens the incentives of the essential facilities defendant to invest in improvements in its facilities, since price regulation will limit the returns it can earn on such investments and force it to share successful investments with its competitors.”); see also *Telecom Act Generally Worked, Policymakers Say*, COMM. DAILY, Feb. 7, 2006.

dustry to maximize its respective efficiencies (often via vertical integration).³⁰

Two of the most common examples of intermodal-based policies can be seen in the network neutrality and media ownership debates. As to the former, the FCC has opted to deregulate broadband access rather than to impose intramodal policies such as open access, nondiscrimination, or other “neutrality” requirements.³¹ Essentially, the FCC is relying on competition among various modes of broadband access—wireless, cable, and DSL—to prevent anticompetitive behavior.³² With respect to media ownership, the FCC has recently relaxed ownership caps (both in 2003 and 2007), which will inevitably—and intentionally—lead to greater consolidation.³³ The rationale for easing these caps was the increased competition from other “modes” of communication such as the Internet.³⁴

2. Facilities-Based Competition

“Facilities-based competition” is another form of competition commonly cited within communications proceedings to justify deregulation. Facilities-based competitors provide services using network infrastructure that they own and operate. Non-facilities-based competitors, by contrast, offer services over the networks of others.

The primary justifications for promoting facilities-based competition are (1) competitors can operate more independently of network owners with bottleneck facilities; (2) competition will be more robust if companies have incentives to invest in network construction rather than relying—or “free-riding”—on others’ networks; and (3) increased network security.³⁵

30. See, e.g., Christopher S. Yoo, *Vertical Integration and Media Regulation in the New Economy*, 19 YALE J. ON REG. 171, 187–205 (2002) (providing overview of literature discussing how and whether vertical integration leads to greater efficiencies).

31. See *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities (Wireline Broadband Order)*, 20 F.C.C.R. 14853, 14857 (2005) (report and order) (“We . . . determine that . . . the transmission component of wireline broadband Internet access is not a telecommunications service.”); *Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities (Cable Modem Declaratory Ruling)*, 17 F.C.C.R. 4798, 4802 (2002) (declaratory ruling) (“[W]e conclude that cable modem service, as it is currently offered, is properly classified as an interstate information service, not as a cable service, and that there is no separate offering of telecommunications service.”).

32. See *Wireline Broadband Order*, 20 F.C.C.R. at 14884.

33. See 2006 Quadrennial Regulatory Review—Review of the Commission’s Broadcast Ownership Rules (*2008 Media Ownership Order*), 23 F.C.C.R. 2010 (2008) (report and order on reconsideration); 2002 Biennial Regulatory Review—Review of Commission’s Broadcast Ownership Rules (*2003 Media Ownership Order*), 18 F.C.C.R. 13620, 13621–24 (2003) (report and order), *remanded in part by Prometheus Radio Project v. FCC*, 373 F.3d 372 (3d Cir. 2004).

34. See *2003 Media Ownership Order*, 18 F.C.C.R. at 13623 (“Our current rules inadequately account for the competitive presence of cable, ignore the diversity-enhancing value of the Internet, and lack any sound basis for a national audience reach cap.”).

35. See Speta, *supra* note 14, at 1109–10; see also Michael K. Powell, Chairman, Fed. Comm’n Comm’n, Remarks at the Goldman Sachs Communicopia Conference XI (Oct. 2, 2002), *available at*

Former FCC Chairman Michael Powell expanded upon these justifications in a recent speech:

[We should promote] investment in facilities. For only through facilities-based competition can an entity offer true product and pricing differentiation for consumers. Only through facilities-based competition will corporate spending on equipment thrive. Only through facilities-based competition can a competitor lessen its dependency on an intransigent incumbent, who if committed to frustrate entry has a thousand ways to do so in small, imperceptible ways. Only through facilities-based competition can an entity bypass the incumbent completely and force the incumbent to innovate to offset lost wholesale revenues. Only through facilities-based competition can our Nation attain greater network redundancies for security purposes and national emergencies.³⁶

Facilities-based competition is not inherently antagonistic to intra- and intermodal competition. Indeed, it is complementary in that it describes forms that intra- or intermodal competition might take.³⁷ In practice, however, facilities-based competition generally means facilities-based *intermodal* competition in most regulatory contexts.³⁸

B. The Rise of Facilities-Based Intermodal Competition

Facilities-based competition—particularly facilities-based *intermodal* competition—has become the theoretical foundation of modern communications policy.³⁹ Both policymakers and academic commentators have enthusiastically embraced the concept. The FCC, for instance, has elevated facilities-based competition to be the guiding institutional principle in its most important regulatory proceedings. Former Chairman Reed Hundt

http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-226929A1.txt [hereinafter Powell Speech].

36. Powell Speech, *supra* note 35.

37. For instance, intermodal competition can be either facilities-based (cable vs. satellite) or non-facilities-based (incumbent telephone vs. independent VoIP). Similarly, intramodal competition might be facilities-based (incumbent cable vs. cable overbuilder) or non-facilities-based (incumbent telephone vs. telephone reseller).

38. While facilities-based intramodal competition is theoretically possible, practically speaking the concept is problematic. First, the concept generally refers to owning only part of the facilities necessary to provide service (incumbent rivals provide the rest). To become purely facilities-based, intramodal competitors would require completely duplicative, non-shared networks, which is prohibitively expensive. Second, even assuming a competitor did build a duplicative phone or cable network, it is unclear whether competitors should be deemed as providing the same “mode” of service when they use completely independent networks.

39. See Antonia M. Apps & Thomas M. Dailey, *Non-Regulation of Advanced Internet Services*, 8 GEO. MASON L. REV. 681, 717 (2000) (“The essence of facilities based competition, which is at the heart of the FCC’s intermodal competition theory, is that a potential entrant will be required to make capital expenditures in order to provide broadband Internet access.”).

writes that the FCC's current policy is to "encourage firms to compete by means of building parallel, unconnected, proprietary physical infrastructures."⁴⁰ To illustrate this regulatory trend, the list below offers examples of regulatory (and legal) policy decisions built upon the foundation of facilities-based intermodal competition. While not comprehensive, the list illustrates the ascendance of this particular form of competition, particularly at the federal level:

- *Broadband access.* Broadband access has arguably been the most contentious and high-profile policy issue in recent years. The regulatory debate turns on whether broadband access providers (e.g., cable, DSL) should be required to "share" their facilities with competing providers (i.e., open access) and/or operate under nondiscrimination requirements (i.e., network neutrality).⁴¹ The FCC has declined both options, deciding instead to deregulate broadband access service by removing common carrier obligations.⁴² The FCC has justified these measures as necessary ways to "stimulate deployment of broadband infrastructure" (i.e., facilities-based competition).⁴³ It added that "increasing competition among facilities-based broadband providers . . . will sustain and increase competitive choice among broadband providers and Internet access products."⁴⁴
- *Local Competition.* The 1996 Act attempted to promote competition within the local phone market by requiring legacy monopoly providers to unbundle their networks and make them available to competitors.⁴⁵ Litigation ultimately required the FCC to signifi-

40. Reed Hundt, *The Ineluctable Modality of Broadband*, 21 YALE J. ON REG. 239, 249 (2004) (criticizing this policy).

41. See generally Tim Wu, *The Broadband Debate, A User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69 (2004).

42. The FCC's deregulatory classification extends to all forms of broadband access, including cable, wireline, wireless, and broadband over power line. See Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities (*Cable Modem Declaratory Ruling*), 17 F.C.C.R. 4798, 4802 (2002) (cable); Appropriate Framework for Broadband Access to the Internet over Wireline Facilities (*Wireline Broadband Order*), 20 F.C.C.R. 14853, 14857 (2005) (wireline); Appropriate Regulatory Treatment for Broadband Access to the Internet over Wireless Networks, 22 F.C.C.R. 5901, 5901-02 (2007) (declaratory ruling) (wireless); United Power Line Council's Petition for Declaratory Ruling Regarding the Classification of Broadband over Power Line Internet Access Service as an Information Service, 21 F.C.C.R. 13281, 13281 (2006) (mem.) (broadband over power line).

43. *Wireline Broadband Order*, 20 F.C.C.R. at 14884.

44. *Id.* at 14887. In a subsequent proceeding, the FCC explained, "The Commission relied on the presence of intermodal competitors in the emerging wireline broadband Internet access services market in granting relief from the compulsion to offer as telecommunications services the telecommunications inputs necessary for wireline broadband Internet access service." Petition of the Embarq Local Operating Cos. for Forbearance (*Embarq Forbearance Order*), 22 F.C.C.R. 19478, 19490 n.78 (2007) (mem.).

45. See 47 U.S.C. § 251(c)(3)-(4) (2000) (establishing resale and unbundling requirements for

cantly narrow these access rights.⁴⁶ The new, more deregulatory regime relies heavily on the concepts of intermodal and facilities-based competition. For instance, in ultimately affirming the FCC's limits on unbundling, the D.C. Circuit cited the need to "encourag[e] facilities-based competition" and to avoid regulatory requirements that "pose excessive impediments to infrastructure investment."⁴⁷ The narrowing of unbundling rights has had enormous consequences within the industry. Among other things, it helped convince national CLECs such as AT&T and MCI to give up the ghost and merge with legacy wireline companies SBC and Verizon.⁴⁸

- *Telecommunications Mergers.* The telecommunications industry has recently experienced massive consolidation. The consolidation has been both horizontal—SBC/BellSouth, AT&T Wireless/Cingular, and Sprint/Nextel—and vertical—SBC/AT&T and Verizon/MCI.⁴⁹ The Commission has approved all of these mergers.⁵⁰ In doing so, it has relied heavily upon the presence of intermodal and facilities-based competition. For instance, in approving the AT&T/BellSouth merger, the FCC explained: "[W]e find that intermodal competition from cable telephony and mobile wireless service providers, and providers of certain VoIP services will

ILECs).

46. See U.S. Telecom Ass'n v. FCC (*USTA II*), 359 F.3d 554 (D.C. Cir. 2004) (remanding FCC order defining standard for determining when competitors have access rights to ILEC infrastructure); U.S. Telecom Ass'n v. FCC (*USTA I*), 290 F.3d 415 (D.C. Cir. 2002) (same).

47. *USTA II*, 359 F.3d at 579–80. The court also affirmed the FCC's reliance on intermodal competition to justify the deregulatory regime: "[W]e agree with the Commission that robust intermodal competition from cable providers . . . means that even if all CLECs were driven from the broadband market, mass market consumers will still have the benefits of competition between cable providers and ILECs." *Id.* at 582. It should be noted that the D.C. Circuit virtually willed these results.

48. See, e.g., *MCI Buy Makes Verizon, SBC Head-to-Head Competitors*, COMM. DAILY, Feb. 15, 2005 ("[T]he pending merger should have no effect on MCI's already shrinking consumer business, which has been in steady decline since the FCC's UNE-P decisions."); *SBC-AT&T Merger Would Get Approved But Take Time, Divestitures*, COMM. DAILY, Jan. 28, 2005 ("The merger talks aren't surprising in light of recent regulatory decisions and industry transformation, many said. Medley Advisors said the discussions between SBC and AT&T were 'catapulted' by the FCC UNE decision.").

49. For a discussion of these mergers and their impact, see Joan Engebretson, *What Telecom Megamergers Mean to Enterprise Customers*, BUS. COMM. REV., Oct. 1, 2006, at 26.

50. See AT&T Inc., 22 F.C.C.R. 5662 (2007) (mem.); Verizon Commc'ns Inc., 20 F.C.C.R. 18433 (2005) (mem.); SBC Commc'ns, Inc., 20 F.C.C.R. 18290 (2005) (mem.); Nextel Commc'ns, 20 F.C.C.R. 13967 (2005) (mem.); AT&T Wireless Servs., Inc., 19 F.C.C.R. 21522 (2004) (mem.). While the Commission did impose stricter conditions on more recent mergers (largely because of a 2–2 party-line split following Commissioner McDowell's recusal), even these conditions are temporary, generally lasting no more than a few months or years. The horizontal consolidation has recently been particularly extensive in the wireless industry. See *Cellco P'ship*, 23 F.C.C.R. 12463 (2008) (mem.); AT&T Inc., 22 F.C.C.R. 20295 (2007) (mem.). Verizon Wireless has recently acquired wireless carrier Alltel. See *FCC Approves Verizon's Alltel Bid with Added Roaming Duties*, COMM. DAILY, Nov. 5, 2008.

likely continue to provide . . . customers with viable alternatives.”⁵¹

- *Legacy Network Regulation.* Both the FCC and state commissions have recently considered petitions from incumbent telephone companies to reduce or eliminate legacy regulations (i.e., common carrier regulations stemming from the monopoly era).⁵² The record here is more mixed, with the FCC granting several petitions but declining others.⁵³ When regulators have removed these regulations, they have relied heavily on intermodal competition (primary cable and wireless competition).⁵⁴
- *Media Ownership.* In 2003, the Commission took the controversial step of relaxing media ownership caps (e.g., limits on the number of television stations a single entity could own or control).⁵⁵ The Commission justified relaxing the caps by citing other modes of media access such as the “competitive presence of cable [and] the diversity-enhancing value of the Internet.”⁵⁶

The enthusiasm for facilities-based competition is not limited to policymakers. Leading communications law scholars have also strongly em-

51. AT&T, Inc., 22 F.C.C.R. 5662, 5709 (2007) (mem.). Later in the order, the FCC noted, “[E]vidence in the record indicates increasing intermodal competition is likely between wireline services and services provided on alternative service platforms such as facilities-based VoIP and mobile wireless.” *Id.* at 5718.

52. Several state legislatures are also pushing for rate deregulation. See *Rate Deregulation Bills Proceed in Four States*, COMM. DAILY, Feb. 15, 2008.

53. On the federal level, the FCC recently approved, either in whole or in part, forbearance petitions filed by various incumbent carriers, including Qwest, ACS, Embarq, Citizens, AT&T, and Verizon. See, e.g., *FCC Grants Forbearance to Embarq, Citizens*, COMM. DAILY, Oct. 26, 2007; *FCC Grants Part of AT&T Forbearance Request*, COMM. DAILY, Oct. 15, 2007 (discussing similar relief for Verizon); *FCC Approves Part of ACS Forbearance Petition*, COMM. DAILY, Aug. 22, 2007 (discussing similar relief for Qwest in Omaha). However, the FCC recently rejected Verizon’s request for forbearance from unbundling requirements in six East Coast cities, including Pittsburgh. See *FCC Denies Verizon Forbearance Request*, COMM. DAILY, Dec. 5, 2007. More recently, it rejected Qwest’s petition for several Western cities. See *Qwest Corp.*, 23 F.C.C.R. 11729 (2008) (mem.).

54. See, e.g., Petition of the Embarq Local Operating Cos. for Forbearance (*Embarq Forbearance Order*), 22 F.C.C.R. 19478, 19504 (2007) (mem.) (“[We have] determined that a diverse range of broadband technologies and facilities-based platforms . . . will be available to consumers, and that the prospects of such competition lend credence to calls for restrained regulation of advanced telecommunications technologies and advanced telecommunications providers.” (internal quotation omitted)).

55. See 2002 Biennial Regulatory Review—Review of Commission’s Broadcast Ownership Rules (2003 *Media Ownership Order*), 18 F.C.C.R. 13620, 13621–24 (2003) (report and order and notice of proposed rulemaking), *remanded in part* by *Prometheus Radio Project v. FCC*, 373 F.3d 372 (3d Cir. 2004).

56. *Id.* at 13623. The Third Circuit, however, vacated these rules and the proceeding is continuing on remand. See *Prometheus Radio Project v. FCC*, 373 F.3d 372 (3d Cir. 2004). The FCC recently returned to the issue this year, again relaxing ownership limits. See 2006 Quadrennial Regulatory Review—Review of the Commission’s Broadcast Ownership Rules (2008 *Media Ownership Order*), 23 F.C.C.R. 2010 (2008) (report and order on reconsideration).

braced the concept. For instance, Professors Jonathan Nuechterlein and Philip Weiser write, “From a competition policy standpoint, the most important issue is whether an incumbent faces facilities-based competition”⁵⁷ Similarly, Professor Speta writes, “[M]y principal aim is to attempt a new, comprehensive agenda for telecommunications policy based on the promotion of true facilities-based competition and, in particular, intermodal competition.”⁵⁸ Indeed, Speta has criticized Congress for not doing more to promote this important policy goal.⁵⁹

As these examples illustrate, facilities-based and intermodal competition provide the theoretical foundation of modern communications policy. For that reason, it has been a topic of intense debate among policymakers and scholars. These debates, however, tend to focus on whether these forms of competition (1) actually exist or (2) are realistic and/or appropriate policy goals in light of barriers to entry.

Consider, for instance, the network-neutrality debate. Network-neutrality opponents argue strenuously that these regulatory requirements will harm facilities-based competition by reducing incentives to construct and maintain physical network infrastructure.⁶⁰ Supporters, by contrast, respond that facilities-based competition is unrealistic given the entry barriers to the access market (e.g., fixed sunk costs, network effects).⁶¹ They add that deregulation is also bad policy that would stifle innovation.⁶²

Putting aside the merits, these debates ignore the more fundamental question of whether intermodal and facilities-based competition—the very foundations of modern policy—are coherent concepts in the first place. In

57. JONATHAN E. NUECHTERLEIN & PHILIP J. WEISER, *DIGITAL CROSSROADS: AMERICAN TELECOMMUNICATIONS POLICY IN THE INTERNET AGE* 22 n.* (2005); see also Jim Chen, *Subsidized Rural Telephony and the Public Interest: A Case Study in Cooperative Federalism and Its Pitfalls*, 2 J. ON TELECOMM. & HIGH TECH. L. 307, 343 (2003).

58. Speta, *supra* note 14, at 1109.

59. See *id.* at 1109 (“[T]he 1996 Act could have done much more to increase the possibility of true facilities-based competition (especially intermodal)”).

60. See, e.g., Alfred E. Kahn, *Telecommunications: The Transition from Regulation to Antitrust*, 5 J. ON TELECOMM. & HIGH TECH. L. 159, 182–84 (2006) (arguing that network neutrality regulation is “in essential conflict” with infrastructure investment); Christopher S. Yoo, *Would Mandating Broadband Network Neutrality Help or Hurt Competition? A Comment on the End-To-End Debate*, 3 J. ON TELECOMM. & HIGH TECH. L. 23, 65 (2004) (“Network neutrality may thus have the effect of depriving alternative broadband platforms of their natural strategic partners and of starving them of the resources they need to build out their networks.”); see also ADAM D. THIERER, “NET NEUTRALITY”: DIGITAL DISCRIMINATION OR REGULATORY GAMESMANSHIP IN CYBERSPACE? 17 (Cato Inst., Policy Analysis No. 507, 2004), available at <http://www.cato.org/pubs/pas/pa507.pdf> (“Net neutrality proposals would discourage investment and innovation in broadband networks and services.”).

61. See, e.g., Reza Dibadj, *Saving Antitrust*, 75 U. COLO. L. REV. 745, 836 (2004) (“[Facilities-based competition advocates] ignore[] . . . the often prohibitive costs and inefficiencies of duplicating infrastructure. By and large, competitors who have tried this route have failed miserably”); Tim Wu & Christopher Yoo, *Keeping the Internet Neutral?: Tim Wu and Christopher Yoo Debate*, 59 FED. COMM. L.J. 575, 590–92 (2007) (focusing on whether new infrastructure is realistic).

62. See Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 298 (2007) (arguing that access deregulation is “likely to reduce innovation at the applications level, since more of the value of that innovation will be transferred to the owners of the network”).

particular, policymakers and scholars have not examined whether communications network infrastructure renders the concepts hopelessly vague and even incoherent. The following parts explore these critical questions.

II. THE CONCEPTUAL LIMITS OF “INTERMODAL” COMPETITION

This part argues that the layered structure of communications network infrastructure gives rise to vague, conflicting, and even incoherent definitions of intermodal competition. As a result, policy debates often incorporate inconsistent understandings of this concept. In particular, parties often shift between *technology*-based and *facilities*-based definitions, the former being broader than the latter. This inconsistency can have significant regulatory implications.

For instance, imagine that policymakers were considering whether to privatize interstate highways. It would be problematic to justify repealing the public right to access roads by citing the competition that rides on top of these roads. After all, the ability to access interstate highways is what enables the “higher layer” competition in the first place. By removing the underlying access right, the “above road” competition that justified the deregulation might disappear.

A similar conceptual error is leading to incoherent policy making in the communications context. Specifically, policymakers sometimes cite technology-based competition to justify facilities-based policies that ultimately limit or eliminate technology-based competitors. In other words, they are citing competition on top of the roads to justify policies that shut off the roads. The problem, then, is that both types of competition are generically lumped together within the same linguistic label—intermodal.

This part introduces and illustrates the conceptual confusion using VoIP as a case study. It next illustrates how these errors manifest in two specific regulatory proceedings and in the academic literature.

* * *

Despite intermodal competition’s obvious importance to modern policy, no one seems to know precisely what the concept means. The FCC in particular has struggled to define intermodal competition consistently. As illustrated below, some of the FCC’s most recent definitions vary on whether intermodal refers to different *technologies* or to different *facilities*.

- 2001: “‘Intermodal competitors’ are competitive providers that rely exclusively on *alternative technological platforms* than those deployed by incumbent LECs to deliver similar services.”⁶³
- 2002: “‘Intermodal’ competition is competition among providers using *different types of facilities* (e.g., LECs and cable operators).”⁶⁴
- 2005: “‘Intermodal competitors’ are providers of services similar to those provided by incumbent LECs that rely exclusively on *technological platforms other than wireline technologies*. “[I]ntermodal competitors include, for example, cable modem service providers, wireless broadband Internet access service providers, satellite broadband Internet access service providers, and other broadband Internet access service providers such as broadband over power line providers.”⁶⁵
- 2005: “As we use the term in this Order, an intermodal competitor ‘covers’ a location where it uses *its own network, including its own loop facilities*, through which it [offers service].”⁶⁶

The academic literature has been more consistent, generally opting for technology-based (or “platform”-based) definitions of intermodal.⁶⁷ That is, if competitors use different technologies, they are deemed intermodal. As illustrated below, however, the literature’s definitions may be less consistent than they first appear. While the literature explicitly cites broader technology-based definitions, it often implicitly incorporates narrower facilities-based definitions when discussing the regulatory implications of intermodal competition.

Although it may sound trivial, the distinction between technology-based and facilities-based understandings of the definition of intermodal is critically important to modern policy. The reason is that the decision to promote either technologies or facilities often presents mutually exclusive regulatory choices. Promoting facilities can come at the expense of pro-

63. Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services, 16 F.C.C.R. 22745, 22759 n.60 (2001) (notice of proposed rulemaking) (emphasis added).

64. Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities (*Cable Modem Declaratory Ruling*), 17 F.C.C.R. 4798, 4844 n.314 (2002) (emphasis added).

65. Appropriate Framework for Broadband Access to the Internet over Wireline Facilities (*Wireline Broadband Order*), 20 F.C.C.R. 14853, 14856 n.7 (2005) (emphasis added).

66. Qwest Corp., 20 F.C.C.R. 19415, 19444 n.156 (2005) (mem.) (emphasis added).

67. Nuechterlein and Weiser argue that using the term “cross-platform” competition would be more precise. NUECHTERLEIN & WEISER, *supra* note 57, at 22 n.* (“Many commentators and the FCC use the term ‘intermodal competition’ to describe competition among technologically dissimilar platforms. We prefer the somewhat broader term ‘cross-platform competition.’”).

moting technologies, and vice-versa. The next part introduces these potential tradeoffs by using VoIP as a case study. In particular, it illustrates why the appropriate regulation—or deregulation—of VoIP can vary significantly depending on whether policymakers adopt a technology-based or a facilities-based definition of the service.

A. Is VoIP Competition “Intermodal”?

Voice-over-Internet-Protocol (VoIP) is, in layman’s terms, Internet phone. It is a digital voice service that—like email—operates over standard Internet Protocol (or TCP/IP protocols). Rather than transmitting your voice over analog circuits like traditional phones do, VoIP technology breaks a speaker’s voice into digital packets that are routed like any other data traffic to the call’s destination, where they are reassembled.

Within regulatory debates, VoIP is commonly cited as evidence of intermodal competition within telephony markets. The FCC in particular routinely cites VoIP—especially cable VoIP—to justify deregulatory policies.⁶⁸ Certain characteristics of VoIP service, however, limit its effectiveness as intermodal competition. Simply put, not all VoIP is created equal.

While VoIP services operate in similar ways, they are *offered* in two significantly different ways: (1) over-the-top, and (2) facilities-based.⁶⁹ Over-the-top VoIP depends entirely upon a third-party’s last-mile broadband connection.⁷⁰ Independent providers like Vonage and Skype, for instance, do not offer broadband access themselves—instead, they require customers to have pre-existing broadband connections with separate Internet service providers (ISPs). In this sense, Vonage and Skype provide VoIP service in the same manner that eBay offers auctions or that Google offers searches—namely, “over the top” of others’ access facilities.

Facilities-based VoIP, by contrast, refers to services from providers who own last-mile facilities.⁷¹ Traditionally, “facilities-based VoIP” has

68. For instance, in confirming that the recent BellSouth-AT&T merger would not harm competition in the enterprise market, the Commission explained: “[W]e find that intermodal competition from cable telephony and mobile wireless service providers, and providers of certain VoIP services will likely continue to provide these customers with viable alternatives.” AT&T Inc. & Bellsouth Corp., 22 F.C.C.R. 5662, 5709 (2007) (mem.). Incumbent phone companies—quite understandably—echo these arguments. The RBOCs have, for instance, relied heavily on VoIP’s growth as an “intermodal” competitor to justify their various petitions for legacy network deregulation around the country. Petition of the Verizon Telephone Companies for Forbearance under 47 U.S.C. § 160(c) from Title II and *Computer Inquiry* Rules with Respect to Broadband Services at 3–4, WC Docket No. 04-440 (FCC Dec. 20, 2004) (“[T]he market for broadband services is marked by intense, intermodal competition with cable modem providers as the distinct market leader.”).

69. See SBC Communications, Inc., 20 F.C.C.R. 18290, 18337–38 (2005) (mem.).

70. See *id.* at 18338 (“This type includes those providers that require the end user to obtain broadband transmission from a third-party provider . . .”).

71. *Id.* at 18337 (“[W]e define facilities-based VoIP providers, such as certain cable VoIP providers, as providers that own and control the last mile facility.”).

meant cable VoIP, though telephone companies are increasingly offering VoIP themselves.⁷² Although cable VoIP itself (like Vonage's) "rides" over the top of underlying broadband access facilities, cable companies (unlike Vonage) *own* those underlying facilities. As a result, these companies enjoy guaranteed last-mile access to customers' homes.

These infrastructural differences complicate the question of whether VoIP services are intermodal under the FCC's definitions. Specifically, VoIP's intermodality depends on whether we conceptualize it as a technology-based or facilities-based competitor.

For instance, consider a Vonage customer using Verizon's DSL service. With respect to Verizon's traditional circuit-based voice service, Vonage's VoIP uses different technology but the same facilities. Thus, it is a technology-based competitor, but not a facilities-based one with respect to Verizon. If, however, we assume the Vonage customer uses Comcast's cable broadband (and not Verizon's), then Vonage's VoIP would use similar technology over the same facilities with respect to, say, Comcast's VoIP service. In both contexts, Vonage acts more like an intramodal competitor, given that it shares and relies on its competitor's facilities.

Even in contexts where VoIP seems clearly intermodal, the concepts are fuzzier than they first appear. For instance, imagine a Verizon customer using Verizon VoIP over fiber facilities. With respect to the cable competitor (e.g., Comcast), the Verizon customer is using similar technologies but different facilities. Thus, in the traditional technological sense, Verizon provides intramodal competition because the technological platforms are the same. However, because the two services use different last-mile facilities, they also—from this perspective—compete intermodally.

The broader point is that VoIP itself does not fit neatly into either the intermodal or intramodal conceptual box. It has characteristics of either—or both—depending on the underlying network infrastructure it uses. In some contexts, VoIP more closely resembles intramodal competition (same facilities/same technologies), while in others it appears more intermodal.⁷³

These differences matter for at least two reasons. First, for policymakers who want to promote intermodal competition, the proper regulatory regime depends entirely on the type of definition of intermodal they are using. If promoting intermodal competition means promoting technologies,

72. J. Nicholas Hoover, *5 Things You Must Know About VoIP*, INFO. WK., Jul. 3, 2006, at 34.

73. This intermodal competition, in turn, can be technology-based (Vonage vs. Verizon) or facilities-based (Comcast vs. Verizon VoIP). This same ambiguity exists if you replace "intermodal" with "cross-platform." See NUCHECHTERLEIN & WEISER, *supra* note 57, at 22 n.*. The latter term also encompasses both technological and facilities-based understandings.

then policymakers should be more inclined to adopt regulations that promote access. With respect to VoIP, for instance, access guarantees would theoretically allow dozens of independent, over-the-top VoIP providers to compete over a single DSL or cable line. Further, assuming that securing access for technologies is the goal, then regulations imposing common-carrier or network-neutrality/nondiscrimination requirements become relatively more attractive.

The regulatory picture, however, looks much different under a facilities-based definition of intermodal. Under this framework, policymakers should arguably take precisely the opposite approach and deregulate the service. Rather than securing access, policymakers would limit it, thus allowing companies to block access and/or raise prices to enjoy a greater return on their capital investments in infrastructure. In the VoIP context, for instance, promoting facilities-based competition would (quite consciously) create a more consolidated market that would likely squeeze out over-the-top providers. In this world, VoIP competition would ultimately take place between larger, vertically integrated incumbent cable and phone companies.

A second reason why the different definitions matter is because the conceptual vagueness will inevitably lead to incoherent policies or even strategic behavior. In particular, policymakers could simultaneously cite and apply different understandings of intermodal competition to justify their regulatory decisions.

Returning to the VoIP context, assume that voice competition in a local market consists only of the incumbent phone company and multiple over-the-top VoIP providers. Under a technology-based definition, intermodal competition clearly exists. On the other hand, under a facilities-based definition, it does not. Thus, without clear and consistent definitions, the existence of technology-based intermodal competition could be cited to justify policies that promote only facilities-based competition. Parties could, for instance, theoretically cite the technology-based competition made possible by access regulation to justify the removal of those very access protections, all the while using the same word—intermodal. For these reasons, it is imperative that policymakers closely examine exactly what parties mean when they use the term intermodal.

B. The Source of the Confusion—Layers and Railroads

The fact that intermodal lends itself to different, and even rival, understandings is no accident. The vagueness stems from the inherent structure of communications networks. In particular, it stems from the networks' layered structure. The observation that communications networks have layers is, of course, hardly novel. Numerous articles have described both the existence of network layers and the outlines of a layers-based

telecommunications policy.⁷⁴ My own observations apply and expand on these prior works.⁷⁵

Although discussions of layers generally focus on IP-based networks, even more traditional communications networks—such as cable or copper-based phone networks—can be conceptualized in layers. For our purposes, we can conceptualize communications networks as possessing only two layers: an access layer (i.e., physical layer) and a higher-level applications layer.⁷⁶ If, for instance, we applied this two-layer model to transportation, roads would represent the access layer, while the vehicles riding on top of the roads would represent the applications layer. Applied to traditional circuit-switched phone service, the copper infrastructure would represent the access layer, while the electrical current carrying one's voice would represent the applications layer.

With this layered model in mind, we can better understand why parties have trouble offering consistent definitions of intermodal competition. Properly understood, the two types of VoIP simply refer to service offerings at two different network layers. Over-the-top VoIP provides only applications-layer competition. At this layer, multiple VoIP providers can exist within the same physical facility. Facilities-based VoIP, by contrast, provides competition at the access *and* applications layers given that providers such as incumbent cable and phone companies typically own last-mile facilities.

Understanding network layers also illustrates how—and why—policymakers might use inconsistent definitions of intermodal simultaneously. In the example above, the fear is that policymakers would cite applications-layer competition to justify policies designed to promote access-layer competition. These two forms of competition are quite differ-

74. See, e.g., Rob Frieden, *Adjusting the Horizontal and Vertical in Telecommunications Regulation: A Comparison of the Traditional and a New Layered Approach*, 55 FED. COMM. L.J. 207 (2003); John T. Nakahata, *Regulating Information Platforms: The Challenge of Rewriting Communications Regulation from the Bottom Up*, 1 J. ON TELECOMM. & HIGH TECH. L. 95 (2002); David P. Reed, *Critiquing the Layered Regulatory Model*, 4 J. ON TELECOMM. & HIGH TECH. L. 281 (2006); Douglas C. Sicker & Lisa Blumensadt, *Misunderstanding the Layered Model(s)*, 4 J. ON TELECOMM. & HIGH TECH. L. 299 (2006); Douglas C. Sicker & Joshua L. Mindel, *Refinements of a Layered Model for Telecommunications Policy*, 1 J. ON TELECOMM. & HIGH TECH. L. 69 (2002); Lawrence B. Solum & Minn Chung, *The Layers Principle: Internet Architecture and the Law*, 79 NOTRE DAME L. REV. 815 (2004); Philip J. Weiser, *Law and Information Platforms*, 1 J. ON TELECOMM. & HIGH TECH. L. 1 (2002); Kevin Werbach, *A Layered Model for Internet Policy*, 1 J. ON TELECOMM. & HIGH TECH. L. 37, 39–40 (2002); Whitt, *supra* note 26.

75. In particular, I expand these insights to communications networks generally, rather than limiting them to the Internet. One exception, however, to the focus on the Internet alone is Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 562–63 (2000).

76. In this respect, I narrow Benkler's categories in that he divided networks into three layers: (1) physical infrastructure, (2) logical infrastructure, and (3) content layers. See *id.* at 568.

ent though. Indeed, for most of history, regulations guaranteeing access to physical transport provided the foundation for higher-layer competition.⁷⁷

From a broader perspective, the conceptual vagueness surrounding these terms may partially stem from their earlier use within the transportation context. There, the concept of intermodal competition made perfect sense. The competing industries not only used different, clearly distinguishable technologies, they also used different, clearly distinguishable facilities. Trains used tracks; trucks used roads, etc. Thus, within the transportation context, intermodal competition implicitly encompassed facilities-based competition, even if the parties did not conceptualize it in those terms. The implication, then, is that intermodal may not be a universally applicable concept but may be more appropriately limited to the transportation context in which it developed.

C. Policy Examples—“Layer Confusion”

While theoretical vagueness surrounding intermodal competition makes for an interesting academic debate, the more important issue is whether the vagueness affects real-world policy. The answer is yes. To illustrate how intermodal “layer confusion” manifests itself in modern policy, the remainder of this part examines: (1) broadband access, and (2) the availability of unbundled network elements (UNEs) for wireless providers. To close, it provides further examples of layer confusion within the academic literature.

1. Broadband Access

The broadband access debate is essentially about whether—and how—policymakers should regulate last-mile broadband connections.⁷⁸ The specific question is whether last-mile access providers (primarily incumbent cable and phone companies) should be subject to nondiscrimination or “network neutrality” requirements. Thus far, the FCC has opted for deregulation, and courts have endorsed this approach.⁷⁹ In justifying the deregulatory position, both the FCC and courts have cited the existence of intermodal competition, including wireless service.⁸⁰

77. See, e.g., Whitt, *supra* note 26, at 597–601 (discussing *Computer Inquiry* proceedings).

78. “Last mile” refers to portion of the network that actually connects with an end user’s premises. More precisely, it is “the portion of a wide area network that runs from a user to the nearest aggregation point or hub. Most often that is the telephone company’s local loop running from homes and businesses to a central switching office or exchange.” James B. Speta, *Handicapping the Race for the Last Mile? A Critique of Open Access Rules for Broadband Platforms*, 17 YALE J. ON REG. 39, 45 (2000) (quoting Chip Brookshaw et al., *Last-Mile Alternatives*, INFOWORLD, Sept. 21, 1998, at 90).

79. See, e.g., Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs., 545 U.S. 967 (2005) (rejecting challenge to FCC’s classification of cable broadband access as an “information service”).

80. See, e.g., *id.* at 1001–02; Appropriate Framework for Broadband Access to the Internet over

The problem, however, with treating wireless service as intermodal competition is that it ignores important infrastructural realities. Specifically, it ignores wireless providers' continuing reliance on *shared* physical infrastructure. Contrary to popular opinion, wireless service does not operate on a fully independent network but continues to rely on traditional wireline facilities provided by ILECs. These services are called "special access" services.⁸¹ For instance, although cell phone calls reach local cell towers wirelessly, those towers are connected to the larger network by wires owned largely by ILECs (just as gas stations need off-ramps to "connect" to the larger interstate highway system). Although Part III examines special access infrastructure in greater detail, it is sufficient for now to understand that wireless providers use and require competitors' facilities to connect their own facilities to the broader network.

The continuing reliance on shared infrastructure has two important implications.⁸² First, it means that wireless competition possesses both intermodal and intramodal elements—each of which implies different regulatory regimes. In the last mile (from mobile phone to cell tower), wireless service clearly provides intermodal competition under both technological and facilities-based definitions. However, because those cell towers rely almost exclusively on ILECs' special access facilities to connect them to the broader network,⁸³ wireless competition is largely intramodal from cell tower to the broader network because it relies on shared infrastructure. To make the same points from a layers perspective, the final link from cell tower to phone provides both access- and application-layer competition. However, the links from the cell tower to the broader network generally provide only application-layer competition because the calls ride on other companies' facilities.

This dual nature of wireless competition leads to the second and more critical implication—namely, parties can erroneously (or strategically) confuse the layers in regulatory debates. For instance, opponents of access-promoting regulations sometimes cite application-layer wireless competition to justify their positions. Instead, they advocate deregulatory, facilities-promoting policies that are more relevant to access-layer compe-

Wireline Facilities (*Wireline Broadband Order*), 20 F.C.C.R. 14853, 14856 & n.7 (2005) (relying in part on wireless competition to justify deregulation wireline broadband access).

81. See Comments of Sprint Nextel Corp. at 5, Special Access Rates for Price Cap Local Exchange Carriers, WC Docket No. 05-25 (FCC Aug. 8, 2007) ("Special access facilities are a significant input in the provision of both Commercial Mobile Radio Services . . . and wireless broadband services."); *CTIA Opposes Radical Redefinition of "Broadband,"* COMM. DAILY, May 18, 2007 (summarizing comments from one party who explained that "[w]ireless carriers use special access to connect their cell towers to their switches and to the networks of ILECs").

82. Again, the specific nature of the shared special access infrastructure will be described in fuller detail in Part III.

83. See *infra* note 103 and accompanying text.

tion.⁸⁴ The problem with this approach, however, is that the very existence of application-layer wireless competition has depended on regulations of the access layer—specifically, special access regulations that guaranteed competitors’ ability to use ILEC infrastructure.⁸⁵

2. *Unbundled Network Elements (UNEs)*

Intermodal competition has also been an important rationale for policymakers in deregulating unbundled network elements, or “UNEs.”⁸⁶ Although intermodal wireless service has played a less prominent role in this bitter, decade-long debate, policymakers have, in some contexts, cited wireless competition to justify access-layer deregulation. In doing so, they have incorporated layer confusion into their policies.

The UNE debate is a long and complicated one that requires far more detail to do it justice.⁸⁷ To be grossly general, the debate relates to a controversial provision of the 1996 Act that guarantees competitors access to local ILEC facilities. Specifically, it requires ILECs to “unbundle” various “elements” of their network and make them available on a wholesale basis to competitive carriers at regulated, discounted rates.⁸⁸ In other words, the 1996 Act requires ILECs to “open” their networks to competitors. In this sense, the UNE access-securing provisions aim to promote intramodal competition over shared infrastructure.⁸⁹

Understandably, ILECs were not thrilled with the new requirements. With the ink barely dry on the 1996 Act, ILECs opened a ferocious legal and regulatory assault on the UNE provisions, attempting to significantly narrow the types of elements that must be unbundled.⁹⁰ The ultimate fight

84. For instance, the Supreme Court relied on the existence of wireless broadband (i.e., alternative broadband access media) in affirming the FCC’s classification of broadband access as an information service. *Brand X Internet Servs.*, 545 U.S. at 1001–02 (“Unlike [in the past], substitute forms of Internet transmission exist today: ‘[R]esidential high-speed access to the Internet is evolving over multiple electronic platforms, including wireline, cable, terrestrial wireless and satellite.’”) (second alteration in original) (quoting *Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities (Cable Modem Declaratory Ruling)*, 17 F.C.C.R. 4798, 4802 (2002)).

85. See *infra* Part III.

86. See, e.g., *U.S. Telecom Ass’n v. FCC (USTA II)*, 359 F.3d 554, 582 (D.C. Cir. 2004) (“Nor can we say that the Commission was arbitrary or capricious in thinking that any damage to broadband competition from denying unbundled access to the broadband capacities of hybrid loops is likely to be mitigated by the availability of loop alternatives or intermodal competition.”); see also *Earthlink, Inc. v. FCC*, 462 F.3d 1, 11–12 (D.C. Cir. 2006) (affirming FCC’s reliance on intermodal competition in granting Section 271 forbearance).

87. For a good summary overview, see generally *Covad Commc’ns Co. v. FCC*, 450 F.3d 528, 531–34 (D.C. Cir. 2006).

88. See 47 U.S.C. § 251(c)(3) (2000) (requiring ILECs to provide unbundled access to network elements).

89. See *Ford, Koutsky & Spiwak, supra* note 1, at 332; *Speta, supra* note 14, at 1129.

90. See Shannon M. Heim, *Signaling System Seven: A Case Study in Local Telephone Competition*, 13 *COMMLAW CONSPICUOUS* 51, 65–66 (2004) (“Almost immediately upon adoption, the FCC’s *Local Competition Order* faced legal challenges that ultimately reached the United States Supreme

was over the proper interpretation of the statutory term “impairment.” If regulators concluded that competitors would be impaired without access to a given link of the ILEC network, it triggered the UNE provisions’ discounted access rates.⁹¹ In short, findings of “impairment” equaled cheaper access.

Although the “UNE Wars” primarily pitted ILECs against CLECs, wireless providers also attempted to invoke the UNE provisions to obtain access to ILEC facilities. The potential benefit was that UNE rates were significantly less than the special access rates they would have otherwise been required to pay. Because wireless service required access to ILEC facilities, the question was not whether they would use them—indeed, they had no choice. The question was whether they would pay UNE rates or the more expensive special access rates.

Wireless carriers thus argued that they too would be “impaired” without access to ILECs’ facilities.⁹² ILECs, by contrast, argued that wireless carriers were not impaired because they could always purchase network access from the ILECs, as they always had.⁹³ The FCC initially sided with the wireless carriers, recognizing that the ILECs’ argument—if taken to its logical extreme—would effectively nullify the UNE regime.⁹⁴

The D.C. Circuit, however, disagreed and vacated the FCC’s decision.⁹⁵ The court held that wireless carriers would not be “impaired” without regulated access to UNEs because they had traditionally purchased the same services as special access from ILECs. In other words, the court relied on higher-layer wireless competition to justify lower-layer access deregulation:

[W]ith respect to wireless carriers’ UNE demands, competitors cannot generally be said to be impaired by having to purchase special access services from ILECs, rather than leasing the necessary

Court.”).

91. See Richard A. Epstein, *Takings, Commons, and Associations: Why the Telecommunications Act of 1996 Misfired*, 22 YALE J. ON REG. 315, 318 (2005) (“Unless a CLEC could show such ‘impairment’ it could not gain access to the UNEs at bargain prices.”).

92. See U.S. Telecom Ass’n v. FCC (*USTA II*), 359 F.3d 554, 575–77 (D.C. Cir. 2004).

93. See *id.*

94. In holding that the availability of tariffed special access should be irrelevant to its impairment analysis, the FCC explained:

[M]any commenters have urged us to find that requesting carriers are not necessarily impaired if they can use incumbent LEC resold or retail tariffed services, such as special access, to provide their retail service. We decline to adopt this position. We conclude that it would be inconsistent with the Act if we permitted the incumbent LEC to avoid all unbundling merely by providing resold or tariffed services as an alternative. Such an approach would give the incumbent LECs unilateral power to avoid unbundling at [UNE] rates simply by voluntarily making elements available at some higher price.

Review of Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, 18 F.C.C.R. 16978, 17047–48 (2003) (report and order), *vacated in part by USTA II*, 359 F.3d 554.

95. See *USTA II*, 359 F.3d at 577.

facilities at UNE rates, *where robust competition in the relevant markets belies any suggestion that the lack of unbundling makes entry uneconomic.*⁹⁶

Here, then, is a textbook example of layer confusion. The court relies on regulation-enabled application-layer competition to justify limiting access-layer regulation. The former, however, is simply irrelevant to the latter. Indeed, the court's logic would, if applied more broadly, allow any application-layer competition to justify access-layer deregulation.

3. Academic Literature

The academic literature provides further illustrations of layer confusion in discussing the regulatory implications of intermodal competition. Specifically, commentators often rely on technology-based understandings of intermodal competition (e.g., VoIP, wireless) to justify facilities-based regulatory policies. In doing so, scholars tend to overlook important differences between application-layer and access-layer competition, or at least casually shift from one understanding to another.

For instance, in arguing for increased access-layer deregulation, the following explanation has been offered:

[C]oncerns about [local exchange] discrimination are misplaced. Unlike the long-distance market in 1996, the mass-market broadband services market is characterized by significant intermodal competition. Cable companies and wireless providers, in particular, *are in no way dependent* upon an ILEC's services or facilities in their provision of broadband services.⁹⁷

This passage provides a good example of layer confusion. To the extent that wireless and cable services rely on ILEC special access facilities, the competition is more properly conceptualized as technology-based rather than facilities-based. The authors, however, imply that wireless service relies on completely duplicative networks, when in fact it provides duplicative facilities-based competition only in the final link of the last mile.

Similar examples of layer confusion are found in discussions of VoIP's role as an intermodal competitor. In discussing how intermodal

96. *Id.* at 592 (emphasis added); *see also* Covad Commc'ns Co. v. FCC, 450 F.3d 528, 538 (D.C. Cir. 2006) (summarizing *USTA IP*'s finding that "the presence of robust competition by users of special access precludes a finding that CLECs are impaired without UNEs in the wireless and long-distance markets") (internal quotations omitted).

97. Robert W. Crandall, J. Gregory Sidak & Hal J. Singer, *The Empirical Case Against Asymmetric Regulation of Broadband Internet Access*, 17 BERKELEY TECH. L.J. 953, 982 (2002) (emphasis added).

competition has fundamentally transformed the old monopolistic local exchange market, Professor Howard Shelanski writes:

With the rise of broadband Internet access, however, a set of voice communication providers has arisen that owns no network infrastructure at all and instead provides voice service as an application that consumers can reach over the Internet. Such voice-over-Internet-protocol (VoIP) services, like wireless providers, provide a voice option that does not always, but can and often does, entirely bypass the incumbent local telephone networks. . . . With computers having become inexpensive and ubiquitous, with competing ways to get broadband access, and with the separation of voice service from physical infrastructure through VoIP offerings, consumers have yet another option in addition to wireless for working around conventional local telephone service.⁹⁸

Note how casually Professor Shelanski jumps from technology-based to facilities-based descriptions of intermodal VoIP competition. On the one hand, he notes that VoIP—the *technology*—can be divorced from infrastructure altogether. His point is not that VoIP is literally free of infrastructure, but instead that different technological services can exist and compete within the local exchange market. Here, then, he is focusing on the application layer, where technology-based competition resides.

In other places, however, he shifts to a more facilities-based defense, arguing that VoIP allows competitors to “bypass” and “work[] around” local telephone networks.⁹⁹ This argument focuses more on the physical-access layer. While Shelanski is not so much wrong as imprecise, he is nonetheless describing VoIP in two fundamentally different ways—first as application-layer competition, second as access-layer competition.

III. THE CONCEPTUAL LIMITS OF “FACILITIES-BASED” COMPETITION

This part argues that the concept of facilities-based competition, as currently understood, is inconsistent with modern network infrastructure. As explained above, facilities-based competition is generally associated with deregulation. The idea is that deregulation—which denies competitors guaranteed access to infrastructure—will create incentives for new entrants to construct their own networks.¹⁰⁰ Owning infrastructure, in turn, will make providers less dependent on competitors’ networks and will ultimate-

98. Howard A. Shelanski, *Adjusting Regulation to Competition: Toward a New Model for U.S. Telecommunications Policy*, 24 YALE J. ON REG. 55, 73–74 (2007).

99. *Id.* at 74.

100. *See supra* note 35 and accompanying text.

ly create more efficient, market-based checks on anticompetitive behavior than ex ante regulation.¹⁰¹

While this argument is theoretically appealing, the inescapable reality of shared network infrastructure makes it problematic. In a world of shared infrastructure, facilities-based is a misleading term in that it implies the existence of independent, non-overlapping networks. Facilities-based competition, however, exists only in certain fractions of the broader network. Thus, it does not necessarily eliminate potential chokeholds, but instead reallocates them to other parts of the shared, interconnected network. Because it is unrealistic to expect companies to construct completely duplicative networks (particularly at the last mile), it is impossible to avoid shared network infrastructure for the foreseeable future.

In light of this unavoidable “sharedness,” the primary conceptual error that advocates of facilities-based competition often make is to assume that competition in one part of the network implies competition throughout the entire network. This error manifests itself in at least two related ways: (1) infrastructural, and (2) geographic. In the former, policymakers assume that competition along certain “links of the chain” implies competition throughout the chain.¹⁰² With respect to geography, policymakers often assume that facilities-based competition in one geographic area implies competition in a much larger one.

To better illustrate how these conceptual errors affect real-world policy, this part examines three distinct regulatory contexts that incorporate confused conceptions of facilities-based competition: (1) special access, (2) broadband access (with an emphasis on wireless broadband), and (3) backbone access for cable providers. Specifically, these subparts illustrate the extent to which facilities-based competitors actually rely on the facilities of others.

A. *Special Access*

As explained below, special access is an essential input for various communications services, particularly wireless service and cable business service (i.e., “enterprise” cable).¹⁰³ In recent years, the FCC has extensively deregulated the special access market, relying primarily on the concept of facilities-based competition to justify its policy shift.¹⁰⁴ This sub-

101. See *supra* note 36 and accompanying text.

102. There is, of course, no one single network. Instead, what we call “the network” is a chain of interconnected links, some of which will support more competition than others.

103. See Comments of Sprint Nextel Corp., *supra* note 81, at 5.

104. See U.S. GOV'T ACCOUNTABILITY OFFICE, TELECOMMUNICATIONS: FCC NEEDS TO IMPROVE ITS ABILITY TO MONITOR AND DETERMINE THE EXTENT OF COMPETITION IN DEDICATED ACCESS SERVICES 2-3 (2006) [hereinafter GAO REPORT] (explaining that deregulation of special access was premised on sufficient showings of facilities-based competition). More generally, the GAO Report provides an extremely thorough overview of special access, its history, and its current state of compe-

part argues that the FCC's deregulatory policy incorporates the conceptual errors described above. The analysis that follows necessarily includes a detailed look at how special access facilities operate, though I have attempted to avoid an over-tedious examination.

* * *

All customers of telecommunications services require access to the larger network. Traditionally, there are two different types of access—switched access and special access. The former is used by residential customers, while the latter is used primarily by businesses, wireless providers, and other large organizations such as universities or hospitals.¹⁰⁵

To analogize to the interstate highway system, special access is similar to purchasing an individualized access lane to the interstate highway that is dedicated solely for your use. With this special lane, you need not worry about traffic jams or road construction. It is *your* lane alone. For obvious reasons, businesses and other organizations rely on similar types of guaranteed access to communications networks for their critical voice and data needs.

The broad term “special access” encompasses three distinct parts—i.e., three distinct links of the broader network chain. Understanding their function is critical to understanding their broader relation to the concept of facilities-based competition. Once again, the interstate highway system provides a helpful, if imperfect, analogy.

Assume that you own a gas station along a busy interstate highway. It is obviously important that drivers can access your business from the interstate. In thinking about how drivers will reach your gas station, you can divide their access route into three distinct links. The first link is the off-ramp from the busy interstate highway to a secondary road. The second link is the secondary road itself, while the final one is the driveway linking your business to the secondary road. All three distinct parts are necessary for customers to access your gas station.

These three links correspond loosely to the three components of special access: (1) channel termination (CT), (2) interoffice transport (IT),

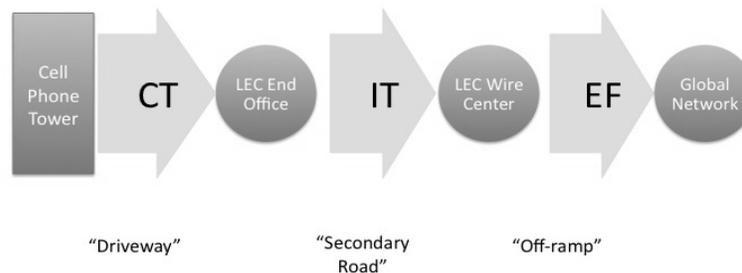
tiveness.

105. The D.C. Circuit explains the distinction well:

There are two types of access service: “switched access” and “special access.” Switched access service requires the creation of a connection between the caller and [a] long distance company on a “call-by-call” basis. . . . “Special access” service, on the other hand, uses dedicated lines between the customer and the [phone company’s] local [facilities]. Switched access is used by most residential customers. Most users of special access services are companies with high call volumes.

WorldCom, Inc. v. FCC, 238 F.3d 449, 453 (D.C. Cir. 2001).

and (3) entrance facilities (EF).¹⁰⁶ The following diagram illustrates this three-part structure:



The most important—and most expensive—component is channel termination. Similar to the driveway that links your gas station to the secondary road, channel terminations connect an end user’s premises (e.g., business, hospital, cell phone tower) with an incumbent’s wire center.¹⁰⁷ Second, interoffice transport—the “secondary road”—“connects one wire center to another wire center”¹⁰⁸ More specifically, it connects the wire center closest to the channel termination with the wire center closest to a competitive carrier’s facilities. Finally, entrance facilities—the “interstate off-ramp”—provide the actual link between the incumbent’s network and the competitive carrier’s facilities, which are themselves the gateway to the global network.¹⁰⁹

Traditionally, special access was exclusively provided by ILECs—and with good reason.¹¹⁰ For one, the companies collectively enjoyed a ubiquitous copper network, a legacy of the publicly subsidized monopoly era. As a result, they already had wires in place when special access customers

106. See AT&T Inc., 22 F.C.C.R. 5662, 5677 (2007) (mem.); Verizon Commc’ns Inc., 20 F.C.C.R. 18433, 18448 (2005) (mem.).

107. See GAO REPORT, *supra* note 104, at 4–5. A wire center refers to “the location of an incumbent LEC local switching facility” 47 C.F.R. § 51.5 (2007). The wire center closest to an end user’s premises is often referred to as an “end office” or “serving wire center.” See, e.g., Verizon, 20 F.C.C.R. 9809, 9815 n.42 (2005) (mem.).

108. GAO REPORT, *supra* note 104, at 4.

109. See Unbundled Access to Network Elements, 20 F.C.C.R. 2533, 2553–55 (2005) (order on remand).

110. See GAO REPORT, *supra* note 104, at 2.

came calling.¹¹¹ More importantly, it is extremely difficult—and likely impossible—for new entrants to replicate this vast network in the post-monopoly era without the benefit of subsidies and protections from competition.¹¹² Indeed, the entry barriers (both on the supply and demand side) explain why major national wireless carriers such as Sprint and T-Mobile continue to purchase the overwhelming majority of their special access services in major cities from incumbent phone companies like Verizon and AT&T, rather than building new facilities or purchasing them from new entrants.¹¹³

For these reasons, the special access market was traditionally regulated and offered on a tariffed basis. However, beginning in earnest in 1999, the Commission began extensively deregulating the special access market by granting the largest incumbent carriers pricing flexibility (i.e., freedom from rate regulation).¹¹⁴ It is unnecessary to exhaustively review this proceeding. Instead, the key to understand is that facilities-based competition provided the theoretical foundation of the FCC's deregulation of special access. Specifically, the FCC deregulated the market where sufficient facilities-based competition existed.¹¹⁵ The FCC reasoned that this competition would constrain and prevent anticompetitive behavior better than regulation.¹¹⁶

Another critical point is that the FCC adopted a test to determine whether sufficient facilities-based competition existed. For purposes here, the test had two noteworthy aspects: (1) collocation proxies, and (2) Metropolitan Statistical Areas (which represented the geographic scope of regulatory relief). I consider each in turn.

111. *See id.* at 1 (“The incumbent firms have an essentially ubiquitous local network that generally reaches all of the business locations in their local areas.”).

112. These entry barriers made GAO skeptical that robust facilities-based competition was a realistic possibility. *Id.* at 42 (“[O]ur analysis suggests that wireline facilities-based competition itself may not be a realistic goal for some segments of the market for dedicated access.”).

113. *See, e.g.*, Comments of Sprint Nextel Corp., *supra* note 81, at iii (stating that Sprint purchases between 97% and 99% of its DS1 and DS3 circuits in Chicago, Boston, and San Francisco from incumbents); Reply Comments of T-Mobile USA, Inc. at 2, Special Access Rates for Price Cap Local Exchange Carriers, WC Docket No. 05-25 (FCC Aug. 15, 2007) (stating that T-Mobile purchases 92% of its DS1 channel terminations—and 90% of its interoffice transport—from incumbents).

114. *See Access Charge Reform (Pricing Flexibility Order)*, 14 F.C.C.R. 14221 (1999) (report and order); *see also* GAO REPORT, *supra* note 104, at 2–3.

115. The Commission ultimately established two distinct levels of pricing flexibility—Phase I and Phase II—both of which required eligible carriers to demonstrate specified levels of facilities-based competition in a designated market. GAO REPORT, *supra* note 104, at 3–4.

116. It explained, “We conclude that irreversible, or ‘sunk,’ investment in facilities used to provide competitive services is the appropriate standard for determining when pricing flexibility [for special access] is warranted.” *Pricing Flexibility Order*, 14 F.C.C.R. at 14263. The Commission is currently reviewing the new regime in response to competitive providers’ (including major wireless carriers) claim that incumbents are abusing market power under Phase II flexibility. *See Parties Asked to Refresh Record in the Special Access Notice of Proposed Rulemaking*, 22 F.C.C.R. 13352 (2007) (public notice). This proceeding has dragged on for years, and the FCC has not acted on it. *See Martin to Resign, Leaving Key Issues on Table*, COMM. DAILY, Jan. 16, 2009.

Crucially, the FCC's test did not require establishing facilities-based competition itself, but instead used proxies—"collocation" proxies—that were deemed *evidence of* facilities-based competition.¹¹⁷ Collocation occurs when competitive carriers install (or co-locate) their own equipment within an incumbent's wire center to provide service.¹¹⁸ In adopting these proxies, the Commission reasoned that collocated facilities provided evidence of competitive entry in an incumbent's market. At minimum, the investment and sunk costs associated with collocated facilities lowered entry costs, thus making the market more contestable.¹¹⁹

The second relevant aspect of the Commission's pricing-flexibility test is that it adopted the Metropolitan Statistical Area (MSA) as the relevant geographic area for its analysis.¹²⁰ Initially, carriers had to establish sufficient collocation levels in wire centers within a single MSA. Once met, however, a carrier would obtain pricing flexibility on an MSA-wide basis.¹²¹ Thus, under the FCC's test, sufficient competition in part of an MSA triggered pricing flexibility throughout the entire MSA.

Both aspects, however, of the FCC's test for determining facilities-based competition ignore key realities of the underlying network infrastructure. With respect to collocation proxies, the most significant error is that the FCC's proxy test assumes that competition along one link of the network constitutes competition throughout all links of the network. The collocation test, however, only looks for competitive facilities at the wire center. Even under the most generous interpretation, the proxy test would only provide evidence of competition for entrance facilities and transport. It provides no evidence whatsoever of facilities-based competition at the channel-termination link, where the last-mile bottleneck presents the most intractable barrier to entry.

The last point is an essential one. The entire rationale of regulating special access was that it was impossible to replicate the incumbents' legacy network in the post-monopoly era, especially in the last mile. Where demand is low, competitive carriers cannot rationally assume the fixed, sunk costs that massive last-mile construction requires. Further, channel terminations—because by definition they serve a small number of customers (often one)—lack the demand necessary to justify these costs. Indeed,

117. See GAO REPORT, *supra* note 104, at 2–4.

118. The FCC has explained, “[With] collocation, the interconnecting party pays for LEC central office space in which to locate the equipment necessary to terminate its transmission links, and has physical access to the LEC central office to install, maintain, and repair this equipment.” Expanded Interconnection with Local Telephone Facilities, 7 F.C.C.R. 7369, 7390 (1992) (report and order).

119. See GAO REPORT, *supra* note 104, at 3–4; see also *WorldCom, Inc. v. FCC*, 238 F.3d 449, 457 (D.C. Cir. 2001).

120. See GAO REPORT, *supra* note 104, at 2–3. An MSA generally refers to “an area roughly equivalent to a central city and its suburbs.” Nancy Chan, *Does Strengthening Inner City Economies Lead to Respectively Stronger Regional Economies?*, 11 GEO. PUB. POL’Y REV. 55, 55 (2006).

121. See *WorldCom, Inc.*, 238 F.3d at 456–57.

competitive carriers have argued that they collocate to obtain access to incumbents' channel-termination facilities, not to construct new termination facilities themselves.¹²²

In short, ignoring the network infrastructure leads to overbroad deregulation. More precisely, it leads to overbroad justifications for deregulation given that facilities-based competition at the wire center is largely irrelevant in determining facilities-based competition within the channel-termination link.¹²³

Even assuming, however, that collocation proxies are reliable, the FCC's geographic scope of relief also ignores important infrastructural realities. Specifically, the FCC's test provides that facilities-based competition in a subset of a geographic area triggers pricing flexibility for the entire area—here, an MSA. MSAs, however, are quite large, encompassing entire metropolitan areas. To take but one example, the Houston MSA (where I live) includes not merely downtown Houston but the entire county, plus nine surrounding counties.¹²⁴ Thus, several million people can live in a single MSA.

While demand might justify duplicative facilities in the heart of downtown commercial areas, these demand levels would not exist uniformly throughout an area as large as an MSA. The FCC's test, however, essentially assumes uniform demand across the MSA despite wildly varying levels of population density. In short, it mistakes competition in one part of the network for competition throughout the network. The result is that incumbent carriers could (quite rationally) act strategically by imposing above-cost rates in noncompetitive areas to subsidize below-cost rates in more competitive ones.

As noted above, I have greatly simplified the pricing flexibility proceeding for this discussion. Accordingly, my description is subject to at least two objections, both of which involve details I have omitted. First, with respect to collocation, the FCC has emphasized that evidence of potential entry is as important as actual entry.¹²⁵ Thus, collocation is intended to illustrate that competitive entry is possible, not necessarily that competi-

122. Comments of Time Warner Telecom and One Communications at 20, Special Access Rates for Price Cap Local Exchange Carriers, WC Docket No. 05-25 (FCC Aug. 8, 2007) [hereinafter Comments of Time Warner] (“When a competitor collocates in an ILEC wire center, it does so primarily for the purpose of gaining access to the . . . channel termination circuits . . . *not* for constructing its own loop facilities.”).

123. Entrance facilities, by contrast, are a much different story. At this link, competitive carriers enjoy exponentially more demand because they can aggregate traffic over a much wider area before connecting it to the POP. Analogizing to the interstate system, far more drivers use an interstate off-ramp than use a single driveway to a local gas station. Thus, construction costs could be rational at the entrance-facilities link while being simultaneously irrational at the channel-termination link.

124. See Dante Chinni, *Metro Papers' New Recipe for Success: Hyperlocalism*, CHRISTIAN SCI. MONITOR, Mar. 27, 2007, at 9.

125. See *WorldCom, Inc.*, 238 F.3d at 458–59.

tors have entered in meaningful ways. Even focusing on potential entry, however, suffers from the same conceptual problems identified above. For instance, collocation at the wire center shows, at best, potential entry at the transport or entrance-facilities level. With respect to channel terminations, it still provides little evidence even of potential entry, particularly given that competitive carriers have explained they will not build these expensive facilities even with collocation.¹²⁶

A second objection is that the FCC has recognized the flaws with its flexibility tests—both collocation and MSAs. For administrative convenience, however, it chose to incorporate easily verifiable metrics.¹²⁷ Even assuming this argument is correct, it is largely irrelevant to the critique above. Specifically, the critique is that the Commission's conception of facilities-based competition within this context ignores important infrastructural realities. It may be a conscious decision motivated by reducing administrative costs, but the fact remains that the test itself overlooks infrastructural realities. In any event, several carriers have proposed more granular tests that would strike a better balance between lowering administrative costs and more precisely identifying competitive presence.¹²⁸

B. Broadband Access and Wireless Service

The previous subpart outlined how the FCC's special access regime ignores critical aspects of underlying network infrastructure. This subpart, in turn, examines how this inattention to special access infrastructure affects *other* regulatory proceedings that rely on wireless facilities-based competition to justify deregulatory policies. The concern here is that an inaccurate view of wireless service—one that ignores its need for special access facilities—is being exported to, and incorporated within, other important regulatory proceedings.

To better illustrate these concerns, consider the broadband access context—and specifically, the network-neutrality debate. The fear animating network-neutrality supporters is that broadband access providers will act anticompetitively because of a lack of meaningful competition in the last

126. See Comments of Time Warner, *supra* note 122, at 20.

127. See Access Charge Reform (*Pricing Flexibility Order*), 14 F.C.C.R. 14221, 14267 (1999) (report and order) (“[W]e believe the costs, particularly the administrative costs, of granting pricing flexibility on a wire center-by-wire center basis outweigh the benefits of protecting against such theoretical harms.”).

128. T-Mobile, for instance, proposes using the wire center (or groups of wire centers), rather than the MSA, as the appropriate baseline. See Reply Comments of T-Mobile USA, Inc., *supra* note 113, at 5. From an administrative costs perspective, one benefit is that wire centers are preexisting, defined areas. Indeed, they are the basis of cost determinations for purposes of the universal service fund. See Federal-State Joint Board on Universal Service Seeks Comment on Proposals to Modify the Commission's Rules Relating to High-Cost Universal Service Support, 20 F.C.C.R. 14267, 14292 (2005) (public notice) (“For wireline networks, costs are largely determined at the wireline exchange or ‘wire center’ level, and those costs control USF support.”).

mile. They argue that broadband access is, at best, a duopoly of cable and DSL providers that benefit from preexisting last-mile connections (which were subsidized via regulated monopolies).¹²⁹

For this reason, the rise of facilities-based wireless broadband has obvious appeal to opponents of network neutrality because it weakens the argument for regulation. To them, wireless broadband provides a crucial “third pipe” into the home—one that bypasses incumbent cable and phone networks and that does not require digging holes in tens of millions of yards and sidewalks.¹³⁰ With greater last-mile competition, broadband access providers would be unable, the argument goes, to discriminate against services and applications.¹³¹ After all, if discrimination occurred, consumers could simply switch providers.

The problem, however, is that advocates of facilities-based wireless service are assuming—at least implicitly—that competition along one link of the network implies competition throughout the network. Admittedly, wireless broadband provides access-layer competition in the last mile—from phone to cell tower. This same wireless service, however, still relies upon special access facilities to connect to the larger network—particularly channel-termination facilities, which are the least competitive link in the chain.

As noted in the previous subpart, channel-termination facilities link cell towers to the broader network. In this link of the network, then, wireless service does not provide facilities-based access-layer competition. Instead, it acts more like intramodal application-layer competition riding over incumbents’ facilities. In sum, increasing levels of last-mile wireless access does not necessarily remove bottlenecks. Instead, it reallocates them to a different part of the network—namely, to special access facilities.

These conceptual errors affect not only broadband access proceedings, but virtually any proceeding where deregulation is premised, at least partially, on wireless facilities-based competition. For instance, wireless service—and the facilities-based competition it provided—has played important roles in the FCC’s recent merger approvals¹³² and in the controversial

129. See, e.g., Susan P. Crawford, *Network Rules*, LAW & CONTEMP. PROBS., Spring 2007, at 51, 61–65.

130. See, e.g., Spulber & Yoo, *supra* note 29, at 1902–03.

131. See, e.g., Crandall, Sidak & Singer, *supra* note 97, at 982; THIERER, *supra* note 60, at 3–4.

132. See *supra* note 50 and accompanying text. For instance, wireless competition played an important role in the Commission’s approval of the 2005 mega-mergers between incumbents SBC and Verizon, and competitive carriers AT&T and MCI, respectively. Justifying its conclusion that the mergers will not have anticompetitive effects in the residential market, the FCC explained: “[We] further [find] that facilities-based intermodal competition, including cable VoIP and wireless services, is growing rapidly and will play an increasingly important role with respect to future mass market competition.” Press Release, FCC, FCC Approves SBC/AT&T and Verizon/MCI Mergers (Oct. 31, 2005), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-261936A1.doc.

Section 271 deregulatory proceedings, which allowed Bell companies to re-enter the lucrative long-distance market for the first time since the AT&T divestiture.¹³³ Conceptualizing wireless service as facilities-based competition in these proceedings, however, obscures its continuing reliance on legacy infrastructure—specifically, special access infrastructure.

This error is not limited to policymakers, but extends to the academic literature as well. Professor Jim Chen, for instance, has written that wireless telephony has long represented “the most economically robust, facilities-based platform by which competitive carriers could undermine incumbent carriers’ wireline legacy networks.”¹³⁴ Similarly, in arguing for deregulatory broadband policy, other prominent scholars have written that “wireless providers, in particular, are in no way dependent upon an ILEC’s services or facilities in their provision of broadband services.”¹³⁵ Both arguments, however, ignore wireless service’s continuing reliance on wireline facilities at a different part of the network.

C. Cable Service—Accessing Backbones

Even more than wireless service, cable competition has been the central justification for several of the FCC’s recent deregulatory policies. It has, for instance, featured prominently in proceedings relating to broadband access and legacy-network deregulation.¹³⁶ Unsurprisingly, when incumbent phone companies seek deregulation, they heavily stress the threat of facilities-based cable competition, which owns its last-mile facilities.¹³⁷

133. As part of the 1996 Act’s grand bargain, Congress allowed the Bell companies (RBOCs) to re-enter the lucrative long-distance market on a state-by-state basis if they first establish sufficient facilities-based competition in the local market. In several proceedings, the RBOCs cited wireless services to justify their Section 271 approvals. In Nevada, for instance, Commissioner Adelstein explained in his concurrence:

[Section 271 approval] requires that one or more competing providers collectively serve . . . subscribers using their own telephone exchange service facilities. I am somewhat concerned about relying on the existence of broadband PCS [i.e., wireless] competition in demonstrating the presence of competition under Track A. However, our precedent . . . clearly states that broadband PCS satisfies the definition of a telephone exchange service for purposes of Section 271(c)(1)(A).

Press Release, FCC, Federal Communications Commission Authorizes SBC To Provide Long Distance Service in Nevada (Apr. 14, 2003), *available at* 2003 WL 1873339 (Separate Statement of Commissioner Jonathan S. Adelstein concurring in judgment of SBC Communications Inc., 18 F.C.C.R. 7196 (2003) (mem.)).

134. Jim Chen, *The Echoes of Forgotten Footfalls: Telecommunications Mergers at the Dawn of the Digital Millennium*, 43 HOUS. L. REV. 1311, 1364 (2007).

135. Crandall, Sidak & Singer, *supra* note 97, at 982.

136. See Appropriate Framework for Broadband Access to the Internet over Wireline Facilities (*Wireline Broadband Order*), 20 F.C.C.R. 14853, 14873 n.93 (2005) (relying on cable broadband’s large market share to justify deregulation); see also *Qwest Corp. v. FCC*, 482 F.3d 471, 474, 480 (D.C. Cir. 2007) (upholding FCC’s deregulation of Omaha telephone market due to intermodal cable competition).

137. See, e.g., Petition of ACS of Anchorage, Inc. for Forbearance from Sections 251(c)(3) and

Even cable service, however, is less facilities-based than it first appears. Cable service is facilities-based only within a fraction of the broader national—and global—network. Although that fraction includes the crucial last mile, cable service nonetheless relies on other companies' facilities to provide service to its customers.

Of course, the fact that cable—or any network operator—relies on other facilities does not necessarily justify regulation. The point in this subpart, then, is simply to illustrate cable's potential vulnerability in light of the reality of shared network infrastructure. Specifically, it illustrates that “facilities-based” in this context implicitly excludes other network facilities upon which cable companies rely. Below, I illustrate cable companies' continuing reliance on others' facilities by examining Internet backbone facilities.

1. Internet Backbones

Backbone networks are the high-capacity, high-speed facilities that form the core of the Internet. As its very name suggests, the Internet is a collection of interconnected networks across the world. Backbones are the trunks that connect these local networks, much like interstate highways connect myriads of towns and smaller roads within one larger, interconnected system. Backbone facilities thus represent a critical input for broadband service providers, particularly cable companies that do not own national backbone facilities themselves.¹³⁸

The Commission has recognized the harms that could result if the backbone market consolidates excessively and reaches a “tipping point” that favors one or two providers.¹³⁹ The potential “tipping” stems from the way in which Internet backbone providers (IBPs) exchange traffic with each other, specifically via “peering” or “transit” arrangements.¹⁴⁰ Under peering arrangements, IBPs exchange traffic with each other for free. Under transit arrangements, by contrast, IBPs charge other IBPs for transport.¹⁴¹

Generally speaking, the largest IBPs, “Tier 1 providers,” peer with each other because they both exchange relatively large and equal amounts of traffic. Larger IBPs, however, charge smaller IBPs because of traffic and cost disparities. As long as a critical mass of larger Tier 1 providers

252(d)(1) at 6–10, WC Docket No. 05-281 (FCC Sept. 30, 2005).

138. See *Verizon Commc'ns, Inc.*, 20 F.C.C.R. 18433, 18493 (2005) (mem.) (“[Internet Service Providers] provide access to the Internet on a local, regional, or national basis, and most have limited network facilities. In order to provide Internet service to end users, ISPs and owners of other smaller networks interconnect with Internet backbone providers (IBPs)—larger Internet backbone networks.”).

139. See *id.* at 18496; see also Michael Kende, *The Digital Handshake: Connecting Internet Backbones*, 11 *COMMLAW CONSPECTUS* 45, 62–63 (2003).

140. See *Verizon Commc'ns, Inc.*, 20 F.C.C.R. at 18493.

141. See *id.* at 18494.

exists, transit customers have viable competitive options. The fear, however, is that—because of network effects—a Tier 1 provider could become large enough to “tip” the market.¹⁴²

Currently, however, the backbone market remains sufficiently competitive to remain unregulated given the number of Tier 1 providers.¹⁴³ While it is true that three of the largest backbone providers are vertically-integrated Bell Companies (Verizon, AT&T, and Qwest), one of the largest backbone providers—Level 3—is not affiliated with an incumbent phone company at all.¹⁴⁴ (Unsurprisingly, Level 3 is Comcast’s primary backbone provider.)¹⁴⁵ The broader point, then, is simply to illustrate that even the most facilities-based of competitors face potentially significant infrastructural limitations. Freedom from other companies’ last-mile facilities is not necessarily freedom from other, equally critical facilities.

IV. THE LEGAL LIMITS OF FACILITIES-BASED COMPETITION

The previous parts outlined internal conceptual weaknesses of facilities-based and intermodal competition within the telecommunications context. This part, by contrast, examines how the concept of facilities-based competition is further undermined by recent changes in legal doctrine—in particular, by the narrowing of interconnection requirements and antitrust remedies.

With respect to interconnection, the concept of facilities-based competition implicitly assumes that different network owners will interconnect with one another. For instance, it makes little sense to construct new facilities if your network cannot connect to the larger global telecommunications network. For similar reasons, it makes little sense to build a new road that cannot connect with larger, more heavily-trafficked roads. While interconnection can be legally required or left to private negotiation, there is a strong academic consensus, even among many deregulatory advocates,

142. The Commission explained the dynamic well:

The Internet backbone market is characterized by ‘direct network effects,’ where the value of the network increases with each additional user who joins it. So long as there is ‘rough equality’ among backbone providers, each has an incentive to peer with the others to provide universal connectivity to the Internet. . . . [T]he incentives of the peering backbones would change, if one backbone provider were to become significantly larger than the others, or if it were to develop greater negotiating power. This dominant provider might be able to ‘tip’ the Internet backbone market into monopoly and then raise prices for all transit services. Once the market begins to ‘tip,’ connecting to the dominant network becomes even more important to competitors, enabling the dominant network to further raise its rivals’ costs.

Id. at 18496.

143. *See id.*

144. *See Wireline News*, COMM. DAILY, Oct. 17, 2007 (“Level 3 . . . is positioning itself as the largest backbone provider in the U.S.”).

145. *See* Jeff Baumgartner, *To Build or To Buy?*, CED, Jul. 1, 2006, at 16, 18–19.

for some type of interconnection mandate.¹⁴⁶ Indeed, the more that modern policy is premised upon facilities-based construction, the more critical these requirements become. Policymakers, however, are going the opposite direction. At the very time interconnection requirements are most needed, policymakers are currently whittling them away.

Some advocates of deregulation may argue that the interconnection concerns above are overblown given that antitrust law can respond to any anticompetitive denials of interconnection. As explained below, however, antitrust remedies are also increasingly unavailable to address these specific anticompetitive concerns in the telecommunications context.

A. *The Decline of Interconnection*

Interconnection refers to the connection between two different providers' network facilities.¹⁴⁷ Interconnection thus functions similarly to the connections between interstate highways that combine to create a national interconnected network of roads.

Facilities-based competition requires and implicitly assumes some form of interconnection among different network providers (whether voluntary or legally coerced).¹⁴⁸ Traditionally, telecommunications providers have been required—at least since the AT&T consent decree—to interconnect with other telecommunications providers.¹⁴⁹ These legal mandates ensure not only access itself, but access at reasonable prices.

In light of both the importance of interconnection and the potential consequences of network effects, even strong opponents of regulation often carve out an exception for interconnection. For instance, Richard Epstein has recognized the potential need for interconnection mandates:

[T]elecommunications is the quintessential network industry so that competition between firms cannot take place without some measure of cooperation. In turn, this cooperation requires some measure of government regulation. The only question worth ask-

146. See *infra* note 150 and accompanying text.

147. *Qwest Corp. v. Pub. Util. Comm'n*, 479 F.3d 1184, 1192 (10th Cir. 2007) (“‘Interconnection’ is defined as ‘the physical linking of two networks for the mutual exchange of traffic.’” (quoting Implementation of the Local Competition Provisions in the Telecomms. Act of 1996 (*First Local Competition Order*), 11 F.C.C.R. 15499, 15514 (1996), *vacated in part*, *California v. FCC*, 124 F.3d 934 (8th Cir. 1997), *rev'd in part sub nom.* *AT&T Corp. v. Iowa Utils. Bd.*, 525 U.S. 366 (1999))).

148. See Reed E. Hundt & Gregory L. Rosston, *Communications Policy for 2006 and Beyond*, 58 FED. COMM. L.J. 1, 18 (2006) (“Facilities-based entry, no matter how extensive the facility, depends on fair charges to interconnect and exchange traffic with the incumbent.”).

149. See 47 U.S.C. § 251(a)(1) (2000) (requiring interconnection). For the interconnection requirements imposed by the Modified Final Judgment breaking up AT&T, see Warren G. Lavey, *Joint Network Planning in the Telephone Industry*, 34 FED. COMM. L.J. 345, 375–76 (1982).

ing is which form of regulation minimizes the distortions attributable to private opportunism and government overreaching.¹⁵⁰

The answer, Epstein concludes, is to limit regulation—and the FCC’s regulatory goals more generally—to promoting interconnection.¹⁵¹

The policy rationale underlying the interconnection requirement is that it prevents the market from—as a result of network effects—tipping toward the largest provider. As explained in Part III, “network effects” stands for the proposition that members of a network enjoy increasingly greater benefits as the network grows larger.¹⁵² For this reason, if one network access provider grows dominant, it will become increasingly imperative for competitors to access this larger network. For instance, a telephone company would soon go out of business if its customers could not place calls to Verizon customers. Indeed, this dynamic is precisely how the original AT&T first obtained its monopoly in the early twentieth century. As it grew, it increasingly denied interconnection to smaller competitive providers, who either failed or joined AT&T. The market eventually tipped, and AT&T was the last man standing.¹⁵³

The legal environment surrounding interconnection has been evolving rapidly in recent years. The evolution traces back to the 1996 Act, which formally divided the world into “telecommunications services” and “information services.”¹⁵⁴ The former is extensively regulated under Title II of the Communications Act, while the latter is essentially deregulated.¹⁵⁵ The 1996 Act explicitly requires telecommunications providers to interconnect with rivals.¹⁵⁶ Providers of information services, by contrast, are not currently subject to explicit interconnection requirements.¹⁵⁷ This legal distinction explains why traditional telephone providers must interconnect, while Internet backbone providers are legally free to refuse to do so.

The rise of broadband has placed pressure on these increasingly anachronistic regulatory distinctions. While classifying broadband service

150. Epstein, *supra* note 91, at 336; *see also* Hundt & Rosston, *supra* note 148, at 19–20 (arguing for interconnection requirements in light of potential monopoly power of terminating provider).

151. *See* Epstein, *supra* note 91, at 347–48.

152. *See supra* note 142 and accompanying text.

153. *See* PAUL STARR, *THE CREATION OF THE MEDIA: POLITICAL ORIGINS OF MODERN COMMUNICATIONS 200–05* (2004). *But see* MILTON L. MUELLER, JR., *UNIVERSAL SERVICE: COMPETITION, INTERCONNECTION, AND MONOPOLY IN THE MAKING OF THE AMERICAN TELEPHONE SYSTEM 9–10* (1997) (disputing historical consensus that interconnection denials led to AT&T’s eventual dominance).

154. *See* 47 U.S.C. § 153(20), (46) (2000).

155. Information services are, however, nominally regulated under Title I. In practice, however, Title I “regulation” is essentially deregulation. It is also referred to as “ancillary jurisdiction.” *See* PETER W. HUBER, MICHAEL K. KELLOGG & JOHN THORNE, *FEDERAL TELECOMMUNICATIONS LAW 1091–94* (2d ed. 1999).

156. *See* 47 U.S.C. § 251(a)(1) (2000).

157. *See* John T. Nakahata, *Broadband Regulation at the Demise of the 1934 Act: The Challenge of Muddling Through*, 12 *COMMLAW CONSPPECTUS* 169, 180–81 (2004).

itself (i.e., the application-layer service) as an information service is uncontroversial, sharp disagreements exist about how to classify broadband access service (i.e., the underlying network infrastructure over which broadband service is provided).

Crucially, over the past few years, the FCC (with federal courts' endorsements) has systematically defined virtually all broadband access as information services. In 2002, the FCC classified cable-based broadband access as an information service,¹⁵⁸ a classification upheld by the Supreme Court in *National Cable & Telecommunications Ass'n v. Brand X Internet Services*.¹⁵⁹ Since *Brand X*, the FCC has extended this classification across the board to virtually all broadband access services, including wireline (DSL), wireless, and broadband over power line.¹⁶⁰

Although the FCC's classifications have significant regulatory implications, the important one for the purposes of this Article is that broadband access providers would no longer be legally required to interconnect with rivals' facilities. In essence, the FCC is allowing market forces to govern interconnection agreements among broadband access providers. Crucially, the significance of this regulatory decision will only grow through time, as traditional circuit-based services increasingly give way to purely packet-based communications (i.e., information services will increasingly replace telecommunications ones). In short, the network's technological evolution means that companies will increasingly provide Title I, rather than Title II, services.¹⁶¹

Although the FCC's deregulatory approach here has numerous virtues, it tends to undermine the viability of facilities-based competition as a regulatory strategy because it narrows interconnection requirements. Further, narrowing these requirements exacerbates the more harmful consequences of industry consolidation. As noted earlier, promoting intermodal facilities-based competition self-consciously embraces industry consolidation as a means to increase consumer welfare.¹⁶² If anything, however, increased reliance on facilities-based competition and consolidation implies more aggressive interconnection requirements in light of potential network effects. In short, as companies grow larger, the threat of network effects and tipping become greater.

In fact, stronger interconnection mandates would actually promote facilities-based competition by ensuring that even small facilities-owning providers can enjoy guaranteed access to the larger network. Given that telecommunications is a "quintessential" network industry, it is unrealistic

158. See Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities (*Cable Modem Declaratory Ruling*), 17 F.C.C.R. 4798, 4802 (2002).

159. 545 U.S. 967, 973-74 (2005).

160. See *supra* note 31 and accompanying text for a comprehensive list of these orders.

161. See NUCHESTERLEIN & WEISER, *supra* note 57, at 220.

162. See *supra* Part I.

to expect new entrants to duplicate entire networks, or even large portions of the network. Instead, new entrants will probably progressively expand their facilities as they expand their consumer base. Interconnection requirements thus encourage this kind of piecemeal construction and make it easier to raise capital by removing the specter of interconnection denials.

In sum, at the very time consolidation makes tipping a more realistic possibility, the FCC is simultaneously weakening interconnection requirements that would mitigate these concerns. One objection to this concern, however, is that interconnection requirements are unnecessary because aggrieved parties can always fall back on antitrust remedies to address anticompetitive behavior relating to network access. As explained in the following subpart, however, antitrust remedies are also increasingly unavailable in the telecommunications context.

B. The Decline of Antitrust

Antitrust remedies play an important role within deregulation debates because they provide a “safety net” to address anticompetitive conduct in the absence of regulation. Indeed, advocates of greater deregulation generally do not support removing all legal oversight. Instead, they often justify deregulatory policies by emphasizing the continued presence of antitrust remedies.¹⁶³ While this subject deserves an article unto itself, this subpart briefly outlines the inadequacies of antitrust remedies in the telecommunications context by grouping them into two categories: (1) doctrinal limitations, and (2) practical obstacles to litigation. The larger point is that antitrust remedies will likely be unavailable for parties alleging anticompetitive interconnection denials.¹⁶⁴

1. Doctrinal Limitations

Doctrinally, recent Supreme Court cases—most notably *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP*¹⁶⁵ and *Credit Suisse Securities (USA), LLC v. Billing*¹⁶⁶—have undermined the viability of antitrust remedies within heavily regulated industries, particularly tele-

163. See, e.g., Access Charge Reform (*Pricing Flexibility Order*), 14 F.C.C.R. 14221, 14267 (1999) (report and order) (“To the extent that an incumbent LEC attempts to use pricing flexibility in a predatory manner, aggrieved parties may pursue remedies under the antitrust laws”); Justin P. Hedge, *The Decline of Title II Common-Carrier Regulations in the Wake of Brand X: Long-Run Success for Consumers, Competition, and the Broadband Internet Market*, 14 COMM.LAW CONSPECTUS 427, 459–61 (2006) (stating that network neutrality is “unnecessary” in light of “antitrust laws”).

164. A Commissioner at the Federal Trade Commission has recently echoed the skepticism that antitrust remedies would be available for modern access disputes such as network neutrality. See *FTC Commissioner Rosch: Antitrust No Net Neutrality Panacea*, COMM. DAILY, June 16, 2008.

165. 540 U.S. 398 (2004).

166. 127 S. Ct. 2383 (2007).

communications. Indeed, *Trinko*'s potential effect on antitrust doctrine has generated extensive commentary.¹⁶⁷ While I touch on this literature briefly, my more limited point is to examine *Trinko*'s effect within the telecommunications industry, rather than on antitrust doctrine as a whole, and to illustrate how more recent cases such as *Credit Suisse Securities* support a broad reading of *Trinko* within this particular industry.

Trinko is, at bottom, an "essential facilities" case—one with significant implications for competitors seeking access to legacy network infrastructure.¹⁶⁸ *Trinko*'s precise legal issue was whether the incumbent phone company—Bell Atlantic (a predecessor to Verizon)—could be liable for its "refusal to deal" with competitors.¹⁶⁹

The general rule for antitrust purposes is that companies can deal, or not deal, with whomever they choose.¹⁷⁰ One exception, however, is that companies that own essential facilities must deal with rivals or face antitrust scrutiny.¹⁷¹ While the Supreme Court has never officially recognized this exception, *Aspen Skiing Co. v. Aspen Highlands Skiing Corp. (Aspen)*¹⁷² is often analyzed as an essential facilities case.¹⁷³

For purposes here, the Court made two significant moves in *Trinko*. First, it sharply limited the essential facilities doctrine.¹⁷⁴ While not explicitly overruling *Aspen*, the Court distinguished and narrowed it by noting that the parties in *Aspen* had entered into a purely *voluntary* agreement *prior* to the refusal to deal.¹⁷⁵ The implication is that, when the pre-existing agreement is involuntary or otherwise legally required, a party cannot avail itself of the refusal-to-deal cause of action, even if essential

167. See, e.g., Eleanor M. Fox, *Is There Life in Aspen after Trinko? The Silent Revolution of Section 2 of the Sherman Act*, 73 ANTITRUST L.J. 153 (2005); Thomas E. Kauper, *Section Two of the Sherman Act: The Search for Standards*, 93 GEO. L.J. 1623 (2005); Marina Lao, *Aspen Skiing and Trinko: Antitrust Intent and "Sacrifice"*, 73 ANTITRUST L.J. 171 (2005); John E. Lopatka & William H. Page, *Bargaining and Monopolization: In Search of the "Boundary of Section 2 Liability" Between Aspen and Trinko*, 73 ANTITRUST L.J. 115 (2005); James B. Speta, *Resale Requirements and the Intersection of Antitrust and Regulated Industries*, 31 J. CORP. L. 307 (2006); Spulber & Yoo, *supra* note 29.

168. See Spulber & Yoo, *supra* note 29, at 1869.

169. See *Trinko*, 540 U.S. at 409.

170. See *id.* at 408 (citing *United States v. Colgate & Co.*, 250 U.S. 300, 307 (1919)).

171. See Fox, *supra* note 167, at 162.

172. 472 U.S. 585 (1985).

173. See *Olympia Equip. Leasing Co. v. Western Union Tel. Co.*, 797 F.2d 370, 377–80 (7th Cir. 1986) (Posner, J.) (interpreting *Aspen* as an essential facilities case). In *Aspen*, the Court ruled that a local ski resort violated antitrust laws by refusing to deal with a local competitor who had less extensive ski facilities.

174. See Spulber & Yoo, *supra* note 29, at 1869 & n.253 ("[C]ommentators generally acknowledge that [*Trinko*'s] reasoning certainly casts serious doubts on the [essential facilities] doctrine's continuing vitality.")

175. The Court noted that *Aspen* lay "at or near the outer boundary of § 2 liability [under the Sherman Act]." *Trinko*, 540 U.S. at 409.

facilities are involved. The Court further added that access would be deemed available if regulators had the power to force access.¹⁷⁶

While these specific holdings have important implications for antitrust doctrine generally, they sharply limit—if not eliminate entirely—antitrust claims involving access to telecommunications network infrastructure. Because competitive access to legacy infrastructure has been, and remains, extensively regulated, it will be impossible for antitrust plaintiffs seeking interconnection to argue either that (1) a voluntary pre-existing relationship existed, or (2) the FCC lacks authority to compel access. These doctrinal limitations are significant given that access to infrastructure has been the central dispute within the telecommunications industry for the past twenty-five years, if not throughout history.

Trinko's second critical move was to express strong criticism of the institutional capabilities of antitrust courts to wade into disputes within regulated industries. In outlining these institutional inadequacies, the Court explained:

Allegations of violations of § 251(c)(3) [of the 1996 Act] duties are difficult for antitrust courts to evaluate, not only because they are highly technical, but also because they are likely to be extremely numerous, given the incessant, complex, and constantly changing interaction of competitive and incumbent LECs implementing the sharing and interconnection obligations. . . . Judicial oversight under the Sherman Act would seem destined to distort investment and lead to a new layer of interminable litigation¹⁷⁷

An important question in the literature has been how broadly we should read *Trinko*'s skepticism of the judiciary's competence in these areas. The general consensus has been to read it broadly.¹⁷⁸ The minority view has been that *Trinko* should be read more narrowly, and that its rule instead is that courts must assess the adequacy of the relevant regulatory regime before allowing antitrust suits to proceed.¹⁷⁹ While I take no position on the proper interpretation of *Trinko* for antitrust doctrine generally, there are at least three reasons why the broader reading is more appropriate within the telecommunications context.

First, more recent cases reinforce the Court's strong skepticism of antitrust litigation within regulated industries. Most importantly, the Court in

176. See *id.* at 410–11.

177. *Id.* at 414.

178. See *supra* note 167.

179. See Philip J. Weiser, *The Relationship of Antitrust and Regulation in a Deregulatory Era*, 50 ANTITRUST BULL. 549, 561–69, 586–87 (2005).

Credit Suisse Securities held that an antitrust claim was implicitly precluded by the extensive securities regulations governing the conduct in question.¹⁸⁰ Nominally, *Credit Suisse Securities* and *Trinko* involve both different legal issues and different industries. The former involved implicit preclusion, which was not formally at issue in *Trinko* because of the 1996 Act's savings clause.¹⁸¹

These may, however, be distinctions without a difference. In both cases, the Court premised its conclusions on the institutional inadequacies of antitrust courts. In *Credit Suisse Securities*, these inadequacies supported a finding of implicit preclusion,¹⁸² while in *Trinko* they led the Court to reject demands for access under the refusal-to-deal doctrine.¹⁸³ The more cynical reading of these cases, then, is that the Court is restricting antitrust litigation in heavily regulated contexts, regardless of whether savings clauses exist.

Second, both *Trinko* and *Credit Suisse Securities* were decided on the pleadings at the Rule 12(b)(6) stage.¹⁸⁴ The early dismissal is difficult to reconcile with the argument that *Trinko* requires courts to first scrutinize the relevant regulatory scheme. If the Court had considered the adequacy of the specific regulations to be relevant, it would have likely allowed these cases to proceed to the summary judgment stage.

Third, to the extent *Trinko* requires courts to scrutinize the regulatory regime, this requirement will provide little relief to telecommunications plaintiffs. The 1996 Act—as part of the larger Communications Act of 1934—extensively regulates virtually every aspect of the telecommunications industry, particularly access to network infrastructure. Indeed, in supporting its conclusion in *Trinko*, the Court emphasized the comprehensiveness of the 1996 Act regulatory scheme.¹⁸⁵

180. See *Credit Suisse Sec. (USA) LLC v. Billing*, 127 S. Ct. 2383, 2397 (2007).

181. See Telecommunications Act of 1996, Pub. L. No. 104-104, § 601(b)(1), 110 Stat. 143 (1996) (codified at 47 U.S.C. § 152 (2000)).

182. See *Credit Suisse Sec.*, 127 S. Ct. at 2395–96.

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

184. See *In re Initial Public Offering Antitrust Litigation*, 287 F. Supp. 2d 497, 499 (S.D.N.Y. 2003); *Law Offices of Curtis V. Trinko, LLP v. Bell Atlantic Corp.*, 123 F. Supp. 2d 738, 739 (S.D.N.Y. 2000).

185. 540 U.S. at 411 (“The 1996 Act’s extensive provision for access makes it unnecessary to impose a judicial doctrine of forced access.”). Further, even deregulated areas such as broadband access remain nominally regulated under Title I of the Communications Act or under the FCC’s authority to forbear from enforcing regulations. The implication is that courts can, somewhat ironically, conceptualize a lack of regulation as a conscious, ongoing regulatory strategy from which antitrust courts should steer clear.

2. *Practical Limitations*

Even assuming, however, that antitrust relief remains doctrinally viable, telecommunications plaintiffs also face significant practical obstacles in bringing litigation. Most obviously, antitrust litigation is extremely expensive and can stretch out for years. While these costs are present in any antitrust litigation, they are particularly onerous within the telecommunications industry.

Judge Posner has recently identified many of the practical concerns with relying on antitrust enforcement.¹⁸⁶ While his discussion focuses more broadly on the “new economy,” his concerns are especially relevant for the telecommunications industry. One concern is that antitrust litigation moves slowly relative to high-tech, rapidly changing industries. Posner writes:

The mismatch between law time and new-economy real time is troubling in two respects. First, an antitrust case involving a new-economy firm may drag on for so long relative to the changing conditions of the industry as to become irrelevant, ineffectual. . . . Second, even if the case is not made obsolete by passage of time, its pendency may cast a pall over parties to and affected by the litigation, making investment riskier and complicating business planning.¹⁸⁷

The fact that antitrust disputes will center around access to legacy infrastructure exacerbates these problems. In traditional telecommunications antitrust cases, the plaintiff usually sues a significantly larger company with extensive legacy infrastructure. Thus, antitrust litigation will often pit smaller, newer companies against long-established companies with extensive resources. Further, these potential plaintiffs could see their capital dry up—or at least become more expensive—to the extent that newer companies’ access to infrastructure depends on successful antitrust litigation that spans years.

In sum, it not so much any one single reason—whether doctrinal or practical—that calls the viability of antitrust relief into question. Instead, the combination tends to undermine antitrust law’s availability and adequacy to address anticompetitive behavior regarding access to legacy infrastructure, particularly interconnection.

186. See Richard A. Posner, *Antitrust in the New Economy*, 68 ANTITRUST L.J. 925 (2001). Posner believes, though, that antitrust remains doctrinally viable in the broader “new economy” context. See *id.* at 925.

187. *Id.* at 939.

V. REGULATORY IMPLICATIONS

This part offers some regulatory implications of the arguments outlined above.

It is of course possible to agree with the observations of the previous parts without necessarily agreeing with the normative implications that follow.

A. Infrastructure Matters

The most important implication of the arguments above is that policy-makers must pay closer attention to infrastructure. The fact that modern conceptions of intermodal and facilities-based competition are often inconsistent with network infrastructure does not mean that regulation is always the answer. Nor does it mean that deregulation is always the problem. Instead, it means that deregulatory policies premised on these forms of competition need to take a closer, more nuanced view of the underlying infrastructure involved.

Generally speaking, the case for facilities-based competition grows stronger in proportion to the degree that networks are independent of each other. Thus, deregulation of broadband access premised on wireless facilities-based competition is problematic because these providers still depend on ILEC special access facilities.¹⁸⁸ In the video context, however, the concept of facilities-based competition becomes far more coherent. There, the primary competitors—cable and satellite providers—operate on two virtually independent networks. In this context, then, deregulation premised on facilities-based competition is much stronger than in the telephony context.¹⁸⁹

The larger point, however, is that the underlying infrastructure should dictate the regulatory strategy. Examining these infrastructures more closely will prevent facilities-based and intermodal from devolving into mere incantations used to justify deregulatory policy.

B. Specific Regulatory Policies

To see how these general implications would affect more specific regulatory proceedings, consider (1) interconnection, and (2) the broadband access proceedings. With respect to the former, the arguments outlined in this Article imply that policymakers should adopt stronger interconnection

188. See Comments of Sprint Nextel Corp., *supra* note 81, at 5.

189. This same logic applies to the recent Sirius–XM satellite radio merger. See Kim Hart, *Satellite Radio Merger Approved*, WASH. POST, July 26, 2008, at A1. Generally speaking, the merger seems to be sound policy because its competitors (terrestrial broadcast radio) operate over completely distinct facilities.

requirements. The primary problem, after all, with facilities-based competition is that it assumes that partial-network competition provides complete-network competition. For instance, even robust last-mile competition can be completely undermined by anticompetitive behavior at the special access or backbone links. Interconnection requirements, however, provide the guaranteed access that would allow competition along other links to prosper. In a sense, interconnection is a foundational regulation that would allow increased deregulation along the rest of the network.

The latter point is key. I share the general distaste for regulatory solutions that displace market competition. Regulations impose costs, and are subject to strategic behavior if politically connected parties seek to impose their business plans upon government policy. Interconnection requirements, however, do not so much thwart deregulatory policy as they help make it possible. In theory, I agree that facilities-based competition in the form of duplicative networks would be ideal. In reality, however, such a world is a fantasy—and a wasteful one at that. Instead, policymakers should understand that promoting facilities-based competition simply means increasing competition along certain links or subsets of the broader network. Interconnection requirements would encourage this more limited facilities construction for the reasons outlined in Part III.

The broadband access proceedings provide another example of how infrastructural realities could be better incorporated into modern policy. Specifically, the observations above imply that the FCC should return to the more traditional policy of classifying broadband access as a telecommunications service under Title II rather than Title I.¹⁹⁰ If broadband access were a Title II service, the FCC could more freely impose access-securing regulations without the fear of litigation hanging over its every move. Indeed, it is possible that the FCC lacks authority to impose access requirements to services “regulated” under Title I.¹⁹¹

The obvious objection is that re-classifying broadband access as a Title II service would burden new dynamic services with common-carrier-esque obligations from the monopoly era. That argument, however, is easily dismissed. Imposing access requirements in no way implies that every aspect of broadband access must be treated as a monopoly-era common carrier service. As recent proceedings illustrate, even if broadband access were reclassified as a Title II telecommunications service, the FCC would remain free to forbear from enforcing any regulation to help promote competition.¹⁹² Indeed, I would urge the FCC to exercise its forbearance

190. As noted earlier, the FCC’s original classification of cable broadband access as an information service was ultimately upheld by the Supreme Court. *See Nat’l Cable & Telecomm. Ass’n v. Brand X Internet Servs.*, 545 U.S. 967, 973 (2005).

191. *See, e.g.,* James B. Speta, *FCC Authority to Regulate the Internet: Creating It and Limiting It*, 35 *LOY. U. CHI. L.J.* 15, 21–30 (2003).

192. The 1996 Act grants the FCC authority to forbear from applying regulatory requirements if it

authority liberally if it reclassified broadband access in this way. The primary benefit of reclassification, though, is that the FCC could impose interconnection requirements (or other access guarantees) with more clear legal authority.

Another important implication of this Article's observations is that policymakers should consider how deregulation in one proceeding affects access to infrastructure in other regulatory proceedings. In other words, no regulatory proceeding is an island. Where shared infrastructure is involved, deregulation in one context can undermine the case for deregulation in another.

For instance, special access deregulation arguably strengthens the case for intramodal, access-securing regulations such as network-neutrality mandates in the broadband access context. As noted above, network-neutrality opponents argue that wireless broadband access strengthens the case for deregulation by providing consumers with a third broadband pipe to access the Internet. Wireless service, however, has traditionally depended on regulated special access (and still does in most places). As ILECs assume increasing control over this key input, neutrality and nondiscrimination requirements become relatively more important to ensure that these bottlenecks do not strangle innovation and downstream markets more generally. In sum, special access *deregulation* strengthens the case for network-neutrality *regulation*.

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The overriding purpose of this Article is to encourage policymakers and scholars to better incorporate infrastructural realities into conceptual policy debates. It is neither a call for comprehensive regulation, nor a broadside against deregulation. Indeed, improved infrastructural awareness will help both regulatory and deregulatory advocates, depending on the context. Where infrastructure truly is duplicative and non-shared, this Article strengthens the case for deregulation. By contrast, where networks are inevitably shared, the case for regulation—particularly access-securing regulation—grows stronger. In either case, a renewed focus on infrastructure will improve policy debates, which currently rely too heavily on abstract and vague concepts that are often inconsistent with modern network facilities.