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Modularity, Vertical Integration, and Open Access Policies: Towards A Convergence of Antitrust and Regulation in The Internet Age

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Abstract

This article aims to help regulators and commentators incorporate both Chicago School and post-Chicago School arguments in assessing whether regulation should mandate open access to information platforms. The authors outline three alternative models that the FCC could adopt to guide its regulation of information platforms in the future and facilitate a true convergence between antitrust and regulatory policy.

This work stems from the University of Colorado's Silicon Flatirons Telecommunications Program's first two policy conferences, "Telecommunications Law for 21st Century" and "The Regulation of Information Platforms," which largely spurred the discussion that led to this collaboration. The authors thank Doug Melamed, Jon Nuechterlein, Robert Pitofsky, Steve Salop, Marius Schwartz, Jim Speta, and Steve Williams for their helpful comments and encouragement.

Modularity, Vertical Integration, and Open Access Policies: Towards A Convergence of Antitrust and Regulation In The Internet Age*

Joseph Farrell and Philip J. Weiser*****

Some current issues in telecommunications policy follow a pattern familiar from many regulatory and antitrust problems. A firm has considerable market power in one market or activity. In a closely complementary activity, there is competition, or it seems there could be. But the powerful firm, not content to exploit its power where it lies, gets involved in the competitive activity. For over fifty years, antitrust and regulatory policy have offered varying answers as to whether "vertical leveraging" – through contract or integration through tie-in arrangement, product bundling, or merger – should concern public policymakers.

In broad-brush terms, antitrust policy found vertical restraints or integration suspect until the 1970s. By the late 1970s, however, the Chicago School of antitrust economics had moved mainstream antitrust thinking to the position that such behavior had many efficiency benefits and was unlikely to cause competitive harm.[1] While post-Chicago School scholarship of the 1980s and 1990s has substantially weakened that view, we would loosely describe current antitrust doctrine as presuming that vertical agreements, vertical extension, and vertical mergers are unobjectionable unless a fact-intensive investigation shows otherwise.

By contrast, in similarly broad-brush terms, telecommunications policy positively encouraged integration and close coordination into "one network" until a series of FCC and court decisions during

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the 1970s and 1980s. Those decisions shifted policy into trying to develop and protect a system of open interfaces. This favoring of "open architecture" reflected a philosophy that powerful firms at one level should not be allowed to leverage that power into—or, in some cases, even participate in—adjacent competitive segments. Likewise, the United States government's early support for the Internet encouraged the development of an open architecture based on modular standards.[2]

These contrasting traditions of analyzing vertical leverage leave telecommunications policy unsettled as technological convergence and emerging competition in telecommunications blur the lines between industries regulated primarily by antitrust and by telecommunications law (i.e., computing and telecommunications), and as telecommunications regulators increasingly pledge fealty to antitrust approaches.[3] The clash of traditions and of arguments is particularly sharp in one of today's central telecommunications problems: the regulatory treatment of broadband transport and its close complements. Broadband transport, usually provided by cable modems or telephone digital subscriber lines (DSL), promises to transform the Internet by vastly speeding up downloads and by permitting high-bandwidth applications.[4] Some, most notably Lawrence Lessig, urge regulators to impose modularity on this market by requiring broadband Internet transport providers to provide

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[1] The landmark event for the rise of Chicago School thinking was the Supreme Court's decision in Continental TV, Inc. v. GTE Sylvania, Inc., 433 U.S. 36 (1978), which cited heavily to Chicago School criticisms of the Court's earlier doctrine, see *id.* at 48 n.13, 55, 56.

[2] As we explain in more detail below, "modularity" is a means of managing complexity. As one commentator defined the term, modularity involves the "breaking up [of] a complex system into discrete pieces—which can then communicate with one another only through standardized interfaces within a standardized architecture—[in order to] eliminate what would otherwise be an unmanageable spaghetti tangle of systemic interconnections." Richard N. Langlois, *Modularity In Technology and Organization*, 49 J. ECON. BEHAVIOR & ORG. 19, 19 (2002).

[3] For two discussions of the impact of convergence on regulatory policy, see Philip J. Weiser, *The Imperative of Harmonization Between Antitrust and Regulation*, 698 PLI/PAT 73 (2002); Philip J. Weiser, *Law and Information Platforms*, 1 J. TELECOM. & HIGH TECH. L. __ (2002).

[4] The definition of "broadband" will evolve over time, but the FCC's current dividing line is 200 kilobits per second, as it constitutes "enough capacity to provide the most popular forms of broadband—to change web pages as fast as one can flip through the pages of a book and to transmit full-motion video." Inquiry Concerning the Development of Advanced Telecommunications Capability to All Americans in a Reasonably Timely Fashion, and Possible Steps to Accelerate Such Development Pursuant to Section 706 of the Telecommunications Act of 1996, 14 FCC Rcd 2398, 2406 (1999); *id.* at 2407-08 (noting that definition will evolve); *see also* Inquiry Concerning the Development of Advanced Telecommunications Capability to All Americans in a Reasonably Timely Fashion, and Possible Steps to Accelerate Such Development Pursuant to Section 706 of the Telecommunications Act of 1996, 17 FCC Rcd. 2844, 2847 (2002) (adhering to definition);

"open access" to their facilities for Internet service providers.[5] Others, echoing the Chicago School perspective, argue that the market will facilitate open access to the extent that it is efficient.

The vertical leverage question is even more ubiquitous than may initially appear because policymakers and commentators often use different terms to describe these issues.[6] Antitrust commentators discuss "the primary (or sometimes `bottleneck') market" and "the secondary (or complementary) market." In telecommunications, participants talk of "conduits" and "content." This Article, consistent with the terminology often used in the computer industry, will distinguish between "platforms" (often "information platforms") and "applications." More fundamentally, the essence of the issue stems from the "complementarity" that arises between "applications" and "platforms," regardless of whether the application is an input to the platform, a buyer of the platform, or neither.[7]

Over this past winter, the Federal Communications Commission (FCC or the Commission) announced a set of rulemaking proceedings aimed at defining its policy towards broadband connections to the Internet.[8] These proceedings ambitiously aim to develop a new regulatory framework for digital technologies that can provide multiple services – text, video, audio, voice, etc.

NATIONAL RESEARCH COUNCIL, BROADBAND: BRINGING HOME THE BITS 78-80 (2002) (hereinafter, "BRINGING HOME THE BITS") (proposing alternative definition).

[5] *See* LAWRENCE LESSIG, FUTURE OF IDEAS 147-67 (2001). This argument builds off a prior piece with Mark Lemley that addressed critics of this proposal. *See* Mark A. Lemley & Lawrence Lessig, *The End of End- to-End: Preserving the Architecture of the Internet in the Broadband Era,* 48 UCLA L. REV. 925 (2001) (engaging arguments made in Phil Weiser, *Paradigm Changes in Telecommunications Regulation,* 71 COLO. L. REV. 819, 831 (2000) and 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, 77-90 (2000)).

[6] For a further explanation of the information platform concept and how it can frame technology policy debates, see Philip J. Weiser, *Law and Information Platforms*, 1 J. TELECOM. & HIGH TECH L. __, __-__ (2002). A notable example of an information platform from the computer industry is the Microsoft Windows operating system, which exposes Application Programming Interfaces (APIs) that can be used by application developers to "call" on certain functions provided by the operating system. *See* United States v. Microsoft Corp., 253 F.3d 34, 53 (2001).

[7] In part for this reason, we define "applications" broadly, not distinguishing between "software applications" and "hardware products" (such as peripherals), both of which may connect to an underlying platform. Rather, we will use the term "applications" for all complementary products or services used in conjunction with a platform.

[8] *See, e.g.*, In re Inquiry Concering High-Speed Access to Internet Over Cable and Other Facilities, Declaratory Ruling and Notice of Proposed Rulemaking, 17 FCC Rcd. 4798 (2002) (Cable Modem Order); Wireline Broadband NPRM, supra note __.

– over broadband connections.[9] The FCC may thus develop a principled framework to evaluate independent providers' claims for mandated access to a platform such as broadband transport.[10] Such a framework could also guide policy in related contexts, such as the appropriate unbundling policy for the local telecommunications network.[11] Thus, the stakes of the current debate over vertical leverage are high.

This Article aims to help regulators and commentators incorporate both Chicago School and post-Chicago School arguments in assessing whether regulation should mandate open access to information platforms. The central analytical tool—but not necessarily the victor—in our discussion is a Chicago School-style argument we call ICE (for reasons discussed below). ICE claims that even a monopolist has incentives to provide access to its platform when it is efficient to do so, and to deny such access only when access is inefficient. ICE is often a persuasive argument, yet its logic admits several cogent exceptions. Unfortunately, both regulators and commentators often fail to acknowledge the complexity of this principle and seek easy answers, either ignoring ICE or failing to acknowledge its exceptions. Only by acknowledging the interplay of ICE and its exceptions can regulators develop a sophisticated economics-based framework for analyzing open access requirements.[12]

This Article proceeds in four parts. Part I recounts experiences of the Internet, computer, and telecommunications industries, illustrating the powerful benefits of modularity that inspire proponents of open access regulation. To explain the Chicago School skepticism of such regulation, Part II first

[9] BRINGING HOME THE BITS, supra note __, at 9 ("With convergence, everything—video, audio, text, and so forth—has become a digital stream that can be transported across the Internet.").
[10] Such a framework would provide more guidance than past FCC decisions in this area, which have tended to arise in merger reviews and have been ad hoc in nature. *See* James B. Speta, *A Common Carrier Approach To Internet Interconnection*, 54 FED. COMM. L.J. 255, 256 (2002) ("And yet, despite these controversies and many others, the only legal rules governing Internet interconnection are a limited number of company-specific conditions in imposed in some merger reviews."); Philip J. Weiser, *Internet Governance, Standard Setting, and Self-Regulation*, 28 N. KY. L. REV. 822, 844 (2001) ("In terms of setting a precedent for future regulation of information platforms, the FCC's AOL/Time Warner Order failed to set forth a principled model of analysis.").
[11] *See* U.S. Telecom Ass'n v. F.C.C., 290 F.3d 415 (D.C. Cir. 2002) (remanding development of standard for the unbundling of the local telecommunications network back to the FCC).

discusses how close vertical relationships and related (i.e., other than arm's-length modular) strategies can yield important efficiencies. Part II then explains the "ICE" principle: even monopoly platform providers have at least some incentive to operate in a modular fashion when it is efficient to do so: they internalize the complementary efficiencies. Part III describes some holes in the ICE logic: we give eight reasons why a monopoly platform provider might inefficiently "close" its platform. We do not see a comparable array of reasons why such a monopoly might inefficiently open its platform. Part IV outlines the set of regulatory tools often used to facilitate open access, using the FCC's *Computer Inquiries* to illustrate how the subtlety of these issues, if not carefully understood, can lead to policy instability. In conclusion, the Article outlines three alternative models that the FCC could adopt to guide its regulation of information platforms in the future and facilitate a true convergence between antitrust and regulatory policy.

I. Open Architecture, Vertical Disintegration, and Modularity

This Part focuses on the benefits of modularity. Sections A, B, and C explain how the Internet, computing, and telecommunications industries all came to be organized in more or less a modular fashion. Section D then discusses the benefits of modularity in general, and the rationale for making it a guiding light for information policy.

A. The Creation of the Internet and Its End-to-End Architecture

The Internet's development was a triumph of United States technology policy. The Internet grew from the Defense Department's Advanced Research Administration's ARPANET and later relied on support from the National Science Foundation. From its early days in the late 1960s until the early 1990s, the Internet remained a government project, relying on the academic and research

[12] For a similar observation and a project related to ours, see Christopher S. Yoo, *Vertical Integration and Media Regulation In The New Economy*, 19 YALE J. ON REG. 171, 177 n.19 & 178 (2002) (describing project's focus on cable and broadcast markets, but disclaiming any application to telecommunications markets).

community for its development.[13] By the time commercial entities developed Internet services and products in the 1990s, its basic architecture was already shaped. This architecture reflects a conscious strategy by the Internet pioneers that the platform should not anticipate what applications would rely on it, and that no central gatekeeper should decide which applications could be provided.

The Internet can be understood as comprised of four layers.[14] At its center lies the logical layer,[15] essentially a two-part standard called the Transfer Control Protocol and Internet Protocol (TCP/IP) that enables computer-to-computer communication. The Internet Protocol (IP) enables network devices ("routers") to send packets of data to their destination without even knowing what form of data is being transmitted.[16] This design feature is often called "end-to-end" networking.[17]

The openness of the Internet's technical architecture invites diversity in the layers above it and the physical layer beneath it. The physical layer includes wired, wireless, satellite, and cable

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[13] *See* Abbate, supra note __, at 54-65.

[14] There is no standard way to describe the relevant layers of Internet architecture. Lawrence Lessig, for example, suggests a definition of the content layer that includes what others call the application layer. *See* Lawrence Lessig, *The Internet Under Siege*, FOREIGN POLICY 56, 59, 60 (November/December 2001); *see also* Yochai Benkler & Alan Toner, *Access To The Internet* 3 (June 12, 2001) (available at http://eon.law.harvard.edu/ilaw/Access/) (using three-layered model and defining logical and applications layer as one). Tim Berners-Lee and Kevin Werbach, by contrast, set out a model similar to what we have in mind. *See* TIM BERNERS-LEE, WEAVING THE WEB __ (1999); Kevin Werbach, *A Layered Model For Internet Policy*, 1 J. TELECOM & HIGH TECH. L. __, __ (2002); *see also* Philip J. Weiser, *Law and Information Platforms*, 1 J. TELECOM & HIGH TECH. L. __, __ (2002) (same).

[15] In light of this protocol's central importance, many definitions of the term "Internet" emphasize the critical role of theTCP/IP standard. *See, e.g.*, *FNC Resolution: Definition of Internet* (October 24, 1995) (available at http://www.itrd.gov/fnc/Internet_res.html). The FCC has underscored this point, opting to use:

> the definition of the Internet that has been adopted by the Federal Networking Council: "'Internet' refers to the global information system that -- (i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ons; (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and (iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein."

In The Matter of Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, GN Docket 00-185, FCC 02-77 2 n.1 (March 15, 2002) (citing *See FNC Resolution: Definition of 'Internet,' available at* http://www.itrd.gov/fnc/ Internet_res.html, visited Jan. 22, 2002).

[16] For an explanation of this standard, see Robert E. Kahn & Vinton G. Cerf, *Internet Policy Institute, What Is the Internet? (And What Makes It Work)* (December 1999) (available at http://www.internetpolicy.org/briefing/12_99_ story.html); Abbate, supra note __, at 122-130; *see also* James B. Speta, *Internet Interconnection*, supra note __, 245-46.

transport facilities. In the layers above, developers can create new applications such as email, World Wide Web, and Napster without first asking permission of a custodian of the TCP/IP standard. In turn, these applications facilitate the exchange and viewing of multimedia content. In explaining the development of the Internet and its wide adoption, many commentators suggest that the openness of the logical standard, which belongs to no one and cannot be licensed or controlled, played a crucial role.[18]

B. The Transformation of the Computer Industry

The computer industry evolved from supplying integrated proprietary systems to a modular industry open to specialization and entry at different layers. Initially, when IBM and other vertically-integrated companies dominated the market, customers typically chose among single-vendor systems, normally relying, for example, on IBM peripherals to go with the IBM mainframes.[19] To keep its system closed, IBM kept secret and proprietary the interfaces between the different parts of its system.[20] In focusing on building and protecting its legacy mainframe products, however, IBM was slow to grasp the significance of the personal computer, which Apple developed and deployed in the late 1970s.[21]

When IBM did introduce its personal computer, it (perhaps almost by accident) used an open architecture model.[22] Whereas Apple relied on a closed business model, IBM relied on Microsoft and

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[17] *See* Dale Hatfield, *Preface*, 8 COMMLAW CONSPECTUS 1, 1 (2000). For a classic articulation of the principle, see Jerome H. Saltzer et al., *End-to-End Arguments in System Design*, 2 ACM TRANSACTIONS IN COMPUTER SYSTEMS 277 (1984), *reprinted in* INNOVATIONS IN INTERNETWORKING 195 (Craig Patridge ed., 1988).

[18] *See* Jason Oxman, *The FCC and the Unregulation of the Internet* 5 (OPP Working Paper No. 31, 1999), available at <http:// www.fcc.gov/Bureaus/OPP/working_papers/oppwp31.txt>) (The Internet's "openness is driven by the sharing of that common communications protocol: IP, the Internet protocol, developed by early Internet pioneers. No one owns the Internet protocol no one licenses its use, and no one restricts access to it.").

[19] Particularly with its System 360, IBM emerged as the dominant firm in this market, leading commentators to refer to the eight leading firms in the proprietary, vertically-integrated computer industry as "Snow White and the Seven Dwarfs." Peter Huber, *Loose Ends*, 4-NOV MEDIA L. & POL'Y 1, 7 (1995).

[20] *See* Langlois, supra note __, at 32.

[21] For a discussion of IBM's failure to grasp the significance of the personal computer market, see CLAYTON CHRISTENSEN, THE INNOVATOR'S DILEMMA 108-110 (1997).

[22] *See* Langlois, supra note__, at 24 (explaining that the open architecture of the IBM PC did not result from any "conscious" design or strategy); *see also* ANNABELLE GAWER AND MICHAEL A. CUSAMANO, PLATFORM

Intel to produce key components for its system and allowed them to license these components to other computer makers. In this way, the industry began to change from a closed to an open or "Silicon Valley" business model, with different providers specializing in different components.[23]

This modular structure facilitated innovation in ways that had not been matched in the integrated structure.[24] New entrants could and did specialize in components where they excelled, ensuring a "rapid improvement in components, including not only the chips but various peripheral devices like hard disks and modems, as well as the proliferation of applications software, that has led to the rapid fall in the quality-adjusted price of the total personal computer system."[25] Consequently, new firms entered the personal computer market and cut prices, taking market share from both Apple and IBM.[26]

C. The Development of Competition In Telecommunications

It has been said that the modern era in telecommunications begins with the story of a plastic cup.[27] This cup, the "Hush-A-Phone," was sold as a way to insulate telephone conversations against background noise. The AT&T Bell System protested that this was a "foreign attachment" to its network and that the FCC should ban it. The FCC agreed, concluding that the Hush-a-Phone was "deleterious to the telephone system" and that, in general, "telephone equipment should be supplied by and under control of the carrier."[28] On appeal, the D.C. Circuit reversed the FCC's decision,

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LEADERSHIP: HOW INTEL, MICROSOFT, AND CISCO DRIVE INDUSTRY INNOVATION 15-38 (2002) (explaining how Intel, along with Microsoft, emerged to provide platform leadership in this open architecture environment).

[23] *See* Grove, supra note __, at 39-52.

[24] *See* ANNALEE SAXENIAN, REGIONAL ADVANTAGE: CULTURE AND COMPETITION IN SILICON VALLEY AND ROUTE 128 (1994).

[25] Richard N. Langlois, *Technology Standards, Innovation, and Essential Facilities: Towards A Schumpeterian Post-Chicago Approach*, in Jerry Ellig (ed.) DYNAMIC COMPETITION AND PUBLIC POLICY: TECHNOLOGY, INNOVATION, AND ANTITRUST ISSUES 215 (2001).

[26] *See* David P. Angel & James Engstrom, *Manufacturing Systems and Technological Change: The U.S. Personal Computer Industry*, 71 ECON. GEOGRAPHY 79, 79, 81 (1995) (noting that market share of IBM and Apple declined from 1984 to 1992 from 52.5% to 21.4% and that average price of computers fell by 40% in 1992 alone).

[27] Telecommunications "[d]eregulation began more or less with a rubber cup." RICHARD VIETOR, CONTRIVED COMPETITION 190 (1994).

[28] Hush-a- Phone Corp., 20 F.C.C. 391, 420 (1955), *rev'd*, 238 F.2d 266 (D.C. Cir. 1956).

establishing the principle that the owner of the telephone network cannot restrict the use of reasonable attachments to the telephone network.[29]

In 1968, the Commission analogously held that AT&T could not prevent the use of a device called the Carterfone, which facilitated communication between a mobile radio and the landline network.[30] In so doing, the Commission announced a broad protection for all users to "interconnect" foreign devices to the telephone network.[31] To implement this principle, the Commission asked AT&T to file new tariffs that would allow the attachment of foreign devices to the network, provided that those devices would not harm the network.[32]

In the wake of its Carterfone decision, the FCC and, later, the Department of Justice supported competitive entry into the long distance sector. Much as in the terminal equipment market, entrants like MCI sought interconnection to the public switched network so that their customers could

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[29] Hush-a-Phone Corp. v. United States, 238 F.2d 266, 269 (D.C. Cir. 1956). It is often thought that the court established this principle over the FCC's opposition. In fact, the FCC ostensibly endorsed this principle, but absurdly agreed with AT&T's claim that the Hush-A-Phone constituted a threat to the network. Because the FCC's decision effectively gutted the principle in its implementation, it may well be that the Commission did not really believe in this principle, though it gave it lip service.

[30] In re Use of the Carterfone Device in Message Toll Tel. Servs., 13 F.C.C.2d 420 (1968). This decision, in response to an antitrust case brought by the producers of the Carterfone, see Carter v. American Tel. & Tel. Co., 365 F.2d 486 (5th Cir. 1966), ruled that AT&T's restrictive tariff violated the Communications Act, see 13 F.C.C.2d at 421 (outlining AT&T tariff providing that "[n]o equipment, apparatus, circuit, or device not furnished by the telephone company shall be attached to or connected with the facilities furnished by the telephone company, physically, by induction, or otherwise"). In particular, the Commission found that the fact that AT&T allowed its own equipment to interconnect to the network rendered such restrictions discriminatory. *Id.* at 421-24.

[31] The Commission announced that:

> [A] customer desiring to use an interconnecting device to improve the utility to him of [the telephone network] . . . should be able to do so, so long as the interconnection does not adversely affect the telephone company's operations or the telephone system's utility for others.

Id. at 424.

[32] AT&T took full advantage of the proviso allowing it to condition the use of attachments, requiring "protective connecting arrangements" (PCAs) that would limit greatly the use of non-AT&T equipment. *See* American Tel. & Tel. Co. "Foreign Attachment" Tariff Revisions in AT&T Tariff FCC Nos. 263, 260, and 259, Memorandum Opinion and Order, 15 F.C.C.2d 605, 606 (1968); *see also* Litton Sys., Inc. v. AT&T Co., 700 F.2d 785, 799 n.15 (2d Cir. 1983) (quoting AT&T internal report that the tariff requirements of employing PCAs were "a redundant, artificial, and economic barrier to those wishing to purchase their own equipment"); Northern Tel. Co. v. AT&T, 651 F.2d 76, 95 (2d Cir. 1981), *cert. denied*, 455 U.S. 943 (1982) (concluding that AT&T may have designed PCAs in an unreasonable manner).

reach all telephone subscribers.[33] In both MCI's private antitrust suit and the Justice Department's action against AT&T, the courts concluded that AT&T must allow MCI to interconnect with its customers so that it could compete with AT&T's long distance services.[34] Because the Department did not believe that equal access regulation alone would effectively safeguard long-distance competition, it also obtained the divestiture and quarantine of the local Bell Companies under the Modified Final Judgment or MFJ.[35] Taking advantage of the protections afforded by the decree, MCI and other entrants to the long distance market introduced new services – like fiber optics in the backbone network[36] – and tailored their offerings to customers who used their lines for data communications.

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[33] *See* Microwave Communications, Inc., 18 F.C.C.2d 953 (1969).

[34] *See* MCI Communications v. AT&T, 708 F.2d 1081, 1105 (7th Cir. 1983); United States v. AT&T, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom*., Maryland v. United States, 460 U.S. 1001 (1983). For a discussion of the exact nature of MCI's interconnection concerns, see *MCI Communications*, 708 F.2d at 1131-32 (discussing, among other things, MCI's claim that AT&T required its customers to dial unnecessary digits and that AT&T's interconnection procedures "utilized materials inadequate for the volume of business MCI was doing . . . and involved unduly complex and ineffective installation and maintenance procedures").

[35] The MFJ's basic logic, which is often called either "Baxter's Law" or the "Bell Doctrine," is that:

> (R)egulated monopolies have the incentive and opportunity to monopolize related markets in which their monopolized service is an input, and that the most effective solution to this problem is to 'quarantine' the regulated monopoly segment of the industry by separating its ownership and control from the ownership and control of firms that operate in potentially competitive segments of the industry.

Paul L. Joskow & Roger G. Noll, *The Bell Doctrine: Applications in Telecommunications, Electricity, and Other Network Industries*, 51 STAN. L. REV. 1249, 1249-50 (1999); *see also* Joseph D. Kearney, *From the Fall of the Bell System to the Telecommunications Act: Regulation of Telecommunications*, 50 HASTINGS L. J. 1395, 1415-16 (1999)(discussing the Department's objections to a pure conduct remedy strategy); *but see* Robert W. Crandall, *The Failure of Divestiture Remedies in Sherman Act Monopolization Cases*, 80 OR. L. REV. 109, 179-92 (2001) (arguing that equal access regulations alone, without divestiture and quarantine, would have ensured the MFJ's competitive benefits).

[36] *See* Howard A. Shelanski, *Competition and Deployment of New Technologies in U.S. Telecommunications*, 2000 U. CHI. LEGAL F. 85, 107 (2000) (explaining that AT&T failed to deploy it in its long-haul network until Sprint and other upstarts did and began advertising a superior quality network). As an executive from Corning explained:

> AT&T, which owned most of the telephone lines in America at the time [of the invention of fiber optic technology], said it would be 30 years before its telephone system would be ready for optical fiber. And when it was, AT&T planned to make its own fiber. . . . [After AT&T entered into a consent decree,] MCI took the risk [of ordering fiber optic technology] and placed a 100,000 kilometer order for a new generation of fiber.

D. Modularity and The Logic For Open Access Regulation

Modularity means organizing complements to interoperate through public, nondiscriminatory and well-understood interfaces. As the cases described above suggest, modularity can arise as an internal management system, as a self-governing organization of a market, or as a result of public policy decisions. In the computer industry and the development of the Internet, this strategy proved very successful in facilitating innovation and entry. Similarly, with the breakup of the integrated Bell System, new companies were able to enter equipment and long distance markets successfully.

Modular industry structures enable independent firms to introduce innovations into an established environment. In particular, an open standard can facilitate innovation in individual components, spur entry, and result in lower prices.[37] Moreover, as producers experiment with different approaches, the market can move quickly based on "rapid trial-and-error learning."[38] Modularity thus allows for a smooth dissemination of the best of breed in each level or layer, as users mix-and-match components.[39]

In the three cases sketched out above, modularity arose through different means, but in each case the modular structure seemed to facilitate innovation. Open standards and interfaces in the telecommunications and Internet industries, for example, have enabled companies to launch new products (such as modems) that work with the telephone network, and new applications – notably, the

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Willard K. Tom & Joshua Newberg, *Antitrust and Intellectual Property: From Separate Spheres to A Unified Field*, 66 ANTITRUST L.J. 167, 202 (1997) (quoting Testimony of Timothy J. Regan, Division Vice President and Director of Public Policy, Corning, Inc., Before House Judiciary Committee (May 9, 1995)).

[37] Joseph Farrell et al, *The Vertical Organization of Industry: Systems Competition Versus Component Competition*, 7 J. ECON. & MGMT. STRAT. 143, 172-73 (1998).

[38] Richard N. Langlois & Paul L. Robertson, *Networks and Innovation In A Modular System: Lessons From The Microcomputer and Stereo Component Industries*, 21 RESEARCH POLICY 297, 301 (1992).

[39] As Clayton Christensen put it:

> Modular architectures help companies respond to individual customer needs and introduce new products faster by upgrading individual subsystems without having to redesign everything. Under these conditions (and only under these conditions), outsourcing titans like Dell and Cisco Systems can prosper—because modular architectures help them be fast, flexible and responsive.

Clayton M. Christensen, *The Rules of Innovation*, TECHNOLOGY REVIEW 33, 36 (June 2002).

World Wide Web – that work over the Internet.[40] Given its success in facilitating innovation in these and other cases, some commentators -- notably Lawrence Lessig -- argue that government policy should facilitate modularity wherever possible.[41]

As Part II discusses, however, making modularity a guiding light for regulatory policy clashes with the thrust of modern economic thinking and antitrust policy. In particular, Part II explains the logic of a critical antitrust economic concept -- *internalizing complementary externalities* (ICE) – and why it claims that firms have an incentive to implement modularity voluntarily when it is efficient to do so.

II. Integration and Efficiencies: Putting the Modularity Movement on ICE

Perhaps partly because modularity has many efficiency and competitive benefits, antitrust policy until the 1970s was wary of (incremental) vertical integration and imposed *per se* rules that limited vertical relationships.[42] Over the last twenty-five years, however, antitrust policy has accepted the Chicago School argument that close vertical relationships also give rise to "integrative efficiencies." Even more importantly, economists' better understanding of complementarities has led antitrust law to recognize that the benefits of modularity will often cause firms to institute it voluntarily. The question for regulators therefore is not whether modularity is good—it very often

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[40] *See* Jay Atkinson & Christopher C. Barnekov, A Competitively Neutral Approach to Network Interconnection, Federal Communications Commission Office of Plans and Policy Working Paper # 34, 6 (December 2000) (available at http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp34.pdf) (explaining this point).

[41] LESSIG, FUTURE OF IDEAS, supra note __, at 174-76; Lawrence Lessig, *Innovation, Regulation, and the Internet*, THE AMERICAN PROSPECT (April 10, 2000) <http://www.prospect.org/archives/V11-10/lessig-1.html> ("the burden should be on those who would compromise [on openness] to show that it will not take away from the innovation we have seen so far"). In a report to the government of Canada, for example, T.M. Denton Consultants argued:

> It might be questioned whether governments had interests to defend here. The justification for taking an interest is that the future operation of networks may well determine how economies will function, and is therefore a matter of national importance. Governments are guardians of the marketplace, and they have legitimate interests in knowing how they work. *In a computer-mediated marketplace, interfaces between networks determine who may compete*.

is—but whether modularity is likely to be good *even when* it will not emerge (or survive) spontaneously, as often it will when it is most valuable.

This Part explains the efficiencies and logic behind allowing firms (even monopolists) to decide whether or not to integrate vertically into—or, more broadly, depart from an arm's-length relationship with—complementary markets. While it is sometimes convenient to talk as if platform firms choose between full integration and an arm's-length modular relationship with a complement, there is, of course, a spectrum of vertical relationships between these, including partial integration (i.e., a joint venture), a tie-in arrangement, an investment in a firm producing a complement, a long term contractual arrangement, and an affiliate relationship.

As we outline in Section A, a vertical relationship closer than an arm's-length modular one can achieve certain efficiency benefits. Moreover, as discussed in Section B, the powerful concept of "internalizing complementary efficiencies," or ICE, explains why even a platform monopoly often has incentives to make efficiency-oriented choices about when to maintain modularity and when to get involved in an adjacent market.

A. Integrative Efficiencies

Palm, which introduced the first successful personal digital assistant, recently decided to separate its operating system and software applications divisions from its hardware division.[43] It did so because it did not want to be another Apple, which failed to commit to an open licensing strategy for its operating system and subsequently lost its initially strong market share.[44] Quite naturally, it wants to be another Microsoft: a firm that has benefited enormously from modularity and the development of independent applications for its platform.

See T.M. DENTON CONSULTANTS, NETHEADS VERSUS BELLHEADS, FINAL REPORT FOR THE CANADIAN FEDERAL DEPT. OF INDUSTRY 15 (available at www.tmdenton.com/netheads.htm).

[42] *See, e.g.*, United States v. Arnold Schwinn & Co., 388 U.S. 365 (1967).

[43] *See* Ian Fried and Dawn Kawamoto, *Two Palms Better Than One?* CNET NEWS.COM (February 4, 2002) (available at http://news.com.com/2100-1040-828446.html#).

[44] *See* Pui-Wing Tam, For Palm, Sp*litting In Two Isn't Seamless*, WALL ST. J., June 27, 2002 at B4.

Palm's decision to vertically disintegrate, compared with Apple's apparent error, might appear to be a no-brainer. But it is not. By separating its operations vertically, Palm will lose control of a number of potentially important aspects of its product deployment. Take, for instance, its ability to prod development of valuable applications. For Palm, its heavy reliance on outsiders and "inability to crack the whip on its far-flung programmers" contributes (according to some observers) to its "slow pace of innovation."[45] By reducing its size and influence over complementors, Palm may find influencing independent developers even more difficult in the future. In contrast, Sega developed the operating system, equipment, and leading games for its Sega Genesis system all in-house – in particular, its Sonic the Hedgehog game – in order to control its product offerings and drive consumer demand for its system.[46]

Where there are interdependencies between the platform and the applications made for it, an arm's-length relationship can predictably involve contractual hazards of hold-up on both sides.[47] A closer vertical relationship can be a rational and efficient response to such hazards. In this sense, developing close vertical relationships often represents a second-best strategy.[48]

One important efficiency created by vertical integration is the avoidance of what economists call "double marginalization." The classic formulation, offered by Augustin Cournot and dating back to 1838, is that separate complementary monopolies, each imposing a monopoly markup, wind up with a final product price that exceeds the overall monopoly price. As a result, where firms enjoy

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[45] Erick Schonfeld & Ian Mount, *Beating Bill*, BUSINESS 2.0 (June 2002) (available at www.business2.com/articles/mag/print/0,1643,40438,FF.html).

[46] *See* ADAM M. BRANDENBURGER & BARRY J. NALEBUFF, CO-OPETITION 237-241 (1996). One possible explanation for these differing approaches is that the proprietary strategy is most effective in getting a system off the ground, but, as Palm is discovering, it is difficult to later separate integrated divisions that once worked well together and it is not easy to determine when, if at all, integration has outlined its usefulness. *See* Tam, supra note __.

[47] *See* Yoo, supra note __, at 262-64 (noting that vertical integration guards against free riding, holdup problems, and other strategic behaviors by vital complementors).

[48] More precisely, the problem arises when fully effective modularity is not available, so that ex post haggling is likely to arise. There is thus apt to be an intriguing positive feedback: when modularity works well, it is appealing and may be stable, but when it starts to break down, a platform supplier's best response may eventually be to integrate—plausibly killing off whatever imperfect modularity remains. For an examination of how Intel approached this problem, see ANNABELLE GAWER AND MICHAEL A. CUSAMANO, PLATFORM LEADERSHIP: HOW INTEL, MICROSOFT, AND CISCO DRIVE INDUSTRY INNOVATION 54-56 (2002).

monopolies in complementary markets, both consumers and the producers are worse off than they would be if the two firms merged and charged a monopoly price for the two goods used in combination.[49] More generally, this insight explains that firms which provide complements or complementary activities are in a mutual position of "vertical externality." When Microsoft, for example, improves its software or lowers its price, more consumers buy Intel's complementary microprocessor; similarly, when Intel improves its hardware or lowers its price, demand for Microsoft's operating system rises. Thus, when complementors move closer to maximizing joint profits -- whether through integration or through a closer contractual relationship than arm's-length pricing -- it tends to encourage innovation and price-cutting.[50]

In technology industries, another important integrative efficiency is that hand-in-glove coordination among complementors can often produce superior products.[51] Where an industry relies on open standards and open interfaces, it can be hard to innovate quickly in a way that requires changing the interface.[52] Antitrust law, even at the height of its hostility to vertical tie-ins, appreciated this point in a case involving the rollout of cable television and its related equipment.[53]

Hand-in-glove coordination between complements also addresses consumer skepticism about trying a new platform product where they must purchase the relevant applications separately. Platform providers may either produce the applications themselves or require some form of quality screening as part of a licensing arrangement to assure consumers that complementary products will

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[49] AUGUSTIN COURNOT, RESEARCHES INTO THE MATHEMATICAL PRINCIPLES OF THE THEORY OF WEALTH 103 (1838) (Nathaniel T. Bacon trans., MacMillan Co. 1927).

[50] For a development of this point and some important refinements of it, see Joseph Farrell and Michael L. Katz, *Innovation, Rent Extraction, and Integration of Systems Markets*, 48 J. IND. ECON. 413 (2000). In particular, it merits noting explicitly that when competitors—in contrast to complementors—move closer to maximizing joint profits, the result can much more readily be anticompetitive.

[51] For the classic work arguing that intellectual property holders should be able to control the development and deployment of complementary products, see Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 287 (1977). For a more recent application of this argument, see Douglas Lichtman, *Property Rights In Emerging Platform Technologies*, 29 J. LEGAL STUD. 615 (2000).

[52] For a development of this theme and a discussion of the virtues of proprietary platform competition, see Weiser, *Intellectual Property Policy*, supra note __, at __-__; *see also* note __, infra. For a further discussion of how developing stable interfaces can be too expensive and time consuming to merit the effort, see Langlois, supra note __, at 23.

work effectively. (Indeed, Palm may have adopted this strategy as a means of introducing its product before moving to implement modularity through its voluntary split.) Moreover, such coordination can give a platform provider more scope for penetration pricing and other tactics aimed to encourage efficient use and adoption of its platform,[54] particularly when the product is newly introduced and relatively unknown.

Businesses' choice of vertical structure are are a mainstay of the "new institutional economics" (NIE), which develops the basic insights offered by the work of Nobel Laureate Ronald Coase.[55] NIE suggests that firms will vertically integrate– or, more generally, depart from arm's-length market dealing -- in cases where the use of the market would be costly.[56] Thus, NIE aims to explain when firms will opt for modularity as a means of bringing the maximum imagination and diversity to the problem of developing applications on a platform and minimizing the need for complex coordination, versus vertical integration to facilitate complex coordination and to strengthen incentives for product development and deployment.[57]

Unfortunately, firms cannot readily get the best of both worlds. Thus, when platform providers integrate but want to encourage independent applications development, they often end up taking pains "not to compete with customers."[58] Consider again Palm's decision to place its operating system into a separate company. As commentators have observed, this measure is designed to help

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[53] *See* United States v. Jerrolds Elec. Corp., 187 F.Supp. 545 (E.D. Pa. 1960), *aff'd per curiam*, 365 U.S. 567 (1961) (allowing leeway for bundling in introducing new product where reputation matters).

[54] For a discussion of this point, see Douglas Lichtman, *Property Rights In Emerging Platform Technologies*, 29 J. LEGAL STUD. 615, __-__ (2000).

[55] *See, e.g.*, Ronald H. Coase, *The Nature of the Firm*, 4 ECONOMICA 386 (1937); Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960). The subject is also known as "transactions cost economics."

[56] For discussions of this point and citations to relevant literature, see Alan J. Messe, *Tying Meets The New Institutional Economics: Farewell To The Chimera of Forcing*, 146 U. PA. L. REV. 1, 50-66 (1997); Gregory J. Werden, *The Law and Economics of The Essential Facility Doctrine*, 32 ST. LOUIS U. L.J. 433, 462-464 (1987).

[57] Because it is seldom obvious which of these two strategies is superior, antitrust courts have waded carefully into the area of "technological tying," requiring plaintiffs to establish that any competitive harms outweigh the efficiencies produced by such developments. *See, e.g.*, United States v. Microsoft Corp., 253 F.3d 34, 53 (2001); ILC Peripherals Leasing Corp. v. IBM, 458 F.Supp. 423, 439 (N.D. Cal. 1978), *aff'd sub nom.* Memorex Corp. v. IBM, 636 F.2d 1188 (9th Cir. 1980); Telex Corp. v. IBM Corp., 367 F. Supp. 258, 347 (N.D. Okl. 1973), *rev'd on other grounds*, 510 F.2d 894 (10th Cir. 1975).

[58] This phrasing is most natural when the platform product is sold to the applications developers, who then sell a combined product downstream. As we discuss at the outset, the same issues arise whether this is the market

reassure its licensees (like Handspring) that it can be trusted as a steward over the standard, it will not take advantage of its control over the platform to give it an advantage in related markets, and it will remain focused on serving the needs of independent developers – particularly now that Microsoft's rival operating system is offered on a modular basis (i.e., without a hardware component).[59] Similarly, AT&T divested its equipment manufacturing arm, Lucent, perhaps to reassure those equipment customers who competed with other parts of AT&T that Lucent would not favor the latter.[60]

B. ICE and The Rationale Against Open Access Regulation

If a monopoly platform provider (for whatever reason) sticks to its core platform business, it would prefer that applications—the complements to its product—be cheaply, innovatively, and efficiently supplied. Thus, where such a firm chooses how to license interface information, certify complementors or not, "evangelize," etc., it has an incentive to choose the pattern that will best provide it or its customers with applications. It can *internalize* these *complementary efficiencies*. This lesson may seem obvious, although antitrust law has not always appreciated it;[61] we call this point *Obvious ICE*.

Obvious ICE can be understood more sharply by using a quantitative example involving a platform monopolist in the game console market.[62] Assume, for exposition purposes, that

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structure, or whether the platform provider buys from the applications developers, or whether end users or intermediaries buy both products. *See* note __, supra, and accompanying text.

[59] *See* Ian Fried and Dawn Kawamoto, *Two Palms Better Than One?* CNET NEWS.COM (February 4, 2002) (available at http://news.com.com/2100-1040-828446.html#).

[60] See CARL SHAPIRO & HAL R. VARIAN, INFORMATION RULES (1998); ADAM M. BRANDENBURGER & BARRY J. NALEBUFF, CO-OPETITION (1996).

[61] Judge Posner makes this point sharply in discussing *Dr Miles*, a case that addressed the antitrust rule governing minimum resale price maintenance. *See* RICHARD POSNER, ANTITRUST LAW 177-78 (2001).

[62] In antitrust, a company need not control 100% of a market (and even "market" is a nuanced term of art) to be considered a "monopolist"; rather, being a "monopolist" merely connotes that a company possesses a considerable degree of control over prices and output (and/or the ability to exclude competitors). *See* United States v. DuPont & Co., 351 U.S. 377, 391 (1956) (defining "monopoly power" as "power to control prices or exclude competition"). For a discussion of "monopoly power" and when a firm is a monopolist, see RICHARD POSNER, ANTITRUST LAW 195-96 (2001) (noting, among other things, that courts often use market shares of 50%-70% as threshold indicators of when a firm is a monopolist); *see also* SEE AM. BAR ASS'N, ANTITRUST

competition in the applications market (i.e., video games for a game console) will ensure a selection of applications that gives each user of the platform a value of $100; by contrast, assume that a monopoly in applications will provide each platform purchaser a value of only $70. (This value reflects the quality, variety, and price of the available applications, and is measured assuming that the platform is already purchased.) Then, if the platform provider decides not to foster competition in the applications market, the platform's value to a buyer falls by $30; consequently, the platform provider must either sell fewer platforms or lower its platform price by $30. As a result, the platform provider *internalizes* a quantitative measure (here $30) of the *complementary efficiencies* from a more valued applications market (hence the term ICE).[63]

Obvious ICE neither proves nor assumes that competition in applications markets is efficient. If, for instance, it is exceptionally hard to avoid spillovers of innovation among applications developers, then competition between applications developers might lead to less rather than more innovation. Or, if it is hard for consumers to judge the quality of applications, free entry into marketing applications could spoil the market for all applications providers. If, as in those examples, a competitive applications market would yield less value than a monopolized one, the monopoly platform provider would benefit by preventing competition in the market for applications. Thus, Obvious ICE does not tell us what structure of the applications market is optimal, but simply observes that the un-integrated platform monopolist has an incentive to favor whichever form of organization of applications is most efficient (or delivers the most value to users).

LAW DEVELOPMENTS 235-36 (4th ed. 1997) (noting the 50% and 70% benchmarks and citing supporting federal case law); *id.* at 238 & n.45 (listing factors relevant for monopoly power determination such as "presence and degree of barriers to entry or expansion, technological superiority resulting in cost advantages, economies of scale and scope, ability to price discriminate, the relative size of competitors, competitors' performance, pricing trends and practices, homogeneity of products, potential competition, and the stability of market shares over time"); United States v. Syufy Enterprises, 903 F.2d 659 (9th Cir. 1990) (even 86% market share not sufficient to constitute a monopoly where entry is easy).

[63] The argument as formulated yields a slightly sharper conclusion than is usually stated. First, it is the incremental value of the marginal platform purchaser that counts. Second, if the platform provider chooses a different price strategy than that described, it will more than capture the advantage of the more efficient downstream organization.

Obvious ICE does not address the concerns that arise when the platform monopolist *does* integrate into (and remain in) the market for applications for its platform.[64] In such cases, the platform provider will often be able to take a dominant position in that business. First, it has a stronger incentive than an independent firm to work harder on its applications, since innovators can seldom capture all their incremental value through simple pricing, and (as ICE reminds us) the integrated provider can capture some—perhaps all—of the residue in its platform sales. Second, even if a platform provider genuinely tries to cooperate with independent applications developers, it is unlikely to be as open with them as with its own applications division (unless it were deliberately to build a "Chinese wall" to withhold information from the latter). Third, if the integrated firm wanted to hamstring applications rivals, it would often be very easy -- blatantly or subtly -- to bias interface design, the timing of new releases, details of pricing policy, and many other choices -- and these subtleties would only be necessary if blunter means were somehow ruled out. In the face of such possibilities, some argue that a platform provider's decision to integrate vertically poses a formidable competitive concern.

But a stronger and less obvious extension of the ICE principle claims that the platform monopolist will act efficiently even when it comes to deciding whether or not to integrate, and, if it integrates, how to treat its applications competitors. Thus, according to this unobvious conception of ICE, close vertical relationships do not raise an economic policy concern.

Suppose, using the hypothetical set out above, that the platform provider could integrate into applications, participate in the competitive market, and improve the value to users from $100 to $105, while breaking even on its applications. Under this scenario, the platform provider will profit from vertical integration—just as it should, since by hypothesis it leads to increased value. Suppose, on the other hand, that it contemplates integrating into applications, monopolizing that market, and making a profit of $20 per user there. Because $20 is less than the $30 harm created by this action—harm that

[64] This need not be literal integration; alliances with particular applications developers could also raise such concerns. Recognizing this point, this Article often discusses "close vertical relationships" as opposed to the

is in the first instance to applications buyers, but that redounds to the platform monopolist's bottom line because consumers will be willing to pay less for the platform—it will lose by such a strategy, as it should since, by hypothesis, it leads to lower consumer value. To be sure, a platform provider would choose to monopolize the applications market if it can make $40 (per user) rather than $20 in doing so, but, by hypothesis, this monopolization would somehow increase rather than decrease total value.[65]

At bottom, ICE maintains that consumers will not pay more whether or not the applications market is monopolized, because the platform monopoly could always have charged consumers more (in the platform price) in the first place. Consequently, ICE suggests that the platform provider has no incentive to take profits or inefficiently hamper or exclude rivals in the applications market because it can appropriate the benefits of cheap and attractive applications in its pricing of the platform. To the contrary, ICE underscores why a platform monopolist has a formidable incentive to innovate and push for improvements in its system – including better applications – in order to gain more profits from a more valuable platform.[66]

For a number of reasons, firms may hesitate to enter an applications market where they must compete with the platform provider. More generally, efficient applications competition can be problematic if one of the competitors controls the platform. In such cases, ICE teaches that platform providers may choose to stay out of (or later exit from) the applications market altogether as a means of ensuring efficient competition in that market. (Palm's recent break-up may well have just this objective.)

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traditional term "vertical integration."

[65] That is, the platform provider makes an extra $40 per user at the cost of only $30 per user reduced value. Admittedly, the assertion that this increases total value rides on an assumption that excluded applications firms do not capture more than the $10 in pure profits.

[66] *See, e.g.*, *Microsoft*, 65 F.Supp.2d at 17 ("[I]f there are innovations that will make Intel-compatible PC systems more attractive to more consumers, and those consumers will be less sensitive to the price of Windows, the innovations will translate into increased profits for Microsoft.").

The un-obvious ICE argument that monopoly platform providers can generally be trusted to act efficiently is often called the "one monopoly profit theory."[67] It dates back to early Chicago School thinking,[68] which underlay much of Richard Posner's work in the 1970s and Robert Bork's arguments in the *Antitrust Paradox*.[69] It implies that a monopoly platform provider's decision to integrate into a complementary market, and its behavior there if it does so, is likely to be efficient and not anticompetitive.

The "one monopoly profit theory"[70] label captures only part of the analysis suggested by ICE. It explains that a platform monopolist cannot increase its profits by "leveraging" that power into applications; it thus focuses on ICE's claim that where competition in the applications market is efficient, the platform monopolist will protect it. But the "one monopoly profit" label fails to suggest the broader principle that the platform monopolist gains from an efficient applications market—whether that be unbridled competition, integration without independents, licensing of a limited set of independents, or some attempt to combine these or other structures. Our term *internalization of complementary efficiencies* stresses that the platform monopolist has a powerful incentive to be a good steward of the applications sector for its platform; it thus better captures the argument against restrictions on vertical ties than the "one monopoly profit" phrase.

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[67] Judge Posner has outlined the argument succinctly:

> But the bare fact that a firm has monopoly power in Market X does not imply that it will have an incentive to obtain monopoly power over Y, an input into X. In general a monopolist like any other firm wants to minimize its input costs; the lower those costs are, the greater the monopoly profits it will be able to make. Therefore the rational monopolist will usually want his input markets to be competitive, for competition usually will minimize the costs that he has to pay for his inputs.

Olympia Equipment Leasing Co. v. Western Union Telegraph Co., 797 F.2d 370, 374 (7th Cir. 1986); *see also* POSNER, ANTITRUST LAW, supra note __, at 200-02.

[68] *See* Bowman, supra note __.

[69] *See, e.g.,* Bork, supra note __; Posner, supra note __.

[70] *See* ROBERT BORK, THE ANTITRUST PARADOX 229 (1978) ("[V]ertically related monopolies can take only one monopoly profit"); RICHARD POSNER & FRANK EASTERBROOK, ANTITRUST 870 (2d ed. 1989) ("There is only one monopoly profit to be made in a chain of production."). Judges, too, have used the "one monopoly profit" label. *See, e.g.*, Town of Concord, Mass. v. Boston Edison Co., 915 F.2d 17, 23 (1st Cir. 1990) (Breyer, J.); Western Resources, Inc. v. Surface Transportation Board, 109 F.3d 782, 787 (D.C. Cir. 1997) (Williams, J.).

The stronger form of ICE largely explains modern antitrust law's reluctance to worry broadly about leveraging and spillovers of market power. It also underlies the basics of Chicago School doctrine,[71] as well as its more ambitious arguments for *per se* legality of tying arrangements.[72] Surprisingly (and, as we see below, not necessarily correctly), it suggests that antitrust and regulation should generally not worry even if an integrated firm engages in behavior that is plainly exclusionary if assessed entirely within the applications market.

Courts and commentators have often heeded the basic ICE argument for skepticism about claims that a monopolist would "leverage" its primary monopoly into a second market.[73] In doing so, they have adopted a somewhat simplistic form of this logic that does not address fully ICE's exceptions. In particular, some take ICE very seriously, others take its exceptions very seriously,[74] but few integrate the two in a sophisticated manner. In light of this divide, a central question for antitrust and regulatory policy is whether ICE represents the rule, with exceptions relatively rare or minor, or whether ICE is actually the exception.[75] To outline this debate, Part III explains the thrust of post-Chicago criticisms of ICE and where ICE's implications must be taken with some caution.

III. Holes in the ICE and When ICE's Logic Can Fail

[71] The classic statement of this position came in Ward Bowman, *Tying Arrangements and the Leverage Problem*, 67 YALE L.J. 19 (1957). The orthodox restatement of it came in ROBERT H. BORK, THE ANTITRUST PARADOX 372-74 (1978).
[72] Bork, supra note __, at 288 (arguing that all vertical restraints, like tying, should be per se legal).
[73] *See, e.g.*, G.K.A. Beverage Corp. v. Honickman, 55 F.3d 762, 767 (2d Cir. 1995) ("Once having achieved the alleged bottling monopoly, therefore, appellees' sole incentive is to select the cheapest method of distribution."); Advo, Inc. v. Philadelphia Newspapers, Inc., 51 F.3d 1191, 1203 (3d Cir. 1995) (arguing that leveraging theory "makes no sense").
[74] For two classic responses to Chicago School thinking, see Lawrence A. Sullivan, *Section 2 of the Sherman Act and Vertical Strategies By Dominant Firms,* 21 SW. U. L. REV. 1227 (1992); Louis Kaplow, *Extension of Monopoly Power Through Leverage*, 85 COLUM. L. REV. 515 (1985).
[75] *See* Herbert Hovenkamp, *Post-Chicago Antitrust: A Review and Critique*, 2001 COLUM. BUS. L. REV. 257 ("The principal difference between Chicago and post- Chicago economic analysis is" the prevalence of "a complex set of assumptions about how a market works, [which make] anticompetitive outcomes seem more plausible."); *see also* RICHARD POSNER, ANTITRUST LAW 194-95 (2001) (maintaining that policy deviations from ICE should be the exception, not the rule). To be sure, there are a few "die-hard" Chicagoans who believe that vertical arrangements can never have anticompetitive effects (i.e., believe that there are no exceptions to ICE), but most commentators recognize the heavy weight of economic opinion agrees that vertical integration and vertical market restrictions can injure competition in certain cases. *See* Richard A. Posner, *The Chicago*

ICE is a central organizing principle for the analysis of vertical competitive effects. But its claims do not always hold. In this Part, we explain some ways in which it can fail. First, we discuss the series of exceptions to ICE's logic. Second, we reflect on the implications of these exceptions for using ICE in developing sound regulatory and antitrust policy.

A. Holes in the ICE

This Part will evaluate eight exceptions to the ICE principle: (1) Baxter's Law; (2) price discrimination; (3) potential competition; (4) bargaining problems; (5) incompetent incumbents; (6) option value; (7) regulatory strategy; and (8) incomplete complementarity. There are other exceptions,[76] but we find these ones particularly noteworthy and relevant to the information industries regulated by both antitrust and telecommunications law.

(1) Baxter's Law

Even classical Chicago School adherents concede an exception to ICE where the platform (the core monopoly) is subject to regulation but the applications market is not.[77] The economics behind this exception to ICE echo the ICE argument itself. ICE claims that a monopolist can capture in its platform profits improvements in consumer value in applications, but it generally cannot if the platform price is regulated. First, suppose that there is an "ideal" price cap that merely constrains the price of the platform product and that will not change if platform-level profits change over time.

School of Antitrust Analysis, 127 U. PA. L. REV. 925, 932 (1979) (discussing "die-hard" Chicagoans who refuse to accept subsequent refinements of early Chicago School ideas).

[76] For one such different formulation, see Steven C. Salop & R. Craig Romaine, *Preserving Monopoly: Economic Analysis, Legal Standards, and Microsoft*, 7 GEO. MASON L. REV. 617, 625 n.26 (1999) (listing situations).

[77] *See Olympia*, 797 F.2d at 374 ("There are, however, special circumstances in which a rational monopolist may want to restrict competition in an input market; as it happens, one of those circumstances is where the monopolist's rates are regulated."); *Jefferson Parish,* 466 U.S. at 36 n. 4 (O'Connor, J., concurring) ("In a regulated industry a firm with market power may be unable to extract a supercompetitive profit because it lacks control over the prices it charges for regulated products or services. Tying may then be used to extract that profit from sale of the unregulated, tied products or services.") (citations omitted). Bowman's initial argument contemplated this exception, see Bowman, supra note __, at 22, but later commentators criticized his treatment of this argument as too deferential to the regulatory process. *See* Kaplow, supra note __, at 522 n.26.

Now consider how the regulated platform monopolist will view an opportunity to raise the price of applications and take a profit there. Assuming fixed 1:1 proportions between the platform and the applications market, suppose that the platform provider can take an additional profit of $10 per unit in the applications market by monopolizing that market. As ICE stresses, this lowers the profit-maximizing price for its platform by $10 (in the simplest case), given the level of platform sales. But whereas this "normally" lowers platform profits by $10, it may have a far smaller effect on platform profits when the platform price is regulated below the profit-maximizing level.[78] In a sense, the platform provider can compensate for the fact that its platform is priced below the profit-maximizing price by taking additional – and possibly otherwise inefficient -- profits in the applications market.

The same basic point holds under various other forms of price regulation. Suppose, for example, that the platform provider is regulated in a rate-of-return fashion, or is regulated by a price cap that responds over time to changes in profits in the platform market. In either case, by raising the price of its application product by $10 and gaining profits there, a platform provider can gain on net even if in the short term its profits in the platform market would fall by the full $10, because the regulatory process will over time make its platform operations whole and restore that "lost" $10.

This exception to ICE has been central in telecommunications policy.[79] In particular, the Bell System allegedly leveraged its way to market power in complementary markets in various ways, refusing to allow competitors in long distance and equipment manufacturing to gain equal access to its network.[80] Thus AT&T was able to rent telephones to its customers and/or sell equipment from its

[78] The loss of demand is the $1 divided by the absolute slope of the demand curve, so it is -dx/dp, or (-dx/dp)/x per unit sales. Multiplying by the gross margin (p-MC) gives (p-MC)(-dx/dp)/x, or [(p-MC)/p] * (-p/x dx/dp). This is the Lerner markup index times the absolute elasticity of demand; this amounts to 1 if p is profit-maximizing, and is less than 1 if p is below the profit-maximizing level.

[79] This issue also emerged in cases involving railroad regulation. *See* Northern Pacific Ry. v. United States, 356 U.S. 1, 8 (1958) (noting that land grant sales conditioned on "preferential commitments" might well be an example of a tie used as a substitute for an unlawful rebate); *see also* Kaplow, supra note __, at 522 n.26.

[80] *See* Roger Noll & Bruce Owen, *The Anticompetitive Uses of Regulation*: United States v. AT&T, in THE ANTITRUST REVOLUTION 290 (J. E. Kwoka & Lawrence J. White eds., 1989). In theory, an ideal "global price cap" could restore ICE, but much modern telecommunications regulation rarely focuses on this goal, instead aiming to deregulate workably competitive segments. For more extensive discussions of the relationship of ICE to regulation, see JEAN-JACQUES LAFFONT & JEAN TIROLE, COMPETITION IN TELECOMMUNICATIONS (2000); B. DOUGLAS BERNHEIM AND ROBERT D. WILLIG, THE SCOPE OF COMPETITION IN TELECOMMUNICATIONS (1996);

Western Electric affiliate to its operating companies or telephone subscribers at inflated rates; the resulting decrease in demand for telephone subscription did little to dissuade AT&T from such strategies because of the price regulation of local telephone service. In its Carterfone decision and its aftermath, the FCC imposed an "unbundling" requirement on AT&T to prevent it from requiring consumers to rent phones from it, and thereby opened the customer premises equipment market to competition.[81]

This issue also was at the heart of the government's antitrust case against AT&T, even though AT&T's long distance rates – like its local ones – were regulated.[82] Because then-Assistant Attorney General Baxter highlighted this hole in ICE in championing the consent decree that broke up AT&T, this exception is also termed "Baxter's Law" or the "Bell Doctrine."[83]

(2) Price Discrimination

Participating in, or dominating, the applications market can help a platform monopolist to price discriminate; that may make even inefficient vertical leveraging profitable.[84] By controlling how applications are sold, a platform monopolist can engage in price discrimination by charging

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MARK ARMSTRONG , SIMON COWAN & JOHN VICKERS, REGULATORY REFORM: ECONOMIC ANALYSIS AND BRITISH EXPERIENCE (1994).

[81] *See* note __ and accompanying text, supra.

[82] AT&T was federally regulated as a dominant carrier in the interstate long-distance market until 1995. *See* Motion of AT&T Corp. to be Reclassified as a Non-Dominant Carrier, Order, 11 F.C.C.R. 3271, 3280-82 (1995) (ending rate regulation of AT&T in the long distance market). The fact that AT&T actually faced regulation in its complementary markets – both in long distance and, in some cases, in CPE – suggests that this justification for regulatory action is more complicated than often appreciated. In particular, there are three possible variations on this classic explanation that would grapple with this complication. First, it is possible that areas where regulation did not address – such as certain CPE markets, particularly where AT&T sold equipment to itself – were open to abuses. Second, it is possible that the imperfect nature of regulation enabled the AT&T monopoly to take greater advantage of consumers by providing both the monopoly and complementary service – i.e., the end of vertical integration helped consumers by facilitating better regulation. Finally, it is possible that the ability to prevent competition aided AT&T's ability to forestall innovation in complementary markets that would force it to depreciate its sunk investments more quickly than it would in a monopoly environment.

[83] *See* note __, supra.

[84] Proponents of the "leverage theory" of tying regularly invoke this explanation. *See* Lawrence A. Sullivan, *Section 2 of the Sherman Act and Vertical Strategies By Dominant Firms*, 21 SW. U. L. REV. 1227, 1237 (1992); Kaplow, supra note __, at 523 ("practices merely increasing profits to an existing monopoly, without `extending' it, can increase the welfare loss that results").

different markups on combinations of the platform with different sets of applications.[85] Put in economic terms, a seller can customize its offerings for different buyers, thereby distinguishing between those "inframarginal" customers who are willing to pay more than the "marginal" customers who would switch to other alternatives in the face of a price increase.[86] A familiar example of price discrimination is in airline travel, where airlines use a variety of means to segment the market and extract premium prices from the inframarginal customers who most desire the product – e.g., the business traveler who cannot plan in advance.

While price discrimination need not in itself be inefficient or anti-consumer, the platform monopolist's desire to discriminate can lead it to exclude innovation or price competition in complementary products. In the classic case, it does so more or less intentionally where maximizing its profits involves large markups on (certain) complements – say, better meal service for first class passengers -- because in order to price discriminate in this manner, the monopolist must remain in full control of the complementary market.[87] In other cases, it may do so reluctantly when (as is also very possible) profit maximization involves *below*-cost pricing of complements: for those cases, the platform provider probably would be delighted if independent complementors were to offer cheap and innovative offerings, but independent developers may refrain from providing such products where the platform provider offers its own complements below cost.[88]

Economists recognize that price discrimination is ambiguous in its aggregate effect because it can either harm or benefit consumers overall (and is likely to harm some and benefit others).[89] Much

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[85] As is becoming more common in the Internet environment, customer identity might be more readily tracked through the complement than through the platform product.

[86] For a discussion and explanation of the difference between "marginal" and "inframarginal" customers, see James A. Keyte, *Market Definition and Differentiated Products: The Need For A Workable Standard*, 63 ANTITRUST L.J. 697, 739-45 (1995).

[87] This, of course, does not explain why the platform monopolist does not welcome independent innovation, but co-opt and tame it. But that approach may well be hard to do.

[88] *See* Farrell and Katz, supra note __ (formally modeling such an effect). A platform provider could alternatively offer a uniform subsidy to independent as well as its own complements, which would perhaps avoid this problem but might raise others.

[89] *See* Posner, *Chicago School of Antitrust*, supra note __, at 926, 928 (explaining how price discrimination can bring a monopolistic market closer to a competitive one and reduce the "misallocative effects of monopoly"). Moreover, where the increased output can generate economies of scale and/or "learning by doing" efficiencies,

like Ramsey pricing, it can raise profits at the lowest possible cost to consumers as a group,[90] and this is valuable where profits provide an important incentive for research and development and the deployment of new technologies.[91] One should also remember that in the face of restrictions on tying, monopolists may well find other (and potentially less efficient) means of price discrimination.[92] Finally, it merits note that firms without monopoly power also engage in price discrimination.[93]

Because modern economic thought is not hostile to price discrimination, some commentators categorically discount price discrimination as an exception to the logic of ICE.[94] But this is a mistake. Even where the price discrimination itself *enhances* efficiency, the platform monopolist may impose highly inefficient restrictions on applications competition in order to engage in price discrimination, particularly where there is a history of a consumer willingness to pay for products in a certain manner. A possible example is the unwillingness of cable providers to allow streaming video applications to use their cable modems. ICE would suggest that cable providers should happily endorse this usage of their platform, as it would raise the potential profits available from this platform. The hole in this argument is that a cable provider who allows video streaming will find it harder to engage in the profitable and customary price discrimination that sets high markups for premium cable programming, leading them to consider banning (or disadvantaging) this method of distribution altogether.[95]

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unit cost of production will drop as a result. *See* Jerry Hausman & Jeffrey MacKie-Mason, *Price Discrimination and Patent Policy*, 19 RAND J. OF ECON. 253, 257 (Summer, 1988).

[90] As Justice Breyer explained, "Ramsey pricing is a classical regulatory pricing system that assigns fixed costs in a way that helps maintain services for customers who cannot (or will not) pay higher prices." AT&T v. Iowa Util. Bd., 119 S. Ct. 721, 752, (1999) (Breyer, J., concurring in part and dissenting in part).

[91] *See* Hausman & MacKie-Mason, supra note__, at 263 (allowing for price discrimination in the sale of a patented product can spur innovation and thus substitute for longer intellectual property protection).

[92] *See* Hal Varian, *Price Discrimination*, in HANDBOOK OF INDUSTRIAL ORGANIZATION __ (Schmalensee and Willig, eds., 1989); Hausman & MacKie-Mason, supra note__, at __.

[93] The price discrimination and market segmentation strategy of non-cable incumbents provides some evidence for this possibility. *See* Tiffany Kane, Legislators Laud Debut of Covad's Service, CNET News.com (June 19, 2002) (http://news.com.com/2100-1033-937523.html) (reporting on Covad's tiered pricing structure).

[94] *See, e.g.*, *Town of Concord*, 915 F.2d at 24; Bork, supra note __, at 241-42; POSNER, ANTITRUST LAW, supra note __, at 203-06.

[95] For an anectodal suggestion that cable providers may fear such effects. *See* David Lieberman, *Media Giants' Net Change Establish Strong Foothold Online*, USA TODAY, Dec. 14, 1999, at B3 (reporting that Dan Somers,

(3) Potential Competition

Platform monopolists will evaluate actions in complementary markets through two lenses. On the one hand, ICE reminds us that the platform franchise often is worth more when the complement is efficiently supplied. On the other hand, competition in the complement can sometimes threaten the durability of the primary monopoly.[96]

First, if there are no independent applications suppliers, any potential platform rival would need to enter at both the platform and applications levels.[97] This "two-level entry" theory is familiar to both telecommunications regulation and antitrust policy. For example, the program access provisions of the Cable Policy Act of 1992 give satellite firms access to cable networks affiliated with rival cable operators in order to ensure that satellite providers can compete effectively with cable and are not hindered by a lack of programming availability.[98] Even if controlling a two-level monopoly may not yield more than one monopoly profit, it can protect that monopoly against entry.[99]

CEO of AT&T Broadband, dismissed suggestions that it would allow video streaming of programming on the ground that "AT&T did not spend $56 billion to get the blood sucked out of its veins.").

[96] Some have argued that this reason adds a dynamic element to the analysis that the traditional Chicago School model lacks. *See* Kaplow, supra note __, at 528-30 (contrasting "dynamic" and "static" approaches); *id.* at 523-23 (arguing that a monopolist's "motivation is to change the structural conditions it faces in order that it may receive greater profits in the future"); Steven C. Salop & R. Craig Romaine, *Preserving Monopoly: Economic Analysis, Legal Standards, and Microsoft*, 7 GEO. MASON L. REV. 617, 625-26 (1999) (discussing "preserving monopoly theory" that posits that vertical integration can be used "to impede the efforts of firms that might reduce the monopolist's power and thereby cause it to reduce its prices, increase innovation or perhaps lose out to a superior rival."); Herbert Hovenkamp, *Antitrust Policy After Chicago*, 84 MICH. L. REV. 213, 261 (1985) (criticizing Chicago School orthodoxy as focused on "static" analysis and unable to take account of "strategic behavior"). For an economic model of this strategy, see Dennis W. Carlton & Michael Waldman, The Strategic Use of Tying To Preserve and Create Market Power In Evolving Industries, NBER Working Paper #6831 (December 1998) (www.nber.org/papers/w6831).

[97] Artificially created entry barrier concerns emerged as an early "post-Chicago School" concern. *See, e.g.*, Jonathan B. Baker, *Recent Developments In Economics That Challenge Chicago School Views*, 58 ANTITRUST L.J. 645, 651-52 (1989).

[98] *See* 47 U.S.C. § 548(c)(5)*;* In re Implementation of Cable Television Consumer Protection and Competition Act of 1992, Notice of Proposed Rulemaking, 16 FCC Rcd. 19,074 (2001) (evaluating whether to extend rules); News Release, FCC Extends Program Access Exclusivity Rules (June 13, 2002) (available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-223381A1.doc).

[99] In his *Town of Concord* opinion, then-Chief Judge Breyer set out this justification:

> Insofar as it is more difficult for a firm to enter an industry at two levels than at one, the monopolist, by expanding its monopoly power, has made entry by new firms more difficult. And insofar as the

The Department of Justice relied on this very theory in the competitive impact statement it filed along with a consent decree that resolved its challenge to General Electric's licensing policies for medical imaging equipment. GE had imposed contractual restrictions on the ability of hospitals to service equipment of other hospitals. The Department argued that these restrictions illegally raised the barriers to entry in the market for medical imaging equipment, because if hospitals' service staffs learned to service outside equipment, new medical imaging equipment providers would need only to enter only the equipment market, relying on hospital service staffs to service their own equipment as well as that of other hospitals.[100] Thus, this case fits our framework with equipment playing the role of the "platform" and service the role of "applications."

A closely related possibility is that complements may ultimately make possible substitutes for the platform. In the Microsoft case, for example, Netscape's Web browser was a complementary application in the short run, but could have facilitated operating systems competition over the long term.[101] In exposing its own application programming interfaces, the browser represented an independently supplied "middleware" product that could ultimately "commoditize" the underlying operating system.[102] As the district court found (and the court of appeals affirmed), Microsoft

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monopolist previously set prices cautiously to avoid attracting a competitive challenge, the added security of a two-level monopoly could even lead that monopolist to raise its prices.

915 F.2d at 23-24; *see also* Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574, 591 n.15 (1986) ("[W]ithout barriers to entry it would presumably be impossible to maintain supracompetitive prices for an extended time."); POSNER, ANTITRUST LAW, supra note __, at 202 ("The possibility that tying might discourage entry into the monopolized market for the tying product cannot be excluded altogether."). For an argument along these lines, see Jay Pil Choi, *Preemptive R&D, Rent Dissipation, and the "Leverage Theory,"* 111 Q. J. OF ECON. 1153 (1996).

[100] *See* United States v. General Electric, Civil No. CV 96-121-M-CCL, Competitive Impact Statement (July 13, 1998) (available at http://www.usdoj.gov/atr/cases/f1800/1842.htm).

[101] Lessig has called this scenario a "partial substitute," see note __, infra, but this term does not emphasize the temporal nature of what is often called "middleware." *See* James B. Speta, *Tying, Essential Facilities, and Network Externalities: A Comment On Piraino*, 93 NW. U. L. REV. 1277, 1282 (1999) (pointing out that Microsoft's predatory actions vis-a-vis Netscape can be explained on the ground that Microsoft viewed the browser as a partial substitute for the operating system); Michael D. Whinston, *Exclusivity and Tying In* U.S. v. Microsoft: *What We Know, and Don't Know*, 15 J. ECON. PERSP. 63 (2001) (same).

[102] For a discussion of the threat posed by Netscape that develops this point with reference to Microsoft's own internal documents (as revealed by the trial), see Timothy F. Bresnahan, *Network Effects and Microsoft* 23-24 (2001) (http://www.stanford.edu/~tbres/Microsoft/Network_Theory_and_Microsoft.pdf); *see also* Timothy F. Bresnahan, *A Remedy That Falls Short of Restoring Competition*, ANTITRUST 67 (Fall 2001) ("[T]he

concluded that this was a serious threat to its core monopoly and undertook a campaign to exclude that technology from the market.[103]

Second, providers of complementary applications may be among the most likely entrants into a platform market. Carl Shapiro recently concluded that while "network monopolies can be very strong, they are most vulnerable to attack by firms in a strong position in a widely-used *complementary product*."[104] Complementors enjoy expertise in the relevant market and also have an economic interest in lowering the price of the underlying platform because lower platform prices will drive additional demand for their product. For the same reason, complementors need not fear a platform monopoly's price cuts or quality enhancements in response to entry in the same degree as a stand-alone company would.[105]

Complementors were recognized as effective potential entrants in the history of the FCC's financial interest and syndication ("finsyn") rules. In the broadcasting industry, these rules effectively barred major networks (then ABC, NBC, and CBS) from the programming market and major studios (then Fox, Warner Bros., and Paramount) from the network market.[106] In litigation, the FCC failed to offer a compelling explanation for them and they were invalidated as a result.[107] In the

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development of a spectacularly innovative complementary product . . . can lower entry barriers into the monopolized market and create an opening for substitutes to make inroads and competition to emerge.").

[103] United States v. Microsoft Corp., 87 F.Supp.2d 30, 38 (D.D.C 2000) ("In this case, Microsoft early on recognized middleware as the Trojan horse that, once having, in effect, infiltrated the applications barrier, could enable rival operating systems to enter the market for Intel-compatible PC operating systems unimpeded. Simply put, middleware threatened to demolish Microsoft's coveted monopoly power."), *aff'd,* 253 F.3d 34 (D.C. Cir. 2001); Timothy F. Bresnahan, *A Remedy That Falls Short of Restoring Competition*, ANTITRUST 67, 67-68 (Fall 2001) (describing Microsoft's campaign).

[104] *See* Declaration of Carl Shapiro, United States v. Microsoft Corp. 5-6 (April 28, 2000) (available at http://www.usdoj.gov/atr/cases/f4600/4642.pdf) (listing cases). To address Microsoft's anticompetitive tactics to defeat a complementary product that threatened its monopoly platform, Shapiro's testimony for the Justice Department recommended divesting Microsoft's applications products from its operating system in order to create additional competition in the operating systems market. *See id.*; *but see* Howard A. Shelanski & J. Gregory Sidak, *Antitrust Divestiture in Network Industries*, 68 U. CHI. L. REV. 1, 99 (2001) (criticizing proposal).

[105] *See* Joseph Farrell, *Prospects for Deregulation In Telecommunications,* 4 INDUSTRIAL AND CORPORATE CHANGE __, __ (1997)

[106] *See* Schurz Comm, Inc. v. FCC, 982 F.2d 1043, 1045-48 (7th Cir. 1992).

[107] Judge Posner summed up his evaluation of the FCC's justification for these rules: "Stripped of verbiage, the opinion, like a Persian cat with its fur shaved, is alarmingly pale and thin." *Id.* at 1050. Most commentators have concurred with Judge Posner's critical assessment of the rules. *See, e.g.,* Crandall, supra note __, at 178-79.

wake of their removal, the studios – who had been the complementary providers of programming -- quickly entered the platform market, creating three new networks. Likewise, the existing networks moved quickly into the creation of their own programming.[108] Similarly, in the telecommunications industry, the long distance providers – who rely on the local network -- are seen both by the Telecom Act and the FCC as likely entrants into the local telephone market.

(4) Bargaining Problems

When there is a gatekeeper in the form of a platform monopolist, the parties will sometimes fail to reach a mutually beneficial access arrangement. These "bargaining problems" often involve one of two situations. In the first situation, a complementor develops an innovative application, but "transaction costs" obstruct agreement with the platform gatekeeper and the innovation lies fallow.[109] In a fully modular structure without a gatekeeper, the innovation could quickly be introduced.[110] Thus, this problem has an immediate impact.[111]

In the second kind of bargaining problem, the platform provider threatens to withhold access to the platform unless the application inventor licenses its new application for one dollar. If the inventor reluctantly agrees, this may be an efficient solution after the fact, but the prospect of this outcome discourages efficient independent invention.[112] Naturally, the problem described in the previous paragraph similarly discourages independent invention (in addition to its immediate impact).

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[108] In so doing, the networks often eschewed outside programming, only much later realizing the benefits of contracting out. *See, e.g.,* Bill Carter, *Ailing ABC Turns To HBO In Search of TV Hits*, N.Y. TIMES D1 (August 5, 2002) (reporting that, after its initial hesitation, ABC decided not to rely largely on its internal production of programming, but to solicit programming from outside sources). This history underscores how the finsyn rules were important in protecting modularity and preventing vertical integration, whether or not it was desirable.

[109] *See* Michael L. Katz, *Intellectual Property Rights and Competition Policy: Four Principles For A Complex World*, 1 J. TELECOM. & HIGH TECH. L. __, __ (2002).

[110] This is the case in the Internet environment, for example, where the openness of the logical standard allows developers of applications like Napster to introduce them without first obtaining permission of the network owner. *See* supra notes __-__ and accompanying text.

[111] Economists would call this "short-run" both because it is immediate and because it is an inefficiency given the set of applications that have been developed, in contrast to the next problem sketched in the text.

[112] Invoking this theory, the FTC complained that Intel's demand of intellectual property licenses on favorable terms from its licensees (complementors) ran afoul of the antitrust laws. *See* note __, supra; Carl Shapiro, *The*

To the extent that the "transaction costs" and "holdout" problems discourage innovation that would otherwise be efficient and desirable, this might be called a longer-term problem inherent in closed architectures.[113] In a fully modular and open architecture environment, by contrast, a superior application can capture quasi-rents broadly commensurate with its incremental value.

In the still longer term, ICE might address these problems: if the platform sponsor thinks that more complementary innovation will be forthcoming as a result, it could set up a private commons or otherwise implement modularity. In exposing its APIs to independent developers, Microsoft has roughly done this. That is, for the most part (and "for the most part" is of course important), Microsoft cooperates, and indeed spends money and resources to cooperate, with complementary software (applications) providers.[114] Similarly, Intel carefully manages its complementors and, like Microsoft, its policies have attracted antitrust oversight.[115]

But these and similarly situated firms sometimes find it hard to make a credible commitment to such modularity. One way to make such a commitment credible may be for the platform monopolist to stay out of the complementary sector altogether. Just as in the AT&T case where the Justice Department was skeptical that equal access was possible without divestiture and quarantine,

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FTC's Challenge To Intel's Cross-Licensing Policies (June 2002), available at http://faculty.haas.berkeley.edu/shapiro/intel.pdf.

[113] To mitigate these potential barriers to innovation, intellectual property law has sought to develop certain open access doctrines. On whether copyright law should allow complementors to gain access to a platform standard through reverse engineering as a means of addressing transaction cost issues, see Lichtman, supra note __, at __-__ (discussing issue and arguing against such access). On whether patent law should give second-generation inventors legal protection to facilitate a fair arrangement with the original inventor and address the holdout problem, see Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. ECON. PERSP. 29 (1991) (discussing issue and arguing for such protection). Moreover, real property law also recognizes that "strategic behavior" can prevent a socially desirable arrangement and provides for flexibility in crafting appropriate relief so as to avoid this outcome. *See, e.g.*, Walgreen Co. v. Sara Creek Property Co., 966 F.2d 273, 276-79 (7th Cir. 1992) (Posner, J.).

[114] *See* MICHAEL A. CUSUMANO & RICHARD W. SELBY, MICROSOFT SECRETS: HOW THE WORLD'S MOST POWERFUL SOFTWARE COMPANY CREATES TECHNOLOGY, SHAPES MARKETS, AND MANAGES PEOPLE (1995). Under the proposed consent decree reached with the Justice Department, Microsoft would formalize – and be subject to judicial oversight related to – the disclosure of information related to its otherwise proprietary interfaces. *See* Joe Wilcox, Microsoft Tallies Anitrust Efforts, CNET News.com (August 5, 2002) (http://news.com.com/2100-1009-948440.html).

[115] For a discussion of Intel's strategy, see Gawer, supra note __. For Intel's antitrust issues, see Intel Corp., Analysis of Proposed Consent Order to Aid, Public Comment at 2 (Mar. 17, 1999), available at http:// www.ftc.gov/os/1999/9903/d09288intelanalysis.htm; *see also* Intergraph Corp. v. Intel Corp., 195 F.3d 1346 (Fed. Cir. 1999).

some platform gatekeepers think their complementors will find a voluntary quarantine the best guarantee of fair treatment. But for firms without government oversight of their policies, spinning off certain divisions – as AT&T did with Lucent to enable it to sell to its competitors – may be a promising strategy.

(5) Incompetent Incumbents

As a prediction of business strategies, ICE can and will fail if the platform monopolist fails to understand ICE itself. This phenomenon of "incumbents not getting ICE" could be a significant crack in ICE's logic as predictor of the platform monopolist's actual decisions. Some applications of ICE are surprising even for professional economists.[116] Moreover, even where top management appreciates ICE, other employees may be reluctant to let a rival take business away from a division of the firm. Thus, even if there is only one monopoly profit, some may think otherwise and inefficiently seek a second.[117] Or, for either rational or irrational (e.g., psychological) reasons, firms may resist helping rivals in the applications market, even if some of that success will also benefit the platform monopolist.[118]

In our experience, businesspersons often find it counterintuitive to help outside firms compete against internal supply in applications.[119] This may be particularly likely if the benefit of modularity comes in the form of "a hundred flowers" of diverse paths of innovation in the complement.[120] In

[116] For example, consider competition when a platform monopoly such as an ILEC (incumbent local exchange company) charges an "access charge" above marginal cost to its downstream (long-distance, for example) rivals. If demand is totally inelastic, ICE implies that no imputation rule is necessary to ensure that the ILEC should charge itself the same access charge as it charges rivals. In our experience, however, this "opportunity cost argument" is not obvious to policymakers, business people, or even distinguished economists.
[117] *See* Kaplow, supra note __, at 548-49 ("one might argue that even if a leveraging strategy is unprofitable or doomed to complete failure in the long run, many firms cling to a misguided belief that they can succeed").
[118] Some courts have acknowledged this possibility. *See, e.g.*, Time Warner Entertainment Co. v. Federal Communications Commission, 240 F.3d 1126, 1138 (D.C. Cir. 2001) (noting that a company may be "reluctant to ditch or curtail an inefficient in-house operation because of the impact on firm executives or other employees, or the resulting spotlight on management's earlier judgment").
[119] *See, e.g.*, Allen, *Vertical Integration and Market Foreclosure: The Case of Cement and Concrete*, 14 J. L. & ECON. 251, 270-72 (1971) (offering this explanation for vertical integration).
[120] This recalls Mao Tse-Tung's famous adage: "Let a hundred flowers bloom, a hundred schools of thought contend." For an exploration of the economics of innovation and diversity, see Joseph Farrell, Richard J.

particular, incumbents may lack the imagination to realize what they are failing to imagine, and thus fail to implement modularity even when it will spur greater innovation and thus increase their platform profits.

Appreciating ICE's insights for business strategy may be particularly difficult for industries emerging from a regulated environment of end-to-end service, which will often view voluntarily implemented modularity as a foreign concept or as an anathama.[121] ICE-aware business commentators have argued that the customer relationship business, the product innovation business, and the infrastructure business can be "unbundled" from one another to great efficiency benefits,[122] but that regulated incumbent firms often fail to recognize this opportunity.[123] Thus two commentators claim that the local telephone companies have "deliberately limited the growth and profitability of their infrastructure business to protect their customer relationship business."[124]

Such ICE-savvy commentators also often argue that Apple missed the boat in the early 1980s by not licensing its operating system so that others could build computer systems around it.[125] Apple had developed an operating system widely viewed as better than Microsoft's MS-DOS (which IBM and others licensed),[126] but it thought it could make more money if it bundled the operating system with its own computers. Thus, considered as an operating system platform provider, Apple bet on its own production and distribution channel rather than on a competitive hardware sector. Whether it

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Gilbert, and Michael L. Katz, "Market Structure, Organizational Structure, and R&D Diversity," unpublished manuscript (2002).

[121] *See* Rogerson, supra note __, at 89 (Under the influence of regulation, "managers and employees of regulated firms settle into patterns of inefficient production and missed opportunities for technological advance and entry into new markets"); *id.* at 98 (noting that it takes time for the management of formerly regulated monopolists to move to a more entrepreneurial culture).

[122] John Hagel III & Marc Singer, *Unbundling the Corporation*, 3 MCKINSEY Q. (2000) (available at http://www/optimizemagazine.com/mckinsey/2002/0408.htm).

[123] *Id.* This concern underlies the much-discussed proposal of imposing a wholesale-retail separation of the incumbent local telephone providers' operations. For a sense of the debate on this point, compare T.Randolph Beard et al., *Why Adco? Why Now? An Economic Exploration Into The Future Structure For The "Last Mile" In Local Telecommunications Markets*, 54 FED. COMM. L.J. 421 (2002) *with* Robert W. Crandall & J. Gregory Sidak, *Is Structural Separation of Incumbent Local Exchange Carriers Necessary For Competition?,* 19 YALE J. REG. 335 (2002).

[124] Hagel & Singer, supra note __.

[125] Charles R. Morris & Charles H. Ferguson, *How Architecture Wins Technology Wars*, HARV. BUS. REV., March-April 1993, at 90 (noting how Macintosh's refusal to open its platform hurt it in the marketplace).

failed to "get it" (i.e., did not see that it was making this bet), or was simply wrong about its hardware and distribution prowess, Apple thus lost the chance to be the leading producer of operating systems, realizing too late that it would have done better to promote an open network.[127]

If, as we suggest, incumbents do not always fully understand ICE, what policy implications might follow? Sensibly, public policy does not normally let regulators tell a business how to maximize its profits.[128] Rather, the antitrust laws and regulatory policy generally take the position that they do not serve to correct business strategy failures.

Although we agree with this reluctance to second-guess individual platform providers' calculations of their best interests, one lesson does follow. The less we can count on monopoly to be efficient even on its own terms, the more we should value platform-level (intermodal) competition, perhaps especially diverse competition.[129] In the case of Apple, for example, the presence of a rival platform ensured that customers were protected by the availability of an alternative platform, while Apple was more strikingly and visibly punished for its error. Even monopolists who disregard ICE are punished in the form of lower profit margins, the punishment is sharper or at least more visible when there is competition among platforms.[130] Thus, the arcane complexities of ICE and its implications boost the (already strong) case for platform-level competition.[131]

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[126] *See* Stanley M. Besen & Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, 8 J. ECON. PERS. 117, 118 (1994).

[127] For an explanation of the inferiority of Apple's strategy, see Langlois & Robertson, supra note __, at 308-12.

[128] For example, the "business judgment rule" used in corporate law instructs courts not to substitute their judgment for business decisions in assessing liability, provided that the decision at issue can be "attributed to any rational business purpose." Sinclair Oil Corp. v. Levien, 280 A.2d 717, 720 (Del. 1971); s*ee also* William Baxter, *Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis*, 76 YALE L.J. 267, 318 (1966) (rejecting use of "antitrust laws to assure that private economic interests are perceived correctly"); Kaplow, supra note __, at 549 ("purpose of antitrust laws is not to improve the effectiveness of management").

[129] The importance of such competition is elaborated in Weiser, Intellectual Property Policy, supra note __.

[130] Joseph Farrell, *Standardization and Intellectual Property*, 30 JURIMETRICS J. 35, 42 (1989) ("As the IBM PC experience reminds us, moreover, a technology may be much more likely to set a standard if its owner chooses to renounce at least part of the prospective proprietary gains, by making the system `open' or by widespread licensing."); *see also* Joseph Farrell & Nancy Gallini, *Second Sourcing As A Commitment: Monopoly Incentives To Attract Competition,* 108 Q. J. ECON. 673 (1988).

[131] In evaluating, for example, mergers between alternate platform providers, antitrust enforcers should be mindful of the competitive impact related to the loss of rival platforms and the associated experimentation that arises from such platform diversity.

If, as Judge Posner claims, the economics-based Chicago approach has won in antitrust,[132] we urge that this salutary triumph be leavened by recognizing that competition protects not only against powerful firms with bad incentives (on which economics-based antitrust mainly focuses), but also against powerful firms with incompetent or dishonest management. When a firm fails to optimize modularity in a competitive industry, its shareholders suffer, but customers broadly do not. When a monopoly fails to do, however, customers suffer. Antitrust and regulation should thus aim to protect against incompetent monopolies as well as against rapacious ones.

(6) Option Value

Paradoxically (even perversely), fear of access regulation may itself discourage a firm from opening its platform. After a monopolist allows open access to its platform, it may not later be allowed to pursue a closed or fully integrated strategy. Under current antitrust practice, for example, a firm is far more likely to get into trouble for closing a previously open platform than for never opening it in the first place.[133] Some commentators and judges have noted the adverse ex ante effect of imposing liability for changing a cooperative practice and have cautioned courts against imposing such liability,[134] but the fear of such liability will not dissipate any time soon. Consequently, a firm may keep its platform closed even if it would more profitably be open, if the "option value" of later being able to close it is important.

Thus suppose that the platform provider can extract $10 per customer of profits in applications by monopolizing that market, and knows the demand for its platform that will result, but is uncertain about how much more valuable the platform would be to its customers if applications

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[132] *See* POSNER, ANTITRUST LAW, supra note __, at ix.

[133] For two cases that reflect this point, see Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585 (1985); Eastman Kodak Co. v. Image Technical Servs., Inc., 504 U.S. 451 (1992). For a sense of the debate over these cases, compare Dennis Carlton, *A General Analysis of Exclusionary Conduct and Refusal to Deal--Why* Aspen *and* Kodak *Are Misguided*, 68 ANTITRUST L.J. 659, 668-71 (2001) (criticizing cases) with Jonathan B. Baker, *Promoting Innovation Competition Through the Aspen/Kodak Rule*, 7 GEO. MASON L. REV. 495 (1999) (endorsing cases).
See also speech by Jonathan Baker, then Director of the FTC's Bureau of Economics.

[134] For a discussion of this point, see *Olympia*, 797 F.2d at 376.

were competitively supplied. Suppose in particular that the firm thinks it equally likely that customers will value the platform at only $5 more (the advantages of applications competition are small) or that customers will value the platform at $12 more (competitively supplied applications are very valuable). Then the efficient path, which also (as in ICE) maximizes the firm's overall profits, is to open the platform initially, learn how much customer value that openness, and to leave it open if customers turn out to value competition in applications at $12, but to close it and to take over the applications market if they turn out to value competition in applications at only $5.

But if that path will be prohibited (or will expose the firm to antitrust liability), the firm must choose between opening the market forever and closing it. Because an equal chance of a $5 or $12 boost to platform demand (from applications competition) is worth less than the $10 applications profits, a firm faced with that constrained choice will prefer to close the platform. Removal of the option to close the platform (if customer value from openness is disappointing) tips the balance in this example and causes the firm to close the platform *ab initio*.

(7) Regulatory Strategy Considerations

A second "iatrogenic"[135] exception to ICE arises if a firm thinks allowing open access in one context will increase its regulatory duties elsewhere. On this logic, a broadband transport provider might refuse to open its platform on the theory that even if a certain form of open access increases its profits, it does not want to risk being required to provide other access or allow a precedent that it cede any control of its network. To refer to the example given above with regard to option value, we might imagine that in one context – say, open access to broadband transport – competitive providers of broadband Internet service might actually add value to the firm's broadband transport product, but in another, related market – say, in the supply of video content – competitive providers will actually detract value from the cable company's core product offering. If the cable firm believed that an

[135] This term literally means "[I]nduced in a patient by a physician's activity, manner, or therapy." AMERICAN HERITAGE DICTIONARY (2000) (available online at www.dictionary.com).

endorsement of a regulatory duty – or even a voluntary action – in the first context would make it substantially more likely that it would face a regulatory duty in the second context, it might rationally resist open access in that first context even though it would be profitable there. Similarly, AT&T may have believed that the complementary product at issue in the Hush-A-Phone case was benign, but resisted allowing its use for fear that the precedent would apply to other markets that would impact its profits. In this way, the likely response of law and regulation can affect a firm's stance toward modularity.

The weight placed on such regulatory strategy considerations may well differ from firm to firm, as some firms may be more inclined than others to believe that regulators will make broad generalizations across markets. Certainly, regulators do sometimes make such generalizations across firms, as they use benchmarking between different regional monopolists in devising public policy.[136] Thus, in the cable market, they may well seek to preserve – or at least bemoan the loss of – those cable firms with a different set of assets or business strategy – say, AOL/Time Warner – on the view that some cable firms will be more willing than others to experiment with open access arrangements.

(8) Incomplete Complementarity

In some markets, where applications can be valuable without the platform, there is an opportunity for platform providers to profit by monopolizing the applications market. As Michael Whinston has explained, this exception arises where (1) the monopolized product is not essential for all uses of the complementary good; and (2) there are economies of scale or network effects in the

[136] In its approval of the SBC/Ameritech merger, the FCC focused on this point. *See* Applications of Ameritech Corp., Transferor, and SBC Communications, Inc., Transferee, For Consent to Transfer Control of Corporations Holding Commission Licenses and Lines Pursuant to Sections 214 and 310(d) of the Communications Act and Parts 5, 22, 24, 25, 63, 90, 95, and 101 of the Commission's Rules, CC Docket 98-141, Memorandum Opinion and Order, 14 FCC Rcd 14712, 14713 (1999) ("The merger will substantially reduce the Commission's ability to implement the market-opening requirements of the 1996 Act by comparative practice oversight methods."). In that proceeding, one of us (Farrell) made this very argument on behalf of Sprint Corporation. In this regard, it is important to note that differences among regional monopolies may be sufficient to make them choose different strategies, so it is arguable whether regulators should be willing, a priori, to impose on one monopoly what another seemingly similarly situated one finds acceptable.

complementary market.[137] In such cases, say, a restaurant on a beach resort that some travelers attend for day trips, but others stay for longer periods, the monopolist – in this case, the resort – might be able to reap greater profits by bundling its complementary product (meals) with its core offering (resort stay) in order to foreclose the complementary market to rivals. Because the information industries tend to enjoy fairly strong complementarities between platform markets and applications, we have assumed that applications are provided strictly along with the platform. In certain cases, however, an application for one platform – say, broadband transport – may also be useful for another one – say, narrowband transport – possibly leading the broadband transport provider to attempt to control the applications market.

IV. Lessons From ICE, Its Exceptions, and The Computer Inquiries

As discussed in Part II, modern antitrust generally supposes that ICE is broadly right with limited and fairly easily diagnosed exceptions. Consequently, antitrust law usually permits even a dominant firm to make its own vertical choices. In contrast, as telecommunications policy moved away from its disposition toward regulated integration, it turned sharply toward mandating modularity or "openness" with the Hush-a-Phone and Carterfone decisions, followed by the breakup of the Bell System and the Telecommunications Act's unbundling provisions.

For a true convergence of antitrust and regulatory policy, policymakers and commentators will need to develop a common perspective on how to use ICE. In an era where the monopoly platform was generally price-regulated, the telecom presumption to mandate modularity might be justified by this fact alone: "Baxter's law" notes that ICE does not apply to regulated monopolies.[138] And while the Telecom Act's unbundling obligations aim to play several roles, they can in part be understood in this light, as shifting the focus from regulating a monopoly at the retail level to

[137] *See* Michael Whinston, *Tying, Foreclosure, and Exclusion*, 80 AMER. ECON. REV. 837 (1990).
[138] *See* Joskow & Noll, supra note __, at 1249-50.

regulating "bottleneck" wholesale inputs – say, the local lines to residential telephone subscribers.[139] But increasingly, as in the provision of broadband transport via cable modems, telecommunications regulators will contemplate access regulation where the platform is not generally price-regulated. To make such judgments in a fashion that is consistent with antitrust policy, policymakers must appreciate both the different regulatory tools for facilitating modularity and the possible regulatory philosophies for addressing the issue. This Part addresses each issue in turn.

A. Regulatory Strategies To Facilitate Modularity

Regulatory models to preserve the benefits of modularity fall into two categories: "structural measures" and "conduct remedies."[140] After briefly describing each category, this Section concludes by describing how the FCC, in its Computer Inquiries, vacillated among different approaches.

The classic and pure form of structural regulation is a "quarantine" that forbids the platform monopolist from participating in the applications sector. A quarantine is more drastic than even an antitrust divestiture used to remedy an unlawful merger because the regulator must continue to enforce line-of-business restrictions. In principle, this form of regulation strives for clarity in its definition and administerability, but, as demonstrated by the AT&T consent decree requirement that the Bell Companies be quarantined in the local telephone market,[141] it can be difficult to police such restrictions in practice. Finally, this form of regulation precludes (by definition) potential integrative efficiencies.[142]

Recognizing these problems, regulators will often seek to enable at least some integrative efficiencies while still largely preventing anticompetitive behavior. If, for example, a less stringent

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[139] For a description of the Telecom Act's market opening strategy, see Philip J. Weiser, *Federal Common Law, Cooperative Federalism, and the Enforcement of the Telecom Act*, 76 N.Y.U. L. REV. 1692, 1733-67 (2001). The regulatory reforms in electricity, which aim to facilitate competition in the generation market and more effective regulation of the natural monopoly transmission and distribution elements, embody a similar ambition. *See* Joskow, supra note __, at 125.

[140] For a discussion of this point, see Howard A. Shelanski & J. Gregory Sidak, *Antitrust Divestiture in Network Industries*, 68 U. CHI. L. REV. 1, 15-16 (2001).

[141] *See* AT&T, 552 F.Supp. at 227 (reprinting MFJ Sec. II (D)(1)).

solution than the quarantine could limit to x the amount of anticompetitive harms while facilitating x + 10 integrative efficiencies, regulators would be wise to adopt that strategy.

In an attempt to strike an optimal balance of costs and benefits from regulation, regulators sometimes replace a quarantine with a structural separation requirement that allows the platform provider to integrate but tries to ensure that it not abuse its position. Under the Telecom Act, for example, the Bell Companies may enter the long-distance market once certain conditions are met, but must do so through a structurally separate entity.[143] This form of regulation aims to modulate incentives and set up a monitoring regime so as to make the platform monopolist behave in some ways (the worrying ways) as if it were not integrated into the applications market, even while behaving in other ways (the integrative efficiencies) as if it is.

Implementing a structural separation solution is inherently challenging and is apt to require a good deal of regulatory effort to ensure that the regulated firm in fact provides equal access to its platform. This effort may well include policing the equal access arrangements and overseeing the management of the separate subsidiary (including the imputation of any access charges); and, in many cases, the stricter the rules to achieve this, the greater the collateral damage to integrative efficiencies that presumably motivated the rejection of a quarantine approach. It is very difficult to know in advance – let alone measure – whether a particular regulatory reform will allow more by way of efficiencies or of anticompetitive effect. Nonetheless, regulators often seek to develop less restrictive strategies than quarantine without moving all the way to vertical laissez-faire.

Another alternative is a pure "conduct remedy" that directs the platform provider not to discriminate. This requires the regulator (or court) to supervise the firm's actions on an ongoing

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[142] It is likely that the restrictions on entry will limit competition in the applications market, but because of the possible countervailing effect, this is not a certainty.

[143] *See* 47 U.S.C. Sec. 272. This form of regulation does not necessarily change a firm's ability to discriminate against rivals, but it, in theory, should make such discrimination easier to detect and prevent by requiring the firm to deal with its own affiliate at arms' length.

basis,[144] but does not restrict its entry into applications markets. Conduct remedies can include various forms of facilitating "open access," including (1) interconnection; and (2) unbundling.[145]

Interconnection mandates require a platform provider to allow other platform providers to make their products compatible. (A precondition of such a mandate is, of course, that there is some platform-level competition.) Specifically, regulators can either require compatibility or establish a right for a firm (presumably a non-dominant one) to request it. Two different kinds of compatibility requirements might apply in different situations: requirements that govern *access to applications* on rival platforms, and requirements that govern *access to customers* who use rival platforms. For an example of the latter, consider the FCC's mandate (as part of a merger approval) that AOL develop an interoperable system with at least two other instant messaging providers.[146] For such situations, interconnection requirements ensure that platform rivals share the benefits of a larger network, even if one firm contributes the majority of customers on that network.[147]

In telecommunications, where competitors must often cooperate to deliver a compatible (or indeed any) product, regulators often must evaluate requests for and supervise the terms of interconnection.[148] In most cases, interconnection arrangements will impose costs – e.g., for

[144] *See, e.g.*, Roland Machinery Co. v. Dresser Industries, Inc., 749 F.2d 380, 391-92 (7th Cir. 1984) (Posner, J.); *cf* Ken Auletta, *Final Offer*, THE NEW YORKER, 43 (Jan. 15, 2001) (quoting Chief Judge Posner, mediator in the Microsoft case, as stating that a conduct remedy-based consent decree must be "sufficiently clear to be judicially administerable and that (even if clear) they would not impose an undue administrative burden on the district court, which would have to administer the decree.").

[145] For ease of exposition, we will use the general term "open access" to describe all measures that require the platform provider to deal with other firms with whom it might otherwise choose not to deal. To be sure, there are variants of these two basic tools as well as other steps that regulators can employ, such as mandating disclosure of existing access arrangements or empowering industry standard setting bodies to develop approaches for access. This Article, however, will concentrate on unbundling and interconnection requirements.

[146] *See* In the Matter of America Online, Inc. and Time Warner, Inc., Decision and Order (December 14, 2000) (available at http://www.ftc.gov/os/2000/12/aoldando.pdf).

[147] Economists have termed the value of a larger network as a "network effect." For an overview of this phenomenon, see Joseph Farrell & Paul Klemperer, *Competition with Switching Costs and Network Effects*, 3 HANDBOOK OF INDUSTRIAL ORGANIZATION (Mark Armstrong and Robert Porter, eds.) (forthcoming 2003) (on file with authors); Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479 (1998).

[148] Unless a firm owns an entire telecommunications path from its customer to the party with whom its customer wants to communicate, it must rely on others—who often are competitors elsewhere—in order to offer any telecommunications product.

terminating a call arising from a competitors' network.[149] Sound regulatory policy would mandate interconnection – and wade into the supervision of interconnection terms and conditions – in cases where so doing will facilitate efficient competition. In particular, appropriate interconnection policies and the continued presence of alternative networks can create opportunities for experimentation between alternative business strategies, including the stance towards vertical relations.

By contrast to an interconnection requirement, an *unbundling mandate* requires a firm to allow others to *complement* one of its products; this often calls for detailed supervision and requires the firm to reduce the scope of its product or service to something smaller than it would otherwise choose to supply.[150] For example, as a condition of their merger, the FTC mandated that AOL/Time Warner offer transport separately and not only together with Internet access.[151] Similarly, in the Carterfone decision, the FCC required AT&T to unbundle equipment from telephone service, triggering a set of proceedings to define the interface between the local telephone network and customer premises equipment. Thus, unbundling regulation governs situations when an applications developer – a complementor to the platform provider -- seeks "vertical compatibility" or access to a platform in order to deploy a complement (e.g. an applications program) that works with the system.

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[149] At present, different segments of the telecommunications industry rely on different regimes for compensating such cooperation, with some using "bill and keep" arrangements and others using "reciprocal compensation." For a discussion of such issues, see Jay Atkinson & Christopher C. Barnekov, A Competitively Neutral Approach to Network Interconnection, Federal Communications Commission Office of Plans and Policy Working Paper # 34 36-39 (December 2000) (available at http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp34.pdf). One of us (Farrell) submitted comments on this paper on behalf of Time Warner Telecom.

[150] With regard to the definition of "unbundling," the Supreme Court noted the following: "The dictionary definition of `unbundle[d]' matches the [Federal Communication Commission's] interpretation of the word: `to give separate prices for equipment and supporting services.'" AT&T v. Iowa Utilities Board, 525 U.S. 366, 394 (1999) (quoting WEBSTER'S NINTH COLLEGIATE DICTIONARY 1283 (1988)).

[151] Unfortunately, the general term "open access" masks the distinctions between the two approaches. *See* Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in A Broadband Era,* 48 UCLA L. REV. 925, 929 n.10 (2001) ("`open access' has become a contentious and ill-defined term"); *id.* at 969 n.139 (quarreling with suggestion that interconnection regulation and unbundling regulation are distinct approaches). Because these two tools reflect distinct approaches, they should be referred to differently and analyzed separately, see Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1350-57 (1998) (distinguishing between interconnection and unbundling); Weiser, *Paradigm Changes*, supra note _, at 826 (same); Speta, *Internet Interconnection*, supra note __, at 252 (same).

In so doing, unbundling regulation must decide on the scope of modularity to be imposed by regulation.

B. The Computer Inquiries

The history of the FCC's *Computer Inquiries* illustrates the challenges of access regulation that governed the relationship between a platform and its application market. In the 1960s, when data processing services (applications) began to be offered over the network (platform) of a monopoly telephone company, the FCC found itself presented with just the problems on which this Article focuses: local telephone companies, each the sole supplier in its region of the basic platform for such services, wished to integrate and to provide such services in competition with others.

In its *Computer I* decision, the Commission found that computer data services enjoyed "open competition and relatively free entry," and concluded that it should not "at this point, assert regulatory authority over data processing as such."[152] As a result of an earlier antitrust consent decree that limited AT&T to providing regulated common carrier services,[153] this decision not to regulate data processing amounted to a quarantine, excluding the platform monopolist AT&T from the "application" sector (data processing).[154] The FCC recognized that AT&T and other local telephone companies would be obvious entrants into this market, but emphasized its concern that they would "favor their own data processing activities by discriminatory services, cross-subsidization, improper pricing of common carrier services, and related anticompetitive practices and activities."[155] Its initial response was thus to impose a quarantine on AT&T while allowing non-Bell telephone companies to integrate into data processing through a structurally separated subsidiary.

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[152] In the Matter of Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities, Final Decision and Order, 28 F.C.C.2d 267, 270 (1971) ("Computer I"). By contrast, the Commission had previously used its ancillary regulatory jurisdiction to regulate providers outside the scope of its explicit regulatory mandate. *See* United States v. Southwestern Cable Co., 392 U.S. 157, 167-68 (1968) (regulations of cable television permissible on the ground that such regulations were ancillary to Commission's charge to regulate broadcasting).
[153] *Id.* at 298.
[154] *Id.* at 302.
[155] Computer I, 28 FCC at 270-71.

But the *Computer I* regime's quarantine turned out to be hard to implement, because it required the FCC to classify all services. Because it could not anticipate how to divide all services into "telecommunications" and "data processing," the FCC decided to classify "hybrid services" on a case-by-case basis.[156] In so doing, however, the FCC created a large amount of work for itself in the form of a continuous stream of cases that ultimately led it to reconsider altogether the basic premises of the *Computer I* regime. [157]

In its *Computer II* decision, the Commission followed the same basic philosophy as in *Computer I*, but developed a new dividing line between "basic" telecommunications services and "enhanced" services. In so doing, it concluded that would not regulate the latter even if they relied on and contained basic telecommunications services.[158] Moreover, the Computer II rules tinkered with its philosophy by lifting the separate subsidiary requirement for non-Bell ("independent") local telephone (monopoly) companies, and concluding that the Bell Companies, if allowed to provide such services, could do so under a separate subsidiary.[159] In the place of structural regulation for the independent telephone companies, the Commission imposed a set of open access requirements on the telephone companies to ensure the unimpeded growth of enhanced services.[160]

In a subsequent re-evaluation, the FCC's *Computer III* decision ended the requirement that the Bell Companies establish a separate subsidiary to provide enhanced services (although the Bell

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[156] *Id.* at 276-79.

[157] Communications Industry Assoc. v. FCC, 693 F.2d 198, 204 (D.C. Cir. 1982) ("As computer and communications technology continued to merge, the line between regulated and unregulated activities became increasingly blurred, and the *Computer I* definitions became unworkable.").

[158] *See* Final Decision, *Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry*), 77 F.C.C.2d 384, 431-35, 450-52 (1980) ("*Computer II*"), *aff'd sub. nom.* Communications Industry Assoc. v. FCC, 693 F.2d 198 (D.C. Cir. 1982).

[159] *See* 77 F.C.C.2d at 474. Even after the antitrust litigation against AT&T culminated in a divestiture of the local Bell Companies, the new consent decree continued to bar the Bell Companies from providing "information services" (a closely related concept to "enhanced services") until the D.C. Circuit ultimately lifted that bar. *See* United States v. W. Elec. Co., 900 F.2d 283 (D.C. Cir.), *cert. denied*, 510 U.S. 984 (1990).

[160] *See id.* at 474-75 (1980); *see also* Report and Order, *1998 Biennal Review - Review of Customer Premises Equipment and Enhanced Services Unbundling Rules in the Interexchange, Exchange Access and Local Exchange Markets*, 16 FCC Rcd 7418, 7442 ¶ 40 (2001) ("*CPE Unbundling Order*") (noting *Computer II* requirement that all carriers not subject to the separate subsidiary requirement must "acquire transmission capacity pursuant to the same prices, terms, and conditions reflected in their tariffs when their own facilities are used").

Companies were still restricted under the MFJ), concluding that this form of regulation ultimately imposed more costs than it yielded consumer benefits, particularly when replaced with a set of non-structural safeguards.[161] With respect to such safeguards, the decision called for "comparably efficient interconnection" and "open network architecture" requirements to ensure enhanced service providers non-discriminatory access to the telephone network.[162] In the wake of a remand from the Ninth Circuit regarding these requirements, the Commission has yet to close the book on the *Computer III* rules.[163]

In short, the FCC's actions in the Computer Inquiries reflect a series of different approaches to regulating the relationship between the data processing and telecommunications market, beginning with a quarantine-like model in *Computer I*, moving to structural separation in *Computer II*, and then to a conduct remedy without structural separation in *Computer III*. Similarly, while the MFJ quarantined the Bell Companies from certain adjacent markets, first the MFJ court and then the Telecom Act loosened the restrictions, allowing for more vertical integration.[164] Likewise, in the private sphere, firms often voluntarily change their approaches to vertical scope, as AT&T did with its divestiture of its equipment-manufacturing arm Lucent, and with its wireless and cable operations.

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[161] Final Decision, Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry), 104 F.C.C.2d 958, 964-965 (1986).

[162] For the comparably efficient interconnection requirements, see Report and Order, *Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services*, *1998 Biennial Regulatory Review - Review of Computer III and ONA Safeguards*, 14 FCC Rcd 4289, 4297–99 ¶ 13 (1999) ("*Computer III March 1999 Order*"). For the open architecture requirements, see Further Notice of Proposed Rulemaking, *Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services*, 13 FCC Rcd 6040, 6085-6089 ¶¶ 78-91 (1998) ("*Computer III Further Notice*"); *see also* Robert Cannon, *Where Internet Service Providers and Telephone Companies Compete: A Guide To The Computer Inquiries, Enhanced Service Providers, and Information Service Providers*, 9 COMMLAW CONSPECTUS 49, 56-65 (2001).

[163] *See* People of State of Cal. v. F.C.C., 905 F.2d 1217, 113 P.U.R.4th 92 (9th Cir. 1990) (vacating and remanding initial order); California v. FCC, 39 F.3d 919 (9th Cir. 1994) (vacating in part), *cert. denied*, 514 U.S. 1050 (1995); In re Computer III Further Remand Proceedings: Bell Operating Company Provision Of Enhanced Services, 1998 Biennial Regulatory Review--Review of Computer III and ONA Safeguards and Requirements, Further Notice of Proposed Rulemaking, 13 FCC Rcd. 6040, 6051, para. 15 (1998); *see also* Robert Cannon, *Where Internet Service Providers and Telephone Companies Compete: A Guide To the Computer Inquiries, Enhanced Service Providers and Information Service Providers*, 9 COMMLAW CONSPECTUS 49 (2001).

[164] With respect to changes in the MFJ, see United States v. Western Elec. Co., 767 F.Supp. 308 (D.D.C. 1991), *aff'd*, 993 F.2d 1572 (D.C. Cir. 1993) (lifting information services restriction). With respect to the Telecom Act's policies, see 47 U.S.C. Sec. 271 (governing entry into in-region long distance).

An optimistic interpretation of such instability would be that, unsurprisingly in view of the competing merits, the right policy can shift quickly, and that policymakers and executives ably track these shifts. For instance, relevant magnitudes may simply vary over time. Or perhaps a spell of quarantine will establish reliable access arrangements, creating a benchmark that makes later discrimination harder and thus making it possible to capture benefits of vertical integration without excessive discrimination or the need for heavy-handed conduct regulation.[165] Alternatively, a cynical interpretation would be that the FCC rightly adopted a quarantine in *Computer I* and that later relaxations reflect the political power of the local telephone companies. Finally, a pessimistic but less cynical interpretation would be that the FCC was repeatedly stabbing in the dark, unable to form a stable view of the relative merits of different policies.

We see little evidence of subtle balancing to suggest that changes in the relevant circumstances explain the changes in policy, so it is tempting instead to describe the variation as "vacillating" in an inadequate analytical framework.[166] Thus, having first adopted one imperfect policy, regulators may become painfully aware of its deficiencies and of the advantages of an alternative approach. This greener-grass syndrome could arise with any tradeoff, but it seems particularly likely with a tradeoff only poorly understood and not guided by clearly developed analytical principles. Indeed, in recent years, the FCC's inability to articulate its outlook on vertical relations clearly and convincingly – in the finsyn case and the *Computer III* rules, for example – has begun to plague it in court, where it must offer a cogent explanation for policy swings. In light of the judicial oversight of its decisions and the industry's call for regulatory clarity, there is considerable pressure on the FCC to develop a clear position. As discussed at the outset of the Article, the FCC's recently commenced proceedings on broadband may offer it such an opportunity.

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[165] For a development of this point, see Marius Schwartz, *The Economic Logic for Conditioning Bell Entry into Long Distance on the Prior Opening of Local Markets*, 18 J. REG. ECON. 247 (2000).

[166] Lavey, supra note __, at 85-86 (arguing that Computer I's separate subsidiary requirement did not rest on any demonstrated monopoly abuses or cost-benefit analysis).

In its recently commenced broadband proceedings, the FCC announced that it intends to re-examine its *Computer III* rules. In the old environment, regulated monopoly telephone companies held the keys to the development of new, "information services" like "dial-a-joke" and dial-up Internet access.[167] Without the cooperation of the local monopoly telephone provider, these services might not have been developed or deployed in an effective manner. During the 1970s, the FCC's Carterfone decision's requirement of "network neutrality" (i.e., that any compliant equipment be allowed to use the telephone network) and the open access rules developed in *Computer II* (and later *Computer III*) converged to facilitate competition in – and ultimately justify the deregulation of -- equipment manufacturing.[168] As Baxter's Law indicates, local monopoly providers often have an incentive to evade regulation by reaping profits in unregulated (or less tightly regulated) markets. The FCC responded successfully in this case by facilitating competition in and ultimately deregulating the equipment manufacturing market. Indeed, the FCC recently even lifted the requirement that local telephone service be unbundled from equipment sales, only leaving in place its requirements related to network neutrality.[169]

In its broadband proceedings, the FCC has an opportunity to re-think the traditional differences between the roles of antitrust and of regulation. In updating its *Computer Inquiry* rules for the broadband context, where price regulation is not an issue, the FCC will need to explain to what extent the *Computer Inquiry* rules reflected Baxter's law, a regulatory commitment to protecting modularity based on another exception (or exceptions) to ICE, or some other reason. In re-thinking the basis for these rules, the FCC will be able to decide whether to adopt a more "antitrust-like"

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[167] *See* Wireline Broadband NPRM, supra note __, ¶ 36 ("[T]he core assumption underlying the *Computer Inquiries* was that the telephone network is the primary, if not exclusive, means through which information service providers can gain access to their customers").

[168] *See* North Carolina Utilities Comm'n v. FCC, 552 F.2d 1036 (4th Cir.), *cert. denied*, 434 U.S. 874 (1977) (upholding certification process requirements); 47 C.F.R. Sec 64.702(e) (requiring unbundling of CPE and telephone service); *Communications Industry Assoc*., 693 F.2d at 205-06 (requiring, among other things, incumbent telephone companies to market CPE only through a separate subsidiary and preempting inconsistent state regulation).

[169] *See* In re Review of Customer Premises Equipment and Enhanced Services Unbundling Rules In the Interexchange, Exchange Access, and Local Exchange Markets, Report and Order, 16 FCC Rcd 7418 (2001) (removing unbundling restrictions in light of market conditions).

approach to regulation. In particular, antitrust law aspires to aid the workings of the market by ruling on the legality of certain potentially anticompetitive practices, whereas regulation substitutes for the market itself. In the traditional public utility regulation environment, regulators oversaw price-setting as well as entry and exit decisions in order to limit the monopolists' ability to extract rents from consumers while ensuring that the regulated utility earned a sufficient return on its investment.[170] As alternative providers entered formerly monopolized industries, antitrust enforcers sought to facilitate competition, whereas regulators reacted hesitantly.[171] Ultimately, in the Telecom Act, regulatory policy endorsed entry and aimed to facilitate competition in an emergingly competitive market,[172] but the Act still left the FCC with broad regulatory powers and discretion in picking regulatory strategies.

In developing its regulatory strategy for new environments such as broadband where price regulation is not generally an issue, the FCC can begin to define more clearly when to impose restrictions on a firm's conduct – for instance, only after exclusionary conduct is demonstrated, where it seems probable, or where it would do the most harm. In the antitrust context, enforcers only address exclusionary conduct by a monopoly once demonstrated to a court, but are authorized to act in advance of such conduct where it is a probable result of a merger. In the regulatory context, regulators often adopt proactive regulations to avoid vertical competitive harms before they occur, but they have rarely explained how their actions fit with the ICE logic or antitrust policy more generally.[173]

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[170] For a discussion of this role, see Kearney & Merrill, supra note __, at 1359-1361.

[171] *Compare, e.g.*, Otter Tail Power Co. v. United States, 410 U.S. 366 (1973) *with* Hush-a- Phone Corp., 20 F.C.C. 391, 420 (1955), *rev'd*, 238 F.2d 266 (D.C. Cir. 1956). In the case of *Otter Tail*, antitrust's market-opening measures came twenty years in advance of regulatory reforms. *See* Pub. L. No. 102-486, 106 Stat. 2776, 2915-16 (1992) (codified at 16 U.S.C. Sec. 824(j)-(k)) (authorizing FERC to mandate wholesale "wheeling" of power to facilitate competition).

[172] For discussions of the evolution of how antitrust and telecommunications regulation relate to one another, see Philip J. Weiser, *Information Platforms*, supra note __, at __; Philip J. Weiser, Goldwasser, The Telecom Act, and Reflections on Antitrust Remedies (forthcoming 2003). For a discussion of regulation's evolution from its old regime to a new paradigm, see Joseph D. Kearney & Thomas W. Merrill, *The Great Transformation of Regulated Industries Law*, 98 COLUM. L. REV. 1323, 1329 (1998).

[173] Some commentators suggest that telecommunications regulation parts company with the basic anitrust maxim that sound competition policy aims to protect "*competition*, not *competitors*." Brown Shoe Co. v. United States, 370 U.S. 294, 320 (1962) (emphasis in original). In particular, regulation sometimes adopts measures rationalized as infant industry protection that seeks to produce certain innovative benefits – at the risk

CONCLUSION

The future course of regulation on vertical relations can take one of three basic coherent paths. Each of these models for regulation ultimately converges with antitrust policy by taking account of integrative efficiencies, appreciating the logic of ICE, and acknowledging its exceptions, but each proceeds from different basic premises. In particular, they differ in their presumptions about the reliability of assessing claimed exceptions to ICE, in their presumptions about vertical efficiencies, and in the ability of the FCC to administer different regulatory regimes.

In the model closest to antitrust practice, the FCC could refrain from aggressive regulatory policies unless a careful investigation compellingly shows that ICE fails and that the likely benefits of regulation outweigh its costs.[174] This model thus expects that exceptions to ICE can be reliably diagnosed or predicted (and efficiently corrected by regulation). In the first instance, this model would most likely not authorize more ambitious regulatory policies. But over time, this model would evaluate (on a case-by-case basis) arguments for more restrictive regulatory policies, investigating claims that ICE substantially fails along the lines envisioned by an analytically coherent exception. Similarly, this model could also consider how existing regulations can be removed due to a change in marketplace circumstances (or new economic learning).[175]

The two other possible models, while very different in substance, are both based on pessimism about the ability of regulators to diagnose exceptions to ICE. Since some of the exceptions sketched above might easily be colorably asserted in a wide range of cases, it is not unreasonable to be pessimistic about such diagnosis. One response to such pessimism could be a

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of falling victim to the perilous exercise of predicting winners and losers. *See* Joskow, supra note __, at 125 (noting that the Public Utility Regulatory Power Act's "requirements that utilities contract with certain independent power suppliers, combined with competitive generation procurement programs in the late 1980s, helped to stimulate technological innovation" that facilitated the use of natural gas as a fuel).

[174] One of us has advocated this approach previously. *See* Phil Weiser, *Changing Paradigms in Telecommunications Regulation*, 71 U. COLO. L. REV. 819, 835 (2000); *see also, e.g.*, *Western Resources, Inc.*, 109 F.3d at 788 (noting that the Surface Transportation Board took roughly this approach).

[175] In some recent decisions, for example, the Commission has gone ahead to lift more restrictive regulations on this very logic. *See* Unbundling Order, 166 FCC Rcd at 7424, para. 10; *id.* at 7438, paras. 34 & 35.

categorical protection of modularity, as in much recent telecommunications policy and as advocated by Lessig and others for broadband.[176] An alternative response to this pessimism is a categorical presumption that ICE always applies, as in a hard-line Chicago approach.[177] Stating the strategies in this manner suggests a helpful way to frame the contrast between an open architecture strategy and the Chicago School approach. Some Chicago scholars appear to trust ICE more than they trust imperfect regulators or courts to diagnose its exceptions; while open architecture advocates such as Lessig appear to trust the history of successful innovation through modularity (and its extrapolation to the future) more than they trust either ICE or regulators' ability to diagnose its exceptions.

[176] *See, e.g.*, Francois Bar et al., *Access and Innovation Policy For The Third Generation Internet*, 24 TELECOMMUNICATIONS POLICY 489, 496 (2000) (insisting that "open access to the network led to rich experimentation by many actors whose ideas had previously been excluded from shaping network evolution"). This categorical protection might also rely on an argument that telecommunications uniquely justifies regulatory oversight that deviates from the logic of ICE's suggestion that platform providers can be trusted. There are at least two reasons why one might adopt this view. First, one might believe that the nature of network industries creates greater incentives for predatory strategies, particularly those that would raise entry barriers. *See* A. Douglas Melamed, *Network Industries and Antitrust*, 23 HARV. J.L. & PUB. POL'Y 147, 149-152 (1999) (suggesting this possibility). Second, one might believe that telecommunications networks – as platforms for transporting ideas – require open access regulation not based on competition policy, but on First Amendment values that trump any economic analysis.

[177] *See* William F. Baxter, *Reflections Upon Professor Williamson's Comments*, 27 ST. LOUIS U. L.J. 315, 320 (1983) (admonishing courts to be mindful of problem of "error rates" and "false positives" in judging exclusionary conduct); Frank H. Easterbrook, *The Limits of Antitrust,* 63 TEXAS L. REV. 1, 3 (1984) ("judicial errors that tolerate baleful practices are self-correcting while erroneous condemnations are not.").