Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	GN Docket No. 09-191
Preserving the Open Internet	)	
Broadband Industry Practices	)	WC Docket No. 07-52

REPLY COMMENTS OF THOMAS W. HAZLETT

April 23, 2010

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I. INTRODUCTION

1. My name is Thomas W. Hazlett. I serve as Professor of Law & Economics and Director of the Information Economy Project at George Mason University, and previously held the position of Chief Economist of the Federal Communications Commission. I submit these Comments as a scholar whose research focuses on the economic analysis of information markets, and not at the behest of any interested party.

2. In this proceeding,[1] the Commission seeks to craft "network neutrality" rules ensuring that the Internet remains a robust social tool, continuing to generate economic benefits by accommodating the growth of innovative information services. The objective is a worthy one, and generates no controversy. The regulatory means are, however, intensely contentious. Were new mandates placed on Internet Service Providers (ISPs) to ensure "openness," as defined by Commission rules, a host of consequences would ensue. Interested parties widely disagree on what these (intended or unintended) outcomes would be. At the heart of this debate is the specific impact of network access mandates on broadband network investment. Proponents claim that net neutrality will protect the flow of new applications without any material diminution of infrastructure deployment. Opponents argue the reverse.

3. The Federal Communications Commission must necessarily consider these arguments in evaluating possible rules. To implement a new governing regime for the key social capital now productively employed in IP communications networks without careful empirical analysis of the marketplace impact would be to fly blindly into a policy cloud. This is precisely

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[1] Federal Communications Commission, *In the Matter of Preserving the Open Internet and Broadband Industry Practices, Notice of Proposed Rulemaking* (GN Docket No. 09-191; WC Docket No. 07-52, Oct. 22, 2009) (hereafter "*Notice"* or "*NPRM*").

the path that the Commission has announced it will not take. In the words of FCC Chairman Julius Genachowski, the Commission's "processes should be open, participatory, fact-based, and analytically rigorous."[2] The data and analysis herein bear directly on the economic impacts and social payoffs likely to ensue from the rules contemplated in the Notice.

4. The NPRM proposes that broadband service providers ("broadband ISPs") be prohibited from preventing users from (i) "sending or receiving the lawful content of the user's choice," (ii) "running the lawful applications or using the lawful services of the user's choice," (iii) "connecting to and using on its network the user's choice of lawful devices;" or, (iv) "depriv[ing] any of its users of the user's entitlement to competition among network providers, application providers, service providers, and content providers;"[3] and, further, that they be required to (v) "treat lawful content, applications, and services in a nondiscriminatory manner."[4] By "nondiscriminatory," the FCC means "that a broadband Internet access service provider may not charge a content, application, or service provider for enhanced or prioritized access to the subscribers of the broadband Internet access service provider [but] this rule would not prevent a broadband Internet access service provider from charging subscribers different prices for different services."[5]

5. In this filing, I present evidence showing that U.S. broadband markets provide ample opportunity to gauge the potential effects of the rules contemplated in the NPRM. This evidence is gleaned from several regulatory episodes, each of which reveals that imposing access

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[2] Quoted in Mindel de la Torre, *FCC Discusses National Broadband Plan in First-Ever Online Global Policy Meeting*, Broadband.Gov (March 26, 2010); http://blog.broadband.gov/blog/index.jsp?entryId=326006.
[3] NPRM at ¶92. Each of these requirements would be "subject to reasonable network management;" "subject to exceptions for the needs of law enforcement, public safety, national and homeland security authorities;" and, subject to an exemption for "managed services."
[4] NPRM at ¶105.
[5] NPRM at ¶106.

obligations on broadband network providers tends to reduce investment incentives, deterring the build-out of advanced communications networks. Perhaps the most complete set of natural experiments is offered in the performance of U.S. broadband services over time.[6] Due to differing "open access" regimes for cable modems and Digital Subscriber Line (DSL) services in the U.S., and variation in the DSL rules following FCC deregulatory actions in 2003 and 2005, we are able to observe policy effects. *The evidence is overwhelming that restrictions on networks tend to diminish the rate at which advanced services are made available to U.S. consumers.* Additional evidence from other natural experiments, as noted herein, is entirely consistent with this conclusion.

6. Section II describes the proper framework for analyzing the regulations contemplated by the Commission. The key issue is not whether the Commission finds there to be high concentration or even market power in broadband services, but whether new rules will advance the interests of consumers. Moreover, categorical prohibitions of certain business models that may be adopted by ISPs, including those that create platforms featuring ISP-selected standards or bundled products, cannot be presumed efficient on theoretical reasoning. Section III presents the pattern evinced in U.S. broadband markets, regulated distinctly with respect to rival technologies and then altered over time. The less regulated market has consistently outperformed the more regulated market, as determined by the choices of subscribers. In the important emergence of fiber-to-the-home (FTTH) ultra-high-speed data services, the elimination of network access rules appears a causative factor unleashing new technology. Further market tests of the relationship between access mandates and networks investment

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[6] This analysis has been conducted in much greater detail in Thomas W. Hazlett and Anil Caliskan, *Natural Experiments in U.S. Broadband Regulation*, 7 REVIEW OF NETWORK ECONOMICS 460 (Dec. 2008).

incentives are seen in the huge price discount for the 700 MHz C block license in 2008, and the refusal of major ISPs to apply for broadband stimulus subsidies in 2009. Section IV follows with market evidence demonstrating a wide range of activity that might be called "efficient non-neutrality." The Internet relies on (unregulated) contracting between carriers, promoting innovation in the "core" and at the "edge." The advent of NTT DoCoMo's wireless "walled garden," for example, and the later emergence of mobile handset platforms with considerable vertical links (triggering the Smart Phone Wars), demonstrate the importance of free choice in business models. So too the history of ISP rivalry, where AOL's early "walled garden" model helped spur mass-market access to the Internet. Exclusive deals between application vendors and ISPs have also played a very productive role. The contract placing Google Search as AOL's default choice in 2002, a bargain wherein the country's largest ISP extracted payment for placing an application in the "fast lane," is emblematic of contract forms that have spontaneously emerged, enabling ISPs to compete, content creators to gain wide market access, and customers to choose among continually improving services. Section V then offers a Conclusion.

II. COMPETITION POLICY

7. The goal of the FCC's proceeding should be to promote market competition. The consequence of a successful policy initiative will then yield the most efficient (welfare-maximizing) outcome for the U.S. consumers and producers. This is sometimes misconstrued as a unilateral mission to correct "market failure," an initiative that begins and ends with an inquiry into the level of market concentration. High concentration is taken to proxy market power, and market power then implies market failure. This approach diverts attention from the relevant facts needed to frame a successful competition policy. That quest necessarily focuses on the ability of alternative regulations to increase efficiency.

8. Where monopoly power obtains, it is possible that well-crafted policies can increase competitiveness and, thereby, efficiency. But even in this case it is the policies that form the direct objects of inquiry. Monopoly power, such as obtained in local cable TV markets in the early 1990s, for instance, was not remedied by retail price controls. Indeed, consumers were demonstrably harmed by retail price reductions that actually diminished product quality so substantially that subscriber growth sharply declined from trend.[7] Hence, the existence of market power, while necessary to suggest a role for policy intervention, is not sufficient.

9. This point is made explicit in the Comments recently submitted to the Federal Communications Commission by the U.S. Department of Justice Antitrust Division:

> We do not find it especially helpful to define some abstract notion of whether or not broadband markets are "competitive." Such a dichotomy makes little sense in the presence of large economies of scale… The operative question in competition policy is whether there are policy levers that can be used to produce superior outcomes, not whether the market resembles the textbook model of perfect competition.[8]

Nonetheless, much of the discussion of net neutrality rules in the FCC record and elsewhere is narrowly aimed at the "broadband duopoly," seeing this market structure as sufficient grounds for regulation. Michael Levine of NYU Law School, echoing economist Alfred Kahn and a rich tradition in regulatory analysis, puts the matter differently and correctly: "In this world, the choice is never between imperfect markets and perfect regulation, or between imperfect regulation and perfect markets. The choice is between imperfect markets and imperfect

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[7] Thomas W. Hazlett and Matthew L. Spitzer, PUBLIC POLICY TOWARD CABLE TELEVISION: THE ECONOMICS OF RATE CONTROLS (MIT Press; 1997).

[8] U.S. Department of Justice Antitrust Division, *Ex Parte* Submission to the Federal Communications Commission I*n the Matter of Economic Issues in Broadband Competition, A National Broadband Plan for Our Future*, GN Docket No. 09-51 (Jan. 4, 2010), at 11.

regulation. The antitrust laws now reflect this…"[9]

10. Before leaving this topic, it is useful to note that the U.S. broadband market does exhibit a fairly high degree of concentration, especially when emerging wireless broadband services are excluded as competitors. This market definition will likely become less and less persuasive as wireless networks develop and 3G/4G technologies mature, but even today the full range of empirical evidence does not lead to the conclusion that the wireline broadband sector evinces market power. Were such the case, the main "duopoly" suppliers would exhibit supra-competitive returns. Market metrics, however, suggest that cable and telco rivals are at best capturing only average profits.[10] Hence, the necessary finding justifying policy intervention in standard treatments is lacking in the U.S. broadband markets.

11. None of the above says that regulators cannot improve the performance of broadband services. Pro-competitive reforms can help enormously. First among these initiatives is a push for aggressive spectrum policies that permit advanced wireless broadband networks to develop more rapidly and with far larger capacities. Indeed, competition among fixed and wireless data networks is substantially truncated by the artificial lack of bandwidth, a constraint imposed not by opportunity costs but by rigid regulatory structures that leave vast swaths of valuable airspace severely under-utilized.[11] The FCC's recent emphasis on new liberal license

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[9] Michael E. Levine, *Regulation, the Market, and Interest Group Cohesion: Why Airlines Were Not Reregulated*, NYU Law & Economics Working Paper (2006); http://lsr.nellco.org/cgi/viewcontent.cgi?article=1084&context=nyu_lewp, at 19. See also, Charles Wolf, Jr., *A Theory of Non-Market Failure*, 22 JOURNAL OF LAW & ECONOMICS 107 (1979); Alfred E. Kahn, LESSONS FROM DEREGULATION: TELECOMMUNICATIONS AND AIRLINES AFTER THE CRUNCH (Brookings; 2004);

[10] Thomas W. Hazlett and Dennis L. Weisman, "Market Power in U.S. Broadband Services," George Mason University Law and Economics Research Paper Series 09-69 (November 2009) at 31 ("We find no credible basis to believe that broadband providers, despite their relatively few numbers, are currently exercising market power.")

[11] I recently submitted a proposal to the FCC for an overlay license auction which would facilitate the efficient, expeditious reallocation of TV Band frequencies to potentially higher-valued uses (including mobile broadband). Thomas W. Hazlett, *Unleashing the TV Band: A Proposal for An Overlay Auction,* paper submitted tot the Federal

allocations in the National Broadband Plan constitutes a major shift in regulatory focus and is a welcome development.[12]

III. NATURAL EXPERIMENTS IN U.S. BROADBAND MARKETS

12. The theories of potential harm from vertical integration, exclusive contracts, and bundling require the firms under investigation to have market power. Even though I do not intend in this filing to delve much into a discussion of the competitiveness of broadband service provision, I nonetheless summarize the evidence to set the stage.

13. The great majority of consumers in the U.S. have at least two choices of broadband ISPs.[13] Fiber deployments by telecom carriers have been increasing at a rapid rate (see Figure 3, below). Advanced wireless data services are widely available and are emerging as alternatives to DSL and cable modem connections. Moreover, recent research has failed to find the existence of supra-competitive profits by broadband ISPs.[14] The implication is that the market power

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Communications Commission *In the Matter of A National Broadband Plan for Our Future*, Docket No. GN 09-51(Dec. 18, 2009). Many previous studies have noted the social cost of the spectrum allocation rigidities that artificially constrain wireless services. See: Reed Hundt & Gregory L. Rosston, *Spectrum Flexibility Will Promote Competition and the Public Interest*, IEEE COMM. MAG. 40 (Dec. 1995); Gregory L. Rosston & Jeffrey Steinberg, *Using Market-Based Spectrum Policy to Promote the Public Interest,*[†] 50 FED. COMM. L.J. (1997); Thomas W. Hazlett, *The Wireless Craze, the Unlimited Bandwidth Myth, the Spectrum Auction Faux Pas, and the Punchline to Ronald Coase's 'Big Joke': An Essay on Airwave Allocation Policy,* 15 HARVARD JOURNAL OF LAW & TECHNOLOGY 335 (Spring 2001); Gerald R. Faulhaber, *The Future of Wireless Telecommunications: Spectrum As A Critical Resource*, 18 INFORMATION ECONOMICS AND POLICY 256 (2006); Thomas W. Hazlett, *Optimal Abolition of FCC Allocation of Radio Spectrum*, 22 JOURNAL OF ECONOMIC PERSPECTIVES (Winter 2008), 103-28; Thomas W. Hazlett & Roberto E. Muñoz, *A Welfare Analysis of Spectrum Allocation Policies*,40 RAND JOURNAL ON ECONOMICS (Autumn 2009), 424-54; Thomas W. Hazlett, *Tragedy T.V.: Rights Fragmentation and the Junk Band Problem*, 53 ARIZONA LAW REVIEW (forthcoming 2011); Thomas W. Hazlett & Roberto E. Muñoz, *What Really Matters in Spectrum Allocation Design*, paper for the Berkeley-Georgetown Conference on Wireless Policy (April 16, 2010).

[12] Federal Communications Commission, *National Broadband Plan* (March 16, 2010), Ch. 5.

[13] See, e.g., Declaration of Michael D. Topper, Attachment C to *Comments of Verizon Communications and Verizon Wireless,* GN Docket 09-191 and WC Docket 07-52 (January 14, 2010), at Attachment B (hereafter Topper Declaration) (showing that 97 percent of households in Verizon's service territory have both Verizon broadband and cable modem service available).

[14] Thomas W. Hazlett and Dennis L. Weisman, *Market Power in U.S. Broadband Services*, George Mason University Law and Economics Research Paper Series 09-69 (November 2009) at 31 ("We find no credible basis to believe that broadband providers, despite their relatively few numbers, are currently exercising market power.")

necessary to establish the existence of market failure is generally not in evidence in U.S. broadband services.

A. Market Performance Through Regime Switches for Broadband Services[15]

14. In the early days of broadband technology, telephone carriers supplying DSL services were subject to extensive unbundling rules, while cable TV operators offering cable modem (CM) internet access were not – a regulatory status for cable that remains unchanged through today. This dichotomous market structure was abruptly changed when the FCC voted to end "line sharing" in February 2003. This policy had allowed third parties to lease the high-frequency portion of incumbent carriers' voice lines, using the shared link to provide data services to retail customers at relatively low (wholesale) rates. Ending line-sharing dramatically raised the prices charged to competitive local exchange carriers (CLECs), undercutting their business models and effectively ending the network sharing obligations faced by DSL providers. This deregulatory policy was then formally implemented when DSL was classified as an "information service" by the FCC in August 2005, a reform enacted to bring parity to the broadband market following the Supreme Court's June 2005 decision upholding the longstanding no-regulation policy for cable modems.[16]

15. Hence, three distinct policy regimes have been observed. CM providers have always been free of network sharing obligations. In the initial phase of competition, however, DSL providers faced important network sharing mandates. Following the FCC's Feb. 2003 decision to end line-sharing, a second period – one of substantial deregulation – was introduced.

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[15] This section relies on Thomas W. Hazlett and Anil Caliskan, *Natural Experiments in U.S. Broadband Regulation*, 7 REVIEW OF NETWORK ECONOMICS 460 (Dec. 2008).

[16] *National Cable & Telecommunications Assn. v. Brand X Internet Services,* 545 U.S. 967 (2005).

Then, from August 2005, both CM and DSL suppliers were formally deregulated. See Table 1 for a summary.

TABLE 1. THREE POLICY REGIMES IN U.S. BROADBAND SERVICES

Period	*Cable Modem Rules*	*DSL Rules*
before 1st Qtr 2003	unregulated	open access
2nd Qtr 2003 – 2nd rd Qtr 2005	unregulated	effectively deregulated
3rd Qtr 2003 - after	unregulated	formally deregulated

16. Before turning to economic evidence generated by this natural policy experiment, it is important to note that the objective of "open access" rules is to counter the market power of ISPs, particularly with respect to discrimination in vertical services. Where an ISP is required to offer carriage to competing retail ISPs, it faces potential competition that constrains its behavior to favor one set of applications over another.[17] The argument for applying open access rules targets the same asserted market failure aimed at in the argument for network neutrality (NN) rules, and its proffered solution – the sharing of network facilities by independent ISPs – is similar to the access provisions extended applications and devices under the rules being considered by the FCC now. Indeed, advocates of NN have pointedly argued that the elimination of the access rules for DSL in 2005 drive the need for NN rules today.

17. One intuitively appealing way to test this view is to compare the subscriber growth in rival CM and DSL networks across the three periods. If access regulation spurs innovation by creating a more efficient platform for content and applications, these complements will increase the value of the regulated network relative to unregulated rivals. Network suppliers will have

[17] Mark A. Lemley and Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA LAW REVIEW 925 (2001).

incentives to build more robustly, meeting more intense consumer demand. Both effects will tend to be captured in the pattern of subscriber growth. Hence, a test focusing on customer growth yields evidence on the effectiveness of the regulatory regimes.

Period I (DSL regulated)

18. Until 1Q2003, when DSL was regulated under relatively tight wholesale price controls, cable operators emerged as early leaders in the "broadband race." Through 2002, cable modem households held nearly a 2-1 advantage over DSL households. See Figure 1.

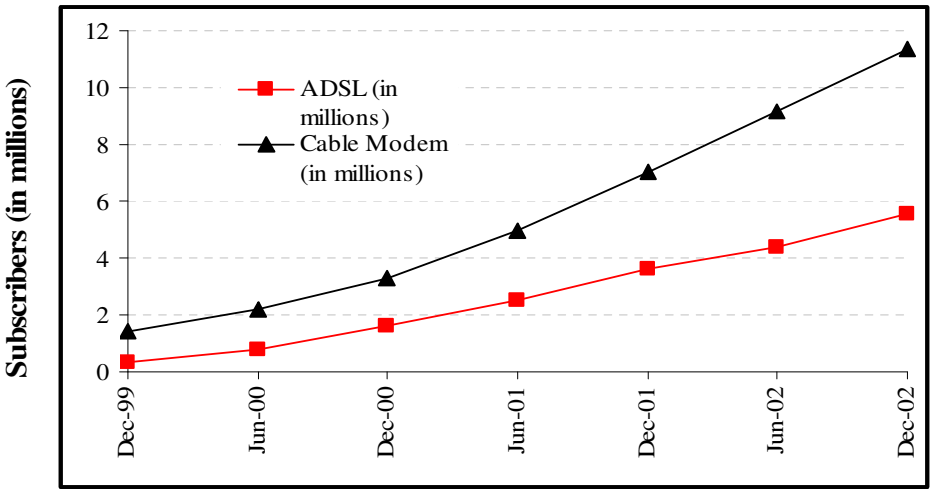

FIG. 1. CABLE MODEM VS. DSL SUBSCRIBERSHIP, 1999-2002[18]

19. Two key parties, the FCC and a major telephone company, were both convinced that a lack of regulation was materially assisting cable modem deployments. That is the precise rationale the FCC used to resist widespread calls to impose "open access" rules. The FCC Chairman, William Kennard, stated in July 1999: "[W]e don't have a duopoly in broadband. We don't even have a monopoly in broadband. We have a 'no-opoly.'… 'So how do we get

[18] Source: Hazlett & Caliskan (2008).

Americans broadband pipes? … [B]y letting a competitive marketplace thrive.'"[19] GTE, a large local exchange carrier, joined with AOL, the leading Internet Service Provider, to promote mandatory access rules on cable modem suppliers.[20] Given that GTE was a direct cable rival in the emerging market for broadband services, it is clear that the firm believed that regulation would retard, rather than stimulate, cable modem deployment.

20. The pattern seen in this initial phase suggests that the unregulated providers invested more aggressively, and deployed broadband services more expeditiously, than rivals facing heavier access requirements imposed by the FCC.

Period II (DSL "line sharing" ended)

21. The elimination of line-sharing sharply raised wholesale rates, undermining "open access." In line with this, data-CLEC growth was adversely impacted. However, total DSL lines spurted in the post-deregulation period, sending the total broadband trend much higher. Quarterly subscriber DSL growth, which had trailed cable nearly two-to-one under line-sharing, matched cable modems within a few quarters. Overall, the trend in DSL growth relative to cable modem growth substantially increased in the period immediately after the FCC announced the termination of line-sharing. See Figure 2. This suggests that access mandates on DSL providers had not been assisting, but deterring, broadband deployment.

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[19] Remarks of Federal Communications Commission Chairman William E. Kennard (No. Calif. FCBA, San Francisco, CA; July 20, 1999).

[20] George Bittlingmayer and Thomas W. Hazlett, *"Open Access": The Ideal and the Real*, 26 TELECOMMUNICATIONS POLICY 29 (June 2002).

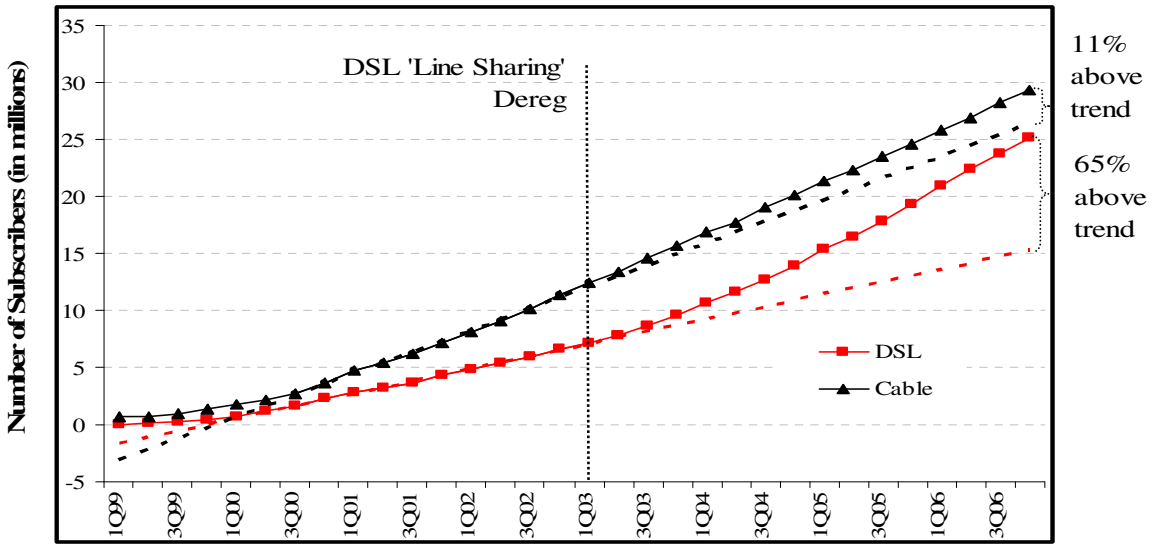

FIG. 2. CM & DSL SUBSCRIBER GROWTH PRE- AND POST-DEREGULATION[21]

Period III (DSL as an "information service")

22. Then in Aug. 2005 the Commission further deregulated telephone carriers, eliminating remaining open access rules by designating DSL as an "information service." DSL exhibited another, if smaller, increase from trend.[22] The larger impact was apparently associated with the policy reform of 1Q2003, however. At that pivot point, the projected year-end 2006 DSL universe was projected to be about 15 million households. The actual year-end DSL subscribership was over 25 million. The 65% increase from trend did not come at the expense of cable modems, which maintained their growth profile. These results cannot be attributed to technological changes unconnected to U.S. policy shifts, a possibility adjusted for in regressions that used Canadian cable modem and DSL subscribership as control variables. The evidence here,

[21] Source: Hazlett and Caliskan (2008).
[22] That incremental 2005 effect is not shown here; rather, the 2003 and 2005 DSL deregulations are combined in Figure 2. Marginal effects for both regulatory changes are quantified, and found statistically significant, in Hazlett & Caliskan (2008).

and across all three time periods, is consistent with the view that U.S. consumers responded very positively to policies that reduced or eliminated "open access" rules.

B. Fiber Unbundling

23. The U.S. regulatory stance on fiber networks provides another marketplace experiment. There was virtually no fiber-to-the-curb (FTTC) being deployed in the U.S. prior to October 2004. Then, to encourage technology adoption, the Commission eliminated unbundling obligations on such systems: "we are persuaded that making such a change in our rules is necessary to ensure that regulatory disincentives for broadband deployment are removed for carriers seeking to provide advanced services to mass market customers using FTTC technology."[23] At that point, the market began to grow. By March 2009, more than 15 million households were able to subscribe to the Internet through ultra-fast fiber connections (Figure 3).

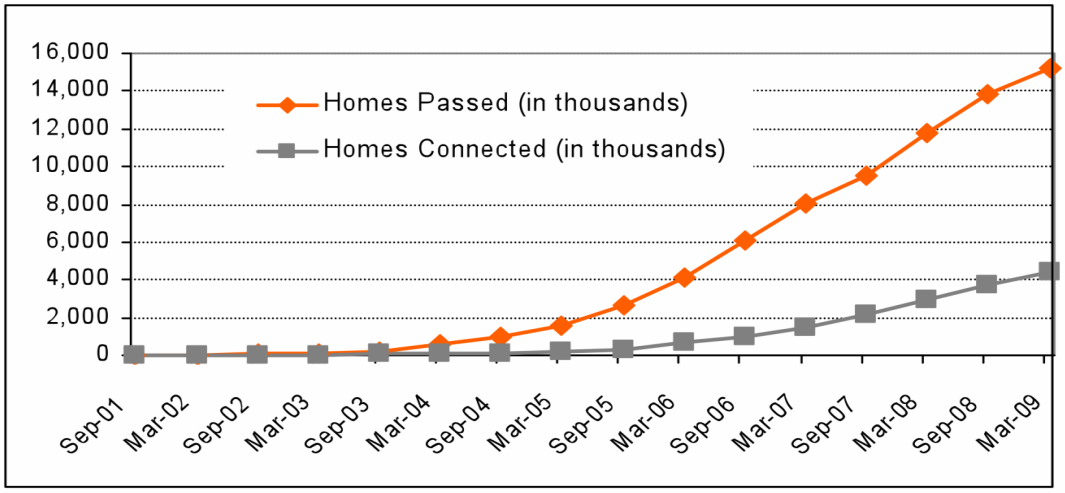

FIG. 3. FTTC HOMES PASSED AND SUBSCRIBERS IN THE U.S.[24]

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[23] Federal Communications Commission, *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, CC Docket No. 01-338 (rel. Oct. 18, 2004), at par. 9.

[24] Source: RVA Market Research and Consulting, *Fiber-to-the-Home: North American Update* (April 2009; prepared for the FTTH Council). Mar-02, Mar-03, Mar-04 extrapolated averages of adjacent periods.

24. Industry experts asserted that the correlation reflected causality. Fiber components sales forecasts, e.g., were projected by industry consultancy Gartner. Their initial forecast for 2004-08 was undertaken prior to the FCC deregulation. When the decision to bar unbundling obligations on new fiber networks was made, Gartner explicitly upped its sales estimates for fiber optic inputs as in Figure 4. This forecast, made not for policy purposes but to yield actionable information for commercial interests in factor markets, is a presumptively unbiased metric. The pattern seen in the FTTC build-out, as well as the analysis embedded in such forecasts, is that this regime switch produced visible results showing the negative impact of access regulation on network investment.

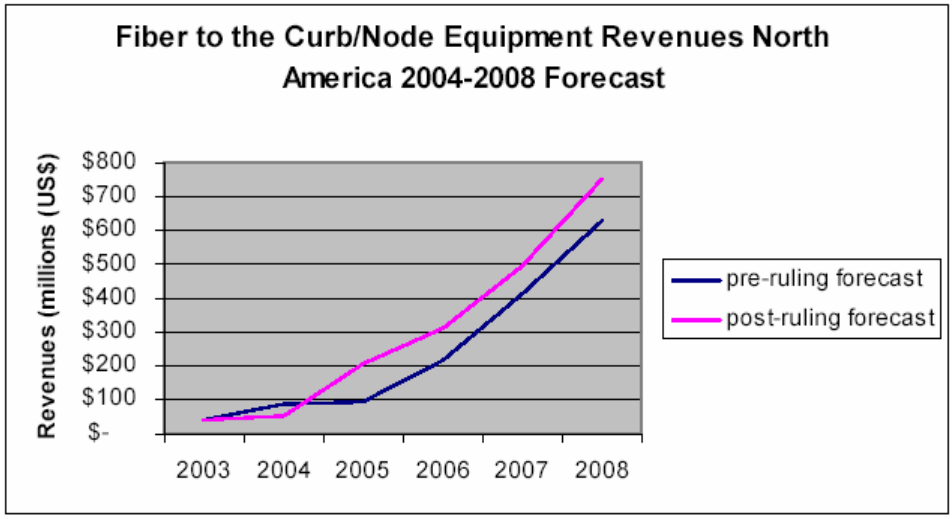

FIG. 4: GARTNER NORTH AMERICA FTTC REVENUE FORECAST

C. Discounting the 700 MHz C Block License[25]

25. In crafting rules for the licenses to be auctioned in 2008 the FCC determined that the winner of the 22 MHz C license (the largest in the auction) would be obligated to provide non-discriminatory network access for all devices and applications.[26] This mandate leaves many details unanswered; it is not clear how far *prices* and *technologies* – as distinct from Acceptable Use Policies – may exclude devices or applications. Verizon won the C block, capturing a *60% discount* attributed, in substantial measure, to the regulatory liability assumed.[27] If the discount resulted in superior retail market performance, it could well be justified in the competitive benefits that ensue. But what is already established is that wireless assets subject to "open access" regulations are worth less to investors. This goes to the heart of the investment incentive issue, revealing less willingness to pay for the creation of networks subject to more intrusive network sharing mandates.

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[25] This subsection is taken from Thomas W. Hazlett, David Porter, and Vernon L. Smith, *Radio Spectrum and the Disruptive Clarity of Coase*, paper presented to Markets, Firms, and Property Rights: A Celebration of the Research of Ronald Coase, Conference at the University of Chicago School of Law (Dec. 4-5, 2009).

[26] The C Licensee is mandated by the FCC not to:

> Block, degrade, or interfere with the ability of end users to download and utilize applications of their choosing on the licensee's Block C network, subject to reasonable network management. Wireless service providers subject to this requirement will not be allowed to disable features or functionality in handsets where such action is not related to reasonable network management and protection, or compliance with applicable regulatory requirements. For example, providers may not "lock" handsets to prevent their transfer from one system to another.
>
> Block Wi-Fi access, MP3 playback ringtone capability, or other services that compete with wireless service providers' own offerings.
>
> Exclude applications or devices solely on the basis that such applications or devices would unreasonably increase bandwidth demands.
>
> Impose any additional discriminatory charges (one-time or recurring) or conditions on customers who seek to use devices or applications outside of those provided by the licensee.
>
> Deny access to a customer's device solely because that device makes use of other wireless spectrum bands, such as cellular or PCS spectrum.

Bingham Law firm summary (Aug. 15, 2007); http://www.bingham.com/Media.aspx?MediaID=5492.

[27] Verizon paid $4.7 billion for licenses allocated 22 MHz of nationwide spectrum; at the mean prices for the other comparable licenses sold in the auction (the A and B licenses also having paired spectrum) it would have paid $11.8 billion, or 2.5 times as much.

D. Major Carrier Rejection of Broadband Stimulus Subsidies

26. Another test of the valuation discount applied to assets subject to "open access" or common carrier type regulation, was conducted by the U.S. Government following authorization of $7.2 billion in broadband subsidies in the "Stimulus Package" enacted by Congress in February 2009. Rules were drafted to distribute most of the funds through grants to applicants, including public agencies and private firms, to extend modern broadband networks to underserved areas. Service operators accepting such funding were required to adhere to FCC network neutrality rules. Major ISPs have declined to apply for these government funds. The large networks, including Qwest, Verizon, AT&T, Comcast, and Time Warner Cable, have decided to forgo "free money" on the grounds that it costs too much.[28] This reveals an important aspect of the market's supply function. Investments shouldering the overhead costs associated with the regulatory burdens of FCC network access rules are not worth the risk, even when taxpayers subsidize them.

27. Experienced, independent financial analysts in the sector confirm this interpretation. Net neutrality rules are widely seen to foreclose potential efficiencies, and are hence inimical to the interests of long-term investors in capital infrastructure. As Anna Maria Kovacs writes:

> Net neutrality would also affect wireline, wireless and cable companies' cash flows and capital requirements, by creating a need for additional capital expenditures while potentially limiting revenue sources.[29]

These economic effects are of central importance to the FCC's (uncontroversial) goal of promoting growth and innovation in broadband markets. Not only are government subsidies a

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[28] Ceclia Kang, *Major Carriers Shun Broadband Stimulus: Funds Would Come with Tighter Rules,* WASHINGTON POST *(Aug. 14, 2009).*

[29] Anna-Maria Kovacs, *FCC: Broadband Update*, Regulatory Source Associates (Dec. 17, 2009).

drain on taxpayers and, therefore, a drag on economic growth generally, they are of very limited use in advancing connectivity. Investment analyst George Reed-Dellinger, commenting on the National Broadband Plan's recommendation to shift "high-cost" subsidies (in the Universal Service Fund) from narrowband voice to broadband data support, notes:

> The FCC has about $4 billion of Universal Service Fund (USF) monies to repurpose compared to the $65 billion AT&T (T-$26), Verizon (VZ-$30), Comcast and the other Internet carriers spend annually on capital expenditures. The key for the Commission is not to mess up the larger number in pursuit of fine tuning their smaller pool of money by, as some recommend, declaring that the Internet is a public utility subject to common carrier regulations.[30]

IV. EFFICIENT NON-NEUTRALITY

28. Not only is there substantial evidence that access regulation has deterred rather than advanced broadband network deployment, there is a plethora of marketplace experience demonstrating that a "non-neutral" business models deployed by ISPs have often proven highly efficient. Vertical integration, in which a firm expands its scope to produce complementary products, and vertical restrictions, where a firm favors one set of complements over another, can enable productive coordination leading to lower costs and better products. That such strategies may also, in certain instance, produce anti-consumer results is established in economic theory,[31] even as the empirical support for successful, anti-competitive outcomes is weak.[32] But there is no theory or empirical analysis that supports the view that such market structures are inherently anti-competitive and should be categorically restricted. This forms the basis of the very strong

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[30] George Reed-Dellinger, *FCC National Broadband Plan Agenda*, Washington Analysis (April 8, 2010).
[31] Joseph Farrell & Phil Weiser, Modularity, *Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARVARD JOURNAL OF LAW AND TECHNOLOGY (Fall 2003).
[32] James C. Cooper, Luke M. Froeb, Dan O'Brien, and Michael G. Vita, *Vertical Antitrust Policy as a Problem of Inference*, 23 INTERNATIONAL JOURNAL OF INDUSTRIAL ORGANIZATION 639 (Sept. 2005).

arguments by Alfred Kahn,[33] Jon Nuechterlein,[34] Scott Hemphill,[35] and others that network discrimination conflicts best be left to antitrust enforcement. Moreover, the history of regulatory attempts to impose vertical structures on communications carriers has not, in most instances, ended happily for consumers.[36]

29. On the contrary, however, pro-consumer outcomes from innovations in business models, many of which layer new vertical relationships on top of network operations, are numerous. The section below offers a brief review that is illustrative, if not close to exhaustive. It displays an important set of economic relationships that have become confused in the net neutrality debate.

30. It has been postulated that *"innovation at the edge"* is far more robust than *"innovation at the core"* of the Internet. Exciting new applications that ride over the network, are there seen as generating more economic value than the pipes that carry bits to their destination. "[U]nco-ordinated innovation at the edge of the network… has taught us that, at least sometimes, decentralised innovation trumps innovation at the core."[37] Yet comparing one set of innovations to the other is not only problematic because we lack a metric to scale the rival contributions, but is conceptually flawed.[38] Applications at the edge rely on investments in the core, and vice versa.

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[33] Alfred E. Kahn, Network Neutrality, AEI-Brookings Joint Center for Regulatory Studies Working Paper RP07-05 (March 2007).

[34] Jonathan Neuchterlein, *Antitrust Oversight of an Antitrust Dispute: An Institutional Perspective on the Net Neutrality Debate*, J. TELECOM & HIGH TECH LAW (2008).

[35] Scott Hemphill, *Network Neutrality and the False Promise of Zero-Price Regulation*, YALE J. ON REG. (2008).

[36] Gerald R. Faulhaber, *Policy-Induced Competition: The Telecommunications Experiments*, 15 INFORMATION ECONOMICS AND POLICY 79 (2003); Bruce M. Owen, *Antecedents to Net Neutrality*, REGULATION 14 (Fall 2007).

[37] Lawrence Lessig, *Do You Floss?* 27 LONDON REVIEW OF BOOKS 24 (Aug. 18, 2005).

[38] Prof. Lessig has suggested that the metric be simple observation: which set of utilities – applications or transport networks – look more useful. "...but when you look at… that class of innovators for the network versus the innovators that actually built the Internet, even if we can't in the strict economic sense prove which would have been better, then we have a pretty clear sense of which of those classes of innovators we'd like to be trusting the innovation in this particular context to and which environment has demonstrated more innovative capacity between the two. And maybe it's just a cultural thing, maybe it's red versus blue thing I don't know, but my intuition is that's the way we should be focusing on instead of this really crude really really misleading pro-regulation/anti-regulation

The sets of services are complements, precisely the argument for net neutrality rules – which seek to reduce barriers to edge innovation by attempting to impose rules that purportedly best maintain this complementarity. The implication of that position is that a flourishing edge is indicative of a flourishing core. To separate developments based on appearances is to arbitrarily unpack a team effort.

31. Similarly, it is an error to categorically favor one set of investment activities over the other as a matter of law. Restrictions placed on advanced data transport networks will predictably harm edge innovators where the result of such regulation is to materially forestall investments in complementary capital (i.e., broadband build-out). Rules constraining network business models are liable to do just this, as they impose rigidities on a changing and unpredictable market environment. Economists and business strategy experts have focused on the general problem for innovators as one where those creating productive platforms may be left without economic gain, even as other firms extract returns. "It is quite common for innovators… to lament the fact that competitors/imitators have profited more from the innovation than the firm" that took the original risks.[39]

32. This dilemma may undermine the deployment of advanced communications networks. As one recent study laments, "The broadband value chain is headed for a train wreck."[40] The source of this dire forecast is that network builders will not recoup sufficient returns from the value yielded network applications, disrupting feedback loops and leading to market failure. "The 'all you can eat' pricing models that are common today create incentives for

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debate..."".*Internet Economics and "Net Neutrality"*, Panel I on "Key Issues in Telecommunications Policy" Conference (May 10, 2006); http://www.aei.org/event/1307.

[39] David J. Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RESEARCH POLICY 285 (Dec. 1986), at 285.

[40] *The Broadband Incentive Problem*, White Paper by the Broadband Working Group, MIT Communications Futures Program and Cambridge University Communications Research Network (Sept. 2005), at 2.

providers to limit usage growth rather than invest to support it."[41] The study concludes that, "Good solutions to this problem need to align the incentives of network operators and upstream stakeholders, for example by enabling monetization of usage that imposes costs on providers."[42] The policy conclusion may be right or wrong. The more fundamental point is that the analysis properly sees the success of edge and core as inextricably linked, and properly sees that dynamic adjustments to business models may well improve the mechanisms by which the market supports newer, faster and better services over time. Rather than protecting one class of economic activity by imposing restrictions on competition from other parts of the value chain, it sees a balancing of interests as key to progress for the system as a whole. The following examples of efficient non-neutrality highlight this economic view.

33. *DoCoMo's "walled garden."*[43] NTT's DoCoMo, the leading cellular carrier in Japan, first brought web access to customers in February 1999, before cellular systems were engineered for broadband (3G) applications. The carrier[44] launched i-mode as "the first packet-based, always-on, mobile Internet service available anywhere in the world."[45] "Official" i-mode vendors are featured on the phone's menu, enabling customers to easily access their content. Billing is handled exclusively through DoCoMo, which lists transactions on subscribers' monthly statements, and charges content providers nine percent of revenues for the service. DoCoMo also allows "unofficial sites" to be accessed by i-mode users, although such vendors suffer a severe competitive disadvantage.

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[41] Id. at 11.
[42] Id.
[43] This sub-section is based on Thomas W. Hazlett, *Modular Confines of Mobile Networks: Are iPhones iPhoney?* 19 SUPREME ECONOMIC COURT REVIEW (forthcoming 2011).
[44] Originally NTT Mobile Communications Network. Renamed NTT DoCoMo in April 2000.
[45] John Ratliff, *DoCoMo as National Champion: I-Mode, W-CDMA and NTT's Role as Japan's Pilot Organization in Global Telecommunications* (Santa Clara, California: Santa Clara University, 2000), at 12.

34. DoCoMo erected a "walled garden" which, critics charged, limited customer choice.[46] Yet, i-mode created an innovative hot-house for content. By enabling a platform that limited application prices via vertical restraints, included payments to the ISP, and excluded non-compliant services (specifications set by the carrier), content providers have been given access to a more valuable platform and endowed with a more productive opportunities.

> At the heart of all this is a paradox: i-mode depends on outside providers for everything from handsets to content, yet it's managed so carefully that nothing is left to chance. Critics see a walled garden, more mobile mall than wireless Web. But in fact, i-mode's success comes less from being walled than from being obsessively tended.[47]

35. I-mode has proven exceptionally popular with third party applications developers. Katzutomo Robert Hori, CEO of Cybird, has 23 sites connected to i-mode. "For a company like us," Hori said, "the i-mode environment has proven very profitable."[48] The result has been a steady stream of content innovation.[49] DoCoMo's vertical control has favored certain technologies, formats, or business models. The carrier decided, e.g., to support Linux and Symbian software for i-mode applications, but to exclude Microsoft.[50] Customer acceptance was so pronounced that DoCoMo became Japan's leading ISP, fixed or mobile. By March 2007, it served 52.6 million cell phone subscribers, of which 47.6 million bought i-mode services.[51] This success prompted Japan's other wireless networks, KDDI and Softbank,[52] to each offer competing

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[46] As reported by Frank Rose, *Pocket Monster*, WIRED (Sept. 2001).
[47] *Ibid.*
[48] *Ibid.*
[49] Jack Qiu, *NTT DoCoMo: Review of a Case*, JAPAN MEDIA REVIEW (Oct. 2004); http://www.ojr.org/japan/research/1097446811.php.
[50] *Microsoft Excluded from DoCoMo's Ecosystem*, THE REGISTER (Nov. 26, 2004); http://www.theregister.co.uk/2004/11/26/microsoft_excluded_from_docomo/.
[51] NTTDoCoMo, http://www.nttdocomo.co.jp/english/corporate/ir/finance/annual/.
[52] Softbank acquired the assets of Vodafone Japan in 2006. Vodafone had purchased J-Phone in 2001.

platforms. DoCoMo responded by extending its proprietary platform into e-commerce.[53] The upshot is that Japan is noted as the leading wireless data services market globally.

36. *Dedicated bandwidth for cable telephony.* For years, U.S. regulators grappled with the challenges presented in the local telephone market. Thought to be a natural monopoly at the time of the AT&T divestiture in 1984, the objective of gaining rivalry between competing services formed the basic motivation for the Telecommunications Act of 1996. While great efforts were expended in network sharing mandates, ultimately over-turned by federal courts as inimical to the stated objectives of the Act, success was finally had: local phone competition emerged when cable TV operators provided high-quality wireline voice services nationwide, head-to-head with local phone companies.

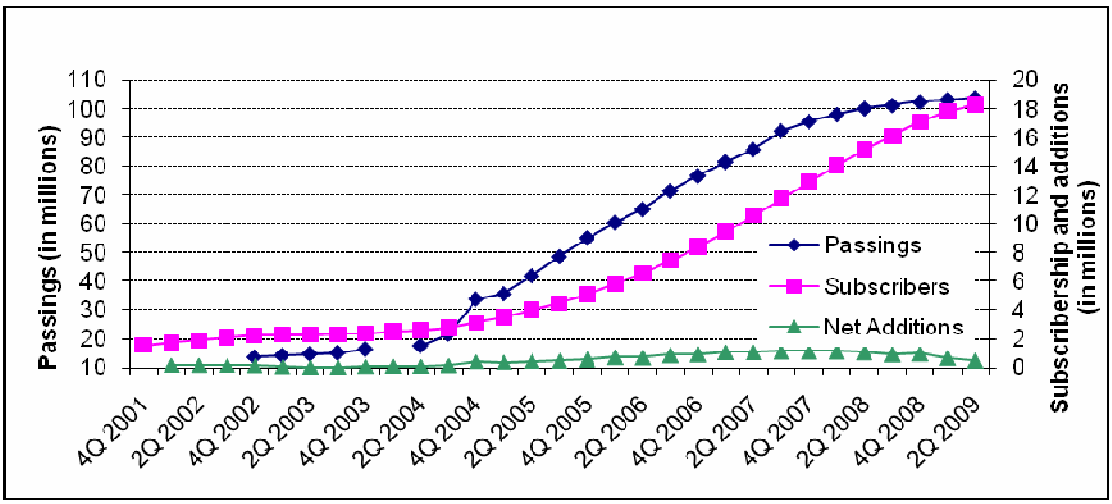

FIG. 5. U.S. CABLE TELEPHONE DEPLOYMENT, 2001-09[54]

38. The technology deployed by cable operators was voice-over-Internet (VoIP), a product generally called "digital voice." Build-out and subscribership began exploding in about

[53] See, e.g., Dan Einhorn, *DoCoMo's "New Business Model,"* BUS WK (April 19, 2004); John Boyd, *Here Comes the Wallet Phone*, IEEE SPECTRUM (Nov. 2005).

[54] Sources: Federal Communications Commission, *Local Telephone Competition* (July 2009); Leichtman Research Group - Research Notes (1Q 2002 through 3Q 2009).

2004. See Figure 5. Two points are directly relevant to the discussion here: (a) Cable operators use dedicated bandwidth within their local area networks (LANs) to provide a premium service for cable VoIP subscribers.[55] Independent VoIP service providers such as Vonage or Skype are free to market their services to cable modem subscribers, but cannot gain access to the LAN 'fast lane' reserved for the cable operator's voice customers.[56] This evinces vertical control of a complementary application, with discrimination in favor of network-provided services. (b) The discrimination is clearly pro-competitive. The leveraging of the network is what, in part, entices cable operators to create and vigorously market voice services. It yields higher returns, and more aggressive competitive risk-taking, in extending competitive telephony. With over 100 million U.S. homes now having a choice between rival fixed line phone operators, a key, long-standing competitive policy objective has been met. It owes much to the vertical integration of cable data and cable voice.

39. *Clearwire's network discrimination.* An emergent wireless broadband network is being built by Clearwire, a public company whose investors include Sprint, Intel, Motorola, Google, Comcast, and Time Warner Cable. The system, now offering 4G services at the cutting edge of wireless technology, is investing billions of dollars in an effort to challenge the leading fixed and wireless broadband ISPs. One of the interesting structural features of its operations is that it seeks to leverage the competencies of its partners, favoring their vertical services over unaffiliated rivals. For instance, network access devices embed default applications provided by

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[55] Ryan Leatherbury, *Dedicated Bandwidth over Cable: Simplifying the Migration to VoIP Service*, CONNECTED PLANET ONLINE (May 21, 2003).

[56] "The telephone service that Comcast and the telephone companies sell uses dedicated bandwidth, while the over-the-top VoIP service that Vonage and Skype offer uses shared bandwidth. I certainly hope that native phone service outperforms ad hoc VoIP; I pay good money to ensure that it does." Richard Bennett, *Damned if You Do, Screwed if You Don't*, A Regular Old Blog (Jan. 20, 2009); http://bennett.com/blog/2009/01/damned-if-you-do-screwed-if-you-dont/.

partner Google.[57] Marketing deals extend to partners Sprint, Comcast, and Time Warner Cable. In some respects, such discriminatory operations are unexceptional – even *de rigeur*. Investors often seek, and obtain, preferential terms in exchange for their financial support. With Clearwire an upstart (with just 688,000 subscribers at year-end 2009,[58] as compared to more than 100 million fixed and mobile ISP subscribers) presumably possessing no market power, there is nothing to suggest that these preferential business terms are anything but pro-competitive. But this says much more than that whatever NN rules are adopted should make allowance for firms without market power to enjoy full flexibility in their choice of business models. Rather, it demonstrates that firms use such alliances to more effectively innovate in a competitive market. To categorically exclude such conduct would target all such efficiencies.

40. *Apple's App Store.* The robust rivalry in smart phones, arguably triggered by Apple iPhone but pioneered by Research In Motion's Blackberry, features highly integrated applications platform that crucially depend on vertical coordination across multiple layers. The capital deployments of networks, the innovations of device makers, the efficiency of operating systems, and the ingenuity of application providers all tie together in a "wireless ecosystem" that consumers enter by subscribing. There are varying degrees of proprietary control exercised in this cross-platform rivalry: RIM and Apple tend towards more proprietary solutions, while Google's Android OS tends to leave more for third parties to engineer.[59] That is not to say that third parties will predictably generate more sales under one model or the other; to date the RIM

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[57] "According to published reports, Google has invested $500 million to secure its place as Clearwire's default Internet search engine—which probably means Clearwire users will automatically rely on Google unless they know how to manipulate their handheld device's software to select another search application." Ted Hearn, *Google Quiet on Clearwire Stake*, MULTICHANNEL NEWS (June 19, 2008); http://www.multichannel.com/article/106191-Clearwire_Quiet_On_Google_Stake.php.

[58] Clearwire Press Release, *Clearwire Reports Fourth Quarter and Full Year 2009 Results*, (Feb. 24, 2010); http://investors.clearwire.com/phoenix.zhtml?c=198722&p=RssLanding&cat=news&id=1394717.

[59] Hazlett, *Mobile Modularity* (2011).

and Apple forms of integration are proving most successful in attracting customers and, in Apple's case, application developers. The future may reveal new winners and new models, structures chosen out of competitive confrontation in the market. Network neutrality rules seek to truncate that selection process by foreordaining that less vertical coordination is categorically preferred to less. The economics of that assertion are wrong. Often, more integrated business models outperform more neutral (less integrated) rivals, and so produce social gains.

41. Indeed, "walled gardens" have contributed materially to the evolution of the Internet. One important example is the business model deployed by America Online (AOL) in the mid-1990s. While the World Wide Web was just beginning to feature content appealing to mass-market consumers, AOL sought to dramatically expand subscribership by offering custom features and proprietary websites. Paying brand name media companies, including TIME and the NEW YORK TIMES, and investing in new services like the Motley Fool, a financial website, it offered its members what they could not find elsewhere. This not only provided competition to rival ISPs, it gave AOL added incentives to market its services to new customers in a campaign, "carpet-bombing.. America with free AOL disks," that would eventually distribute "more than 250 million disks bearing AOL software to the mass market."[60] Spreading easy to use access was enormously important. "Webheads would sneer that using AOL was 'the Internet on training wheels,'" writes Ken Auletta. "Yet it was AOL's user-friendliness that helped popularize the Web – and which attracted thirty-four million paid subscribers in 2002."[61]

42. *Preferential Deals Between ISPs and Content Providers*. Development of innovative "edge" applications has often been advanced by rivalry among content vendors seeking to secure preferential deals with ISPs. Web browsers such as Mozilla Firefox or Opera,

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[60] Kara Swisher, AOL.COM (1998), at 99.
[61] Ken Auletta, Googled: The End of the World as We Know It (2009), at 94-5.

for instance, gain traction – entering a market in which the dominance of Microsoft's Internet Explorer has been documented in U.S. antitrust courts – by entering into exclusive contracts with both ISPs and complementary application providers.[62] Google, now the world's leading search engine, strategically achieved economies of scale via exclusive contracts with ISPs. On May 1, 2002, Google's service was first featured as the default choice on AOL's start-up page – a prime locational advantage sought also by search rivals Inktomi and Overture, but won by Google's commitment to compensate the country's leading ISP "with a very large financial guarantee, running to many millions of dollars."[63] Today, services such as ESPN360 market themselves not to end-users but to ISPs; customers of non-subscribing ISPs do not obtain access to their content.[64] This approach may or may not run afoul of net neutrality regulation, depending on rules adopted and interpretations rendered. But the more essential point is that this business model, one that creates "walled garden" content for ISPs, is instigated by the application provider and is a business model selected to advance its interests. Market structures differentiate the content available on competing ISPs are not inherently hostile to the interests of edge innovators. Treating them as if they are does not protect such entrepreneurial activity, but suppresses it.

V. CONCLUSION

43. The FCC states in the NPRM that "the key issue we face is distinguishing socially beneficial discrimination from socially harmful discrimination in a workable manner."[65] That task poses an enormous challenge for the agency. It is appropriate to take the embedded 'degree of difficulty' seriously, and to fully assess the costs and benefits of new regulation. Empirical

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[62] Marshall Fitzpatrick, *Yahoo! Loses Mobile Giant Opera to Google; Did Google Just Buy a Mobile Browser?* READWRITEWEB (Feb. 27, 2008); http://www.readwriteweb.com/archives/yahoo_looses_opera.php.
[63] David Vise and Mark Malseed, The Google Story (2005), at 113.
[64] David Joachim, *Sports' Greatest Hits at One Web Site* (But There's a Catch), N.Y. TIMES (July 31, 2006).
[65] See NPRM at ¶103.

evidence from markets in the U.S. and elsewhere helps to inform this decision. These data establish that (a) "open access" rules, imposed to achieve neutrality in applications, has counter-productively deterred broadband subscriber growth in the U.S.; (b) diverse business models, including those differentiating ISP content, are an essential, highly productive feature of the rivalry between broadband platforms, as well as in competition among application developers. Policies that disrupt these dynamic processes involving the creation and destruction of vertical structures will predictably reduce innovation and, consequently, consumer welfare.

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