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FROM THE EDITOR

This second issue of the fifth volume of the *Journal on Telecommunications and High Technology Law* begins with three articles and a book review. In the first article, Dr. Barbara van Schewick completes her already influential economic analysis of network neutrality.[1] In the second article, Professors Lynne Holt and Mark Jamison explain recent findings by their home institution, the Public Utility Research Center at the University of Florida, in an article on Universal Service Fund reform. In the third article, Andy Crain polishes his research at the Gerald R. Ford Presidential Library into an unprecedented historical record of deregulation during the Ford and Carter administrations. Finally, Professor Ann Bartow reviews Yochai Benkler's new book, *The Wealth of Networks*,[2] and suggests some additions for his next edition.

This issue also contains two pieces resulting from the recent Silicon Flatirons Telecommunications Program symposium,[3] as well as the winning student note from the 2006 Silicon Flatirons Writing Competition. Professor Susan Crawford, a conference panel participant, examines the terminological pitfalls of using the term "the Internet" within debates over network neutrality. Keynote speaker and Level 3 CEO James Crowe adds to Crawford's consideration of network neutrality in his address on regulation of the telecommunications industry. Danny Sherwinter, our Executive Editor, rounds out the issue with his award-winning note on "strong" encryption, law enforcement, and private efforts to stem legislative erosion of privacy protections. The variety and quality of material in this issue is simply astounding.

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1. *See, e.g.*, Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 298 n.150 (2007); Tim Wu, *Why Have a Telecommunications Law? Anti-Discrimination Norms in Communications*, 5 J. ON TELECOMM. & HIGH TECH. L. 15, 25 n.27 (2006); Hannibal Travis, *Wi-Fi Everywhere: Universal Broadband Access as Antitrust and Telecommunications Policy*, 55 AM. U. L. REV. 1697, 1717 n.105 (2006); Barbara A. Cherry, *Misusing Network Neutrality to Eliminate Common Carriage Threatens Free Speech and the Postal System*, 33 N. KY. L. REV. 483, 486 n.12 (2006).

2. YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM (2006).

3. The Silicon Flatirons Telecommunications Program, The Digital Broadband Migration: Confronting the New Regulatory Frontiers, http://www.silicon-flatirons.org/conferences_old/20060219dbm.asp (last visited Sept. 29, 2006); *see also* Integrated Telecommunications Program, SFTP Conference Videos, http://telecom.colorado.edu/index.php?load=content&page_id=126 (last visited Sept. 29, 2006) (offering videos of the conference proceedings).

I must thank Kevin Bell, James Crowe Jr., Preston Johnson, and Darlene Kondo for helping to produce such a fine collection of scholarship. Becky Farr, Patrick Haines, Ryan Howe, and Justin Pless deserve equal gratitude, as the student notes in the sixth volume will fully demonstrate. Without Mark Walker, Danny Sherwinter, and Todd Spanier, however, the trains would not run on time, and so I commend them for keeping the boilers stoked. Above all, however, I owe particular thanks to Mike Boucher and Michael Beylkin for their fantastic production efforts.

Beyond the staff, Dale Hatfield, Patrick Ryan, and Brad Bernthal deserve special thanks for their continued help and advice. Paul Ohm, winner of the 2007 JTHTL "Right, Right, Right" Award, continues to exceed the call of duty, and I am forever in his debt. The Silicon Flatirons Program Advisory Board likewise allows this publication to reach new heights, and we thank them for their continued support. And no acknowledgement from this publication would be complete without a tip of the hat to Phil Weiser, who continues to demonstrate why he is the veritable Godfather of Telecomm, cape and all.

Phil is technically on sabbatical this year, but is never further than a phone call or email away. He's an endless font of advice, and we happily welcome him back to the Front Range with open arms, a stack of resumes, and our admiration.

With that, I am pleased to offer this, the second issue of the fifth volume of the *Journal on Telecommunications & High Technology Law*.

Micah Schwalb
Editor-in-Chief

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TOWARDS AN ECONOMIC FRAMEWORK FOR NETWORK NEUTRALITY REGULATION

DR.-ING. BARBARA VAN SCHEWICK, ASS. IUR.*

Network neutrality rules forbid network operators from excluding or discriminating against third-party applications. This analysis shows that calls for network neutrality regulation are justified: absent network neutrality regulation, network providers will likely discriminate against or exclude independent producers of applications, content, or portals from their networks. This threat reduces the amount of innovation in applications, content and portals at significant costs to society. While network neutrality rules remove this threat, they are not without costs. Due to the potentially enormous benefits of application-level innovation for economic growth, however, increasing the amount of application-level innovation through network neutrality regulation is more important than the costs associated with it. This paper also highlights important limitations of the "one monopoly rent" argument, demonstrating previously unidentified exceptions that may be quite common in the Internet context, showing how exclusion may be a profitable strategy even if the excluding actor does not manage to drive its competitors from the complementary market, and proving that competition in the primary market may be insufficient to remove the ability and incentive to engage in exclusionary conduct.

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Thanks to Pio Baake, Yochai Benkler, Marjory Blumenthal, David Clark, Joseph Farrell, Gerald Faulhaber, David Isenberg, Bill Lehr, Lawrence Lessig, Doug Lichtman, Robert Pepper, Arnold Picot, David Reed, Tim Wu, Christopher Yoo and participants of the 33rd Research Conference on Communication, Information and Internet Policy (TPRC 2005), the Berkman Center for Internet and Society Luncheon Series, Harvard Law School, and the MIT Computer Science and Artificial Intelligence Laboratory Speaker Series, Massachusetts Institute of Technology, for comments on an earlier version of this paper and for discussions.

Parts of this paper are based on Barbara van Schewick, Architecture and Innovation: The Role of the End-to-End Arguments in the Original Internet, Chapter 9 and Chapter 11 (Ph.D. dissertation, Technical University Berlin 2005, MIT Press forthcoming 2008), for which financial support of the German National Academic Foundation ("Studienstiftung des Deutschen Volkes") and the Gottlieb Daimler- and Karl Benz-Foundation is gratefully acknowledged.

INTRODUCTION

Over the past years, the merits of network neutrality regulation have become a hot topic in telecommunications policy debates. Repeatedly, proponents of network neutrality regulation have asked the Federal Communications Commission to impose rules on the operators of broadband access networks that forbid network operators to discriminate against third-party applications, content or portals ("independent applications") and to exclude them from their network.[1] Congress is currently considering proposals to introduce network neutrality legislation;[2] the House of Representatives and the Senate held hearings on the subject.[3]

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1. *See, e.g.*, *Ex parte* Submission of Tim Wu and Lawrence Lessig to the *Declaratory Ruling & Notice of Proposed Rulemaking* in Inquiry Concerning High-Speed Access to the Internet, CS Dkt. No. 02-52 (Aug. 22, 2003), *available at* http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6514683885 [hereinafter Wu & Lessig, *Ex parte*]; Comments of the High Tech Broadband Coalition, to the *Declaratory Ruling & Notice of Proposed Rulemaking* in Inquiry Concerning High-Speed Access to the Internet, CS Dkt. No. 02-52 (June 17, 2002), *available at* http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6513198353; *Ex parte* Submission of the Coalition of Broadband Users and Innovators to the *Declaratory Ruling & Notice of Proposed Rulemaking* in Inquiry Concerning High-Speed Access to the Internet, CS Dkt. No. 02-52 (July 17, 2003), *available at* http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6514286197. For proponents of nondiscrimination rules in the scientific arena, see, for example, LAWRENCE LESSIG, THE FUTURE OF IDEAS 248-49 (2001) [hereinafter LESSIG, FUTURE OF IDEAS]; Philip J. Weiser, *Toward a Next Generation Regulatory Strategy*, 35 LOY. U. CHI. L.J. 41 (2003); Wu & Lessig, *Ex parte*, *supra*; Tim Wu, *Network Neutrality and Broadband Discrimination*, 2 J. ON TELECOMM. & HIGH TECH. L. 141 (2003) [hereinafter Wu, *Network Neutrality*]; Tim Wu, *The Broadband Debate: A User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69 (2004) [hereinafter Wu, *Broadband Debate*]; Brett M. Frischmann & Barbara van Schewick, *Yoo's Frame and What it Ignores: Network Neutrality and the Economics of an Information Superhighway*, 47 JURIMETRICS (forthcoming 2007); Bill D. Herman, *Opening Bottlenecks: On Behalf of Mandated Network Neutrality*, 59 FED. COMM. L. J. (forthcoming 2007), *available at* http://ssrn.com/abstract=902071; Robert D. Atkinson & Philip J. Weiser, *A Third Way on Network Neutrality*, THE NEW ATLANTIS, Summer 2006, at 47, *available at* http://www.thenewatlantis.com/archive/13/atkinsonweiser.htm (last visited November 23, 2006); Susan P. Crawford, *Network Rules*, LAW & CONTEMP. PROBS. (forthcoming 2007), *available at* http://ssrn.com/abstract=885583.

2. For an overview of the different proposals and their history, see Declan McCullagh, *Republicans Defeat Net Neutrality Proposal*, CNET NEWS.COM, Apr. 5, 2006, http://news.com.com/2100-1028_3-6058223.html. For an overview of government actions and statements of officials concerning network neutrality, see John Windhausen, Public Knowledge, *Good Fences Make Bad Broadband. A Public Knowledge White Paper*, http://static.publicknowledge.org/pdf/pk-net-neutrality-whitep-20060206.pdf (Feb. 6, 2006) [hereinafter *Public Knowledge White Paper*], at 13-16.

3. *Net Neutrality: Hearing Before the S. Comm. on Commerce, Science, and Transportation*, 109th Cong. (2006), *available at* http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_senate_hearings&docid=f:30115.pdf [hereinafter *Senate Hearing*]; *Internet Protocol and Broadband Services Legislation: Hearing Before the Subcomm. on Telecommunications and the Internet of the H. Comm. on Energy and Commerce,* 109th Cong. (2005), http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_house_hearings&docid=f:26998.pdf.

Network neutrality proposals are based on the concern that in the absence of such regulation, network operators may discriminate against independent applications and that this behavior may reduce innovation by providers of these products to the detriment of society.

Opponents of regulation deny the need for network neutrality regulation.[4] They argue that regulation is not necessary because network operators do not have an incentive to discriminate against independent applications anyway,[5] or, alternatively,[6] that regulation is harmful because it would reduce network operators' incentive to upgrade their networks in the future.[7]

This paper aims at assessing the economic merits of network neutrality regulation. To this aim, the paper applies insights from game theory, industrial organization, antitrust, evolutionary economics and management strategy to analyze network operators' incentives to discriminate, the impact of potential discriminatory behavior on innovation and social welfare, and the costs of regulation. By focusing on the economic merits of network neutrality, the paper complements theoretical approaches that base calls for network neutrality regulation on non-

4. *See, e.g.*, Ex Parte Submission of the National Cable & Telecommunications Association to the *Declaratory Ruling & Notice of Proposed Rulemaking* in Inquiry Concerning High-Speed Access to the Internet, CS Dkt. No. 02-52 (Sept. 8, 2003), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6514882243. For opponents of nondiscrimination rules in the scientific arena, see, for example, Bruce M. Owen & Gregory L. Rosston, *Local Broadband Access: Non Nocere or Primum Processi? A Property Rights Approach* (Stanford Law Sch., John M. Olin Program in Law and Econ., Working Paper No. 263, 2003); Christopher S. Yoo, *Beyond Network Neutrality*, 19 HARV. J.L. & TECH. 1 (2005) [hereinafter Yoo, *Beyond Network Neutrality*]; Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEO. L.J. 1847 (2006) [hereinafter Yoo, *Economics of Congestion*]; Christopher S. Yoo, *Would Mandating Broadband Network Neutrality Help or Hurt Competition? A Comment on the End-to-End Debate*, 3 J. ON TELECOMM. & HIGH TECH. L. 23 (2004) [hereinafter Yoo, *Mandating Network Neutrality*]; J. Gregory Sidak, *A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet*, 2 J. OF COMPETITION L. & ECON. 349 (2006), *available at* http://jcle.oxfordjournals.org/cgi/reprint/2/3/349.pdf.

5. There are two representative examples of this view in the context of the debate over open access to broadband networks. *See* 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 (2000) [hereinafter Speta, *Handicapping*]; James B. Speta, *The Vertical Dimension of Cable Open Access*, 71 U. COLO. L. REV. 975 (2000) [hereinafter Speta, *Vertical Dimension*]. On the open access debate, see *infra* note 31.

6. Both arguments are mutually exclusive. If network owners do not have an incentive to discriminate against independent applications anyway, the imposition of a network neutrality regime that prevents such discrimination will not reduce their profits. If it does not reduce their profits, however, it cannot reduce their incentives to invest in upgrades of their network infrastructure in the future.

7. For a representative example of this view, see Adam D. Thierer, *"Net Neutrality" Digital Discrimination or Regulatory Gamesmanship in Cyberspace?* (Cato Inst., Policy Analysis No. 507, 2004).

economic rationales.[8]

Throughout this paper, the term "network neutrality rules" refers to non-discrimination rules that forbid operators of broadband networks to discriminate against third-party applications, content or portals ("independent applications") and to exclude them from their network. This terminology captures the common rationale behind the various network neutrality proposals before Congress and the FCC – to design rules that prevent network operators and ISPs from using their power over the transmission technology to negatively affect competition in complementary markets for applications, content and portals.[9] By contrast, network neutrality opponents sometimes use a much broader definition of network neutrality that includes mandating interconnection, non-discrimination, rate regulation and the adoption of standardized protocol interfaces such as TCP/IP.[10] While providing a convenient straw man for

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8. *E.g.*, Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917 (2005); Crawford, *supra* note 1. For a critical evaluation of such approaches, see Yoo, *Beyond Network Neutrality*, *supra* note 4, at 53-57.

9. For an overview of the various proposals, see McCullagh, *supra* note 2, and *Public Knowledge White Paper, supra* note 2, at 3-7, 26-27. In addition to the non-discrimination rules discussed in the text, network neutrality proposals often include the right of consumers to attach communication equipment of their choice to the network. *See Public Knowledge White Paper, supra* note 2, at 3-7, 26-27. Network neutrality regulation is not intended to prevent vertical integration between network providers and application providers (i.e., network providers are allowed to offer applications as well). *See* Wu, *Broadband Debate*, *supra* note 1, at 89.

While calls for network neutrality rules share a common rationale, they differ with respect to how these rules should be implemented. For example, in some proposals, the non-discrimination rules take the form of user rights (to access and use the content and applications of their choice), in others the respective rights are vested in the providers of complimentary products (to offer the application and content of their choice). *See, e.g.*, *Public Knowledge White Paper, supra* note 2, at 3-7, 26-27. Proposals differ with respect to the exceptions to the non-discrimination rule they include, (i.e., with respect to the cases in which a deviation from the principle of network neutrality is justified). *Id.* at 27. For example, whether and, if yes, what form of price discrimination should be forbidden under network neutrality regulation, is still an open question. *Compare* Wu, *Network Neutrality*, *supra* note 1, at 151-54 (arguing against price discrimination, if it is based on discrimination between applications), *and* JONATHAN E. NUECHTERLEIN & PHILIP J. WEISER, DIGITAL CROSSROADS 177 (2005); *see also Senate Hearing*, *supra* note 3 (testimony of Prof. Lawrence Lessig), *available at* http://commerce.senate.gov/pdf/lessig-020706.pdf (arguing against "access tiering," i.e. "any policy by network owners to condition content or service providers' right to provide content or service to the network upon the payment of some fee [. . . which is] independent of basic Internet access fee," *id.* at 2 note 2, but supporting "customer tiering," i.e. price discrimination, as long as it is not based on discrimination among content or application providers); *but see* Sidak, *supra* note 4, at 83-99 (arguing in favor of allowing access tiering). For specific implementation proposals from the scientific literature, refer to Wu, *Broadband Debate*, *supra* note 1, appendix A; Weiser, *supra* note 1, at 74-84; Atkinson & Weiser, *supra* note 1, at 55.

10. *E.g.* Yoo, *Beyond Network Neutrality*, *supra* note 4, at 3, 8, 27, 32. As most of Yoo's arguments about the negative impact of network neutrality are based on the negative impact of measures such as the adoption of standardized interfaces that are not part of the network neutrality regime discussed in this paper, his analysis does not carry over to the case of "pure" non-discrimination rules discussed here. *See also* discussion *infra* notes 192, 198. For a

attack, this definition goes far beyond what network neutrality proponents want to achieve: the measures included in the broad definition constitute heavy forms of regulation; by contrast, the non-discrimination rules in network neutrality proposals have been explicitly designed to provide a light form of behavioral regulation that narrowly targets the behavior identified as problematic and is far less intrusive than other forms of regulation such as structural separation or open access regulation.[11]

The analysis proceeds in three steps. Part II explores whether network providers have an incentive to discriminate against applications.[12] This question has not been examined in detail in the existing literature.[13] If, however, network providers do not have such an incentive, there is no need for regulation.[14]

Whether exclusionary conduct in complementary markets is a profitable strategy has been hotly debated over the years. Today, most scholars agree that a monopolist in a primary market does not generally have an incentive to exclude its competitors from a secondary, complementary

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critical appraisal of Yoo's work on network neutrality, see Frischmann & van Schewick, *supra* note 1; Herman, *supra* note 1.

11. *See, e.g.*, Weiser, *supra* note 1, at 48, 74, 78-80; Wu, *Network Neutrality*, *supra* note 1, at 145-49. By contrast, Yoo derives its definition from statements of network neutrality proponents with respect to Internet policy in general, not to network neutrality in particular, Yoo, *Beyond Network Neutrality*, *supra* note 4, at 3.

12. See i*nfra* Part II.

13. For a similar assessment with respect to network neutrality proponents, see Weiser, *supra* note 1, at 74-75. For an example of the treatment of the question by a network neutrality proponent, see Wu, *Broadband Debate, supra* note 1, Part II.B. For an example of the treatment of the question by a network neutrality opponent, see Yoo, *Beyond Network Neutrality*, *supra* note 4, Part II. (arguing that network neutrality proponents' focus on safeguarding competition in the markets for application and content is misplaced without examining whether there is indeed a threat of discrimination) and at 60-61 (arguing that competition in the broadband market "should remain sufficiently robust to ameliorate concerns of anticompetitive effects" without covering specific motivations for discrimination); Yoo, *Economics of Congestion, supra* note 4 (manuscript at 49-50). While Farrell and discuss exceptions to the "one monopoly rent" argument in detail, their analysis is not specifically targeted at the economic relationships relevant in the network neutrality context. Joseph Farrell & Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J.L. & TECH. 85, 114 (2003). Similarly, while participants in the open access debate have explored the incentives of network providers to exclude independent ISPs from their network, their analysis focuses on the competitive relationships between the operators of physical networks on the one hand and unaffiliated ISPs that may also offer applications, content or portals on the other hand. *E.g.*, Speta, *Handicapping*, *supra* note 5; Speta, *Vertical Dimension*, *supra* note 5 (both denying an incentive to exclude); Daniel L. Rubinfeld & Hal J. Singer, *Vertical Foreclosure in Broadband Access?*, 49 J. INDUS. ECON. 299 (identifying an incentive to exclude). By contrast, network neutrality rules focus on the competitive relationships between the operators of physical networks and/or ISPs on the one hand and unaffiliated providers of complementary applications, content and portals on the other hand. Thus, the open access literature is not directly applicable to the network neutrality debate.

14. For a qualification of this assessment, see *infra* notes 27-28 and accompanying text.

market – the well known "one monopoly rent" argument.[15] There are known exceptions to this rule, but these rarely apply. As a result, when analyzing allegations of exclusionary conduct in a complementary market, most scholars intuitively assume there will not be a problem, in particular if the excluding actor faces competition in the primary market.

The results of the analysis challenge this intuition in several ways:

First, Part II identifies exceptions to the "one monopoly rent" argument that have not been previously thought of, but are quite common in the Internet context.[16]

Second, the paper shows that some of the known exceptions do indeed apply in the Internet context.[17]

Third, researchers commonly assume that discrimination against a complementary product will only be profitable, if the primary good monopolist manages to monopolize the market for the application in question. The paper shows that this assumption is not necessarily correct. A network operator may have an incentive to discriminate against an application even if the operator does not manage to drive all independent applications from the corresponding market.[18] As a result, researchers commonly underestimate the potential for discriminatory behavior by network providers.

Finally, in line with conventional thinking on the profitability of exclusionary conduct, participants in the debate usually share the view that competition in the market for Internet services may be able to mitigate the problem. Two policy proposals, the proposals for facilities-based competition and for open access, are based on this view. The results of Part II contradict this view. The analysis highlights a variety of circumstances under which a network operator may have the ability and incentive to discriminate against independent applications in spite of competition in the market for Internet services.[19]

Thus, Part II highlights important limitations of the "one monopoly rent" argument in the Internet context that may be relevant beyond the network neutrality debate. In the network neutrality context, it shows that in the absence of network neutrality regulation, there is a real threat of discriminatory behavior that is more severe than is commonly assumed.

Part III analyzes the impact of this threat on innovation in the markets for applications, content and portals ("application-level innovation").[20] It shows that the threat of discrimination reduces the amount of

15. *See infra* Part II.B.1.
16. *See infra* Part II.B.2.
17. *See infra* Part II.B.3.
18. *See infra* Part II.B.4.
19. *See infra* Part II.C.
20. *See infra* Part III.

application-level innovation by independent producers of complementary products.[21] While discrimination increases network providers' incentives to engage in application-level innovation, this increase cannot offset the reduction in innovation by independent producers.[22] Thus, the threat of discrimination reduces the amount of application-level innovation.

Part IV explores the social benefits and costs of network neutrality regulation.[23] It shows that the increase in application-level innovation resulting from network neutrality rules is socially beneficial.[24] On the cost side, network neutrality rules reduce network providers' incentives to innovate at the network level and to deploy network infrastructure.[25] While regulatory intervention has its own costs, these are not covered in detail. When deciding whether to introduce network neutrality regulation, regulators must trade-off the benefits against the costs. The analysis shows that in the context of the Internet, the benefits of network neutrality regulation are more important than the costs.[26]

I. THREAT OF DISCRIMINATION

Calls for network neutrality regulation are based on the assumption that network providers have an incentive to discriminate against unaffiliated providers of complementary products. If network providers do not have such an incentive, there is no need for regulation. In this case, regulation may still serve an educational function and protect customers and providers of independent content, portals and applications from discriminatory or exclusionary conduct by "incompetent incumbents"[27] that fail to recognize that discrimination is not in their best economic interest.[28] Compared to a threat of discrimination due to a real incentive to discriminate, this constitutes a considerably weaker basis for regulatory intervention.

Network technology gives network providers the ability to discriminate against applications running over their networks or to exclude them from the network. The following part explores, whether network providers have an incentive to actually use this discriminatory power.[29] The analysis is based on a stylized model (Section A). As the answer may dif-

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21. *See infra* Part III.A.
22. *See infra* Part III.B.
23. *See infra* Part IV.
24. *See infra* Part IV.A.
25. *See infra* Part IV.B.
26. *See infra* Part IV.C.
27. Farrell & Weiser, *supra* note 13, at 114.
28. *Id.* at 114-17; Wu, *Network Neutrality*, *supra* note 1, at 154-56.
29. There have been various instances of discrimination by network providers in practice, both in the United States and internationally. *See generally Public Knowledge White Paper, supra* note 2, at 16-23.

fer depending on the market structure in the market for Internet services, the analysis proceeds in two steps: In the first step, the network provider is a local monopolist (Section B). In the second step, the network provider competes with at least one other network provider (Section C).

The analysis shows that discrimination is much more likely than is commonly assumed.

A. Stylized Model

Network neutrality rules seek to protect competition in complementary products such as Internet applications, content and portals from anti-competitive behavior by network operators or ISPs. To reflect this goal, the analysis focuses on the competitive interactions between "the network" and "applications."[30] Economically, "the network" comprises two distinct layers of economic activity: the operation of physical networks and the provision of Internet access and transport services over these networks. In real life, these activities may or may not be provided by different economic actors with differing economic interests. The resulting competitive interactions between network operators and Internet service providers have featured prominently in the debate over "open access" for independent Internet service providers to broadband cable networks in the United States.[31] To focus on the specific impact of network neutrality

30. In the context of the four layer model of the Internet Architecture used by the Internet Engineering Task Force, "the network" consists of the network layer and the Internet layer, while the application domain consists of the transport layer and the application layer. *See, e.g.*, LARRY L. PETERSON & BRUCE S. DAVIE, COMPUTER NETWORKS: A SYSTEMS APPROACH 27-30 (3d ed. 2003).

31. The open access debate focuses on the question whether the owners of cable networks should be required to allow independent Internet service providers to provide Internet access services over their cable networks. Several scholars advocate open access regulation. *See Ex parte* Submission of Mark A. Lemley & Lawrence Lessig, to the *Public Notice*, in Application for Consent to the Transfer of Control of License Licenses from MediaOne Group, Inc. to AT&T Corp., at 1, CS Dkt. No. 99-251 (November 10, 1999), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6010050443 [hereinafter Lemley & Lessig, *Ex parte*]; 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); LESSIG, FUTURE OF IDEAS, *supra* note 1, at 147-67, 246-49; Francois Bar et al., *Access and Innovation Policy for the Third-Generation Internet*, 24 TELECOMM. POL'Y 489 (2000); Jim Chen, *The Authority to Regulate Broadband Internet Access over Cable*, 16 BERKELEY TECH. L.J. 677 (2001); Mark N. Cooper, *Open Access to the Broadband Internet: Technical and Economic Discrimination in Closed, Proprietary Networks*, 71 U. COLO. L. REV. 1011 (2000); Jerry A. Hausman et al., *Cable Modems and DSL: Broadband Internet Access for Residential Customers*, 91 AM. ECON. REV. 302 (2001) [hereinafter Hausman et al., *Cable Modems*]; Jerry A. Hausman et al., *Residential Demand for Broadband Telecommunications and Consumer Access to Unaffiliated Internet Content Providers*, 18 YALE J. ON REG. 129 (2001) [hereinafter Hausman et al., *Residential Demand*]; William P. Rogerson, *The Regulation of Broadband Telecommunications, the Principle of Regulating Narrowly Defined Input Bottlenecks, and Incentives for Investment and Innovation*, 2000 U. CHI. LEGAL F. 119; Daniel L. Rubinfeld & Hal J. Singer, *Open Access to Broadband Networks: A Case Study of the*

rules, the following analysis abstracts from these issues and treats these players as a single economic entity called the "network provider."

The analysis will be based on the following stylized model: for a given physical network, Internet access and transport services and the operation of the network infrastructure are provided by the same economic entity, the "network provider." The corresponding service will be called "Internet service." The network is assumed to provide the same general functionality as the Internet in that it enables computers attached to distinct physical, but interconnected networks to communicate. Contrary to the original Internet,[32] but similar to networks today, the network is application-aware and can control the execution of applications running over its network. Today, technology is available that enables network operators and ISPs to distinguish between the different applications using the network and to control their execution.[33] For example, network

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AOL/Time Warner Merger, 16 BERKELEY TECH. L.J. 631 (2001); Rubinfeld & Singer, *supra* note 13. Several experts also opose open access regulation. *See* John E. Lopatka & William H. Page, *Internet Regulation and Consumer Welfare: Innovation, Speculation, and Cable Bundling*, 52 HASTINGS L.J. 891 (2001); Glen O. Robinson, *On Refusing to Deal With Rivals*, 87 CORNELL L. REV. 1177 (2002); Speta, *Handicapping*, *supra* note 5; Speta, *Vertical Dimension*, *supra* note 5; Glenn A. Woroch, *Open Access Rules and the Broadband Race*, 2002 L. REV. M.S.U.-D.C.L. 719 (2002); Christopher S. Yoo, *Vertical Integration and Media Regulation in the New Economy*, 19 YALE J. ON REG. 171 (2002).

32. In the original Internet, the network was application-blind, (i.e., it was unable to distinguish between the applications running over the network). Consequently, network operators were unable to affect the execution of specific applications, shielding independent application developers from strategic behavior by network operators.

The application-blindness was the result of following the broad version of the end-to-end arguments during the design of the Internet, Barbara van Schewick, Architecture and Innovation: The Role of the End-to-End Arguments in the Original Internet 101-03 (Ph.D. dissertation, Technical University Berlin 2005, MIT Press forthcoming 2008). This design principle requires that the lower layers of the network be as general as possible, while all application-specific functionality is concentrated at higher layers at end hosts. (There are two versions of the end-to-end arguments: a narrow version, which was first identified, named and described in a seminal paper by Saltzer, Clark and Reed in 1981. Jerome H. Saltzer et al., *End-to-End Arguments in System Design*, 1981 2ND INT'L CONF. ON DISTRIBUTED COMPUTING SYS. 509 (a revised version of paper was later published as Jerome H. Saltzer et al., *End-to-End Arguments in System Design*, 2 ACM TRANSACTIONS ON COMPUTER SYS.S 277 (1984)). A broad version was the focus of later papers by other authors. *See, e.g.*, David P. Reed et al., *Commentaries on "Active Networking and End-to-End Arguments"*, 12 IEEE NETWORK 69, 69 (1998); Marjory S. Blumenthal & David D. Clark, *Rethinking the Design of the Internet: The End-to-End Arguments vs. the Brave New World*, 1 ACM TRANSACTIONS ON INTERNET TECH. 70, 71 (2001). While both versions have shaped the original architecture of the Internet, only the broad version is responsible for the application-blindness of the network.) For a detailed analysis of the two versions and their relationship to the architecture of the Internet, see van Schewick, *supra*, at 87-129.

33. *See, e.g.*, Cisco Systems, Inc., *Network-Based Application Recognition and Distributed Network-Based Application Recognition*, http://www.cisco.com/en/US/products/ps6350/products_configuration_guide_chapter09186a0080455985.html (last visited Sept. 30, 2006). This technology violates the broad version of the end-to-end arguments, but as the end-to-end arguments are just a design principle, there is

providers can slow down selected applications or content, speed them up or exclude them from the network completely.

In the analysis of Section B, the network provider is a local monopolist.[34] The size of its footprint relative to the size of the nationwide network may differ. In the extreme case, the network provider owns the nationwide network and has a nationwide monopoly in the provision of Internet services.

In Section C, the network provider competes with at least one other network provider.

The network provider also offers products in the market for applications, content or portals.[35] These products may be offered in two different ways:

In the first case, the complementary product is offered to consumers nationwide. Thus, if the size of the provider's footprint is smaller than the nationwide network, the product in question is not only offered to customers of its Internet services, but also to consumers living outside its footprint. A product that is offered this way will be called an affiliated product.

Alternatively, the network provider may only offer the product to customers of its Internet service. If the size of the provider's footprint is smaller than the nationwide network, consumers outside its footprint will not be able to use or buy the product. This kind of product will be referred to as proprietary product.

For a particular product, the two ways of offering the product are mutually exclusive.

This division reflects the way in which network providers' comple-

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nothing that forces technology to comply with it. *See* van Schewick, *supra* note 32, at 101-03.

34. *See* Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations by Time Warner Inc. and America Online, Inc., Transferors, to AOL Time Warner Inc., Transferee, *Memorandum Opinion & Order,* 16 FCC Rcd. 6,547, ¶ 74 (2001) [hereinafter *AOL Memorandum Opinion & Order*] ("The relevant geographic markets for residential high-speed Internet access services are local. That is, a consumer's choices are limited to those companies that offer high-speed Internet access services in his or her area, and the only way to obtain different choices is to move. While high-speed ISPs other than cable operators may offer service over different local areas (e.g., DSL or wireless), or may offer service over much wider areas, even nationally (e.g., satellite), a consumer's choices are dictated by what is offered in his or her locality.") *See also* Hausman et al., *Residential Demand, supra* note 31, at 135 ("From a consumer's perspective, the relevant geographic market is local because one can purchase broadband Internet access only from a local residence. Stated another way, a hypothetical monopoly supplier of broadband Internet access in a given geographic market could exercise market power without controlling the provision of broadband access in neighboring geographic markets").

35. Thus, the analysis assumes that the network provider is vertically integrated into the provision of at least some applications. Vertical integration, however, is not the only case to which the analysis applies. A similar analysis applies to other forms of close vertical relationships between the network provider and a provider of complementary products such as partial integration, partial equity investments, long-term contracts, or other forms of close affiliation.

mentary products are offered in today's Internet market. For example, AOL offers MapQuest, AOL Moviefone or its instant messenger to anybody using the Internet.[36] Similarly, AOL's portal is available both bundled with Internet service and separately.[37] By contrast, T-Online, the dominant German Internet provider, offers its portal only bundled with its Internet service.

The subsequent analysis does not further examine the choice of product provisioning, but takes the result as given.

B. Network Provider is Monopolist in the Market for Internet Services

Economic theory predicts that a network operator that has a monopoly in the market for Internet services does not generally have an incentive to discriminate against independent applications (Section 1). There are known exceptions to this rule, but there is considerable debate over whether these apply in the Internet context. The following analysis shows that the threat of discrimination is more severe than is commonly assumed. First, there are more exceptions than have been previously identified (Section 2). Second, some of the known exceptions may be more relevant in the Internet context than is commonly assumed (Section 3). Third, discrimination may be a profitable strategy, even if the network provider does not manage to drive independent applications from the market (Section 4).

1. No General Incentive to Discriminate

According to the "one monopoly rent" theory, a monopolist has no incentive to monopolize a complementary product market, if the complementary product is used in fixed proportions[38] with the monopoly good and is competitively supplied.[39]

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36. Time Warner, Inc., *Time Warner Businesses: AOL*, Aug. 2, 2006, http://www.timewarner.com/corp/businesses/detail/aol/index.html.

37. Alan Breznick, *AOL Shifts Broadband Strategy*, CABLE DATACOM NEWS, Jan. 1, 2003, http://www.cabledatacomnews.com/jan03/jan03-3.html.

38. If the two goods are used in variable proportions, the monopolist may have an incentive to monopolize the complementary market, as this creates greater flexibility in its relative pricing of both components. Through appropriate pricing, the monopolist may be able to extract more surplus from consumers. If it needs a monopoly over both products to price discriminate in this fashion, monopolizing the second market will increase its profits. *See, e.g.*, Janusz A. Ordover et al., *Nonprice Anticompetitive Behavior by Dominant Firms toward the Producers of Complementary Products*, *in* ANTITRUST AND REGULATION: ESSAYS IN MEMORY OF JOHN J. MCGOWAN 119 (Franklin M. Fisher ed., 1985).

39. *See, e.g.*, ROBERT H. BORK, THE ANTITRUST PARADOX; A POLICY AT WAR WITH ITSELF 372-75 (Free Press 1993) (1978); RICHARD A. POSNER, ANTITRUST LAW 198-99 (2d ed. 2001).

In this case, there is only one final product, and, therefore, only one monopoly profit available in the market for the final product. The monopolist can extract the complete monopoly profit through its pricing of the monopoly good, and does not gain additional profits by monopolizing the complementary good.

This line of reasoning suggests that the monopolist need not monopolize the secondary market to extract the entire monopoly rent and therefore has no incentive to drive rivals from that market.

Moreover, economists note that the monopolist may benefit from the presence of independent producers in the complementary product market, implying that the monopolist will welcome, not exclude independent producers of complementary products. This argument has been labeled "internalizing complementary efficiencies (ICE)."[40]

If the presence of independent producers of complementary products generates additional surplus, the monopolist may be able to capture some of that surplus through its pricing of the primary good. In this case, the monopolist will earn greater profits when its rivals are in the market than when they are not. In this case, the monopolist does not wish to steal sales in the secondary market, but takes its profits by charging a higher price for the primary good.[41]

Whether the presence of independent producers generates additional surplus, depends on the structure of consumer preferences and on factors such as the intensity of competition in the complementary market or the degree of differentiation in the complementary market.[42]

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40. Farrell & Weiser, *supra* note 13, at 89.

41. *See, e.g.*, Michael D. Whinston, *Tying, Foreclosure, and Exclusion*, 80 AM. ECON. REV. 837, 840, 850-52 (1990); Joseph Farrell & Michael L. Katz, *Innovation, Rent Extraction, and Integration in Systems Markets*, 48 J. INDUS. ECON. 413 (2000); Farrell & Weiser, *supra* note 13, at 103.

42. As the intensity of competition increases, prices are driven down to marginal costs. Due to the complementarity between both products, the monopolist benefits from lower prices in the complementary market. The lower prices in the complementary market, the higher demand (if demand is responsive to price) or consumer surplus (if demand is inelastic), and, consequently, the higher the profits that can be extracted in the primary market. *Id.*

Given the complementarity between both markets and appropriate consumer preferences, an increase in the quality or variety of complementary goods will increase consumers' valuation of the primary good. For example, consumer surplus rises, if a rival enters with a differentiated complementary product and some consumers prefer that product, *e.g.*, Whinston, *supra* note 41, at 850-52; Dennis W. Carlton & Michael Waldman, *The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries* 11 (George J. Stigler Ctr. for the Study of the Econ. and the State, Graduate Sch. of Bus., Univ. of Chicago, Working Paper No. 145, 2000), *available at* http://gsbwww.uchicago.edu/research/cses/WorkingPapersPDF's/145.pdf. The value consumers derive from greater variety may well differ depending on the type of complementary product. For example, consumers may value the fifth teleconferencing application less than the fifth multiplayer online game.

In general, two goods are complements if a decrease in the price of one increases the de-

While the "one monopoly rent" theory argues that exclusionary conduct in the complementary market will not increase the monopolist's profits, the "internalizing complementary efficiencies" theory suggests that such conduct may even reduce its profits.

Recent research shows that this line of reasoning is incomplete: Contrary to the assumptions of the "one monopoly rent" argument, there are cases in which the monopolist profits from monopolizing the complementary market. In these cases, the monopolist may profit from the presence of independent producers in the complementary market, but the loss of these profits may be more than offset by the gains associated with discriminating in the complementary market. In other words, although the monopolist may profit from the presence of independent producers in the complementary market, it may profit even more by excluding them from the market. In this case, the monopolist will engage in exclusionary conduct, if the associated profits are larger than the associated costs.[43]

2. New Exceptions

The following section highlights three exceptions that have not been previously considered. In the first exception, the complementary product is a source of outside revenues that the monopolist cannot extract in the primary market. In the second exception, which is a variant of the first, only the monopolist's complementary product is a source of outside revenue which is lost when rival producers of the product make the sales. This exception is particularly relevant in the Voice over IP (VoIP) context. In the third exception, the exclusionary conduct in the complementary market preserves a legally acquired monopoly in the complementary market.

The following analysis sets out the theories underlying these exceptions, highlights the conditions under which they apply and shows that these conditions may well be met in the Internet context.

2.1. Complementary Product Source of Outside Revenue

a) Theory

A monopolist in the primary market may be unable to extract the maximum possible profit through its sales of the primary good, if some of the revenue in the complementary market comes from outside

mand for the other. HAL R. VARIAN, INTERMEDIATE MICROECONOMICS; A MODERN APPROACH 112 (5th ed. 1999).

43. *See, e.g.*, Whinston, *supra* note 41, at 850-52, 855.

sources.[44]

In conventional markets, firms typically derive their revenue from sales of products or from fees for the provision of services. Firms also have the option of following the example of the media: they offer value to their customers, but at least partly charge third parties such as advertisers. In other words, a part of their revenue stems from selling access to their customers to interested third parties. In the extreme case, consumers get a firm's product or service for free, while all of the firm's revenue comes from outside sources.

If firms in the complementary market derive some of their revenue from outside sources, a monopolist in the primary market may be unable to earn the maximum possible profit unless it monopolizes the complementary market as well. To see this, consider the following example: suppose that firms in the complementary market offer their product or service for free and make all their revenue from selling access to their customers to third parties.

Usually, the monopolist can use a variety of tactics to extract or "squeeze" revenue from its rivals: A common set of tactics forces rival producers of the complementary good to lower the quality-adjusted price of their product.[45] This increases the consumer surplus available for extraction in the primary market. In the example, the price of complementary products already equals zero; thus, these tactics are not feasible.

In another tactic, the monopolist threatens to exclude a rival from the complementary market, unless the rival pays an access charge.[46] To be able to apply this tactic, the monopolist must have the power to exclude its rivals, for example due to intellectual property rights or because rivals' access to the primary good requires the monopolist's cooperation. While this mechanism enables the monopolist to extract its rivals' outside revenue, the monopolist may still earn less than if it excludes its rivals, monopolizes the complementary product market and captures all outside revenue directly: first, by monopolizing the complementary market, the monopolist gains a monopoly in the market for access to the users of its primary good. As a result, it will be able to charge higher prices (per customer) for access to its customers than competing producers of complementary products.[47] Second, due to its relationship with consum-

44. This theory is new and has not been covered by the existing literature.

45. For an overview of such tactics, see, e.g., Farrell & Katz, *supra* note 41, at 414-15.

46. *See, e.g.*, *id.* at 422.

47. Ultimately, this will harm consumers, as firms will pass on at least some of the increased costs to their customers. For example, higher advertising fees will ultimately lead to higher prices for the goods that are advertised. *See* Rubinfeld & Singer, *supra* note 13, at 316; Jeffrey K. MacKie-Mason, An AOL/Time Warner Merger Will Harm Competition in Internet Online Services 23 (October 17, 2000) (Report submitted to the U.S. Federal Trade Commission), http://www-personal.umich.edu/~jmm/papers/aol-tw00-public.pdf.

ers in the primary market, the monopolist may have information about its consumers that enables it to charge higher prices to third parties.[48] Third, even if the per customer prices charged to third parties stay the same, the monopolist's profits will be lower in the presence of rivals due to the costs of negotiating and administering the access fees.

Thus, the monopolist will have an incentive to exclude its rivals from the complementary market, if the gains from directly capturing the outside revenue more than offset the reduction in profits that results from the reduction in complementary goods variety.

b) Application to the Internet

In the market for Internet content, portals and applications, firms often derive at least some of their revenue from outside sources by selling access to their customers to advertisers or online merchants.[49]

In the hypothetical network that is the focus of this analysis, the monopolist can extract at least some of its rivals' outside revenue: the network enables the monopolist to exclude applications from the network. Thus, the monopolist can condition the "access" of rivals' products and services on the payment of an access fee that captures some or all of its rivals' outside revenue. That this is not a mere theoretical possibility shows the practice of cable network owners in the United States. Unaffiliated Internet service providers who want to offer their service over a cable network have to pay a fixed fee per customer. In addition, the cable network owner receives a portion of the outside revenue that the Internet service provider earns on that customer.[50]

While the monopolist is able to capture some or all of its rivals' outside revenue by threatening exclusion, its outside revenue will be higher if it excludes its rivals and collects the outside revenue directly.

First, selling access to one large group of customers as a whole may yield substantially more revenue than selling access to subgroups of that group separately. This is obvious, if the monopolist network provider manages to monopolize the market in which access to its Internet service customers is sold.[51]

Second, through its billing relationship with customers of its Inter-

48. *See, e.g.*, CARL SHAPIRO & HAL R. VARIAN, INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY 34-35 (1999).

49. ALLAN AFUAH & CHRISTOPHER L. TUCCI, INTERNET BUSINESS MODELS AND STRATEGIES; TEXT AND CASES 56 (2001); SHAPIRO & VARIAN, *supra* note 48, at 162-63.

50. *See* Seth Schiesel, *New Economy: A New Model for AOL May Influence Cable's Future*, N.Y. TIMES, Aug. 26, 2002, at C1 (discussing a contract between AOL and AT&T Comcast).

51. *See, e.g.*, Rubinfeld & Singer, *supra* note 13, at 316; MacKie-Mason, *supra* note 47, at 23. This remains true even if the monopolist does not manage to drive its rivals from the market completely. *See* the analysis *infra* Part II.B.4.2.

net service, the network owner has data on customer demographics that enables it to charge higher advertising fees or commissions for online sales than many of its rivals in the market for Internet content, portals and applications.[52]

Finally, due to the potentially large number of complementary products, negotiating and administering the access charges for unaffiliated content, applications and portals may be prohibitively expensive. In any event, these transaction costs will further decrease the monopolist's profits in the presence of rivals.

Thus, if firms in the market for a particular type of application, content or portal derive some of their revenue from outside sources, a monopolist in Internet services may have an incentive to monopolize that market in order to capture all outside revenue available in that market directly.

2.2. Monopolist's Complementary Product Source of Outside Revenue

a) Theory

In the scenario outlined above, only the network provider, not its rivals in the complementary market can realize higher outside revenues. As a result, letting rivals make the sales and extracting the outside revenue from them is less profitable than making the sales directly.

The following exception is a variant of this line of reasoning. The network provider's offering is a source of outside revenue; the rivals' offering does not provide this revenue. Thus, this revenue is lost if rivals make the sales. As a result, the network provider has an incentive to make as many sales as possible directly.

b) Application to the Internet[53]

Consider a local phone company that offers broadband Internet services over its network. Independent companies such as Vonage or Skype offer Voice over IP (VoIP) services to customers of this network provider. As the costs of long-distance calls using VoIP are usually considerably lower than the costs of long-distance calls using the conventional telephone service, those of the network provider's customers using VoIP will place less long-distance calls using the network provider's legacy

52. Even if those rivals require consumers to register before using their product or service, they have no way to verify the information, unless they require payment; in this case, they can verify the information as part of the billing process. *See* SHAPIRO & VARIAN, *supra* note 48, at 34-35; MacKie-Mason, *supra* note 47, at 11.

53. Thanks to Robert Pepper for highlighting this example.

telephone service.

To the network provider, conventional long-distance services are a source of outside revenue that is not similarly available to the providers of VoIP services. In the US, local phone companies are paid so-called access charges by long-distance providers for every long-distance call they originate or terminate. As access charges were traditionally intended to implicitly cross-subsidize local telephone service, regulators have mostly set these access charges significantly above the costs of originating or terminating long-distance calls. Thus, for many local phone companies, access charges are an important source of revenue.[54]

Independent VoIP providers threaten the source of this revenue: The more of the network provider's telephone customers place their long-distance calls using VoIP, the less access charges the network provider will receive. If independent VoIP providers are excluded from the network and the network provider does not offer VoIP itself,[55] customers are forced to make their long-distance calls using the conventional telephone service. Thus, exclusion in the VoIP market serves to preserve the network provider's current profits.[56]

It is not surprising that the first publicly documented incident of VoIP blocking involved a rural telephone company.[57] For rural phone companies, access charges constitute a substantial portion of their revenue. Thus, they have a particularly high incentive to protect this revenue.

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54. *See* NUECHTERLEIN & WEISER, *supra* note 9, at 195, 204, 294.

55. The access charge is lost if the call is placed using VoIP, regardless of whether VoIP is provided by the network provider or by an independent provider. Thus, the network provider has an incentive not to have VoIP used on its network at all.

56. In the example discussed in the text, the existence of the outside revenue is the result of regulation that requires long-distance providers to pay above-cost access charges to local phone companies. Whether local phone companies that are local monopolists in the market for Internet services (this assumption holds throughout Section II.B) would also have an incentive to block VoIP in the absence of such regulation, is more difficult to determine.

57. In February 2005, Vonage, a US VoIP provider, complained to the Federal Communications Commission that its Internet telephony application was being blocked by Madison River Communications, a rural, local telephone company based in North Carolina. After a short investigation, Madison River and the FCC entered into a consent decree in March 2005. Madison River agreed to voluntarily pay $15,000 as well as to stop blocking VoIP applications; the FCC terminated the investigation. *See* Madison River Communications, LLC and Affiliated Companies, *Order*, 20 FCC Rcd. 4,295 (2005); Ben Charny, *Vonage Says Broadband Provider Blocks Its Calls*, CNET News.com, http://news.com.com/2100-7352_3-5576234.html (last modified Feb 14, 2005); Declan McCullagh, *Telco Agrees to Stop Blocking VoIP Calls*, CNET News.com, http://news.com.com/2100-7352_3-5598633.html (last modified Mar 3, 2005); Madison River Communications, *Who We Are*, *at* http://www.madisonriver.net/about_us/who_we_are.php (last visited Nov 21, 2006).

2.3. Monopoly Preservation in the Complementary Market

a) Theory

The monopolist may also use its monopoly over the primary good to protect a monopoly in the complementary market against dynamic competition. In this case, the exclusionary conduct in the complementary market preserves the monopoly in that market.[58]

For this theory to apply, the following conditions must be met:[59]

First, the monopolized product is not essential for all uses of the complementary good (i.e., there are uses of the complementary good that do not require the primary good). Second, the monopolist can prevent its rivals from selling their version of the complementary good to users of the primary good. Third, the complementary market is subject to economies of scale or network effects. Fourth, the monopolist also has a monopoly in the complementary market.

While the first condition explains why the monopolist will want to maintain its monopoly in the complementary market in spite of its monopoly in the primary market, the second and third condition provide the mechanism that enables the monopolist to protect its monopoly in the complementary market.

The first condition provides the motivation for preserving a monopoly in the complementary market in spite of the monopoly in the primary market: The existence of uses of the complementary good that do not require the primary good deprives the monopolist of its ability to extract all profits through sales of the primary good.

To see this, consider the following example: suppose there is some use of the complementary good that does not require the primary good. As a result, the complementary market consists of two parts: a "systems market" for uses in which the primary good is essential, and a "stand-alone market" for uses that do not require the primary good; consumers in the systems market desire the primary and the complementary good,

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58. This theory has not been used as an exception to the "one monopoly rent" argument before. It generalizes from an argument that was used by the Federal Communications Commission in the AOL/ Time Warner merger proceeding with regard to instant messaging. *AOL Memorandum Opinion & Order*, *supra* note 34, at 6603-29, ¶¶ 128-200; Gerald Faulhaber, *Network Effects and Merger Analysis: Instant Messaging and the AOL-Time Warner Case*, 26 TELECOMM. POL'Y 311 (2002). *See infra* Part II.B.2.3.b).

59. The structure of the model and the underlying reasoning are parallel to the "primary good not essential" case outlined *infra* Part II.B.3.1. Whinston, *supra* note 41, at 854-55. However, in the "primary good not essential" case, the monopolist takes advantage of economies of scale and network effects in the complementary market to extend its monopoly to the complementary market by excluding its rivals from the systems part of the market. In the case under consideration here, the monopolist uses the same mechanism to protect a legally acquired monopoly in the complementary market against emerging competition.

whereas consumers in the stand-alone market desire only the complementary good.

Suppose there are rival producers of the complementary good. The monopolist can extract all monopoly profits in the systems market through its pricing of the primary good. As consumers in the stand-alone market do not buy the primary good, however, the monopolist does not derive any profit from its rivals' sales in that market. Moreover, the presence of rivals constrains its ability to price its version of the complementary good in the stand-alone market.

Thus, the monopolist cannot earn monopoly profits in the stand-alone market, unless it has a monopoly in that market. Consequently, keeping competitors out of the complementary market is a prerequisite for preserving current profits.

The second and third condition provide the mechanism that enables the monopolist to preserve the monopoly in the complementary market: In the presence of economies of scale or network effects, the monopolist may be able to drive potential rivals from the complementary market by excluding them from the systems part of the market.

When the second condition is met, the monopolist can deprive rival producers of complementary products of any sales in the systems part of the market.

This behavior does not exclude rivals from the stand-alone market. Given economies of scale[60] in the complementary market, the remaining sales to customers in the stand-alone market may not suffice to reach an economically efficient scale. Thus, being excluded from the systems part of the market, rivals may be forced to exit the stand-alone market as well.

Similarly, in the presence of network effects[61] in the complementary

60. Economies of scale exist, if an increase in output causes long run average total costs to decrease. In other words, the more output is produced, the lower the cost per unit. *E.g.*, ROBERT E. HALL & MARC LIEBERMAN, ECONOMICS; PRINCIPLES AND APPLICATIONS 177-78 (2d ed. 2001). For example, economies of scale exist, if fixed costs are large relative to marginal costs. In this case, an increase in output allows the firm to spread the fixed costs of production over greater amounts of output, lowering the costs of unit per output.

61. Network effects exist if the utility an individual customer derives from the consumption of a good depends upon, and increases with, the number of other customers who consume products that are compatible with that good. *See, e.g.*, the definition by Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424, 424 (1985) [hereinafter Katz & Shapiro, *Network Externalities*]. Network effects are covered by a large body of literature. *See, e.g.*, Jeffrey Rohlfs, *A Theory of Interdependent Demand for a Communications Service*, 5 BELL J. ECON. & MGMT. SCI. 16 (1974); Paul A. David, *Clio and the Economics of QWERTY*, 75 AM. ECON. REV. 332 (1985); Joseph Farrell & Garth Saloner, *Standardization, Compatibility, and Innovation*, 16 RAND J. ECON. 70 (1985); Katz & Shapiro, *Network Externalities, supra*; Michael L. Katz & Carl Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 J. POL. ECON. 822 (1986); Carmen Matutes & Pierre Regibeau, *"Mix and Match": Product Compatibility without Network External-*

market, exclusion from the systems part of the market may suffice to drive competitors from the market or into a niche existence. In markets with network effects, the incumbent's large installed base makes it difficult for new entrants to dislodge the incumbent. Exclusion from the customers in the systems part of the market makes it even more difficult for new entrants to reach the critical mass of customers necessary to start the positive feedback required to succeed with their product.

Thus, the exclusion of rivals from the systems part of the market enables the monopolist to protect a legally acquired monopoly in the complementary market against emerging competition.

Such a scenario may be particularly relevant, if the complementary market belongs to an R&D intensive industry subject to dynamic or "Schumpeterian" competition.[62] Due to the presence of intellectual property rights, economies of scale or network effects, R&D intensive industries are prone to short run exercise of market power. In other words, competition in these markets often results in a single firm dominating the market. Thus, firms in these industries typically compete "for the market," not "within the market." While firms with market power (the winners of the competition) are an inherent feature of such industries, their dominance may be temporary, as rapid technological change and drastic

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ities, 19 RAND J. ECON. 221 (1988); Brian W. Arthur, *Competing Technologies, Increasing Returns, and Lock-In by Historical Events*, 99 ECON. J. 116 (1989); Jeffrey Church & Neil Gandal, *Network Effects, Software Provision, and Standardization*, 40 J. INDUS. ECON. 85 (1992); Nicholas Economides & Steven C. Salop, *Competition and Integration among Complements, and Network Market Structure*, 40 J. INDUS. ECON. 105 (1992); Joseph Farrell & Garth Saloner, *Converters, Compatibility, and the Control of Interfaces*, 40 J. INDUS. ECON. 9 (1992); Michael L. Katz & Carl Shapiro, *Product Introduction with Network Externalities*, 40 J. INDUS. ECON. 55 (1992); Stanley M. Besen & Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, 8 J. ECON. PERSP. 117 (1994); Michael L. Katz & Carl Shapiro, *Systems Competition and Network Effects*, 8 J. ECON. PERSP. 93 (1994) [hereinafter Katz & Shapiro, *Systems Competition*]; Nicholas Economides, *The Economics of Networks*, 14 INT'L J. INDUS. ORG. 673 (1996); *see also* SHAPIRO & VARIAN, *supra* note 48, chapters 7-9 (analyzing network effects in the context of information goods); Joseph Farrell & Paul Klemperer, *Coordination and Lock-In: Competition with Switching Costs and Network Effects, in* 3 HANDBOOK OF INDUSTRIAL ORGANIZATION (forthcoming) (providing a recent survey), *available at* http://ssrn.com/abstract=917785; Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479 (1998) (analyzing the legal implications of network economic effects). For some critical voices, see STAN J. LIEBOWITZ & STEPHEN E. MARGOLIS, WINNERS, LOSERS & MICROSOFT. COMPETITION AND ANTITRUST IN HIGH TECHNOLOGY (rev. ed. 2001); William J. Kolasky, *Network Effects: A Contrarian View*, 7 GEO. MASON L. REV. 577 (1999).

62. On dynamic or "Schumpeterian" competition, *see* JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY, 81-86 (Harper Perennial 1975); *see also* Dennis W. Carlton & Robert H. Gertner, *Intellectual Property, Antitrust and Strategic Behavior* 19-22 (Nat'l Bureau of Econ. Research, Working Paper No. 8976, 2002); David S. Evans & Richard L. Schmalensee, *Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries* (Nat'l Bureau of Econ. Research, Working Paper No. 8268, 2001); Howard A. Shelanski & Gregory J. Sidak, *Antitrust Divestiture in Network Industries*, 68 U. CHI. L. REV. 1, 10-15 (2001).

innovations may cause demand for their product to collapse: for example, rivals may come up with a vastly superior product or develop a new product that makes the incumbent's product obsolete. Thus, incumbents in these industries are primarily constrained by dynamic competition - by the innovation of other firms seeking to replace the existing firm with market power. To avoid being dislodged by rivals, incumbents are forced to innovate themselves.

In the scenario described above, a monopolist could use its market power in the primary market to preserve the legally obtained market power in the complementary market, distorting the dynamic competition for future market power. Instead of innovating to prevent being dislodged by competitors, the monopolist could simply exclude its rivals from the systems part of the complementary market, preventing them from reaching the scale or network size necessary to displace the incumbent.

b) Application to the Internet

The conditions underlying this model may well be present in the Internet context.

First, a specific provider's Internet service may be non-essential for using applications or accessing content. Consider the market for residential broadband Internet access in the United States.[63] Depending on local conditions, the owner of a cable network that provides broadband Internet access through its affiliated broadband Internet access provider may well be a local monopolist.[64] While this monopolist offers broadband Internet access only in the area covered by its network, it may offer content or applications to Internet users nationwide. In this case, the area covered by its network constitutes the "systems market," while customers outside its footprint make up the "stand-alone market."

Such a situation is not uncommon. For example, where it has been able to strike a deal with cable network owners, AOL offers its portal bundled with broadband Internet access. In addition, consumers nationwide can buy the portal without access, known as the "bring your own access" option.[65] Other AOL services such as MapQuest or AOL Moviefone are also offered to all consumers on the Internet.[66] Similarly, if a narrowband access provider has a monopoly with respect to narrowband access, but offers its portal both to its narrowband access customers and

63. The market for broadband Internet access is considered a distinct market from the narrowband access market, *see, e.g.*, *AOL Memorandum Opinion & Order, supra* note 34, at 6574-77, ¶¶ 68-73; Hausman et al., *Residential Demand*, *supra* note 31, at 135-57.

64. *See supra* note 34.

65. Breznick, *supra* note 37.

66. *See* Time Warner, Inc., *supra* note 36.

to anybody on the Internet, the narrowband access service will be non-essential for customers accessing the portal via broadband access services.[67]

Second, in the hypothetical network that forms the basis of the analysis, the monopolist can technically exclude rivals' applications, content or portals from running over its network. As a result, the monopolist's Internet service customers (the consumers in the systems market) are unable to access or use these products. Thus, rivals are deprived of any sales in the systems part of the market.

Third, the markets for software applications, Internet content and portals are all subject to significant economies of scale. The development of these products and services is characterized by large fixed costs, while the marginal costs of production and distribution over the Internet are very small. Thus, the marginal cost of production[68] is very low relative to the average cost of production,[69] resulting in significant economies of scale.[70]

In addition, many software applications are subject to direct or indirect network effects.[71] For example, a communication service like instant

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67. Scott Beardsley et al., *Making Sense of Broadband*, MCKINSEY Q., Issue 2, 2003 at 78-87 (showing that "so far, [. . .] faster and better access to the Internet is the sole killer application of broadband") Thus, the scenario described in the text may be quite common. *See also* Farrell & Weiser, *supra* note 13, at 119.

68. The marginal cost of production is the incremental cost of producing an additional unit of the good. Thus, the marginal cost of production does not include the costs of product development, *e.g.*, HALL & LIEBERMAN, *supra* note 60, at 168-69. In the case of software applications, Internet content and portals, the marginal cost of production is the cost of making an additional digital copy of the product, which is typically very low.

69. The average cost of production indicates a firm's total cost per unit of output. In other words, it denotes the total cost associated with a particular product divided by the quantity of output produced. Thus, contrary to the marginal cost of production which does not include the cost of developing the first unit of the product, the average cost of production includes the cost of development divided by the total number of copies. *E.g.*, *id.* at 168.

70. This cost structure (low marginal costs relative to average costs), which results in significant economies of scale, is generally viewed as a key economic characteristic of the markets for these products. *See, e.g.*, SHAPIRO & VARIAN, *supra* note 48, at 3-4 (discussing information goods in general); Michael L. Katz & Carl Shapiro, *Antitrust in Software Markets*, *in* COMPETITION, INNOVATION, AND THE MICROSOFT MONOPOLY: ANTITRUST IN THE DIGITAL MARKETPLACE 29 (Jeffrey A. Eisenach & Thomas M. Lenard eds., 1999) (discussing software markets), *manuscript available at* http://faculty.haas.berkeley.edu/shapiro/software.pdf; POSNER, *supra* note 39, at 245-46 (discussing Internet content, portals and software); MacKie-Mason, *supra* note 47, at 14 (discussing broadband portals); Rubinfeld & Singer, *supra* note 13, at 307 (discussing broadband content).

71. Network effects are called "direct network effects," if the consumption benefits directly result from the size of the network. *E.g.*, Katz & Shapiro, *Network Externalities*, *supra* note 61, at 424. "Indirect network effects" exist, if consumer demand for the primary good increases with the variety of complementary goods and services. In this case, network effects arise from supply-side economies of scale in the complementary market: a larger installed base for the primary product allows application developers to spread sunk development costs over a

messenger or Internet telephony is more valuable the more people can be contacted using the service.[72] Viewers for multimedia content are subject to indirect network effects:[73] The larger the catalogue of content available in a particular format, the more users value owning viewers compatible with that format. At the same time, content providers are more likely to incur the costs of coding their content in a particular format, the larger the installed base of viewers compatible with that format.

Finally, at least some of these markets are subject to rapid technological change. Not surprisingly, markets for software applications are the canonical example of R&D intensive industries subject to dynamic competition.[74]

Now consider a network provider that is a local monopolist in Internet services and has acquired a dominant position in the nationwide market for a particular application. Such a provider has an incentive to exclude rivals from that market to protect itself from dynamic competition and preserve its monopoly in that market. Whether the monopolist will manage to prevent new entrants from entering the complementary market by excluding them from access to its Internet service customers, depends on the exact size of economies of scale with respect to the product in question, on the strength of any potential network effects and on the size of both the monopolist's network and the remaining network.

This theory played an important role in the FCC's evaluation of the merger between AOL and Time Warner. Time Warner owned a number of broadband cable networks; AOL held a dominant position in the market for instant messaging services and offered its instant messaging program to consumers nationwide. The FCC was concerned that the merged firm could use its control over broadband cable networks to disadvantage competitors seeking to overturn AOL's legally acquired monopoly in instant messaging services. To alleviate this problem, the FCC approved the merger subject to a condition (among others) that required AOL Time Warner to interoperate with instant messenger competitors prior to offering "advanced" instant messaging services.[75]

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larger potential sales base. Thus, in the presence of economies of scale and free entry into the complementary product market, a larger customer base leads to lower costs and greater variety of complementary products. *See, e.g.*, *id.* at 424; Katz & Shapiro, *Systems Competition*, *supra* note 61, at 99. The existence of direct or indirect network effects is a fundamental economic characteristic of many software markets. *See, e.g.*, EVANS & SCHMALENSEE, *supra* note 62, at 9-11; Katz & Shapiro, *supra* note 70.

72. *E.g.*, Faulhaber, *supra* note 58.

73. *E.g.*, MacKie-Mason, *supra* note 47, at 16.

74. *E.g.*, EVANS & SCHMALENSEE, *supra* note 62, at 4-15.

75. *AOL Memorandum Opinion & Order*, *supra* note 34, at 6603-29, ¶¶ 128-200. For an in-depth analysis of the economic rationale underlying this condition, see Faulhaber, *supra* note 58.

3. Relevance of Known Exceptions

There are a number of known exceptions to the "one monopoly rent" argument and to the "internalizing complementary efficiencies" argument outlined above. The following section describes two exceptions that may be relevant in the network neutrality context, but whose relevance in the network neutrality context has not been discussed in detail yet.[76]

In the first exception, the primary good is not essential for all uses of the complementary good, making it impossible for the monopolist to extract all monopoly profits through its pricing of the primary good.

In the second exception, the monopolist excludes competitors from the complementary market in order to protect its monopoly in the primary market.

3.1. Primary Good not Essential

a) Theory

The structure of models in this category,[77] and the underlying reasoning, is similar to the "monopoly preservation in the complementary market" case described above:

First, the monopolist has a monopoly in the primary market and the primary good is not essential (i.e., there are uses of the complementary good that do not require the primary good). Thus, the complementary market consists of a systems market and a stand-alone market. As a result, the monopolist cannot extract all profits through its pricing of the primary good and profits from extending its monopoly to the complementary market.

Second, there is a mechanism that enables the monopolist to exclude rival producers of the complementary good from the systems part of the market. Third, the complementary market is subject to economies of scale or network effects.

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76. For a more complete overview of known exceptions to the "one monopoly rent" argument, see Farrell & Weiser, *supra* note 13, at 105-19; van Schewick, *supra* note 32, at 245-67.

77. The following theory was developed by Whinston, *supra* note 41, at 854-55, and is widely accepted as an exception to the "one monopoly rent" argument. *See, e.g.*, Dennis W. Carlton, *A General Analysis of Exclusionary Conduct and Refusal to Deal: Why Aspen and Kodak Are Misguided*, 68 ANTITRUST L.J. 659, 667-68 (2001); Dennis W. Carlton & Michael Waldman, *The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries*, 33 RAND J. ECON. 194, 195 (2002); Jay Pil Choi & Chris Stefanadis, *Tying, Investment, and the Dynamic Leverage Theory*, 32 RAND J. ECON. 52, 55 (2001); Whinston, *supra* note 41, at 71. For a detailed application of this theory in the context of the open access debate, *see* Rubinfeld & Singer, *supra* note 13. *See also* Farrell & Weiser, *supra* note 13, at 119.

Given economies of scale in the complementary market, the monopolist can force its rivals to exit the stand-alone market by excluding them from the systems part of the market, extending its monopoly to the complementary market.[78]

Similarly, in the presence of network effects[79] in the complementary market, exclusion from the systems part of the market may suffice to drive competitors from the market or into a niche existence:

If the benefits derived from a larger network are large relative to the benefits of product differentiation in the network good, competition between two incompatible technologies will usually result in a single technology dominating the market.[80] The reason is that network effects give rise to strong positive feedback in technology adoption: other things being equal, consumers derive larger benefits from a larger network. As the larger network is more attractive, more consumers will join that network, making it even more valuable, leading to even more consumers joining the network. Once this positive feedback loop sets in, the affected technology will quickly pull away from its rivals in market share, ultimately dominating the market. This phenomenon is referred to as "tipping."[81]

As small initial advantages may quickly get magnified, small differences, in either perception[82] or reality, may determine the outcome of the competition. Therefore, establishing an early lead in installed base[83] that is large enough to start the positive feedback loop is an important strategy in network markets.[84]

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78. In the "monopoly preservation in the complementary market" case described *supra* Part II.B.2.3, the monopolist uses this mechanism to protect a legally acquired monopoly in the complementary market against emerging competition.

79. On network effects in general, see *supra* note 61. On direct and indirect network effects, see *supra* note 71.

80. Often, competitors will not be driven completely from the market. In particular, some customers with high switching costs or a unique preference for a competitor's product will prefer to stay with that competitor in spite of the strong network effects associated with the winning technology. *See, e.g.*, Faulhaber, *supra* note 58, at 329 n.37.

81. "'Tipping' occurs when a single provider reaches a critical mass of customers that are so attractive to others that competitors must inevitably shrink, in the absence of interoperation." *Id.* at 316.

82. In network markets, consumer expectations about the future size of the network play a crucial role in determining the outcome of the competition. This is due to the costs of belonging to the losing network: A consumer who has chosen the losing network can either switch to the winner, which may be costly, or suffer from the lower value of a small network. To avoid this situation, the consumer will choose the network that it expects to be the winner. *See, e.g.*, Besen & Farrell, *supra* note 61, at 118.

83. The installed base is the total number of consumers who have already bought the network good.

84. A substantial lead in installed base is not the only factor that influences the outcome of the competition. Due to the huge benefits of belonging to the winning network, users have a strong desire to choose the technology that will ultimately prevail. Therefore, consumers expectations of who the winner will be are at least as important. Other factors that may influence customers' expectations and that may therefore result in a competitive advantage are an estab-

Thus, if the monopolist excludes its rivals from the complementary market, it can capture all customers in the systems market. If the systems market is large enough, the monopolist's advantage in that market may enable it to reach a critical mass of customers that are so attractive to others that positive feedback sets in, making it impossible for a rival to catch up.

If the presence of rivals increases consumer surplus, the exclusion of rivals may reduce the monopolist's profits in the systems market.[85] In such a case, monopolizing the complementary market increases the monopolist's profits, if the gain from monopolizing the stand-alone market is larger than the loss resulting from the exclusion of the rival in the systems market.[86]

If the complementary market is subject to network effects, two effects make it even more likely that exclusion is a profitable strategy:

First, the potential profits from winning the competition between incompatible technologies are huge, increasing the benefits of exclusion. Imagine a competition between incompatible technologies that are subject to indirect network effects. If the winning standard is protected by intellectual property, the winner can make money on any primary and complementary product that uses the standard. Given the potentially large number of complementary products in markets with indirect network effects, licensing fees can lead to substantial profits.[87] For example, the winner in the standard competition between competing media player technologies who wins with a proprietary standard protected by intellectual property will not only dominate the market for media players, but will also be able to charge licensing fees for every piece of music or video that is encoded for use with the player.

Second, if the complementary product is subject to network effects, the presence of an independent rival in the complementary market does not necessarily increase the monopolist's profits in the systems market, a fact that reduces the costs of exclusion. If the monopolist's and the rival's complementary product are incompatible, sales to the rival decrease the size of the network of users of the monopolist's complementary

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lished reputation, a well-known brand name, or ready visible access to capital. Thus, an unknown firm with an early lead may be overtaken by a market leader that enters second, but has a well-known brand name and good reputation. *See, e.g.*, Katz & Shapiro, *Systems Competition*, *supra* note 61, at 107.

85. For example, if the rival produces a differentiated product, the rival's presence creates additional surplus, some of which the monopolist can extract through its sales of the primary good. Thus, the monopolist's profits in the systems market are increased if its rival is in the market.

86. *See* Whinston, *supra* note 41, at 850-52, 855.

87. Due to the cost structure of information products, profits are not even dependent on charging a monopoly price. *See* the analysis *infra* Part II.B.4.1.

product. As a result, the value users can derive from the monopolist's complementary product (and the profit the monopolist can extract from them) is lower than the corresponding value if the rival does not make any sales.[88]

b) Application to the Internet

As has been set out above,[89] the conditions underlying this theory are quite common in the Internet context:

Network providers may be local monopolists in the market for Internet services, but offer applications, content or portals to consumers nationwide. Network technology enables network providers to exclude providers of complementary products from access to its Internet service customers. At the same time, the markets for applications, content or portals are usually subject to significant economies of scale and, potentially, network effects.

As a result, an Internet service provider may be able to force its rivals from the nationwide market (the stand-alone market) by excluding rival portal, content or application providers from access to its Internet service customers (the systems part of the market). Whether exclusion from its Internet service customers suffices to drive its competitors from the nation-wide market[90] depends on the exact size of economies of scale with respect to the product in question, on the strength of any potential network effects and on the size of both the monopolist's network and the remaining network.[91]

Such a provider will have an incentive to monopolize the market for a particular type of application, content or portal, if the increased profit from additional application, content or portal sales nationwide more than offsets the reduction in broadband access revenues due to the reduction in variety resulting from the exclusion of its rivals with respect to its Internet service customers.[92]

88. Carlton & Waldman, *supra* note 77, at 206-07.

89. *See supra* Part II.B.2.3.b.

90. *See* Rubinfeld & Singer, *supra* note 13, at 310-13 (providing a numerical example). Their paper assesses the likelihood of content discrimination (i.e., blocking or degrading the quality of outside content) by a broadband network provider that is vertically integrated into the market for broadband content and portals in the context of the merger between AOL and Time Warner.

91. Even if the monopolist's footprint is not large enough to force its rivals to exit the market completely, exclusion from a part of the market may put them at a severe competitive disadvantage by forcing them to operate at a less efficient scale or with a smaller network. *See* the analysis *infra* Part II.B.4.1.

92. *See, e.g.*, Rubinfeld & Singer, *supra* note 13, at 310-13.

3.2. Monopoly Preservation in the Primary Market

a) Theory

In the following class of models, exclusionary behavior in the complementary market maintains the monopoly in the primary market.[93]

In models belonging to this category, the monopolist faces potential competition in the primary market. The monopolist can deter entry to the primary market by engaging in exclusionary conduct in the complementary market. Thus, by deterring entry to the primary market, the exclusionary behavior in the complementary market preserves the monopoly in the primary market.

Economists have come up with a number of explanations of why exclusionary conduct in the complementary market may be able to deter entry to the primary market. The following analysis will focus on an explanation that is particularly relevant in the Internet context: the exclusionary behavior in the complementary market harms future competitors in the primary market by depriving them of a source of complementary products.[94] As a result, in order to make any sales in the primary market, an entrant to the primary market needs to enter the complementary market as well (or otherwise secure a sufficient supply of complementary products). If this is significantly more difficult or costly than entering the primary market alone, potential entrants to the primary market may refrain from entering.

For such a strategy to succeed, two conditions must be met:

First, the exclusionary behavior in the complementary market must deprive a potential entrant to the primary market of a source of complementary products. As a result, the entrant cannot enter the primary market alone, but must enter both markets at once.

Second, simultaneously entering both markets must be more difficult or costly than the sum of the costs of entering both markets on their own.[95] Otherwise, the exclusionary behavior in the complementary mar-

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93. On this type of monopoly maintenance in general, see, e.g., Carlton, *supra* note 77, at 668-71; Farrell & Weiser, *supra* note 13, at 109-12; Steven C. Salop & R. Craig Romaine, *Preserving Monopoly: Economic Analysis, Legal Standards, and Microsoft*, 7 GEO. MASON L. REV. 617, 623-24 (1999). For specific models, see, for example, Carlton & Waldman, *supra* note 77; Choi & Stefanadis, *supra* note 77.

94. *See, e.g.*, Carlton, *supra* note 77, at 669-70.

95. *E.g.*, U.S. Dep't of Justice & FTC, Non-Horizontal Merger Guidelines, § 4.212 (promulgated in 1984 and reaffirmed in 1992 and 1997) ("The relevant question is whether the need for simultaneous entry to the secondary market gives rise to a substantial incremental difficulty as compared to entry into the primary market alone. If the entry at the secondary level is easy in absolute terms, the requirement of simultaneous entry to that market is unlikely adversely to affect entry to the primary market."), *available at* http://www.usdoj.gov/atr/public/guidelines/2614.htm [hereinafter Non-Horizontal Merger

ket is unlikely to adversely affect entry to the primary market.

Economists have identified four alternative reasons why simultaneous entry to both markets may be significantly more difficult or costly than the sum of the costs of entering each market on its own:

-increased cost of capital,
-differing economies of scale in both markets,
-the uncertainty of innovation, or
-the existence of indirect network effects.

Increased Cost of Capital

An entrant that is forced to enter both markets may face an increased cost of capital, if it only has experience relevant for operating in one of the markets. If the skills and knowledge necessary to succeed in both markets differ considerably, the increased probability of failure due to his inexperience in one of them may lead lenders to charge a higher rate for the necessary capital. The risk premium will be even larger, if the entrant has to incur huge sunk costs to enter the market. The higher sunk costs, the more costs cannot be recovered in the event of failure.[96]

Differing Economies of Scale in Both Markets

Entering two markets is more difficult than entering one, if the minimum efficient scale in both markets differs considerably. In this case, the entrant must choose between operating at an inefficiently small size in one market or at a larger than necessary scale in the other. Both strategies may significantly increase the operating costs of the entering firm.[97]

Uncertainty of Innovation

Given the uncertainty associated with the innovative process, the need to innovate successfully in two markets may decrease the probability of successful entry. To see this, assume that the probability of innovating successfully in one component is k. In this case, the chances of successful innovation in n components are k^n. Unless k is close to 1, this is considerably lower than k.[98] Thus, the probability of successful innovation in n components required to enter into n markets simultaneously is lower than the probability of successful innovation and successful entry

Guidelines].

96. For an argument along these lines, see Oliver E. Williamson, *Assessing Vertical Market Restrictions: Antitrust Ramifications of the Transaction Cost Approach*, 127 U. PA. L. REV. 953, 953-93 (1979); Non-Horizontal Merger Guidelines, *supra* note 95, § 4.212.

97. Non-Horizontal Merger Guidelines, *supra* note 95, § 4.212.

98. Carlton and Gertner, *supra* note 62, pp. 23-27; Choi & Stefanadis, *supra* note 77.

in one component market.

Existence of Indirect Network Effects

If the primary good is subject to indirect network effects[99] and any available complementary goods are offered exclusively with the monopolist's platform, an entrant into the primary market faces a "chicken and egg" problem: due to consumers' desire for variety in complementary products, consumers prefer a primary good that already offers a large number of complementary goods and services. At the same time, due to economies of scale and sunk costs in complementary product development, developers of complementary products prefer to develop products for primary goods that already have a large number of users. Thus, "[an entrant into the primary market] either has to offer consumers much lower value or has to incur large sunk costs to develop (or subsidize) a wide range of [complementary goods and services] before there is a large user base to purchase them." [100]

b) Application to the Internet

The conditions underlying this theory may well be present in the Internet context.

First, the exclusionary behavior in the complementary market must deprive a potential entrant to the market for Internet services of a source of complementary products.

By excluding rival producers of Internet portals, content and application from its network, the monopolist network provider may be able to drive its rivals from the nationwide market.

To deprive a potential entrant of a source of complementary products, the monopolist needs not only drive rival content and application producers from the market. He also needs to deny access to its own content and applications to consumers outside its network.[101] Otherwise,

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99. For a definition of indirect network effects, see *supra* note 71, 351.

100. Richard J. Gilbert & Michael L. Katz, *An Economist's Guide to US v. Microsoft*, 15 J. ECON. PERSP. 25, 30 (2001) (referring to operating systems and application programs). Under the label "applications barrier to entry," this line of reasoning has featured prominently in the Microsoft case. *See, e.g.*, United States v. Microsoft Corp., 253 F.3d 34, 54-56 (D.C. Cir. 2001); Gilbert & Katz, *supra*, at 28-30.

101. In addition to offering its own content and applications to the customers of its Internet service, the monopolist may also "allow" independent producers of these products to offer their products to the customers of its Internet service, as long as they agree to offer their products exclusively to these customers. Stated differently, instead of depriving a potential entrant into the market for Internet services of a source of complementary products by driving rival content and application producers from the market, the monopolist could deprive the potential entrant of a source of complementary products by signing exclusive contracts with independent content and application producers. Whether a monopolist could profitably impose such an

customers of rival network providers could simply use the monopolist's content and applications with the rival's Internet service.[102] Hence, for a particular application or content, this strategy and the "primary good not essential" strategy are mutually exclusive.[103]

Thus, this theory is only applicable, if (a) an Internet service provider offers proprietary content and applications exclusively to customers of its Internet service,[104] and if (b) - potentially due to the exclusion of rivals from its customers - there are not enough remaining independent applications, content or portals available that could be used by customers of rival or newly entering network providers.[105] In this case, a new entrant into the market for Internet services needs to develop (or subsidize the development of) its own content or applications.

One may wonder whether the condition (b) may ever be fulfilled in

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exclusivity provision, has been the subject of considerable debate. The Chicago school denied such a possibility, arguing that the other party to the exclusive contract would not agree to contracts that made it worse off, *e.g.*, BORK, *supra* note 39, at 309. More recent research has shown that this argument is incomplete: it does not consider the possibility that the exclusive contract imposes harm on third parties that are not parties to the contract, while not making the contracting parties worse off. In other words, the exclusive contract gives rise to a negative externality on third parties, and due to this externality, signing an exclusive contract is jointly optimal for the contracting parties. For a discussion of this question with pointers to the literature, see, for example, Gilbert & Katz , *supra* note 100, at 31-33; Michael D. Whinston, *Exclusivity and Tying in U.S. v. Microsoft: What We Know; and Don't Know*, 15 J. ECON. PERSP. 63, 66-70 (2001).

102. Usually, this theory is applied to cases, where the entrant's primary good is technically unable to take advantage of the set of applications developed for the monopolist's primary good. For example, software applications make use of a specific operating system's application programming interfaces and therefore run only on this operating system. As a result, customers of the entrant's operating system are technically unable to use applications developed for the incumbent's operating system. By contrast, as long as an application complies with the specifications of the Internet protocol, it can run over any physical network that supports the Internet protocol. As a result, applications adhering to that standard can be used by anyone connected to the Internet. Thus, from a technical point of view, the applications offered by the monopolist could be used by customers of a rival network provider as well. Therefore, the entrant's inability to use the monopolist's applications and content is not due to technical differences or incompatibility between the Internet services offered by the monopolist and a potential entrant, but results from the monopolist's business decision to offer its content and applications exclusively to customers of its own Internet service.

103. The strategy described here requires that the monopolist does not offer the content, application or portal to consumers outside its network; by contrast, in the "primary good not essential" strategy, the inability to earn monopoly profits on its sales to consumers outside its network is the reason that leads the monopolist to monopolize the complementary market as well. *See supra* Part II.B.3.1.

104. The potential anti-competitive implications of such a strategy are explored by, for example, MacKie-Mason, *supra* note 47, at 23-25; Rubinfeld & Singer, *supra* note 13, at 313-16.

105. Alternatively, the monopolist could reach the same result by allowing independent producers of applications, content and portals to offer their products to the customers of its Internet service, if they agree to provide the products exclusively to its customers. *See* the discussion *supra* note 101.

the Internet context: after all, there are a number of portals, content and applications that are available to anyone using the Internet today. The condition may be met in emerging markets such as the market for broadband Internet services, the market for Internet services for mobile phones or in emerging national markets in countries outside the United States. For example, there may be not enough independent applications or content that take advantage of broadband specific characteristics such as high transport speed or broadband's always on capacity.[106] Similarly, there may not be enough independent applications or content that are adapted to the specific limitations associated with using the Internet from mobile phones.[107] In a country that just started adopting the Internet, there may not be enough independent applications or content in the national language.

One may also imagine that consumers perceive certain applications and content as indispensable elements of Internet usage. If these applications and content are exclusively available with the incumbent's Internet service, consumers may not consider an entrant's Internet service an adequate alternative to the incumbent's Internet service, unless the entrant offers a similar set of applications and content itself. In this case, to deter entry to the market for Internet services, the incumbent does not need to drive all existing independent applications, portals and content from the market and offer all affiliated complementary products exclusively to customers of its Internet service. It suffices to restrict the exclusionary conduct to those applications and content that consumers view as essential. Although there are independent applications and content left that customers of a rival Internet service could use, the entrant will still be forced to enter the market for specific applications and content in order to be able to compete in the primary market.[108]

Second, simultaneously entering the market for Internet services and the market for content or applications must be more difficult or costly than entering the market for Internet services alone. This requirement is fulfilled as well. Simultaneous entry into both markets is more difficult or costly than entry into the market for Internet services alone if

106. Many broadband customers may simply use broadband Internet services to access narrowband offerings at higher speed. According to McKinsey, "so far, [. . .] faster and better access to the Internet is the sole killer application of broadband.," Beardsley et al., *supra* note 67, § "what happens next?" and Exhibit 6.

107. For example, compared to PCs, mobile handsets have small screens, limited keypads and not a lot of storage. *See, e.g.*, Francis Deprez et al., *Portals for All Platforms*, *in* MCKINSEY Q., Issue 1, 2002, at 92.

108. Finally, one may imagine a situation in which the nationwide market for Internet services consists of a collection of local monopolies who all bundle their content, portal and applications exclusively with their Internet service. In this case, a new entrant into the market for Internet services would have to enter the market for content, portals, or applications as well.

the two markets exhibit at least one of the four characteristics described above. In the Internet context, all four characteristics are present: first, entry to both markets requires very different capabilities, second, production in both markets is subject to differing economies of scale, third, success in the different markets is uncertain, and finally, due to the incumbent's exclusionary conduct, the provision of Internet service is subject to indirect network effects with respect to the individual provider's network.

First, developing software applications or interesting content requires very different capabilities than operating a network. As a result, a potential entrant to the market for Internet services may not necessarily have the capabilities required for entering the markets for applications or content.[109] In addition, most of the cost of entry into those complementary industries consists of the sunk costs of developing the offering that cannot be recovered in case of failure.[110] Due to these factors, the need to enter the complementary markets as well considerably increases the risks associated with entry to the primary market. Consequently, an entrant into both markets will most likely be charged higher rates for capital than an entrant to the primary market alone.

Second, the market for Internet services and the markets for complementary products are subject to very different economies of scale: for example, McKinsey estimates that assuming an average revenue per user of $ 18.00 to $ 22.50 a year in 2005, a broadband PC portal in Germany would need more than 8 million unique users to break even.[111] By contrast, the economies of building and operating physical networks over which IP services could be provided are much lower.[112]

Third, although network technology is undergoing rapid innovation, a new entrant into the market for Internet services can take advantage of existing technology and does not have to innovate itself. By contrast, the development of applications and content is subject to considerable uncertainty. If a potential entrant to the market for Internet services needs to develop several applications and services in order to be able to compete with the incumbent's Internet service, the uncertainty associated with each development reduces the likelihood of successful entry to the market for Internet services.

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109. *See, e.g.*, Robert Niewijk et al., *Why European ISPs Need Partners*, *in* MCKINSEY Q., Issue 1, 2003, 98.

110. That the costs of capital may increase with the amount of entry costs that are sunk is discussed by W. KIP VISCUSI ET AL., ECONOMICS OF REGULATION AND ANTITRUST 157-58, 161 (3d ed. 2000).

111. Deprez, et al., *supra* note 107.

112. For example, as of June 30, 2001, the 10 largest providers in the market for broadband transport services in the United States had between 1,409,000 and 360,000 residential broadband customers, Yoo, *supra* note 31, at 256 tbl.7 (internal citations omitted).

Fourth, Internet service is subject to indirect network effects:[113] the more applications and content are available for users, the more valuable Internet service becomes. At the same time, the development of content and applications is subject to economies of scale.[114] As a larger number of users allows application and content developers to spread the fixed costs of development over a larger potential sales base, under free entry to these markets the variety of applications and content will be higher and their cost will be lower, the larger the number of users.

Technically, any application based on the Internet protocol can run over any network that is connected to the public Internet and supports the Internet protocol. As a result, from a technical point of view, the relevant network for indirect network effects is not an individual provider's network, but the global Internet. Thus, technically, Internet service providers compete under conditions of compatibility.

By excluding independent applications from its network and offering its own applications exclusively to its own Internet customers, an Internet service provider can reintroduce indirect network effects with respect to its own network.[115] Stated differently, as a result of this strategy, the benefits of adding a new user do not accrue to anyone connected to the Internet, but are limited to the customers of the new user's Internet service provider. Application and content developers now have to decide whether to offer their product to the customers of the Internet service provider with the "closed" network or to the customers of Internet service providers following an open system strategy. Due to economies of scale in the production of application and content, the developers will base their decision on the size of the different networks.

As a result, an entrant to the market for Internet services will have difficulties attracting application and content developers who write for its network instead of the incumbent's. Thus, due to the incumbent's strategy, the entrant faces the chicken and egg problem described above: consumers will not subscribe to its Internet service in the absence of an attractive amount of content and applications; application and content developers will not produce for its network in the absence of an attractive number of users.[116]

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113. *E.g.*, Speta, *Handicapping*, *supra* note 5, at 83-84.

114. *See supra* Part II.B.2.3.b.

115. An Internet service provider could reach the same effect (i.e., reintroduce indirect network effects with respect to its own network) by using proprietary protocols inside its network, *see, e.g.*, COMPUTER SCI. & TELECOMM.S BD. & NAT'L RES. COUNCIL, THE INTERNET'S COMING OF AGE 147-49 (2001). An alternative strategy may be the provision of quality of service only within an Internet provider's network, *see, e.g.*, SHAPIRO & VARIAN, *supra* note 48, at 187.

116. COMPUTER SCI. & TELECOMM.S BD. & NAT'L RES. COUNCIL, *supra* note 115, at 147-49, describe a similar situation in the context of provider-specific indirect network effects

Thus, a monopolist provider of Internet services may be able to deter entry to the market for Internet services by excluding rival producers of applications, content and portals from the market and offering its own content and applications exclusively to the customers of its own Internet service.[117] This strategy may reduce consumers' valuation of its Internet service, as the exclusion of rival producers of applications, content and portals reduces the variety of complementary products available to customers of its Internet service. Thus, in deciding whether to employ such a strategy, the monopolist must trade off the loss in Internet service fees against the gains in future monopoly profits.

4. Profitability of Discrimination without Monopolization

In the network neutrality context, researchers commonly focus on the ability and incentive of a network provider to monopolize the market for selected complementary products. The previous sections have followed this approach. It is based on the implicit assumption that discrimination is only profitable, if the network provider manages to monopolize the complementary market. As the following section shows, this focus may be too narrow: A network provider may have an incentive to discriminate against an application even if the provider does not manage to drive it from the market.

Thus, researchers commonly underestimate the likelihood of discriminatory behavior by network providers: If discrimination requires the network provider to monopolize the complementary market to be a profitable strategy, discrimination will be restricted to those cases where the network provider can expect to drive its competitors from the complementary market. If, however, discrimination is a profitable strategy, even if the network provider does not manage to monopolize the complementary market, it is much more likely to occur.

The following analysis will cover four of the five exceptions outlined above.[118] It is based on the assumption that the exclusion of rivals from the network provider's Internet service customers increases the number of sales of the network provider's complementary product. At least some of the network provider's Internet service customers that would have used a rival's complementary product in the absence of ex-

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due to the use of proprietary protocols inside the network.

117. As highlighted *supra* note 101, an alternative way of deterring entry would be to sign exclusive contracts with independent producers of applications, content and portals. Such a strategy would have the advantage that the monopolist does not have to bear losses with respect to its Internet service fees, as its customers would have access to all existing applications, content and portals.

118. The fifth exception, "monopoly preservation in the primary market," *supra* Part II.B.3.2, requires that rival producers of excluded complementary products are driven from the market.

clusion will use the network provider's offering instead. Thus, by excluding rival producers of applications or content from its network, the network provider gains additional sales from its Internet service customers at the expense of its rivals. If the complementary product is subject to economies of scale or network effects and the network provider offers its complementary product to customers nation-wide, the exclusion from the network provider's Internet service customers may force rivals to operate at an economically less efficient scale or with a smaller network of customers, putting the rivals at a competitive disadvantage in the rest of the market as well and potentially leading to even more additional sales for the network provider's complementary product.

Based on this assumption, the analysis will ask, whether a larger number of sales of the network provider's complementary product increase its profits, even if the network provider does not manage to monopolize the complementary market in question.

4.1. More Sales at Market Prices

In a perfectly competitive market subject to constant returns to scale, simply increasing the number of sales at the market price will not increase profits. In such an industry, long-run equilibrium prices equal marginal costs, resulting in zero profit per unit sold. As a result, a firm cannot increase its profits by making additional sales at the market price. Instead, it needs to gain a monopoly position that enables it to raise prices above marginal costs.

Markets for applications, content and portals are different: In these markets, the exclusionary conduct need not result in a monopoly to increase the network provider's profits; it suffices if it results in a larger number of sales.[119] This is due to the cost structure underlying the production of applications and content: the production of these goods is characterized by high fixed costs and very low marginal costs. While the costs of developing the first instance of an application or content may be significant, the costs of producing additional copies may be negligible. Due to the need to cover fixed costs, such products are priced signifi-

119. For an economic model demonstrating this effect in the context of tying, see Patrick DeGraba, *Why Lever into a Zero-Profit Industry: Tying, Foreclosure, and Exclusion*, 5 J. ECON. & MGMT. STRATEGY 433 (1996). In DeGraba's model, oligopolists sell a differentiated good (the primary good) and a homogenous good (the complementary good) that are used in fixed proportions to produce the final good. The homogenous good can be produced at constant marginal cost by any firm incurring a certain fixed cost. The homogenous market is characterized by free-entry Cournot competition. In such a market, the zero-profit price of the good is greater than the marginal cost. As a result, the oligopolist in DeGraba's model will tie in order to increase the sales of the complementary good. Note that this model does not require the complementary good to be a differentiated good.

cantly above marginal costs.[120]

If the market price is significantly above marginal costs, a firm does not need to be able to charge monopoly prices to increase its profits: Instead, making additional sales at the market price may be enough.[121] More sales enable the firm to spread the fixed costs of production over more units, resulting in lower average costs per unit and a higher profit margin at the same price. Put differently, once a firm has made enough sales to cover the fixed costs, any additional sale at the market price only adds to the profits. For example, given that gross margins of 80% or 90% are common in computer software,[122] any additional sale may lead to a significant increase in profits.

By excluding rival producers of complementary products from its network, the network provider gains additional sales. These additional sales increase the network provider's profit, even if the excluded rivals are not driven from the complementary market completely.

For example, this fact has important implications for the relevance of the exception "primary good not essential" outlined above.[123] Whether a network provider can monopolize the nation-wide complementary market in question by excluding its rivals from access to its Internet service customers, depends on a variety of factors such as the exact size of economies of scale with respect to the complementary product in question, the strength of any potential network effects and the size of both the monopolist's network and the remaining network. Ultimately, the cases in which monopolization is a realistic prospect may not be very common. As monopolization is not necessary to increase the network provider's profits, however, this restriction does not matter. As long as the exclusion of rivals from its Internet service customers enables the network provider to increase the number of sales of its complementary product and the additional profits resulting from more sales at the market price are larger than the costs of exclusion, exclusion will be a profitable strategy. Given how often the conditions underlying the "primary good not essential" exception[124] are met, this drastically increases the likelihood

120. If the price were equal to marginal costs, firms would not be able to cover their fixed costs and would earn negative profits. In the long run, firms would not operate in such a market. Thus, even if all firms earn zero profit per unit in long-run equilibrium, equilibrium prices are above marginal costs.

121. SHAPIRO & VARIAN, *supra* note 48, at 161. The importance of market share and number of units sold in knowledge-based products is also described by AFUAH & TUCCI, *supra* note 49, at 52-54. For an economic model demonstrating this effect in the context of tying, see DeGraba, *supra* note 119.

122. Katz & Shapiro, *supra* note 70.

123. *See supra* Part II.B.3.1.

124. As outlined *supra* Part II.B.3.1, these conditions are: The network provider has a monopoly in the primary market (i.e., the market for Internet services). The primary good is not essential (i.e., there are uses of the complementary product that do not require the primary

that exclusion may be a profitable strategy.

4.2. More Outside Revenue

As indicated above,[125] a network provider may have an incentive to monopolize the complementary market, if the complementary product is a source of outside revenue that cannot be extracted in the market for Internet services. For reasons outlined above, its outside revenue will be higher if it excludes its rivals and collects the outside revenue directly than if tries to capture some or all of its rivals' outside revenue by threatening exclusion.

This increase in profit, however, is not dependent on a monopolization of the complementary product market.

Although the network provider's revenue from outside sources will be highest if it manages to monopolize the market for access to its customers, increasing the number of customers who access the network provider's offering may still lead to higher profits than trying to extract the outside revenue from its rivals.

Evidence suggests that even without a monopoly, the relationship between the number of customers and advertising revenue is not a linear one: for example, MacKie-Mason reports that although Lycos had 72 percent as many unique visitors as Yahoo! in September 1999, it received only 36 percent as much advertising revenue.[126] This implies that selling access to one large group of customers as a whole may still yield substantially more revenue than selling access to subgroups of that group separately, even if the seller does not have a monopoly in the market for access to its customers.

In addition, through its billing relationship with customers of its Internet service, the network provider has data on customer demographics that enables it to charge higher advertising fees or commissions for online sales than many of its rivals in the market for Internet content, portals and applications.[127] Again, this ability is not dependent on a mo-

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good). This condition is met when the Internet service provider offers its complementary product not only to its Internet service customers, but to customers nation-wide. The complementary market is subject to economies of scale or network effects, a condition that is met in most markets for applications, content or portals. The monopolist has a mechanism at its disposal that enables it to exclude its rivals from access to its primary good customers. In the Internet context, technology that enables the network provider to distinguish between applications running over its network and to control their execution provides the network provider with this capability.

125. *See supra* Part II.B.2.1.

126. MacKie-Mason, *supra* note 47, at 13.

127. Even if those rivals require consumers to register before using their product or service, they have no way to verify the information, unless they require payment; in this case, they can verify the information as part of the billing process, SHAPIRO & VARIAN, *supra* note 48, at 34-35; MacKie-Mason, *supra* note 47, at 11.

nopoly in the complementary market.

A similar argument applies to the variant of this exception described above.[128] In this variant, a network provider excludes Voice over IP (VoIP) providers from access to its Internet Service customers in order to preserve the outside revenue in the form of access charges associated with traditional long-distance calls. Such a strategy will also be profitable, if the network provider does not manage to exclude the VoIP providers from its customers completely: Access charges are per-call charges set by regulators; the ability to charge them is not dependent on keeping all long-distance customers. Every long-distance call lost to a VoIP provider reduces profits; the more conventional long-distance calls the network provider manages to keep, the higher its profits.

4.3. Monopoly Preservation in the Complementary Market

In the "monopoly preservation in the complementary market" exception outlined above,[129] the network provider excludes rival producers of a complementary product from access to its Internet service customers to preserve a legally acquired monopoly in the corresponding complementary market.

In the exception outlined above, the analysis assumes that the monopolist will be able to keep its rivals out of the nation-wide market by excluding them from access to its Internet service customers.

Even if the monopolist's footprint is not large enough to force its rivals to stay out of the market completely, exclusion from a part of the market may put them at a severe competitive disadvantage by forcing them to operate at a less efficient scale or with a smaller network. Compared to a world without exclusion, this may slow down the erosion of the network provider's monopoly in the complementary market, preserving its ability to charge monopoly profits for a longer time. Again, this may make exclusion a profitable strategy, even if the network provider does not manage to keep its rivals out of the market completely.[130]

C. Network Provider Faces Competition in the Market for Internet Services

Up this point, the analysis was based on the assumption that the network provider is at least a local monopolist in the market for Internet services. This assumption is in line with standard economic thinking on

128. *See supra* Part II.B.2.2.

129. *See supra* Part II.B.2.3.

130. *Cf.* POSNER, *supra* note 39, at 254 (making a similar argument with respect to the profitability of monopoly preservation through exclusionary conduct in new economy markets, if the monopoly is of intellectual property).

vertical exclusionary conduct in complementary markets: according to economic theory, an economic actor without monopoly power in the primary market will be incapable of excluding competitors in the complementary market using vertical practices such as tying, vertical mergers or exclusive dealing. A monopoly in the primary market is therefore considered to be an indispensable precondition for successful monopolization of the secondary market.[131]

Given this theory, it is not surprising that most of the literature on vertical exclusionary conduct in complementary product markets focuses on exclusionary conduct by monopolists: after all, the same conduct is unlikely to pose any significant anti-competitive threat, if the firm faces competition in the primary market.[132] This theory has also shaped the evaluation of existing firms' behavior in a complementary market: allegations of anti-competitive conduct in a secondary market are often countered by evidence that the accused firm does not have monopoly power in the primary market.[133] Alternatively, the analysis of the monopoly case is used as an argument "a maiore ad minus": if a monopolist in the primary market does not have the ability and incentive to impede competition in the secondary market, it is argued, then a competitive firm's conduct will pose even less of a threat.[134]

Based on this line of reasoning, most commentators believe that the threat of discrimination against independent providers of complementary products can be mitigated by competition in the market for Internet services. Stated differently, it is usually assumed that competition in the market for Internet services will restrict a network operator's ability and incentive to discriminate against independent content, portals or applications. This assumption forms the basis for two common policy proposals:

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131. *E.g.*, *id.* at 195; Yoo, *supra* note 31, at 188-91. Similarly, some sort of market power or political power is considered to be a prerequisite for strategies that raise rivals costs, *e.g.*, DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 353 (3d ed. 2000).

132. For an important exception to this point, see the literature on the exercise of aftermarket power by a firm that faces competition in the foremarket. This literature focuses on the question whether primary market competition precludes anti-competitive aftermarket actions. For an analysis of these issues with pointers to the literature, *see* Jeffrey K. MacKie-Mason & John Metzler, *Links between Vertically Related Markets: Kodak*, *in* THE ANTITRUST REVOLUTION: ECONOMICS, COMPETITION, AND POLICY 386 (John E. Kwoka, Jr. & Lawrence J. White eds., 3d ed. 1999).

133. *See, e.g.*, Yoo, *supra* note 31, at 249-50, 253 in the context of the open access debate ("I conclude that the structure of the broadband industry renders it unlikely that such combinations will pose any significant anti-competitive threat. . ."); and Yoo, *Beyond Network Neutrality*, *supra* note 4, at 61 in the context of the network neutrality debate ("This suggests that for most of the country, competition should remain sufficiently robust to ameliorate concerns of anticompetitive effects.").

134. *E.g.*, Speta, *Vertical Dimension*, *supra* note 5, at 986 (discussing this notion in the context of the open access debate).

the first proposal assumes that fostering facilities-based competition (i.e., increased competition between operators of different physical networks) will mitigate a network provider's ability and incentive to discriminate.[135] The second proposal seeks to restore competition at the Internet service provider level by requiring the owners of broadband networks to allow independent Internet service providers to offer their services over these networks. This regulatory response is called "open access," "multiple access" or "forced access," depending on the point of view of the commentator.[136]

The following analysis shows that this assumption is not correct: a network provider may have the ability and incentive to exclude rival content, applications or portals from its network, even if it faces limited competition[137] in the market for Internet services.[138] Apart from increasing the number of cases in which unaffiliated providers of complementary products face a real threat of discrimination, this result also implies that neither facilities-based competition nor open access regulation are the appropriate tools to mitigate this threat.[139]

Three arguments drive this result: First, in the Internet context, the ability to exclude competitors from a complementary market (the markets for applications, content and portals) is not dependent on a monop-

135. *See, e.g.*, Yoo, *Mandating Network Neutrality*, *supra* note 4, at 67 ("On the other hand, regulators can adopt a more humble posture about their ability to distinguish anticompetitive from procompetitive behavior and attempt to resolve the problem by promoting entry by alternative broadband platforms. Once a sufficient number of alternative last mile providers exists, the danger of anticompetitive effects disappears, as any attempt to use an exclusivity arrangement to harm competition will simply induce consumers to obtain their services from another last mile provider").

136. An example of this line of reasoning can be found in the FCC memorandum and opinion in the AOL Time Warner merger proceeding. *AOL Memorandum Opinion & Order*, *supra* note 34, at 6594-95, ¶ 107 ("We believe that if unaffiliated ISPs receive nondiscriminatory access to Time Warner cable systems [. . .] the merged firm's incentives and ability to withhold unaffiliated content from its subscribers will be substantially mitigated."); *see id.* at 6596, ¶ 112; Lemley & Lessig, *Ex parte, supra* note 31.

137. The analysis assumes that the network provider competes with at least one other network provider. *See infra* note 140 and accompanying text.

138. S*ee also* Joseph Farrell, *Open Access Arguments: Why Confidence is Misplaced, in* Net NEUTRALITY OR NET NEUTERING: SHOULD BROADBAND INTERNET SERVICES BE REGULATED 195 (Thomas M. Lenard & Randoph J. May eds., 2006) (arguing that limited competition may not necessarily remove network providers' incentives to discriminate). For a similar argument in the context of the debate over censorship by private proxies, see Seth F. Kreimer, *Censorship by Proxy: the First Amendment, Internet Intermediaries, and the Problem of the Weakest Link,* 155 U. PA. L. REV. 11, 33-36 (2006) (arguing that competition between Internet service providers may not be sufficient to discipline Internet service providers that disable content needlessly based on arguments very similar to the ones advanced above).

139. There may be other reasons that justify these proposals, though. For example, according to Lemley & Lessig, *Ex parte, supra* note 31, at 21-25, ¶ 54-65, the reduction in application-level innovation by independent providers resulting from the threat of discrimination constitutes only one of three arguments in favor of open access.

oly position in the primary market (the market for Internet services). Instead, the power to exclude is conferred by network technology (Section 1). Second, realizing the benefits of exclusion (i.e., an increase in profits (or, sometimes, a preservation of current profits)) does not require a monopoly position in the primary market. The lack of monopoly in the primary market even increases the network provider's incentive to increase profits by engaging in exclusionary conduct in the complementary market, as the network provider cannot simply extract the available monopoly profit by charging higher prices in the primary market (Section 2). Third, due to various factors such as the existence of switching costs or the ability to use discrimination instead of exclusion, the exclusion of rivals will not necessarily cause the network provider's Internet service customers to switch to another provider, making the costs of exclusion lower than is commonly assumed (Section 3).

The following analysis assumes that the network provider competes with at least one other network provider.[140] In addition, the network provider may offer content or applications. A particular application or content may be offered to all consumers (affiliated product) or exclusively to the customers of its own Internet service (proprietary product).[141]

1. Ability to Exclude

Today, technology is available that enables network providers to distinguish between applications and content running over its network and to control their execution. This technology enables the network provider to exclude selected complementary products from its network or to slow down their execution.

This technology enables the network provider to exclude unaffiliated providers of complementary products from access to its Internet service customers, independent of a monopoly in the market for Internet services.

While the exclusionary power of the technology does not reach beyond the network provider's network, exclusion from the network provider's Internet service customers may suffice to drive rival producers of complementary products from the nation-wide market, if there are economies of scale or network effects in the complementary market.[142]

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140. This assumption reflects the reality in the broadband market for residential customers in the US. According to a recent study by the United States Government Accountability Office, the median number of broadband providers available to residential users is two. United States Government Accountability Office, Report to Congressional Committees; Telecommunications; Broadband Deployment is Extensive throughout the United States, but It Is Difficult to Assess the Extent of Deployment Gaps in Rural Areas, at 18 (May 2006), *available at* http://www.gao.gov/new.items/d06426.pdf.

141. *See supra* Part II.A.

142. *See supra* Part II.B.3.1.

Whether this will happen, depends on the exact size of economies of scale with respect to the complementary product in question, on the strength of any potential network effects and on the nation-wide number of both the monopolist's Internet service customers and the customers of other network providers.[143] Thus, in this context, the ability to drive competitors from the nation-wide complementary market depends on the network provider's nation-wide market share in the market for Internet services. Again, a monopoly position in this market is not required.

2. Benefits of Exclusion

In a variety of cases, the exclusionary conduct will increase (or preserve) the network provider's profits in the complementary market. As the analysis will show, this increase is not dependent on a monopoly position in the market for Internet services; nor does it require the network provider to gain a monopoly in the complementary market.[144] Instead, the lack of monopoly in the primary market constrains the network provider's ability to extract profits in the market for Internet services, making the ability to realize profits in the complementary market even more attractive. As a result, there are many more cases in which exclusion may be profitable than is commonly assumed.

In general, by excluding rival producers of a specific complementary product from access to the network provider's Internet service customers, the network provider will increase the number of sales of its own complementary product.[145]

As set out in detail above, the increase in the number of sales will often lead to an increase in profits. In the cases outlined above, the increase in profits results from an increase in the number of sales, not from the ability to charge monopoly profits. Thus, to be profitable, the exclusionary conduct need not drive rivals from the complementary market completely.

In the cases described above, the network provider had a monopoly in the market for Internet services. As the following analysis will show, however, the increase in profits due to exclusion was not dependent on this monopoly position (Sections 2.1 – 2.3). In addition, it will highlight a variant of the "monopoly preservation in the primary market" exception outlined above: the network provider may exclude selected producers of complementary products from access to its customers to protect its

143. Even if the monopolist's footprint is not large enough to force its rivals to exit the market completely, exclusion from a part of the market may put them at a severe competitive disadvantage by forcing them to operate at a less efficient scale or with a smaller network. *See* the analysis *supra* Part II.B.4.1.

144. *See supra* Part II.B.4.

145. *See supra* Part II.B.4.

competitive position in the primary market (Section 2.4).

2.1. More Sales at Market Prices

In the exception "more sales at market prices,"[146] the increase in profits resulting from the higher number of sales in the complementary market was driven by the specific cost structure of the markets for applications, content or portals, which are characterized by high fixed costs and low marginal costs. This cost structure is not affected by the existence of market power in the market for Internet services.[147]

2.2. More Outside Revenue

In the exception "more outside revenue,"[148] the increase in profits resulted from the logic of pricing in the markets for advertising. This enabled the network provider to realize higher outside revenue by selling access to a large group of its Internet service customers directly, instead of letting rival producers of complementary products sell access to smaller groups of customers and extracting the outside revenue from them. Again, a monopoly in the market for Internet services is not required for this relationship to hold.

There is evidence that some Internet service providers (i.e., economic actors that face competition in the Internet service market) do in fact attempt to reduce the amount of time their customers spend on unaffiliated content or portal offerings. For example, in the AOL/Time Warner merger proceeding the FCC found that "[t]he record in this proceeding provides some evidence that AOL already seeks to limit its members' access to unaffiliated content on the World Wide Web. For example, AOL requires that content appearing on AOL web sites have only a limited number of hyperlinks to unaffiliated content." [References omitted][149]

In the variant of this exception,[150] the network provider was interested in excluding Voice over IP (VoIP) providers from access to its customers, because it could only charge access charges for long-distance calls placed using the conventional telephone service, not for long-

146. *See supra* Part II.B.3.1, and Part II.B.4.1.

147. DeGraba's model, DeGraba, *supra* note 119, which demonstrates this effect in the context of tying, supports this analysis. In the model, the producer of the primary good has an incentive to tie in order to increase the number of sales of the secondary good, although it competes with another producer in the primary market. Thus, in the model the incentive to exclude independent competitors from the secondary market is not dependent on a monopoly position in the primary market. The model is discussed in more detail *supra* note 119.

148. *See supra* Part II.B.2.1, and Part II.B.4.2.

149. *AOL Memorandum Opinion & Order*, *supra* note 34, at 6594 ¶ 106; *id.* at 6593-94, 104-06.

150. *See supra* Part II.B.2.2, and Part II.B.4.2.

distance calls using VoIP. Access charges are per-call charges set by regulation; they do not depend on a monopoly in the market for Internet services.

2.3. Monopoly Preservation in the Complementary Market

In the exception "monopoly preservation in the complementary market,"[151] the ability to preserve the monopoly in the complementary market depended on various factors such as the exact size of economies of scale with respect to the complementary product in question, on the strength of any potential network effects and on the nation-wide number of both the monopolist's Internet service customers and the customers of other network providers. A monopoly in the market for Internet services is not required.

2.4. Preserving Competitive Position in the Primary Market

The exclusion of rivals may protect the network provider's competitive position in the market for Internet services, even if it faces competition in this market. Such an incentive may occur, if an Internet transport provider offers proprietary content and applications exclusively to its transport customers. This is a common strategy, as it enables the transport provider to relax price competition in the market for Internet services by differentiating its transport service from rival offerings, to reduce customer turnover and increase profits by raising switching costs and to make additional profits by selling access to its customers to advertisers, content providers or online merchants.[152]

Independent content and applications that can be used from any provider threaten the success of this strategy:

First, they reduce the differentiation of a provider's offerings by providing comparable, but independent alternatives.

Second, independent offerings may reduce the switching costs of the network provider's Internet service customers. Switching costs are the costs a customer incurs when switching to a competitor.[153] For example, when switching from one dial up access provider to another, a consumer must reconfigure his or her Internet access program. When switching from broadband access over cable to DSL, a consumer also needs to buy and install new equipment such as a DSL modem. Switching costs reduce customer turnover: when considering whether to switch

151. *See supra* Part II.B.2.3, and Part II.B.4.2.

152. *See, e.g.*, MacKie-Mason, *supra* note 47, at 11.

153. *See, e.g.*, VARIAN, *supra* note 42, at 603-05 (providing overview of switching costs); *see also* SHAPIRO & VARIAN, *supra* note 48, chapters 5-6 (treating switching costs in the context of information goods).

to a competitor, a customer takes his switching costs into account. Switching costs also make demand more inelastic, enabling the seller to raise prices.[154]

Bundling Internet transport service with proprietary content and applications that are offered exclusively to transport customers is a common way to increase switching costs.[155] In this case, consumers loose access to their old provider's proprietary content and applications when they switch to another provider. As a result, they have to search for new ones and learn how to use them. If the new provider does not offer comparable content or applications, not being able to use the old provider's proprietary content or applications any more is itself a cost of switching. In addition, many proprietary offerings induce their customers to engage in nontransferable database creation and customization. For example, Internet service providers offer provider-specific e-mail addresses that cannot be transferred to another provider;[156] to take advantage of services like stock portfolio tracking, instant messaging or customized news pages, users have to enter nontransferable data as well. When switching providers, customers need to notify relevant parties of their new e-mail addresses or instant messaging IDs and loose their site-specific data.

Independent offerings may reduce the effectiveness of this strategy by reducing customers' switching costs: as the independent application or content is not tied to a specific provider of Internet services, consumers can continue to use it after switching providers. In addition, by creating site-specific data on independent offerings, customers can avoid becoming locked in to a specific access provider.[157]

Third, as has been set out above, independent alternatives may also reduce the time customers spend using proprietary offerings, reducing third party revenues such as advertising fees or commissions for online sales.

By excluding independent applications and content that compete with the network provider's proprietary offerings, the network provider may be able to prevent these problems.

3. Costs of Exclusion

Compared to the monopoly case, the existence of other, competing network providers may increase the costs of exclusionary behavior in the complementary market. Due to a variety of factors such as the existence of switching costs or the ability to use discrimination instead of exclu-

154. *E.g.*, VARIAN, *supra* note 42, at 604-05; Hausman et al., *Residential Demand*, *supra* note 31, at 164.

155. *See, e.g.*, MacKie-Mason, *supra* note 47, at 11.

156. *See, e.g.*, SHAPIRO & VARIAN, *supra* note 48, at 109-10.

157. They get locked in to the independent offering, though.

sion, the costs of exclusion will still be lower than is commonly assumed.

If the network provider is the only supplier of Internet services in a particular geographic area, consumers have no alternative way of accessing the excluded application or content. They either subscribe to the provider's Internet service or do not use Internet services at all. Thus, the costs of the exclusionary behavior are twofold: first, the price of Internet services will be lower due to the reduction in application and content variety.[158] Second, without being able to use the excluded application or content, some consumers may not value Internet services enough to pay the lower price.[159] Given that that the pricing of the service already reflects the reduced value, the number of lost transport customers will probably not be very high.

If the provider competes with at least one other network provider, consumers who desire access to the excluded application may switch to another provider. As these consumers do not have to forgo Internet services altogether, the number of lost transport customers will probably be higher than if the excluding network provider does not face competition. Thus, competition increases the costs of exclusionary behavior in the complementary market.[160]

Several factors may limit the costs of exclusionary behavior in spite of competition in the market for Internet services:

First, if the exclusionary conduct manages to drive the producers of the excluded application or content from the market, switching providers will not enable consumers to get access to the excluded product. As a result, fewer consumers will switch in response to the exclusion.[161]

Second, switching costs may prevent consumers from changing providers to get access to the excluded application.[162] This is the case, if the increased value from being able to use the excluded application is smaller than the costs of switching to another network provider. Thus, the higher switching costs, the lower the number of customers lost to other network providers.[163]

Third, and potentially most importantly, the network provider may be able to avoid this problem altogether by using discrimination instead

158. *See* Wu, *Network Neutrality*, *supra* note 1, at 153 (discussing the costs of a discriminatory pricing scheme that prohibits customers of a network provider's basic Internet service from using specific applications).

159. *See, e.g.*, Rubinfeld & Singer, *supra* note 13, at 310.

160. *See, e.g.*, *id.* at 310.

161. *See, e.g.*, *id.* at 312-13.

162. *See, e.g.*, Hausman et al., *Residential Demand*, *supra* note 31, at 164; Kreimer, *supra* note 138, at 34-35; NUECHTERLEIN & WEISER, *supra* note 9, at 156. For a discussion of switching costs in the market for Internet services, see *supra* notes 153-157 and accompanying text.

163. Switching costs do not protect the network provider from losing business from new customers.

of direct exclusion.[164] As today's network technology provides the ability to control the execution of applications running over the network, a network provider can negatively affect the execution of particular applications. For example, the network provider can slow down the transport of certain applications or the delivery of selected content. If a network provider discriminates against a rival's complementary product, consumers' use of the rival's product is less satisfactory than their use of the network provider's own offering, even if the rival's product is of higher quality.

Thus, discrimination works indirectly by changing consumers' perception of the quality of a rival's offering. As consumers are unable to detect the true cause of the lower quality, they may mistakenly attribute it to bad product design and use competing products whose use is more satisfactory. For example, a slow gaming experience may be due to bad application programming, insufficient server capacity at the gaming site or slow Internet transport. Similarly, long waiting times for pages from an online shop could result from bad programming of the underlying databases or insufficient server speed. If customers do not usually experience problems with network speed, they will be inclined to blame the online game or the online shop.

With discrimination, consumers have the option of choosing the rival's product, but prefer the network provider's product which they perceive to be of higher quality. Contrary to direct technical exclusion or tying, they will not feel that their choice has been restricted. As they do not wish to use the rival's product, the discrimination will neither reduce their valuation of the network provider's Internet services nor cause them to switch to a competing provider.

Thus, if the network provider discriminates against rival products instead of excluding them directly, competition in the market for Internet services does not increase the costs of the exclusionary conduct.

D. Conclusion

Although a network provider does not generally have an incentive to discriminate against independent providers of content, applications or content, the analysis has highlighted a variety of circumstances under which it may have such an incentive. Such an incentive may not only occur if it has a (local) monopoly in the market for Internet services, but also if it faces competition. Whether the conditions giving rise to such an incentive are present in a real life situation, is an empirical question. In most cases, however, the network provider need not be able to gain a monopoly in the complementary market to make exclusion a profitable

164. *See, e.g.*, Rubinfeld & Singer, *supra* note 13, at 310, 313.

strategy, making the threat of discrimination more relevant than commonly assumed.

In most cases, the network provider need not exclude all independent developers of complementary products from its network in order to increase its profits. Instead, it will often be profitable to exclude only those complementary products that directly compete with one of its own complementary products. This reduces the costs of exclusion, as the reduction in complementary goods variety is restricted to those products that are actually excluded.

Due to the specific characteristics of markets for applications and content such as the cost structure of information goods and (sometimes) the existence of network effects, the exclusion of rivals may lead to gains that are significantly higher than in traditional markets. As a result, it is more likely that the gains from exclusion exceed the associated costs, making it more likely that exclusion is a profitable strategy.[165]

II. IMPACT ON APPLICATION-LEVEL INNOVATION

The previous part has highlighted conditions under which a network provider may have an incentive to exclude independent producers of applications, content or portals from access to its Internet service customers. When these conditions are present, independent producers of complementary products face a real threat of discrimination.

The following section analyzes the impact of this threat on innovation in the markets for applications, content and portals ("application-level innovation"). It shows that the threat of discrimination reduces the amount of application-level innovation by independent producers of complementary products (Section A). While discrimination increases network providers' incentives to engage in application-level innovation, this increase cannot offset the reduction in innovation by independent producers (Section B). Thus, the threat of discrimination reduces the amount of application-level innovation.

A. Incentives of Independent Producers of Complementary Products

In the absence of network neutrality regulation, the threat of discrimination reduces the amount of application-level innovation by independent producers of complementary products in three ways.

First, when the conditions for profitable exclusion outlined above are present in a particular complementary market, a network provider will discriminate against rivals in this market. As indicated above, dis-

165. *Cf.* POSNER, *supra* note 39, at 254 (discussing the profitability of monopoly preservation through exclusionary conduct in new economy markets, if the monopoly is of intellectual property).

crimination will reduce their profits.[166] A potential innovator bases its decision to innovate on the expected costs and benefits of realizing the innovation. Facing the threat of discrimination, potential innovators in affected markets will expect lower profits. Thus, the threat of discrimination reduces their incentives to innovate.

Second, the profitability of exclusion depends on a large number of factors that may not be common knowledge for all market participants. As a result, an economic actor with an idea for a complementary product may not be able to decide whether the network provider will have an incentive to exclude the final product from the market.[167] As a result, potential innovators face a significant uncertainty with respect to their future competitive environment. This uncertainty may reduce a developer's incentive to innovate, even if the factual conditions for profitable exclusion are not present.

Third, the above analysis suggests that independent producers of complementary products need not be concerned about exclusion, if the network provider does not currently offer a competing product. This seems to imply that innovation will only be harmed where the network provider is already vertically integrated into one or more complementary markets. Economic theory shows that this is not correct: Even if the network provider does not currently offer a competing product, it may be tempted to imitate the entrant, exclude the entrant from its network and exploit the complementary market itself, once the entrant starts to make significant profits.

Economic models show that in the presence of demand uncertainty in a complementary market, a primary good monopolist with a selling advantage in this market may have an incentive to let an independent producer enter the complementary market first to let him "test the waters."[168] If the level of demand turns out to be large enough once the demand uncertainty is resolved, the primary good monopolist enters the

166. The exclusionary conduct hurts independent producers of excluded complementary products in several ways: first, they are excluded from the part of the complementary market that consists of the network provider's Internet service customers. As a result, they are unable to make any sales in that market. In addition, due to economies of scale and, potentially, network effects in the production of their products, the exclusion from a part of the market may put them at a competitive disadvantage in the rest of the market as well. In the worst case, they may be forced to exit the complementary market completely. If they had made at least some sales to the network provider's Internet service customers in the absence of the exclusionary conduct, the exclusion will reduce their profits.

167. Similarly, the network provider may fail to assess the situation correctly and discriminate against or exclude an independent provider of complementary products, even if none of the conditions under which this conduct would be profitable apply. Farrell & Weiser, *supra* note 13, at 114-17 (calling this problem "incompetent incumbents" and include it in their list of exceptions to their version of the "one monopoly rent" argument).

168. David A. Miller, *Invention under Uncertainty and the Threat of Ex Post Entry,* (Aug. 24, 2006), http://ssrn.com/abstract=319180.

market as well and uses its selling advantage to make most of the sales. Foreseeing this course of events, the independent producer refrains from entering the market. As a result, nobody enters the complementary market; there is a region of foregone invention where privately and socially beneficial innovations are not realized.

For this situation to occur, three conditions must be realized: First, there must be demand uncertainty in the complementary market. Second, in the presence of demand uncertainty, entry to the complementary market is attractive for the independent producer, but not for the primary good monopolist (e.g., due to cost heterogeneity). Third, the primary good monopolist has a selling advantage in the complementary market.

In the Internet context, these conditions will often be met: First, in markets for new applications or content, there is usually a considerable demand uncertainty. Second, the economics and business strategy literature highlights a variety of reasons, why an incumbent network provider may not have an incentive to enter a complementary market for a new product in the presence of demand uncertainty, while an independent producer may have such an incentive. For example, start-ups often have lower entry costs than an incumbent due to the different cost structure of incumbents and new entrants.[169] In addition, while a small level of demand may meet the growth needs of a small company, a large incumbent will need much higher levels of demand to meet its growth needs.[170] Similarly, even if the level of demand is too uncertain for the network provider to justify innovation, users may find it attractive to innovate to meet their own application needs.[171] Third, the ability to technically exclude a rival producer of complementary products from its network provides the network provider with a huge selling advantage in the complementary market.

Thus, the number of markets in which independent developers' incentives to innovate are reduced will be larger than implied by the exceptions outlined above.

B. Incentives of Network Providers

As the previous section has shown, the threat of discrimination reduces independent producers' incentives to innovate in the markets for applications, content or portals. This reduction is only relevant, if it is not offset by a corresponding increase in network providers' incentives to

169. *E.g.*, CLAYTON M. CHRISTENSEN, THE INNOVATOR´S DILEMMA; WHEN NEW TECHNOLOGIES CAUSE GREAT FIRMS TO FAIL 132 (rev., updated ed., Harper Business 2000) (1997).

170. *E.g.*, *id.* at 128-30.

171. *See* van Schewick, *supra note* 32, at 329-42 (providing pointers to the relevant literature).

innovate in these markets. While network providers' incentives to innovate at this level do rise due to the increase in profit under discrimination, this increase in a few network providers' incentives to innovate cannot compensate for the reduction in innovation by independent producers.

There are three reasons for this: First, the reduction in potential innovators results in less diverse approaches to innovation, with negative consequences for the amount and quality of innovation. Second, with respect to particular innovations, economic actors other than the network providers may have an incentive to innovate, while the network providers may lack such an incentive. This further reduces the amount of innovation. Third, there are specific benefits associated with specific types of independent innovators which a network provider cannot replicate.

First, while there are a large number of (potential) independent producers of complementary products, there are only a few network providers. Thus, by reducing the innovation incentives of a large number of independent developers, the threat of discrimination ultimately reduces the number of innovators at the application-level. In the presence of technological uncertainty, market uncertainty or consumer heterogeneity, this reduction negatively affects the amount and potentially the quality of application-level innovation.

Human beings and, consequently, the firms for which they work have different experiences, capabilities and organizations, a fact that is stressed by research in evolutionary economics and management strategy. Due to these differences, economic actors may react very differently when exposed to the same situation. The impact of these differences rises with technological uncertainty, market uncertainty or consumer heterogeneity. Under these conditions, an increase in the number of potential innovators will result in a more diverse set of approaches to innovation,[172] and a more diverse set of approaches will be socially beneficial:[173] It guarantees a more complete search of the space of potential complementary products and decreases the probability that beneficial uses of the platform remain undetected. It increases the expected quality of the resulting products and may increase the amount of heterogeneous consumer needs that are served.

Second, research in economics and management strategy has identified systematic differences in the nature and direction of innovative activity between different types of innovators. In particular, due to differences in history, economic position and capabilities, the same innovation may be attractive to one type of innovator, but not to another. This re-

172. *See id.* at 299-305 with pointers to the relevant literature.
173. *See* the discussion in *id.* at 305-10 with pointers to the relevant literature.

search suggests that there are a large number of cases in which economic actors other than the network provider may have an incentive to realize an innovative idea, while the network provider may lack such an incentive. For example, this has been shown for new entrants to a complementary market, for venture-capital backed firms and for users.[174] When independent producers loose their incentive to innovate, this innovation will be lost.

Third, there are specific benefits associated with specific types of independent innovators which a network provider cannot replicate. For example, research has shown that the participation of firms backed by venture capitalists may increase the amount and the quality of innovation. Enabling users to innovate, may leave less customer needs unserved. In addition, users often make their innovation freely available to others; as a result, such innovations will reach a higher level of diffusion than a similar innovation of comparable quality that is produced by a network provider which sells the innovation to make a profit.[175]

In the context of the Internet, technological and market uncertainty as well as user heterogeneity are high,[176] suggesting that the reduction in independent producers' incentives to innovate will have the detrimental impact on application-level innovation outlined above.

III. IMPACT ON SOCIAL WELFARE

Network neutrality rules prevent network providers from discriminating against independent producers of complementary products or excluding them from their network. In the absence of network neutrality regulation, there is a real threat of discrimination (see Part II). Regulatory intervention to remove this threat is only justified, if the social benefits of regulatory intervention are larger than the costs.

As Part III has shown, network neutrality regulation increases the

174. *Id.* at 311-24 (new entrants), 324-29 (venture capital backed firms), 329-42 (users), based on a discussion of the relevant literature.

175. *Id.* at 337-42, based on a discussion of the relevant literature. While it is difficult to quantify these benefits, there are indications that they may be significant. For example, surveys indicate that today's standard commercial products may on average leave between 46% and 54% of customer needs unserved. *See* Nikolaus Franke & Eric von Hippel, *Satisfying Heterogeneous User Needs Via Innovation Toolkits: The Case of Apache Security Software*, 32 RES. POL'Y 1199, 1201-02 (2003).

176. Both network technology as well as technologies for the development of applications are still evolving, creating considerable technological uncertainty. A large number of useful applications are still waiting to be identified; in these areas, market uncertainty is high. The more people and businesses get connected to the Internet, the higher the heterogeneity of Internet users will become. Ultimately, the heterogeneity of Internet users will mirror the heterogeneity of society. As a result, the heterogeneity of user needs is bound to be increasing, not decreasing.

amount of application-level innovation. The increase is only relevant, if it is socially beneficial (Section A). On the cost side, network neutrality rules reduce network providers' incentives to innovate at the network level and to deploy network infrastructure (Section B.1). While regulatory intervention has its own costs, these are not covered in detail (Section B.2). When deciding whether to introduce network neutrality regulation, regulators must trade-off the benefits against the costs (Section C).

The analysis shows that the increase in application-level innovation is socially beneficial and that these benefits are more important than the costs.

A. Benefits

Network neutrality rules increase the amount of application-level innovation. This increase is only relevant to public policy, if it increases social welfare. This question can be approached in several ways.

First, one may ask whether the amount of innovation is generally lower than the social optimum. In this case, an increase in the amount of innovation would be socially beneficial.

In dealing with such questions, economists often note that the link between innovation and social welfare is theoretically ambiguous:[177] on the one hand, some economic models highlight the possibility that in their desire to capture the rents from innovation, firms may increase the level of investment in research and development above the socially efficient amount.[178] On the other hand, the existence of uncompensated spillovers and other factors such as the inability of innovators to perfectly appropriate the increase in consumer surplus lead to the theoretical prediction that firms will not be able to completely appropriate the social gains from innovation, leading them to invest less than the socially optimal amount in innovation.[179]

A closer look at the underlying models indicates that under conditions of uncertainty this ambiguity may disappear, leading to the insight that the amount of innovation is usually too low, which makes any increase in innovation socially beneficial. In models where firms invest more than the socially efficient amount in innovation, the wedge

177. *See, e.g.*, Jennifer F. Reinganum, *The Timing of Innovation: Research, Development, and Diffusion*, *in* 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 849 (Richard L. Schmalensee & Robert D. Willig eds., 1st ed. 1989); JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 399-400 (1988); Michael L. Katz, *Intellectual Property Rights and Antitrust Policy: Four Principles for a Complex World*, 1 J. ON TELECOMM. & HIGH TECH. L. 325, 337 sec.C (2002).

178. For an overview of this literature, see Reinganum, *supra* note 177. For a particular example of such a model, see Partha Dasgupta & Eric Maskin, *The Simple Economics of Research Portfolios*, 97 ECON. J. 581 (1987).

179. *See, e.g.*, TIROLE, *supra* note 177, at 399-400.

between private and social benefits from innovation results from the argument that society does not care which firm is ultimately successful, whereas each individual firm wants to be the winner.[180] Thus, these models are based on the implicit assumption that similar approaches by different firms constitute a wasteful duplication of efforts that should better be avoided. As indicated above, such an assumption neglects differences in firm heterogeneity. Once firm heterogeneity is taken into account, having different firms approach a particular problem will often be socially beneficial.

These theoretical insights are supported by empirical studies. They indicate that there is indeed too little innovation, because private firms are typically unable to appropriate all social gains from the innovation.[181]

Second, one may ask whether in the specific case under analysis there is likely to be less innovation than the socially optimal amount. Innovation in platform products[182] and complementary products is subject to two types of externalities that are likely to reduce the amount of innovation below the social optimum:[183] while the first operates vertically between the platform product and each complementary product, the second externality operates horizontally between different complementary products.

Due to the complementarity between the platform product and complementary products, innovation in complementary products usually increases demand for the platform product and vice versa. If the platform product and the complementary product are developed by different economic actors, the innovator in a complementary component does not appropriate the positive effect on the platform product, and vice versa.[184]

Innovation in one complementary product usually increases demand for the platform product, which may in turn positively affect demand for other complementary products. If different economic actors pursue innovation in the different components, each actor does not appropriate the positive effect on the other components. As a result, each actor's incentives to innovate will be lower than the social optimum.

A common solution to the problems caused by such externalities is

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180. *See, e.g.*, Dasgupta & Maskin, *supra* note 178, at 584-85.

181. *See, e.g.*, Edwin Mansfield et al., *Social and Private Rates of Return from Industrial Innovations*, 91 Q. J. ECON. 221 (1977); Charles I. Jones & John C. Williams, *Measuring the Social Return to R&D*, 113 Q.J. ECON. 1119 (1998).

182. A platform product is a product that may be used with a large number of complementary products. *See, e.g.*, Douglas G. Lichtman, *Property Rights in Emerging Platform Technologies*, 29 J. LEGAL STUD. 615 (2000).

183. This observation is made in two different contexts by Timothy F. Bresnahan & Manuel Trajtenberg, *General Purpose Technologies 'Engines of Growth*,?' 65 J. ECONOMETRICS 83 (1995) and Lichtman, *supra* note 182.

184. *See, e.g.*, Bresnahan & Trajtenberg, *supra* note 183, at 94; Farrell & Katz, *supra* note 41, at 414 and appendix.

integration by all affected parties. The integrated entity internalizes the externalities and has therefore higher incentives to innovate.[185] In the current context, this is not a feasible solution: no single economic actor will be able to identify and realize all beneficial uses of the Internet.[186]

Finally, any assessment of the benefits of additional application-level innovation needs to take account of the character of the Internet as a general purpose technology.[187]

As a general purpose technology, the Internet has the potential to significantly increase economic growth.[188] General-purpose technologies offer a generic functionality that can potentially be applied in a large number of sectors within the economy. As the use of a general-purpose technology spreads throughout the economy and increases productivity in the sectors in which it is applied, the promises for economic growth that this technology holds materialize. At the same time, new applications trigger new advances in the general-purpose technology itself; these advances may in turn spawn the adoption of the general-purpose technology in additional sectors of the economy or may lead to new or improved applications in sectors that already use the technology. Thus, the adoption of general-purpose technologies exhibits increasing returns to scale, leading to potentially enormous increases in economic growth.[189]

As the positive impact of a general purpose technology stems primarily from the productivity increases resulting from its adoption in more and more sectors of the economy, the existence of a general-purpose technology is not sufficient to positively impact economic growth. Instead, the rate at which a general purpose technology affects

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185. See Farrell & Katz, *supra* note 41(discussing some important refinements to this statement). As Farrell & Katz demonstrate, integration between two firms that each are the sole supplier of a component that is complementary with the other does not necessarily increase the incentives to invest in socially valuable research and development. *(See id.* at appendix). In addition, they show that integration between a monopoly supplier of one component with one of several suppliers of a complementary component may inefficiently lower independent suppliers' incentives to innovate.

186. *See, e.g.*, Timothy F. Bresnahan & Shane Greenstein, *The Economic Contribution of Information Technology: Towards Comparative and User Studies*, 11 J. EVOLUTIONARY ECON. 95, 98 (2001); Lichtman, *supra* note 182.

187. *See* van Schewick, *supra note* 32, at 346-49 (providing a detailed exposition of the argument in the text with pointers to the literature).

188. On general-purpose technologies, see, e.g., Bresnahan & Trajtenberg, *supra* note 183; Bresnahan & Greenstein, *supra* note 186; and the collection of papers in GENERAL PURPOSE TECHNOLOGIES AND ECONOMIC GROWTH (Elhanan Helpman ed., 1998) [hereinafter GENERAL PURPOSE TECHNOLOGIES]. On the Internet as a general-purpose technology, see, *e.g.*, Richard G. Harris, *The Internet as a GPT. Factor Market Implications*, *in* GENERAL PURPOSE TECHNOLOGIES, *supra*, at 145.

189. *E.g.*, Bresnahan & Trajtenberg, *supra* note 183; Elhanan Helpman & Manuel Trajtenberg, *A Time to Sow and a Time to Reap; Growth Based on General Purpose Technologies*, *in* GENERAL PURPOSE TECHNOLOGIES, *supra* note 188, at 55.

economic growth depends on the rate of co-invention[190] (i.e., the rate at which potential uses of the technology are identified and realized).

With respect to the Internet, this analysis implies that identifying potential uses for the Internet and developing the corresponding applications is the prerequisite for realizing the enormous growth potential inherent in the Internet as a general-purpose technology.[191]

As a result, measures that reduce the amount of application-level innovation have the potential to significantly harm social welfare by significantly limiting economic growth.

B. Costs

On the cost side, network neutrality rules reduce network providers' incentives to innovate at the network level and to deploy network infrastructure (Section 1). Regulatory intervention also creates its own costs (Section 2); however, these are not covered in detail.

1. Impact on Incentives at the Network Level

As highlighted in Part II, there is a variety of cases in which discrimination increases (or preserves) network providers' profits. As network neutrality regulation prevents network providers from realizing these profits, network neutrality regulation reduces their profits. Due to the complementarity between applications, content and portals on the one hand and Internet services on the other hand, this reduction in profits also affects network providers' incentives to innovate at the network level and to deploy network infrastructure.[192]

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190. The term "co-invention" denotes the innovative activity associated with identifying and realizing potential uses of the general purpose-technology in particular sectors of the economy, *e.g.*, Bresnahan & Trajtenberg, *supra* note 183, at 86-88; Bresnahan & Greenstein, *supra* note 186, at 95-97.

191. *See* ROBERT E. LITAN & ALICE M. RIVLIN, BEYOND THE DOT.COMS; THE ECONOMIC PROMISE OF THE INTERNET 104-07 (2001) (making a similar observation).

192. *See* THIERER, *supra* note 7, at 17-19; OWEN & ROSSTON, *supra* note 4, at 24-25. *See also* Yoo, *Beyond Network Neutrality*, *supra* note 4, at 27-37, 48-53 (arguing that network neutrality may increase concentration in the market for last-mile broadband access, based on a broader definition of network neutrality that includes mandating interconnection, nondiscrimination, rate regulation and the adoption of standardized protocol interfaces such as TCP/IP). As Yoo's argument is based on the negative impact of measures such as mandating the adoption of standardized interfaces, which are not included in the definition of network neutrality used here, his arguments do not apply to the analysis of this paper. For a discussion of the differences in the usage of the term network neutrality, see *supra* notes 9-11 and accompanying text. *But see* Frischmann & van Schewick, *supra* note 1 (offering a critical reply to Yoo's argument).

2. Costs of Regulation

The costs of network neutrality regulation depend on the chosen form of implementation. While the costs of network neutrality regulation are not the focus of this article, existing literature suggests that the costs of regulation itself will not be significant. In particular, they will be significantly lower than the costs associated with implementing and overseeing an open access regime.[193]

C. Trade-Off

The social benefits and costs outlined above suggest that the introduction of network neutrality regulation requires a trade-off: On the one hand, network neutrality regulation increases the amount of application-level innovation, which is critically important for economic growth. On the other hand, it decreases network providers' incentives to innovate at the network level and to deploy network infrastructure. The following section analyzes the two trade-offs in turn.

1. Application-Level Innovation vs. Innovation at the Network Level

Research on information-technology based general-purpose technologies suggests that increasing co-invention[194] is more important than increasing innovation in the general-purpose technology itself. Applied to the Internet, this implies that increasing application-level innovation is relatively more important than increasing innovation at the network level.

In information technology-based general-purpose technologies the incentives to invest in advancing the general-purpose technology itself seem to be higher than the incentives to invest in co-invention,[195] making it relatively more important to foster co-invention. This difference is attributed to two factors: first, the science and engineering base of hardware technologies is more developed than the science base of software engineering and of finding attractive business uses. Second, due to their generality, general-purpose technologies have larger markets than the individual applications; after all, while not all users of a general-

193. *See, e.g.*, Weiser, *supra* note 1, at 79-80.

194. The term "co-invention" denotes the innovative activity associated with identifying and realizing potential uses of the general purpose-technology in particular sectors of the economy. *E.g.*, Bresnahan & Trajtenberg, *supra* note 183, at 86-88; Bresnahan & Greenstein, *supra* note 186, at 95-97.

195. Timothy F. Bresnahan, The Changing Structure of Innovation in Computing: Sources of and Threats to the Dominant U.S. Position 10, (July 21, 1998), http://www.stanford.edu/~tbres/research/step.pdf.

purpose technology need all applications, all users need the general-purpose technology.

These factors are also present in the context of the Internet, making it reasonable to assume that the imbalance between incentives to innovate found in information-based general-purpose technologies in general also exists in the context of the Internet: Network engineering has a more developed science base than the identification of uses and software engineering. Due to the generality of the networking infrastructure, the market for network technology itself is larger than the market for individual applications.

Thus, compared to the incentives to innovate at the application-level, incentives to innovate at the network level are higher. At the same time, application-level innovation is the main determinant of economic growth. This suggests that increasing the amount of application-level innovation is relatively more important than increasing innovation at the network level.

2. Application-Level Innovation vs. Deployment of Network Infrastructure

As indicated above, network neutrality regulation reduces network providers' profits. This reduction in profits will also affect their incentive to deploy network infrastructure. This causal relationship, however, does not say anything about the degree to which these incentives are reduced.

Thus, in determining the appropriate trade-off between infrastructure deployment and application-level innovation, two questions must be answered: First, will the reduction in profits reduce the incentive to deploy infrastructure below the necessary level? Second, even if this is the case, is allowing network providers to discriminate the appropriate solution to this problem?

First, it is an open question, whether network neutrality regulation will reduce incentives to deploy network infrastructure below the necessary level. Not surprisingly, network providers and their industry organizations have claimed that this is the case. There are several reasons to doubt this assessment, though: Network neutrality regulation does not forbid network providers to vertically integrate into complementary markets;[196] it only bans them from using discrimination to increase their sales at the expense of rivals. Thus, it does not prevent network providers from making profit in complementary markets; it just takes away the additional profits that could be realized due to discrimination.[197] It also

196. *E.g.*, Wu, *Broadband Debate*, *supra* note 1, at 89.

197. Whether and, if yes, what form of price discrimination should be forbidden under network neutrality regulation, is still an open question. *See supra* note 9.

does not prevent them from making profit in the market for Internet services. As a result, the remaining profit may still be sufficient to motivate them to deploy the necessary infrastructure. Moreover, new wireless technologies may ameliorate the problem by further reducing the costs of broadband infrastructure. Thus, it still needs to be proven that the reduction in profits caused by network neutrality regulation suffices to reduce network providers' incentives to deploy infrastructure so severely that it becomes relevant for public policy.

Second, even if network providers' incentives are too low to guarantee the necessary deployment of broadband infrastructure under network neutrality regulation, this does not necessarily imply that network providers should be allowed to discriminate.[198] As Michael Katz has put it, "In the antitrust – if not regulatory – context [. . .] U.S. policy rejects the notion that the otherwise illegal maintenance or acquisition of monopoly power in a market can be justified by 'good' use of the monopoly profits in that market or another one."[199] Following this line of reasoning, instead of allowing discrimination, regulators should contemplate other ways of ensuring a sufficient deployment of network infrastructure, if necessary. For example, in light of the severe consequences of stifling application-level innovation for economic growth, subsidizing the deployment of broadband infrastructure may be preferable to allowing network providers to discriminate.

Thus, in trading off application-level innovation against infrastructure deployment, it seems reasonable to opt for fostering application-level innovation in order to realize the enormous growth potential inherent in Internet technology, and to contemplate other ways of ensuring a sufficient deployment of network infrastructure, if necessary.

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198. *But see* Yoo, *Beyond Network Neutrality*, *supra* note 4, Part II. Yoo argues that by focusing on competition in the market for applications and content, network neutrality proponents are focusing on the wrong policy problem. According to him, policy makers should focus on increasing competition in the market for last-mile broadband access, which is less competitive than the markets for applications and content, *id.* at Part II. In line with this assumption, he mainly rejects network neutrality proposals based on their negative impact on competition in last-mile broadband access. *Id.* at 27-37, 48-53. Apart from neglecting the different impact of innovation in these markets on economic growth, and accompanying text, this analysis fails to take account of the possibility to stimulate competition in the market for last-mile broadband access through other means. *See supra* notes 187-191, 194-195. In addition, his arguments about the negative impact of network neutrality on competition in the market for last-mile broadband access are based on a much broader definition of network neutrality than the one advocated by network neutrality proponents and used in this paper; as a result, his analysis does not carry over to the case of "pure" non-discrimination rules discussed here. *See also supra* notes 9-11 and accompanying text; *see supra* note 192 and accompanying text. For a critical appraisal of Yoo's work on network neutrality, see Frischmann & van Schewick, *supra* note 1; *see* Herman, *supra* note 1.

199. Katz, *supra* note 177, at 340.

CONCLUSION

This paper advances the debate over network neutrality by providing an economic framework within which calls for network neutrality regulation can be analyzed.

The analysis shows that calls for network neutrality regulation are justified: In the absence of network neutrality regulation, there is a real threat that network providers will discriminate against independent producers of applications, content or portals or exclude them from their network. This threat reduces the amount of innovation in the markets for applications, content and portals at significant costs to society.

While network neutrality rules remove this threat, they are not without costs: Apart from creating the costs of regulation itself, network neutrality rules reduce network providers' incentives to innovate at the network level and to deploy network infrastructure. Thus, regulators face a trade-off. As the paper shows, due to the potentially enormous benefits of application-level innovation for economic growth, increasing the amount of application-level innovation through network neutrality regulation is more important than the costs associated with it.

Before network neutrality regulation can be drafted, however, more research is needed. In particular, the open questions surrounding the scope of network neutrality regulation need to be resolved. In addition, the best way of implementing network neutrality rules still needs to be identified.[200]

The paper also contributes to the debate over "open access" and "facilities-based competition." As has been set out above, the proposals for "facilities-based competition" and "open access" are based on the assumption that competition in the market for Internet services will mitigate a network operator's ability and incentive to discriminate against or exclude independent portals, content and applications. The analysis has highlighted a variety of circumstances under which a network provider may have the ability and incentive to discriminate against unaffiliated producers of complementary products or exclude them from its network, even if it faces competition in the market for Internet services. Thus, neither increased facilities-based competition nor open access regulation are the appropriate tools to mitigate the threat of discrimination.

Finally, the paper shows that our intuitions regarding the profitability of exclusionary conduct that have been shaped by antitrust analysis of markets for conventional goods may be misleading in markets such as the markets for applications, portals and content that are characterized by high fixed costs, low marginal costs and, potentially, network effects, in

200. For an overview of open issues in these areas, see *supra* note 9 and accompanying text.

particular if the exclusionary conduct is based technological means.

RE-EVALUATING FCC POLICIES CONCERNING THE LIFELINE & LINK-UP PROGRAMS

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INTRODUCTION

Since 1984, the Lifeline Assistance program ("Lifeline") has been the centerpiece of efforts by U.S. telecommunications regulators to ensure that traditional local telephone service is affordable for low-income households.[1] Lifeline reduces monthly local telephone bills for customers who sign up for the benefit through a credit on their basic service charge. The Federal Communications Commission's ("FCC") rules[2] establish the amount of the discount, which averaged $11.22 in 2004.[3] The Link-Up America ("Link-Up") program, a companion program to Lifeline, reduces the cost of telephone installation by fifty percent. The Link-Up reduction assumes the form of a credit to the service installation charge.[4] A third program, toll limitation support, compensates eligible telecommunications carriers for offering no-cost toll limitation service.[5]

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1. The programs originated in 1984 and 1985 under the FCC''s general authority under 47 U.S.C. §§ 151, 154(i), 201 & 205 (1934). The first of two Lifeline plans adopted by the Federal Communications Commission in 1984 reduced an eligible subscriber's monthly telephone bill by an amount equal to the subscriber line charge ("SLC") of $3.50, with half the reduction coming from a 50% waiver of the SLC, and the rest from the participating state. The second Lifeline plan, adopted by the FCC in 1985, waived the entire SLC of $3.50, and was matched by the state, so a subscriber's bill was reduced by a total of $7.00. These programs were subsequently established as explicit universal support mechanisms in response to the federal Telecommunications Act of 1996. See 47 U.S.C. § 254 (b)(1), (2) & (5) (2000); 47 C.F.R. § 54.400-904.

2. *See* § 54.403 for Lifeline support reductions.

3. Universal Service Monitoring Report, CC Dkt. 98-202, tbl. 2.3 (2005), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-262986A1.pdf. [hereinafter 2005 Universal Service Monitoring Report].

4. *See* § 54.411 for Link-Up reductions.

5. "Toll limitation" is defined in § 54.400 (d) as denoting "either toll blocking or toll control for eligible telecommunications carriers that are incapable of providing both services.

Lifeline, Link-Up, and toll limitation are the three support mechanisms in the low-income program financed from contributions to the federal Universal Service Fund ("USF") by telecommunications carriers. Prior to 1996, USF was funded by the long distance companies, such as AT&T and MCI, but is now funded by assessments against all telecommunications companies that provide interstate services. In addition to supporting the low-income program, the federal USF also provides support for three other programs: (1) predominantly small, high-cost companies serving remote and rural areas; (2) discounts for telecommunications and Internet access services for eligible schools, school districts, libraries, and consortia; and (3) reduced telecommunications and Internet service rates to rural health care providers so that their payments for those services are no more than their urban counterparts for the same or similar services.[6] A basic level of federal funding for Lifeline is currently provided from the federal USF for all states. States may receive additional federal support if they elect to provide matching support either through state universal service funds or state assessments against eligible telecommunications carriers ("ETCs").[7] This additional federal support is provided directly to the ETCs and can only be used for Lifeline and Link-Up. Although the low-income program represents approximately $820 million, or 11.2 percent, of total national USF support of $7.3 billion estimated for 2006, it attracts considerable political attention be-

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For eligible telecommunications carriers that are capable of providing both services, 'toll limitation' denotes both toll blocking and toll control." In § 54.400 (b) "toll blocking" is defined as "a service provided by carriers that lets consumers elect not to allow the completion of outgoing toll calls from their telecommunications channel." In § 54.400 (c), "toll control" is defined as "a service provided by carriers that allows consumers to specify a certain amount of toll usage that may be incurred on their telecommunications channel per month or per billing cycle."

6. *See* Universal Service Administrative Company (USAC) (describing the programs), http://www.usac.org/default.aspx, (last visited Sept. 17, 2006). USAC administers the USF.

7. The term "eligible telecommunications carrier" or ETC has a specific meaning in the 1996 Act. To be designated an ETC, a company must meet conditions prescribed in § 214 (e). With respect to the maximum federal and matching support for Lifeline, there are currently four tiers of federal support on a monthly basis for the federal Lifeline component of the program. The first tier of federal support is a $6.50 credit which is available to all eligible subscribers. The second tier of federal support is a $1.75 credit which is available to subscribers in those states that have approved the credit. All 50 states have approved this tier of support. The third tier of federal support is one-half of the amount of additional support up to a maximum of $1.75 in federal support. All states, except for seven, match that tier of support. The maximum monthly Lifeline discount for low-income consumers not living on reservations is currently $13.50, with $10.00 in federal support and $3.50 in matching state support. States can provide more support than $3.50, but it is not matched. In addition, a fourth tier of federal support is available for eligible residents of tribal lands as long as that amount does not bring the basic local residential rate below $1.00 per month per qualifying low-income subscriber. For consumers living on reservations, the maximum monthly Lifeline support is currently $38.50, with $35.00 in federal support and $3.50 in state matching support. *See* § 54.403 (2000).

cause of the low participation rates[8] and because it is the only USF program that is targeted to people and not to faceless institutions or companies.

In this article, we examine the evolution of policy objectives for Lifeline and Link-Up that were first developed by the FCC,[9] outlined in the Telecommunications Act of 1996 and subsequently reaffirmed in the FCC's 1997 Universal Service *Report & Order*,[10] and the FCC's subsequent decisions that have shaped state strategies for meeting those objectives. We also analyze whether the mechanism for funding Lifeline and Link-Up is appropriate given rapidly changing technologies and services.[11] Finally, we examine whether there might be better ways to implement Lifeline and Link-Up. To that end, we apply findings from recent research conducted for the Public Utility Research Center (PURC) at the University of Florida.[12] We also apply complementary findings from research conducted by Mark Burton and John W. Mayo.[13]

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8. The national participation rate was 33.7 percent of eligible households in 2002. Lifeline and Link-Up, *Report & Order & Further Notice of Proposed Rulemaking*, 19 FCC Rcd. 8,302, app. K, tbl. 1.A, (2004). [hereinafter Lifeline and Link-Up NPRM].

9. The FCC's initial policy objectives for universal service did not refer explicitly to universal service. The 1934 Communications Act envisioned the benefits of a universally accessible network in the Act that created the Federal Communications Commission:

> For the purpose of regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges, for the purpose of the national defense, for the purpose of promoting safety of life and property through the use of wire and radio communications, and for the purpose of securing a more effective execution of this policy by centralizing authority heretofore granted by law to several agencies and by granting additional authority with respect to interstate and foreign commerce in wire and radio communication, there is created a commission to be known as the "Federal Communications Commission," which shall be constituted as hereinafter provided, and which shall execute and enforce the provisions of this chapter.

Communications Act of 1934, 47 U.S.C. § 151 (1936).

10. Federal-State Joint Board on Universal Service, *Report & Order*, 12 FCC Rcd. 8,776 (1997). [hereinafter 1997 Universal Service Report]

11. We do not address the toll limitation component of the low-income program in this article. In 2005, only $5.8 million or less than 1% of all funding for low-income support was used for that purpose.

12. *See* Lynne Holt & Mark Jamison, *Making Telephone Service Affordable for Low-Income Households: An Analysis of Lifeline and Link-Up Telephone Programs in Florida* (Univ. of Florida Pub. Util. Research Ctr. Report 2006), *available at* http://bear.cba.ufl.edu/centers/purc/documents/LifelineFinalReportcorrected3_04_05.pdf.

13. Mark Burton & John W. Mayo, *Understanding Participation in Social Programs: Why Don't Households Pick up the Lifeline?* (Univ. of Florida Pub. Util. Research Ctr. Report 2006) http://www.purc.ufl.edu/documents/Burton-Mayo-UnderstandingParticipationinSocialPrograms2005_000.pdf.

I. INITIAL POLICY OBJECTIVES – LOW-INCOME SUBSCRIBER ACCESS TO BASIC TELEPHONE SERVICE AT AFFORDABLE RATES

At this juncture, we should step back several years and review the evolution of Lifeline and Link-Up. The FCC established these programs in 1984 upon a recommendation from the Federal-State Joint Board.[14] Since 1985, the FCC has amended the programs several times under its general regulatory authority.[15] In July 1995, before enactment of the Telecommunications Act of 1996, the FCC issued a *Notice of Proposed Rulemaking* ("NPRM") to review the programs and elicit comments on "ways in which the market can work to reduce obstacles that prevent those who want telephone service from being able to afford it and help those with service to maintain it."[16] A subsequent NPRM was issued following passage of the 1996 Act, in which the FCC raised the question of interpretation concerning section 254(j) of the Act affecting the collection, distribution, and administration of Lifeline proceeds. More specifically, the FCC questioned the flexibility afforded by section 254(j) of the Act to the FCC in amending the program to make it more compatible with the Act.[17] The Joint Board concluded that the FCC did have such flexibility, and the FCC concurred with the Joint Board in a report and order issued in May 1997.[18]

The 1996 Act outlined several principles, including the availability of quality service at "just, reasonable, and affordable rates" and access of consumers throughout the nation to telecommunications and information services. Low-income consumers are explicitly included in the require-

14. MTS and WATS Market Structure, and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, *Recommended Decision*, 49 Fed. Reg. 48325 (Nov. 23, 1984) (recommending the adoption of federal Lifeline assistance measures); MTS and WATS Market Structure, and Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, Decision and Order, 50 Fed. Reg. 939 (Dec. 28, 1984) (adopting the Joint Board's recommendation).

15. *See* § 254 (b)(1), (2) & (5) and rules promulgated pursuant to § 54.400.

16. Amendment of the Commission's Rules and Policies to Increase Subscribership and Usage of the Public Switched Network, *Notice of Proposed Rulemaking*, 10 FCC Rcd. 13,003, ¶ 6 (1995).

17. Federal-State Joint Board of Universal Service, *Recommended Decision*, 12 FCC Rcd. 87 (1996). [hereinafter *Recommended Decision*] Prior to the 1997 Universal Service Report, *supra* note 10, Lifeline and Link-Up were funded by contributions to a Lifeline/Link-Up pool administered by the National Exchange Carrier Association, Inc. All interexchange carriers having at least .05% of prescribed lines nationwide were required to contribute on a flat-rate, per-line basis. Section 254(j) states: "Lifeline assistance. Nothing in this section shall affect the collection, distribution, or administration of the Lifeline Assistance Program provided for by the Commission under regulations set forth in section 69.117 of title 47, Code of Federal Regulations, and other related sections of such title."

18. 1997 Universal Service Report*, supra* note 10, at ¶ 337.

ment for provision of such access.[19] The FCC's 1997 Universal Service Report and Order interprets the 1996 Act as follows:

> With respect to the Lifeline and Link-Up programs, we observe that the Act evinces a renewed concern for the needs of low-income citizens. Thus, for the first time, Congress expresses the principle that rates should be "affordable," and that access should be provided to "low-income consumers" in all regions of the nation. These principles strengthen and reinforce the Commission's preexisting interest in ensuring that telecommunications service is available "to all the people of the United States." Under these directives, all consumers, including low-income consumers, are equally entitled to universal service as defined by this Commission under section 254(c)(1).[20]

The definition of "affordable" received more extensive scrutiny by the Joint Board in the *Recommended Decision* to which the FCC's 1997 Universal Support and Order responded. Specifically, the Joint Board found that "factors, other than rates, such as local calling area size, income levels, cost of living, population density, and other socio-economic

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19. Section 254 (b) states:
Universal service principles. The Joint Board and the Commission shall base policies for the preservation and advancement of universal service on the following principles:
(1) Quality and rates. Quality services should be available at just, reasonable, and affordable rates.
(2) Access to advanced services. Access to advanced telecommunications and information services should be provided in all regions of the Nation.
(3) Access in rural and high cost areas. Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas.
(4) Equitable and nondiscriminatory contributions. All providers of telecommunications services should make an equitable and nondiscriminatory contribution to the preservation and advancement of universal service.
(5) Specific and predictable support mechanisms. There should be specific, predictable and sufficient Federal and State mechanisms to preserve and advance universal service.
(6) Access to advanced telecommunications services for schools, health care, and libraries. Elementary and secondary schools and classrooms, health care providers, and libraries should have access to advanced telecommunications services as described in subsection (h).
(7) Additional principles. Such other principles as the Joint Board and the Commission determine are necessary and appropriate for the protection of the public interest, convenience, and necessity and are consistent with this Act."

20. 1997 Universal Service Report**,** *supra* note 10, at ¶ 335.

factors may affect affordability."[21] The Joint Board rejected the concept of a nationwide affordable rate and acknowledged the role of states in making the primary determination with respect to affordability.[22] However, if subscribership were to fall below the 1996 level, the Joint Board suggested that the FCC might work informally with the affected state to determine the factors resulting in the lower level and the implications for rate affordability.[23] We discuss this further in the next section.

In a subsequent report and order issued in April 2004, the FCC returned to the principles of universal service that were articulated in 47 U.S.C. § 254(b), noting that "these principles also recognize that ensuring rates are affordable is a national priority."[24] In the 2004 report and order, the FCC observed that "The Lifeline/Link-Up program is one of several universal service support mechanisms to further those (universal service) goals."[25]

II. CHANGING POLICY OBJECTIVES—INCREASING EMPHASIS ON PROGRAM PARTICIPATION

The FCC's interest in the low level of subscribership, particularly among the poor, predated the 1996 Act. In July 1995, the FCC sought comments on initiatives to increase telephone subscribership, specifically on ways Lifeline might be modified to increase network subscribership.[26]

While continuing to acknowledge the importance of low-income subscribers' access to affordable basic telephony service, the FCC appears to have placed greater emphasis after passage of the 1996 Act on the importance of participation in Lifeline and Link-Up. This emphasis is reflected in FCC actions regarding the programs to date. Low subscribership was raised as a concern, particularly among low-income households, in an FCC staff report released only a few days after the enactment of the 1996 Act.[27] In the 1997 Universal Service Report and Order, the FCC agreed with the Joint Board that participation in Lifeline and Link-Up was low.[28] Efforts to increase program participation are reflected in that order: the FCC adopted the Joint Board's recommenda-

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21. *Recommended Decision, supra* note 17, at ¶¶ 66, 126.
22. *Id.* at ¶ 131.
23. *Id.* at ¶ 132.
24. Lifeline and Link-Up NPRM, *supra* note 8, at ¶ 3.
25. *Id.* at ¶ 4 (emphasis supplied).
26. 281 Amendment of the Commission's Rules and Policies to Increase Subscribership and Usage of the Public Switched Network, *Notice of Proposed Rulemaking*, 10 FCC Rcd. 13,003, ¶ 36 (1995).
27. *Preparation for Addressing Universal Service Issues: A Review of Current State Support Mechanisms*, http://www.fcc.gov/Bureaus/Common_Carrier/Reports/univserv.txt (Feb. 23, 1996).
28. 1997 Universal Service Report, *supra* note 10, at ¶ 346.

tions that allow Lifeline to be offered in all states regardless of whether they provided matching funds and to require all ETCs to offer Lifeline service.[29] The basic level of federal support was also increased but only if states agreed to permit carriers to reduce the intrastate charges paid by subscribers.[30]

In December 2000, the FCC requested the Joint Board to review the Lifeline and Link-Up programs for all low-income consumers, including the review of income eligibility criteria.[31] In its *Recommended Decision* the Joint Board suggested several changes to increase program participation, and the FCC subsequently issued an NPRM to solicit comments on the Joint Board's recommendations.[32] The FCC's report and order (April 29, 2004) had as its objective increasing participation in the Lifeline and Link-Up programs by making the low-income support mechanism more effective.[33] A survey conducted in tandem with that report and order noted that "only one-third of households currently eligible for Lifeline/Link-Up actually subscribe to this program."[34] To encourage greater program participation, the FCC expanded in its report and order of April 29, 2004 the federal default eligibility criteria to include an income-based criterion of 135 percent of the Federal Poverty Guidelines (FPG) and the addition of the Temporary Assistance to Needy Families (TANF) program and the National School Lunch's free lunch program as federal default eligibility criteria. Other measures included adoption of federal certification and verification procedures and outreach guidelines. In July 2005, the FCC announced a sixteen-member working group of FCC and public service commission staff to develop the best practices and outreach materials for the Lifeline and Link-Up programs.[35]

One could conclude that the FCC's interest in increasing Lifeline participation was simply the result of the Commission's interest in expanding access by low-income households to basic telephone service. However, the FCC's own reports show that eighty-eight percent of low-income households nationally subscribe to local telephone service,[36] and only one-third subscribe to Lifeline.[37] This suggests that sixty-five percent of low-income households with telephone service do not receive

29. *Id.* at ¶¶ 326, 347 & 348.

30. *Id.* at ¶¶ 326, 352.

31. Federal-State Joint Board on Universal Service, *Order*, 15 FCC Rcd. 25,257 (2000).

32. Federal-State Joint Board on Universal Service, *Recommended Decision*, 18 FCC Rcd. 6,589, 6,591 (2003).

33. Lifeline and Link-Up NPRM**,** *supra* note 8, at ¶1.

34. *Id.*

35. Press Release, Federal Communication Commission, FCC Announces Members of Joint Working Group on Lifeline and Link-Up Services (Sept. 28, 2005), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-05-2539A1.pdf.

36. 2005 Universal Service Monitoring Report, *supra* note 3, at 2-2.

37. Lifeline and Link-Up NPRM, *supra* note 8.

Lifeline benefits. Lifeline does not appear to have a large impact on the proportion of low-income households receiving telephone service.[38] In Florida, for example, approximately ninety percent of low-income households have a phone,[39] and only about twelve percent participate in Lifeline.[40]

III. REVIEWING THE FCC'S APPROACHES FOR INCREASING PARTICIPATION

The FCC's efforts in increasing Lifeline program participation have focused on streamlining certification and verification procedures and expanding the federal default eligibility criteria that trigger Lifeline and Link-Up program participation. In addition, the FCC has focused on more effective measures of getting the message out.

Federal default eligibility criteria apply to those states that have elected not to implement their own Lifeline and Link-Up programs. To date, five states do not implement their own programs and have elected instead to use the default criteria: Delaware, Hawaii, Indiana, Louisiana, and New Hampshire.[41] In terms of default eligibility criteria, consumers may qualify for Lifeline and Link-Up benefits through the income-based criterion of 135 percent FPG or through eligibility in one of the following programs: the National School Lunch's free lunch program, TANF, Medicaid, Food Stamps, Supplemental Security Income, Federal Public Housing Assistance (Section 8), Low Income Home Energy Assistance Program, and Bureau of Indian Affairs Program.[42] In states that subscribe to the federal default program, an ETC must obtain a signed document from the Lifeline recipient certifying under penalty of perjury that the consumer receives benefits from a Lifeline-eligible program or that he or she meets the income criterion, and that he or she will alert the

38. *See* Christopher Garbacz & Herbert G. Thompson, Jr., *Estimating Telephone Demand with State Decennial Census Data from 1970–1990: Update with 2000 Data,* 24 J. REG. ECON. 373, 373-78 (2003) (finding that Lifeline discounts are decreasing in their capacity to increase telephone penetration in the United States). For example, a study by the FCC staff estimated that increasing the income criterion for Lifeline from 125% of FPG to 135% of FPG would increase the number of households with telephone service in the United States by only 247,000 in 2005. *See* Lifeline and Link-Up NPRM, *supra* note 8, app. K-26. The addition of 247,000 households would represent only 0.23% of the approximately 105.8 million households that had telephone service in 2005.

39. *See* Justin Brown, *Understanding Participation in Telecommunications Lifeline Programs: A Survey of Low-Income Households in Florida*. (PURC Working Paper, Draft 1/2006), *available at* http://bear.cba.ufl.edu/centers/purc/documents/Lifeline-Low_income_Report.pdf. [hereinafter Brown, *Understanding Participation*]

40. *See* Holt & Jamison, *supra* note 12, at 14.

41. Lifeline and Link-Up NPRM, *supra* note 8, at app. G.

42. § 54.409 (b).

carrier if the Lifeline eligibility no longer applies.[43]

Most states have adopted their own Lifeline and Link-Up programs and have some flexibility in establishing eligibility criteria governing those programs. However, for those states, eligibility criteria are restricted to criteria solely or directly based on income.[44] Moreover, eligibility criteria for tribal lands must be reasonably applicable to low-income residents of those reservations.[45] In addition to the selection of eligibility criteria, states vary in other ways in their design and implementation of Lifeline: their choice of certification and verification procedures for program participation, restrictions on the types of service available to Lifeline subscribers (single residential line without advanced features to multiple residential lines with or without advanced features), and level of benefit offered by states (a maximum benefit of $8.25 in Indiana to a maximum benefit of $18.45 in Massachusetts).[46]

In 2005, with funding from BellSouth and Sprint, PURC undertook several research initiatives so that we might better understand the determinants for Lifeline and Link-Up participation in Florida and the nation. Four surveys examined customers' perceptions and two econometric studies provided quantitative findings to that end. The four surveys included: (1) in-person interviews of Floridians who attended Lifeline/Link-Up outreach programs in various parts of the state for a better understanding of their levels of awareness and comprehension of the programs and why they ultimately decided to enroll or not enroll in Lifeline; (2) telephone interviews of Floridians concerning their use of communications services, knowledge of Lifeline, and attitudes toward Lifeline; (3) a written survey of low-income households to ascertain their awareness of Lifeline and their reasons for non-participation if they were aware of the program, qualified for it, and did not participate; and (4) written surveys of households that qualified for Lifeline and that had disconnected their telephone service.[47] One of the econometric studies ex-

43. § 54.409 (d).

44. § 54.409 (a) (stating that "[t]he state commission shall establish narrowly targeted qualification criteria that are based solely on income or factors directly related to income. A state containing geographic areas included in the definition of 'reservation' and 'near reservation,' as defined in § 54.400(e), must ensure that its qualification criteria are reasonably designed to apply to low-income individuals living in such areas").

45. *Id.*

46. *See* Burton & Mayo, *supra* note 13; *see also* 2005 Universal Service Monitoring Report, *supra* note 3, at tbl. 2.3 (listing Lifeline Support by State of Jurisdiction).

47. Justin Brown & Mark A. Jamison, *Motivations Behind Low-Income Households Bypass of Support for Universal Service* (Pub. Util. Research Ctr., Univ. of Fla., Working Paper, 2005), *available at* http://bear.cba.ufl.edu/centers/purc/documents/Brown-Motivations_Behind_Lowincome.pdf; Justin Brown, *Perspectives on Communications Services & Lifeline: Results of a Telephone Survey of Florida Households* (Pub. Util. Research Ctr., Univ. of Fla., Working Paper, 2006), *available at* http://bear.cba.ufl.edu/centers/purc/documents/Brown-Perspectives_Comm_Services.pdf,

amined Florida county-level data for 2003-2005, and the other study examined state-level data for the United States from 2000-2005.[48] These studies are discussed further below.

There is a price tag for Lifeline and Link-Up subsidies: these subsidies are reflected in telephony rates of all subscribers whose companies elect to pass the charges on to them.[49] So the relevant questions are as follows: (1) what benefits do all telephone subscribers receive from those subsidies; and (2) do the benefits exceed the costs? At least conceptually, the benefits conferred by these subsidies are based on the value of increasing subscribership to the telecommunications network. To the extent that this network is expanded by a given consumer, the utility and value of the larger network to all network users theoretically exceeds the discount provided to add that consumer. Furthermore, there is social value to increasing telephone penetration for low-income households. For example, having a telephone makes it easier for a person to stay connected with his or her social network, find employment, access emergency services, and participate in political processes.

In 2004, the Lifeline and Link-Up programs were funded by almost $763 million in subsidy payments.[50] By far the largest share of funding for the two programs applied to Lifeline ($731 million or ninety-six percent), with the remaining $32 million applied to Link-Up. The discount level for Lifeline and Link-Up has grown by sixty-four percent in nominal dollars since policy changes in 1998, which allowed a basic level of support to be provided to all states and expanded the basic level of federal support.[51] The total number of Lifeline and Link-Up participants increased from 7.6 million in 1998 to 8.7 million in 2004, almost a fifteen percent increase.[52] Enrollment numbers for Lifeline might be expected

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[hereinafter Brown, *Perspectives on Communications*]; Justin Brown, *Understanding Participation, supra* note 39; Justin Brown, *Disconnecting from Communications: A Survey of Floridians Who Qualify for Lifeline and Dropped Their Telephone Service* (Pub. Util. Research Ctr., Univ. of Fla., Working Paper, 2006), *available at* http://bear.cba.ufl.edu/centers/purc/documents/Lifeline-Disconnecting_fr_Comm.pdf. [hereinafter Brown, *Disconnecting from Communications*]

48. *See* Janice A. Hauge, et al., *Discounting Telephone Service: An Examination of Participation in Florida's Lifeline Program Using Panel Data* (Pub. Util. Research Ctr., Univ. of Fla., Working Paper, 2006), *available at* http://bear.cba.ufl.edu/centers/purc/documents/Lifeline-FL-Econometrics_000.pdf [hereinafter Hauge et al., *Discounting Telephone Service*]; *see also* Janice A. Hauge, et al., *Participation in Social Programs by Consumers and Companies: A Nationwide Analysis of Penetration Rates for Telephone Lifeline Programs* (Pub. Util. Research Ctr., Univ. of Fla., Working Paper, 2006), *available at* http://www.purc.org/documents/Lifeline_USStudyforPFR.pdf. [hereinafter Hauge et al., *Participation in Social Programs by Consumers and Companies*]

49. ETCs may, but are not required to, pass on those assessments to their customers.

50. 2005 Universal Service Monitoring Report, *supra* note 3, at tbl. 2.2.

51. *See id.*; *see also* 1997 Universal Service Report, *supra* note 10, at ¶409. In 1998, Lifeline benefits were offered to qualified individuals residing in tribal lands.

52. *Id,* at tbl. 2.1.

to increase from 2004 to 2005, resulting from the expanded eligibility criteria and streamlined certification and verification procedures authorized by the FCC's Report and Order (April 2004), all things equal. However, other public policy actions could offset growing participation. In Florida, for example, the Florida Public Service Commission actually reported declining enrollment in Florida's Lifeline program from September 2004 to September 2005. This reduction was largely due to BellSouth's implementation of federally-mandated annual verification of recipient eligibility.[53]

It appears that existing Lifeline and Link-Up funding mechanisms are increasingly costly ways of trying to improve low-income households' access to telecommunications services. While the Lifeline and Link-up discount level increased sixty-four percent since 1998, the percentage of low-income households with telephone service increased only two percentage points.[54] Indeed, Garbacz and Thompson find that the cost of increasing telephone penetration through Lifeline and Link-Up discounts is high and increasing: the cost of adding a low-income household to the network— measured in terms of providing price discounts to households that would subscribe to telephone service even without the discount—— increased from $260 in 1990 to $2,127 in 2000 (figures are in 1999 dollars).[55] This implies that efforts to simply increase low-income household participation in the Lifeline and Link-Up programs may not be an effective method of increasing telephone penetration in low-income households.

IV. PLAUSIBLE EXPLANATIONS FOR PARTICIPATION RATES IN LIFELINE

The participation rate in Lifeline is determined by the number of participating households divided by the total number of eligible house-

53. These procedures resulted in the company's determination that a large number of customers were no longer eligible for Lifeline benefits. In September 2004, 154,017 Floridians (served by all companies) subscribed to Lifeline; in September 2005, the number reported was 139,261. *See* Florida Public Service Commission, Lifeline & Link-Up Assistance Florida Programs: Number of Customers Subscribing to Lifeline Service and the Effectiveness of Procedures to Promote Participation 8 (2005), *available at* http://www.psc.state.fl.us/publications/pdf/telecomm/tele-lifelinereport2005.pdf. The total number of Lifeline and Link-Up participants (non-tribal and tribal) nationwide was 8.45 million for the first nine months of 2005. *See* Universal Service Administrative Company, Lifeline Subscribers by State or Jurisdiction, app. L108 (2Q2006), *available at* http://www.universalservice.org/about/governance/fcc-filings/2006/quarter2/; Universal Service Administrative Company, Link-Up Beneficiaries by State or Jurisdiction, app. L109 (2Q2006), *available at* http://www.universalservice.org/about/governance/fcc-filings/2006/quarter2/. This number is still about 260,000 more than for the first nine months of 2004.

54. 2005 Universal Service Monitoring Report, *supra* note 3, at tbl. 6.4.

55. *See* Garbacz & Thompson, *supra* note 38, at 377.

holds. Each state has some flexibility to design and implement the Lifeline program within the state. The FCC estimated the nationwide Lifeline participation rate to be 33.7 percent in 2002. However, the 33.7 percentage rate is not indicative of the typical state's experience.[56] Nearly half (49.3 percent) of the Lifeline subscribers in the United States were in California in 2002, which had a 132 percent participation rate.[57] California's over-enrollment (32 percent more Californians participated than were eligible) might have been the result of self-certification.[58] If California's Lifeline subscribers are excluded the nationwide participation rate would have been much lower—19.5 percent. In short, the number of subscribers nationwide had been growing (as noted, from 7.6 million in 1998 to 8.7 million in 2004) but the FCC determined in 2004 that the participation rate was still sufficiently low to warrant more aggressive measures.

Will the FCC's adopted measures and the states' corresponding actions to adopt complementary measures make a significant difference in average participation rates? The Burton and Mayo study concludes that expanding the eligibility criteria governing Lifeline participation appears to have no significant impact on participation, a finding confirmed by the PURC nationwide econometric study.[59] The two econometric studies conducted for PURC found that Lifeline participation rates were higher with higher local telephone rates and greater Lifeline discounts.[60] These findings appear to complement the Burton and Mayo study that found administrative features of state Lifeline programs have a significant bearing on program participation.[61] In states with more burdensome enrollment processes and lower discounts on local telephone rates, one might expect lower participation rates, all things equal, because the costs to low-income consumers in terms of administrative hassles would appear to outweigh the benefits they might realize from lower rates for basic telephone service.

The four surveys conducted for PURC indicate the primary barrier to Lifeline participation appears to be a lack of public awareness.[62] Therefore, the appropriate response would appear to be more aggressive and targeted marketing of the program, particularly by people and or-

56. Lifeline and Link-Up NPRM, *supra* note 8, at tbl. 1-A.

57. *Id*; *see also id.* at ¶ 28 (stating a plausible reason for California's high participation rate).

58. *Id.*

59. The one possible exception is the addition of the criterion, the Low Income Energy Assistance Program. *See* Burton & Mayo**,** *supra* note 13, at 24.

60. *See generally* Hauge et al., *Discounting Telephone Service, supra* note 48; Hauge et al., *Participation in Social Programs by Consumers and Companies, supra* note 48.

61. *See* Burton & Mayo, *supra* note 13, at 24.

62. *See* Holt & Jamison, *supra* note 12, at vi.

ganizations trusted by prospective Lifeline participants.[63] The econometric studies show differences in factors affecting participation rates in Florida and elsewhere, suggesting that marketing efforts should differ across geographic areas and population groups to be optimally effective. However, targeted marketing costs money. Is the universal service objective of affordable rates for low-income consumers in all regions of the nation most effectively realized by continuing along the FCC's decision trajectory of expanding eligibility criteria and streamlining qualification procedures?

Perhaps another perspective is needed. So let us revisit the question: to what extent do low-income households really have access to affordable telephone service? A survey of low-income households commissioned for PURC's report found that over half the respondents had access to a cell phone.[64] A survey of customers who disconnected from BellSouth and who also qualified for Lifeline found that many had access to cellular telephone at home (thirty-six percent) or at work (forty-seven percent), and some survey respondents stated that they had dropped their wireline service because they preferred a cellular phone.[65] Therefore, at least some substitution of cellular telephony for wireline telephony is occurring among low-income households. Other studies also appear to corroborate these survey results. For example, Rodini, Ward, and Woroch conclude that customers in the population at large substitute cellular phones for second fixed lines.[66] Because the Rodini, Ward, and Woroch study used data from 2000-2001, it seems reasonable to expect their finding to be more relevant to primary fixed lines in 2006 because total wireless substitution has increased significantly in recent years. At the end of 2004, there were more wireless subscribers (184 million) than wireline subscribers (176 million access lines) in the United States.[67] Incumbent wireline companies are also focusing more of their efforts on wireless services.[68] Moreover, wireless prices have continued to fall.[69] The Florida-specific econometric study identifies cell phone penetration as a determinant of Lifeline participation. Specifically, greater cellular penetration in a Florida county was associated with lower

63. *Id.*

64. *Id.* at 28.

65. *Id.* at tbl. 13.

66. Mark Rodini, et al., *Going Mobile: Substitutability between Fixed and Mobile Access*, 27 TELECOMM. POL'Y 457, 475 (2003).

67. Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993, *First Report*, 20 FCC Rcd. 15,908, ¶ 197 (2005). [hereinafter *Market Conditions of Mobile Services*]

68. *Id. See also* Dionne Searcy, et al., *As Telecom Shifts, Providers Seek New Connections; Phone Companies Roll Out Products, Services in Fight for Tech-Savvy Customers*, WALL ST. J., Dec. 6, 2005, at A1.

69. *Market Conditions of Mobile Services*, *supra* note 67, at ¶¶ 198-99.

Lifeline program participation rates.[70] While substitution appears to be occurring, we note this trend cautiously because the U.S. econometric study commissioned for PURC's report did not find that cell phone penetration had a significant effect on Lifeline penetration nationwide.[71] One possible explanation is that cellular phone penetration is likely to be greater in states with larger urban areas, like Florida, where markets are likely to be more lucrative and competitive. The FCC estimates cellular phone penetration to be sixty-two percent nationwide; however, Anchorage, Alaska with the lowest population density has a penetration rate of fifty-one percent, and the Tampa Secondary Market Area (SMA) in Florida, with the highest density, has a penetration rate of seventy-two percent.[72]

Providers of wireless service throughout the nation have only recently begun to receive ETC status. Therefore, the number of wireless customers receiving Lifeline assistance is very small. In 2005, approximately 121 wireless competitive ETCs provided Lifeline support to an average number of only 116,588 customers.[73] Wireless providers offer various monthly calling plans to different niche markets.[74] In the future, we might expect more niche marketing of calling plans to low-income subscribers, in addition to other types of subscribers.

Like wireless providers, cable companies have been vying with wireline companies for a greater share of the phone subscribers. More than five million subscribers receive phone service from cable companies, and cable companies are offering those services as part of a larger bundle of services.[75] This prospect raises the policy question of the defi-

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70. Holt & Jamison, *supra* note 12, at 36. Three wireless providers only received ETC status from the FCC in 2005 in Florida so their customer base was not captured in the Florida econometric study.

71. *Id*. at 35, n.77.

72. *Market Conditions of Mobile Services*, *supra* note 67**,** at ¶ 175.

73. Email from John Mardis, External Relations, Universal Service Administrative Company, to Lynne Holt, Policy Analyst, Public Utility Research Center, University of Florida (Mar. 14, 2006) (on file with author). Mr. Mardis noted that USAC does not specifically track the number of wireless versus wireline companies so the data provided are not definitive.

74. For a description of niche marketing efforts, see Shawn Young, *Mobile Mavens: African-Americans and Hispanics Are the Early Adopters When It Comes to Wireless Phone Service*, WALL ST. J., Oct. 24, 2005, at R11.

75. Peter Grant & Amy Schatz, *Battle Lines: For Cable Giants, AT&T Deal Is One More Reason to Worry*, WALL ST. J., Mar. 7, 2006, at A10; Searcy, et al., *supra* note 68, at A1. Standard & Poor's also noted: "In addition to the broadband area, the cable companies are competing with the Bells and other telcos via cable telephony offerings. North American cable providers added more than 580,000 VoIP subscribers in the third quarter of 2005 to finish September with approximately two million IP phone customers. . . . We expect the cable companies to offer a discounted bundle of telephony service and their traditional television service. With their large marketing budgets, established customer loyalty, and a secure broadband networks (sic), we believe the cable companies have the ability to put pressure on the traditional voice carriers with their service bundles." *See* Todd Rosenbluth, *Industry Surveys: Telecom-*

nition of "affordable service," as articulated in the 1996 Act. The Act contemplated a different type of service and set of payment assumptions that may no longer comport with our rapidly changing technologies.

V. TIME FOR ANOTHER APPROACH

What is the most appropriate approach given this trend toward increasing substitution of wireless service for wireline service, increasing cable company and Internet competition for phone service shares, the popularity of alternative payment methods such as prepaid mobile and calling cards, and the findings that states vary in the determinants of Lifeline participation? Specifically, strategies to increase Lifeline participation in one state might not be as effective in another. Is there a better way to proceed? Is the FCC's recent focus on increasing participation rates "barking up the wrong tree"?

We argue that the focus on participation rates is misdirected, and the goal of the 1996 Act should be revisited, specifically the principles of availability of quality service at "just, reasonable, and affordable rates" and "access of consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas . . . to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas."[76]

Of course, the first principle raises a valid question: who should determine what is affordable for low-income consumers given rapidly changing communications technologies and the uneven impact of those changes on consumers throughout the country? Targeting currently occurs for Lifeline and Link-Up eligibility because the eligibility criteria must be income-based. However, access to other communications modes may be more important than targeting based on low-income criteria alone. The survey of customers who disconnected from BellSouth found that less than one quarter of respondents cited affordability of local phone service as their most important reason for disconnecting. Over half have access to wireline telephony at home, and over a third to wireless telephony.[77] Moreover, the existing discount formula for Lifeline and Link-Up is becoming increasingly problematic because it fails to reflect the greater availability of communications options in densely popu-

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munications: Wireline, 2006 STANDARD & POOR'S 1, 11.

76. § 254 (b).

77. Brown, *Disconnecting from Communications*, *supra* note 47, at tbl. 4.

lated areas of the nation compared to more sparsely populated regions.[78] In effect, the current approach arguably gives low-income households a financial incentive to stay with old technologies rather than adopt more advanced communications services. Furthermore a household in a densely populated region with more communications options might receive a higher discount than a household with fewer options. Admittedly, the cost of living may be higher in more densely populated regions, all things equal, but that is not true for all commodities.

The funding to reimburse companies is implicitly redistributed through the federal Universal Service Fund mechanism administered by the USAC, so the support to individual ETCs may have little relationship to the actual cost of serving their low-income customers.[79] To receive federal USF support, an eligible telecommunications carrier must meet four conditions: (1) make Lifeline service available to qualifying low-income consumers; (2) publicize the availability of the service; (3) notify the Lifeline subscriber of impending termination if the carrier believes the subscriber no longer is eligible for Lifeline; and (4) allow subscribers sixty days following the date of the letter indicating impending termination to demonstrate continued eligibility.[80] While the FCC's intent, in adopting the Joint Board's recommendation, was to provide a competitively neutral funding mechanism for Lifeline by decoupling it from the FCC's cost allocation and pricing rules,[81] the communications services currently offered are increasingly different from the clearly demarcated intrastate and interstate telephony services provided before 1996. Indeed, the FCC arguably envisioned another telecommunications universe as early as 1995 when it noted in an NPRM:

> Thus, although our universal service policies have been relatively successful, additional measures may now be necessary to continue to carry out our statutory mandate of making universal service available to all Americans. This Notice presents initiatives aimed at increasing connection and reconnection to, and reducing disconnection from, the public switched telecommunications network. Our review of non-subscribership data, the reasons for non-subscribership, together with the ever-broadening variety of services being offered, indicate a combination of measures may offer the best opportunity to achieve our objective of a universal opportunity to subscribe. *We are particularly interested in ways wireless and cable television technologies*

78. *See supra* note 7 and accompanying text (describing the federal and state matching funding formula). The formula applies to all states although states may decide not to provide any or a full match to federal support.

79. § 54.407 (specifying the rules governing reimbursement for Lifeline subscribers); § 54.413 (specifying the rules governing reimbursement for Link-Up reimbursement).

80. § 54.405.

81. *See* 1997 Universal Service Report, *supra* note 10, at ¶ 213.

> *can now be used and will be available in the future to achieve the goals of universal service. Similarly, we encourage parties to comment on the role of the Internet in achieving universal service.*[82]

In light of the changing technology, pricing schemes, and bundling efforts in the competitive market, we propose that the existing program be transformed to a voucher program that each state would fund itself.[83] Each state would be allowed to determine its own approach to obtaining funds, but each state would be required to fund its program at no less than the total amount of federal and state matching support currently in effect for that state although states could certainly provide greater levels of support. We envision this transformation taking place through voluntary state experiments with various forms of vouchers and funding mechanisms. States not wishing to adopt a voucher-based program would be permitted to continue with the current Lifeline/Link-Up programs. The Federal-State Joint Board on Universal Service would serve as a clearinghouse of data and analyses so that states could learn from each other.

Our proposal allows for states to adopt different policies where differences make sense or to adopt uniform policies where uniformity makes sense, without federal pre-emption or federally-imposed financial transfers among states. The current interstate transfer of universal service moneys was initiated about fifty years ago to equalize costs and prices among states.[84] The goal of low-income programs is to improve affordability for low-income households relative to higher-income households, not to equalize prices for low-income households across states. Accordingly, there appears to be no reason for this type of federal funding mechanism. Each state that adopted a voucher-based program would be allowed to opt out of the current federal funding of Lifeline and Link-Up; that is to say, the federal fees assessed against interstate revenues for

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82. Amendment of the Commission's Rules and Policies to Increase Subscribership and Usage of the Public Switched Network, *Notice of Proposed Rulemaking*, 10 FCC Rcd. 13,003, ¶ 2 (2005) (emphasis added).

83. Vouchers are not an original idea for these programs. The concept is raised in a report by the Progress & Freedom Foundation. *See* PROGRESS & FREEDOM FOUND., DIGITAL AGE COMMUNICATIONS ACT: PROPOSAL OF THE UNIVERSAL SERVICE WORKING GROUP RELEASE 2.0, at 23-24 (2005), http://www.pff.org/issues-pubs/books/051207daca-usf-2.0.pdf. An Appendix to the report by Robert Atkinson, Columbia Institute for Telecommunications, proposes the automatic provision of vouchers to low-income consumers through the Department of Agriculture's Food Stamps program and to individuals in high-cost markets to buy telecommunications services at market rates. *Id.* at 48. Low-income households in high-cost areas would receive both vouchers. This proposal includes a method of establishing the size of the "high-cost" voucher and ways to curb the program so that more affluent households with multiple residences would not be subsidized. *See supra* note 54, and accompanying text.

84. RICHARD GABEL, DEVELOPMENT OF SEPARATIONS PRINCIPLES IN THE TELEPHONE INDUSTRY 116 (1967).

each opt-out state would not include fees for funding the USAC's support of Lifeline and Link-Up programs.

States could choose which, if any, social service programs would trigger Lifeline and Link-Up participation, or they could elect to simply use income-based criteria. Research for the PURC report noted that most eligible households that qualify for those programs automatically meet the income-based criterion of 135 percent of FPG.[85] As a result, the social programs criteria do not significantly increase the number of eligible households. However, states may find it more expedient to use existing social programs to distribute communications vouchers. This approach of qualifying households could decrease bureaucratic costs and also eliminate the need for low-income households to sign up for communications voucher benefits separately from other social program benefits.

We propose that the role of ETCs, as currently configured, should be eliminated from the programs altogether. Subscribers would receive on a monthly basis vouchers that could be used for telephone bill discounts, cell phone post-paid bills or prepaid card discounts, calling card purchases, payment for VoIP services (Voice over Internet Protocol), cable service telephony, and other communications services. All retail providers of such products would be required to accept the vouchers and existing consumer protection laws would be used to ensure that fly-by-night outfits do not bilk consumers. Because the distinction between intrastate and interstate services and voice services and other communications services is rapidly disappearing, we propose that the discount could be used for any communications connectivity including broadband service. In our view, Lifeline support should be provided for a defined functionality and access and not for specific services.[86] We contend that this approach is much more reflective and supportive of the competitive industry that telecommunications has become and that it is also much more technologically neutral than the existing approach. One of the

85. Holt & Jamison, *supra* note 12, at tbl. IV. The Shimberg study for the report found that 93.4% of total eligible households in Florida were eligible for Lifeline and Link-Up through the 135% of FPG income-based criterion. We have no reason to believe that the situation in other states is markedly different. Eligibility criteria for TANF, Medicaid (in specified cases), and LIHEAP are more generous than for the Lifeline and Link-Up programs under the 135% of FPG criterion. We would suggest that recipients who were receiving Lifeline and Link-Up benefits before the proposed program is implemented be grandfathered into the new program.

86. This is not a new concept. In fact, it has been around since 1997. In its 1997 Universal Service Report, the Joint Board cited Washington Utilities and Transportation Commission's ('UTC) objections to defining universal service in a similar vein: "Washington UTC, for example, argues that listing specific services to support "freeze[s] universal service policy in the technology and services of 1996. Washington UTC proposes instead that a description of functionalities and access, rather than services, be used to define universal service." *See* 1997 Universal Service Report, *supra* note 10, at ¶ 34.

problems with Lifeline and Link-Up under the existing system is that, due to federal forbearance, VoIP providers and cable companies, for example, do not contribute to the federal USF. In our view, the suggested proposal would go further than the Lifeline and Link-Up programs operating under existing federal and state regulatory authority in supporting competition and promoting deployment of developing communications technologies throughout the nation. Furthermore, in the long run, the proposed voucher program structure would be streamlined and simpler to administer. It would also decouple the program from a redistribution funding mechanism that has become increasingly divorced from the true objective of the 1996 Act — "just, reasonable, and affordable rates."

Fewer transaction costs are associated with our proposal than with the current system. First, a state could implement our suggestions without enrollment forms and procedures. As the Burton and Mayo study found, administrative burdens were significantly related to decisions of nonparticipation.[87] Second, customers tend to apply for programs they trust, so marketing may be more effective if enrollment forms are available at other social service agencies providing programs from which they might already receive benefits. Third, the elderly as a whole tend to lag behind young people in their adoption of new technologies, but there are signs that deployment of other technologies will affect them, as well. It may come as no surprise that when asked about Lifeline expansion priorities, low-income respondents preferred extending the subsidy to cell phones over cable and Internet access. However, benefit extensions to cable and Internet access, currently not part of the Lifeline program, were not lagging that far behind.[88]

Technological neutrality was clearly of importance to the FCC. Following passage of the 1996 Act, the FCC released a Further Comment Public Notice which posed the question as to "whether the new universal service support mechanisms should provide support for Lifeline in order to make the support technologically and competitively neutral."[89] Technological advances increasingly undermine the justification for perpetuating a program that is not used by most low-income households and is far from technologically-neutral. In the 1997 Universal Service Report and Order, the FCC endorsed the Joint Board''s recommendation to adopt the principle of "competitive neutrality." The FCC also concluded

87. *See* Burton & Mayo, *supra* note 13, at 24.

88. *See* Brown, *Understanding Participation, supra* note 39, at tbl. 6. Over one-fourth of those surveyed (28.4%) indicated the strongest preference for cell phones, followed by 22.5% for cable television, and 20.6% for Internet access.

89. Call for Public Comment of the Federal Communications Commission, in the *Notice of Proposed Rulemaking & Order Establishing Joint Board* in Federal-State Joint Board on Universal Service, CC Dkt. No. 96-45, at ¶ 71 (Aug. 2, 1996), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=1751710001.

in the report and order that "universal service support mechanisms and rules should not unfairly advantage one provider, nor favor one technology."[90] But certain technologies are clearly favored over others under the present scheme.

Our proposal does not necessarily entail changes to other programs supported by the federal USF, although reforms in those programs could and probably would affect service availability options to Lifeline and Link-Up subscribers in ways that we cannot easily predict.[91] To conclude, the times are changing, and the mechanism for Lifeline and Link-Up needs to keep pace with those changes.

90. 1997 Universal Service Report*, supra* note 10, at ¶ 364.

91. Many proposals have been put forth to reform the Universal Service Funding mechanisms. For example, the National Association of Regulatory Utility Commissioners issued a report, Federalism and Telecom, July 2005. That report recommends revamping the collection of revenues to be based on either revenues (interstate and intrastate), telephone numbers, connections, or a hybrid. *See generally,* Allen S. Hammond IV, *Universal Service: Problems, Solutions, and Responsive Policies*, 57 FED. COMM. L.J. 187 (2005).

FORD, CARTER, AND DEREGULATION IN THE 1970S

ANDREW DOWNER CRAIN*

INTRODUCTION

Several respected experts recently declared victory in the deregulation of telecommunications, favorably comparing changes in the industry to the 1970s, when Gerald Ford and Jimmy Carter eliminated regulations on transportation and oil and gas industries.[1] Compared to that wave of deregulation, however, declaring victory in telecommunications is premature. Regulatory reform in communications has always lagged behind reform in transportation and oil and gas by several decades, and the gap has not yet closed. When deregulation of transportation and oil and gas began in 1974, substantial sectors of those industries had already been freed of regulation and opened to competition. The process of opening sectors of telecommunications to competition, however, only started in 1974.

In the transportation and oil and gas industries, a second deregulatory step lifted the entire regulatory edifice. That second step has yet to be taken at the federal level in telecommunications.[2] While the process of deregulation is underway in some states, progress has been slow. For example, the California commission recently lifted price regulations on retail services, but it is still considering whether to eliminate tariffs and contract filing requirements. Some smaller states have gone further and eliminated tariffs for retail telecommunications

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1. *See, e.g.*, PETER J. WALLISON, AEI, GROUNDHOG DAY: RELIVING DEREGULATION DEBATES 1 (2006), http://www.aei.org/publications/ pubID.25034/pub_detail.asp.

2. William A. Niskanen, *A Retrospective*, REGULATION, Summer 2002, at 4-5 ("Most of the older forms of economic regulation, some dating from the nineteenth century, have now been substantially reduced or eliminated—including most of the industry-specific regulation of agriculture, communications, energy, finance, and transportation. . . .The major remaining challenges involve further deregulation of the wired telephone and electricity networks. . ."); Robert W. Crandall, *A Somewhat Better Connection*, REGULATION, Summer 2002, at 22 ("Unlike transportation, the change in atmosphere has not led to deregulation in telecommunications.").

services, but the services often remain subject to price caps.[3]

The second step will not be taken at the federal level until a president focuses on freeing telecommunications from regulation so that special interests that benefit from the regulations do not find a sympathetic ear at the White House. In addition, telecommunications regulators need to do three related things: (1) avoid complexity; (2) avoid choosing sides in competition; and (3) avoid balancing the interests of competitors. Because none of those options are currently in practice, deregulation is unlikely to happen anytime soon. As the industry waits for real deregulation, it is instructive to consider the mistakes that made the deregulatory wave of the 1970s necessary and the factors that made it possible.

The deregulatory wave of the 1970s began when Richard Nixon resigned. Nixon had presided over the apogee of economic regulation in American history. Faced with run-away inflation, he instituted the most extreme peace-time economic regulations since Jefferson embargoed foreign trade. Nixon imposed wage and price controls, putting the federal government in charge of business prices and wages.[4] However, the controls were ineffective and Nixon allowed them to expire in April 1974, with one significant exception. As the country was in the midst of an energy crisis, price controls on oil and gas were retained, making energy the most regulated sector of the economy outside communications and transportation.

By the 1970s, complexity plagued regulations in those industries. Justice Breyer recommended that regulators "strive for simplicity," but Occam's razor has never appealed to regulators.[5] On virtually every occasion that regulators in those industries addressed the unintended

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3. Assess and Revise the Regulation of Telecommunications Utilities, *Order Instituting Rulemaking on the Commission's Own Motion*, Cal. PUC Decision 06-08-030, Cal. PUC Rulemaking 05-04-005, 2006 Cal. PUC LEXIS 367 (2006); *see also,* N.D. Cent. Code § 49-21-01.2 (2005).

4. For details of the controls, *see* President Richard M. Nixon, Address to the Nation Outlining a New Economic Policy: The Challenge of Peace (Aug. 15, 1971), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=3115; President Richard M. Nixon, Special Message to the Congress Announcing Phase III of the Economic Stabilization Program and Requesting Extension of Authorizing Legislation (Jan. 11, 1973), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=4119; President Richard M. Nixon, Address to the Nation Announcing Price Control Measures (June 13, 1973), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=3868; Exec. Order No. 11,615, 36 Fed. Reg. 15,727 (Aug. 15, 1971); Exec. Order No. 11,627, 36 Fed. Reg. 20,139 (Oct. 16, 1971); Exec. Order No. 11,695, 38 Fed. Reg. 1,473 (January 12, 1973); Exec. Order No. 11,723, 38 Fed. Reg. 15765 (June 15, 1973); Exec. Order No. 11,730, 38 Fed. Reg. 19,345 (July 19, 1973).

5. STEPHEN BREYER, REGULATION AND ITS REFORM 184 (1982). Regulators would do well to follow a slightly-revised version of William of Ockham's famous rule, *ordinatii non sunt multiplicanda praeter necessitatem*. (Regulations should not be multiplied beyond necessity.)

consequences of their rules, they made the rules more complicated by exempting certain services or competitors, rather than taking the sensible step of lifting the rules. They avoided lifting regulations because they wanted to benefit certain types of competitors—or, in the case of oil and gas, because they wanted to disadvantage certain companies. Once regulatory advantages were bestowed on competitors, they fought against all attempts to lift the regulations.

The political power of the regulated companies and their unions was finally overcome by two presidents who made deregulating the industries a top priority. After Nixon resigned, Gerald Ford "made a great hullabaloo about deregulation."[6] During his short time in office, he appointed pro-deregulation commissioners and convinced Congress to partially deregulate railroads and oil and gas. Jimmy Carter picked up where Ford left off. "Jimmy Carter seized on deregulation very early in his administration largely because Ford had prepared the issue for action."[7] Carter scored a remarkable string of victories. He lifted most of the remaining regulations on oil and gas, and he revolutionized the transportation industry by eliminating controls on airlines, railroads and trucking companies.

I. HISTORY OF TRANSPORTATION REGULATION

When Ford took office, railroad regulations had been unchanged relatively for eighty-seven years. The regulations had been enacted at the end of the 19th century, when the railroads had taken advantage of the lack of practical alternatives to monopolize the movement of people and goods. In 1887, the government responded with the Interstate Commerce Act, leading to the creation of the first independent regulatory commission, the Interstate Commerce Commission. The act restricted competitive entry and exit, required that all charges be "reasonable and just," and limited price competition by prohibiting discrimination.[8]

During the 1920s, new semi-trailers challenged the railroads' monopoly over the transport of goods, which enabled trucking

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6. John Osborne, *White House Watch: Ford and Deregulation*, NEW REPUBLIC, October 11, 1975, *reprinted in* JOHN OSBORNE, WHITE HOUSE WATCH: THE FORD YEARS 192-97 (1977).

7. MARTHA DERTHICK & PAUL J. QUIRK, THE POLITICS OF DEREGULATION 241 (1985); *see also* PAUL W. MACAVOY, INDUSTRY REGULATION AND THE PERFORMANCE OF THE AMERICAN ECONOMY 4 (1992) ("The Reagan administration carried on an effort that had been initiated as early as the Ford administration but that had reached its zenith with deregulation of airline, trucking, and railroad services in the Carter administration."); David B. Cohen & Chris J. Dolan, *Debunking the Myth: Carter, Congress, and the Politics of Airline Deregulation*, WHITE HOUSE STUDIES, Spring 2001, at 197 ("Carter benefited from a process that was well underway when he was sworn in on January 20, 1977.").

8. Interstate Commerce Act, ch. 104, 24 Stat. 379 (1887) (repealed 1978).

companies to compete with very little capital. At the same time, the transport of people was revolutionized by the Ford Motor Company, which mass-produced automobiles and the first successful airliner. The sensible response to the erosion of the railroad market power would have been to lift regulations, but eliminating regulation was not in vogue during the failure of *laissez-faire* capitalism that was the Great Depression. During the New Deal, Congress passed laws patterned on the 1887 railroad legislation to regulate trucking, airlines and telecommunications.[9] Independent regulatory commissions were established, competitive entry was limited, prices were fixed, and nondiscrimination rules were promulgated to ensure that vigorous price competition did not develop.

The ICC was given jurisdiction over trucking companies and prevented competitive entry by rarely granting new trucking permits.[10] The development of efficient trucks should have been a great boon to shippers. Trucking companies had the ability to deliver door-to-door, rather than to the nearest train station; they could travel the most direct route possible, rather than where a railroad happened to have track; and they could schedule to meet demand, rather than to wait for a set train schedule. ICC regulations, however, prevented truckers from offering those benefits to consumers. Trucking companies were forced to travel set routes at set prices. As the negative impacts of regulation were identified, the ICC worked incrementally, easing regulations on narrow segments of the industry, trying to address each issue without lifting the entire regulatory edifice. The result was a pastiche of regulations under which a company might become exempt based on its size or number of customers. By the time Ford took office, unregulated carriers—independent truckers, companies that shipped their own products, and carriers that agreed to serve one company only—carried more freight than the regulated companies.[11]

Similarly, the Civil Aeronautics Board ("CAB") was given jurisdiction over the airlines, and for 40 years it did not allow a single new, major airline to start flying.[12] Airlines rarely were allowed to fly

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9. Civil Aeronautics Act of 1938, ch. 601, 52 Stat. 973 (1938) (repealed 1978); Motor Carrier Act of 1935, ch. 498, 49 Stat. 543, 543-567 (1935). The ICC was first given jurisdiction over telecommunications companies in 1910, when common carriage rules were applied to the industry. Mann-Elkins Act, ch. 309, 36 Stat. 539, 539-557 (1910) (codified at 47 U.S.C. § 601 (1934)). The full panoply of regulations was imposed by the Communications Act of 1934, ch. 652, 48 Stat. 1064, 1064-1105 (codified as amended in scattered sections of 47 U.S.C.).

10. Osborne, *supra* note 6 at 195-196.

11. BREYER, *supra* note 5, at 223; DERTHICK & QUIRK, *supra* note 7, at 23.

12. *See* ANDREAS KNORR & ANDREAS ARNDT, INSTITUTE FOR WORLD ECONOMICS AND INTERNATIONAL MANAGEMENT, SUCCESSFUL ENTRY STRATEGIES ON THE DEREGULATED US DOMESTIC MARKET (2002), http://www.iwim.uni-

new routes, and the CAB took years to decide applications.[13] The CAB made flying comfortable for the wealthy but unavailable to the masses. Prices were high, flights frequent, and airports uncrowded. But everything was not better for the Jet Set. Passengers often had to change airlines to reach their destinations, because the commission did not allow one airline to serve both legs of a trip. To be responsive to passenger needs, each airline needed to serve most major routes, which the CAB made impossible. The CAB allowed only one or two airlines to serve most routes between major cities, and no airline was allowed to serve more than a small number of major routes. The CAB almost killed Federal Express in its infancy when it denied the company's petition to fly cargo in large aircraft. The company survived only because the CAB did not have jurisdiction over small aircrafts. Federal Express flew a fleet of small planes, and it often had to fly two smaller planes when one larger plane would be much more economical. The company could not make a profit during the early 1970s, and almost did not survive.

The regulatory edifice made the country more insular than it wanted to be. Each commission subsidized local service by keeping the price of long distance service artificially high. Despite the fact that costs were similar between long and short trips, the CAB required that airlines charge more for long trips than for short ones.[14] As a result, most Americans could not afford to fly to other areas of the country—the cheapest coast-to-coast round-trip flight in 1974 cost more than $1,400 in today's dollars. The poor also could not afford to take a bus to visit relatives and friends in other parts of the country, because the ICC forced bus companies to charge artificially high prices for long trips to subsidize service between nearby towns. Most people could not afford to phone friends and relatives regularly in other parts of the country, because the FCC and state regulators set long distance rates high to subsidize local service. Coast-to-coast calls cost $2 a minute in today's dollars.

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bremen.de/publikationen/pdf/w022.pdf; Dipendra Sinha, *Regulation and Deregulation of US Airlines*, 20 J. TRANS. HIST. 46, 58 (1999); President James Earl Carter, Airline Industry Reform Legislation, Remarks at a Briefing for Representatives of the Airline Industry and Public Interest Groups (June 20, 1977), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=7698.

13. *See generally*, Robert W. Poole, Jr. & Viggo Butler, *Airline Deregulation: The Unfinished Revolution* (Competitive Enter. Ins. Policy Study No. 255, 1999), *available at* http://www.reason.org/ps255.html. A 1974 Supreme Court opinion upholding the ICC's rejection new route applications showed the proceedings that applicants were forced to endure. *See generally,* Bowman Transportation v. Arkansas-Best Freight System, 419 U.S. 281 (1974). The applications were filed 1966, and the ICC issued its order in 1971. The ICC held 18 months of hearings with nearly 1,000 witnesses representing the 10 applicants and the 66 incumbents opposing the applications.

14. *See* DANIEL P. KAPLAN & MARK R. DAYTON, CONGRESSIONAL BUDGET OFFICE, POLICIES FOR THE DEREGULATED AIRLINE INDUSTRY 3 (1988), http://www.cbo.gov/ftpdocs/55xx/doc5541/doc02b-Entire.pdf; Sinha, *supra.*note 12, at 58.

The only way most Americans could keep in contact with other areas of the country was to get in a car and drive. The Eisenhower Highway Act of 1955-56 made driving across the country practical. It had also eliminated, once and for all, the possibility that the railroads could monopolize transportation. But the regulatory system remained and kept the nation apart. To make matters worse, the energy crisis of the early 70s proceeded to render driving to other parts of the country prohibitively expensive.

II. ENERGY PRICE CONTROLS

When Ford took office, a spike in oil prices had been wreaking havoc on the economy. OPEC cut back production in response to America's support of Israel during the Yom Kippur War of 1973, and the price of a barrel of oil jumped from $1 to $10. Price controls were in place, but their primary impact was to increase the country's dependence on foreign oil. When Nixon first imposed price controls on domestically-produced oil, the oil companies had less incentive to pump oil, and production fell. To offset the drop in supply, Nixon lifted restrictions on oil imports in April 1973 and oil imports skyrocketed.[15]

The sensible response to the drop in domestic oil production would have been to lift the controls on energy products, but Nixon's regulators followed the typical regulatory pattern of making rules more complex. Nixon's Cost of Living Council lifted controls only on "new oil," defined as oil from new wells and oil from old wells above the wells' 1972 volume. Price controls were not lifted from "old oil," that is, oil produced from an existing oil field below the level of production in 1972.[16] In theory, the oil companies had already paid for the production facilities for old oil, so the remaining controls on old oil would not depress production, while freeing new oil from price controls would promote production. The theory, however, did not match reality. Although oil companies had already paid for most equipment at the old fields, they had to invest in those fields to keep production at the same level. Once the oil companies were allowed to charge more for new oil than old, they diverted capital from old oil fields to new fields and to fields that were producing at higher than their 1972 levels. Old oil

15. Proclamation No. 4210, 38 Fed. Reg. 10,725 (May 1, 1973); Emergency Petroleum Allocation Act of 1973, Pub. L. No. 93-159, 87 Stat. 627 (codified as amended at 15 U.S.C. §§ 751-60 (1988)); Richard L. Gordon, *Lessons Learned and Forgotten*, REGULATION, Summer 2002, at 46.; MACAVOY, *supra* note 7, at 9; *see* FOSTER ASSOCIATES, INC., ENERGY PRICES 1960-73, 18 (1974), *available at* http://www.fordfound.org/elibrary/documents/0102/toc.cfm.

16. 10 C.F.R. § 212.73 (1973); 38 Fed. Reg. 22,536 (Aug. 22, 1973); 38 Fed. Reg. 34,414 (December 13, 1973); 39 Fed. Reg. 744 (January 2, 1974); 39 Fed. Reg. 1924 (January 15, 1974). A complete description of the energy controls is contained in FOSTER ASSOCIATES, INC., *supra* note 15, at 21-27.

production declined at a rate of 14 percent per year.[17]

The distinction between new and old oil caused downstream economic distortions. Oil refiners that happened to have contracts in place with producers of cheap old oil had an arbitrary competitive advantage over other refiners that had to purchase expensive new oil. To remedy the situation, the Federal Energy Administration complicated the regulatory scheme even further by issuing "entitlements" to refiners, which allowed them to buy a specified number of barrels of old oil. At the same time, the FEA froze all distribution relationships between oil suppliers and refiners, and refineries were allowed to increase prices only to reflect cost increases. The controls flowed through to retail sellers of gasoline, heating oil and diesel fuel, who were not allowed to charge more than their costs plus seven cents per gallon.[18]

The controls had contributed to—and may have been the sole cause of—shortages of oil and natural gas in parts of the country.[19] Daniel Yergin and Joseph Stanislaw have called the energy control program "a lasting lesson in the perversities that can ensue when government takes over the marketplace." [20] William Simon, who ran the program, agreed: "The kindest thing I can say about it is that it was a disaster."[21] The price controls contributed to long lines and sold-out gas stations during the oil crisis of 1973-74. At the same time, they caused shortages of natural gas. The price of natural gas that crossed state lines was lower than the price of gas that was sold intrastate, and shortages hit various areas of the country as gas producers sold gas in-state, rather than shipping it to where it was needed. The shortages were serious; some states found it necessary to cut consumption in half. Faced with the shortages, regulators again chose more complexity. They set up a new system of controls to allocate scarce supplies of gas.[22]

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17. Herman Kahn, Oil Prices and Energy in General (Hudson Ins. Research Memorandum No. 2, August 1974) (copy on file with author).

18. 39 Fed. Reg. 42,246 (Dec. 4, 1974); 10 C.F.R. § 211.67; FOSTER ASSOCIATES, INC., *supra* note 15, at 24.

19. BREYER, *supra* note 5, at 244 ("The major adverse effect of regulation was to cause—or at least to aggravate—a serious natural gas shortage.").

20. DANIEL YERGIN & JOSEPH STANISLAW, THE COMMANDING HEIGHTS 64 (1998); JAMES REICHLEY, CONSERVATIVES IN AN AGE OF CHANGE 364 (1981).

21. *Id*. at 361-64.

22. BREYER, *supra* note 5, at 244 ("[O]nce the shortage was created, it was necessary to develop another system of regulatory allocation."); Memorandum from Frank Zarb on Natural Gas Shortages to the President (August 6, 1975), *in* Briefing Papers from Energy Review with the President (August 9, 1975) (on file at Gerald R. Ford Presidential Library, Presidential Handwriting Files, Box 50, Folder: "Utilities – Energy (3)"); Stephen Breyer, *Reforming Regulation*, 59 TUL. L. REV. 4, 5 (1984); REICHLEY, *supra* note 20, at 361-64; DERTHICK & QUIRK, *supra* note 7, at 208; Gordon, *supra* note 15.

III. NIXON'S TEPID DEREGULATORY EFFORTS

Nixon espoused deregulation, but he backed away when he ran into opposition from regulated companies and their unions. The Teamsters were one of the few unions to support Nixon, and when they objected to legislation drafted by his Transportation Department to deregulate trucking, Nixon withdrew his support.[23] The Nixon administration was more concerned about the financial condition of transportation companies than about lifting regulations. Despite protection from competition, the airlines were in poor financial condition, with Pan Am in particular on the verge of bankruptcy.[24] The railroads were in even worse shape, and nationalization of the rails was a real possibility. The federal government formed Amtrack in 1971 to take over passenger traffic. Penn-Central filed bankruptcy in 1970—at that time the largest bankruptcy in U.S. history—and the federal government created Conrail to operate the Penn-Central tracks and other bankrupt routes in the northeast.[25]

Almost uniformly, Nixon appointees to regulatory commissions favored more regulation over deregulation. Under Chairman Secor Browne and his successor, Robert Timm, the CAB followed an informal policy of denying all new route applications, and eliminated what little freedom airlines had to sell discount fares.[26] Browne and Timm also promoted anticompetitive agreements between airlines. In 1970, for instance, the Department of Transportation brokered an agreement between American, TWA, and United to cut back on coast-to-coast flights. The CAB approved the agreement and exempted it from antitrust laws, later approving another capacity-limitation agreement between the airlines in early 1973. When the Energy Policy Office issued rules allocating jet fuel to airlines, the CAB tried to help airlines conserve fuel by ordering them to coordinate schedules, and approved four coordinated schedule agreements on October 31.[27]

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23. DERTHICK & QUIRK, *supra* note 7, at 38. *See also* Thomas Gale Moore, *Moving Ahead*, REGULATION, Summer 2002, *available at* http://www.cato.org/pubs/regulation/regv25n2/v25n2-3.pdf.

24. *Commanding Heights: Up for Debate: Deregulation* (PBS Television Broadcast May 2003), *available at* http://www.pbs.org/wgbh/commandingheights/shared/minitextlo/ufd_deregulation_full.html; *see also* John E. Robson, *Airline Deregulation: Twenty Years of Success and Counting*, REGULATION, Spring 1998, at 17, *available at* http://www.cato.org/pubs/regulation/regv21n2/airline2-98.pdf; BARBARA STURKEN PETERSON & JAMES GLAB, RAPID DESCENT 27-46 (1994); DERTHICK & QUIRK, *supra* note 7, at 22.

25. Regional Rail Reorganization Act of 1973, Pub. L. No. 93-236, 87 Stat. 985 (codified as amended in scattered sections of 45 U.S.C.); President Richard M. Nixon, Statement on Signing the Regional Rail Reorganization Act of 1973 (January 2, 1974), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=4274.

26. Cohen & Dolan, *supra* note 7, at 198.

27. CAB Order 73-7-147; CAB Order 73-10-50; CAB Order 73-10-110; CAB Order

The most charitable explanation of why Nixon backed away from deregulation is that he shared a common confusion of Republican leaders—he confused supporting business with supporting the free market. Companies that benefit from the rules fight hard against attempts to lift economic regulations, which often stymies Republicans like Nixon because acting against business interests is a departure from their customary position. A less-charitable explanation is that Nixon was bending to the will of his political contributors. The Watergate scandal exposed how regulated companies lined up to give briefcases of cash to the Nixon campaign. The chairman of American Airlines admitted that the company had made an illegal contribution of $55,000 to Nixon's campaign. Braniff Airways announced that it had made illegal contributions totaling $50,000. Gulf Oil pled guilty to making illegal contributions totaling $100,000. Phillips Petroleum also pled guilty to making an illegal $100,000 cash contribution.[28]

IV. FORD'S EFFORTS TO DEREGULATE TRANSPORTATION

Gerald Ford was not cowed by opposition from politically-connected companies and unions. Roderick Hills, Counselor to the President, explained that Ford pushed deregulation knowing that he would face strong opposition: "He was aware that his support for such reform would be strongly opposed by the industries affected, by labor unions and by strong congressional elements. He persisted, nonetheless."[29] Ford's Secretary of Transportation William Coleman tells an illuminating story. When Coleman presented a draft trucking deregulation bill to Ford, the president took a puff on his pipe and asked about the political impact of the bill. When Coleman explained that both the Teamsters and the trucking companies would fight hard against it, Ford was pleased. "Well, if the Teamsters and truckers are against it, it must be a pretty good bill."[30]

74-7-105. The D.C. Court of Appeals ruled that the October 31, 1973 order was justified by the oil crisis, but it overturned the rest of the orders. *See* United States v. Civil Aeronautics Board, 511 F.2d 1315 (D.C. Cir. 1975).

28. R.W. Apple, Jr., *A Tragedy in Three Acts, in* THE END OF A PRESIDENCY 30 (1974); Linda Amster, *Events Leading to the Resignation of Richard M. Nixon*, *in* THE END OF A PRESIDENCY 23, 266 (1974); EVAN DROSSMAN & EDWARD W. KNAPPMAN, WATERGATE AND THE WHITE HOUSE: JULY-DECEMBER 1973, 26, 28, 30, 31, 109, 116, 119 (1973); Edward W. KNAPPMAN & EVAN DROSSMAN, WATERGATE AND THE WHITE HOUSE: JANUARY-SEPTEMBER 1974, 42, 133, 187 (1974).

29. Trude B. Feldman*, Gerald Ford at 90 Reflects on his Presidency, Prays for Bush*, WORLDTRIBUNE.COM, August 9, 2003, http://www.worldtribune.com/worldtribune/WTARC/2003/ss_ford_07_20.html.

30. Interview with William Coleman in Washington D.C. (July 6, 2004). For report of same incident, *see also* DERTHICK & QUIRK, *supra* note 7, at 46; Paul H. Weaver, *Unlocking the Gilded Cage of Regulation*, FORTUNE, February 1977, at 182.

Deregulation came naturally to Ford; he was a traditional conservative who believed in less government. His deregulatory inclinations were reinforced by his economic advisors, most prominently Chairman of the Counsel of Economic Advisors, Alan Greenspan.[31] Economists throughout the government had supported deregulation for years, and Ford gave them leadership and support that they had never experienced. "Under him, the loose, informal sub-community of reformers inside the executive branch was converted into a more organized force, aided by White House leadership to settle internal differences, and inspired by the belief that a president was prepared to take political risks on behalf of their cause."[32]

Ford was also driven by his belief that deregulation would help stem inflation, and thought about fighting inflation in microeconomic terms. Rather than attacking the core problem of monetary growth, Ford tried to convince consumers to spend less and companies to charge less. Some of Ford's efforts were questionable, such as his Whip Inflation Now program under which Americans pledged not to buy expensive goods. Other efforts, like deregulation, had salutary long-term benefits but little impact on inflation.

It was the nation's misfortune to have a Federal Reserve Chairman who shared Ford's microeconomic focus. Arthur Burns controlled the country's money supply and thought that monetary policy was not an appropriate tool to fight inflation.[33] From the minute Nixon appointed him in 1970, Burns allowed the money supply to grow at an unprecedented rate, and inflation followed.[34] In 1974, the consumer price index grew by double digits for the first time in the post-war period. Inflation peaked when Ford took office in August 1974, when consumer

31. For example, Greenspan urged Ford to deregulate the trucking industry. Notes of Michael Raoul-Duval of Meeting with President Ford and Others (Apr. 25, 1974) (on file with the Gerald R. Ford Presidential Library, Box 6, File: "Meeting with the President, 4/25/75, Greenspan, et al. (energy, farm bill, railroads).").

32. DERTHICK & QUIRK, *supra* note 7, at 49.

33. Robert Hetzel offers a good analysis of Burns' views on monetary policy and inflation. *See* Robert L. Hetzel, *Arthur Burns and Inflation,* FED. RES. BANK OF RICHMOND ECON. Q, Winter 1998, at 21.

34. In 1972, the growth of M1 hit an unprecedented rate of 9.2 percent, and M2 grew by double digits for the first time in the post-war period in both 1971 and 1972. Real interest rates plummeted in 1971 and stayed abnormally low until 1973. Burns' tenure at the Fed was the only time in post-war history that the Fed consistently kept the federal funds rate below the rate of inflation. 2005 *ECON. REP. OF THE PRESIDENT.*, 291*, available at* http://www.gpoaccess.gov/eop/2005/2005_erp.pdf*;* U.S. BUREAU OF THE CENSUS, STATISTICAL ABSTRACT OF THE UNITED STATES 1976, no. 790, fig. 16-2 (1976); Lee Hoskins, *Monetary Policy AG*, SHADOW OPEN MARKET COMMITTEE, May 2, 2004, at 2 ("Money growth (M2) was in double digits much of the time and real interest rates often were negative."), *available at* http://www.somc.rochester.edu/May05/Hoskins.pdf.

prices were growing by an annual rate of 15.6 percent.[35]

Ford made deregulation a key element of his fight against inflation.[36] In July 1975, Ford met with the chairs and ranking minority members of ten regulatory agencies in the East Room of the White House. Ford explained why he cared about deregulation:

> We should recognize that occasionally Government policies which appear to be in the short-term public interest are in fact detrimental to long-term consumer interests. . . . It is my strong conviction that the consumer is best able to signal his wants and needs through the marketplace, that government should not dictate what his economic needs should be. . . . I believe the Government should intrude in the free market only when well-defined social objectives can be obtained by such intervention or when inherent monopoly structures prevent a free, competitive market system from operating. Government should foster rather than frustrate competition. It should seek to ensure maximum freedom for private enterprise.[37]

The president then urged the commissioners to start easing regulations. "It is my judgment that in every case you have to ask yourself individually as commissioners and as a commission: Is regulation better in each case than an unregulated market?"[38]

Ford decided to focus his deregulatory efforts on transportation. "Few sectors of the American economy were more stifled by government regulation than the transportation industry, and I thought deregulation was urgently required."[39] He gave deregulation of transportation a prominent place in his 1975 State of the Union speech:

> Now, we badly need reforms in other key areas in our economy: the airlines, trucking, railroads, and financial institutions. I have submitted concrete plans in each of these areas, not to help this or that industry, but to foster competition and to bring prices down for the consumer.[40]

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35. *Recent Price Developments*, FEDERAL RESERVE BULLETIN, September 1974, at 613-14; Memorandum from Alan Greenspan to the President*, Consumer Price Index for August* (September 19, 1974) (on file at Gerald R. Ford Presidential Library, Presidential Handwriting Files, Box 4, Folder: "Business and Economics – National Economy 9/74");U.S. BUREAU OF THE CENSUS, *supra* note 33.

36. President Gerald R. Ford, Address to a Joint Session of Congress on the Economy (Oct. 8, 1974), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=4434.

37. President Gerald R. Ford, Remarks at a Meeting to Discuss Federal Regulatory Reform (July 10, 1975), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=5063.

38. *Id.*

39. GERALD R. FORD, A TIME TO HEAL 273 (1979).

40. President Gerald R. Ford, Address before a Joint Session of the Congress Reporting on the State of the Union (Jan. 19, 1976), *available at*

Ford thought that deregulation of the railroads would be easiest to push through Congress, because he could add funding for Conrail, which key members of Congress dearly wanted. "Railroad deregulation would be my number one priority."[41] In May 1975, Ford submitted the Railroad Revitalization and Regulatory Reform Act, proposing to ease restrictions on abandonment and to allow railroads to change rates within a range without ICC approval. To induce Congress to pass the bill, Ford added federal funds for restructuring Conrail.[42] He also promised to veto any bill that was stripped of its deregulatory provisions, and Congress passed the bill in its entirety in 1976.[43]

It took three years for the ICC to take advantage of its new flexibility under the act. Until 1979, when a deregulatory majority took over the commission, Chairman George Stafford, a Nixon appointee, proved to be staunchly opposed to reform.[44] Part of the responsibility was Ford's. He started his administration choosing commissioners because of their overall qualifications, paying little attention to whether they shared his deregulatory agenda. After Ford appointed him to the ICC in 1975, Roger Corber called deregulation "a prescription for disaster," and he followed with a speech denouncing deregulation. Ford was surprised to read about the speech in the Grand Rapids paper, and he asked his aides, "Isn't this one of ours?"[45] Ford started to pay attention with later appointments. His other ICC appointees, Betty Jo Christian and Charles L. Clapp, were consistent supporters of competition and deregulation, but they did not form a deregulatory majority because Ford had misfired with the appointment of Corber.[46]

Ford was more successful forcing changes at the CAB. When Ford took office, CAB Chairman Robert Timm was being investigated for trips he took at the expense of regulated companies. Ford wanted to fire Timm, but White House Counsel Philip Buchen explained that he could only remove a member of an independent commission in the middle of

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http://www.presidency.ucsb.edu/ws/index.php?pid=5677.

41. FORD, *supra* note 39*,* at 273.

42. President Gerald R. Ford, Special Message to the Congress Proposing Reform of Railroad Regulations (May 19, 1975), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=4925.

43. Pub. L. No. 94-210, 90 Stat. 31 (1976); President Gerald R. Ford, Statement on the Railroad Revitalization and Regulatory Reform Act of 1976 (Feb. 5, 1976), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=6121.

44. FORD, *supra* note 39*,* at 366; Osborne, *supra* note 6*,* at 195; DERTHICK & QUIRK, *supra* note 7, at 15.

45. Memo from Jim Connor to Ed Schmults, with enclosure (Apr. 1976) and Memo from Ed Schmults to Jim Connor (Apr. 27, 1976), *cited in* DERTHICK & QUIRK, *supra* note 7, at 85 (on file with author).

46. DERTHICK & QUIRK, *supra* note 7, at 71, 75, 85; Thomas Gale Moore, *Regulation: Trucking Deregulation*, THE CONCISE ENCYCLOPEDIA OF ECONOMICS, http://www.econlib.org/library/Enc/TruckingDeregulation.html (last visited Feb. 3, 2007).

his term after a finding of malfeasance.[47] Ford was able to take away Timm's chairmanship, and in December 1974 administration aides told Timm that the president would not reappoint him chairman. They tried to convince Timm to resign, but he refused.[48] Timm remained on the commission for another year, but Ford gave the chairmanship to CAB commissioner Richard O'Melia on January 1, 1975.[49]

Ford received formidable support for airline deregulation from Democratic Senator Ted Kennedy. Kennedy convinced one of the prominent proponents of deregulation, a young Harvard law professor named Stephen Breyer, to join his staff in August 1974. Breyer was a perceptive critic of regulation who understood that the market could not be replicated by economic models.

> Efforts, both here and abroad, to have people guess what the market would produce if it were free to create a price are so very different in their result from what the market does produce when it is free that it becomes a kind of parody of a free market situation.[50]

Breyer knew that he wanted to attack regulation, but he was unsure where to begin until the morning of September 27, when he read in the *Washington Post* that Secretary of Transportation Claude Brinegar had called a meeting with the major airlines to discuss how to help Pan Am. Shortly after Breyer walked into the meeting, he was shocked to hear Brinegar extort the airlines to fix prices. "Raise your prices! What's wrong with you airlines?" Brinegar then asked the visitors to leave so the airlines could reach an agreement in private. When he returned to Capitol Hill, Breyer told Kennedy that he had seen a classic case of price fixing: "It was a cartel, a simple cartel being organized by the government."[51] Breyer suggested that Kennedy's Subcommittee on Administrative

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47. Memorandum from Dean Burch to Philip W. Buchen (Sept. 20, 1974) (on file with author); Letter from Robert Timm to Philip Buchen (Sept. 9, 1974) (on file with author); Memorandum from Dean Burch to Philip W. Buchen (Sept. 5, 1974) (on file with author).

48. Letter from Robert Timm to Philip Buchen (Dec. 19, 1975) (on file with the Gerald R. Ford Presidential Library, John E. Robson Papers, Box 5, Folder: "C.A.B. – Timm, Robert (material relating to W.H. efforts to force Timm's resignation from Board, and Dept. of Justice investigation of Timm's conduct)"); Notes Gerald R. Ford Presidential Library (John E. Robson Papers, Box 5, Folder: "C.A.B. – Timm, Robert (2).").

49. President Gerald R. Ford, Remarks at the Swearing in of John E. Robson as Chairman of the Civil Aeronautics Board (Apr. 21, 1975); *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=4854; Letter from Robert Timm to Philip Buchen (Dec. 19, 1975) (John E. Robson Papers, Box 5, Folder: "C.A.B. – Timm, Robert (material relating to W.H. efforts to force Timm's resignation from Board, and Dept. of Justice investigation of Timm's conduct)").

50. *Commanding Heights: Up for Debate: Deregulation*, *supra* note 24. Breyer had not even seen the absurd results of the FCC's USF models when he made the comment.

51. STURKEN & GLAB, *supra* note 24, at 34.

Practice and Procedure hold hearings on airline regulations.

> I just simply went over there and went to the meeting. And I sat in on a meeting, and the Secretary of Transportation was encouraging all the industry to raise its prices in order to make more money and to stop competition. . . . I thought, well, maybe we could have a hearing on this very meeting. Why is the President on the one hand saying, "Keep prices down," and the Secretary of Transportation, on the other hand, is trying to raise the price? And we did have that hearing.[52]

Kennedy held round one of hearings in November 1974, focusing on the CAB rules for charter airlines. On the first day, Deputy Attorney General Keith Clearwaters testified that the administration opposed minimum charter rates and that the commission's effort to broker a deal to raise rates was illegal: "No justification whatever has been shown for government-sanctioned price fixing in the charter industry."[53]

The star witness that day was Sir Freddy Laker, who was trying to get permission to fly cheap flights (approximately $500 in today's money for a one-way ticket) between London and the United States. In his testimony, Laker called the obsession for saving Pan Am "PanAmania."[54] Laker was not asking for handouts from the government or the incumbent airlines; he just wanted to compete. It was not a fight of good against evil, but that was not the way regulators saw it. Traditionalists at the CAB thought that they were protecting the broad-base of shareholders and unionized employees at the incumbent airlines against a rich man who wanted to undercut the incumbents with inferior service and cheap, non-union labor. That belief drove many decisions that appear in retrospect to be nonsensical, but that were made with sincere and honest intent. Many of the telecommunications decisions of the last ten years will look as baffling in the future, as historians struggle to understand why regulators intentionally gave advantages to companies owned by enormously rich individuals over those owned by institutional investors like TIAA-CREF.

Kennedy began round two of the hearings in February 1975. This time the subject was the entirety of airline regulations. On the first day, Acting Secretary of Transportation John Barnum testified on behalf of the administration that the time was ripe for change, saying "I believe we

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52. *Commanding Heights: Up for Debate: Deregulation*, *supra* note 24.

53. *Airline Charter Fares: Hearings before the Subcomm. on Admin. Practice and Procedure of the S. Comm. on the Judiciary*, 93rd Cong. 212 (1975) (statement of Kenneth I. Clearwaters).

54. *Id.* at 190.

are now at a regulatory watershed."[55]

It took a tragedy for the media to give the hearings prominent coverage. Breyer's investigators had convinced a staffer named William Gingery to provide copies of confidential CAB documents, but a few days before his scheduled testimony, Gingery was found dead in his apartment. He had shot himself, leaving a 20-page suicide note filled with invective about his superiors at the commission. Suicide is usually caused more by underlying depression than by any single event, but according to Gingery's note, documents he found in a safe the Friday before his testimony pushed him over the edge. "Last Friday I learned that I am a fool." The documents showed that Timm had ordered O'Melia (then head of the enforcement bureau) to close an investigation into airlines slush funds for illegal contributions.[56] In the days after the suicide, the hearing room was packed with reporters.[57] Timm denied ever telling O'Melia to shut down the investigation, but his testimony contradicted by O'Melia and several CAB investigators.[58]

The next dramatic event occurred when Kennedy and Breyer proved that CAB officials were lying when they testified that there was no moratorium on new route awards. Breyer's investigators unearthed a memorandum from an administrative law judge referring to "informal instructions of the chairman's office in connection with the unofficial moratorium on route cases."[59] Timm continued to deny the existence of any moratorium, but his convoluted testimony was hardly credible. O'Melia admitted the existence of the moratorium.[60] "In fact, as far as I am concerned, there is no route moratorium as of now."[61] Breyer thought that O'Melia's admission was a seminal event. "Deregulation began at

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55. *Id,* at 4-22 (statement of John W. Barnum), *Id.* at 34–56 (statement of Thomas E. Kauper).

56. *C.A.B. Aide is Dead in Apparent Suicide*, N.Y. TIMES, Feb. 19, 1975, at 37; *C.A.B. Aide Faults Airlines on Election Laws*, N.Y. TIMES, Mar. 3, 1975, at 51; David Burnham, *2 U.S. Aides Back Suicide Note Saying C.A.B. Chief Cut Off Politics Inquiries,* N.Y. TIMES, Mar. 5, 1975, at 18; DERTHICK & QUIRK, *supra* note 7, at 44; STURKEN & GLAB, *supra* note 24, at 41-43.

57. David Burnham, *It Took a Suicide Note*, N.Y. TIMES, Mar. 30, 1975, at 142; STURKEN & GLAB, *supra* note 24, at 43.

58. *Airline Charter Fares: Hearings before the Subcomm. on Admin. Practice and Procedure of the S. Comm. on the Judiciary*, 93rd Cong. 2374-84 (1975) (testimony of CAB Chairman Robert Timm); *Id.* at 2303–2323 (testimony of Stephen Alterman); *Id.* at 2326–2329 (testimony of Robert F. Rickey).

59. BREYER, *supra* note 5, at 338.

60. *Airline Charter Fares: Hearings before the Subcomm. on Admin. Practice and Procedure of the S. Comm. on the Judiciary*, 93rd Cong. 1358 (1975) (testimony of Richard J. O'Melia) ("There was a memorandum apparently stating that the former Chairman, Secor Browne, said there should be an unofficial route moratorium. I think the language of the memo goes one, which indicated to the chief examiner to sit on them for a while.").

61. *Id.* at 648–49.

that moment."[62]

In the hearings' final report, Breyer was harsh in his indictment of CAB commissioners, declaring that the hearings revealed "a strong likelihood of highly improper and possibly criminal behavior on the part of the Board members themselves."[63] In response to Breyer's report, Kennedy and Ford exchanged letters promising to work together for deregulation, and they each submitted deregulatory legislation.[64]

Timm's testimony was the last straw for Ford, who decided to remove him from the commission. When Timm again refused to resign, the White House sent him notice of a hearing to determine whether the president would remove him from office.[65] Timm did not go quietly. He accused the White House of intervening in the affairs of the CAB and leveled wild accusations against fellow board members.[66] On December 5, Buchen sent Timm a letter setting forth the charge of obstructing the investigation of airline campaign contributions and making false statements to investigators and Congress. Timm finally resigned on December 10, 1975.[67]

Within a month of the end of the hearings, Ford appointed John Robson as chair of the CAB.[68] Before he took office, Robson was "objective and agnostic" about deregulation, but he quickly became a supporter.[69] Two weeks before he took office, the United States Circuit Court for the District of Colombia court had voted in favor of competition, ruling that the commission could not deny route

62. STURKEN & GLAB, *supra* note 24, at 44-45. For discussions of the impact of O'Melia's testimony, *see* BREYER, *supra* note 5, at 337; STURKEN & GLAB , *supra* note 24, at 44; *Kennedy Denounces C.A.B. Moratorium on New Route Competition for Airlines*, N.Y. TIMES, Feb. 27, 1975, at 69.

63. DERTHICK & QUIRK, *supra* note 7, at 50; STURKEN & GLAB, *supra* note 24, at 48.

64. David Burnham, *Ford Lauds Panel for C.A.B. Report*, N.Y. TIMES, Feb. 22, 1976, at 22. *See* DERTHICK & QUIRK, *supra* note 7, at 52; President Gerald R. Ford, President's Special Message to the Congress Proposing Reform of Airline Industry Regulation, (Oct. 8, 1975), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=5314.

65. Letter from Roderick Hills to Robert D. Timm (Oct. 17, 1975) (on file with the Gerald R. Ford Presidential Library, John E. Robson Papers, Box 5, Folder: "C.A.B. – Timm, Robert (2).").

66. Letter from Robert Timm to Philip Buchen and Notes on "Meeting Ex Session 12/16/75" (Dec. 19, 1975) (on file with the Gerald R. Ford Presidential Library, John E. Robson Papers, Box 5, Folder: "C.A.B. – Timm, Robert (material relating to W.H. efforts to force Timm's resignation from Board, and Dept. of Justice investigation of Timm's conduct)).

67. Letter from Philip Buchen to Robert D. Timm (Dec. 5, 1975) (on file with the Gerald R. Ford Presidential Library, John E. Robson Papers, Box 5, Folder: "C.A.B. – Timm, Robert (2)."); Letter from Robert D. Timm to the President (Dec. 10, 1975) (on file with the Gerald R. Ford Presidential Library, John E. Robson Papers, Box 5, Folder: "C.A.B. – Timm, Robert (2).")

68. President Gerald R. Ford, President's Remarks at the Swearing in of John E. Robson as Chairman of the Civil Aeronautics Board (Apr. 21, 1975), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=4854.

69. *See generally*, Robson, *supra* note 24, at 17.

applications without considering the public benefits of additional competition.[70] Robson took the hint.

On July 6, 1975, Robson announced that the CAB would "assess the operation of the US domestic air transport system under limited or no regulatory constraints." On the same day, the CAB announced that it would begin an experiment allowing airlines to raise or lower prices within "zones of reasonableness" and to enter and exit specified routes without permission.[71] At the end of July, the CAB issued a staff report recommending deregulation within five years.[72] In August—and again a year later—the commission liberalized charter rules.[73] In September, the CAB finally granted several new routes to airlines, and it continued to approve new routes throughout Robson's tenure.[74] In April 1976, the CAB commissioners unanimously announced that they supported deregulation.[75] Not all of the commissioners actually supported deregulation, but they supported Robson, as he explained, out of "an amalgam of persuasion, loyalty, fear of political retribution, institutional pride, and tactic."[76]

In March 1977, the CAB allowed Texas International to charge discounted "Peanuts" fares and American to charge "Supersaver" fares. The discount prices seem high today—round-trip coast-to-coast tickets cost the equivalent of $750 to $900 in today's dollars—but at the time they were significantly lower than other available fares. By 1978, discount fares were widely available, prices had fallen by 8 percent, and air traffic had increased by 17 percent.[77] Robson believed that the law restrained his ability to impose further deregulation without

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70. Continental Airlines v. Civil Aeronautics Bd., 519 F.2d 944 (D.C. Cir. 1975).

71. Richard Witkin, *C.A.B. Acts to Ease Curbs on Airlines' Competition*, N.Y. TIMES, July 8, 1975, at A1.

72. ROY PULSIFER, ET AL., CIVIL AERONAUTICS BOARD, REPORT OF THE CAB SPECIAL STAFF ON REGULATORY REFORM (1975); *CAB Should Curtail Regulatory Duties, Staff Report Urges*, WALL ST. J., July 23, 1975, at 8; Richard Witkin, *C.A.B. Offers Plan Easing Fare Curbs*, N.Y. TIMES, July 23, 1975, at 30; Jeffrey W. Hayes, Airline Deregulation: A Financial Markets Perspective on Who Mattered When 4 (Aug. 16, 1998), *available at* http://polmeth.wustl.edu/retrieve.php?id=314.

73. *See Charter-Flight Rule Revisions Adopted by CAB*, WALL ST. J., Aug. 11, 1975, at 8; *CAB Loosens Curbs For Air Charters; Plan to Start Oct. 7*, WALL ST. J., Sept. 3, 1976, at 8; Ralph Blumenthal, *Air Charter Plan Approved By C.A.B. Cuts Restrictions*, N.Y. TIMES, Sept. 3, 1976, at A1.

74. *See CAB Adds Carriers To Routes Serving Omaha, Des Moines*, WALL ST. J., Sept. 10, 1975, at 3. *See also CAB Official Favors Washington-Cincinnati Route for 2 Airlines*, WALL ST. J., Mar. 16, 1977, at 21.

75. Robson, *supra* note 24, at 18

76. DERTHICK & QUIRK, *supra* note 7, at 88-89.

77. *A Discount Air Fare to Coast Approved*, N.Y. Times, Mar. 16, 1977, at 14; *CAB to Let American Air Try Lower Fare on New York-California Runs for a Year*, WALL ST. J., Mar. 16, 1977, at 6; KAPLAN & DAYTON, *supra* note 14, at 3; Moore, *supra* note 23; Sinha, *supra* note 12.

congressional action, but the D.C. Circuit disagreed. Robson's CAB had denied the application of World Airlines to fly regularly-scheduled flights, because Robson thought he did not have the authority to approve the application.[78] The court reversed the order, telling the CAB that existing law gave it the authority to allow charter airlines to fly scheduled routes.[79]

Meanwhile, Congress worked on clarifying Robson's power to lift regulations. In April 1976, hearings were held on the Ford and Kennedy bills before the Senate Aviation Subcommittee chaired by Nevada Democrat Howard Cannon. Robson made a big impact on Cannon when he asserted that regulations hurt the airlines financially, stating "[w]e are concerned that the present regulatory system may have great difficulty in coping successfully with the future."[80] Ford's Secretary of Transportation William Coleman agreed: "There must be fundamental changes. . . . We believe the fault clearly lies in the regulatory system."[81] One airline broke with its brethren and told the commission that regulations hurt the industry. Because United was the largest airline, the CAB had discriminated against it in awarding new routes, and United President Edward Carlson testified that his company supported deregulation. "United could be comfortable with total deregulation in contrast to what we have now."[82]

After the testimony of Robson, Coleman and Carlson, Cannon announced his support for reform.[83] The committee was still considering the deregulation bills when Ford left office.

V. CARTER'S EFFORTS TO DEREGULATE TRANSPORTATION

Carter's experiences running a small business taught him to hate regulations. "As a farmer and a small businessman, and later as a Governor, I shared this resentment and frustration. I resented the cost of Government red tape, the interference it represented in my business and

78. *World Airways Denied Scheduled Runs, But CAB Suggests Congress Study Issue*, WALL ST. J., Jan. 26, 1976, at 5. *See also A Coast-to-Coast Fare of $89 May Never Come*, WALL ST. J., Apr. 15, 1975, at 1.

79. World Airways, Inc. v. C.A.B., 547 F.2d 695, 699-701 (D.C. Cir. 1975).

80. *Regulatory Reform in Air Transportation: Hearings Before the Subcomm. on Aviation of the S. Comm. on Commerce*, 94th Cong. 347 (1976) (statement of Hon. John E. Robson).

81. *Id.* at 220-30 (statement of Hon. William Coleman).

82. *Id.* at 531 (statement of Edward Carlson, Chairman and Chief Executive Officer, United Air Lines, Inc.). For discussions of the impact of United's change in position, *see* DERTHICK & QUIRK, *supra* note 7, at 99-100, 157; William Carley, *Major Split Develops Among Airlines as Congress Sets Deregulation Hearings*, WALL ST. J., Mar. 17, 1977, at 4; Richard Witkin, *United Airlines President Backs Proposals for Regulatory Reform*, N.Y. TIMES, Mar. 17, 1977, at 104.

83. Hayes, *supra* note 72, at 4; Cohen & Dolan, *supra* note 7, at 199.

personal life, and not least of all, having to deal with the bureaucratic gobbledygook itself."[84]

During his presidential campaign, Carter promised to pursue deregulation. "The reform of our regulatory agencies would be one of the highest priorities of a Carter Administration."[85] In an address to Ralph Nader's Public Citizens' Forum, Carter promised to appoint regulatory commissioners who supported competition.[86] His campaign statements singled out transportation for reform. "The chief impediments against more effective utilization of the existing system are physical deterioration and outmoded regulations."[87] Carter was less inclined, however, to lift regulations on oil: "There is no need to, and I oppose efforts to, deregulate the price of old oil."[88] Carter's first inclination was to repeat the mistakes made in oil regulation with natural gas, lifting controls on only "new" gas. "I have advocated the deregulation of new natural gas for a limited period of time—four to five years."[89] When he took office, Carter promised a "new spirit of openness, simplicity and clarity" in regulation.[90]

For his first appointment to a regulatory commission, Carter fortuitously chose someone who shared his deregulatory views. Carter replaced ICC Chairman George Stafford with Commissioner A. Daniel O'Neal, who until that time was considered to be against deregulation, but who championed deregulation once in office.[91] There was no question that Carter deliberately chose a proponent of deregulation for his next appointment when he convinced New York Public Utilities

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84. President James E. Carter, Statement on Executive Order 12044 (Mar 23, 1978), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=30540.

85. Governor James E. Carter, Response to Questions from the Association for Cooperation in Engineering (Aug. 6, 1976), *reprinted in* THE PRESIDENTIAL CAMPAIGN OF 1976: JIMMY CARTER 855 (1978).

86. Governor James E. Carter, Address to Ralph Nader's Public Citizens' Forum (Aug. 9, 1976), *reprinted in* THE PRESIDENTIAL CAMPAIGN OF 1976: JIMMY CARTER, 478–79 (1978).

87. Governor James E. Carter, Proposal to the Platform Committee of the Democratic Party (June 16, 1976), *reprinted in* THE PRESIDENTIAL CAMPAIGN OF 1976: JIMMY CARTER, 235 (1978).

88. *Id.*

89. *Issues for Investors*, FINANCIAL WORLD, Sept. 15, 1976, *reprinted in* THE PRESIDENTIAL CAMPAIGN OF 1976: JIMMY CARTER, 795 (1978).

90. Letter from the President to the Heads of Independent Regulatory Agencies (Mar. 23, 1978) (improving government regulations).

91. President James E. Carter, Announcement of Interstate Commerce Commission Designation of A. Daniel O'Neal as Chairman (Apr. 5, 1977), *available at* http://www.presidency.ucsb.edu/ws/print.php?pid=7297; DERTHICK & QUIRK, *supra* note 7, at 66 n.14; KIMBERLY VACHAL, UPPER GREAT PLAINS TRANSPORTATION INSTITUTE, THE INTERSTATE COMMERCE COMMISSION: PAST AND PRESENT 8 (Mar. 1993), *available at* http://www.ugpti.org/pubs/pdf/SP111.pdf; Moore, *supra* note 23, at 6-8. Prior to appointing him chairman, Carter asked O'Neal only one vague question about deregulation.

Commission Chairman Alfred Kahn to take over the CAB.[92] Kahn's support of deregulation was well known. He summed up his philosophy in testimony to Congress. "The superiority of open markets . . . lies in the fact that the optimum outcome cannot be predicted."[93] Two years earlier, he had told Congress that regulations should be eliminated in the transportation industry. "Transportation is the leading example of an area in which a substantial dose of deregulation, and perhaps something close to complete deregulation, is long overdue.[94] Elizabeth Bailey, Carter's next appointment to the CAB, had no hesitations about joining Kahn's deregulatory cause.[95] And Carter proclaimed that he would continue to choose deregulatory proponents.

> I am very proud that the ICC Chairman, Dan O'Neal, has been staunch in moving to deregulate the trucking industry. I back him in this. I realize the independence of the regulatory agencies, but with my own voice, my own influence, my future appointments to the ICC, my intention is to continue this trend.[96]

Carter was good to his word. In 1979, he appointed three deregulation proponents to the ICC, Darius B. Gaskins, Marcus Alexis and Thomas Trantum. Later that year, Carter made Gaskins chair.[97]

When he took over the CAB in May 1977, Kahn set out to achieve "something as close to total deregulation as the law will permit, to be achieved as quickly as possible."[98] He told his staff that they "were going

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92. President James E. Carter, Announcement of Civil Aeronautics Board Nomination of Alfred E. Kahn to be a Member (May 19, 1977), *available at* http://www.presidency.ucsb.edu/ws/print.php?pid=7532; DERTHICK & QUIRK, *supra* note 7, at 69.

93. *Hearing before the Subcomm. on Aviation of the H. Comm. on Public Works and Transportation*, 95th Cong. (testimony of Alfred E. Kahn), *cited in* DERTHICK & QUIRK, *supra* note 7, at 124 (emphasis in original).

94. Albert R Karr, *Nominee for CAB Holds Outspoken Regulatory Views*, WALL ST. J., May 20, 1977, at 14.

95. President James E. Carter, Announcement of Civil Aeronautics Board Nomination of Elizabeth E. Bailey to be a Member (July 7, 1977), *available at* http://www.presidency.ucsb.edu/ws/print.php?pid=7769.

96. President James E. Carter, Business Council Remarks and a Question-and-Answer Session at a Meeting of the Council (Dec. 13, 1978), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=30299.

97. President James E. Carter, Announcement of Interstate Commerce Commission Designation of Darius W. Gaskins, Jr., as Chairman (Oct. 12, 1979), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=31521; President James E. Carter, Announcement of Interstate Commerce Commission Nomination of Marcus Alexis to be a Member (May 17, 1979), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=32359; President James E. Carter, Announcement of Interstate Commerce Commission Nomination of Two Members (May 16, 1979), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=32347.

98. DERTHICK & QUIRK, *supra* note 7, at 73.

to get the airline eggs so scrambled that no one was ever going to be able to unscramble them."[99] Kahn's goal was not meaningfully different from Robson's; they both believed that the ultimate goal was deregulation of the airlines. Where they differed was in how to accomplish that goal. Robson thought that deregulation had to wait for congressional action, while Kahn was willing to use his powers as chairman to implement change. "We'll do what we can, until somebody says we can't."[100] Kahn later explained the difference between his approach and Robson's, noting that "the main difference between the preceding chairman and me was not on the general efficacy of deregulation, he had in fact come out in favor of it, but in his attitude toward moving before a bill. Now in that he was extraordinarily conservative."[101]

Under Kahn, the CAB approved all new route applications.[102] In 1978, the commission lifted restrictions on charter companies, allowed airlines to lower fares up to 50% without board approval, and eliminated its requirement that first class fares be 50% higher than coach fares.[103]

Airline deregulation also worked its way through Congress. Carter signed the Air Cargo Deregulation Act on November 9, 1977, and deregulated air freight.[104] Deregulation of passenger traffic took longer; Carter pushed deregulation on Capitol Hill for almost two years.[105] When the Cannon committee continued hearings in 1977, Charles Schultze, the chairman of Carter's Council of Economic Advisors, testified that the administration fully supported the Kennedy and Cannon deregulation bills.[106] The Cannon committee finally approved a bill on October 27,

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99. Alfred E. Kahn, *Deregulation: Looking Backward and Looking Forward*, 7 YALE J. ON REG. 325, 331 (Summer 1990).

100. Ernest Holsendolph, *The Airlines Try to Cope With Freedom: The Rulings of Alfred E. Kahn, C.A.B. Chairman Have Fueled the Competitive Fires*, N.Y. TIMES, Apr. 23, 1978, at F7 (quoting Alfred E. Kahn, professor at Cornell University).

101. Interview with Alfred E. Kahn for Jimmy Carter Oral History Project, *cited in* Cohen & Dolan, *supra* note 7.

102. *See* DERTHICK & QUIRK, *supra* note 7, at 149; Sinha, *supra* note 11; *see also* Albert R. Karr, *CAB Moves to Throw Routes Wide Open for Competition in Reversal of Policy*, WALL ST. J., May 8, 1978, at 3.

103. Sinha*, supra* note 11*; see Sharp Relaxing of Air-Fare Regulations Planned by CAB in Drive to Cut Controls*, WALL ST. J., Apr. 4, 1978, at 8; *CAB Will Liberalize Stance on Accepting Carter-Route Bids*, WALL ST. J., July 31, 1978, at 24.

104. Act of Nov. 9, 1977, Pub. L. No. 95-163, 91 Stat. 1278 (codified as amended in scattered sections of 26 and 49 U.S.C.); *see also* President James E. Carter, Federal Mine Safety and Health Amendments Act of 1977 and Air Cargo Deregulation Bill Remarks on Signing S. 717 and H.R. 6010 into Law (Nov. 9, 1977), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=6905.

105. Cohen & Dolan, *supra* note 7.

106. *Regulatory Reform in Air Transportation: Hearing on S .292 and S. 689 Before S. Subcomm. on Aviation of the S. Comm. on Commerce, Science, and Transportation,* 95th Cong. (1977) (statement of Charles Schultze, Chairman, President Carter's Council of Economic Advisors).

1977.[107] The Senate followed, passing the bill almost without dissent.[108]

Georgia Democrat Elliott Levitas held up the bill when it arrived in the House Aviation Subcommittee, refusing to act against the wishes of Atlanta-based Delta Airlines. Levitas thought he was adding a poison pill to the bill when he proposed an amendment for the CAB to sunset. Levitas sold the provision to airline executives by explaining that it would force Congress to reconsider deregulation by the time the CAB was scheduled to be dissolved.[109] Carter convinced Speaker Tip O'Neill to intervene, and the bill passed out of committee in May.[110] The House passed a bill in September, including the provision for the CAB to sunset. Carter signed the Airline Deregulation Act of 1978 on October 24, noting that "[f]or the first time in decades, we have deregulated a major industry."[111]

Under the new law, the CAB's ability to restrict entry and exit ended in December 1981, CAB price jurisdiction ended in January 1983, and the CAB itself was dissolved at the end of 1984.[112] When Carter signed the act, a CAB staffer told airline executives that the board would issue certificates for new routes "like confetti."[113] The CAB gave airlines price freedom two years early.

Carter's appointees to the ICC pushed deregulation as hard as Kahn did. In 1977, the D.C. Circuit Court held that the ICC could not deny new route applications without first considering the benefits of additional competition.[114] O'Neal took the court's direction and began to allow competition. "It appears that the goals of this program can be reached through administrative actions alone. While legislation confirming the administrative actions could be drafted, we do not believe it is necessary."[115] In 1979, the board approved 98 percent of route

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107. President James E. Carter, Domestic Airline Industry Statement on Action by the Senate Committee on Commerce, Science, and Transportation to Reduce Regulation of the Industry (Oct. 27, 1977), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=6850.

108. *Fighting Inflation at 30,000 Feet*, N.Y. TIMES, Apr. 24, 1978, at A22; Albert R. Hunt, *Senate Votes 83-9 to Substantially Reduce Airline Regulation to Boost Competition*, WALL ST. J., Apr. 20, 1978, at 5.

109. DERTHICK & QUIRK, *supra* note 7, at 160–62.

110. Albert R. Karr, *Scare Talk about Deregulation*, WALL ST. J., May 9, 1978, at 26.

111. President James E. Carter, Airline Deregulation Act of 1978 Remarks on Signing S. 2493 into Law (Oct. 24, 1978), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=30038; *Bill Deregulating Airline Industry Clears Conferees*, WALL ST. J., Oct. 9, 1978, at 2.

112. Airline Deregulation Act of 1978, Pub. L. No. 95-504, 92 Stat. 1705 (codified as amended in scattered sections of 45 and 49 U.S.C.); Moore, *supra* note 23; *see generally,* DERTHICK & QUIRK, *supra* note 7, at 69, 88-89, 97, 124.

113. Albert R. Karr, *Carter Signs Airline-Deregulation Law; CAB Will Grant Routes More Generously*, WALL ST. J., Oct. 25, 1978, at 2; *see* KAPLAN & DAYTON, *supra* note 14.

114. DERTHICK & QUIRK, *supra* note 7, at 67-68.

115. INTERSTATE COMMERCE COMMISSION, INITIAL REPORT OF THE MOTOR CARRIER

applications. Congress balked at the pace of deregulation. During hearings to confirm him as chair, congressional leaders compelled from Gaskins a promise to hold up further deregulation until June 30, 1980 to give Congress time to pass legislation.[116] But Carter had already begun the legislative process on June 21, 1979 when he submitted legislation to deregulate trucking.[117]

The Cannon committee was the first stop for Carter's bill, and the fight over the legislation was fierce and dirty. The Teamsters even tried to bribe Senator Cannon. Teamsters President Roy Williams and Allen Dorfman, a Chicago businessman with mob connections, were caught on tape admitting that they tried to bribe him, and they were convicted of conspiracy in December 1982.[118] Despite fierce opposition, Carter continued to push his legislation, warning Congress that he would veto any bill that would roll back the commission's deregulatory actions. Congress responded with legislation to Carter's liking. [119]

In July 1980, Carter signed the Motor Carrier Act, which lifted most restrictions on entry, on the goods truckers could carry, and on the routes they could travel. Truckers were free to set prices within a "zone of reasonableness." Unfortunately, the Byzantine rules requiring truckers to file tariffs were not lifted, and state commissions continued to limit entry and regulate prices.[120] Although the Act did not completely lift regulations, it did the next best thing by allowing market entry. The ICC commissioners used the flexibility granted by the act to revolutionize the industry.[121] Rates fell, and trucking companies multiplied. Deregulation was completed during the Clinton administration, when the Trucking Industry Regulatory Reform Act of 1994 eliminated the rate-filing requirement for trucking companies and preempted state jurisdiction over intrastate trucking prices.[122] A year later, Congress dissolved the ICC.[123]

TASK FORCE 36 (May 1979), *cited in* VACHAL, *supra* note 91, at 9.

116. *See* VACHAL, *supra* note 91, at 9.

117. President James E. Carter, Trucking Industry Deregulation Remarks Announcing Proposed Legislation (June 21, 1979) *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=32506.

118. *See* Lombardo v. United States, 865 F.2d 155, (7th Cir. 1989); DERTHICK & QUIRK, *supra* note 7, at 169; *see also* Ben A. Franklin, *Teamster Trial Goes to the Jury*, N.Y. TIMES, Dec. 12, 1982.

119. *See* DERTHICK & QUIRK, *supra* note 7, at 6; Moore, *Trucking Deregulation*, *supra* note 46.

120. *See* Moore, *Trucking Deregulation*, *supra* note 46. *See generally* DERTHICK & QUIRK, *supra* note 7, at 6, 73, 149-50; VACHAL, *supra* note 91, at 9; Moore, *supra* note 23.

121. DERTHICK & QUIRK, *supra* note 7, at 97; Moore, *supra* note 23.

122. Trucking Industry Regulatory Reform Act of 1994, Pub. L. No. 103-311, 108 Stat. 1673 (codified as amended in scattered sections of 23 and 49 U.S.C.).

123. ICC Termination Act of 1995, Pub. L. No. 104-88, 109 Stat. 803 (codified as amended in scattered sections of 2, 5, 11, 15, 16, 23, 26, 28, 39, 42, and 49 U.S.C.); *see also* President William J. Clinton, Statement on Signing the ICC Termination Act of 1995 (Dec. 29,

Three months after signing the trucking bill, Carter signed a bill deregulating moving companies. The Household Goods Transportation Act of 1980 gave the ICC authority to allow pricing freedom, but required moving companies to continue filing rates. The Act also allowed carriers to guarantee pick-up and delivery times, and to offer insurance for lost or damaged goods. Prior to the Act, a moving company was not allowed to give binding quotes or accept any form of payment other than cash or certified check. The Act allowed companies to accept payment by check or credit card.[124] Carter proposed deregulation of busing, but regulations were not lifted until the Reagan administration, with the Bus Regulatory Reform Act of 1982. Like trucking, busing was not completely deregulated until the ICC was abolished. Also like trucking, the key was allowing entry which caused rates for long bus trips to fall.[125]

In 1979, the ICC began using its authority under the 1976 railroad legislation to lift restrictions on entry and controls over prices.[126] Carter submitted a bill to further deregulate the railroads in 1979, motivated in part by fear that the government would be obligated to nationalize the railroads.[127] Carter pushed the bill for most of the 1980 campaign year, and Congress finally passed a bill at the end of his administration. Carter signed the Staggers Rail Act on October 14, 1980, calling it the "capstone" of his deregulatory efforts.

> The Staggers Rail Act of 1980 is the capstone of my own efforts to get rid of needless and burdensome Federal regulations which benefit nobody and which harm all of us. This effort is crucial to promote more competition, to improve productivity, and to hold down inflation. We deregulated the airlines, we deregulated the trucking industry, we deregulated financial institutions, we decontrolled oil and natural gas prices, and we negotiated lower trade barriers throughout the world for our exports.[128]

1995), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=52436.

124. Household Goods Transportation Act of 1980, Pub. L. No. 96-454, 94 Stat. 2011 (codified as amended in scattered sections of 26, 28, and 49 U.S.C.); *see* Thomas Gale Moore, *Clearing the Track: The Remaining Transportation Regulations*, 18 REG., Spring 1995, *available at* http://www.cato.org/pubs/regulation/reg18n2f.html.

125. Bus Regulatory Reform Act of 1982, Pub. L. No. 97-261, 96 Stat. 1102 (codified as amended in scattered sections of 5, 26, 31, and 49 U.S.C.); Moore, *supra* note 124.

126. *See* Moore, *supra* note 23, at 7.

127. *See* President James E. Carter, Freight Rail Industry Deregulation Message to the Congress Transmitting Proposed Legislation (Mar. 23, 1979), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=32085.

128. President James E. Carter, Staggers Rail Act of 1980 Remarks on Signing S. 1946 into Law (Oct. 14, 1980), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=45283.

The Staggers Act allowed the ICC to exempt railroad traffic from rate regulation if it found that regulation was not necessary to protect shippers from monopoly power—only rates to "captive shippers" remained regulated.[129] The ICC used its authority aggressively, exempting most rail traffic, but coal and grain producers have used the "captive shippers" provision to maintain artificially low rates for the past 30 years.[130]

Other aspects of the law that fell short of complete deregulation. Fifty years after the railroad companies were able to dominate anything, they were still subject to more regulation than their competitors. The railroads were still required to file rates and contracts, which the commission could reject, and railroads needed approval to build new track or abandon old tracks. The most important aspect in which the Staggers Act fell short of full deregulation was that it did not eliminate all barriers to entry in the transportation industry. Even today, railroads need approval to ender any new area of business, they are forbidden to carry their own commodities, and they cannot own trucking companies.[131]

VI. FORD'S FIGHT TO DEREGULATE OIL AND GAS

One of the first issues Ford turned to when he took office was what to do about price controls on petroleum products, which were scheduled to expire in June 1975. John Sawhill, the head of the Federal Energy Administration, recommended "progressive deregulation" and "price equalization," making the price of oil the same regardless of where it was produced. But he did not propose simple equalization. Fear of oil companies making "windfall profits" drove him to recommend a "capacity-based entitlement system" that would create "substantial price equalization."[132] Ford's Council of Economic Advisors recommended immediate deregulation.[133] The CEA estimated that deregulation would spur an increase in domestic production by 5 percent, reducing oil imports by 9 to 16 percent. The downside to deregulation was that it would cause a one-time increase in the inflation rate of 0.4 percent.[134]

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129. *See* Staggers Rail Act of 1980, Pub. L. No. 96-448, 94 Stat. 1895 (codified as amended in scattered sections of 5 and 49 U.S.C.).

130. *See* Moore, *supra* note 124; Moore, *supra* note 23, at 10.

131. Moore, *supra* note 124.

132. Memorandum from John Sawhill to Kenneth Rush, et al. on Crude Oil Price Equalization (Aug. 12, 1974) (on file at Gerald R. Ford Presidential Library, Kenneth Rush Files, Box 1, Folder: "Crude Oil Price Equalization, August 23, 1974.").

133. Memorandum from Bob Dohner to Gary Seevers on Cost of Crude Price Decontrol (Aug. 12, 1974) (on file at Gerald R. Ford Presidential Library, Kenneth Rush Files, Box 1, Folder: "Crude Oil Price Equalization, August 23, 1974.").

134. *Id.*

Ford agreed with the CEA and decided to push for complete and immediate deregulation of petroleum prices. Ford also told his domestic advisors to "push hard" for deregulation of natural gas during the pending congressional session, but Congress did not act on natural gas until after Ford left office.[135]

The disagreement between Ford and Sawhill came to a head over Sawhill's proposal for a 20-cent-per-gallon tax on gasoline to discourage consumption.[136] Sawhill's proposal would have made the regulatory scheme nonsensical. Instead of allowing the price of gasoline to rise by lifting the price controls, Sawhill proposed a more complex solution, in which the government would simultaneously try to reduce and increase the price of gasoline. The sole purpose of price controls was to keep the price of gasoline artificially low, while the sole purpose of Sawhill's gas tax would have been to increase the price of gasoline. Ford thought that the gas tax increase had no chance in Congress, and he preferred to let gas prices increase naturally by lifting price controls.[137] Sawhill would not give up, and he went public with his proposal on the "Today" show on October 1, 1974. Ford disowned Sawhill's statements and asked him to resign, replacing him with OMB Associate Director Frank Zarb.[138]

On December 27, Ford met in Vail with his energy advisors to consider a series of energy proposals to include in his state of the union speech.[139] They gave him three options: (1) a series of deregulatory legislative proposals, (2) a program of additional governmental controls, and (3) a series of administrative actions to increase the price of domestic oil. His economic advisors recommended option 1, deregulation. Ford had already decided that deregulation was important, but he did not reject the administrative options, which he considered a valuable tool to force Congress to accept deregulation. By allowing the price of oil to rise, he could remove the incentive for Congress to keep controls. Rather than choosing between options 1 and 3, he decided to pursue both. "I will go

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135. Notes and Memorandum for the Record of Michael Raoul-Duval of Meeting with President Ford, Secretary Simon, Secretary Morton, and John Sawhill (Aug. 28, 1974) (on file with the Gerald R. Ford Presidential Library, Michael Raoul-Duval Papers, Box 4, File: "Meeting with the President, 8/28/74, Energy"); REICHLEY, *supra* note 20, at 372-73.

136. FORD, *supra* note 39, at 228.

137. FORD, *supra* note 39, at 229, 241-44. In an October 22, 1974 meeting with Max Fisher, Ford said that Congress would not pass a gas tax aimed at promoting conservation. Notes of Michael Raoul-Duval of Meeting with President Ford (Oct. 22, 1974) (on file with the Gerald R. Ford Presidential Library, Michael Raoul-Duval Papers, Box 4, File: "Meeting with the President, 10/22/74, Max Fisher.").

138. FORD, *supra* note 39*,* at 229; President Gerald R. Ford, News Conference (Oct. 29, 1974); Letter of President Gerald R. Ford Accepting the Resignation of John C. Sawhill as Administrator of the Federal Energy Administration (Oct. 29, 1974) (on file with author); RICHARD REEVES, A FORD, NOT A LINCOLN 136-37(1975); REICHLEY, *supra* note 20, at 70.

139. Interview with Roger B. Porter, William A. Syers (May 13, 1985) (on file with the Gerald R. Ford Library, William A. Syers Papers, Box 1, Folder "Porter, Roger," p. 1.).

forward with a legislative package on using the market mechanism, getting government out of the business of regulating energy, but at the same time, I'll move simultaneously with the administrative options. . . . And if they don't produce anything, we'll keep the heat on with the administrative package."[140]

Ford explained that allowing the price of oil and natural gas to increase was the only way to effectively discourage consumption. "Painful as they are, higher prices do promote conservation, and higher prices do promote increased efficiency in the use of petroleum products."[141] Greenspan later explained the administration's policy. "We found that there is no alternative to allowing—in fact, encouraging—prices of energy to rise."[142]

On the evening of January 13, 1975, Ford introduced his energy program in a televised fireside chat from the Lincoln Library at the White House, and two days later he gave more details in his 1975 State of the Union address. Ford announced that he would increase the price of domestic oil by $3, in equal increments over three months. Ford also announced that he would be submitting legislation to deregulate oil and natural gas, along with a proposal for a windfall profits tax.[143] Within a week, Democratic Senators Scoop Jackson and Ted Kennedy filed a resolution to block the proposed oil price increases. Ford and Congress were stalemated for the rest of the year. They began a cycle in which Ford imposed price increases on oil. Congress responded by vetoing the price increases and extending the expiring price controls. Ford responded by vetoing the extension, but offering a short extension of the controls so a compromise could be worked out, and the process started over. After several cycles, Congress finally passed an energy bill on December 17.

The bill retained controls on the price of old oil, which was held at $5.25, and controls were again imposed on new oil, rolling the price back to $11.00. After 40 months, the president was given the authority to

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140. Interview of Richard B. Cheney, Stephen J. Wayne (June 27, 1975) (on file with the Gerald R. Ford Library, James F. C. Hyde and Stephen J. Wayne Oral History Collection, 1975-1977, Box 1, Folder "Cheney, Richard – Interview, 6/27/75," pp. 8-9); Notes of Michael Raoul-Duval Meeting with President Ford and Others (Dec. 19, 1974) (on file with the Gerald R. Ford Presidential Library, Michael Raoul-Duval Papers, Box 5, File: "Meeting with the President, 12/19/74, Morton, et al.").

141. John Osborne, *White House Watch*, NEW REPUBLIC, Sept. 6, 1975, *reprinted in* Osborne, *supra* note 6, at 180.

142. Address by Alan Greenspan (on file with the Gerald R. Ford Presidential Library, Michael Raoul-Duval Papers, Box 4, File: "Greenspan, Alan.").

143. President Gerald R. Ford, Address to the Nation on Energy and Economic Programs (Jan. 13, 1975); President Gerald R. Ford, Address before a Joint Session of the Congress Reporting on the State of the Union (Jan. 15, 1975). As promised, Ford submitted his omnibus energy bill to Congress on January 30. Letter from President Gerald R. Ford, to the Speaker of the House and the President of the Senate Transmitting Proposed Energy Legislation (Jan. 30, 1975) (on file with author).

gradually eliminate controls. The law also gave the president the authority to eliminate categories of controls, subject to veto by either house. Ford was faced with a tough choice. The price controls had lapsed, and if he vetoed the bill, the controls would stay dissolved. But Congress could pass new controls in 1976, without giving Ford the power to eliminate them over time. Ford's advisors were uncertain whether a veto would be sustained, and they were fairly certain that a new bill would be worse. The positive side of the bill was that it "set a course towards decontrol." Ford chose the ability to gradually deregulate over continuation of the battle with Congress, and he signed the Energy Policy and Conservation Act on December 27, 1975.[144]

The FEA immediately began implementing the deregulatory provisions of the act. "Our goal is deregulation to the maximum extent possible."[145] In 1976, the FEA exercised its authority to lift controls from residential fuel oil, middle distillates, military jet fuel, naphtha, and gas oils. Approximately half of refinery output was decontrolled, but gasoline, natural gas liquids, commercial jet fuel and aviation gasoline were still subject to controls.[146] By the time Ford left office, the FEA had completed hearings on decontrol of gasoline. Zarb gave Ford three options: (1) lift controls in December, so Congress would be forced to act before he left office, (2) lift controls in early January, so the new administration would have 15 days to act once it took office if it disagreed with decontrol, and (3) allow the new administration to make the decision. Congressional leaders asked Ford to allow the incoming

144. FORD, *supra* note 39, at 340-41; Memorandum from Frank Zarb to President Gerald R. Ford concerning Recommendations on Energy Bill (Nov. 7, 1975) (on file with the Gerald R. Ford Presidential Library, Frank Zarb Files, Box 2, File: "Memoranda to the President 11/1/75 – 11/24/75"); Memorandum from Frank Zarb to President Gerald R. Ford concerning Conference Energy Bill (Nov. 10, 1975) (on file with the Gerald R. Ford Presidential Library, Frank Zarb Files, Box 2, File: "Memoranda to the President 11/1/75 – 11/24/75"); Memorandum from William Simon to President Gerald R. Ford concerning The Energy Policy and Conservation Act of 1975 (Dec. 8, 1975) (on file with the Gerald R. Ford Presidential Library, Frank Zarb Files, Box 2, File: "Memoranda to the President 11/25/75 – 12/12/75"); Memorandum from Jim Cannon to Frank Zarb concerning Energy Bill (Dec. 8, 1975) (on file with the Gerald R. Ford Presidential Library, Frank Zarb Files, Box 2, File: "Memoranda to the President 11/25/75 – 12/12/75"); Memorandum from Frank Zarb to President Gerald R. Ford concerning H.R. 7104/S. 622: The Energy Policy and Conservation Act (Dec. 12, 1975) (on file with the Gerald R. Ford Presidential Library, Frank Zarb Files, Box 2, File: "Memoranda to the President 11/25/75 – 12/12/75"); Memorandum from Frank Zarb to President Gerald R. Ford entitled "The Energy Policy and Conservation Act: If You Decide to Veto" (Dec. 16, 1975) (on file with the Gerald R. Ford Presidential Library, Alan Greenspan Files, Box 44, File: "Energy – Legislation.").

145. Memorandum from Frank Zarb to President Gerald R. Ford entitled "Implementation of the Energy Policy and Conservation Act Amendment to the Allocation Act" (Jan. 13, 1976) (on file with the Gerald R. Ford Presidential Library, Frank Zarb Files, Box 2, File: "Memoranda to the President 2/13/76 – 4/16/76.").

146. REICHLEY, *supra* note 20, at 371. Congress had reserved the right to overturn administrative deregulatory action within 15 days, but did not exercise its rights.

administration to make the decision.[147] Ford decided not to wait, but he gave Carter the ability to reverse his decision. On his second-to-last day in office, he eliminated controls on gasoline, but Carter rescinded the action after taking office.[148]

VII. CARTER'S EFFORTS TO DEREGULATE OIL AND GAS

Carter shared Ford's belief that keeping the cost of energy artificially low was a bad policy. "Oil and natural gas . . . are priced domestically below their marginal replacement costs; as a result, the Nation uses them wastefully with little regard to their true value."[149] At first, the prospect of shareholders of oil companies making more money kept Carter from eliminating price controls. For his first energy proposal, Carter turned to the only Republican in his Cabinet, Secretary of Energy James Schlesinger. Schlesinger was a darling of the right wing, and he fancied himself as a keen reader of congressional politics. Schlesinger knew that Carter opposed lifting controls on old oil, and he thought that decontrol had little chance in Congress, so he developed a plan which would have added to the complexity of price controls.[150] Most of Carter's economic and energy advisors objected to the complexity of Schlesinger's proposal and urged Carter to delay any announcement until a new plan could be developed, but Carter decided to go with the Schlesinger plan.[151] Under the plan Carter announced on April 20, 1977, price controls on gasoline would have been eliminated, but the price controls on crude oil would have been more complex, adding a "crude oil equalization tax" to make the price of domestic old oil equal to the price of new and imported oil.[152] Because Carter did not want the shareholders of oil companies to make more money, he proposed a plan that was nonsensical. The price that producers received would have remained the same, so the plan would have done nothing to address the effect the controls had on domestic production. At the same time, the equalization tax would have made the price that refiners paid for old oil equal to the

147. Memorandum from Frank Zarb to President Gerald R. Ford entitled "Gasoline Decontrol" (Dec. 30, 1976) (on file with the Gerald R. Ford Presidential Library, Frank Zarb Files, Box 2, File: "Memoranda to the President 12/1//76 – 1/20/77.").

148. President James E. Carter, Gasoline Decontrol Announcement of Modification of Federal Energy Administration Regulations (Jan. 24, 1977); REICHLEY, *supra* note 20, at 371.

149. Press Release, Carter Administration, National Energy Program Fact Sheet on the President's Program (Apr. 20, 1977), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=7373.

150. Interview by James Sterling Young et al. with Stuart Eizenstat, in Charlottesville, VA., (January 29-30, 1982), *available at* http://webstorage1.mcpa.virginia.edu/library/mc/poh/jec/transcripts/.

151. JOHN C. BARROW, THE CARTER PRESIDENCY: POLICY CHOICES IN THE POST-NEW DEAL ERA 164-65 (Gary M. Fink & Hugh D. Graham eds., 1998).

152. Press Release, *supra* note 147.

world market price, eliminating any benefit consumers received from the price controls.

Schlesinger also fought hard against deregulation of natural gas—again because he thought it would have no chance in Congress. Carter's chief domestic policy advisor Stuart Eizenstat pushed for deregulation, because he mistakenly believed that Carter had promised to completely deregulate natural gas during the campaign.[153] In fact, Carter had been careful to promise deregulation of "new gas," and he stuck with the misguided distinction between old and new gas after he took office. "I'm not in favor of complete deregulation."[154] He could not overcome his aversion to "massive profits for producers that overnight decontrol would allow."[155]

Gas producers lobbied hard for complete deregulation, but they were unsuccessful in the House, which passed Carter's proposal. Deregulation had more support in the Senate, which passed a bill lifting price controls on natural gas and old oil.[156] Carter objected to those provisions, and he threatened a veto if they survived the House-Senate conference committee. "I will not sign an unfair bill."[157] It took another eight months for the committee to work out a compromise.[158] On November 9, Carter signed the Natural Gas Pricing Act of 1978, which phased out price regulations, but created an even-more-complicated system of interim controls. The law eliminated the artificial distinction between gas sold within states and gas that crossed state lines, ending the natural gas shortages that had plagued the nation.[159]

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153. Interview by James Sterling Young, *supra* note 150.

154. President James E. Carter, News Conference (July 12, 1977) *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=7786; *see also* President James E. Carter, National Energy Plan - Address Delivered Before a Joint Session of the Congress (Apr. 20, 1977), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=7372; President James E. Carter, The Energy Shortage Remarks and a Question-and-Answer Session at the Westinghouse Plant in Pittsburgh, Pennsylvania (Jan. 30, 1977), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=7311. Schlesinger later explained that he thought that removing the natural gas caps was not politically feasible. *See* Interview by James Sterling Young, *supra* note 150.

155. White House Statement, Carter Administration, Natural Gas Legislation White House Statement (Aug. 25, 1978) *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=31232.

156. *Senate Avoids Vote on Natural Gas Price*, N.Y. TIMES, Sept. 25, 1977, at 21; Steven Rattner, *Gas Filibuster Ends as Byrd Overrides Customs of Senate*, N.Y. TIMES, Oct. 4, 1977, at 77.

157. President James E. Carter, Natural Gas Deregulation Statement on Senate Action (Oct. 4, 1977) *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=6746.

158. *See* President James E. Carter, Natural Gas Legislation Remarks on the Congressional Conference Committee Report on the Legislation (Aug. 18, 1978), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=31202; White House Statement, *supra* note 153.

159. *See* Natural Gas Policy Act of 1978, Pub. L. No. 95-621, 92 Stat. 3350 (codified as amended in scattered sections of 5, 12, 15, 16, and 42 U.S.C.); President James E. Carter,

President Reagan petitioned Congress to eliminate the remaining controls on natural gas, and legislation finally passed lifting the price controls during the administration of the first George Bush in 1989.[160]

Carter was forced to revisit his support for price controls on crude oil when prices spiked after the 1978 revolution in Iran. As of June 1, 1979, Carter had the authority to gradually deregulate the price of oil under the Energy Policy and Conservation Act of 1975. Carter convened a meeting with his advisors at Camp David on March 19. Because Carter had the authority to lift controls by executive action, Schlesinger was not diverted by his tin ear for congressional politics, and he proposed phasing out controls between June 1, 1979 and September 1981, along with a windfall profits tax.[161] Carter agreed and announced his executive action in April 1979. "We still face the basic reality about America's use of oil: We must use less, and we must pay more for what we use."[162]

Carter had finally dropped his energy equalization tax, but he was still concerned about the shareholders of oil companies making too much money, so he proposed a windfall profits tax of 50% of the difference between the price for which a barrel of oil sold on the market and the price at which it would have sold under the price controls.[163] Congress passed the windfall profits tax in March 1980.[164] The tax restored some of the disincentive against production of domestic oil that existed under the price control regime, but Carter's lifting price controls and imposing

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National Energy Bills Remarks on Signing H.R. 4018, H.R. 5263, H.R. 5037, H.R. 5146, and H.R. 5289 Into Law (Nov. 9, 1978), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=6746; DERTHICK & QUIRK, *supra* note 7, at 208-11; *Congress and the Nation, Vol. IV, 1973-1976: A Review of Government and Politics*, CONGRESSIONAL QUARTERLY 11 (1977); *see also* MACAVOY, *supra* note 7, at 10.

160. *See* President Ronald W. Reagan, Statement on Transmitting to Congress Proposed Natural Gas Deregulation Legislation (Feb. 28, 1983), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=40984; Natural Gas Wellhead Decontrol Act of 1989, Pub. L. No. 101-60, 103 Stat. 157 (codified as amended in scattered sections of 15 U.S.C.); President George H.W. Bush, Remarks on Signing the Natural Gas Wellhead Decontrol Act of 1989 (July 26, 1989), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=17354.

161. Interview by James Sterling Young, *supra* note 150; *see also* BARROW, *supra* note 151, at 168–69.

162. President James E. Carter, Remarks at the State Democratic Party's Jefferson-Jackson Day Dinner (Apr. 7, 1979), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=32172.

163. President James E. Carter, Energy Address to the Nation (Apr. 5, 1979), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=32159; *see also* President James E. Carter, News Conference (Apr. 10, 1979), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=32183.

164. Crude Oil Windfall Profit Tax Act of 1980, Pub. L. No. 96-223, 94 Stat. 229 (codified as amended in scattered sections of 7, 12, 15, 19, 26, 42, and 43 U.S.C.); *see also* President James E. Carter, Crude Oil Windfall Profit Tax Act of 1980 Remarks on Signing H.R. 3919 Into Law (Apr. 2, 1980) *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=33214.

a windfall profits tax was a far better solution than his equalization tax proposal, and it was manifestly better than the price controls he lifted.

When he took office, Reagan accelerated the deregulation process with an executive order that eliminated price controls on oil products, rather than allowing them to be phased out over time.[165] Reagan also pushed hard to eliminate the windfall profits tax, which was repealed in 1988.[166]

POSSIBILITIES FOR TELECOMMUNICATIONS DEREGULATION

After the first step, when the market opened to competition, deregulation of the transportation industry included a second step when regulations and the commissions themselves were eliminated. The Airline Deregulation Act of 1978 phased out all price regulations and dissolved the CAB, and regulation of trucking was finally eliminated by the Trucking Industry Regulatory Reform Act of 1994 and the dissolution of the ICC a year later. A similar second step has not been taken in the communications industry—price regulations remain, along with the regulatory detritus of tariff and contract filing requirements and complex rules governing the relations between competitors.

The Telecommunications Act of 1996 opened the market to competition, but Congress wanted it to do more—the purpose of the Act was to both "promote competition and reduce regulation."[167] The FCC and state commissions have taken to heart Congress's directive to "promote competition," but they have generally ignored the mandate to "reduce regulation."[168] Congress was sincere in 1996 when it said its goal was to reduce regulation, as evidenced by the two powerful tools it gave to the FCC to complete the task: section 10 of the act authorizes the Commission to forbear from any unnecessary sections of the law, and section 11 orders the commission to conduct a review of its regulations every two years and eliminate any that are unnecessary. A Commission committed to deregulation will not be in the same position as Robson, thinking that the law does not allow deregulation, or as Kahn, setting out

165. Exec. Order No. 12,287, 46 Fed. Reg. 9909 (Jan. 28, 1981).

166. Omnibus Trade and Competitiveness Act of 1988, Pub. L. No. 100-418, 102 Stat. 1107; *see also* President Ronald W. Reagan, Remarks on Signing the Omnibus Trade and Competitiveness Act of 1988 in Long Beach, California (Aug. 23, 1988), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=36289.

167. Preamble, Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (codified as amended in scattered sections of 15, 18, and 47 U.S.C.) ("An Act to promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid growth of new telecommunications technologies.").

168. *See* J. Gregory Sidak, *The Failure of Good Intentions: The WorldCom Fraud and the Collapse of American Telecommunications after Deregulation*, 20 YALE J. ON REG. 207, 211–12 (2003) ("Deregulation has actually increased regulation.").

to "do what we can, until somebody says we can't."

As yet, the FCC has not taken meaningful advantage of its authority to eliminate regulations. But it may be too much to ask for a Commission to voluntarily lift an entire rubric of regulation. In the transportation industry, true deregulation did not occur until the regulatory commissions dissolved. But elimination of the FCC is impractical. In the transportation industry, the CAB and ICC were only responsible for economic regulation, and the FAA and the Department of Transportation were responsible for safety and maintenance of public facilities. In communications, the FCC does it all, and eliminating the agency would necessitate setting up another in its place.

That leaves two paths for deregulation: the Commission voluntarily sweeping away rules or Congress removing Commission jurisdiction. Congress has already given the Commission the tools to accomplish deregulation on its own, but the FCC is a quasi-legislative body, subject to constant lobbying by interest groups. To accomplish deregulation, the commissioners need to resist the powerful impulse to pick one of those interest groups to support and the equally powerful impulse to weigh the interests of various competitors in concession-filled 200-page orders.

Opposing regulation in general is not enough. More than anything, deregulation will require an administration that cares about telecommunications. Every president since Kennedy has spoken out against regulations, but efforts to eliminate regulation across the government have been unsuccessful.[169] It is essential to have a president who cares about deregulating the industry, so that parties that benefit from regulations do not find a sympathetic ear at the White House. Nixon torpedoed deregulation when the Teamsters objected, not because he lacked political courage, but because he was focused on other issues. Ford was focused on deregulating transportation, and he was not diverted by objections from politically-powerful groups, as evidenced by his comment that, "if the Teamsters and truckers are against it, it must be a pretty good bill."

Why did Ford and Carter focus on deregulating transportation? The easy answer was that they had to, because the railroads were failing and the airlines were about to crash. In contrast, industry hardship has not been enough to force the current administration to focus on telecommunications, but to be fair, the industry never was in as dire a shape as transportation was in the 1970s, with nationalization a real possibility.

Part of the reason Ford and Carter focused on transportation was

169. Justice Breyer has noted that the deregulatory efforts that were successful in the 70s were focused on specific industries, and efforts to reform regulations across government have generally failed. Breyer, *supra* note 22, at 5; *see also* BREYER, *supra* note 5, at 341.

that the academic community was uniform in its recommendations. Carter's chief economic advisor, Charles Schultze, explained that one of the reasons Carter favored deregulation was uniformity of expert opinion. "If you polled 500 economists you'd get 499 to say you ought to do it."[170] At the Kennedy hearings, Professor Merton Peck was surprised to find that the administration witnesses were citing economic literature in support of deregulation. "Looking at their footnotes, I discovered an amazing fact. People do read economists' writings, and those writings are reflected in the testimony of the previous witnesses."[171] Moreover, Professor Roger Noll testified that economists were almost universal in their support for deregulation:

> The nice thing about being a student of industrial organization and regulation is that you can get along with your colleagues, because you never have to run the risk of being dead wrong and saying regulation has been foolish in a particular sector. I know of no major industrial scholarly work by an economist or political scientist or lawyer in the past 10 years that reaches the conclusion that a particular industry would operate less efficiently and less equitably than with regulation. The conclusion is unanimous.[172]

Such uniform recommendations found ready listeners in Ford and Carter. Ford was probably the most economically-conservative president since Coolidge, believing in smaller government to his core. Carter came to deregulation through his fights for better government. He saw that regulation of transportation was a mess, and he set out to fix the problem.

Ford and Carter were both naturally drawn to deregulation, but there is another reason they made deregulation a priority: because they could. The late 1970s were a time when big political donors had less influence than any time before or since. Prior to the 1970s, there were no independent commissions to enforce campaign financing laws, and those laws were more honored in the breach than in the observance. The 1970s were a time of revolutionary reform of campaign finance laws, when 49 states and the federal government passed laws making contributions public, banning large cash contributions, and creating enforcement agencies. Over time, loopholes in the new laws were exploited, PACs grew, and the stain of Watergate faded, allowing well-connected companies and unions to again exert influence over the political process.

Today, money talks again, and it will be difficult to overcome the

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170. Interview by James Sterling Young, *supra* note 150.

171. *Airline Charter Fares: Hearings before the Subcomm. on Admin. Practice and Procedure of the S. Comm. on the Judiciary*, 93rd Cong. 68 (1975) (statement of Merton Peck).

172. *Id.* at 76 (statement of Roger G. Noll), *cited in* DERTHICK & QUIRK, *supra* note 7.

special interests that benefit from the remaining economic communications regulations. Because vested interests are strong, Congress is unlikely to do more than it already has to deregulate the industry. It is more likely that Congress will bow to the interests of Internet giants and impose economic regulation on Internet traffic. If it does, the regulations will probably last 30 to 50 years. Trucking regulations may have made sense when they were imposed during the Depression (although in retrospect they were a bad idea even then), but they made no sense after the war, and they lasted for 60 years. Regulating the railroads made sense at the end of the 19th century, but the regulations remained unchanged for 87 years. Today—120 years later, when mention of "the economic power of the railroads" elicits laughter or bewilderment—railroads remain subject to more regulation than their trucking and airline competitors.

Federal regulations of telecommunications have been around for almost a century, and they are unlikely to be eliminated, or even simplified, in the current environment. Regulatory capture is alive and well in Washington, as demonstrated by the concessions the FCC allowed competitive carriers to elicit during the AT&T–BellSouth merger proceeding. Individual regulators may differ in the competitors they support, such as rural carriers, Bell Operating Companies or Competitive Local Exchange Carriers, but they almost all confuse advancing the interests of companies with advancing the national interest.

Decades of incremental decisions that balance the interests of competitors have created a nonsensical jumble of telecommunications regulations which arbitrarily apply to some services and not to others. The system can no longer be fixed though added complexity. The answer is simplicity, and simplicity means eliminating regulations. For that to happen, the country needs a leader who cares about the industry and who is willing to suffer criticism from companies who benefit from the current regulatory scheme. Let's hope one comes along soon.

SOME PEER-TO-PEER, DEMOCRATICALLY, AND VOLUNTARILY-PRODUCED THOUGHTS

ANN BARTOW*

THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM. By Yochai Benkler. Yale University Press. 2006. $26.40.

INTRODUCTION

Yochai Benkler is an exceedingly smart, widely-read and thoughtful person, so it is no surprise that his new book is very interesting and well worth reading. In many respects I ought to end my review right here, or maybe after a sentence (such as this one!) in which I explicitly recommend that you obtain and read it.[1] Benkler offers a lot of fascinating observations and predictions that are very useful to consider, even if you are not necessarily in agreement with his world view.

In an exercise of either hubris or idiocy, or possibly both, I am going to continue this review beyond that initial introductory paragraph with some observations, and even a few criticisms, of the tome. I'm not really sure who the target audience for a book review such as this is: people who are considering reading the book, people who have already read it and are interested in the reactions of others, or people who have no intention of reading the book but want to know enough about its slant and content so that they can pretend that they did. For the purpose of this review, I'm going to assume that anyone who has read this far has at least some familiarity with Benkler's academic scholarship. Even if you

* Associate Professor of Law, University of South Carolina School of Law. The author thanks Vanessa Byars for editorial support, and Keith Aoki, Ed Baker, Mike Carroll, Maggie Chon, Daniel Gervais, Shubah Ghosh, Llew Gibbons, Bob Hamilton, Melissa Henriksen, Joan Heminway, Jessica Litman, Robin Malloy, Rebecca Tushnet, Siva Vaidhyanathan and Peter Yu for helpful conversations about the issues discussed herein. I dedicate this review to Casey Bartow-McKenney. I also thank Phil Weiser for proposing this review.

1. YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM (2006). It can be purchased in hardbound form at most mainstream commercial book venders, both online and in real space. It can also be freely downloaded here in its entirety, which is pretty great: http://www.benkler.org/wealth_of_networks/index.php?title=Download_PDFs_of_the_book.

haven't yet read *The Wealth of Networks*, many of the themes and some of the examples will already be known to anyone who has read his law review articles, including (but not limited to, not even close): *"Sharing Nicely": On shareable goods and the emergence of sharing as a modality of economic production*;[2] *Freedom in the Commons*;[3] *Coase's Penguin, or Linux and the Nature of the Firm*;[4] *An Unhurried View of Private Ordering in Information Transactions*;[5] and *Free as the Air to Common Use: First Amendment Constraints on Enclosure of the Public Domain*.[6]

I. AN OVERVIEW OF THE BOOK AS IT IS WRITTEN

Yochai Benkler has written a book that articulates a lot of the things that people love about the Internet, and offers some thoughtful explanations about how and why it developed so quickly and expansively. The work has already received many gloriously positive reviews,[7] including a statement by Lawrence Lessig that it is "the most important and powerful book written in the fields that matter most to [him] in the last ten years."[8]

Another reviewer asserted:

> *The Wealth of Networks* . . .is an extended philosophical manifesto on the potential of open source decentralized "peer production" – not just as a way of creating software, but in the broader sense of a fundamentally new means of producing goods, services, and freedom itself.[9]

The book was also the subject of an online seminar at the Crooked Timber blog.[10] I was aware of the seminar before I agreed to write this review, but I did not read Benkler's replies to his critics until afterwards. His response to Siva Vaidhyanathan's commentary gave me particular

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2. 114 YALE L.J. 273 (2004).
3. 52 DUKE L.J. 1245 (2003).
4. 112 YALE L.J (2002).
5. 53 VAND. L. REV. 2063 (2000).
6. 74 N.Y.U. L. REV. 354 (1999).
7. *See* Debora Halbert, *Book Review*, 16 L. & POL'Y. BOOK REV. 8, 572-75 (2006), *available at* http://www.bsos.umd.edu/gvpt/lpbr/subpages/reviews/benkler0806.htm; Amazon.com, Review of *The Wealth of Networks: How Social Functions Transforms Markets and Freedom*, http://www.amazon.com/gp/product/product-description/0300110561/ (last visited Sept. 25, 2006).
8. Posting of Lawrence Lessig to Lessig Blog, Benkler's Book is Out, http://www.lessig.org/blog/archives/003368.shtml (Apr. 15, 2006, 12:50 PM).
9. Posting of Hassan Masum to WorldChanging Blog, *The Wealth of Networks: Remixed Highlights*, http://www.worldchanging.com/archives/004691.html (July 14, 2006, 07:47 PM).
10. *See* Archive for the Benkler Seminar at Crooked Timber, http://crookedtimber.org/category/benkler-seminar/ (last visited Sept. 25, 2006).

pause.[11] Vaidhyanathan wrote that he felt the story of Internet technology was an underwritten subject, noting:

> Throughout the text, there seems to be an almost givenness [sic] about the technology. TCP/IP is just there. Even Cisco's notorious discriminating servers, the source of so much tension over the end of network neutrality, just appear. . . . We get no sense that particular technologies are malleable, adaptable, contingent, and socially shaped. We get no account of developer's wishes or users' adaptations. We only get cursory accounts of the conflicts over the future of these technologies that have unleashed (to choose a loaded term) so much creativity.[12]

In reply, Benkler retorted:

> His complaint . . .is that I wrote a book about what interests me, not about what interests him. That is, that I wrote a book about how the dynamics of how technology, society, economy, and law intersect to fundamentally alter how information, knowledge, and culture are produced, rather than a book about the dynamics of how the technology component itself got to be as it is, and how it may or may not change given present pressures.
>
> I plead only partly guilty, and that part excused by the fact that not every book can be about everything.[13]

Ouch. No doubt his reaction to this review will be similar, if he reads it, because my focus is largely on what I think is missing from the work, which I will detail below, after just a few observations about the subjects it does cover, very thoughtfully and in great detail.

Benkler's book offers a meta-account of the Internet's role in cultural production that meshes mostly comfortably with my own observations and experiences. Among other ideas, Benkler argues that the Internet offers something that, though imperfect, allows for all kinds of productive transactions that were difficult and inefficient to arrange and complete in real space. People can, for example, freely exchange information in both senses of the word free – unfettered, and without cost – if

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11. Posting of Yochai Benkler to Crooked Timber Blog, *Response*, http://crookedtimber.org/2006/05/30/response-2/ (May 30, 2006, 9:30AM). I should note at this juncture that Siva Vaidhyanathan is a friend of mine, and also the founder of Sivacracy.net, a group blog in which I participate. Sivacracy.net, http://www.nyu.edu/classes/siva/ (last visited Sept. 25, 2006).

12. Posting of Siva Vaidhyanathan to Crooked Timber blog, *The Dialectic of Technology*, http://crookedtimber.org/2006/05/30/the-dialectic-of-technology/ (May 30, 2006, 9:31 AM).

13. Posting of Yochai Benkler to Crooked Timber blog, *supra* note 11.

they choose to. Creative works can be produced and distributed by individuals acting as socially connected beings rather than cogs in the market economy.

Though unhampered by logistical constraints like transportation or postage costs, Benkler observes that there are artificial barriers to many interactions that have been constructed as part of an enclosure movement facilitated by expansive intellectual property precepts, particularly in the area of copyright law. He says that rather than the naïve model of "everyone a pamphleteer," there are editorial functions, and filtration and accreditation issues that impose limits on personal autonomy.[14] Nevertheless, he believes that the Internet empowers individuals to do things themselves, and reduces their susceptibility to intervention and manipulation. As Jack Balkin articulated it:

> [A]t the very moment when the digital revolution holds out the promise of genuine democratic participation, businesses driven by the twin needs to maximize profits and protect themselves from competition have tried to assert control over the knowledge economy through expanding intellectual property rights and securing legal protection for proprietary architectures, undermining the Internet's democratic promise. This collision of interests is not accidental: Industrial, closed and proprietary models of information production and democratic, open, and commons-based models are made possible by the same technology; the struggle between these two models of information production is the social contradiction of the digital age.
>
> How can these opposing trends be reconciled? Yochai Benkler's argument in The Wealth of Networks is that the contradiction can be resolved by two features of the digital revolution. The first is that not all successful business models in the knowledge economy have rested or will rest on maximizing the exploitation of intellectual property or closed and proprietary architectures. The second is that the digital networked environment makes possible and gives increased salience to commons-based peer production methods for information production. In both cases, but especially in the second, democratic participation in information production is wholly consistent with efficient economic production and the growth of the knowledge economy. Indeed, preserving a space for democratic participation in the means of production is the best way for the knowledge economy to flourish.[15]

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14. He uses or quotes this phrase to characterize an unattainable, democratically utopian view of mass communications. BENKLER, *supra* note 1, *passim*.

15. Posting of Jack Balkin to Crooked Timber blog, *Mediating the Social Contradiction of the Digital Age*, http://crookedtimber.org/2006/05/30/mediating-the-social-contradiction-of-the-digital-age/ (May 30, 2006, 9:32AM).

Given that Benkler credited Balkin with "captur[ing] precisely what [he] was trying to say in so many portions of the book," and with providing a "well reasoned and generous exploration of central themes of the book,"[16] I am more than willing to assume that Balkin got this exactly right.

II. COMMENTS ON THE UNWRITTEN CHAPTERS: WITH AN ANTICIPATORY NOD. . .

By "information production," one assumes that both Benkler and Balkin basically mean both the ascertainment of technologically useful information and the authorship of creative works, aggregates of knowledge that are potentially patentable or copyrightable which fit under the broad rubric of "intellectual property."[17] An acquaintance once told me that she thought very pretentious people were drawn to intellectual property law because they adored being able to invoke the word "intellectual" to describe their area of legal practice. For various reasons including but not limited to the Fifth Amendment I prefer not to speculate about how much truth there might be to this observation, but it is certainly true that representations that an invention is patented, or a work is "protected by copyright," lend a certain superficial gravitas, or patina of respectability to marketable goods and services, including informational products.[18]

The so-called "intellectual property clause"[19] of the U.S. Constitution authorizes Congress "to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[20] Patents and copyright registrations are governmental imprimaturs which imply that the ideas or expressions of ideas embodied in the protected works are useful and progress promoting. This of course is not necessarily true in any meaningful sense. Only a small fraction of patented inventions are ever commercially exploited,[21] and only a small fraction of copyrighted

16. Posting of Yochai Benkler to Crooked Timber blog, *supra* note 11.

17. Benkler makes what he characterizes as a "tricky" distinction between information and knowledge at page 313 that is admittedly elided here. BENKLER, *supra* note 1, at 313.

18. *See, e.g.,* Ann Bartow, *Separating Marketing Innovation from Actual Invention: A Proposal for a New, Improved, Lighter, and Better-Tasting Form of Patent Protection*, 4 J. SMALL & EMERGING BUS. L. 1 (2000).

19. The term "intellectual property" did not likely exist when the Constitution was drafted. Richard Stallman has argued that it carries a hidden assumption that concepts like copyrights should be analogized with physical objects and ideas about physical property. He has noted that widespread use of the term is a fairly recent development, and he criticizes it on several grounds. *See* Richard Stallman, *Did You Say "Intellectual Property"? It's a Seductive Mirage*, www.gnu.philosophy/not_ipr.xhtml (last visited Feb. 4, 2007).

20. U.S. CONST. art. I, § 7.

21. *See, e.g.,* Jean O. Lanjouw & Mark Schankerman, *Enforcement of Patent Rights in the United States, in* PATENTS IN THE KNOWLEDGE-BASED ECONOMY 145 (Wesley M. Cohen

works are ever commercially distributed,[22] suggesting that most of the "knowledge" that is developed is not seen as valuable by market actors. Whether it is socially useful is a different question, but not one that can be reflexively answered in the affirmative. Blanket generalizations about some categories of information are deeply problematic.

A. Pornography

My University of South Carolina School of Law students are overwhelmingly conservative in their social and political views. For this reason, at the start of each semester of Cyberspace Law, I advise them that if they will be uncomfortable learning about cases involving sexual and scatological topics, this probably isn't a good elective for them to take, and they should drop the course. I need my students to be prepared for the fact that we will need to discuss cases and substantive issues related to pornography, though I do not go so far as require them to view any. As a screening device, I sometimes show them a satirical website called "Furniture Porn."[23] To provide the reader with a bit of the upholstered flavor of this site, I reprint below an excerpt from the putative Click-Wrap End User License Agreement one must acquiesce to in order to access the substantive portions of the site:

> I agree that I will not steal this site outright and put it on my own website and pass it off as my own work. Nor will I use, view, access, share, think about, or show my sniggering co-workers this site in violation of international agreements and/or treaties, or federal, state, county, city or incorporated village laws or their non-U.S. equivalent. Nor will I share any materials on this site with minors or allow minors to view any portion of this site, or mix paper and plastic recyclables or allow minors to mix paper and plastic recyclables.[24]

The site itself shows pictures of ordinary chairs (folding chairs, law chairs, recliners, etc.) in familiar, banal arrangements reframed through

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& Stephen A. Merrill, eds. 2003); John R. Allison & Mark A. Lemley, *Who's Patenting What? An Empirical Exploration of Patent Prosecution*, 53 VAND. L. REV. 2099 (2000); Jonathan A. Barney, *A Study of Patent Mortality Rates: Using Statistical Survival Analysis to Rate and Value Patent Assets*, 30 AIPLA Q.J. 317 (2002); Josh Lerner, *Patenting in the Shadow of Competitors*, 38 J.L. & ECON. 463 (1995); *Kimberly A. Moore, Judges, Juries, and Patent Cases - - An Empirical Peek Inside the Black Box*, 99 MICH. L. REV. 365 (2000); Bronwyn H. Hall et al., *The NBER Patent Citations Data File: Lessons, Insights and Methodological Tools*, (Nat'l Bureau of Econ. Research, Working Paper No. 8498), *available at* http://www.nber.org/papers/w8498.

22. *See, e.g.*, JESSICA LITMAN, DIGITAL COPYRIGHT, (2001), *available at* http://www.msen.com/~litman/digital-copyright/.

23. Furniture Porn: Enter. . ., http://www.furnitureporn.com/ (last visited Oct. 2, 2006).

24. Furniture Porn: Warning!, http://www.furnitureporn.com/warning.html, ¶ 4 (last visited Oct. 2, 2006).

creative captioning as "hot, triple XXX chair-on-chair action." This alone is enough to make some law students profess discomfort or revulsion.[25] Typically, however, my course enrollment actually spikes upward a little after this exercise, but growing the size of the class roster is not the primary reason I engage in it. In fact, this warning is necessitated by the fact that in many respects the law of the Internet is the law of pornography, and some law students are not intellectually or emotionally equipped to analyze legal issues related to pornography with anything resembling objectivity. The politically liberal students, generally outnumbered in any classroom setting, usually oppose anything resembling censorship quite vehemently. The conservative students are eager to advocate in favor of governmental promulgation of "decency" and morality that does not countenance the distribution of pornography. This polarization makes substantive discussions difficult and prickly.[26]

Whether expansive access to pornography is good, bad or neutral for society as a general matter raises contentious issues far beyond the scope of this book review.[27] What is indisputable though, is that the Internet has provided pornography on an enormous scale.[28] Although e-mail is often touted as the "killer application" of the Internet, pornography is a very successful content-based, online business model.[29] Estimates of the Internet pornography market vary,[30] but it is generally believed to be substantial.[31] Legal issues concerning privacy, censorship, filtering, jurisdiction, copyrights and trademarks have frequently arisen and been addressed by courts in the context of online pornography cases,

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25. I have been accused of exaggerating about his, but in a roomful of South Carolina law students, many quite reasonably anticipate careers in state politics or in the judiciary, and the opportunity to publicly embrace and exhibit prudence, temperance and a rather rigid sort of morality proves irresistible to some of them.

26. Experiences with trying to discuss pornography in law school classrooms have made me more sympathetic than I used to be toward law professors who decline to cover subjects like rape in criminal law courses, though I still disagree with their decisions.

27. The author discusses online pornography in a limited way in Ann Bartow, *Open Access, Law, Knowledge, Copyrights, Dominance and Subordination*, 10 LEWIS & CLARK L. REV. 869 (2007).

28. Answers.com, Internet pornography, http://www.answers.com/topic/internet-pornography (last visited Oct. 2, 2006).

29. *See* Jay Lyman, *Priority for Internet Users: Porn*, TECHNEWSWORLD, Jun. 4, 2004, http://www.technewsworld.com/story/34233.html; Raymond Chan et al., The Porn Business (Winter Quarter 2001) (unpublished student project, Stanford University), *available at* http://cse.stanford.edu/class/cs201/projects-00-01/pornography/business.htm..

30. *See, e.g.,* Cecil Adams, *How much of all Internet traffic is pornography?*, THE STRAIGHT DOPE, Oct. 7, 2005, http://www.straightdope.com/columns/051007.html; SUSANNAH FOX, PEW INTERNET & AM. LIFE, ADULT CONTENT ONLINE (2005), http://www.pewinternet.org/PPF/p/1102/pipcomments.asp.

31. National Academy of Sciences, Pornography on the Internet, http://www4.nationalacademies.org/onpi/webextra.nsf/44bf87db309563a0852566f2006d63bb/13a0fdabb8339dce85256bac005b4a2f?OpenDocument (last visited Oct. 2, 2006).

demonstrating its salience to the form and content of cyberspace law.[32] In additional to commercial porn production, there is also a substantial amount of "amateur" pornography[33] that is uploaded and downloaded in cyberspace, an enormous socially important category of nonmarket social production Benkler leaves uninterrogated.

Generally when "bad knowledge" is communicated, the locus of the harm is related to end uses. Instructions for building bombs, or for manufacturing amphetamines out of cold medicine, or for tapping into strangers' bank accounts do not cause any real damage until they are followed. With pornography, however, simply "producing" the "information" can inflict emotional or physical damages on living humans, such as HIV transmission.[34] Pornography is also deeply linked to sex trafficking and slavery.[35] The role of the Internet in enabling and incentivizing

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32. *See, e.g.*, Tom W. Bell, Internet Privacy and Self-Regulation Lessons from the Porn Wars, *available at* http://www.cato.org/pubs/brief/bp-065es.html; *see also* Reno v. ACLU, 521 U.S. 844 (1997); ACLU v. Reno, 217 F.3d 162 (3d Cir. 1999); Free Speech Coal. v. Reno, 198 F.3d 1083 (9th Cir. 1999); ACLU v. Johnson, 194 F.3d 1149 (10th Cir. 1999); United States v. Thomas, 74 F.3d 701 (3d Cir. 1996); Computer Professionals for Social Responsibility v. U.S. Secret Service, 72 F.3d 897 (D.C. Cir. 1996); Playboy Enters. v. Netscape Comm. Corp., 55 F.Supp.2d 1070 (C.D. Cal. 1999); Mainstream Loudoun v. Bd. of Trustees of the Loudoun County Library, 24 F.Supp.2d 552, (E.D. Va. 1998); Playboy Enters. v. Welles, 7 F.Supp.2d 1098 (S.D. Cal. 1998); Playboy Enters. v. Calvin Designer Label, 985 F.Supp. 1220 (N.D. Cal. 1997); Playboy Enters. v. Russ Hardenburgh, Inc., 982 F.Supp. 503 (N.D.Ohio 1997); ACLU v. Miller, 977 F.Supp. 1228 (N.D. Georgia 1997); Am. Library. Ass'n. v. Pataki, 969 F.Supp. 160 (S.D.N.Y. 1997); Playboy Enters. v. Webbworld, 968 F.Supp. 1171 (N.D. Tex. 1997); Playboy Enters. v. Chuckleberry Pub., Inc., 939 F.Supp. 1032 (S.D.N.Y. 1996); Playboy Enters. v. Frena, 839 F.Supp. 1552 (M.D.Fla. 1994); Playboy Enters. v. AsiaFocus Int'l Inc., NO. CIV.A. 97-734-A, 1998 WL 724000 (E.D. Va. Apr. 10, 1998); Child Online Protection Act (COPA), Pub. L. No. 105-277, §1403, 112 Stat. 2681-736 to 2681-739 (1998) (codified at 47 U.S.C. § 231 (2000)); Communications Decency Act of 1996, Pub. L. No. 104-104, tit. V, 110 Stat. 133, *invalidated in part by* Reno v. ACLU, 521 U.S. 844 (1997); Electronic Communications Privacy Act (ECPA) of 1986, Pub. L. No. 99-508, 100 Stat. 1848 (codified as amended at 18 U.S.C. §§ 2510-2521); Todd Kendall, Pornography, Rape and the Internet (Sept. 28, 2006), http://www.law.stanford.edu/display/images/dynamic/events_media/Kendall%20cover%20+%20paper.pdf.

33. Answers.com, Amateur Pornography, http://www.answers.com/topic/amateur-pornography (last visited Oct. 2, 2006).

34. *See, e.g.,* Xeni Jardin, *Porn Valley's HIV Crisis*, BOINGBOING, Apr. 18, 2004, http://www.boingboing.net/2004/04/18/porn_valleys_hiv_cri.html; *Let them eat HIV: Who failed Lara Roxx?*, http://www.slumdance.com/blogs/brian_flemming/archives/000873.html (Apr. 16, 2004, 12:38 AM); *Jessica Dee tests positive for HIV*, http://www.slumdance.com/blogs/brian_flemming/archives/000926.html (Apr. 29, 2004, 4:49 PM). *See also* Kurt Eichenwald, *With Child Sex Sites on the Run, Nearly Nude Photos Hit the Web*, N.Y. TIMES MAG., Aug. 20, 2006, at 1; *Playboy, call your lawyers*, http://tushnet.blogspot.com/2006/08/playboy-call-your-lawyers.html (Aug. 19, 2006, 9:45 PM).

35. See the San Francisco Chronicle's Series on Sex Trafficking. Meredith May, *San Francisco is a Major Center for International Crime Networks that Smuggle and Enslave*, SAN FRANCISCO CHRON., Oct. 6, 2006, *available at* http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2006/10/06/MNGR1LGUQ41.DTL; Meredith May & Deanne Fitzmaurice, *A Youthful Mistake: You Mi Was a Typical College Student, Until her first Credit Card*

the production of pornography is a nontrivial aspect of the information society's big picture that I expected Benkler to analyze in the book, and I hope that he will do so in the future. Many observers believe that the Internet has drastically expanded both the production and the distribution of pornography.[36] It is a pervasive aspect of online culture that many people would prefer for various reasons to ignore, but Benkler does not strike me as a person who lacks the fortitude to engage with controversial subjects.

B. Astroturf

Another non-beneficial body of information that Benkler did not address substantively in the book but has explicitly articulated an interest in addressing in upcoming research, is an Internet phenomenon sometimes described as "astroturf." According to one Wikipedia entry,

> Astroturfing techniques usually consist of a few people discreetly posing as mass numbers of activists advocating a specific cause. Supporters or employees will manipulate the degree of interest through letters to the editor, e-mails, blog posts, crossposts, trackbacks, etc. They are instructed on what to say, how to say it, where to send it, and how to make it appear that their indignation, appreciation, joy, or hate is entirely spontaneous and independent. This makes their campaign seem "real" rather than the product of an orchestrated campaign. Local newspapers are often victims of astroturfing when they publish letters identical to those received and printed by other newspapers.
>
> It has become easier to structure an astroturfing campaign in the electronic era because the cost and effort to send an e-mail (especially a pre-written, sign-your-name-at-the-bottom e-mail) is so low. Companies may use a boiler room full of telephones and computers where hired activists locate people and groups that create enthusiasm for the

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got her into Trouble, SAN FRANCISCO CHRON., Oct. 8, 2006, *available at* http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2006/10/08/MNGAULL53D1.DTL; Meredith May, *You Mi is Put into Debt Bondage—Life Becomes an Endless Cycle of Sex with Strangers*, SAN FRANCISCO CHRON., Oct. 9, 2006, *available at* http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2006/10/09/MNGM5K215270.DTL; Meredith May, *Free, but Trapped: In San Francisco, You Mi Begins to Put her Life Back Together—but the Cost is High*, SAN FRANCISCO CHRON., Oct. 10, 2006, *available at* http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2006/10/10/MNGN9LFHRO1.DTL; Meredith May, *The Story: How we Reported the Series*, SAN FRANCISCO CHRON., Oct. 9, 2006, *available at* http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2006/10/09/MNGN9LFHOP1.DTL.

36. *See, e.g.*, Anthony D'Amato, *Porn Up, Rape Down*, (Northwestern Pub. Law Res. Paper No. 913013), *available at* http://ssrn.com/abstract=913013; *see also* Steven E. Landsburg, *How the Web Prevents Rape*, SLATE, http://www.slate.com/id/2152487/; Kendall, *supra* note 32.

> specified cause. Also, the use of psychographics allows hired supporters to persuade their targeted audience. This correlates with the merge-purge technique that combines information about an individual from multiple databases. Companies can then turn hypothetical supporters into activists for the cause. This leads to misuse of the Internet, for one person is able to play the role of a whole group of like-minded people (see also Internet sockpuppet).[37]

"Astroturf" is thus commentary that is manufactured to look authentic and natural, but is actually the product of deceptive public relations "opinion shaping" campaigns.[38] It is faux political or commercial feedback that springs from artificial grass roots engineered to appear as diverse and geographically distributed, independently acting individuals.[39] Astroturf subverts an informal norm of the Internet and of the blogosphere in particular, authenticity. In his review of the book, Henry Farrell observed:

> Roughly speaking, I take this norm to say that individual bloggers should represent their own points of view in an honest and straightforward fashion. The comparative advantage of bloggers vis-a-vis other kinds of pundits is that they have (or should have) a strong personal voice based on their internal beliefs. This distinguishes the blogosphere from many other spheres of publication, where individuals are expected to represent the positions of their institution, or their political party rather than their own personal position on the issue at hand. It also distinguishes blogging from genres of writing (op-eds, speeches, political autobiographies) where authorship is blurred and ghost-writing by others than the official author are considered to be perfectly acceptable. Bloggers who are perceived as not representing their own position on the issues, or as having their material written for them by others, are likely to have a hard time getting their writing accepted by other bloggers.[40]

Benkler wrote in reply:

> We cannot be sanguine about the sustainability of the practices we today celebrate. There are internal pressures—like what he describes

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37. Wikipedia, Astroturfing, http://en.wikipedia.org/wiki/Astroturfing (last visited Oct. 2, 2006).

38. *See* Center for Media and Democracy, Astroturf, http://www.prwatch.org/taxonomy/term/110 (last visited Oct. 2, 2006); *see also* NewPR Wiki, AntiAstroturfing.GeneralDiscussion, http://www.thenewpr.com/wiki/pmwiki.php?pagename=AntiAstroturfing.GeneralDiscussion (last visited Oct. 2, 2006).

39. Wikipedia, Astroturfing, *supra* note 37.

40. Posting of Henry Farrell to Crooked Timber blog, *Norms and Networks*, http://crookedtimber.org/2006/05/30/norms-and-networks/ (May 30, 2006, 9:34 AM).

> as "invasion" from actors such as paid political astroturf bloggers or spammers—that put pressure on the genuinely free environment, and require technological or norms-based changes from a more open norm. All this is true. The ways in which these are developing, and the responses to them represent a rich and important area of research. Going into the basic science of cooperation to try to get some of the answers is an important project, and my next major focus.[41]

Astroturf campaigns have been uncovered or at least suspected in contexts including various political campaigns,[42] debates about broadband policy,[43] tort reform initiatives,[44] Al Gore's movie about global warming,[45] and companies like Monsanto,[46] American Apparel, Microsoft[47] and Miller.[48] It is a corrupting influence on open and honest de-

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41. Posting of Yochai Benkler to Crooked Timber, *supra* note 11.

42. *See* Aaron Glantz, *Kurds just want to thank the US*, ASIATIMES ONLINE, Aug. 2, 2006, http://www.atimes.com/atimes/Front_Page/HH02Aa01.html; *"Their voice. Amplified." or Why I'm banning comments*, newsrack blog, http://pages.prodigy.net/thomasn528/blog/2006_08_20_newsarcv.html#115573804040419389 (Aug. 22, 2006, 7:43 AM); Posting of DBK to Blanton's and Ashton's – Article. III. Section. 4. blog, *Strange Days Indeed: Shadowy Propoganda-for-Pay Group Targeting Web Logs*, http://frogsdong.blogspot.com/2006/06/strange-days-indeed-shadowy-propoganda.html (June 13, 2006, 10:52 AM); Posting of Tyler Slack to Desultory Thoughts blog, *Has Netvocates Visited Your Blog Recently*, http://www.utahadventurevideos.com/blog/archives/2006/06/10/has-netvocates-visited-your-blog-recently/ (June 10, 2006, 2:09 AM); Posting of Blogenfreude to Daily Kos, *Get Out Your Tinfoil Hats*, http://www.dailykos.com/story/2006/6/14/105534/099 (June 14, 2006, 07:55 PDT); Posting of Robin Hamman to Cybersoc.com blog, *behind netvocates (and it's link to customscoop)*, http://www.cybersoc.com/2006/05/behind_netvocat.html (May 31, 2006); The Rendon Group and Astroturfing, http://morewhat.com/wordpress/?p=99 (Aug. 31, 2006, 2:12 AM); *see also* Posting of Peter Rost to Dr. Peter Rost blog, *Am I Crazy Paranoid*, http://peterrost.blogspot.com/2006/06/am-i-crazy-paranoid.html (June 2006).

43. *See* Posting of Cynthia Brumfield to IP Democracy blog, *Do Broadband Providers Employ Blog Comment Shills?*, http://www.ipdemocracy.com/archives/001580do_broadband_providers_employ_blog_comment_shills.php (May 21, 2006, 9:39 AM); Posting of Cog to The Abstract Factory blog, *Anti-Network Neutrality Astroturfing*, http://abstractfactory.blogspot.com/2006/05/anti-network-neutrality-astroturfing.html (May 30, 2006, 22:55 PDT).

44. *See* Posting of Teresa Nielsen Hayden to Making Light blog, *Common Fraud*, http://nielsenhayden.com/makinglight/archives/005850.html#005850 (Dec. 3, 2004, 11:00 AM).

45. *See* Comments to Words, Not Fists blog*, Another Inconveninent Truth,* http://wordsnotfists.blogspot.com/2006/06/another-inconvenient-truth-netvocates.html (June 9, 2006); TheNewPR/Wiki, *Links to resource discussing a YouTube video attacking Al Gore that the Wall Street Journal uncovered as possibly the work of PR firm DCI Group*, http://www.thenewpr.com/wiki/pmwiki.php?pagename=AntiAstroturfing.OnlineCommunication.

46. *See* George Monbiot, *The Fake Persuaders*, THE GUARDIAN, May 14, 2002, http://ngin.tripod.com/deceit4.html.

47. Joseph Menn & Edmund Sanders, *Microsoft lobbying campaign backfires; even dead people write in support of firm*, SEATTLE TIMES, Aug. 23, 2001, *available at* http://archives.seattletimes.nwsource.com/cgi-bin/texis.cgi/web/vortex/display?slug=microlob23&date=20010823; John Lettice, *Dead people rise in support of Microsoft*, THE REGISTER, Aug. 24, 2001,

bate.[49] One commentator wryly observed that when he was writing "A Declaration of the Independence of Cyberspace," John Perry Barlow "didn't realize that moneyed interests would treat open society as damage and route around it."[50] Another sardonically noted, "The killing aspect of astroturf is that it poisons the well of discourse. Before this, you could at least have a degree of confidence that the stupid was *authentic* stupid. I'm not sure if I can deal with sorting out the fake stupid."[51]

In theory, the blogosphere offers an alternative to the top down "trust me, I have authority" model of mass media that Benkler discusses in Chapter 7, where he touts the transparency of the networked public sphere. I'm glad he recognizes the practical, opacity-inducing risks posed by astroturfing. It is simple and inexpensive to do and virtually impossible to police. Attempts to resist its corrosive reach necessarily undermine norms of privacy and tolerance toward anonymity and pseudonymity. In consequence, some observers characterize online astroturf as a tremendous threat to the future of the Internet.[52]

C. The Migration of Resources From Real Space To Cyberspace

Though his contention that the material means of information and cultural production are in the hands of a significant fraction of the world population is fairly important to the book's central claims, Benkler acknowledges that the Internet will not improve the lives of all people, writing:

> How will the emergence of a substantial sector of nonmarket, commons-based production in the information economy affect questions

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http://www.theregister.co.uk/2001/08/24/dead_people_rise_in_support/; *Microsoft funded 'grass roots' campaign*, USA TODAY, Aug. 23, 2001, *available at* http://www.usatoday.com/tech/news/2001-08-23-microsoft-letters.htm; *Dead People, Fake Letters, Support Microsoft*, NEWSBYTES NEWS NETWORK, Aug. 23, 2001, *available at* http://www.findarticles.com/p/articles/mi_m0NEW/is_2001_August_23/ai_77447353.

48. *See* Posting of Amanda Marcotte to Pandagon blog, *One More Reason to be Wary of Feeding Trolls*, http://pandagon.net/2006/06/13/one-more-reason-to-be-wary-of-feeding-trolls/ (June 13, 2006).

49. *See* Posting of Trevor Cook and JWM colleagues to Corporate Engagement blog, *PR Bloggers Urged to Fight Against Astroturfing*, http://trevorcook.typepad.com/weblog/2006/07/pr_bloggers_urg.html (July 16, 2006).

50. *See* Posting of Bill Humphries to More Like This Weblog, *Turf Wars,* http://www.whump.com/moreLikeThis/2006/08/30/turf-wars/ (Aug. 30, 2006, 10:41 PM); Posting of John Perry Barlow, *A Declaration of the Independence*, http://homes.eff.org/~barlow/Declaration-Final.html (Feb. 8, 1996).

51. Comments of John D. to Making Light blog*, Another Update on Astroturf*, http://nielsenhayden.com/makinglight/archives/007947.html#141279 (Sept, 2, 2006, 9:09 AM).

52. Ann Cavoukian, 7 Laws of Identity: The Case for Privacy-Embedded Laws of Identity in the Digital Age, *available at* http://www.identityblog.com/wp-content/resources/7_laws_whitepaper.pdf.

> of distribution and human well-being? The pessimistic answer is, very little. Hunger, disease, and deeply rooted racial, ethnic, or class stratification will not be solved by a more decentralized, nonproprietary information production system. Without clean water, basic literacy, moderately well-functioning governments, and universal practical adoption of the commitment to treat all human beings as fundamentally deserving of equal regard, the fancy Internet-based society will have little effect on the billions living in poverty or deprivation, either in the rich world, or, more urgently and deeply, in poor and middle-income economies.[53]

Chapter nine focuses on ways in which the emergence of Internet-facilitated social production can improve the lives and living conditions of people everywhere, even those lacking connectivity. He notes that information policy is a critical aspect of development policy, and asserts that access to knowledge is hampered by a market system that accords access to innovations based on the willingness and ability to pay privileges to the interests and desires of the wealthy over those of the poor. What I don't think he adequately considers is the fact that investment in "the networked information economy" may actually worsen conditions for poor people by stripping them of resources that were previously available. When the interactions that are necessary for human flourishing move online, those without regular, unfettered Internet access will see the quality of their lives actually deteriorate.

The "Law of Conservation of Matter" states that matter cannot be created or destroyed, it can only be changed in form.[54] In other words, in a closed system, which is one in which nothing escapes, any process will not change the total "matter content" of the system. I would propose that to the extent that the global economy can be characterized as a closed system, an analogous statement can be made: Wealth isn't created or destroyed either, it is only changed in form, as well as moved around.

When money and resources are electrified and pixilated, those who live primarily offline may see their living conditions worsen dramatically. Consider if you will this ambling personal anecdote as an illustrative analogy. I live in within the city limits of Columbia, South Carolina, about seven miles from the University of South Carolina School of Law where I teach. Because I tend to work more productively in the office than I do at home, I typically drive there at least five days per week. Taking mass transit as an alternative isn't really an option, as the nearest bus stop is over a mile and a half from my home, and after walking there, which could easily take 30 minutes or more, I would have to take two

53. BENKLER, *supra* note 1, at 301.

54. Wikipedia, Law of Conservation of Matter, http://en.wikipedia.org/wiki/Law_of_Conservation_of_Matter (last visited Sept. 26, 2006).

different buses to get within a quarter mile of the law school building. It could take me as long as two hours to get to work by bus even when the buses are running on schedule, so I have never attempted this. I could not live in my current neighborhood if I lacked a car, and would have to choose from a very narrow and unappealing range of housing options.

One weekend day, when the weather was reasonably pleasant, I decided to walk from my house to my office, to see how long it would take me and what the walk would be like, in the event I find myself lacking a car or other source of transportation and needing to get back and forth on my own power. I secured a ride home beforehand, and set off early one morning on what I referred to as my excellent urban pedestrian commuter adventure. Under different circumstances, however, I might have dreaded such a long walk, particularly if the weather was hotter and wetter, as could easily have been the case. Much as I was voluntarily forgoing the use of my car, I sometimes forgo the use of my computer and Internet access for short periods, which is a very different experience than the frustration that accrues when my computer malfunctions or my Internet connection is unavailable, despite my desire to be online.

An ultimately positive aspect of my pedestrian journey is that I was reminded of how nice and kindhearted people in Columbia SC can be, as I was offered a ride on five different occasions by friends, neighbors, and a former student. Not a single ride offer came while I strode the shaded lanes near my home (even though I had to walk in the street because there are no sidewalks there) because recreational walking is commonplace in this part of town (even in spite of the lack of basic pedestrian amenities). Once I began trodding the narrow sidewalk that runs along the eight lane highway that joins my neighborhood with downtown Columbia, however, the ride offers came fast and furious, because apparently it seemed exceedingly unlikely to passersby that I would be walking there voluntarily.

That part of the walk was quite unpleasant from a multi-sensory standpoint. In addition to the noise of the cars whizzing past me were the smells of auto exhaust, and of fast food restaurant fry emissions. And the route itself was unremittingly ugly. Landscaping was sparse, but billboards were plentiful. This section of the hike was rife with litter, and I have to assume this was at least partly correlated to the complete absence of convenient trash receptacles. I wished I had thought to bring work gloves and a trash bag, so that I could have picked up some of the rampant refuse as I walked along. Most of it seemed beverage consumption related, as cups, cans, and bottles were everywhere. There are homologous places on the Internet, such as sites that are choked with advertisements and browser traps, webpages that require complicated registration disclosures, programs that impose onerous and sometimes degrading terms and conditions for use, and “free” e-mail programs that

inject ads, extract personal informtion and intrusively monitor all of a user's activities and communications. People who can avoid them undoubtedly do.

At one point I crossed a bridge, where several people stood fishing in the stream below, for what I assumed were utilitarian rather than recreational purposes. Copius litter floated in the water too, and it appeared to have a sudsing problem. Unsurprisingly, the catch of the day was catfish, a piscine creature known to flourish in less than environmentally pristine environments. I thought about how lucky I was not to have to fish for my dinner. I think now, as I write this, about how fortunate I am to have the means to own computers and related equipment and to afford top-notch Internet connectivity at my home.

After passing a number of crowded, unsheltered and shadeless bus stops, I arrived at the office grateful that I didn't have to make the trek regularly, thanks to my trusty Honda Civic Hybrid. Owning and operating a car, even one that gets good gas mileage, is a fairly expensive proposition. People of modest financial means are forced to either dedicate a substantial portion of their incomes toward buying, fueling, insuring, and maintaining an automobile, or to make do with the limited mass transportation that is available, along with rides provided by friends or family members, and supplement this with walking, bicycling, and the occasional cab ride. They would benefit greatly from an extensive, dependable and affordable mass transit system, and they suffer from the lack of one. Yet as long as possessing personal automobiles is within the reach of the citizens to whom governments are most responsive, it is unlikely that Columbia, South Carolina (or similarly situated communities elsewhere), will be motivated to invest in additional bus routes, or commuter rail systems. Long ago public resources were redirected from mass transit to highways and parking garages, to the detriment of the carless poor. So too are public resources migrating online, where they are less easily accessible, and sometimes completely unreachable, by the computerless poor.

In the United States the Internet is developing away from a public transit model, and many of its attributes may be fully accessible only to those who can afford expensive computer equipment and monthly broadband cable fees. Governmental initiatives like the E-Rate are burdened by censorware[55] requirements[56] and there is little indication they

55. The Censorware Project, What is Censorware? http://censorware.net/article.pl?sid=01/02/10/2241204 (last visited Feb. 5, 2007) (defining censorware as "software which is designed to prevent another person from sending or receiving information (usually on the web").

56. American Library Association, E-Rate and Universal Service, *available at* http://www.ala.org/ala/washoff/WOissues/techinttele/erate/erate.htm; Nancy Kranich, *Why Filters Won't Protect Children or Adults*, 18 LIBR. ADMIN. & MGMT. 1, (2004), *available at*

will be expanded. The corporate Internet is laced with toll roads, and only people with financial resources and expensive computers can take optimal advantage of them. Low cost Internet access is slow and it subjects the user to constant advertisements and chronic monitoring. Even when people with economic challenges manage to purchase computers, their machines and software will quickly require new peripherals, maintenance and updating to remain fully functional, and resources devoted to computers and Internet service reduce the funds available for other life expenditures.

Consider also telephones and telephony. As Benkler noted repeatedly, those with access to high speed broadband connectivity and sufficient financial resources can obtain phone service over the Internet.[57] This can be supplemented with portable cellular phones, such that people can have extensive, almost seamless access to telephone services. Except, of course, when they don't. Before widespread adoption of cell phones, pay phones were in plentiful abundance. Expansion of the cell phone market shrank the pay phone customer base dramatically, such that people without cell phones have much less access to distributed telephone services than they did previously.[58] If Benkler's prediction that the Internet will replace traditional telephone service comes true, even assuming there are federal subsidies for rural residents, the digital divide will become a gaping chasm that divests people without constant Internet access of their only reliable means of communication.

Finally, a few words about public libraries. Benkler expresses understandable excitement about developments like Project Gutenberg[59] and the Public Library of Science (PLoS), which are making large amounts of information accessible to the interested public.[60] It is also true that as a general matter libraries benefit from the availability of networked electronic publications, but often only in the sense that demands placed on the physical space of a library facility are reduced.. Budgetary demands preclude infinite access to pay per view resources, and subscriptions to electronic periodicals may cost as much or more as ink and paper versions, with the added drawback that libraries lose the benefits of the first sale doctrine under copyright law.[61] Most electronic publica-

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http://www.ala.org/ala/oif/ifissues/issuesrelatedlinks/whyfilterswontp.

57. *See, e.g.,* BENKLER, *supra* note 1, at 86, 421 (mentioning Skype).

58. *See, e.g.,* The Payphone Project, http://www.payphone-project.com/ (last visited Sept. 26, 2006); Wikipedia, Payphone, http://en.wikipedia.org/wiki/Payphone (last visited Sept. 26, 2006).

59. *See* BENKLER, *supra* note 1, at 80-81, 137,142.

60. *Id.* at 271, 313, 324.

61. *See* Ann Bartow, *Electrifying Copyright Norms and Making Cyberspace More Like a Book,* 48 VILL. L. REV. 13, 13 (2003); Ann Bartow, *Libraries in a Digital and Aggressively Copyrighted World: Retaining Patron Access through Changing Technologies,* 62 OHIO ST.

tions are licensed rather than sold, under terms and conditions that may not be readily negotiable. It is not at all clear that digitalization enhances access, and it may instead be true that it decreases the scope of collections over time, because when a subscription runs out, even the back issues of a periodical may be rendered unavailable.

The bankruptcies of publishers could extinguish access to certain works, and technology changes will serve to remove resources from library collections as well. Just as in real space where information contained exclusively on seven inch floppy disks is functionally lost to most of us and the means to play music contained on eight track tapes is woefully hard to come by, as platforms and formats on the Internet improve and evolve, information that is not in regular use may become functionally lost as well. You can experience this phenomenon firsthand by simply finding a website that hasn't been updated in several years, and attempting to open or play associative files. Chances are, the document readers and media players on your computer will no longer recognize or know how to interact with this data. Libraries can repurchase access to old content that is recast in new media, but only if it is both available and affordable, and sometimes neither will be the case.

Also, instead of merely providing seating space to patrons, libraries must now provide them with computer terminals and passwords for access to library-subscribed e-collections and online services.[62] Resources that might have previously been used for acquisitions may be invested instead in computers and broadband access and of course the almost obligatory filtering software.[63] And patrons desiring access to online collections may have to wait in line for computer terminals alongside people needing to check their e-mail accounts, creating library resource demand bottlenecks that had no analog homology.

CONCLUSION

"The Wealth of Networks: How Social Production Transforms Markets and Freedom" is a book well worth reading. The author still has a bit more work to do, however, before his Grand Unifying Theory of Life, The Internet, and Everything is satisfactorily complete. It isn't enough to concede that the Internet won't benefit everyone. He needs to more thoroughly consider the ways in which the lives of poor people actually worsen when previously accessible information, goods and services are rendered less convenient or completely unattainable by their migration

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L.J. 821, 821 (2001).

62. *See generally* Bartow, *Electrifying Copyright Norms, supra* note 61, at 13.

63. *See* Ann Bartow, *Women in the Web of Secondary Copyright Liability and Internet Filtering*, 32 N. KY. L. REV. 449, (2005), *available at* http://ssrn.com/abstract=755724.

online.

Additionally, the Internet is easy enough to be optimistic enough as a technological achievement, but just as nuclear fission can be harnessed both for electrical power generation and annihilating destruction, the raw communicative capabilities can't be qualitatively assessed without reference to specific content. Pornography and its symbiotic relationship to the Internet require thoughtful scrutiny. Astroturf and other targeted attempts to instrumentally distort democratic discourse need to be recognized and analyzed, so that mechanisms of re-channeling and containment can be theorized and developed. Finally, the impact of moving resources online upon people who substantially live in an offline, analog world, needs to be contemplated more fully. I hope that Benkler decides to undertake all these projects in the future.

INTERNET THINK

SUSAN P. CRAWFORD*

There are many lawyers and policymakers now engaged in debating laws concerning high speed broadband connections to the Internet. What do they mean by "the Internet"? Does it matter what they mean?

This essay suggests that how "the Internet" is understood has substantial legal, social, and cultural consequences. In particular, what is meant by "the Internet" determines which actors' voices will be listened to, what arguments will be respected, and which goals will be considered legitimate. If "the Internet" means "a logical architecture" (as the original engineers would say it does), protections for speech may not be relevant, and that architecture could change at any time. If "the Internet" means "privately-owned pipes" (as the incumbent telephone companies would say it does), fundamental principles developed over centuries to avoid monopolies over communication may be lost. If "the Internet" means standards and relationships that give rise to persistent social worlds (as Internet futurists would say it does), economic arguments made by the owners of the transport pipes may be undermined. Both the FCC and Congress have been confronted with all three of these definitions at one time or another. Which one will be chosen to frame our domestic approach to "the Internet"? What effects will choosing one or another have on policy?

This essay represents a brief exploration of this issue from my intuitive perspective that public policy should "protect the Internet." I acknowledge this starting point, but I want to be open-minded about where this intuition leads and what stumbling blocks it will (and should) encounter. To the extent policymakers have an opportunity to choose one or another of these three definitions, I would like to understand what these choices mean in some detail. Then, instead of committing myself in advance to abstract economic talk or theories of democracy, I would like to understand the social and cultural implications of choosing one definition over another.[1] If the shared goal of pro-"network neutrality" advo-

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1. I gratefully acknowledge Julie Cohen's suggestion that this "social and cultural" question is the right one to ask. Prof. Cohen made this suggestion in response to a different draft paper of mine. *See* Julie E. Cohen, Commentary, *Network Stories*, 70 LAW & CONTEMP. PROBS. (forthcoming 2007); *see also* Susan P. Crawford, *Network Rules*, LAW & CONTEMP.

cates is to "protect the Internet," what exactly will we be protecting, and to what social and cultural end?

In Part I of this essay, I will very briefly describe representative proponents of each of these views, and the historical contexts in which their particular definitions have been put forward. In Part II, I will describe some of the changes in the Internet that have taken place since the FCC's and Congress's initial involvement, and the ways in which these changes relate (if at all) to the three "definitions" I have suggested. And in Part III, I will outline what these changes suggest for our future if one or another of them is chosen for protection.

I. THE INTERNET DEFINED

A. The Engineers

At this year's Silicon Flatirons Conference, Robert Kahn defined the Internet as follows:

> One of the things about the Internet that escapes a lot of people but was mentioned today, is that it really is composed of things like routers and lines and computers and the like, but those do not define the Internet. They're just the things of which it's built. The Internet really was a logical architecture that allowed you to connect virtually any type of networking machine together. So when people ask me what's the Internet, I say it's this logical construct, independent of the particular elements that go into it. So if this network went away and got replaced by a new technology in the future, it's still the Internet.[2]

Kahn's views on "what is the Internet" are taken seriously because he was one of the co-inventors of the TCP/IP protocol. His views are also representative of a class of computer engineers who "invented the Internet" thirty years ago (the "Engineers").

From the Engineers' perspective, the Internet began with the ARPANet and the idea of packet switching, both of which had their intellectual origins in the work of J.C.R. Licklider of MIT.[3] In September

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PROBS. (forthcoming 2007), *available at* http://www.scrawford.net/display/061406%20network%20rules.doc. This essay is a first step towards taking on the task of establishing a "social theory of regulation by protocol" that Prof. Cohen suggested, by beginning in the context of a particular definitional swamp: "What is the Internet?"

2. Video: Robert Kahn, Keynote Address at the The Digital Broadband Migration (Silicon Flatirons Telecommunications Program 2006), *available at* http://telecom.colorado.edu/index.php?load=content&page_id=126.

3. ARPANet was a precursor to the Internet. M. MITCHELL WALDROP, THE DREAM MACHINE: J.C.R. LICKLIDER AND THE REVOLUTION THAT MADE COMPUTING PERSONAL 178 (reprint 2002) (2001).

1969, Bolt Beranek and Newman, Inc. (BBN) installed the first packet-switching device (an Interface Message Processor, or IMP) at UCLA; three more nodes were soon added (at the Stanford Research Institute, UC Santa Barbara, and the University of Utah); and by the end of 1969 four host computers were connected together into the initial ARPANet. An initial packet-switching protocol, called the Network Control Protocol (NCP), was used through the early 1970s.[4] NCP did not have the ability to allow one network to address another, because it was designed to work within the single ARPANet network.

In 1972, Bob Kahn (then at BBN) began work on a meta-level internetworking architecture that would allow addressing of machines and networks other than ARPANet. Vint Cerf became involved in 1973, and together Kahn and Cerf developed the Transmission Control Protocol/Internet Protocol, or TCP/IP. The overall plan was to make it possible for any machine attached to any network to connect to any other. The TCP portion of the protocol was designed to check (through acknowledgments) whether packets had made it to their destination; the IP portion was designed to allow communications to be chunked into packet-sized informational units, addressed, and forwarded to hosts identified through numerical "octets."

From Kahn's perspective, TCP/IP is the Internet. It is a logical architecture designed to be a general infrastructure on top of which new applications could be introduced. Protocols constrain, but this one constrained only in that (1) it provided only for "best efforts" quality control (if packets didn't make it to their destinations, the source would try again), (2) it suggested that the gateways between the connected networks would not retain information about the packets flowing through them, and (3) it did not suggest that there would be any global control of these operations.[5]

ARPANet and the two other early national US packet-switched networks (packet-switched radio and packet-switched satellite) had few hosts, and the identity of these hosts could be kept track of easily.[6] With the rise of Local Area Networks and Ethernet technology, the number of hosts (each with a unique IP address) proliferated quickly. Because IP addresses were difficult for humans to remember, Paul Mockapetris of USC/Information Sciences Institute invented the domain name system (DNS), which is a distributed mechanism for translating textual host names into IP addresses.[7]

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4. BARRY LEINER ET AL., ISOC, ALL ABOUT THE INTERNET: HISTORIES OF THE INTERNET (2003), http://www.isoc.org/internet/history/brief.shtml.

5. *Id.*

6. *Id.*

7. *Id.*

The idea behind this TCP/IP logical architecture was that networks could do their own form of routing and forwarding as long as they used a common gateway method of routing.[8] TCP/IP was incorporated into the Unix operating system, and that operating system was adopted by many computer science researchers. According to the Internet Society, the adoption of Unix (and the responsiveness of researchers to updates to that operating system) was key to the widespread use of these protocols.[9] Beginning in 1985, the U.S. NSFNet program required that "the connection must be made available to ALL qualified users on [academic] campuses,"[10] and mandated use of TCP/IP.[11]

The NSF national backbone could only be used for educational purposes until 1995, when NSF defunded the backbone and redistributed the resulting funds to regional networks to buy connectivity from private long-haul networks.[12] By 1995, the Internet was connecting 50,000 networks around the globe, and TCP/IP was in wide use worldwide. The task that Kahn and Cerf took on was to interconnect independent networks. They did that, and the resulting logical architecture, to them, is "the Internet."

For the Engineers, then, the definition of the "Internet" that makes sense is the one adopted by the Federal Networking Council in 1995:

> RESOLUTION: The Federal Networking Council (FNC) agrees that the following language reflects our definition of the term "Internet". "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.[13]

Two points about this definition characterize the Engineers' approach. First, this definition of the "Internet" emphasizes globally unique addressing (supporting interconnectivity) and the use of TCP/IP, but makes clear that these elements can change. IP can have "exten-

8. *Id.*
9. *Id.*
10. LEINER, *supra* note 4. Government involvement in the early Internet was crucial. Federal agencies helped pay for common infrastructure, coordinated with other networking organizations, and encouraged networks to find commercial customers for local services.
11. *Id.*
12. *Id.*
13. *Id.*

sions/follow-ons," TCP/IP can be subsumed by "other IP-compatible protocols," and services using communications infrastructure could be made available privately or publicly, depending on what made sense. Any logical architecture that provides for interconnection between networks and a set of agreed-on protocols (with some connection to the historical TCP/IP suite) will be "the Internet" to the Engineers. Second, the FNC/Engineer definition does not recognize the role of the transport pipes, because the Engineers are indifferent to them.

B. The Telcos

Another Silicon Flatirons speaker, Level 3 CEO James Crowe, gave his own definition of "the Internet":

> First there's the local connection, generally a fairly big connection, from the content provider to the backbone. Generally this is quite a large fiber optic connection. Then, there's the Internet backbone itself, which is again a very large optical IP connection. Then there is the piece that connects the end-user to the backbone—local Internet access. The first two sections of the Internet, that is the piece from the content provider to the backbone, and the backbone itself, are hotly competitive. We have lots of choices of providers. It's the piece that we all buy, connecting our homes to the Internet, that's the real issue. I think the content providers and the Internet community are generally correct that the telco providers and cable companies have a duopoly [for this section of the Internet].[14]

This speaker is steeped in the history of telephony. He thinks of "the Internet" as three categories of pipes that connect "consumers" to "content" and vice versa. For him, the definition of "the Internet" is not driven by the logical architecture employed over transport pipes, although he is certainly aware of the Internet Protocol.[15] In his mind, the pipes themselves are the Internet. Although this is probably unfair to Crowe himself, I will label his Internet definition the "Telco" position.[16]

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14. James Crowe, *Regulation and Free Markets Redux: Additional Insights on Regulating the Telecommunications Industry in the New Economy*, 5 J. ON TELECOMM. & HIGH TECH. L. 487, 498 (2007).

15. Indeed, Crowe is famous for understanding the benefits of packet-switched networks in competing with traditional circuit-switched telephony networks, and the name "Level 3" comes from IP routing soft-switches above transport networks. *See* James Crow, *Regulation and Free Markets: How to Regulate the Telecommunication Industry in the New Economy*, 2 J. ON TELECOMM. & HIGH TECH. L. 429, 436 (2003). Level 3 owns fiber infrastructure across the U.S. and provides long-haul IP-based communications services to other carriers and businesses.

16. "Telco" is a common shorthand designation for "telephone company," and connotes the incumbent providers of telephone services that were spun off of AT&T by court order in 1984 but have since recombined through merger into four large companies: AT&T, BellSouth,

If "the Internet" is the three sections of connection pipes described by Crowe, then whether or not a protocol related to TCP/IP is used by or over those pipes is irrelevant. Global interconnection through unique addressing, the central assumption underlying the Engineers' definition, is also moved to the side. Networks may or may not connect to one another, depending on the commercial realities of their relationships. (Indeed, the 2005 flap over Level 3's refusal to peer with Cogent, and subsequent backing-down, is emblematic of the Telco approach to the Internet.)[17] The pipes that make up "the Internet," from the Telco point of view, are privately owned and can be privately deployed.

The historical context for the Telco definition of "the Internet" is straightforward. From the Telco point of view, "the Internet" is what happened when telephone companies all around the world allowed computers to connect (through modems) to previously-existing telephone networks. Thus, the combination of these underlying networks is the totality of "the Internet" to them.

In general, Telcos in the U.S. have always worried that allowing equipment not sold by them to be connected to their networks would risk the integrity of these pre-existing networks, and it took regulatory intervention to require that non-Telco equipment (including modems) be allowed to be connected.[18] The Telco attitude toward Internet communications in particular (communications that originate in computers that are not "part" of the Telco networks from the Telco point of view) has traditionally been grudging acceptance – although telephone companies made money when people bought second lines to allow dial-up connections, they were slow to embrace the idea that access to the Internet was essential to American households. Now that the disruptive effects of Internet communications on traditional Telco business models have been thoroughly digested by the Telcos, they are re-focusing on the importance of their particular network connections and reminding us that their private networks are collectively "the Internet."

This common sense understanding of "the Internet" has penetrated the minds of many. For example, Senator Ted Stevens (R-Alaska) recently said that the Internet was a "series of tubes."[19] And people on the

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Qwest Communications International and Verizon Communications. The large providers of cable services in the U.S., Comcast, Time Warner Cable and Cablevision, are sometimes aligned with the Telcos, and in my view have the same understanding of "the Internet."

17. Hiawatha Bray, *Dispute Threatens to Snarl Internet*, BOSTON GLOBE, Oct. 7, 2005, at C1.

18. Connection of Terminal Equipment to the Telephone Network, 47 C.F.R. § 68.106 (2006).

19. *Communications Reform Bill: Full Committee Markup Before The S. Comm. on Commerce, Science & Transportation*, 109th Cong. (2006) (statement of Sen. Ted Stevens), *available at* http://www.publicknowledge.org/node/497 (last visited Sept. 29, 2006).

street will say that "the Internet" is the same as "the telephone network." The Telco definition of "the Internet" is often the default, standard definition.

C. The Nethead

In often glowing and hyperbolic terms, Internet futurists define the Internet in terms of the social worlds and creative conversations that exist online. Here is David Weinberger, well-known co-author of The Cluetrain Manifesto and blogger:

> The Internet is a medium only at the bit level. At the human level, it is a conversation that, because of the persistence and linkedness of pages, has elements of a world. It could only be a medium if we absolutely didn't care.[20]

This "human level" view of the Internet – as a "conversation" that is a "world" – can be characterized as the "Nethead" definition.[21] This definition has a distinguished history, reaching back to Vannevar Bush, Doug Engelbart, Norbert Wiener, and J.C.R. Licklider.

In 1945, Vannevar Bush's essay "As We May Think" (published in the *Atlantic Monthly* and in *Life*), proposed the creation of a "memex," an enormous, indexed database of knowledge that would allow scholars and others to create links through information.[22] In Bush's words:

> The human mind . . . operates by association. With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain. . . . Selection by association, rather than indexing, may yet be mechanized. . . . Consider a future device for individual use, which is a sort of mechanized private file and library. It needs a name, and, to coin one at random, 'memex' will do. A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory.[23]

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20. Joho the Blog!, http://www.hyperorg.com/blogger/index.html (Mar. 27, 2004, 07:32 EDT).

21. PCMag.com defines "Nethead" as "[a] person who has a passion for the Internet." PCMag.com, Nethead, http://www.pcmag.com/encyclopedia_term/0,2542,t=Nethead&i=47793,00.asp (last visited Sept. 26, 2006).

22. Vannevar Bush, *As We May Think*, ATLANTIC MONTHLY 101, 106-08 (1945), *available at* http://www.theatlantic.com/doc/print/194507/bush.

23. *Id.* at 106.

Bush posited that the memex could be used for associative indexing, so that anyone could join items together in a "trail" that could be followed and added to by others.[24]

Bush's vision of scientific applications that would allow people "truly to encompass the great record" of human achievement was eagerly adopted by Doug Engelbart, who had read around the same time an essay by William James entitled "What Makes a Life Significant."[25] The James essay urged readers wishing to live a significant life to join "inner joy, courage, and endurance" with an ideal.[26] Engelbart's ideal became to make it possible for people to follow the associative trails dreamed of by Bush – to augment human intellect.

Doug Engelbart decided to boost mankind's ability to deal with complex, urgent problems by creating a "general information environment" that would use screens to allow people to "work in a collaboration mode that would be much closer and more effective than we had ever been able to accomplish."[27] This original vision of Engelbart's became his obsession and his lifelong project. He went on to invent the mouse, the window, and the word processor. Engelbart's demonstration of computer-supported cooperative work using videoconferencing and mixed text/graphic displays ("dealing lightning with both hands," in the words of one of the young computer designers who saw a video of the demonstration),[28] the mouse, and linked media made an enormous impact on those who saw it or heard about it. On a rainy Monday morning in December 1968, Engelbart "showed the nation's best computer scientists and hardware engineers how people would in the future work together and share complex digital information instantaneously, even though they might be a world apart."[29] Engelbart sat before the audience in front of an enormous screen on which images of participants from miles away were projected, while they collaborated on text. It seems simple now, but it was one of the most remarkable demonstrations of technology of all time. Instead of man acting at the behest of a computer (a mainframe hidden behind glass), man would wield the computer (and the personal computer) for his own purposes.

In a sense, Engelbart was introducing his viewers to "cyberspace,"

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24. *Id.*

25. JOHN MARKOFF, WHAT THE DORMOUSE SAID: HOW THE SIXTIES COUNTERCULTURE SHAPED THE PERSONAL COMPUTER INDUSTRY 7 (2005).

26. WILLIAM JAMES, WHAT MAKES A LIFE SIGNIFICANT 16 (1898), *available at* http://philosophy.lander.edu/intro/articles/jameslife-a.pdf.

27. D.C. ENGELBART, STAN. RES. INST., AUGMENTING HUMAN INTELLECT: A CONCEPTUAL FRAMEWORK 188-89 (1962), *available at* http://www.bootstrap.org/augdocs/friedewald030402/augmentinghumanintellect/AHI62.pdf.

28. MARKOFF, *supra* note 25, at 148.

29. *Id.* at 149.

that idea of decentralized feedback that had galvanized Norbert Wiener more than twenty years before. Wiener, often described as the "father of the information age,"[30] had a conception of information that re-characterized it as communication. For Wiener, "information was not just a string of bits to be transmitted or a succession of signals with or without meaning, but *a measure of the degree of organization in a system.*"[31] He developed a new science of communication and control, focusing on "the interplay of complex communication processes that connect human beings to the living world around them,"[32] and called it "cybernetics" (from the Greek word for steersman, 'kubernetes'). This steersman was like the governor for a thermostat: automatic, and controlled by feedback generated by the autonomous actions of all the communicants. "Communication and control" can also be understood as "interactivity," the central breakthrough that makes the Internet the "conversation" celebrated by Weinberger. Thus, while "cyberspace" is sometimes derided as an old-fashioned term, its currency remains: cyberspace is that place/mode/medium[33] where humans can interact electronically and collectively create feedback ("steer" automatically) that generates nonlinear (but still essentially human) outcomes. In other words, the online interactivity celebrated and demonstrated by Engelbart was the implementation of Wiener's cybernetic discussions.

Another key Engelbart and Internet antecedent was, of course, J.C.R. Licklider, who led the Advanced Research Projects Agency (ARPA, now DARPA, the Defense Advanced Research Projects Agency) and vigorously encouraged the networking that led to the Internet.[34] Licklider shared with Wiener a strong vision of human-computer coexistence, saying that it would be essential "to enable men and computers to cooperate in making decisions and controlling complex situations without inflexible dependence on predetermined programs."[35] Licklider understood that communication was not a one-way street running between a sender and a passive "receiver," and claimed that "[i]n a

30. FLO CONWAY & JIM SIEGELMAN, DARK HERO OF THE INFORMATION AGE: IN SEARCH OF NORBERT WIENER 1 (2004).

31. *Id.* at 190.

32. *Id.* at 173. Wiener's CYBERNETICS: OR CONTROL AND COMMUNICATION IN THE ANIMAL AND THE MACHINE (1948) has been ranked as among the most "memorable and influential" works of 20th century science.

33. *See generally*, Julie Cohen, *Cyberspace as/and Space*, 107 COLUM. L. REV. 210 (2007); Dan Hunter, *Cyberspace as a Place, and the Tragedy of the Anticommons*, 91 CAL. L. REV. 439 (2003) (referring to the implications of using "place" as a metaphor to describe cyberspace).

34. *See generally* WALDROP, *supra* note 3, at 204-58.

35. J.C.R. Licklider, *Man-Computer Symbiosis*, HFE-1 IRE TRANSACTIONS ON HUM. FACTORS IN ELECTRONICS 4 (1960), *available at* ftp://gatekeeper.research.compaq.com/pub/DEC/SRC/research-reports/SRC-061.pdf.

few years, men will be able to communicate more effectively through a machine than face to face."[36] Early on, Licklider was among the first to believe in Engelbart's vision of interactivity, and Engelbart thought of him as a big brother.[37]

This history of Nethead-understanding is both distinguished and dreamlike. For more than forty years now, people like Bush, Wiener, Licklider, and Engelbart have mused about the possibilities of human interaction online. Many of their dreams seem to have come true – but not all. The development of the World Wide Web by Tim Berners-Lee has made possible the "pool of human knowledge" envisioned by Bush, because it allows the linking of documents and navigation among them.[38] As Weinberger and many others have pointed out, the Internet makes everyone a publisher. Over 48 million American Internet users have posted something of their own online, such as a photo, a piece of art, a video, a piece of writing, or some other form of a digital file.[39] They have grown up being able to interact with media, and they are very used to an Internet-centric life. Overall, almost 50 million Americans have left part of their creative life online – by having their own blog, having their own web page, working on a blog or webpage for work or a group, or sharing self-created content such as a story, artwork, or video.[40] But the "associational trails" envisioned by Bush are not yet easily perceptible by us online, and it seems likely that we are still in an early, primitive era of the Internet's development.

Nonetheless, for definitional purposes, the Nethead view is that the *standards* that make the Internet (and the web) work – TCP/IP, HTML, HTTP – are an essential part of "the Internet" but do not capture the entire idea of the Internet. Importantly, these standards make *relationships* possible and persistent. These relationships can be among texts (the hypertext links of the web) as well as machines, and among humans and groups as well. On this view, the Internet is made up of standards and relationships, both the logical architecture beloved by the Engineers and the cultural and intellectual life essential to humans.

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36. J.C.R. Licklider & Robert W. Taylor, *The Computer as a Communication Device*, SCI. & TECH., Apr. 1968, at 40, *available at* http://gatekeeper.dec.com/pub/DEC/SRC/publications/taylor/licklider-taylor.pdf.

37. MARKOFF, *supra* note 25, at 52.

38. *See generally* TIM BERNERS-LEE & MARK FISCHETTI, WEAVING THE WEB: THE ORIGINAL DESIGN AND ULTIMATE DESTINY OF THE WORLD WIDE WEB BY ITS INVENTOR (1999).

39. JOHN B. HORRIGAN, PEW INTERNET & AM. LIFE PROJECT, HOME BROADBAND ADOPTION (2006), http://www.pewinternet.org/pdfs/PIP_Broadband_trends2006.pdf.

40. *Id.*

II. THE EVOLUTION OF THE INTERNET

All three of these "Internet" definitions emerged some time ago. The Engineers and the early Netheads were there at the start, developing logical architecture and human-computer interactions. The Telcos were also there at the start (even if they did not really understand what they were dealing with), providing the pipes (or "tubes" in Sen. Stevens's lexicon) necessary for transport of packets. During the early days of the Internet, Congressional and FCC involvement in Internet "regulation" was minimal.[41] But the facts on the ground have changed dramatically since then. This Part briefly discusses how the evolution of the Internet relates to the three broad "definitions" I have suggested in Part I. Although many dimensions of Internet use have changed since the early 1990s, I have chosen four in particular to discuss: number of hosts, bandwidth speed and penetration of access, development of new applications, and the social impact of Internet availability.

A. Number of Hosts

The number of hosts[42] is usually considered to be the most accurate available measure of the size of the Internet.[43] In 1994, when Tim Berners-Lee published his first articles about his development of the World Wide Web, there were approximately 2.2 million hosts.[44] As of January 2006, there were approximately 394 million hosts.[45] A less accurate measure of the size of the Internet attempts to assess the number of world Internet users. The estimate being used these days is a billion Internet

41. *See* Susan P. Crawford, *Shortness of Vision: Regulatory Ambition in the Digital Age*, 74 FORDHAM L. REV. 695, 697-98 (2005).

42. "A computer system that is accessed by a user working at a remote location. Typically, the term is used when there are two computer systems connected by modems and telephone lines. The system that contains the data is called the host, while the computer at which the user sits is called the remote terminal[.]" Webopedia Computer Dictionary, Host, http://www.webopedia.com/TERM/h/host.html (last visited Sept. 29, 2006); *but see* Internet System Consortium, http://www.isc.org/index.pl?/ops/ds/ (follow "Frequently Asked Questions" hyperlink) (last visited Sept. 29, 2006) (stating that a host used to be a single machine on the Internet; however, the definition of a host has changed in recent years due to virtual hosting, where a single machine acts like multiple systems and has multiple domain names and IP addresses).

43. *See Internet Hosts Reach 100 Million Worldwide*, INFO. SUPERHIGHWAYS NEWSL. (IGI Group Inc., Brighton, Mass.), June 2001, *available at* http://www.findarticles.com/p/articles/mi_m0IGM/is_6_8/ai_76701365.

44. *See* Internet Systems Consortium, Internet Domain Survey, http://www.isc.org/index.pl?/ops/ds/ (last visited Sept. 29, 2006). In 1969, of course, there were only four hosts: SRI, UCLA, UCSB, and Utah. *See* Computer History Museum, Exhibits, Internet History, http://www.computerhistory.org/exhibits/internet_history/ (last visited Sept. 29, 2006).

45. *Id.*

users, representing 15 percent of the world's population.[46] On any measure, of course, the Internet is a much larger place than it was thirteen years ago.

It is also far less homogeneous. In both 1999 and 2002, fully half of the public sites on the Internet were asserted to be in America.[47] Although America remains the country with the most Internet users, only 18 percent of all Internet users worldwide are American.[48] Eleven percent of Internet users are now found in China,[49] and observers believe that Chinese Internet use has already exceeded that of the U.S.[50]

From the Engineers' perspective, the logical architecture that is "the Internet" may no longer be adequately serving the world. Although the idea of interconnection of autonomous networks is still important, and interconnection is still functioning well, the architecture they designed for the use of a relatively homogenous group of engineers may not be appropriate for such a large and diverse world. For example, MIT's Dave Clark and Internet pioneer Bob Kahn have separately called for a re-engineering of the Internet to deal with security issues, spam, intellectual property problems, and other current Internet issues.[51] And ICANN has been discussing for years whether and how to create multilingual top-level domains in the DNS to serve non-English speaking populations. For an Engineer, the free flow of information may not be the top priority; the architecture that is "the Internet" was always supposed to be able to evolve.

From the Telcos' perspective, the use of their pipes for Internet communications is increasing, but they are being treated as the provider

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46. *See* Internet World Stats, World Internet Usage and Population Stats, http://www.internetworldstats.com/stats.htm (last visited Sept. 29, 2006). This represents a 200.9 percent growth since 2000. *Id.* This figure is up from only 45 million in 1995 and 420 million in 2000. Press Release, Computer Indus. Almanac, Worldwide Internet Users Top 1 Billion in 2005 (Jan. 4, 2006), *available at* http://www.c-i-a.com/pr0106.htm.

47. *See* Online Computer Library Center, Country and Language Statistics, http://www.oclc.org/research/projects/archive/wcp/stats/intnl.htm (last visited Sept. 29, 2006).

48. *See* Press Release, Computer Indus. Almanac, *supra* note 46.

49. *Id.*

50. Natalie Pace, Opinion, *China Surpasses U.S. in Internet Use,* FORBES.COM, Apr. 3, 2006 ("Chinese Internet users spend nearly two billion hours online each week, while the U.S. audience logs on for 129 million hours per week"), *available at* http://www.forbes.com/2006/03/31/china-internet-usage-cx_nwp_0403china.html.

51. David Talbot, *The Internet is Broken,* 108 TECH. REV., Dec. 2005 / Jan. 2006, at 63 ("The Net's fundamental flaws cost companies billions, impede innovation, and threaten national security. It's time for a clean-slate approach."). Kahn frequently speaks about the necessity of treating online information as "digital objects" that can be managed authoritatively. *See, e.g.*, Robert Kahn & Patrice Lyons, *Representing Value as Digital Objects: A Discussion of Transferability and Anonymity*, 5 J. ON TELECOMM. & HIGH TECH. L. 189 (2006). Kahn also recently argued against net neutrality. *See generally*, Andrew Orlowski, *Father of Internet Warns Against Net Neutrality*, THE REGISTER, Jan. 18, 2007, http://www.theregister.co.uk/2007/01/18/kahn_net_neutrality_warning/.

of transport—a commodity service. They are frustrated with their inability to internalize the benefits of increasing network connectivity experienced by the communicating world.

From the Netheads' perspective, the critical online mass needed to make human-computer symbiosis and meaningful online "conversation" real is rapidly emerging. The world is online, and being so may make the world a better place. They are anxious to retain global interconnectivity and the free flow of information online, confident that the decentralized "steersman" will cause positive world outcomes to come into being.

B. Bandwidth speed and penetration

When Doug Engelbart did his 1969 demonstration, only one-direction modems carrying data at 1200 baud were available to him.[52] By 1994, the highest-speed dial-up connection commercially available was 9600bps (or 9.6Kbps), and text transfers continued to be the only feasible use for these connections (unless the user was extraordinarily patient).[53] Connections were unreliable. Dial-up speeds widely available eventually reached 56Kbps in the late 1990s,[54] but still precluded use of the Internet for downloading or uploading visual files.

By the 2000s, Digital Subscriber Line ("DSL") access over traditional copper telephone wires (providing digital data transmission) became commercially available, as did cable modem access. The traditional local exchange carriers were not initially enthusiastic about DSL, because they were happy with the profit margins generated by consumers installing second phone lines.[55] But pressure from the cable installations forced them to install DSL widely, cannibalizing their second-line business. In any event, speeds currently available from DSL and cable modem installations in the U.S. range from 256K to 24Mbps, with most

52. MARKOFF, *supra* note 25, at 151. "At slow speeds, only one bit of information (signaling element) is encoded in each electrical change. The baud, therefore, indicates the number of bits per second that are transmitted. For example, 300 baud means that 300 bits are transmitted each second (abbreviated 300 bps)." Webopedia Computer Dictionary, Baud, http://www.webopedia.com/TERM/b/baud.html (last visited Sept. 29, 2006). *See also* Bandwidth Speed Test, Results Explanation ("At one time [the baud rate at higher speeds] was equal to the bits per second, but modern technology allows us to send more than one bit per electric signal"), http://www.bandwidthplace.com/speedtest/about/tech.php?a=results (last visited Sept. 29, 2006).

53. TRACY L. LAGUEY, THE INTERNET COMPANION: A BEGINNER'S GUIDE TO GLOBAL NETWORKING ch. 7 (2d ed. 1994), *available at* http://archives.obs-us.com/obs/english/books/editinc/andr-7.htm.

54. Wikipedia, Modem, http://en.wikipedia.org/wiki/Modem (last visited Nov. 1, 2006).

55. Wikipedia, Digital Subscriber Line, http://en.wikipedia.org/wiki/Digital_Subscriber_Line (last visited Nov. 1, 2006).

commercial connections having speeds of 1.5 to 2Mbps in the U.S.[56] Meanwhile, however, in South Korea and Japan speeds of 100Mbps are common.[57]

Thus, broadband data speeds now are millions of times faster than they were at the birth of the Internet. And penetration of these broadband connections is high: as of May 2006, more than 40 percent of all American adults (estimates range between 84 million and 95.5 million people) had a high-speed Internet connection at home – a 40 percent increase over the number in 2005.[58] The U.S. remains behind at least eleven other OECD (Organisation for Economic Co-Operation and Development) countries in broadband penetration (in Iceland, for example, there are 27 broadband subscribers for every 100 people, but in the U.S. there are only 17 per 100),[59] but penetration is continuing to increase. Meanwhile, cable and telephone companies in the U.S. are busily upgrading their networks so as to be able to provide video, voice, and data services over proprietary high-speed connections. As fast as they are, standard, current-generation DSL and cable modem connections cannot deliver high-quality video-on-demand services.[60]

From the Engineers' perspective, increasing access speeds are almost irrelevant to their understanding of "the Internet." The logical architecture may need to change, but any successor will still be the interconnection protocol that makes the Internet what it is. To avoid the spam and other troubles available on the commercial Internet, they are happy to use the affordances of Internet2.[61]

From the Telcos' perspective, all of this speed requires enormous investment. They want assurance that they will be able to monetize "their" networks through price differentiation in order to recoup their outlays. Because "the Internet" is a collection of private network connections, to their mind monetization is no more than garden-variety exploitation of a private resource. They have successfully convinced the FCC to cease treating them as a common carrier with respect to these re-

56. GLOBAL BROADBAND BATTLES: WHY THE U.S. AND EUROPE LAG WHILE ASIA LEADS 148 (Martin Fransman ed., 2006).

57. *Id.*

58. PEW INTERNET & AM. LIFE PROJECT, HOME BROADBAND ADOPTION 2006 1 (2006), http://www.pewinternet.org/pdfs/PIP_Broadband_trends2006.pdf; Press Release, Neilsen//Netratings, Two-Thirds of Active U.S. Web Population Using Broadband, Up 28 Percent Year-Over-Year to an All-Time High (Mar. 14, 2006), *available at* http://www.nielsen-netratings.com/pr/pr_060314.pdf.

59. Organisation for Economic Co-operation & Development, OECD Broadband Statistics to June 2006 (2006), http://www.oecd.org/sti/ict/broadband.

60. *See* COMM. ON BROADBAND LAST MILE TECH. ET AL., BROADBAND: BRINGING HOME THE BITS ch. 3 (2002), *available at* http://newton.nap.edu/html/broadband/ch3.html.

61. *See generally* Internet 2, http://www.internet2.edu/ (last visited Feb. 4, 2006).

sources, and are planning to do the same in statutory language.[62]

From the Netheads' perspective, high-speed access makes possible a myriad of yet-to-be-invented applications that will make collaboration and user participation online even easier. They are worried that the Telcos' monetization of their pipes will stymie these positive developments.

C. New Applications

What are all these people using these high-speed connections for? In the U.S., they look for news,[63] banking services,[64] health information,[65] information relevant to major life decisions,[66] and, increasingly, use these high-speed connections to post material of their own (pictures, text, video) online.[67] Voice-over-Internet Protocol ("VoIP") services have not taken off in the U.S. with the same ferocity that they have overseas,[68] but U.S. users are likely to discover these services in large numbers in the next few years. U.S. consumers spent $1.4 billion on online gaming in 2005, and more than a million people in the U.S. subscribed to online gaming services like World of Warcraft.[69] According to the NPD Group, "With the increase in high speed Internet access, not only are users purchasing their games online, they are also willingly paying additional recurring fees over and above the price of the game to subscribe to services that let them play with others online."[70] And some U.S. broadband Internet users use their connections to facilitate sharing files of all

62. *See* Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967 (2005) (holding that, neither cable modem service nor DSL broadband provision is subject to the common carrier requirements (interconnection, nondiscrimination, and access) of Title II of the Communications Act); *see also* Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities, *Report & Order & Notice of Proposed Rulemaking*, 20 FCC Rcd. 14,853 (2005).

63. JOHN B. HORRIGAN, PEW INTERNET & AM. LIFE PROJECT, FOR MANY HOME BROADBAND USERS, THE INTERNET IS A PRIMARY NEWS SOURCE (2006), http://www.pewinternet.org/pdfs/PIP_News.and.Broadband.pdf.

64. SUSANNAH FOX & JEAN BEIER, PEW INTERNET & AM. LIFE PROJECT, ONLINE BANKING 2006: SURFING TO THE BANK (2006), http://www.pewinternet.org/pdfs/PIP_Online_Banking_2006.pdf.

65. MARRY MADDEN & SUSANNAH FOX, PEW INTERNET & AM. LIFE, FINDING ANSWERS ONLINE IN SICKNESS AND IN HEALTH (2006), http://www.pewinternet.org/pdfs/PIP_Health_Decisions_2006.pdf.

66. JOHN HORRIGAN & LEE RAINIE, PEW INTERNET & AM. LIFE, THE INTERNET'S GROWING ROLE IN LIFE'S MAJOR MOMENTS (2006), http://www.pewinternet.org/pdfs/PIP_Major%20Moments_2006.pdf.

67. HORRIGAN, *supra* note 39.

68. *Id.*

69. Press Release, The NPD Group, The NPD Group Reports Total U.S. Consumer Spending on PC Games Reached $1.4 Billion in 2005 (May 25, 2006), *available at* http://www.npd.com/press/releases/press_060525.html.

70. *Id.*

kinds with others.[71] Many Americans want to send photos and other large files to their families and friends (and not to strangers), and broadband connections make these activities possible.[72]

Americans, like other broadband users worldwide, will likely find uses for broadband that are collaborative, user-generated, immersive, and persistent – involving always-on presence, voice/video conferencing, video creation and distribution, elaborate virtual-world interactions, and social interactions generally.[73]

From the Engineers' perspective, these new applications made possible by broadband availability are no more than additional layers made possible by the original logical architecture that is the Internet. They are, again, concerned about the security and other risks posed by an "open" Internet in which the original protocols have not evolved beyond their 1970s state.

From the Telcos' perspective, it is enormously frustrating not to be participating in some way as a provider of applications as well as transport. They would like to be selling their own video-on-demand services to willing consumers as another way to recoup their enormous investment in infrastructure. They assert that these services are sensitive to latency and jitter issues for which the Internet provides no quality assurance, and claim that they require quality assurance control over their own pipes in order to provide them. The cable companies, for their part, would like to be providing online voice services without worrying about competition from services they do not control.

From the Netheads' perspective, these new applications have the potential to change the world dramatically, bringing us closer to the dreams of "associational trails" described so eloquently by Vannevar Bush. They have some concerns about the synchronous nature (e.g., real-time video conferencing) of these applications, but they are excited by the future to come. They assert that adequate bandwidth availability

71. In early 2005, Wired reported that "[a]nalysts at CacheLogic, an Internet-traffic analysis firm in Cambridge, England, report that BitTorrent traffic accounts for more than one-third of all data sent across the Internet." Clive Thompson, *The BitTorrent Effect*, WIRED, Jan. 2005, at 1, *available at* http://www.wired.com/wired/archive/13.01/bittorrent.html. The creator of the BitTorrent protocol has since then announced that he will partner with content distributors interested in creating efficient download systems. *See NTL, BitTorrent, CacheLogic Team Up on Legit Video Download Service*, ONLINE REPORTER, Feb. 18, 2006, http://www.onlinereporter.com/article.php?article_id=6101.

72. Om Malik, *File-sharing Is the New Email*, BUS. 2.0 MAG., May 1, 2006 (describing three start-ups aiming to serve Americans wanting easy-to-use BitTorrent functionality for point-to-point sending of large files), *available at* http://money.cnn.com/2006/05/01/technology/business2_launchpad0501/index.htm.

73. *See, e.g.*, Ben Anderson & Yoel Raban, *The Social Impact Of Broadband Household Internet Access* (Chimera Inst. for Soc. & Technical Res. Working Paper No. 2005-06), *available at* http://www.essex.ac.uk/chimera/content/pubs/wps/CWP-2005-06-Social-Impact-BB.pdf.

would solve all the latency and jitter issues raised by the Telcos. These new applications, on the Nethead view, are creating new relationships among people using the standards agreed to for the public Internet. The economic arguments made by the Telcos strike Netheads as being orthogonal to the human-development opportunities the future Internet will make possible.

D. Social impact

The social impact of broadband access is unclear. We do know that Americans are spending a great deal of time communicating and using media devices—more time than they spend doing anything else during the day—and that they are often mobile when they are communicating.[74] People with broadband connections tend to spend more time online more often, interacting with multimedia, bringing offline activities online, and generally feeling positively about the Internet's "role in their lives."[75] They expect to find communities they want to join online.[76] They look to "amateur experts" online for advice and rely on it.

We do not know what the future will bring. If "fiber to the family" connections become available, with 1 Gbit/sec of data, that family will be able to "hold more than 8,000 simultaneous telephone conversations. . . listen to 3500 CD-quality music tracks at the same time . . . download the entire Encyclopedia Britannica [in] just over 30 seconds . . . [and] watch 200 DVD-quality or 66 HDTV channels."[77] At the moment, Americans are primarily doing what they used to do with their dial-up connections, but doing it more quickly. The transformative social and cultural effects of true high-speed access will be a fruitful area for future study.

III. CHOOSING A LENS

With the prospect of several years of discussion about revising U.S. communications law before us, we will need to have some understanding about what is meant by the words "the Internet" and how any legislative change will affect "the Internet" (once we understand it). From the Engineers' point of view, the logical architecture that is "the Internet" can

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74. Lee Rainie, Director, Pew Internet & Am. Life Project, How the Internet is Changing Consumer Behavior and Expectations (June 7, 2006), *available at* http://www.pewinternet.org/ppt/2006 - 6.7.06 ThinkTank Seton Hall.pdf.

75. *See* DEBORAH FALLOWS, PEW INTERNET & AM. LIFE PROJECT, THE INTERNET AND DAILY LIFE (2004), http://www.pewinternet.org/pdfs/PIP_Internet_and_Daily_Life.pdf.

76. Rainie, *supra* note 74, at 12.

77. Lightwave Online Article, *South Korea Loses Broadband Penetration crown, Gains FTTx Subscribers*, LIGHTWAVE, July 5, 2006, http://lw.pennnet.com/Articles/Article_Display.cfm?ARTICLE_ID=259277&p=1.

change at any time, and legislators should have little to say about that logical architecture. This perspective may assist the Telcos, who would like to change the current "open" architecture of consumers' broadband connections to the Telcos' pipes (the Telcos' "Internet") in order to be able to discriminate in favor of particular packets, and are anxious to have statutory language in place that will enable them to do this. But the Netheads want the original logical architecture to remain constant, unchanged, to facilitate the establishment of relationships that is "the Internet" to them.

What is a policymaker to do? If we choose the Engineers' lens, which so easily combines with that of the Telcos', then the Telcos' arguments about their need for certainty and ownership will unquestionably prevail, and "Internet" fast lanes will be created using changed logical architectures that favor the Telcos' content. This may be very good news for the Telcos, but not such good news for the future of online communications. If we choose the Netheads' lens, and mandate in statutory language that the standards of the Internet remain unchanged (thus facilitating the interesting relationships that the Netheads hold dear), it is unclear who will pay to maintain and upgrade the broadband networks that the Netheads say they want.

Each of these three viewpoints, standing by itself, is too narrow to be used meaningfully by policymakers. Neither the Engineer nor the Nethead perspective is of any help when lawmakers are worried about the economics of installing and upgrading physical pipes. The Telco perspective seems short-sighted, because it assumes that people prefer to passively receive communications rather than participate in creating their own – which does not necessarily fit with the findings of recent studies of broadband use.[78] The Nethead perspective, on the other hand, seems to lead inevitably to the creation of heavy-handed regulatory control over expensive privately-held assets. The Engineers would rather not deal with regulators at all, and point to their own standard-setting activities as being perfectly capable of encouraging the continued evolution of the Internet. All three of these groups have legitimate concerns and a good deal of logic on their side. None of these three definitions, however, adequately assists policymakers in planning for the future.

What is missing from the Engineer and Telco definitions is a sense of social or cultural context. They are unconcerned with how the Internet has changed the world (if it has) and how it may force social and cultural changes in the years ahead. Indeed, their definitions bear no relationship to human uses of the Internet, and are focused instead on how computers communicate (the Engineers) and how machines are con-

78. HORRIGAN, *supra* note 39.

nected (the Telcos). On the other hand, the Netheads are focused almost exclusively on cultural context and cannot adequately explain how the real costs involved in setting up the kinds of broadband access regimes established in South Korea and Japan will be covered.

This is a difficult set of issues that is likely to engage Congress and the courts for years to come. My own contribution to this debate is modest: I would like policymakers to understand what people from different professional backgrounds mean when they talk about "the Internet." It also seems to me that it would be wise to take a larger, social/cultural view of the future, rather than focusing only on either freezing the current logical architecture in its place or protecting the Telcos' investments at all costs. The Netheads' view needs to be taken into consideration more seriously than it has been in the past. After all, dreams of Netheads like Vannevar Bush, Norbert Wiener, and Doug Engelbart played a significant role in the creation of the Internet, and it cannot be denied that this network of networks (however defined) has had an enormous impact on global economic and cultural life.

My normative view, based on this brief exploration, is that some combination of these three lenses should be adopted by lawmakers. The Engineers are right to emphasize global interconnectivity of networks, and the Telcos' resistance to that understanding is troubling. On the other hand, the Telcos are right to emphasize the private nature of their pipes. They may need to be compensated for their investments if those pipes are transformed into a utility. Finally, the Netheads are right to be concerned about human collaboration online and the effects of private Telco control on the global flow of information. If we adopt only the Telco point of view, we run the risk of encouraging a not-very-interesting online future, in which only those application providers affiliated with the Telcos are able to reach subscribers and users have little ability to participate in content-creation themselves. If we adopt only the Nethead point of view, we may end up with highly-collaborative use of very slow, government-controlled network connections. If we adopt only the Engineer point of view, and fail to enact any legislation whatsoever, we run the risk of having Internet standard-setting activities around the world co-opted by the Telcos—who have the funding to attend and make great progress towards their goals.

A fruitful combination of all three perspectives on "the Internet" might involve emphasizing the importance of global interconnectivity (the Engineer priority) while recognizing both the potential for human development inherent in globally interactive communications (the Nethead priority) and the need for adequate investment in infrastructure (the Telco priority). Many policy outcomes are made possible by such a combined approach.

CONCLUSION

Beginning in the 1940s, Netheads adopted an understanding of man-computer symbiosis that continues to be attractive to Internet futurists. Later on, in the 1970s, Engineers addressed the architectural needs of the future in a concrete way, seeking to interconnect diverse networks. In recent years, the Telcos have increasingly taken the position that "the Internet" is no more than the sum of their privately-owned pipes and wires. These three different approaches to "the Internet" are now informing a complex and important public policy debate about "network neutrality." Policymakers need to recognize that each of these definitions has something to contribute to the debate. The wisest approach may be to craft legislative approaches to "the Internet" that take into account all three viewpoints. In particular, Nethead concern for the social and cultural potential of the Internet needs to be considered seriously.

REGULATION AND FREE MARKETS REDUX

ADDITIONAL INSIGHTS ON REGULATING THE TELECOMMUNICATIONS INDUSTRY IN THE NEW ECONOMY

JAMES CROWE*

I guess it has been about three years since last I addressed this forum.[1] For those of you who were here, you'll either consider me consistent or boring depending on your point of view concerning what I have to say. My views are largely the same as they were three years ago. I'll take a bit of your time to explain those views.

I want to start by reading from something Phil Weiser sent me. He emailed me some thoughts that I might consider in putting together my remarks. He said—I think it's in the agenda for the meeting—that "the transformation of telecommunications from an analog narrowband network optimized for voice to a digital broadband network optimized for data traffic has created a myriad of challenges for businesses, policymakers, and academics alike." I want to start by elaborating a bit on that statement. While I think the shift in the technical underpinnings of our industry is certainly important and certainly visible, something a lot more fundamental is going on. I think the implications of that fundamental shift are going to affect not just the communications industry but the information technology business, broadly defined. Further, I think that change is not simply a one-time event, but is continuous and accelerating. As Weiser points out, those changes are going to cause some real challenges, and already have for policymakers, regulators, and users. I have some thoughts on the implications of those changes.

To explain my point of view, I am going to talk about history. I know you're all familiar with George Santayana's remark that "those who cannot remember the past are condemned to repeat it."[2] Well, given

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* These comments are adapted from a speech given by James Crowe at the Symposium on the Digital Broadband Migration, delivered at the University of Colorado on February 20, 2006. Mr. Crowe currently serves as the CEO of Level 3 Communications. He previously founded and served as the Chairman and CEO of MFS until it merged with WorldCom. Mr. Crowe became the Chairman of WorldCom following the merger with MFS.

1. James Crowe, *Regulation and Free Markets: How to Regulate the Telecommunications Industry in the New Economy*, 2 J. ON TELECOMM. & HIGH TECH. L. 429 (2003).

2. GEORGE SANTAYANA, THE LIFE OF REASON: THE PHASES OF HUMAN PROGRESS

the setting here, maybe we can find a more relevant quote. I kind of like Sir Walter Scott's comment that, "a lawyer without history or literature is a mechanic, a mere working mason. If he possesses some knowledge of these he may venture to call himself an architect."[3] I have nothing but respect for masons, but I suspect that the law school students here would prefer to get paid like an architect, so pay attention to history. I also am reminded of something that Winston Churchill said. He said, "History will be kind to me, for I intend to write it." I have the same benefit. I get to write my own version of history. I'll try to be somewhat factual and not too self-serving.

Anyway, that is enough of other people's material. I guess I would call what I am about to say history, but with an economic flavor. I am at risk given the economists in the room. But it is certainly true that over the last several hundred years, mankind has undergone a number of economic revolutions. We are all familiar with how the agricultural revolution played out over centuries and concentrated people in cities because we no longer had to spend time producing food. Next came the industrial revolution, which substituted steam and other forms of power for muscle.

And we are right in the middle of the information revolution which is playing out over a much shorter period of time. That revolution is really about the three component parts of information technology—the things we do with information. We process it—computing, if you would; we store it in various forms, on magnetic media, on optical media, and on discs; and we move it—which is my business. I find it fascinating that until relatively recently, the price performance improvements of the first two—processing and storing information—have been nothing short of magical. In comparison, the price performance improvements of communications have been relatively static. Today, if my calculations are somewhere near correct, we buy about 70 million times as much computing per dollar spent as we did in 1965. And on the same kind of scales, communications between cities—long distance communications—price performance improvement has been pretty slow—a few percent a year. And within cities, in real terms and in real dollars, it's actually gone up in price.

Why is that? Why should we have enjoyed the benefits of incredible improvements in computing and storing information, and yet seen almost no improvements in moving information? That's a speculative question and you may have your own views. Mine is that it most certainly is not technology. Much of the technical underpinnings of infor-

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(1980), *available at* http://www.gutenberg.org/files/15000/15000-h/vol1.html.

3. SIR WALTER SCOTT, GUY MANNERING ch. 37 (1815).

mation technology have actually come from communications— many of them from institutions like Bell Labs. Our industry has employed some of the most advanced technologies—optical fiber, lasers—for quite a long time.

I think the fundamental difference lies in the way in which the technical standards operate, the way in which the technical standards are developed. You are all familiar with those technical standards. We call them "protocols," but in essence they're no different from the technical standards in any networking industry.

Think about the rail industry. There are technical standards for the gauge of the rails, the spacing, the size of the wheels, the cars, the radiuses.[4] They're all designed so that a rail car that starts in L.A. will show up in New York and can move across various owners' tracks. We agree on standards so that we have end-to-end connectivity. The same sort of standards process works in communications networks, and the goal is the same: seamless, end-to-end connectivity.

In computing and storage, the relevant standards or protocols are set in the marketplace. That kind of market-based standards development is messy and risky, but very fast. An example of that kind of market-based development that I know we're all familiar with would be VHS versus Beta video tapes.[5] Some in the room are probably too young to remember that, but you can probably go to a museum somewhere and see a Beta machine. Or you could go to my house. I was a smart young engineer and I thought, "Well, Beta has higher head speeds, it's a better technical standard, so I'll buy a Beta machine." And now it's good for a tax write-off if I give it away because VHS won in the marketplace. You want a current example of the same kind of battle? Blu-ray versus HD DVD.[6] It's going on as we speak. Who knows what will win, but the market will decide.

Contrast that with the way that, until recently, standards have been set in our industry. In our industry, folks like those in the room—technologists, people like me—would get together, and still do, under the auspices of the International Telecommunications Union.[7] We would argue, sometimes *ad nauseam*, about what customers ought to want. After many years of debate, we would publish the standards, and then hard-

4. American National Standards Institute, Through History with Standards, http://www.ansi.org/consumer_affairs/history_standards.aspx?menuid=5 (last visited Jan. 23, 2007).

5. *See generally* Michael I. Krauss, *Regulation v. Markets in the Development of Standards*, 3 S. CAL. INTERDISC. L.J. 781 (1994) (discussing the VHS vs. Betamax battle).

6. *See* Dan Costa, *Blu-ray vs. HD DVD: What You Need to Know*, PC MAG., June 28, 2006, *available at* http://www.pcmag.com/article2/0,1895,1982533,00.asp.

7. *See* International Telecommunications Union, http://www.itu.int/home/index.html (last visited Jan. 23, 2007).

ware and software manufacturers would produce the product. That process has been defended in the name of interoperability. But when compared with market-based processes, it is glacially slow.

However, that is precisely what goes on even today in much of the local loop and in wireless; think of 3G, for instance. It was debated for 10 or 15 years and only now, finally, after much debate, the standards are being implemented. That same kind of central planning is applied to pricing, to capital allocation. In effect, we viewed communications—wrongly, in my view—as a slow-moving utility industry.

The alternative is certainly messy, it is confusing, and it is sometimes hard on consumers who make the wrong choice in technical standard, like my selection of a Beta machine. Think of those who picked Token Ring networking, a standard that IBM pushed, and who watched Ethernet become the choice. If you picked Token Ring, you made the wrong selection of networking standards. However, over any reasonable period of time, market-based processes, when they can work, outperform central planning. It is the central planning process in communications, in my view, that has distorted investment on a massive scale. We process and store information today with incredible new technologies, but we still move information largely the way we did many years ago.

To prove my point, let me pose a question. We have quite a number of industry observers here in the room. What do you think is the cheapest way to move information today? Given this era of optical networks, and the Internet protocol, what's the cheapest way to move information? The answer is to put it on little silver discs, DVDs, and stuff it in a truck or a railroad car and move it across the country. It is an indictment of that central planning process in that it is still cheaper to use transportation networks to move information than modern information technology networks.

And, of course, the result is all around us if we care to look. We process and store information with assets that are located locally. At the home and at the office, we own computing and storage assets not because we choose to do so, but because it costs too much to centralize information, process it centrally, and move it to the point of use. At the office, most of the Chief Information Officers I know would be perfectly happy to outsource processing and storage. They're interested in owning information about their customers and about their transactions. And employing legions of information technology experts, computing experts, and software experts is not generally their core business. They own local area networks, they own servers, and they own computers because it simply historically has cost too much to centralize on a network and move the information to the point of use.

In the home, the same thing occurs. Unfortunately, it's true that most information measured in terms of bits in and out of the home is en-

tertainment. We may wish it was education, but it's entertainment. And it is still moved physically over transportation networks. It is still awkward, we still have to spend hours and hours updating software on our computers and updating our machines when all that ought to be done seamlessly over networks. A good example of consumers' desire for that simplicity and centralization is the combination of Apple's iPod and iTunes, where we do access information, in that case music, in a simple and straightforward way over networks.[8]

That differential rate of improvement, between processing and storing information on the one hand, and moving information on the other, led to one of the great arbitrage opportunities in economic history, and the dam finally started to break somewhere in the middle part of the 1990s. It broke with two complimentary developments. The first is the Internet protocol, the technical underpinnings of the Internet. It moved into the marketplace and, today, if you want to develop an alternative or an extension to IP or a new optical technology, if you can get capital and if you can get customer support, the standards tend to follow.

These developments have changed totally the approach that has been taken to the development of technology in our industry. Optical technology today may be the fastest improving technology in industrial history, doubling in price performance every nine to twelve months at the component level. IP technology has simply a special purpose—computing—and improves at about Moore's law rate, doubling in price performance about every 18 months.[9] That means a properly designed communications network ought to enjoy price performance improvement rates that make computing rates look comparatively slow.

The result is a tsunami that is swamping the old order. It means that communications, networking and connectivity, is where the action is going to be for the next few decades and, I might add, regulation of the same is where the action is going to be for policymakers. First of all, the effect is going to be on existing information distribution channels, which will certainly become disintermediated. It means that existing information and distribution channels will move quickly or slowly, in fits and starts, to less expensive optical IP networks. Today, information is distributed in cars, trucks, and airplanes, in books, newspapers, CDs, videotapes, DVDs, and more. Many of these items will move, quickly or slowly, to optical IP networks. It also means more and more outsourcing of processing and storage of information. That's a long-term trend you can bet on. I remember when most corporations owned their own long

8. *See* Apple - iPod + iTunes, http://www.apple.com/ (follow "iPod + iTunes" hyperlink) (last visited Jan. 23, 2007).

9. CNet.com, Moore's Law, http://www.cnet.com/Resources/Info/Glossary/Terms/mooreslaw.html (last visited Jan. 23, 2007).

distance companies, so-called "electronic tandem networks." Today, all of that is outsourced because it is cheaper. You can bet that the same is going to happen over time to processing and storing information.

Technologists tend to assume that the needs of society remain constant and that only the technologies change. As a result, we always miss the ways in which technologies are used. For example, when computers were first invented, you remember, they were considered fast adding machines and fast typewriters. Today, they are communications tools or terminals. Generally, writers and artists see the future with a lot more clarity than technologists. If you have not picked up a copy of Thomas Friedman's book, *The World is Flat*, it is worth a read. [10] He does a pretty good job, I think, of explaining some of the implications of the trends I am talking about here. Unfortunately, I am all you have here today, so I will give it my best shot.

I will provide another caveat. Technology development is smooth only in retrospect when viewed over decades. Up close, it's punctuated by rapid development and unexpected change. It can be disruptive; it can be slowed or sped up by regulation and by disruptions in the capital markets. However, maybe the shape of things to come is possible to anticipate, at least in outline.

I think of it this way: we have spent the last 100 years building communications networks that are largely about our ears. Today, we can extend our ears around the world and listen and talk at prices most would consider affordable.

The next 100 years will be about doing the same for visual communications. That's a difference of kind. We are visual animals. Most of the information we gather comes from our eyes. The time will come when it is possible to interact at a distance with the quality of a face-to-face interaction. Today it is not possible to pick up all of the visual cues, all of the unsaid things that go on between humans. That is the reason I am here today, rather than having this conversation from some other locale. But that too is coming.

In fact, when I was trying to raise money for Level 3, I thought it would be kind of interesting to answer the question, "How much communications capacity would be necessary to support interaction at a distance with the quality of physical presence? What would that take?"

You know, the bandwidth of the auditory nerve is about one and a half megabits per second. You can get that on a DSL connection, so you can move information with the quality that approaches what your auditory nerves can handle on today's networks.

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10. THOMAS FREIDMAN, THE WORLD IS FLAT: A BRIEF HISTORY OF THE TWENTY-FIRST CENTURY (2005).

Well, what does it take to match the optic nerve? The answer is that no one knows. Something goes on in the brain that we do not understand. There is something in terms of processing and interpolation that scientists have not yet characterized. So I came to the problem from a different angle. I said, "Alright, what would it take to present information to people in such a way that was virtually indistinguishable from reality?" That question is a little easier to answer.

It turns out that if you had half a sphere in front of your eyes, and you painted a picture with enough quality so that it was approaching reality, it would take about 15 terabits per second. You will just have to trust me that our engineers have done the math on that somewhere near the correct answer. It is about 15 terabits a second with high definition frame rates and color depth that approaches reality. In fact, you could actually have a higher bandwidth, but then again you could have compression, so we will just say that 15 terabits is somewhere near the correct number.

What is that? What does that mean to anyone? Well, when we built our network, we decided that we wanted it to be future-proof. So rather than put a single conduit in the ground—a conduit is a piece of plastic, maybe an inch and a half in diameter, through which you place fiber optic cable. Fiber optic cable is about the thickness of your thumb. With today's technology, we actually blow the fiber optic cable through the conduit. Well, fiber is a technology, and we thought that fiber might change over time as well. We do not want to dig up the coast in Santa Barbara or the streets of New York more than once, so we put twelve conduits into the ground. That way, instead of needing $5 or $6 billion to build a national network, we will spend a few hundred million to blow the next generation of fiber through this conduit. We thought that was a pretty good idea. We put 144 fibers in the first of those twelve conduits. We actually would use four to eight. The others were for sale, and we made several billion dollars selling them to other companies. As a side note, most went broke. We got the cash up front and then got the fiber back—it turned out it was a pretty good deal for Level 3.

But, let us just say, instead of putting 144 fibers in one conduit, we bought the most fiber count that was commercially available. That's 432 fibers in a single cable. Let's say instead of filling one conduit, we filled all twelve. Again, if my math is correct, that's 5,184 fibers. That's ten times the total number of fibers in the entire industry. On each of those fibers today, we flash a laser on and off ten billion times a second. That is ten gigabits and that is the way we encode information. And, we have 32 different lasers, which use—think of it as a prism—to combine and run data over one fiber. So we use a rainbow of different colors, and each color flashes on and off ten billion times a second. Let's say we do that on all 5,184 fibers. That would be many, many orders of magnitude

more capacity than the entire industry has available today. We could support many, perhaps 30, telepresence sessions. We would have to charge about a half billion dollars a month for each session, and so if there is anyone in the room who would like to buy one, I have my order book in my back pocket.

If we were able to drop the price of communicating by 60% a year—the cost and price—at a rate similar to what we have seen in computing, each and every year, it would take 25 years before telepresence would become affordable. I consider that job security. This is an exciting development. That is why I said earlier, I think communications is where the action is going to be for a long, long time. It certainly means that the world is going to be a smaller place. It already is. Communities of interest are becoming more and more important; geography, less and less important. It certainly means enormous improvements in productivity of the kind the economists are just now starting to point to here in the US, fueled by enormous improvements in information technology. And I believe that the benefits of that kind of market-based process, while at times messy and unpredictable, must be recognized by policymakers.

I said I had a few opinions about the right approach to regulation in this new kind of environment. I am going to start with some observations about the industry. First, I think it is clear that our industry, if it ever was, is today not a utility industry with long asset lives, slow product development, and it is most certainly not a natural monopoly, whatever that means. It is the vital third leg of the information technology tripod, and it is a leg whose development has been stunted and delayed because of central planning, embraced and encouraged by entrenched monopolists, and sometimes supported by wrongheaded regulation.

Second, I think it is clear that innovation comes from competition. It is rarely the companies who are dominant in one economic era that break new ground and have developed the kind of exciting new technologies that we enjoy today. Internet protocol did not come from the traditional telephone industry. Optical technology did not come from the traditional telephone industry. Both came from startups and from innovators. I also think it is true that the faster the pace of change, the more we need the entrepreneur backed by risk capital. The faster the pace of change, the more we need to resist those who defend de facto monopolies on whatever grounds, and the more we need to encourage and nurture competition.

But competition and regulation are not mutually exclusive. The answer, as some might say, is not to simply and immediately eliminate all regulation and let the free market work. Competition is not the terminal forest of economic activity. That is, it is not the economic organization that inevitably appears if well enough is left alone. In fact, I think the lessons of history are clear. Market leaders often end up with a monop-

oly, especially in technology industries where a six or twelve month head start can mean an overwhelming advantage. Networking industries like the rail industry and the airline industry are especially susceptible to monopolization because incumbents can simply refuse to interconnect with new entrants. Communications is especially difficult since it is a networking industry and it is an industry moving inexorably from a utility financial model to a technology model wherein asset lives are shorter, investment is going to be higher, and where first to market can mean an effective monopoly. And it is an industry with over 100 years of rather intense regulation, most of it of a single monopoly whose divested parts, even today, maintain bottleneck control of certain facilities.

So what do you do, as a regulator, if too much regulation either leads to irrelevance, as technology moves too quickly to get your arms around it, or to economic distortions of the kind I just described, and too little regulation leads to damaging monopolies? I said I had an opinion. Well I am going to deliver it to you in the form of some guidelines, which is the best I can do. Guidelines mean I reserve the right to change them in three years when Weiser invites me back again, if he does.

First and foremost, regulation is to fast moving technology industries as garlic is to cooking: use it sparingly. Do not interfere unnecessarily with the operations of the free market or the introduction of innovative technologies. The primary goal should be as little regulation and as much free market as is reasonably possible.

I think a new model of regulation is needed, one formed around the notion that the universe of entities in communication can be divided into two groups: users and service providers. The difference between the two is one of privilege and responsibilities and the degree of regulatory oversight. Users are those who are not service providers, by simple definition. I will define service providers in a minute, but first I want to talk a bit about universal service and its funding, a topic of some current interest in DC and elsewhere.

For some time, regulators and policy makers have concluded that all residential users—I am talking about end users—ought to have access to certain basic services.[11] In industry jargon, this is called universal service. Today it's defined as affordable access to local voice telephone calling.[12] Notice that I said local voice calling, not long distance. At the time the policy was developed, society was much more oriented around local community, and long distance was considered something of a luxury. The result is a system that overprices urban local calling and all long distance calls in order to subsidize suburban and rural local calling.

11. *See* JONATHAN E. NUECHTERLEIN & PHILIP J. WEISER, DIGITAL CROSSROADS 333-357 (2004).

12. *Id.*

That system is maintained today by the political muscle of less densely populated states that benefit from the subsidies.[13]

We have the best communications network in the world. It is changing, perhaps somewhat slowly, but that seems appropriate, given the enormity of the industry. So is there actually a problem? We do have a great system, and like students and businesses, thank goodness, governments and regulators are graded on a curve, not on an absolute scale. On that basis, we're not doing too badly. But we can and we should do better. Today, "urban" is no longer synonymous with "rich." Needy residents of our inner cities overpay for local calling because of an inappropriate system.[14] I have an acquaintance who is quite wealthy, who owns a great fishing camp in Wyoming. Qwest is forced to provide heavily subsidized local calling to him because of a system that is no longer appropriate. And I question whether local voice phone calling is the correct definition of universal service today. I think we badly need a clearheaded debate about what services Americans ought to have access to. For my part, I certainly believe it goes beyond local voice calling. I'm deeply concerned about the growing gap between those who have access to the digital world and those who are left behind. Whatever the outcome of the debate over universal service, it should be funded in a fair, open, and competitively neutral way by service providers, as opposed to the users I mentioned earlier.

Earlier, I said that a user is simply someone who is not a service provider. So what is a service provider? I think two interrelated concepts ought to define service providers. First, except for monopolies, service provider status ought to be elective. If you do elect to be a service provider, however, you have to accept the universal service obligations, and you get the benefits of interconnection, which is essential if you want to be a competitive provider in today's world. Those who decide to be service providers would receive the benefits of interconnection with other service providers on a fair nondiscriminatory basis. In return for the benefits of interconnection, without which you cannot provide communications services as a practical matter, service providers would be required to contribute to funding universal service—whatever the definition might be. And those who elect for service provider status should have access to public and private rights-of-way on a fair and nondiscriminatory basis so that they can build their networks.

Over time, the FCC and state regulators should move to allow oversight by industry self-regulation. The SEC's oversight of the financial industry, using self-regulatory bodies, is an example of such an ap-

13. *Id.* at 337.
14. *Id.* at 334.

proach. Since our industry has no particular history of self-regulation, that step should be carefully taken and cautiously managed, but over time it is certainly a better model for a fast-moving industry.

No distinction should be made among service providers by the type of service or technology employed. It is increasingly obvious that to do so only creates distortions. Communications by circuit, by packet, by radio wave, or by wire, should be treated equally. Limited regulation is required, I believe, to prevent firms from abusing dominant positions or exploiting monopoly control of central bottlenecks. Firms controlling essential facilities should be required to provide access on reasonable, transparent, nondiscriminatory terms. Essential facilities should not be owned or controlled by firms that abuse such bottlenecks. When the record is clear that a firm is abusing a bottleneck, I think the only answer is divestiture, period.

I would like to close by eating my own cooking and attempting to apply the guidelines I just provided to a topic of some current interest. That topic is net neutrality, a term I am sure most, if not all of you, have heard. There is an op-ed piece in today's *New York Times* about the topic.[15] We had our brush with a limited form of net neutrality when we attempted to de-peer a company called Cogent about six months ago. Perhaps you read about it and perhaps not, all I can tell you is that if you mess around with net neutrality you are going to get in trouble. We folded like wet cardboard and turned the connection up twelve seconds after I started getting calls from governors and congressmen who could not access the Internet.[16] So I at least have some experience with what happens when you try to filter information in one form or another.

For those of you who do not look at this on a daily basis, the concept of net neutrality is at the heart of a battle raging between the cable companies and the Bell companies on the one hand and the Internet content providers like Google, Microsoft, and to a certain extent Yahoo, maybe a Vonage, and what I'll call the internet community—the academics and the techies who helped build the Internet—on the other. The argument, which now involves hearings before Congress, asks the following question: what rights, if any, do the cable companies and the Bells companies have to use their control of residential Internet access to discriminate against certain content and to favor other kinds of content?

The Bells and cable companies say that they are building newer, higher-speed access systems for residential users, and that they plan to give preferential access to this better system to those who pay more, and

15. *Tollbooths on the Internet Highway*, N.Y. TIMES, Feb. 20, 2006, at A14.

16. Press Release, Level 3, Level 3 and Cogent Reach Agreement on Equitable Peering Terms (Oct. 28, 2005), *available at* http://www.level3.com/newsroom/pressreleases/2005/20051028.html.

perhaps also to their own content. They and their supporters argue that this will speed development of new services, that regulation will only deter investment, that it is their right as owners of the facility to do so, and that content providers should be willing to pay extra for better kinds of access.[17]

Those who oppose what they term, pejoratively, "discrimination," argue that the cables and Bells are leveraging an effective duopoly, that they will inevitably favor their own content and crowd out alternative content, that the Internet has succeeded because of its open, end-to-end connectivity, and that forcing content providers to pay extra for preferential access will slow the kind of innovation that has clearly benefited consumers and our economy today.[18] The only answer, they contend, is immediate and preemptive regulation which mandates equal treatment of all content.

Before we discuss who is right and wrong, I should clarify a few things. The problem, if indeed there is one, is not with Internet infrastructure broadly. I am going to take a moment to define some terms in a bit of an oversimplified way, but directionally it is correct. Consumers are connected to content over the Internet by three fairly distinct segments. First, there is the local connection, generally a fairly big connection from the content provider to the backbone.[19] Those are generally fiber-optic connections, quite large in size.[20] Then there is the Internet backbone itself, which has very large optical IP connections.[21] Then there is the piece that connects the end user to the backbone: local internet access.[22]

The first two sections of the Internet, the piece from the content provider to the backbone and the backbone itself, are hotly competitive and you have lots of choices of providers. The segment that poses the real challenge is the piece connecting our homes to the Internet.

I think the content providers and the internet community are essentially correct when they say the cable companies and telcos have a duopoly. While some point to wireless access and broadband over power line as alternatives, they are not practical alternatives for most Americans today.

So, should we be concerned about that duopoly? You bet. The Bells have a long, colorful and well-documented history of abusing bottleneck facilities.[23] The Bells, as we know them today, are a direct result

17. *See generally*, NUECHTERLEIN & WEISER, *supra* note 15, at 168-174.
18. *Id.*
19. *Id.* at 131-147.
20. *Id.*
21. *Id.*
22. *Id.*
23. *See* JEFFERY E. COHEN, THE POLITICS OF TELECOMMUNICATIONS REGULATION: THE

of the breakup of the old AT&T, caused by anticompetitive behavior. And the cable companies, while possessing a shorter and certainly less colorful legal history, are not the result of a competitive market, but are creatures of what were once exclusive government franchises. So governments and policymakers should be concerned.

However, here is where I refer back to my guidelines. We should make sure that the regulation is no worse than the problem that we are concerned about and that the market itself will not provide a better solution before we try to regulate. So far, the abuses that the content providers and the Internet community are worried about are simply theoretical. I point out that both sides in this conflict are well-armed. Indeed, it is hard to feel too sorry for Google, Microsoft, or Yahoo. They and the other content providers have a great deal of money and can hire people in this room, lawyers by the legion, and complain very loudly if their content is interfered with. Perhaps more importantly, consumers now have a history of using that content, greatly value that content, and, I believe, would make a great deal of noise if access to that content is impaired.

It does well to remember that this debate, while concerned with an issue that is clearly important, is not of the religious significance that some might have you believe, given the doomsday predictions of both sides. It is a debate about a duopoly's potential behavior and about anticompetitive behavior. As Microsoft has discovered, the antitrust laws can have teeth. And if the antitrust laws move too slowly or are too cumbersome, I am sure that many in the room will be happy to write up a petition, and file it with the FCC. So my recommendation would be to leave well enough alone until there is a reason to act. Given the market power of both sides in this face off, I think you will get plenty of notice before any real abuse takes place.

I do want to add, on a broader note, that our country does need alternatives to the duopoly. We should encourage every form of new Internet access. Earlier, I heard a panel comment about radio spectrum. It absolutely is essential that more radio spectrum be made available to entrepreneurs to find alternatives to the duopoly. We ought to encourage every flavor and variant of WiFi and WiMax. It is sad and we all ought to feel terrible about the fact that the U.S., country that invented the Internet, is now 12th in the world in providing high speed Internet access to its citizens.[24] That is an unfortunate fact that is going to affect our long-term competitiveness if we do not correct it.

Now I realize that much of what I said is going to take changes to a century-old construct, a century-old regulatory regime. I also know that

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STATES AND THE DIVESTITURE OF AT&T (1992).

24. ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, OECD BROADBAND STATISTICS TO JUNE 2006 (2006), http://www.oecd.org/sti/ict/broadband.

some issues, like tinkering with universal service, are a political third rail. However, the stakes are high. Over the long term, our national economic welfare and our security depend on getting it right. But I look at the progress we have made over the past, and at times it has been halting and convoluted, but it has been real progress, and it gives me optimism about the future. Thank you for the opportunity to speak, and see you in three or four years.

SURVEILLANCE'S SLIPPERY SLOPE: USING ENCRYPTION TO RECAPTURE PRIVACY RIGHTS

DANIEL J. SHERWINTER*

INTRODUCTION

> "Is freedom inversely related to the efficiency of the available means of surveillance? If so, we have much to fear."[1]

The digital revolution happened very quickly. Only 20 years ago, fewer than 10 percent of American households had computers.[2] However, by as early as 1993, the number of American households with computers had already risen to almost 25%.[3] At the same time, the Internet was quickly growing in popularity. Tim Berners-Lee debuted the World Wide Web on August 6, 1991, and within five years, most publicly traded companies had websites.[4] This was the dawn of a new information age.

Now, it seems that Internet access points are everywhere. In addition to having access to the Internet at home and at the office, it is becoming increasingly rare to find a coffee shop, university, or library which does not provide Internet access to its patrons. This global infor-

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1. JAMES BOYLE, SHAMANS, SOFTWARE, AND SPLEENS: LAW AND THE CONSTRUCTION OF THE INFORMATION SOCIETY 4 (1996).

2. U.S. Census Bureau, Current Population Survey 1984 (In 1984, 8.2% of American households had at least one computer.).

3. U.S. Census Bureau, Current Population Survey 1993 (In 1993, 22.6% of American households had at least one computer.).

4. *See* Wikipedia, History of the World Wide Web, http://en.wikipedia.org/wiki/History_of_the_World_Wide_Web (last visited Feb. 4, 2007).

mation network lets people shop for goods and services, trade commodities on world markets, find information on myriad subjects, and stay in communication.

Further, this same information provides tremendous new opportunities for law enforcement. Surveillance through the interception of communications is an important law enforcement tool. Tapping[5] a criminal's phone conversation may reveal details of a pending heist, admissions of guilt, associations with other criminals, and other potentially incriminating evidence. But the Internet can provide the same information, plus much more, including a criminal's passwords, search patterns, and spending patterns.[6] Law enforcement can use these new capabilities to improve the security[7] of the nation.

Historically, surveillance laws have attempted a careful balance between the security needs of the nation against the privacy rights of its citizens. Recently, however, despite an erosion of privacy rights, the trend in surveillance has favored security over privacy. This trend has included an expansion of CALEA[8] to cover certain broadband communications, and an application of the USA PATRIOT Act[9] to justify the domestic surveillance of Americans. The question, then, is what the public can do to preserve their right to privacy in the face of this erosive trend.

One promising solution is the ubiquitous adoption of strong encryption. Currently, most Internet users fail to adequately encrypt their online communications. Using strong encryption, however, can render online communication virtually undecipherable to unauthorized eavesdroppers. Therefore, even though the Internet gives law enforcement agencies added surveillance power, individuals can limit that power through encryption. In that way, the ubiquitous usage of strong encryption can help restore the balance between privacy and security.

This comment begins in Part I with an overview of the right to privacy and its importance to American society. Part II presents the development of the framework of Federal surveillance laws, ending with the

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5. In this paper, "tapping" or "wire tapping" refers to eavesdropping on a phone call through some electronic means.

6. Some may argue at this point that there is so much information on the Internet that it is increasingly difficult to separate out the useful information. Digital information, however, better lends itself to filtering, sorting, searching, comparing, and other invaluable data processing techniques.

7. Throughout this paper, I have used the term "security" to refer to public, or national security (not computer security, or physical security against personal crimes).

8. Communications Assistance for Law Enforcement Act (CALEA) of 1994, Pub. L. No. 103-414, 108 Stat. 4279 (1994) (codified as amended in scattered sections of 18 U.S.C. and 47 U.S.C.).

9. Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act (USA PATRIOT Act) of 2001, Pub. L. No. 107-56, 115 Stat. 272 (Oct. 26, 2001) [hereinafter Patriot Act].

recent trend away from the preservation of privacy rights. Section III provides a background to encryption technology and its importance in preserving communication privacy. Section IV discusses the government's failure with and retreat from encryption regulation, which has set the stage for worldwide e-commerce and the free flow of information. The background from Sections II through IV frames a discussion in Section V on the ability of encryption to defeat law enforcement's surveillance regime under the expanded CALEA Order. Given the inefficacy of Internet surveillance in the face of encryption, Section VI will examine other options and considerations for law enforcement. Finally, Section VII will conclude the comment.

I. THE RIGHT TO PRIVACY

The right to privacy is nowhere in the text of the Constitution. However, the history of Constitutional jurisprudence has demonstrated the accepted belief that the right to privacy inheres within the Constitution's language, and that privacy must be protected both procedurally and substantively. In 1890, future Justices Warren and Brandeis defined four types of privacy torts that are based on a substantive right to privacy.[10] The Supreme Court upheld the substantive right to privacy in the seminal case, *Griswold v. Connecticut*.[11] In that case, Justice Douglas claimed that the Bill of Rights creates a penumbra of inherent rights, including the right to privacy. Consenting opinions in *Griswold* also found the right to privacy inherent in the Ninth Amendment's un-enumerated rights[12] and the Fourteenth Amendment's notion of substantive due process.[13] In addition to the substantive right, there is also a procedural privacy right inherent in the Fourth Amendment's prohibition against illegal search and seizure.

While these privacy rights inhere in the Constitution,[14] they are not considered fundamental rights to American society. Even though privacy preservation is extremely important, "privacy is not an absolute good because it imposes real costs on society."[15] Thus, lawmakers must always weigh privacy against competing interests, like national security. This is a particularly difficult balance–some believe that privacy is mean-

10. Louis D. Brandeis & Samuel D. Warren, *The Right to Privacy*, 4 HARV. L. REV. 193 (1890). *Cf.* Jeffrey Cole, *My Afternoon with Alex: An Interview with Judge Kozinski*, 30 LITIGATION 12 (Summer 2004) (Justice Kozinsky of the Ninth Circuit said about the Warren and Brandeis article, "Seldom had I seen so much made out of so very little with quite so much zest. . . . [It] was the legal equivalent of a soufflé—all air, no substance, tastes great.").

11. Griswold v. Connecticut, 381 U.S. 479 (1965).

12. *Id.* at 487 (Goldberg, J., concurring).

13. *Id.* at 500 (Harlan, J. and White, J., concurring).

14. *See id.;* Brandeis & Warren, *supra* note 10, at 193.

15. U.S. West v. FCC, 182 F.3d 1224, 1235 (10th Cir. 1999).

ingless in an insecure country, while others believe that a country without privacy is not worth securing. That balance between privacy and security frames much of the debate surrounding both surveillance and encryption.

Surveillance can be very important to national security, but it can also threaten individual privacy. After all, the purpose of surveillance is to reveal that which an individual intends to conceal. If the FBI uses sophisticated thermal imaging to watch a person in her home without a warrant, they arguably infringe her substantive right to be left alone in her home, while simultaneously performing a procedurally illegal search.[16] The FBI may contend, however, that without surveillance, more criminal activity would threaten the safety of Americans. Similarly, encryption provides a means for substantive privacy through anonymous (or pseudonymous) communication, and a means for procedural privacy through secure data transmission. As before, the FBI may argue that, by using encryption, more criminals can plan illegal behavior without getting caught, thereby harming society.

In the end, absolute security requires totalitarianism, but total privacy creates anarchy. Therefore, regulations on surveillance and encryption must balance these competing privacy and security rights. When regulators fail, people must be willing to take control of their rights to restore the balance. The current failure to maintain that balance is the focus of Parts II and III.

II. FEDERAL ELECTRONIC SURVEILLANCE REGULATIONS

> Whether we are surveilled by our government, by criminals, or by our neighbors, it is fair to say that never has our ability to shield our affairs from prying eyes been at such a low ebb. The availability and use of secure encryption may offer an opportunity to reclaim some portion of the privacy we have lost. Government efforts to control encryption thus may well implicate . . . the constitutional rights of each of us as potential recipients of encryption's bounty.[17]

The Internet has forever changed the way we communicate. In the past, people communicated over long distances through the mail. If they desired to deter people from reading their letters in transit, they sealed the letters in an envelope. The advent and spread of electronic commu-

16. The substantive privacy right in question here may be "intrusion upon seclusion," one of four torts formulated by Brandeis and Warren in *The Right to Privacy*, *supra* note 10. *See also*, Kyllo v. United States, 533 U.S. 27 (2001) (involving thermal imaging surveillance).

17. Lee Tien, *Doors, Envelopes, and Encryption: The Uncertain Role of Precautions in Fourth Amendment Law*, 54 DEPAUL L. REV. 873, 903 (2005) (quoting Bernstein v. U.S. Dep't of Justice, 176 F.3d 1132, 1146, *withdrawn by* 192 F.3d 1308, 1309 (9th Cir. 1999)).

nications, however, came with no easy equivalent, and communications traveled unprotected over publicly accessible wires and airwaves. The rise of the Internet and more powerful computing created a massive increase in the amount of information traversing those media. The newly-enabled content now consisted of both conversations and data (i.e., packets of 1's and 0's containing the details of everything from financial transactions to strategic plans to trade secrets). As more information traveled the globe, wiretapping became critical to law enforcement.[18] However, this new tool also brought new responsibility. Now, with secret remote surveillance, the government could avoid the "knock and announce" types of notice requirements critical to Fourth Amendment protections from illegal searches and seizures.[19]

A. Historic Federal Surveillance Regulation Balanced Privacy and Security

> "Our government is the potent, the omnipresent teacher. For good or for ill, it teaches the whole people by its example. Crime is contagious. If the government becomes a law-breaker, it breeds contempt for law; it invites every man to become a law unto himself; it invites anarchy."[20]

The drafters of the Fourth Amendment saw illegal searches as involving physical trespass onto property. When *Olmstead*, the first major wiretapping case, reached the Supreme Court in 1928,[21] the majority seemed to rely on that conception of "searching." The majority held that communications traveling via the phone lines (or presumably the airwaves) were essentially public. As such, the Court held that eavesdropping was not a violation of Constitutional liberties. Government abuses of this newfound power began to see their way to the Supreme Court in the late 1960's,[22] prompting the Supreme Court to reverse *Olmstead*. In 1968, Congress attempted to balance privacy rights against the needs of law enforcement by passing a set of Federal wiretap provisions. Congress adopted this new act as Title III of the Omnibus Crime Control and Safe Streets Act of 1968.[23] Under these provisions, law enforcement

18. *See, e.g.*, Berger v. New York, 388 U.S. 41, 60-62 (1967) (stating that "electronic eavesdropping is a most important technique of law enforcement").

19. Richards v. Wisconsin, 520 U.S. 385, 395 (1997).

20. Olmstead v. United States, 277 U.S. 438, 485 (1928) (Brandeis, J., dissenting).

21. *Id.*

22. In 1967, the Supreme Court heard two seminal cases in this area: Berger v. New York, 388 U.S. 41 (1967), and Katz v. United States, 389 U.S. 347 (1967). These cases effectively overturned *Olmstead.*

23. 18 U.S.C. § 2510 (2005). This section is also known as "Title III" or the "Federal

could lawfully intercept any wire or oral communication, but only within strict guidelines. For example, a court order permitting the surveillance would only be issued with probable cause,[24] as a last resort when other surveillance was ineffective,[25] and only to combat one of 26 specific crimes.[26] Further, even with a court order, wiretapping had to be accomplished with minimal invasions of benign conversations,[27] and notice had to be given to the subject of the surveillance upon completion of surveillance.[28] The Federal wiretap statute was seemingly a successful compromise between privacy and public safety.

Unfortunately, the compromise did not last long. Since that time, and with each subsequent piece of legislation, the trend has been towards an erosion of privacy rights. The dire results of this trend have become increasingly apparent recently with the use of the Patriot Act to spy on Americans and the expansion of CALEA to allow surveillance of broadband communications.

B. From FISA to the Patriot Act – A Procedural Erosion of Privacy Rights

> "The PATRIOT Act addressed only one side of this [privacy-security] equation, making government access easier without counterbalancing privacy improvements. Now is the time for Congress to finish the job and address the privacy side of the equation."[29]

Just ten years after the passage of the Federal Wiretap Act, Congress passed the Foreign Intelligence Surveillance Act (FISA) of 1978. FISA attempted to make wiretapping easier in national security-related cases[30] by weakening both the probable cause[31] and notice[32] requirements for wiretapping agents of foreign powers. To preserve the privacy of Americans, however, Congress required that surveillance orders only

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Wiretap Act".

24. § 2518(3).

25. *Id.*

26. § 2516(2).

27. § 2518(5) (providing the minimization requirement).

28. § 2518(8)(d).

29. *Oversight Hearing on Implementation of The USA PATRIOT Act: Sections of The Act That Address Crime, Terrorism, and The Age of Technology: Hearing before the Subcomm. on Crime, Terrorism, and Homeland Security of the H. Comm. on the Judiciary*, 109th Cong. (2005) (statement of James X. Dempsey, Executive Director of the Center for Democracy & Technology) *available at* http://www.cdt.org/testimony/20050421dempsey.pdf.

30. 50 U.S.C. §§ 1801-11 (2005).

31. § 1805(a)(3)(A) (retaining a probable cause requirement but commission of a crime is no longer considered probable cause on its own).

32. § 1806(c) (removing the notice requirement when law enforcement decides not to use the information acquired through the surveillance in a criminal proceeding).

be given under FISA when "the purpose of the surveillance [was] to obtain foreign intelligence information."[33] This essentially restricted the use of FISA surveillance orders to foreign counterintelligence operations.

Still, the application of FISA and its predecessors began to reveal a trend away from the privacy protections seemingly intended by those earlier laws. One example of this is that while Title III had originally listed only 26 crimes in 1968 as valid reasons for obtaining a wiretap, Congress increased the list to 95 crimes by 1996.[34] Other examples were evident in the courts' granting increasing numbers of wiretap orders with longer durations,[35] holding that wiretaps may be permitted even when not only used "as a last resort,"[36] exhibiting an extremely lax approach to the "minimization requirement,"[37] and consistently rejecting post hoc challenges to surveillance authority.[38] The shift away from privacy-protective surveillance limitations continued steadily through the 1980's and 1990's.

On September 11, 2001, however, domestic terrorist attacks suddenly changed the American concept of war, and suddenly perched privacy on the precipice of a slippery slope. Overnight, domestic terrorism forced Americans to rethink personal privacy in light of heightened national security concerns. In this environment of public fear, President Bush and Congress passed the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act (USA PATRIOT Act, or "Patriot Act") of 2001.[39] Much of the Patriot Act extended FISA to aid in the domestic war on terror by removing some of its remaining privacy-protective hurdles to domestic surveillance.[40] For example, while FISA initially required identification of the target or place of a wiretap, § 206 of the Patriot Act amended FISA to

33. § 1804(a)(7)(B).

34. James X. Dempsey, *Communications Privacy in the Digital Age: Revitalizing the Federal Wiretap Laws to Enhance Privacy*, 8 ALB. L.J. SCI. & TECH. 65, 75 (1997).

35. Administrative Office of the United States Courts, *2002 Wiretap Report*, Table 5, http://www.uscourts.gov/wiretap02/table5-02.pdf. Since 1986, there have been almost no denials of requests for wiretap orders, and the number of wiretaps requested has consistently increased. In 2002, for example, there were 1,273 orders for which wiretaps were actually installed, costing a total of almost $70 million, and resulting in 493 convictions. *Id. See also* Dempsey, *supra* note 34, at 75 (the quantity of wiretaps was 564 in 1980 and 1,149 in 1996).

36. United States v. Garcia, 785 F.2d 214, 223 (8th Cir. 1986) (weakening the "necessity" requirement, but not completely removing it).

37. *See generally*, Dempsey, *supra* note 34, at 75-78.

38. *Id.*

39. *See* Patriot Act, 115 Stat. 272.

40. *E.g.*, Patriot Act § 218, 115 Stat. 272 (amending FISA to allow surveillance where "a significant purpose," rather than "the purpose" is to gather foreign intelligence. This allows surveillance in a much broader group of criminal cases which formerly fell under law with more stringent privacy protections, like the Wiretap Act).

only require that identification "if known."[41]

Though many feared the privacy implications of the Patriot Act, the threat to privacy stretched farther than most predicted. On December 16, 2005, the New York Times reported that, since September 11, President Bush, in the name of national security, had authorized the surveillance of possibly thousands of people within the United States without a court order.[42] Bush admitted to signing a secret executive order in 2002 which "authorized the National Security Agency to eavesdrop on Americans and others inside the United States to search for evidence of terrorist activity without the court-approved warrants ordinarily required for domestic spying. . . ."[43]

Though FISA's initial language limited its reach to agents of foreign powers, the Bush administration argued that its amended form allowed for warrant-free domestic surveillance as well. The administration put forth the following legal justification:[44] first, FISA requires a court order for all domestic surveillance, but allows the President to bypass that requirement when authorized by a different statute;[45] second, the Authorization for Use of Military Force Against Iraq, passed in 2002, allows the President to authorize force (even domestically) to combat terrorism;[46] third, "throughout history, signals intelligence [i.e. surveillance] has formed a critical part of waging war";[47] fourth, the Authorization for Use of Military Force is a different statute which allows the President to bypass the court order requirement of FISA; and finally, the President can, therefore, lawfully authorize domestic surveillance without a court order. Thus, according to the Bush administration, U.S. surveillance law now permits domestic surveillance without a court order and without notice.

Whether or not this legal analysis proves to be upheld, the logistical hurdles of surveillance laws have certainly lessened in the past few decades. These procedural changes have tilted the balance away from privacy protection in the name of national security. In addition, attempts to adapt surveillance laws to changes in technology have further eroded

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41. 50 U.S.C. § 1805(c)(1)(A) (2000).

42. James Risen & Eric Lichtblau, *Bush Lets U.S. Spy on Callers Without Courts*, N.Y. TIMES, Dec. 16, 2005, at A1, *available at* http://www.nytimes.com/2005/12/16/politics/16program.html.

43. *Id.*

44. David Johnston & Neil A. Lewis, *Defending Spy Program, Administration Cites Law*, N.Y. TIMES, Dec. 23, 2005, at A20, *available at* http://www.nytimes.com/2005/12/23/politics/23court.html.

45. *See* §§ 1801-11.

46. Authorization for Use of Military Force Against Iraq Resolution of 2002, Pub. L. No. 107-243, 107th Cong. (Oct. 16, 2002).

47. Johnston & Lewis, *supra* note 44 (quoting a letter justifying the President's actions to Congress, signed by William E. Moschella, assistant attorney general for Congressional affairs).

privacy rights.

C. From ECPA to the CALEA Order – A Technological Erosion of Privacy Rights

> "[The FCC has] plainly overreached their authority in requiring Internet providers to design systems that make surveillance of the public easier and we are confident that the courts will agree. . . .The FCC needs to call a timeout until it knows what it wants, and seriously reconsider whether it has the authority to demand it."[48]

In the 1980's, shortly after the Federal Wiretap Act passed, the communications arena began to change. Wireless communication was becoming prevalent and large amounts of non-voice data were being transmitted between computers. This created an opportunity for more surveillance, and a need for more privacy protection. In 1986, Congress expanded surveillance laws into those new realms with the Electronic Communications Privacy Act (ECPA).[49] Title I of the ECPA amends the Federal Wiretap Act to cover digitized communications, and Title II covers stored communications (like e-mail) and call-related information beyond the content of the communication.[50] Congress justified the ECPA on grounds that surveillance technology was expanding faster than privacy protection, and that encouragement of technological innovation must not cost the public its rights.[51]

In the early 1990's, in the midst of increasing electronic surveillance, some law enforcement agencies noticed changes that made surveillance less effective.[52] These changes were both logistical and technological: More competition in telecommunications meant more choices and the option to use multiple providers; and technologies like digital circuit switches, call forwarding, and speed dial sometimes obscured the

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48. Electronic Frontier Found., *FCC Urged to Suspend New Internet Wiretap Rules*, EFFECTOR, Nov. 25, 2005, http://www.eff.org/effector/18/41.php (quoting EFF Senior Staff Attorney Lee Tien).

49. Electronic Communications Privacy Act of 1986, Pub. L. No. 99-508, 100 Stat 1848. (codified in scattered sections of 18 U.S.C.).

50. 18 U.S.C. §§ 3121-27 (1996) (covering call information, including phone numbers, dates, and times of calls; as well as the use of devices which track phone numbers, like pen registers (which track outgoing calls) and trap and trace devices (which track incoming calls)).

51. Pub. L. No. 99-508, H.R. Rep. No. 99-647, at 17-19 (1986).

52. *Digital Telephony and Law Enforcement Access to Advanced Telecommunications Technologies and Services: Joint Hearings on H.R. 4922 and S. 2375: Hearing Before the Subcomm. on Tech. and the Law of the S. Comm. on the Judiciary and Before the Subcomm. on Civil and Constitutional Rights of the H. Comm. on the Judiciary*, 103rd Cong. 5-6 (1994) (testimony of Louis J. Freeh, Director, Central Intelligence Agency).

origin or destination of a call.[53] In 1994, Congress passed the Communications Assistance for Law Enforcement Act (CALEA), "to make clear a telecommunications carrier's duty to cooperate in the interception of communications for law enforcement purposes, and for other purposes."[54] In other words, CALEA required telecommunications carriers to engineer their facilities and services to allow easy access for law enforcement surveillance equipment.[55]

A number of organizations, including the Electronic Frontier Foundation (EFF), the Center for Democracy and Technology (CDT), the Electronic Privacy Information Center (EPIC), and the American Civil Liberties Union (ACLU), actively challenged CALEA for its potential negative repercussions to privacy.[56] Implementing CALEA required many decisions regarding specific obligations and technologies, and many organizations wrote comments and press releases to bolster the privacy-protective side of the debate. One specific limit to the privacy-erosive potential of CALEA was its limitation to traditional voice communications, as opposed to "information services" like Internet communications.[57]

In today's world, however, voice communications are no longer restricted to the Public Switched Telephone Network (PSTN). To be comprehensive, surveillance cannot remain restricted to traditional types of phone calls. Telephone-like conversations now occur through multiple channels, including Voice-Over-Internet-Protocol (VoIP), instant messaging (IM), e-mail, and text messaging. Thus, in August 2005, the Federal Communications Commission (FCC) adopted an Order extending the coverage of CALEA to "facilities-based broadband Internet access providers and providers of interconnected VoIP service."[58]

Issues with the Order have incited vehement protests from many organizations.[59] First, changing technology cannot automatically justify sacrificing individual privacy rights.[60] Second, The Order's 18-month

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53. *Id.* at 121.

54. *See* CALEA, 108 Stat. 4279.

55. 47 U.S.C. § 1002 (2000).

56. *See, e.g.*, USTA v. FCC, 227 F.3d 450, 452-53 (D.C. Cir. 2000). The various organizations list many press releases, statements, and other comments available on their respective websites.

57. *See* CALEA § 103(b)(2)(A).

58. Communications Assistance for Law Enforcement Act and Broadband Access and Services, *First Report & Order & Further Notice of Proposed Rulemaking*, 20 FCC Rcd. 14,989 (2005) [hereinafter Order].

59. *E.g.*, Comments of EPIC, EFF and ACLU, to the *Notice of Proposed Rulemaking & Dedclaratory Ruling* in Communications Assistance for Law Enforcement Act, CC Dkt. No. 97-213 (Dec. 14, 1998) (challenging the DOJ/FBI "punchlist" proposal), *available at* http://www.epic.org/privacy/wiretap/calea/comments_12_98.html.

60. Though many argue that CALEA has inherent limitations to potential negative privacy implications, those arguments are unconvincing. The first arguable limitation is that

compliance deadline will saddle many universities, libraries, airports, Internet service providers, and municipalities with huge compliance burdens.[61] Third, adding back doors to more networks adds potentially-vulnerable access points for hackers.[62] Finally, many have argued that the FCC does not even have jurisdiction to issue this Order, stating: "The debate over the scope of CALEA was fought in Congress during the debate and passage of the CALEA statute, and it was determine [sic] that CALEA would not extend to the Internet. Frankly, it is inappropriate for a regulatory body to reinterpret the clear intent of Congress."[63]

History suggests that the initial intention of the surveillance laws was to carefully limit the government's power to surveil the public in order to protect the public's right to privacy. Fears of national security threats, however, have justified an ever-waning restriction on the government's power to infringe those rights. The recent publicity of executive surveillance orders and the CALEA Order highlights the reality of surveillance law's slippery slope. We must challenge the laws which threaten the delicate balance between privacy and security before it is too late. In the digital world, strong encryption technology may be an effective privacy-protective option to help restore that balance.

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various pieces of surveillance legislation require government and law enforcement to obtain a court order before performing surveillance. However, news of the President's secretive authorization of domestic surveillance (*see supra* Part II.B) tends to belie these claims. Also, the trend of surveillance laws reveals the gradual disappearance of those logistical hurdles, showing that society cannot rely on them for privacy protection. Second, the Order does not expand CALEA to reach all types of broadband communication. For example, while the Order reaches managed VoIP services like Vonage, e-mail and peer-to-peer VoIP (like Free World Dialup) probably are not required to comply. However, there are two problems with relying on that statement: (1) It is still unclear exactly who must comply and in what way; and (2) just as the original CALEA language specifically excluded information services like Internet service from compliance, this Order may mark one of a series of expansions to CALEA's reach over time.

61. Sam Dillon & Stephen Labaton, *Colleges Oppose Call to Upgrade Online Systems*, N.Y. TIMES, Oct. 23, 2005, at A1 (estimating compliance costs of over $7 billion for universities alone).

62. *See, e.g.*, Electronic Frontier Foundation, Communications Assistance for Law Enforcement Act (CALEA), http://www.eff.org/Privacy/Surveillance/CALEA/ (last visited Feb. 4, 2007) ("While law enforcement's efforts to hijack the tech market are disturbing, EFF is also concerned that making the Internet CALEA-compliant might backfire: many of the technologies currently used to create wiretap-friendly computer networks make the people on those networks more pregnable to attackers who want to steal their data or personal information.").

63. Press Release, Center for Democracy and Technology, Public Interest, Business Groups Unite to Challenge FCC Wiretapping Rules (October 25, 2005) (quoting Jeff Pulver, chairman and CEO of Pulver.com), *available at* http://www.cdt.org/press/20051025calearelease.pdf.

III. OVERVIEW OF ENCRYPTION TECHNOLOGY[64]

> "[E]ncryption technologies are the most important technological breakthrough in the last one thousand years."[65]

Law enforcement continually demands the ability to conduct surveillance with the latest technologies. The obvious reason for these demands is that people are increasingly using the latest types of communications to plan everything from dinner parties to corporate takeovers to terrorist attacks. As people communicate greater quantities of more important information, the rewards for intercepting that information grow. Encryption is a critical step in keeping electronic information secure from surreptitious interception by governments, business competitors, criminals, and others.[66] This is of critical importance as governments, companies, individuals, and others are increasingly in possession of data requiring protection. Moreover, no one wants their trade secrets, employee information, customer information, or other private data compromised.

A. Brief History of Encryption

> "History is punctuated with codes. They have decided the outcomes of battles and led to the deaths of kings and queens."[67]

There are three main categories of encryption methods: Classical, rotary, and digital.[68] The earliest category, classical encryption, consisted of substitution and transposition algorithms. Complex numerological coding of letters was used as far back as the scribes of Susa and Babylon in the 8th century BCE.[69] Ancient codes and cryptograms were primarily used for mysticism and haruspicy.[70] More recently, Julius

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64. For a more comprehensive overview of encryption-related technology, policy, law, and history, *see* BRUCE SCHNEIER, APPLIED CRYPTOGRAPHY: PROTOCOLS, ALGORITHMS AND SOURCE CODE (1996); SIMON SINGH, THE CODE BOOK (1999).

65. LAWRENCE LESSIG, CODE: AND OTHER LAWS OF CYBERSPACE 35 (1999).

66. Aaron Tan, *Ellison: Encryption is Key to Data Protection*, CNET, Sept. 23, 2005, *available at* http://www.nytimes.com/cnet/CNET_2100-7355_3-5879101.html ("[N]o company would want to face the situation where storage tapes containing unencrypted customer credit card information are lost. And as . . . businesses switch from traditional phone networks to converged voice-data networks, security will become even more crucial. . . .").

67. SINGH, *supra* note 64.

68. Sam Siewert, *Big Iron Lessons, Part 6: The Right Coprocessor Can Help with Encryption*, Aug. 16, 2005, http://www-128.ibm.com/developerworks/power/library/pa-bigiron6/index.html.

69. GEORGES IFRAH, THE UNIVERSAL HISTORY OF NUMBERS 160-61 (2000).

70. *Id.*

Caesar is said to have sent military orders using a secret code, whereby each letter of the alphabet was substituted with a letter from a rearranged or shifted alphabet.[71] For example, if Caesar had used the English alphabet and shifted each letter three places, the word "CAT" would become "FDW." This type of encryption is simple to perform by hand, and almost as simple to crack.

The second category, rotary encryption, used mechanical devices to make what were essentially very complex "Caesar" ciphers. For example, in World War II, the Axis powers could preset rotors, buttons, and other mechanisms on a complex device called the Enigma machine. The machine would use those preset values to convert messages to unreadable code. Without having an Enigma machine and knowing the preset code, it was nearly impossible to crack the code. However, the Allied forces eventually got hold of Enigma machines and were able to break the cipher.[72] The result of this cryptographic success was the acknowledgment of the importance of cryptographic research as "vital to [national] security," which, in turn, lead to President Truman's formation of the National Security Agency.[73]

Modern cryptography developed an entire branch of mathematics that uses algorithms to transform data between its readable form (known as plaintext) and a coded, unreadable form (known as ciphertext). As codes get more complicated, so does the associated math. It is no surprise that the NSA is "said to be the largest employer of mathematicians in the United States and perhaps the world."[74] But even the greatest math minds are no match for the processing speed of a computer. With the advent of computers came the potential for solving complex mathematic problems very rapidly, and the third category of encryption—digital encryption.

B. Computers and Strong Encryption

> "The world isn't run by weapons anymore, or energy, or money. It's run by little 1's and 0's, little bits of data. It's all just electrons."[75]

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71. Adam C. Bonin, *Protecting Protection: First and Fifth Amendment Challenges to Cryptography Regulation*, 1996 U. CHI. LEGAL F. 495, 497 (1996).

72. HERVIE HAUFLER, CODEBREAKERS' VICTORY: HOW THE ALLIED CRYPTOGAPHERS WON WORLD WAR II (2003).

73. Sam Siewert, *Big Iron Lessons, Part 5: Introduction to Cryptography, from Egypt Through Enigma*, July 26, 2005, http://www-128.ibm.com/developerworks/power/library/pa-bigiron5/.

74. National Security Agency Central Security Service, Introduction to NSA/CSS, http://www.nsa.gov/about/index.cfm (last visited Feb. 4, 2007).

75. SNEAKERS (Universal Studios 1992).

Some computers today are able to make trillions of calculations per second.[76] Since encryption mostly involves sets of large mathematical operations, computers are an ideal tool for both encrypting and decrypting data. Suppose that a cryptographic algorithm adds binary "10" (i.e. "00000010"), the "key," to 8-bit ASCII representations of plaintext letters.[77] The result may be as follows:

Plaintext: 'C A T' ➔ 01000011 / 01000001 / 01010100

Add Binary "10": 01000101 / 01000011 / 01010110

Ciphertext Result:01000101 / 01000011 / 01010110 ➔ 'E C V'

Thus, the plaintext "CAT" is passed to the algorithm, and is converted to the unreadable ciphertext "ECV." Most modern encryption methods work in essentially this way – plaintext is converted to unreadable ciphertext via some algorithm which makes use of a key.

There are two typical factors for determining the effectiveness of a key: its secrecy, and its length. Key secrecy, here, refers to how well the key remains hidden. Historically, the key had to be handed off to the recipient in order to decipher the message, creating a weakness in the encryption. Say that A wants to send a message to B in a box. A locks the box and sends it to B. Somehow, A must also send the key, or B cannot open the box (and for the same reasons, A cannot securely send the key). However, what if A sends the locked box, and then B adds her own lock to the box and returns the box to A. Then, A unlocks only his lock, and re-sends it to B. B has now received the box only with her own lock, for which she has the key! In the 1970's, Whitfield Diffie and Martin Hellman devised public-key encryption, an ingenious version of this solution for encryption key exchange.[78] By using a private key and a public key together, the Diffie-Helman algorithm has eliminated the issue of key exchange.

The second traditional issue with encryption keys is their length. Generally, longer keys provide stronger encryption. In the above example, the key is only two bits long. It would take no time to guess the key by trying each of the four possible keys.[79] Thus, the strength of this type of encryption algorithm increases exponentially with the length of the

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76. Stephen Shankland, *IBM Set to Take Supercomputing Crown*, CNET, Nov. 5, 2004, http://news.com.com/2100-1010_3-5439523.html (announcing that IBM's new incarnation of Big Blue can perform 70.7 trillion calculations per second).

77. The ASCII (American Standard Code for Information Interchange) character set is a standard table of 128 correspondences between characters and 8-bit values. For example, the character 'C' corresponds to the bits '01000011', and the character '#' corresponds to the bits '00100011'. This example assumes that the plaintext data is encoded using the ASCII character set. For a full ASCII character set table, *see* http://ostermiller.org/calc/ascii.html.

78. LESSIG, *supra* note 65, at 36.

79. If a key is (n) bits long, the number of possibilities is 2^n. For example, here, n=2, so there are $2^2 = 4$ possibilities ('00', '01', '10', and '11').

key; so even though a 2-bit key only yields four possibilities, a 56-bit key yields 2^{56}, or roughly 72 quadrillion possible combinations. Assuming that a modern computer could try one billion possible keys every second, guessing the key could still require more than 2 billion years.[80] For this reason, encryption systems with keys of 56 bits or longer are referred to as strong encryption.

Though it may seem like strong encryption would provide sufficient security, the preceding example assumes finding the key by brute force guessing. Using advanced mathematical and other techniques, like large-number factoring and parallel processing, can significantly speed up this process. In fact, the former government standard encryption algorithm, called the Data Encryption Standard (or DES), used a 56-bit key, and was eventually broken in less than 23 hours by the Electronic Frontier Foundation and Distributed.net in 1999.[81]

Further, encryption algorithms are subject to threats beyond just advancements in decryption techniques. An empirically-proven rule of thumb in the computing world states that computing power doubles every 18 months.[82] Extrapolating that trend, in 15 years computers will be 1,000 times more powerful than they are today. New decryption techniques coupled with ever-increasing computing power continued to threaten the security of existing encryption algorithms. In November 2001, the National Institute of Standards and Technology (NIST) replaced the existing DES with the new and improved Advanced Encryption Standard (AES) for encrypting classified government information.[83]

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80. For mathematical convenience, we are assuming (1) a computer has a 1 GHz processor (the processor runs at 1 billion clock-cycles per second); and (2) trying a possible key only requires a single clock cycle.

81. *See* Wikipedia, EFF DES Cracker, http://en.wikipedia.org/wiki/EFF_DES_cracker (last visited Feb. 4, 2007); *but see*, Siewert, *supra* note 68 (DES was broken in *less than three hours* by DES Cracker). Ironically, three years earlier, William P. Crowell, Deputy Director of the National Security Agency stated: "If all the personal computers in the world . . . were put to work on a single [strong]-encrypted message, it would still take an estimated 12 million times the age of the universe, on average, to break a single message." *Security and Freedom Through Encryption (SAFE) Act: Hearing on H.R. 695 before the Subcomm. on Courts, the Internet, and Intellectual Property of the H. Comm. on the Judiciary*, 105th Cong. 45 (1997).

82. This rule is an adaptation of "Moore's Law," which comes from an article by Gordon H. Moore, an electronic engineer and co-founder of Intel Corporation. In the article, he stated that "The complexity for minimum component costs has increased at a rate of roughly a factor of two per year. . .," 38 ELECTRONICS 115, Apr. 19, 1965. Though Moore's law specifically relates to the number of transistors on an integrated circuit, the same concept has been empirically proven for other areas of technology. *See, e.g.*, Ray Kurzweil, *Human 2.0: The New Version is Coming Sooner Than You Think*, NEW SCIENTIST, Sept. 24, 2005; Ray Kurzweil, *The Law of Accelerating Returns*, Mar. 7, 2001, http://www.kurzweilai.net/meme/frame.html?main=/articles/art0134.html.

83. NIST, *Announcing the Advanced Encryption Standard (AES)*, FIPS-197, Nov. 26, 2001.

The AES algorithm is based on a cipher known as Rijndael and supports key lengths of up to 256 bits. [84] AES is stronger, and less time- and memory-intensive to process than most of today's other strong encryption algorithms.[85] But how long will it remain secure? The goal of AES was to provide "agencies with a new encryption method designed to be secure for at least 20-30 years."[86] Only one year after its adoption as a standard, cryptographers had already begun to point out flaws in its strength.[87] These claims may be simply Internet machismo, as no published cracks exist yet for AES. Moreover, AES is still the standard for classified information.

Many other ciphers exist, but they are all essentially an algorithm with a key. The world of digital cryptography is a cat and mouse game; stronger ciphers are cracked by faster computers and more clever math, which lead to stronger ciphers. In the end, however, the fundamental flaw with all these encryption methods is that their strength is still based on the number of guesses required to crack the code.

C. Encryption's Death and Rebirth

> "Consequently, the development of a fully operational quantum computer would imperil our personal privacy, destroy electronic commerce and demolish the concept of national security. A quantum computer would jeopardise the stability of the world. Whichever country gets there first will have the ability to monitor the communications of its citizens, read the minds of its commercial rivals and eavesdrop on the plans of its enemies."[88]

With infinite computing power, any of these encryption methods could be cracked in an infinitely small amount of time.[89] Still, modern cryptography primarily relies on the limitations of computing power for

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84. *Id.*

85. For a thorough description of the Rijndael algorithm, *see* Wikipedia, Advanced Encryption Standard, http://en.wikipedia.org/wiki/Advanced_Encryption_Standard (last visited Feb. 4, 2007).

86. Office of Management and Budget, OMB Guidance to Federal Agencies on Data Availability and Encryption, http://csrc.nist.gov/policies/ombencryption-guidance.pdf (last visited Feb. 4, 2007).

87. Dana Mackenzie, *A Game of Chance*, NEW SCIENTIST, June 7, 2003, at 36-39; Charles Seife, *Crucial Cipher Flawed, Cryptographers Claim*, 297 SCIENCE 2193 (Sept. 27, 2002).

88. *See* Singh, *supra* note 64, at 331.

89. Using the same conventions of computing power as above (*supra* note 79) a cipher with a key length of 128 bits would yield 340 trillion trillion trillion combinations (34 followed by 37 zeroes); and trying all the keys would require up to 700 billion times the age of the universe. However, if computers were ten trillion trillion (10^{25}) times faster, trying all the keys would only take about 9 hours.

its strength. "As information becomes the world's most valuable commodity, the economic, political and military fate of nations will depend on the strength of ciphers."[90] Thus, as computers get more powerful, the world falls increasingly into jeopardy. The rise of quantum computing, a new form of computing based on the laws of quantum physics, heralds an age when effectively infinite computing power will be available for cracking the world's largest codes.

Probably the most discussed difference between classical and quantum physics results from what is called the "Heisenberg Uncertainty Principle."[91] Classical physics assumes that a particle's state (its position and momentum) is known and observable. In quantum physics, however, the act of observing the particle affects its path. Thus, the more certain you are of the particle's position, the more uncertain you become about its momentum, and vice versa. A strange implication of this is that when the particle is not being observed, quantum physics says that particle is actually in multiple states simultaneously.[92] This may seem strange, or even like a matter of semantics, but there is a large practical difference. Without this difference, physics would be unable to explain many everyday effects ranging from nuclear power to lasers.[93]

Quantum computers rely on this quantum effect. A classical computer bit is either '1' or '0', like a coin which is either heads or tails. However, when no one is looking, a quantum computer bit (called a qubit) is both '1' and '0' at the same time, like a spinning coin which is effectively both heads and tails until someone stops the spin. If one qubit can be both 0 and 1 at once, seven qubits could be considered to simultaneously represent all the numbers from zero to 127.[94] Recall that the strength of classical encryption methods relies on the impracticality of trying a very large number of possible keys to decipher a message. Unlike a classical computer, which must try each key one-at-a-time to see if it works, a quantum computer could essentially try all possible

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90. *See* Singh, *supra* note 64, at 331.

91. J. A. WHEELER & H. ZUREK, QUANTUM THEORY AND MEASUREMENT 62-84 (1983), at (*translating* W. Heisenberg, *Über den Anschaulichen Inhalt der Quantentheoretischen Kinematik und Mechanik*, 43 ZEITSCHRIFT FÜR PHYSIK 172 (1927)).

92. A famous illustration of this is "Schrödinger's Cat." Imagine a cat in a ventilated, but opaque box. When the door to the box is closed, you cannot see the cat. You place a fragile vial of cyanide on the floor of the box. If the cat steps on the vial and releases the cyanide, it will immediately die. Is the cat alive or dead? In classical physics, the cat is either alive or dead. Quantum physics would say that when no one is looking, the cat is both alive and dead (or more accurately, the cat is in some superposition of the alive and dead states). When the box is opened, the cat immediately chooses either the alive or the dead state. *See id.* at 152-67 (translating the original E. Schroedinger, 23 NATURWISS. 807 (1935)).

93. *See* Singh, *supra* note 64, at 325.

94. Seven binary digits, can represent the decimal numbers from '0' (binary '0000000') to '127' (binary '1111111').

keys at the same time. In this way, quantum computers could be used to crack even the longest key-length ciphers in seconds, rendering classical encryption methods worthless.

Fortunately, however, that is not the end of the story for encryption. First, quantum computing is a nascent field, and the first quantum computers only exist in laboratory settings. Second, the properties of quantum physics also form the basis for a new fundamentally unbreakable class of cipher, known as quantum encryption. Quantum encryption utilizes the quantum properties of individual photons of light. The resulting transmission method is completely secure (the encryption is fundamentally unbreakable) for two reasons. First, because of the Uncertainty Principle, any attempt to eavesdrop will affect the contents of the message. By checking a relatively small sampling of transmitted data, the sender and receiver can detect surveillance attempts. Second, quantum properties of the photons allow the sender and receiver to overtly communicate one-time keys for each message without ever disclosing the values sent. For a more thorough description of how this works, see Appendix A.

For the vast majority of people, who cannot contemplate sending or measuring a single photon, quantum cryptography seems like something out of Star Trek. However, the first cryptographic message was sent using this scheme over fifteen years ago.[95] In the years since, the technology has significantly improved. At an information security conference in Geneva in April 2005, companies began releasing turn-key quantum encryption systems for use with existing Ethernet networks.[96] The products are fast enough to perform quantum encryption and eavesdropping detection for broadband time-critical applications like VoIP calls.[97] In addition to quantum cryptography for wired networks, there are high-speed wireless optical networks running quantum cryptography over distances of ten kilometers.[98]

For now, the average computer user does not have the capability or desire to hack into communications using even strong encryption. In fact, messages in transit are rarely intercepted.[99] However, law enforce-

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95. *See* Singh, *supra* note 64, at 347-48 (Charles Bennett and his graduate student, John Smolin, sent the first message from a computer named Alice to one named Bob in 1989).

96. R. Colin Johnson, *Quantum Encryption Enters Product Phase*, ELEC. ENG'G TIMES, May 2, 2005, at 44.

97. *Id.*

98. Chappell Brown, *Wireless Quantum-Crypto Network is Live*, ELEC. ENG'G TIMES, June 13, 2005, at 58.

99. Alison Diana, *Benchmarking Encryption Technology*, E-COMMERCE TIMES, Aug. 12, 2003, *available at* http://www.ecommercetimes.com/story/31311.html ("[Ray Wagner, research director for information security strategies at Gartner, said,] The likelihood of people attacking encryption in data transfer is relatively low. Most organizations could probably deploy 40-bit encryption and never have an attack against those types of data transfers. That

ment and others with a large interest in electronic surveillance will use whatever technology is available to get the job done. For example, though quantum computers are still in the experimental phase, when they do arrive, they will render strong encryption schemes impotent. On the other hand, today, users can employ strong encryption, which is effectively unbreakable, and quantum encryption, which is fundamentally unbreakable (even by a quantum computer). This provides a government policy incentive to limit the spread and effect of encryption, but, that said, similar policy directions have failed in the past.

D. Overview of United States' Encryption Policy

> "[A poll taken shortly after the September 11th attacks] asked: 'Would you favor reducing encryption of communications to make it easier for the FBI and CIA to monitor the activities of suspected terrorists—even if it might infringe on people's privacy and affect business practices?' Fifty-four percent of those polled answered 'yes,' and 72 percent said anti-encryption laws would be . . . helpful in thwarting similar terrorist attacks."[100]

As with surveillance regulation, encryption regulation must carefully balance individual privacy against national security. These concerns, as well as concerns from the U.S. encryption market, have driven the history of encryption legislation.[101] On the one hand, by using encryption, Internet users can freely engage in private communications with people around the globe. On the other hand, encryption technology impedes law enforcement's ability to intercept communications by criminals.[102] For example, the "widespread availability of strong encryption technology threatens to undermine the effectiveness of the money laundering controls currently in place."[103]

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said, 40-bit encryption is not hard to break").

100. Declan McCullagh, *Senator Backs Off Backdoors*, WIRED NEWS, *at* http://www.wired.com/news/conflict/0,2100,47635,00.html.

101. David B. Walker, *Privacy in the Digital Age: Encryption Policy-A Call for Congressional Action*, 1999 STAN. TECH. L. REV. 3, 22-31 (1999).

102. Jeffrey Yeates, *CALEA and the RIPA: The U.S. and the U.K. Responses to Wiretapping in an Increasingly Wireless World*, 12 ALB. L.J. SCI. & TECH. 125, 136-137 ("Modern communication systems are no longer wires connected to a switch, but are . . . an era of intelligent networks, . . . a digital environment that allows sophisticated encryption. . . . The rapid introduction of these technological innovations has injected difficulty into law enforcement's task of intercepting communications. . . . As noted earlier, the FBI disclosed to Congress at the CALEA hearings more than 180 instances of when it had been unable to intercept a communication because of technological impediments").

103. Andres Rueda, *The Implications of Strong Encryption Technology on Money Laundering*, 12 ALB. L.J. SCI. & TECH. 1, 4 ("Strong encryption threatens current money laundering from two directions. Money laundering is typically perpetrated by exploiting the financial sys-

Currently, however, encryption use is not widespread. While many people use secure servers for financial transactions and password-protected files for secret information, few people encrypt email messages or VoIP phone calls. A likely reason is that there is currently no good push-button encryption program on the market. Encrypting email often requires special software, key management, or even the creation of scripted algorithms. Nonetheless, encryption technology is rapidly changing. If a push-button encryption solution becomes available, it may drive ubiquitous encryption usage.

Lawrence Lessig speaks of four different modalities of regulation: architecture (or "code"), market, legislation, and societal norms.[104] The government has attempted at least the first three in regards to encryption regulation. The first type of regulation involved the architecture, or "code" of encryption. The Clinton administration proposed a number of initiatives, beginning with "Clipper Chip" in 1993, and ending with "Clipper 3.1.1" in 1996.[105] The intent of the Clipper Chip proposals was twofold: The chip would be used in encryption systems to provide the government with a back door for access to encrypted files; and a Trusted Third Party (TTP) would be established to hold, in effect, a spare set of keys for each person using encryption to be used by the government if necessary to gain access to encrypted files (called key escrow).[106] The proposals all received vehement opposition from the software industry and various privacy-advocating organizations.[107] In response, Clinton pressured other countries to support the key escrow initiatives. This tactic failed. The Organization for Economic Cooperation and Development (OECD), the European Union, and the Wassenaar Arrangement Group (consisting of thirty-three industrialized nations) all supported other methods like industry- and market-based regulation; and by 1998, key escrow was dead.[108]

The second type of government-imposed regulation involved limits on the export market. Because of the importance of encryption to the military, the international proliferation of strong encryption was seen as a

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tem's information technology network to obscure through multiple transactions the origin of dirty funds. Accordingly, strong encryption can be used to prevent the recovery by law enforcement of the evidence that could be used to convict money launderers").

104. Lessig, *supra* note 65, at 87.

105. *Id.* at 300.

106. *Id.* at 300-01.

107. *See, e.g.*, Rutrell Yasin, *Senators Pledge to Push Encryption Reform*, INTERNETWEEK, June 18, 1998; *EPIC's Challenge to the Secrecy of the Clipper Initiative*, *at* http://www.epic.org/crypto/Clipper/challenge.html; Shari Steele & Daniel J. Weitzner, *Chipping Away at Privacy*, http://www.cdt.org/crypto/admin/clipper.summary.txt (last visited Feb. 4, 2007).

108. Tricia E. Black, *Taking Account of the World as It Will Be: The Shifting Course of U.S. Encryption Policy*, 53 FED. COMM. L.J. 289, 302 (2001).

threat to national security. The government thus decided that, while encryption sales should not be limited within the United States, its export should be. Prior to 1996, its export was restricted as a dual-use munition[109] (a technology with both military and commercial uses) under the Export Administration Regulations (EAR)[110] and the International Traffic in Arms Regulations (ITAR),[111] both of which administer the Arms Export Control Act (AECA).[112] However, by 1996, it had become clear that the world already had strong encryption, and export restrictions were only hurting U.S. encryption companies.[113] Thus, from 1996 to 2000, President Clinton eliminated the commercial encryption export restrictions to the European Union and eight other countries in an attempt to better balance security and U.S. economic needs.[114] Since that time, the courts have volleyed the question of Congress's Constitutional authority to regulate encryption and its export,[115] but little has changed since the end of the Clinton administration.

The final type of government-imposed regulation involves legislation. One of the most notable recent encryption-based attempts at legislation is the Security and Freedom Through Encryption (SAFE) Act, proposed in 1999.[116] This Act would officially rescind many previous regulatory attempts by removing export regulations, key length limits, and key escrow requirements.[117] Interestingly, no significant actions have been taken on this bill since it was placed on the Union Calendar in July 1999.[118] Few other bills focusing primarily on encryption have been

109. *Id.* at 298-99.

110. Export Administration Regulations (EAR), 15 C.F.R. pts. 730-74.

111. International Traffic in Arms Regulations (ITAR), 22 C.F.R. pts. 120-30.

112. Arms Export Control Act (AECA), 22 U.S.C. §§ 2751-2796c (2000).

113. Rueda, *supra* note 103, at 4-5; s*ee also*, Junger v. Daley, 209 F.3d 481 (6th Cir. 2000); Karn v. United States Dep't of State, 925 F. Supp. 1 (D.D.C. 1996), *remanded in*, 107 F.3d 923 (D.C. Cir 1997).

114. Black, *supra* note 108, at 299-300.

115. *Compare* United States v. Odutayo, 406 F.3d 386, 391-392 (5th Cir. 2005) ("The interest in the regulation of the exportation of weapons, ammunition, and encryption technology, similar to the interest in the flow of currency, represents the fundamental power—indeed, responsibility—of every sovereign nation to maintain its national security."), *with* Universal City Studios v. Reimerdes, 111 F.Supp.2d 294, 304-305 (S.D.N.Y. 2000) ("In an era in which the transmission of computer viruses—which . . . are simply computer code and thus to some degree expressive—can disable systems upon which the nation depends and in which other computer code also is capable of inflicting other harm, society must be able to regulate the use and dissemination of code in appropriate circumstances. The Constitution, after all, is a framework for building a just and democratic society. It is not a suicide pact").

116. Security and Freedom Through Encryption (SAFE) Act, H.R. 850, 106th Cong. (1999). This bill, proposed by Representatives Bob Goodlatte and Zoe Lofgren, is similar to H.R. 695 (105th Cong.) and H.R. 3011 (104th Cong.).

117. *See SAFE HR 850*, *at* http://www.cdt.org/crypto/legis_106/SAFE/.

118. *See* Library of Congress, Major Actions for H.R. 850, *at* http://thomas.loc.gov/cgi-bin/bdquery/z?d106:HR00850:@@@R.

proposed, especially in recent years.

As encryption regulation continues to weaken, public access to effectively unbreakable encryption continues to rise. Further, while weak surveillance regulation hurts privacy,[119] weak encryption policy creates the potential for stronger privacy. Thus, as long as the public is able to take advantage of the current access to encryption technology, the opportunity exists to counteract the erosion of privacy rights from increased surveillance. The privacy-restorative potential of encryption in the face of surveillance is the focus of Section IV.

IV. STRONG ENCRYPTION CAN RESTORE THE PRIVACY-SECURITY BALANCE

> "[C]riminals are increasingly using encryption technologies to conceal their activities and thwart law enforcement efforts to collect critical evidence needed to solve and prosecute serious and often violent criminal activities. The potential use of unbreakable encryption products by a vast array of criminals and terrorists, to conceal their criminal communications and information, poses an extremely serious threat to public safety and national security."[120]

In 2004, graduate students at the University of Colorado examined various options for making VoIP phone calls.[121] The so-called "softphones" used to make VoIP calls come in a variety of forms, including using either open- or closed-source code, centralized or decentralized networks, and free or paid services. After attempting methods for applying end-to-end encryption to secure those calls, the graduate students concluded that:

> [T]here are several readily available tools and methods with which to create a strongly encrypted Internet voice call. Though limited in number now, more of these tools are being created with each passing season. Many of these methods are so basic that any attempt to ban or alter them would profoundly affect the Internet as a whole. At this point in time and in the future, *we believe that two end users using public domain tools and minimum setup can effectively create an*

119. *See supra* Part II.

120. Jessica R. Herrera, *International Aspects of Cybercrime*, *in* CYBERCRIME 172 (Ralph D. Clifford ed. 2001).

121. Matthew Bates & Thiha Min, *Problems with Wiretapping of VoIP Services* (Univ. of Colorado Policy Lab, Working Paper, Summer 2004), http://www.colorado.edu/policylab/Papers/Secure_Voip_writeup%20v3_2%20_2_.pdf (emphasis in original).

Internet call that cannot be wiretapped.[122]

This study has clearly devastating implications for the efficacy of electronic surveillance as applied to the Internet. Consider this hypothetical: The NSA suspects a professor at a university is laundering funds for terrorist organizations, and they want to listen in on his VoIP phone calls. The NSA would have two hurdles to overcome.

First, the NSA must have some authorization to perform electronic surveillance. Under the Federal Wiretap Act or the original language of FISA, the NSA would be required to get a court order to avoid violations of procedural privacy (essentially a warrant for their electronic "search"). Arguably, under FISA as amended by the Patriot Act, there may be a blanket executive order to engage in this activity to combat terrorism. Either way, the trend of weakening surveillance regulation suggests that this would be an easy hurdle to clear.

Armed with authority, the NSA would have to then overcome the second hurdle: performing the actual surveillance to obtain information. After compliance with the CALEA Order, the university would have back doors built into its network. The NSA would patch surveillance equipment into the university's network and begin to monitor VoIP traffic to and from the professor to hopefully gain evidence of his money laundering. Without encryption, this would also be a simple hurdle, rendering the professor's privacy protections impotent. However, using free, publicly-available software, and minimal effort, the professor could encrypt all his VoIP phone calls. With today's strong encryption, the content of these calls would be essentially indecipherable,[123] and therefore useless to the NSA.

Thus, encryption technology has the ability to restore many of the privacy-erosive effects of lax surveillance regulation. Unfortunately, most people tend not to use adequate encryption to protect their Internet traffic. Fortunately, however, the growth of the Internet and the development of push-key encryption may cause that tendency to change.

A. The Rise of Data Threats Will Cause People to Use More Encryption

> "What could quantum physics and Paris Hilton possibly have in common? The Hilton hotel chain heiress and Hollywood starlet got a bonus 15 minutes of fame a few weeks ago after hackers burrowed their way into her mobile phone, stealing her celebrity contact information and distributing it across the Internet. Her experience raised

122. *Id.* (emphasis in original).
123. *See supra* Section III.

> an issue few had contemplated before – That evil techies bent on doing bad things can unlock the contents of a cellphone, Blackberry or wireless PDA just like any other computer system or network."[124]

It is hard to say how many people are using encryption today. Whether or not they are, however, it seems likely that encryption use will rise dramatically in coming years. There are three reasons for this prediction. First, many companies in select industries have adopted encryption standards to avoid liability under various pieces of legislation.[125] In September 2005, for example, the three largest credit reporting agencies pledged to adopt a standard encryption system to protect credit information.[126] Second, though implementing encryption in a large corporation can raise storage and data processing costs, encryption hardware and software is relatively inexpensive;[127] with many corporations employing free algorithms from the Internet,[128] and some purchasing even the newest quantum devices for under $100,000.[129] Ultimately, however, the third reason—fear—will likely be the biggest driving force for adopting encryption.

The ubiquity of the Internet and digital communication means that more digital data is being transmitted around the globe than ever before. Much of this data supports a new economy, including efficient international property transfers and electronic commerce. With that increase in data has come an increase in the danger of identity theft. Public fear of identity theft has, in turn, become a "killer app" for the adoption of encryption.[130]

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124. M. Corey Goldman, *A Quantum Leap for Computer Security; Powerful Chips Perversely Make Hacking Easier. Here's a System that, for Now, Is Said to Make It Impossible*, TORONTO STAR, Mar. 7, 2005, Business, at 1.

125. Jay Lyman, *FTC: Identity Theft Worse than Estimated*, E-COMMERCE TIMES, Sept. 4, 2003, *available at* http://www.ecommercetimes.com/story/31498.html.

126. Reuters, *Credit Bureaus to Adopt Data Protection Standard*, CNET, Sept. 22, 2005 ("The coordinated effort by the three traditional rivals is the latest proof of the serious threat posed by identity thieves and Internet-enabled crooks. . . ."), *available at* http://news.com.com/2100-1029_3-5877870.html.

127. Alison Diana, *Benchmarking Encryption Technology*, E-COMMERCE TIMES, Aug. 12, 2003 ("Indeed, although the cost of encryption technology . . . is negligible, implementing it can lead to higher storage and processing costs."), *available at* http://www.ecommercetimes.com/story/31311.html; *but see* Bruce Schneier, *Information Security: How Liable Should Vendors Be?*, COMPUTERWORLD, Oct. 28, 2004.

128. *See, e.g.*, http://www.cypherix.com/cryptainerle/ (Cryptainer LE from Cypherix Products); http://www.freebyte.com/security/#freeencryption (contains a list of free file encryption programs).

129. Jack Mason, *Quantum Cryptography Companies Tap into Nanoscale's Quirky Core*, SMALL TIMES, Feb. 19, 2004, *available at* http://www.smalltimes.com/document_display.cfm?section_id=47&document_id=7448.

130. The phrase "killer app" generally refers to an application which will drive the market for a certain platform technology. A classic example is the "Super Mario Bros." game for the Nintendo video game system.

The threat of identity theft moved even further to the forefront of public consciousness in the wake of several headline-grabbing, high-profile data breaches. In February 2005, ChoicePoint, Inc., a company which ironically claims to be the "leading provider of identification and credential verification services,"[131] announced that a security breach left the personal information of 145,000 Americans vulnerable to identity thieves.[132] Then, in May 2005, Bank of America announced that over 60,000 of their customers were data breach victims, those customers joining approximately 676,000 victims of a New Jersey data-theft ring.[133] Later that month, data tapes which archived personal information for 3.9 million Citigroup customers literally fell off the back of a UPS truck,[134] and a laptop was stolen from Omega World Travel, which contained the names and credit card numbers of approximately 80,000 employees of the U.S. Department of Justice.[135] Only a couple of weeks later, a number of credit card companies began accusing CardSystems of negligently allowing a breach to compromise 40 million credit card accounts.[136] The stories continued to pile up, and within one year of the ChoicePoint incident, data breaches had claimed 55 million victims.[137]

Individuals were not the only victims of the data breaches. The breached companies incurred enormous losses, both in terms of money and goodwill. Following their respective incidents, ChoicePoint paid $15 million in fines to the FTC,[138] over 50,000 customers closed their Citigroup accounts,[139] and "CardSystems has nearly been forced out of existence as business partners have fled."[140]

To avoid these significant losses, businesses have begun to look to encryption as an essential information security component. There are

131. *See* ChoicePoint, http://www.choicepoint.com/ (last visited Feb. 4, 2007).

132. Rachel Konrad, *Burned by ChoicePoint Breach, Potential ID Theft Victims Face a Lifetime of Vigilance*, THE ASSOCIATED PRESS (Feb. 24, 2005), *available at* http://www.securityfocus.com/news/10552.

133. Todd R. Weiss, *Bank of America Notifying 60,000 Customers About Stolen Data*, COMPUTERWORLD (May 24, 2005), *available at* http://www.computerworld.com/securitytopics/security/cybercrime/story/0,10801,101992,00.html.

134. *Info on 3.9M Citigroup Customers Lost*, CNN MONEY (June 9, 2005), *available at* http://money.cnn.com/2005/06/06/news/fortune500/security_citigroup/index.htm.

135. Weiss, *supra* note 133.

136. Jason Krause, *Law Firms Face Cyberthreats*, *in Flying Under the Radar: These Little-Noticed Legal Developments Could Be Making News this Year*, 92 A.B.A.J. 34 (2006).

137. *See* Privacy Clearinghouse Report, http://www.privacyrights.org/ar/ChronDataBreaches.htm (last visited Feb. 4, 2007). The 55 million victims include targets of data crimes which are not the result of mismanagement, like phishing and pharming on people's home computers (Last visited Feb 3, 2006).

138. Bob Sullivan, *ChoicePoint to Pay $15 Million over Data Breach*, MSNBC (Jan. 26, 2006), http://www.msnbc.msn.com/id/11030692.

139. *Info on 3.9M Citigroup Customers Lost*, *supra* note 134.

140. Krause, *supra* note 136.

two main reasons to choose encryption. First, the adoption of encryption is a clear sign to the public that something is being done to protect their data. For example, after its data breach, Citigroup released a press statement stating that "[b]eginning in July, this data will be sent electronically in encrypted form."[141] Second, a number of information security-related statutes mention encryption as a necessary component of enterprise data security. One example at the Federal level is the Consumer Data Security and Notification Act of 2005, part of which amends the Fair Credit Reporting Act and the Gramm-Leach Bliley Act to give more explicit guidance for the use of encryption.[142] At the state level, encryption can be even more important for companies. Under California's breach notification law, for example, companies which encrypt their data are exempt from disclosing breaches to their customers in many cases.[143]

As the demand for encryption increases, so will the incentive for developers to create effective, inexpensive, push-key encryption solutions. Hopefully, consumers will begin to adopt and use those new solutions to protect their communications from unauthorized surveillance. In that way, the encryption will be able to serve its privacy-restorative function. With undecipherable encryption, it may seem that all hope is lost for law enforcement—that ubiquitous encryption will so tilt the balance towards privacy that National security will suffer. This is not the case. Many options still exist for law enforcement even in a world of ubiquitous encryption.

B. Even with Ubiquitous Encryption, Law Enforcement Has Options

> "Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather. . . . You claim there are problems among us that you need to solve. You use this claim as an excuse to invade our precincts. Many of these problems don't exist. Where there are real conflicts, where there are wrongs, we will identify them and address them by our means. We are forming our own Social Contract. This governance will arise according to the conditions of our world, not yours. Our world is differ-

141. Kevin Kessinger, Executive Vice President of Citigroup's Global Consumer Group and President of Consumer Finance North America, quoted in a statement by CitiGroup Inc., June 02, 2005, *available at* http://www.citigroup.com/citigroup/press/2005/050602e.htm.

142. *See* Consumer Data Security and Notification Act of 2005, H.R. 3140, 109th Cong. (2005).

143. *See* CAL. CIV. CODE § 1798.82.

ent."[144]

There are three likely outcomes to the privacy issues generated from the trend towards lax surveillance regulation. The first would be the most dire and hopefully least likely: The trend will persist, allowing law enforcement increased access to private communications, and the public will fail to widely adopt encryption. This outcome would be the most privacy erosive, and would allow law enforcement to surveil the public with extreme ease. The second outcome would be a change in the direction of the trend. A number of lawsuits have already been filed against the FCC, challenging its authority and the constitutionality of the Order.[145] If these suits succeed, privacy will have won a battle, but the war will continue in the jungles of ever-present privacy-invasive legislation. Another terrorist attack, or other invasion of national security, may prompt even more invasive legislation. Finally, the third outcome would be perhaps the most interesting, and arguably the most sustainable; that the CALEA Order will persist, but the public will move towards ubiquitous strong-encrypted communications.

Either the second or third outcome would debilitate a very important tool of law enforcement. To combat that result, the law enforcement community would have to find another way to get the information they want from criminals. One solution is to once again try to regulate encryption. The government may provide benevolent social justifications for regulating encryption beyond just better surveillance of criminals. It may claim the importance of preventing the potentially false sense of security people feel from encrypted data,[146] the facilitation of faster access to important information (like medical records),[147] or even the preservation of the public domain which should not be subjected to potential obfuscation through encryption.[148] However, the past has shown that regulations on encryption are not a good idea. Encryption allows persecuted

144. John Perry Barlow, *A Declaration of the Independence of Cyberspace*, Feb. 8, 1996, http://homes.eff.org/~barlow/Declaration-Final.html.

145. Caron Carlson, *ACLU Joins Fight Against Internet Surveillance*, EWEEK.COM, Dec. 1, 2005, *available at* http://www.eweek.com/article2/0,1895,1895253,00.asp.

146. Paul F. Roberts, *MCI Data Theft Intensifies Encryption Debate*, EWEEK.COM, May 31, 2005, *available at* http://www.eweek.com/article2/0,1759,1821333,00.asp (A California statute, for example, allows companies to forgo notifying customers of data security breaches if they are using encryption.).

147. Paul Roberts, *Electronic Medical Record Keeping Places Demands on IT Execs at Hospitals*, INFOWORLD, Sept. 7, 2004, *available at* http://www.infoworld.com/article/04/09/07/HNmedicalrecord_1.html?s=feature (discusses balance between access and privacy of medical records); *see also*, R. M. Califf and L. H. Muhlbaier, *Health Insurance Portability and Accountability Act (HIPAA): Must There Be a Trade-Off Between Privacy and Quality of Health Care, or Can We Advance Both?*, 108 CIRCULATION 915-918 (2003).

148. *See, e.g.*, Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 156 (1975).

populations more freedom through anonymous and pseudonymous communication;[149] it facilitates the establishment of private data domains which may be controlled by trespass law or the Fourth Amendment; and it encourages the creation of copyrighted data by protecting authors from unauthorized copying and distribution.[150] Even more importantly, government attempts at regulating encryption in the past have been disasters.[151]

Even though Congress is unlikely to attempt future wide-scale regulations on encryption for the above reasons, there are two other potential possibilities. One possibility would be to help protect security and law enforcement by legislating the effects of encryption. For example, the White House recently announced legislation to give "$80 million over four years for a research center to help law enforcement agencies learn how to crack encryption. . .[, to] create a legal framework that would allow the police to have 'back doors' under certain conditions. . .[, and to] ensure that sensitive investigative techniques . . . remain useful and secret by protecting them from forced disclosure in criminal and civil litigation."[152] The second possibility would be to promote ubiquitous encryption use. This would greatly enhance the potential for privacy, while simultaneously forcing law enforcement to find new ways to obtain information without the aid of domestic electronic surveillance.

Importantly, even if strong encryption usage forces law enforcement to find other methods of surveillance, many options still exist. These options arise from the fact that the types of strong encryption discussed thus far assume the information is in transit. A communication, however, transpires in five stages: (1) the sending party enters the information into a device; (2) the sending party's device stores the information either in permanent or temporary storage on a device; (3) the device takes the information from storage and sends it to the receiving party's device; (4) the receiving party's device stores the information in permanent or temporary storage; and (5) the receiving party views or listens to the information. The information is only in transit during stage (3). New techniques can still provide surveillance options during the other stages of

149. Human Rights Watch, *Crypto Controls Threaten Human Rights*, HUMAN RIGHTS NEWS, Sept. 18, 1998, *available at* http://hrw.org/english/docs/1998/09/18/global1297.htm (HRW is a non-profit organization that investigates and reports violations of human rights in over 70 countries worldwide. In this article, Jagdish Parikh, online research associate at Human Rights Watch states that "Encryption is more than a shield for human rights activists, . . . [c]oded language is still language, and it must be protected as a basic human right to free expression.").

150. MGM Studios Inc. v. Grokster, Ltd., 125 S. Ct. 2764, 2795 (2005) ("Other technology can, through encryption, potentially restrict users' ability to make a digital copy").

151. Part III discussed some of the issues the government faced with regulations on the export and architecture of encryption (like the Clipper Chip and Key Escrow proposals).

152. MARK GROSSMAN, TECHNOLOGY LAW 137-38 (2004).

the communication when the information is at the end points. For example, law enforcement could use a key-logger to capture keystrokes as the sending party types information into the device in stage (1).[153] Other end-point surveillance possibilities include using spyware and Trojan programs which invade the end user's device and give back-door access to other party's, and even using detectors to listen to the high frequency radiation of computer monitors to remotely "see" what the user is seeing.[154]

Assuming the trend continues toward lax surveillance regulation, privacy protection will remain in the hands of the public. People will be forced to either preserve their own privacy through means including encryption, or subject their communications to potentially limitless government surveillance. If, as hoped, they choose the former, the government will still have surveillance options. The effects of ubiquitous encryption use, however, will be able to limit to privacy-erosive effects of those options and help restore the privacy-security balance.

CONCLUSION

> "[W]hile, of course, the law needs to keep pace with changing technology to ensure that government agencies have access to information to prevent crime and terrorism, the law also needs to keep pace with changing technology to protect privacy. . . ."[155]

Only a half-decade ago, communication technology looked vastly different from the technology of today. Most private communication occurred over wires, voice traffic and data traffic were technologically divergent entities, and government surveillance was severely restricted. Gathering private information about a person used to require trespassing onto property or myriad hours of surveillance, hoping to piece together shreds of data. Digital convergence and the Internet have set the stage for revolutions in data types, data quantities, and the media through which data travels. For the world of surveillance, this has created a flood of names, addresses, credit scores, and conversations on our public wires and airwaves.

As surveillance regulations continue to weaken, the ability of law enforcement to ignore the privacy rights of individuals continues to increase. However, effectively unbreakable encryption could limit the pri-

153. *See*, *e.g.*, United States v. Scarfo, 263 F.3d 80 (3d Cir. 2001) (involved the use of key loggers by the FBI).

154. *See*, *e.g.*, Wikipedia, Computer Surveillance, http://en.wikipedia.org/wiki/Computer_surveillance (last visited Feb. 4, 2007).

155. *Oversight Hearing on Implementation of the USA Patriot Act*, *supra* note 29.

vacy-erosive effects of this surveillance, but only with its ubiquitous adoption by the public. The trend in surveillance regulations illustrates law enforcement's assumption that the world of encryption will remain non-user-friendly, allowing surveillance to remain a critical tool for security. Hopefully, this prediction will prove to be incorrect, and the public will choose to take control of their privacy rights.

With ubiquitous encryption usage, the pendulum will swing back towards a privacy-protective environment, and a new crossroad will emerge. Worldwide political dissidents and persecuted individuals will again be able to communicate with impunity, but so will money launderers, sex offenders, and terrorists. The government will have to choose to regulate encryption or support it. The former would mark an unfortunate reversion to past types of restrictions on encryption use, but the latter may herald a new world of privacy—one in which encryption is regaled as a privacy shield against erosive surveillance.

APPENDIX A. A BRIEF EXPLANATION OF QUANTUM CRYPTOGRAPHY

> "I think I can safely say that nobody understands quantum mechanics"[156]

To understand quantum encryption, it is helpful to think of light as individual photons, which move in a direction while vibrating. The direction of vibration is known as polarization.[157] Polarized filters, like those on many sunglasses, only allow photons with certain polarizations to pass through. Photons with a polarization perpendicular to the filter will be blocked, but certain other polarizations will be twisted to align with the filter and pass through.

Say that Alice has a computer from which she can send individual photons through one of two filter modes.[158] In mode one, photons either vibrate vertically ('|'), representing a '1', or horizontally ('-'), representing a '0'. In mode two, photons either vibrate diagonally-left ('\'), representing a '1', or diagonally-right ('/'), representing a '0'. Alice wants to send a message to Bob, who has a similar computer. There are five steps. In step 1, Alice sends random 1's and 0's, randomly switching between filter modes. Bob does not know which modes Alice will choose, so he randomly switches filter modes, as well. Sometimes he chooses the correct mode, and, as a result, measures the correct value ('1' or '0'). Other times, he chooses the incorrect mode, twists the polarization of the photon, and measures a value which may or may not be correct. In step 2, Alice calls Bob and they tell each other which modes they used (but not which values Alice sent). They know that they can only rely on the data Bob received when he picked the correct mode. In step 3, they discard all the values Alice sent when Bob picked the wrong mode (for example, Alice originally sent 1,000 photons and only 573 remain). Now they have created a random 573-bit key which only Alice and Bob know. Because of the fact that picking the wrong mode twists the polarization of the photon, it is nearly impossible to eavesdrop without affecting the data. Imagine that Eve had been listening on the line. She had randomly switched between filter modes, too, but every time she picked the wrong one, she unknowingly twisted the polarization of the photon being transmitted. In some of those cases, Bob and Alice would have the same

156. Attributed to Richard Feynman, considered to be one of the greatest physicists of the 20th Century.

157. In reality, light has the characteristics of both particles and waves, and has some very strange behaviors at the quantum level.

158. This description is based on the work of Charles Bennett and Gilles Brassard, the inventors of quantum cryptography, as related in Singh, *supra* note 64, at 339-47.

mode, but different values.[159] Therefore, in step 4, Alice and Bob call each other again and verify some relatively small random subset of values from the key (say, 75 out of the 573 in the key). If any value does not match, the entire key is discarded, and Alice and Bob know they are being bugged. If all the values match, they can be almost certain that the line is secure. With a secure line, they continue with step 5, in which they use their key to encrypt and transmit one message. Afterwards, they throw away the key, and start over to create a new key for each new message.

159. For example, for Alice's 439th photon, she sends a '1' by sending a photon with a diagonal-left polarization. Eve uses her '+'-shaped filter, which inadvertently and unknowingly twists the polarization, and may either measure a '1' or '0'. At the other end, Bob happens to pick the correct mode (his 'X'-shaped filter), which inadvertently and unknowingly retwists the polarization, but to horizontal instead of vertical (representing a '0' instead of a '1'). The result is that after step two, they would see that Bob had picked the correct mode for measuring photon 439, and they would incorrectly assume that he had the correct value.