

**ECONOMIC ARGUMENTS IN THE NETWORK NEUTRALITY
PROCEEDING**

Declaration of Michael L. Katz

April 6, 2010

CONTENTS

I.	INTRODUCTION AND OVERVIEW.....	1
II.	INVESTMENT INCENTIVES	4
	A. FINANCIAL RETURNS AND INVESTMENT INCENTIVES	5
	B. INVESTMENT, EFFICIENCY, AND CONSUMER WELFARE.....	20
III.	CONSUMER-WELFARE EFFECTS OF ALTERNATIVE PRICING MODELS.....	22
	A. CONSUMERS BENEFIT FROM CONGESTION PRICING AND/OR NETWORK MANAGEMENT.....	23
	B. END-USERS CAN BENEFIT FROM TWO-SIDED PRICING STRATEGIES	26
	C. NETWORK EFFECTS ARE A REASON TO ALLOW SOPHISTICATED PRICING, NOT BAN IT	29
IV.	CONSUMER-WELFARE EFFECTS OF HAVING MENUS OF SERVICES	33
	A. CONSUMERS VALUE CHOICE.....	33
	B. AN EQUILIBRIUM ANALYSIS IS NECESSARY TO UNDERSTAND THE EFFECTS OF PRIORITIZATION	35
	C. THE WRONG SOLUTION TO A PERCEIVED PROBLEM.....	44
V.	THE PROPOSED RULES WOULD HARM COMPETITION	44
VI.	TITLE II TREATMENT	46
VII.	CONCLUSION.....	51

I. INTRODUCTION AND OVERVIEW

1. The Federal Communications Commission (Commission) has opened a proceeding in which the Commission seeks “public input on draft rules to preserve an open Internet.”¹

2. At the request of counsel for Verizon, I conducted an economic analysis of the likely effects of the Commission’s proposed rules on the consumer benefits derived from the broadband industry.² That analysis revealed that the Commission’s proposed rules would not maximize consumer benefits. Instead, the rules would very likely harm innovation, investment, competition, and, consequently, consumer welfare.

3. I have been asked by counsel for Verizon to review the central economic arguments made in the comments filed by other parties in the initial round of this proceeding in order to determine whether those arguments provide a basis for amending or reversing my conclusion that implementation of the Commission’s proposed rules very likely would harm consumers. I conclude that they do not.

4. Briefly, my specific findings are the following:³

¹ Federal Communications Commission, Notice of Proposed Rulemaking, *In the Matter of Preserving the Open Internet, Broadband Industry Practices*, FCC 09-93, GN Docket No. 09-191, WC Docket No. 07-52 (rel. October 22, 2009) (hereinafter, *NPRM*), ¶ 2.

² Declaration of Michael L. Katz, “Maximizing Consumer Benefits from Broadband,” January 9, 2010 (hereinafter, *Katz Network Neutrality Declaration*), attached to Comments of Verizon and Verizon Wireless, *In the Matter of Preserving the Open Internet, Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, January 14, 2010.

³ I address only what I consider to be the most significant economic claims or arguments made by various commenters in support of the proposed rules. I do not attempt to identify or assess every argument made in the initial round of comments.

- *Several commenters misunderstand the role of financial returns as a driver of investment and the role of investment in promoting consumer welfare.*
 - *By harming the financial returns to investment, the proposed rules can be expected to reduce investment.* Contrary to the claims made by several commenters, economic theory and empirical evidence support the finding that regulation can reduce investment incentives significantly.
 - *Investment is a means to an end, not an end in itself.* Some commenters appear to believe that consumers would benefit from increased investment spending even if the increase were triggered by network-management prohibitions that reduced efficiency. A proper economic analysis demonstrates that, in fact, such prohibitions could reduce investment spending and—even where investment spending rises—the effective supply of service to consumers would fall and quality-adjusted prices would rise, thereby reducing consumer welfare.
- *Several commenters make incorrect or misleading assertions regarding the consumer welfare and efficiency effects of various forms of sophisticated pricing.* The Internet serves as an input into many uses economy wide, is a base for widespread innovation, and is subject to network effects. As a result of these factors, there is a tendency toward inefficiently low levels of: (a) adoption by consumers, who do not take into account the benefits that their adoption creates for other agents in the economy, and (b) investment by access providers, which generally will be unable fully to appropriate the economic value that their investments create for the economy. Some commenters

assert that these facts are reasons to impose the Commission's proposed rules. In reality, the opposite is true. Absent prohibitions such as the Commission's proposed rules, sophisticated pricing can promote both consumer adoption and network investment.

- *Several commenters provide incomplete and, thus, incorrect analyses of the consumer welfare effects of menus of service offerings.* Some commenters express concern that, if broadband Internet access service providers offer a range of options to content and application providers, then some of those providers will be relegated to low-quality offerings. In reality, menus of service options can be important means of giving content and application providers—and, ultimately, consumers—more choice. Commenters fail to conduct a full analysis when they simply assert that some or all customers must be harmed when access providers market a range of service-quality offerings to content and application providers. The commenters do not consider whether banning such menus of options will lead to an inefficient allocation of capacity among competing uses and—through adverse effects on network investment incentives—will lead to lower average quality of service. What is needed is a full, equilibrium analysis. Such an analysis demonstrates that product-line restrictions can harm investment decisions and/or drive out of the market end users or application providers that otherwise would have purchased a low-cost option.
- *Commenters proclaiming support for competition and the proposed rules fail to recognize that the proposed rules would undermine and distort competition.* For the reasons discussed in my earlier declaration, the Commission's proposed rules would

discourage and distort competition, especially from wireless networks. Such effects will work against attainment of the goals of the *National Broadband Plan*.

- *Regulation of broadband Internet access services under Title II would very likely harm consumers.* Imposing many of the components of full Title II regulation could be expected to undermine investment incentives and distort competition in the provision of broadband access services. And to the extent that the Commission interpreted Title II regulation to embody the same restraints as the proposed network neutrality rules, all the harms of those network neutrality rules would also occur. In addition, the uncertainty regarding how Title II regulation would be applied to broadband access services could be expected to adversely affect provider incentives and, thus, harm consumer welfare.

5. The remainder of this declaration explains these findings in greater depth and provides details of the facts and analysis that led me to reach them.

II. INVESTMENT INCENTIVES

6. Broadband service providers have invested tens of billions of dollars in both fixed-line and wireless access networks.⁴ If not for past investment in networks, consumers today would not enjoy the tremendous benefits that Internet applications and services generate using those networks. In the future, consumers will enjoy the full potential benefits of services

⁴ See, Declaration of Michael L. Katz, “Investment, Innovation, and Competition in the Provision of Broadband Infrastructure” (hereinafter, *Katz Broadband Declaration*) attached to Comments of Verizon and Verizon Wireless on a National Broadband Plan, *In the Matter of a National Broadband Plan for Our Future*, GN Docket No. 09-51, June 8, 2009, ¶ 6.

provided by the broadband industry only if there continues to be significant investment in access networks. There is widespread agreement that the vast majority of future investment in innovation and facilities in the U.S. broadband industry will be made by private parties. It thus is vital not to stifle private investment.

7. Several commenters appear to misunderstand the role of financial returns as a driver of investment and the role of investment in promoting consumer welfare. Part A of this section examines the relationship between regulation and investment incentives, while Part B addresses the confusion regarding investment and consumer welfare.

A. FINANCIAL RETURNS AND INVESTMENT INCENTIVES

8. Private investors generally will be motivated by the prospect of profits generated by their investments. All else equal, the greater is the expected financial return from a given level of investment, the greater are the incentives to undertake that investment. It follows that public policies that reduce the financial returns to investment weaken private investment incentives. Thus, it is essential to consumer welfare that public policies do not harm private incentives to engage in efficient investment.⁵ These considerations are especially important in the light of the fact that many investments in broadband networks involve large sunk costs and highly uncertain returns.

⁵ Economic theory identifies conditions (*e.g.*, patent races) under which private firms can have inefficiently high investment incentives. I am aware of no evidence or claims that broadband Internet access providers have socially excessive investment incentives. Indeed, as discussed below, it is plausible that private investment incentives are lower than those that would maximize consumer welfare.

9. In my initial declaration, I demonstrated the severe flaws in a study that Free Press had recently released in which the author claimed to demonstrate that network neutrality regulations do not meaningfully harm investment incentives.⁶ The Free Press study based its claim on two pieces of evidence but fundamentally misinterpreted each. First, the Free Press study claimed that AT&T's investment behavior following certain open access commitments made by AT&T in order to garner regulatory approval of its merger with SBC is evidence that network neutrality regulation will not reduce investment incentives. As I explained in my initial declaration, a central and critical flaw in this claim is that the Free Press study failed to establish a plausible counterfactual to serve as a benchmark against which to measure the effects of AT&T's commitments on its level of investment.⁷ Moreover, the Free Press study ignored the facts that: (a) investment decisions are driven by long-term considerations and, consequently, (b) AT&T would rationally anticipate that investments made in 2007 and 2008 would be free of its transitory commitments over most of the lives of those investments. In its initial comments in the present proceeding, Free Press apparently also recognizes these shortcomings and states:⁸

⁶ S. Derek Turner, "Finding the Bottom Line: The Truth about Net Neutrality & Investment," Free Press, October 2009 (hereinafter, *Free Press Study*).

⁷ The Free Press study ignores several factors that clearly could affect AT&T's investment levels, including the merger itself as well as other commitments made by AT&T in seeking Commission approval.

For a brief discussion of the study's defects, see, *Katz Network Neutrality Declaration*, § V.A.3. See also, George Ford, "Finding the Bottom: A Review of Free Press's Analysis of Network Neutrality and Investment," *Phoenix Center Perspectives 09-04*, October 29, 2009, at 3 and 4.

⁸ Comments of Free Press, *In the Matter of Preserving the Open Internet, Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, January 14, 2010 (hereinafter, *Free Press Comments*), at 26.

Now, let us be clear -- we are not making a claim of causality about this one single case of the imposition of a strict principle of non-discrimination and its impact on investment. There's simply not enough data and too many other intervening factors particular to this transaction.

10. The Free Press study also pointed to the fact that Clearwire supports network neutrality regulation as evidence that network neutrality regulation would not harm investment incentives.⁹ Free Press's comments repeat a weaker version of this claim.¹⁰ However, far from supporting network neutrality regulation, service providers' differing attitudes toward network neutrality regulation reveal that different companies have different business models and different assessments of the effects network neutrality would have on the profitability of their chosen business models. The differential effects that network neutrality regulations would have on alternative business models constitute an additional mechanism through which the proposed rules would distort competition and very likely harm consumers.

11. Even if it does not provide a sound and complete answer, Free Press raises an important question about the effect of regulation on network investment incentives, and it is useful to examine other studies that claim to answer this question. For example, the authors of a white paper produced by Economics and Technology, Inc. assert that past regulation of ILEC wholesale local loop offerings stimulated investment and employment, and that regulation of ILEC wholesale broadband services would do the same.¹¹

⁹ *Free Press Study* at 10.

¹⁰ *Free Press Comments* at 23.

¹¹ Susan M. Gately, Helen E. Golding, Lee L. Selwyn, and Colin B. Weir, "Regulation, Investment and Jobs: How Regulation of Wholesale Markets can Stimulate Private Sector Broadband Investment and Create Jobs," February, 2010 (hereinafter, *ETI Study*), *ex parte*

12. A review of the relevant economic theory provides a helpful framework in which to understand *ETI Study*'s empirical analysis. In theory, regulations that mandate infrastructure sharing can promote complementary investments that make use of the shared infrastructure.¹² However, mandatory sharing can also discourage both: (a) substitute (competitive) investment,¹³ and (b) investment by the network infrastructure providers subject to the mandatory sharing requirements.

13. With respect to substitute investment, mandatory facility sharing can adversely affect the investment incentives of parties that can take advantage of mandatory-sharing regulations to gain access to other network operators' facilities. Specifically, mandatory access at relatively low prices undermines the incentives of the service providers gaining access to the facilities of other providers to invest in networks of their own. In colloquial terms, why buy the cow when you can milk it for free?

14. Next, consider the investment incentives of the network providers that are forced to share their facilities. If an operator is forced to share portions of its network with rival network providers, then its investment in those portions of the network will not be a source of

submission by Public Knowledge, Cbeyond, Inc., Covad Communications Company, Integra Telecom, Inc., PAETEC Holding Corp., and tw telecom inc, *In the Matter of a National Broadband Plan for Our Future, Broadband Industry Practices*, GN Docket No. 09-51, WC Docket No. 07-52, February 12, 2010.

¹² Investment projects *A* and *B* are complementary if the economic returns associated with project *B* are greater when project *A* has been completed than when it has not. For example, a smart phone handset and a smart phone operating system are complementary. And access lines in one geographic region may be complementary to access lines in another—each set of access lines is more valuable in the presence of the other due to network effects.

¹³ Investment project *A* is a substitute for investment project *B* if a supplier could make use of either *A* or *B* to provide a desired service but does not need both. Two broadband access lines to a single household, for example, are substitutes.

competitive advantage. As a result, the network operator will have lower incentives to invest in facilities when it is subject to mandatory facilities sharing. These adverse consequences of mandatory facility sharing can be particularly acute when there is a high degree of marketplace uncertainty and facilities investments are risky. A regulatory policy that forced carriers to bear all of the risks of their facilities investments but socialized the benefits associated with any investments that ultimately proved to be successful would have especially pernicious effects on incentives.

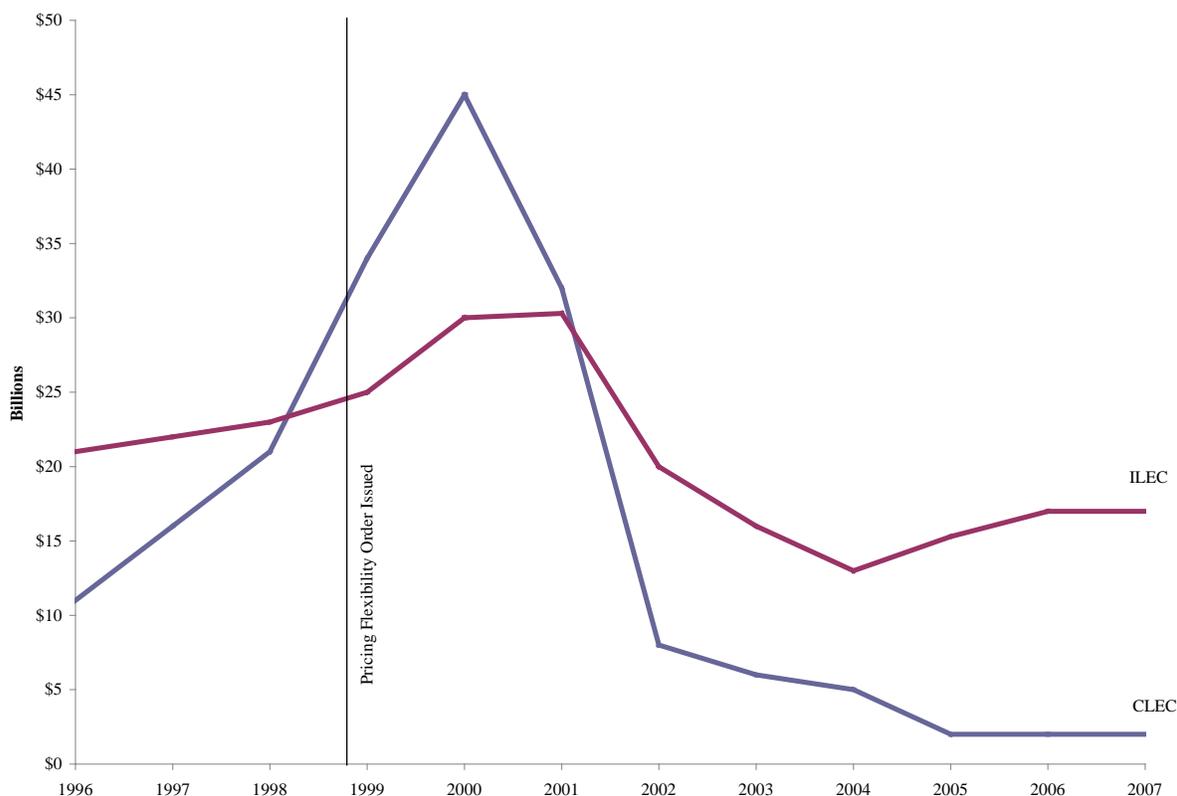
15. The *ETI Study* claims to provide evidence that past mandatory sharing has stimulated complementary investment more than it has discouraged substitute investment and/or investment by the providers that are forced to share their services or facilities. The central methodology of the study is, however, fundamentally unsound. The study does little more than engage in *ex post, ad hoc* rationalization. The authors observe that the rate of ILEC and CLEC investment has changed over time, and they then make unsubstantiated claims that various regulatory events triggered those changes. There is almost no attempt to take other potential causal factors into account.¹⁴ Thus, in taking this approach, the study casually dismisses the effects of the bursting of the tech bubble, 9-11, technological progress, and the shift from wireline to wireless telephony for many consumers, all of which could be expected to affect investment levels. Consider the shift to wireless telephony. A recent survey found

¹⁴ In addition, in measuring investment, the *ETI Study* relies on ARMIS data which are well known to provide inaccurate measures of economically relevant quantities. In particular, ARMIS data rely upon measures of accounting cost and depreciation that can be very different from measures of economic cost and depreciation. (See, George S. Ford and Lawrence S. Spiwak, "The Need for Better Analysis of High Capacity Services," Phoenix Center Policy Paper No. 35, June 2009, at 26.)

that over one-fifth of all U.S. households had only wireless service in the first half of 2009, more than double the comparable figure for 2006.¹⁵ In the light of the ongoing shift away from wireline telephony, it is hardly surprising that ILEC investment was lower in the 2000s than in the 1990s.

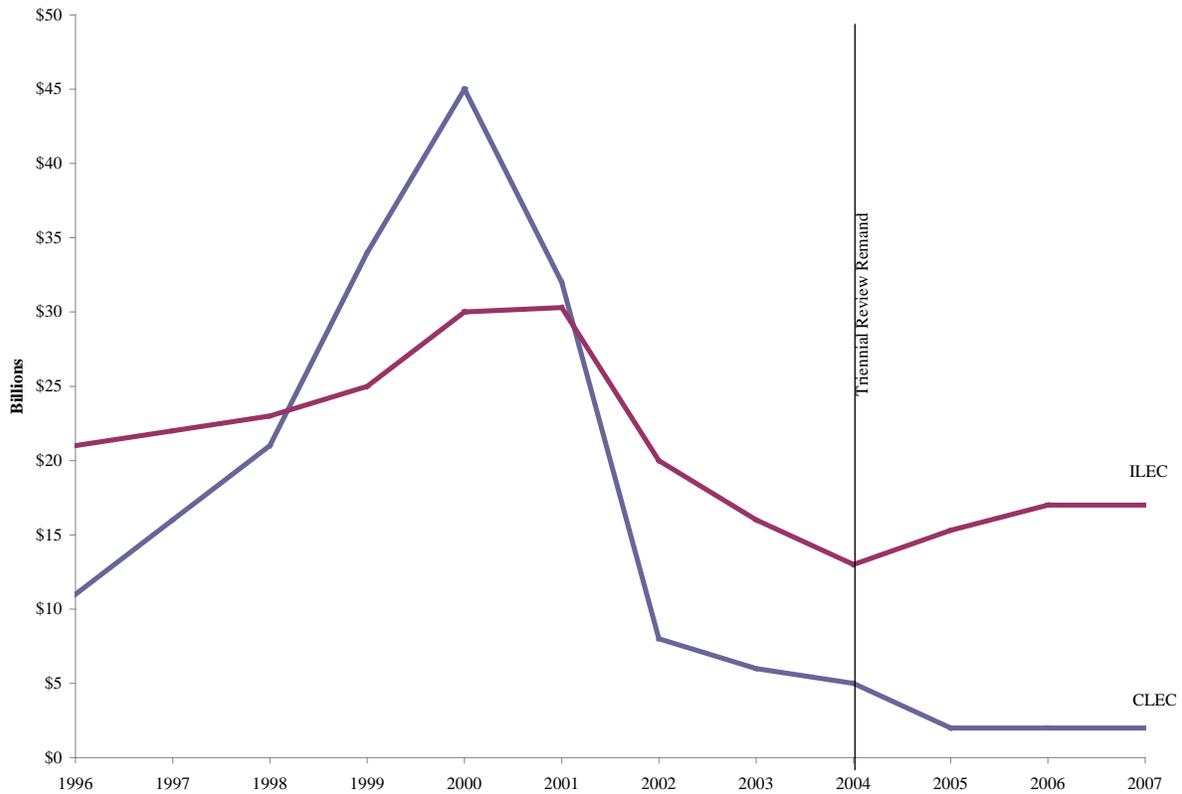
16. Perhaps the clearest way to demonstrate the unsound nature of the *ETI Study*'s methodology is to apply it. The following chart is a copy of Figure 1 – 3 from the *ETI Study*, from which certain labels have been removed to make reading the chart easier. Using the *ETI Study*'s methodology of “eyeballing” the chart and developing rationalizations for the trend, one would conclude that the Commission’s issuing the Pricing Flexibility Order—which the *ETI Study* considers to be a “competition-unfriendly” action—dramatically stimulated both ILEC and CLEC investment.

¹⁵ Stephen J. Blumberg and Julian V. Luke, *Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, January-June 2009*, National Center for Health Statistics, December 16, 2009, available at <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless200912.pdf>, site visited March 26, 2010.



Source: Gately et al., "Regulation, Investment, and Jobs", Economics and Technology Inc., Figure 1-3.

17. The next chart also is a copy of Figure 1 – 3 from the *ETI Study*, this time with different labels removed to make reading the chart easier. Again applying the *ETI Study*'s methodology, one would conclude that the Triennial Review Remand stimulated ILEC investment, which—while it may be true—is the opposite of the conclusion reached by the study's authors. The lesson of this exercise is that the *ETI Study*'s methodology is fundamentally unsound and does not provide insight into the question of how regulation affects private-sector investment.



Source: Gately et al., "Regulation, Investment, and Jobs", Economics and Technology Inc., Figure 1-3.

18. In addition to making the incorrect claim that their empirical analysis demonstrates that regulation stimulated investment, the authors of the *ETI Study* also incorrectly claim that there is no empirical evidence that regulation chills investment.¹⁶ Several empirical studies have concluded that mandatory infrastructure sharing fails to stimulate investment in competitive facilities and, in some circumstances, even reduces it. Crandall *et al.* looked at local loop unbundling and facilities investment across different U.S. states over time. The authors found that “the best argument for maintaining the current unbundling regime—

¹⁶ *ETI Study* at 5.

namely, that low UNE rates encourage CLECs to rent at first, and then build facilities once they have some market experience—is not supported by the data.”¹⁷ Hausman and Sidak examined the experiences of several nations to determine whether mandatory unbundling of local telephone networks promoted facilities-based competition. The authors concluded that there was no evidence that it did.¹⁸ Similarly, Waverman *et al.* examined the effects of local loop unbundling (LLU) on demand for alternative Internet access platforms in 12 European countries and concluded that “The key *finding* from our study is that the intensity of access regulation (measured through LLU prices) negatively affects investment in alternative and new access infrastructures.”¹⁹ Wallsten and Hausladen examined the effects of local loop

¹⁷ Robert W. Crandall, Allan T. Ingraham, and Hal J. Singer (2004), “Do Unbundling Policies Discourage CLEC Facilities-Based Investment?” *Topics in Economic Analysis & Policy* 4(1), at 4. Crandall, *et al.* found that the ratio of CLEC facilities-based loops to UNE loops was higher in states where the price of UNEs was high relative to the cost of building facilities. This finding suggests that CLEC facilities investment would be higher in the absence of unbundling, at least in the short term. This analysis does not directly test whether unbundling facilitates entry of CLECs who later migrate to facilities-based lines. However, Crandall, *et al.* report on a second regression analysis, which finds that the growth of CLEC facilities-based loops relative to the growth in UNE loops was greater in states where the price of UNEs was high relative to the cost of building facilities. This finding provides some evidence against the hypothesis that CLECs will transition over time to facilities-based loops after the availability of UNEs facilitates entry.

¹⁸ Jerry A. Hausman and J. Gregory Sidak (2005), “Did Mandatory Unbundling Achieve its Purpose? Empirical Evidence from Five Countries,” *Journal of Competition Law and Economics* 1(1), 173–245. This study examined the United States, Canada, the United Kingdom, Germany, and New Zealand. In the U.S. and Canada, CLEC-owned lines decreased as a share of all lines after mandatory unbundling, which is the opposite of what would be expected if mandatory unbundling encouraged facilities-based entry. In the U.K., CLECs were already investing in facilities prior to unbundling and the authors saw no evidence of conversion of UNEs to CLEC-owned lines. In Germany, CLECs used both UNEs and owned loops, and the authors saw no evidence of a transition from the former to the latter. Lastly, New Zealand did not implement mandatory unbundling of local loops.

¹⁹ Leonard Waverman, Meloria Meschi, Benoit Reillier, and Kalyan Dasgupta, “Access Regulation and Infrastructure Investment in the Telecommunications Sector: An Empirical Investigation,” September 2007, *available at*

unbundling on investment in next-generation technologies in 27 European countries.²⁰ One of the central findings of that study is “that the more a country relies on unbundled local loops or bitstream unbundling to provide DSL service, the less incumbents and entrants invest in fiber.”²¹ The study also found that, the higher was the number of DSL broadband lines provided over unbundled loops, the lower was the number of broadband connections provided over other facilities-based platforms, including cable, wireless local loops, and facilities-based DSL.²²

19. Lastly, Hazlett and Caliskan specifically examined the effects of U.S. broadband regulation.²³ The authors focused on penetration rates rather than investment levels as their measures of supplier activity. In order to isolate the effects of regulation from other market trends, the authors compare the penetration rates of the two leading technologies for residential broadband, cable modems and digital subscriber line (DSL) service. Cable modem service was

http://www.etno.be/Portals/34/ETNO%20Documents/LECG_Final%20Report.pdf, *site visited* March 26, 2010, at 5. [Emphasis in original.]

Waverman, *et al.* estimated a regression showing that lower LLU prices are associated with lower demand for broadband services provided over alternative, facilities-based platforms. This demand reduction was then used in a calibrated simulation model, which makes the reasonable assumption that lower demand leads to lower facilities investment, to project the investment effects of lower LLU prices.

²⁰ Scott J. Wallsten and Stephanie Hausladen (2009), “Net Neutrality, Unbundling, and their Effects on International Investment in Next-Generation Networks,” *Review of Network Economics* 8(1), 90-112, *available at* <http://www.bepress.com/cgi/viewcontent.cgi?article=1171&context=rne>, *site visited* April 1, 2010.

²¹ *Id.* at 107.

²² *Id.* at 105-106.

²³ Thomas W. Hazlett and Anil Caliskan (2008), “Natural Experiments in U.S. Broadband Regulation,” *Review of Network Economics* 7(4), 460-480, *available at* <http://www.bepress.com/rne/vol7/iss4/2/>, *site visited* April 1, 2010.

unregulated during their sample period, while DSL was subject to varying degrees of network unbundling regulation. The study also uses Canadian data to provide a benchmark. The authors summarize their empirical work as finding that evidence from the U.S. broadband market refutes the claim that broadband regulation does not harm investment incentives.²⁴

20. Turning from empirical studies to economic logic, Professor Economides appears to believe that the sole role of profits is to create a pool of cash that can be used to finance investment. Specifically, he states that:²⁵

If limits on discrimination by broadband providers are abolished, it is unclear that the additional profits the broadband providers would earn from content and application providers would be used to finance investments in the network. The networks are profit-maximizing firms, and may simply pass on the additional profits to shareholders.

Critically, Professor Economides misses the fundamental point that the prospect of profits earned on investment is generally what motivates that investment. To see the importance of this distinction, suppose that a firm is considering whether to undertake a project that would require an upfront investment of \$10 million dollars. One issue the firm faces is whether it has the *ability* to raise the necessary \$10 million through either internal or external financing.²⁶ A second—and equally important—issue is whether the firm would have the

²⁴ *Id.* at 477 and 478.

²⁵ Nicholas Economides, “Why Imposing New Tolls on Third-Party Content and Applications Threatens Innovation and Will Not Improve Broadband Providers’ Investment,” January 2010 (hereinafter, *Economides White Paper*), appended to Comments of Google Inc., *In the Matter of Preserving the Open Internet, Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, January 14, 2010, at 12 and 13. [Internal footnote omitted.]

²⁶ In this regard, Professor Economides flatly asserts that, “if upgrading the network was essential for future profitability, the last-mile networks have ample access to credit markets to fund the investments.” (*Economides White Paper* at 13.) Although I agree with Professor

incentive to make the investment. All else equal, the greater the expected financial return from a given level of investment, the greater are the incentives to undertake that investment. Once one recognizes the central incentive role of returns to investment, one quickly sees that the idea that social welfare is promoted only if all of the returns from investment are plowed back into further investment is mistaken.

21. These considerations are especially important in the light of the fact that many investments in broadband networks involve large sunk costs and highly uncertain returns. Consider a risky investment of \$10 million that has a 50 percent chance of failing—and generating no revenues—and a 50 percent chance of succeeding—and generating \$21 million in revenues. The expected net financial return on this project is \$500,000.²⁷ Observe that, if the project succeeds, the company repays the \$10 million cost of the investment but might well pay the remaining \$11 million to shareholders rather than, as Professor Economides would require, use that \$11 million for further investment. This payment to shareholders is their reward for bearing the risk of the investment. Without the prospect of this outcome, they would have been unwilling to finance the investment and bear the risk of losing \$10 million. In short, the potential for financial reward is what motivates the shareholders to invest in facilities that promote consumer welfare.

Economides's implicit claim that American capital markets generally function well, it is certainly an odd time in our nation's financial history to make the claim that capital is readily available.

²⁷ If the project fails, the company's profits are -\$10 million. If it succeeds, the company's profits are \$11 million (\$21 million in revenue - \$10 million in cost). With success and failure equally likely, the expected return is the simple average of -\$10 million and \$11 million, or, \$500,000.

22. Unlike many other advocates of network neutrality regulation, Chettiar and Holladay admit that network neutrality policies would tend to reduce network investment.²⁸ Their central argument has the following structure:

- Due to network effects, there will be too little investment in network infrastructure and applications.
- Ideally, the government would subsidize both infrastructure and applications investment.
- It is very difficult to subsidize applications directly.
- Therefore, the government should subsidize network infrastructure and use network neutrality policies to transfer wealth to application providers in order indirectly to subsidize investment in applications.²⁹

23. There are several problems with Chettiar and Holladay's proposal. First, if their proposal were put into effect, it would be costly to consumers. Consumers would suffer welfare losses from the distortions to competition that would be triggered by network neutrality rules. Consumers would also be harmed by the efficiency, or "deadweight," losses triggered by the taxation needed to raise the proposed subsidy revenues.³⁰ Moreover, Chettiar

²⁸ Inimai M. Chettiar and J. Scott Holladay, "Free to Invest, The Economic Benefits of Preserving Net Neutrality" Institute for Policy Integrity, New York University School of Law, Report No. 4, January 2010, at 25.

²⁹ *Id.* at 5 and 6 provides a summary.

³⁰ It is widely agreed among economists that are significant "excess burdens" associated with taxation. The revenue associated with a tax is a transfer from the party paying the tax to the party receiving the proceeds of the tax. The excess burden, or deadweight loss, of a tax is the loss in economic welfare that results from the distortions or inefficiencies induced by the tax. Unlike the transfer of revenues, there are no gains that offset these efficiency losses. Thus, the excess burden of a tax is a measure of its social cost.

Hausman's (1998) empirical analysis found that the deadweight losses associated with telecommunications-based taxes were especially high. He estimated that, for each additional \$1 raised in tax revenue on wireline long distance calls, there was a deadweight loss of \$1.25 over and above the tax revenue raised. (Jerry A. Hausman (1998), "Taxation by

and Holladay have not provided any meaningful analysis of whether the implicit subsidies would go to their intended targets or generate significant social benefits. For example, if the subsidies to application providers went primarily to providers offering highly derivative, or “me-too,” applications, then they might generate little social benefit.³¹ In the light of the costs just discussed, there are sound reasons to expect that the benefits of the proposal would be outweighed by the costs.

24. Lastly, it must be recognized that—even if one accepted the entire premise of Chettiar and Holladay’s proposal—it would make sense to impose network neutrality requirements only if huge government subsidies were provided to the providers of broadband network infrastructure. Chettiar and Holladay concede that, all else equal, network neutrality policies will reduce private investment incentives. Hence, absent the subsidies, network neutrality

Telecommunications Regulation," *Tax Policy and the Economy* **12**(1), 29-48, at 41.) In a study of taxes on wireless services, Hausman found a deadweight loss of \$0.72 to \$1.14 for each additional \$1 raised in taxes. (Jerry Hausman (2000), “Efficiency Effects on the U.S. Economy from Wireless Taxation,” *National Tax Journal*, **53**(3), Part 2, 733-742, at 739.)

In addition to deadweight losses from reductions in demand and output due to taxation, taxation can prevent the deployment of new services if there is a fixed cost of entry (investment). Firms that must invest in order to provide a new service (or to provide an existing service in a new market) take into account taxation’s effect on expected profits. If the investment required to enter a market is too high relative to tax-adjusted profits, firms will delay investment (until demand grows sufficiently that the investment is profitable) and may fail to enter new markets at all. In this case, consumer welfare is impacted even more severely than suggested by an analysis that takes the set of available goods and services as given. (Austan Goolsbee (2006), "The Value of Broadband and the Deadweight Loss of Taxing New Technology," *Contributions to Economic Analysis & Policy*,5(1) available at www.bepress.com/bejeap/contributions/vol5/iss1/art8, site visited April 1, 2010.)

³¹ For a discussion of the possibility of socially excessive entry, see N. Gregory Mankiw and Michael D. Whinston (1986), “Free Entry and Social Inefficiency,” *RAND Journal of Economics* **17**(1), 48-58.

policies would worsen the problem of underinvestment that Chettiar and Holladay seek to address in their policy proposal.

25. The requirement that subsidies would be needed to offset the investment disincentives created by network neutrality regulation is a critical shortcoming of that regulation because there is very little reason to believe that subsidies of the size implicated by the Chettiar and Holladay's proposal will be forthcoming. The Commission staff's *National Broadband Plan* estimates that \$24 billion in subsidies would be needed to meet its National Broadband Availability Target, under which every household and business location in America would have access to affordable broadband service with actual speeds of at least 4 Mbps downstream and 1 Mbps upstream.³² This funding would be needed to subsidize investment solely for the least-served households. The *National Broadband Plan* also sets a goal under which "100 million U.S. homes should have affordable access to actual download speeds of at least 100 Mbps and actual upload speeds of at least 50 Mbps by 2020."³³ The team working on the *National Broadband Plan* previously estimated that the incremental cost of providing 100+ megabits per second (Mbps) broadband access to all U.S. households would be \$350 billion.³⁴ Of course, not all investment would need to be subsidized, but is likely that the subsidies

³² Federal Communications Commission, *Connecting America: The National Broadband Plan*, March 2010, available at <http://www.broadband.gov/download-plan/>, site visited March 24, 2010 (hereinafter, *National Broadband Plan*), Box 8-1 and Exhibit 8-B.

³³ *National Broadband Plan* at 9.

³⁴ Federal Communications Commission, "September Commission Meeting," September 29, 2009, available at http://www.fcc.gov/Daily_Releases/Daily_Business/2009/db0929/DOC-293742A1.pdf, site visited January 7, 2010, at 45.

necessary to accelerate investment and deployment along the lines called for by Chettiar and Holladay would be quite substantial.

26. With the intense pressure facing the Administration and Congress to reduce deficits, it is very hard to imagine that sufficiently large subsidies for broadband will be forthcoming anytime soon. Even the almost-trillion dollar American Recovery and Reinvestment Act of 2009 provided less than \$7.2 billion for broadband.³⁵ There are other potential sources of funding that would require shifting government expenditures rather than increasing them. For example, the *National Broadband Plan* recommends shifting up to \$15.5 billion over the next decade from the current High-Cost Program to supporting broadband.³⁶ Still, the amounts are far below what would be needed, especially, if—as Chettiar and Holladay anticipate—much of the funding initially granted to access providers would be transferred to content and application providers.

B. INVESTMENT, EFFICIENCY, AND CONSUMER WELFARE

27. Investment is a means to an end, not an end in itself. The objective is not to have as much investment as possible. The objective is to have *efficient* investment that maximizes net social benefits.

³⁵ This figure is equal to the sum of \$2.5 billion allocated for the cost of broadband loans, loan guarantees, and grants under Rural Utilities Service’s Distance Learning, Telemedicine, and Broadband Program and \$4.7 billion allocated for the Broadband Opportunities Program, which includes some funding earmarked for other purposes (*e.g.*, expanding public computer center capacity). (American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009).)

³⁶ *National Broadband Plan* at 147.

28. As I discussed in earlier declarations, a regulatory policy of limiting network management in order to promote additional investment would harm consumer welfare.³⁷ Restrictions on an operator's management of its network would prevent the operator from producing as much output as possible from any given amount of physical plant and equipment. Because the physical plant could not be used efficiently, the cost of capacity per unit of output would be higher. These higher costs would reduce the operator's net return on investment and, consequently, the operator might invest less in physical assets such as plant and equipment. Moreover, even in those situations in which the reduction in efficiency led to greater investment, the higher costs per unit of output would lead to higher prices, less total output, and lower consumer welfare.³⁸

29. The *ETI Study* makes a similar error of concluding that inefficient behavior would promote consumer welfare. The ETI Study uses the levels of investment and employment in the telecommunications sector as measures of social welfare. The number of dollars invested is, in isolation, a poor measure of social welfare because, as just discussed, consumer welfare depends on the results of the investment, not the dollar amount invested. Thus, for example, if innovation and improved network management practices allow broadband Internet access providers to offer better services and greater capacity with less investment in physical plant, then consumer welfare could be expected to rise even if the dollars invested in facilities fell.

³⁷ These points are discussed in greater detail in *Katz Broadband Declaration*, ¶¶ 31-39. See also, *Katz Network Neutrality Declaration*, § IV.A.1.

³⁸ In *Katz Broadband Declaration* (at note 14), I provide a simple algebraic model that illustrates the harms of public policy limitations on network management practices by establishing conditions under which such policies will reduce total output, raise the costs per unit of output, and lead to less investment in capacity.

30. Employment is a poor measure of social welfare for related reasons. The level of employment in the telecommunications sector might fall due to ongoing innovation and investment in labor-saving plant and equipment. Far from indicating a problem, the decline in employment could be a manifestation of efficiency driven by competitive pressures.³⁹ Although it is true that communications companies employ substantial work forces, the principal means through which telecommunications services can contribute to employment is by stimulating overall economic growth and enabling job creation in other sectors. There is no reason to believe that the number of workers employed by telecommunications providers is a good measure of consumer or household welfare. The *ETI Study* might just as well call for the return of manual switchboards, which would dramatically increase employment (as well as costs).

III. CONSUMER-WELFARE EFFECTS OF ALTERNATIVE PRICING MODELS

31. Several commenters argue against the use of sophisticated pricing strategies. In doing so, these commenters ignore the potential efficiency and consumer welfare benefits of such pricing strategies.

³⁹ This statement is not intended to minimize the adverse consequences suffered by workers who might lose their jobs as a result of the innovation and investment. It is widely recognized among economists that attempting to stifle innovation and investment in the name of protecting employment ultimately harms consumers and is unlikely to succeed in maintaining jobs in the long run. Retraining and other forms of adjustment assistance are much more likely to benefit workers and consumers.

A. CONSUMERS BENEFIT FROM CONGESTION PRICING AND/OR NETWORK MANAGEMENT

32. Before addressing sophisticated pricing, it is useful to review the fundamental need for pricing and/or network management. This is, in part, because some proponents of network neutrality regulation generally are opposed to network management and/or the use of pricing to address congestion or guide usage decisions of households and content and application providers.⁴⁰ However, broadband access networks are subject to congestion.⁴¹ Absent some incentive or control mechanism or the provision of economic incentives: (a) individual users can hog bandwidth to an extreme degree, resulting in degraded performance for other users,⁴² and (b) application and content providers can design their services in ways that inefficiently use bandwidth or place greater burdens on more congested parts of the network.⁴³

⁴⁰ For an example of an attack on usage-sensitive pricing, see Letter from Free Press to Congressmen Waxman, Boucher, Barton, and Stearns, April 22, 2009.

⁴¹ David Clark, William Lehr, and Steve Bauer state that arguments that congestion can be avoided by overprovisioning are based on a misleading view of the Internet and that, because “TCP tries to go as fast as possible unless it is being artificially throttled (as does occur today in some cases), congestion will occur somewhere along the path, if only in the server itself.” (Comments of David Clark, William Lehr, and Steve Bauer, *In the Matter of Preserving the Open Internet, Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, January 14, 2010 (hereinafter, *Clark et al.*), at 10.)

⁴² For example, some peer-to-peer protocols can be constant sources of file uploading even when the personal computer owner is not actively participating. (Declaration of Mitch Bowling, Senior Vice President & General Manager of Online Services and Operations, Comcast Cable Communications, LLC, filed with Letter from Kathryn A. Zachem, Vice President, Regulatory Affairs, Comcast Corporation, to Marlene H. Dortch, Secretary, Federal Communications Commission, July 21, 2008, *In the Matter of Broadband Industry Practices*, WC Docket 07-52, available at <http://fjallfoss.fcc.gov/ecfs/document/view?id=6520034944>, site visited March 27, 2010, at 5.)

⁴³ For example, peer-to-peer networks replace centralized servers, which presumably would be connected to high-capacity facilities, with individual users’ personal computers, which are connected to lower-capacity, last-mile networks. (*Id.*)

Clark et al. (at 18) also observe that application designers

33. One might be tempted to conclude that both issues (a) and (b) could be addressed by placing limits on end users, rather than targeting “selfish” or inefficient applications.

However, *Clark et al.* have made the point that⁴⁴

if ISPs are prohibited from discrimination based on application, then they will have to impose limits on the user as a whole if the user (perhaps unknowingly) invokes an aggressive application. This leaves the user having to figure out that the reason they are getting poor service overall is that they are running an aggressive application that is causing their overall service to be degraded.

Hence, rather than impose limits solely on end users, the better way to address the problem in some instances is to impose limits on applications. If applications providers do not face the costs that they impose on others, then they have incentives to impose excessive costs on others.

34. The vague nature of the Commission’s proposed network neutrality rules leaves open the question of whether the Commission would attack as discriminatory those actions taken by broadband Internet access providers to limit wasteful or aggressive applications. To the extent that it undermines the use of various forms of efficient pricing and network management, the Commission’s proposed non-discrimination rule would *create a market failure* rather than remedy one.

can try to defeat the commonly understood “rules of the road” in order to improve their performance at the expense of other applications. One form of behavior that might be classified in this way is opening up lots of parallel TCP connections and splitting the data to be sent across those several connections. Since the normal congestion behavior of the Internet is to limit all TCP flows equally, the user with more flows gets more capacity. ...

A more serious form of aggression would be to tinker with the tuning parameters of TCP so that it responds more aggressively when it receives signals of congestion.

⁴⁴ *Clark et al.* at 19.

35. It is ironic that broadband Internet access providers wanting to undertake network management are attacked for allegedly seeking to destroy potential telephony or video distribution competitors. The irony arises because network management practices can facilitate the successful offering of these competing services. Absent network management, it might be impossible for users to obtain connections of sufficient quality to support VoIP calling or high-quality video streaming.⁴⁵

36. Even the *NPRM* recognizes that network management can play a valuable and important role in promoting consumer welfare, and the proposed rules are intended to allow reasonable network management. The definition of reasonable network management is thus a fundamental component of the rules. It is also a fundamental weakness. As a general matter, my analysis reaches very different conclusions than do the *Free Press Comments*. However, there is one important area of agreement between the results of my analysis and the conclusions drawn by Free Press: the Commission's proposed definition of "reasonable network management" is unworkable and unsound.⁴⁶ According to Free Press, "The Commission's proposed definition is circular, ambiguous, and incomplete, and without further definition will create loopholes and result in future errors in policymaking."⁴⁷ The Commission's failure to develop a sound definition is not the fault of the Commission. Rather, it is a consequence of the fact that it may well be impossible to craft a sound and

⁴⁵ *Id.*

⁴⁶ *See, Katz Network Neutrality Declaration*, § IV.3.

⁴⁷ *Free Press Comments* at 82.

workable definition. And, absent such a definition, the network neutrality rules are very likely to have many adverse, if unintended, consequences.

B. END-USERS CAN BENEFIT FROM TWO-SIDED PRICING STRATEGIES

37. As I explained in my initial declaration in this proceeding, two-sided pricing has the potential to play an important role in promoting the widespread adoption of broadband services because network operators might use revenue from arrangements with online service or application providers to subsidize the costs of consumer access, which would increase adoption.⁴⁸ *Clark et al.* identify another means by which an application provider could offer to pay to reach an end user in a way that would benefit the end user. As *Clark et al.* explain,⁴⁹

we are moving toward a future where the service agreement of the consumer (at the point of access) is defined as much by the usage cap as by the peak rate. As a result, we could easily imagine an arrangement in which a content provider pays an access provider to carry traffic to the subscriber without having that traffic count against the usage quota of the subscriber. ... It would be a beneficial bargain in many cases for all concerned—providers of high-value, high volume content might be quite prepared to pay a fee to allow the subscriber to receive the information without worries about exceeding a monthly quota.

38. According to Professor Economides, “The two-sided nature of the Internet implies that society can benefit from maximizing network effects (positive feedback effects) that flow from content providers to users and vice versa.”⁵⁰ Yet Professor Economides opposes allowing broadband Internet access providers to engage in two-sided pricing strategies that

⁴⁸ *Katz Network Neutrality Declaration*, ¶ 68.

⁴⁹ *Clark et al.* at 21 and 22.

⁵⁰ *Economides White Paper* at 14.

could have that effect. As an apparent argument against allowing broadband Internet access providers to engage in two-sided pricing, Professor Economides states that⁵¹

[e]ven if the Internet is viewed as a two-sided network, there is no immediate implication that a broadband provider should charge both sides of the market. For example, in payment systems, American Express has no-fee cards that give 2% back to users on purchases while American Express collects a 3% fee from merchants. Even though it is able to charge both sides of the market, American Express, [sic] chooses to charge one side and subsidize the other. Thus, the *private* incentives in some two-sided networks do not necessarily imply positive charges on both sides of the market.

39. Professor Economides is correct that there is no such immediate implication, but he draws the wrong conclusion regarding the implications of this point for the policy debate.

The issue at hand is whether the Commission should adopt a rule that mandates a particular pricing outcome (*i.e.*, a price of zero on the application and content side of the market) rather than allowing competition and market forces to drive broadband service providers' choices of business models. As Professor Economides implicitly states, complex considerations enter the decision of how to price to the two sides of a market. The Commission does not have a reasonable or fact-grounded basis concluding that a price of zero on the application and content side of the market is appropriate. It certainly would be a rare coincidence if such a price were optimal in all circumstances involving the provision of broadband Internet access services.

40. In fact, as discussed further in the next part of my declaration, Professor Economides's example of American Express's pricing illustrates precisely why one would expect a price of zero on the application and content side of the market *not* to be optimal. American Express's

⁵¹ *Economides White Paper* at 11. [Emphasis in original; internal footnote omitted.]

pricing strategy promotes consumer adoption because the higher price charged to merchants tends to lower the price American Express finds it optimal to charge consumers. Hence, if one interprets merchants as application providers, this example illustrates how consumer adoption of broadband Internet access services would be discouraged as a consequence of the ban on such two-sided pricing under the Commission's proposed rules.

41. Professor Economides also makes the following assertion to argue against the social value of two-sided pricing strategies that charge positive prices on the application and content side of the market:⁵²

Broadband providers can of course charge users. Also, as discussed above, the present transit market works well. If a particular broadband provider believes that it deserves more revenue because it has customers that bring great value to the Internet, it can negotiate lower transit rates with backbone providers, effectively decreasing its operational costs. If in fact an ISP brings great value and this is recognized by the backbones providers offering lower prices, they, in turn, can adjust fees to all other ISPs, including those whom the content and applications providers use to connect to the Internet. In making these decisions, all parties have the appropriate incentives to evaluate the value added by each participant.

Thus, a market already exists which can appropriately and effectively respond to any special value that broadband providers bring to the Internet. Additional or special fees are unnecessary to align properly benefits with returns. In fact, the imposition of fees by a broadband provider to content and applications is an attempt to bypass the existing and well-functioning market for transport.

Professor Economides offers no logical argument or data whatsoever to support the claims made in the quoted paragraphs that the particular form of pricing that he advocates promotes efficiency. There is no mention of possible inefficiencies due to the presence of network effects about which he elsewhere expresses concern, and Professor Economides's claim

⁵² *Economides White Paper* at 12.

misses the point that more finely grained pricing strategies can more fully internalize what would otherwise be externalities.⁵³

C. NETWORK EFFECTS ARE A REASON TO ALLOW SOPHISTICATED PRICING, NOT BAN IT

42. Professor Christiaan Hogendorn argues that network neutrality is called for due to several features of the Internet.⁵⁴ Specifically, he points to the facts that the Internet is: (a) a general purpose technology (*i.e.*, it is an input into many uses economy wide); (b) subject to network effects; and (c) an innovation-spawning technology. These features give rise to situations in which there can be a divergence between a consumer's private willingness to pay for Internet access and the social value that that consumer's connection provides.

43. The Internet does indeed have these three characteristics. However, their implications for the network neutrality debate are exactly the reverse of what Professor Hogendorn asserts they are. In fact, the possibility of spillovers and externalities is a reason to allow sophisticated pricing. This is so for several reasons:

- As Professor Hogendorn indicates, these factors tend to lead to inefficiently low levels of adoption by consumers because they do not take into account the benefits that their adoption creates for other agents in the economy. However, the use of sophisticated

⁵³ These concerns are discussed in § III.C below.

⁵⁴ Christiaan Hogendorn, "Spillovers and Network Neutrality," January 2010 (hereinafter, *Hogendorn White Paper*), appended to Comments of Google Inc., *In the Matter of Preserving the Open Internet, Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, January 14, 2010.

pricing can facilitate the greater internalization of network effects.⁵⁵ And strategies such as two-sided pricing and offering menus of service options can promote increased adoption. Specifically, network operators might use revenue from arrangements with online service or application providers to subsidize the costs of consumer access, which would increase adoption.⁵⁶ A network operator could even adopt a business model similar to advertiser-supported over-the-air television broadcasting whereby consumers would receive access for free. Or, a network operator could use the revenues from differentiated arrangements with online service or application providers to offer discounted rates to consumers. Two-sided pricing could be a particularly valuable means of promoting broadband adoption if access providers are able to develop a targeted offering that is particularly attractive to underserved groups. Similarly—absent regulatory prohibitions—wireless carriers can promote consumer adoption by offering handset subsidies for smart phones.⁵⁷ Such subsidies might be an especially important means of increasing broadband adoption by minorities. Relative to Whites, members of minority groups have low adoption rates

⁵⁵ See, generally, E. Glen Weyl (in press) “A Price Theory of Multi-Sided Platforms,” *American Economic Review*.

⁵⁶ This benefit of two-sided pricing does not rely on altruism by the network provider. The ability to collect fees from application providers would lower the marginal cost of serving consumers, possibly to the point where effective marginal costs would be negative. The forces at work are similar to those that lead Google to offer consumers search services without charge.

⁵⁷ These regulatory prohibitions could take the form of “non-discrimination” requirements or limitations on exclusive dealing arrangements.

for residential broadband services, but high utilization rates for wireless Internet access.⁵⁸

- As Professor Hogendorn indicates, the three factors that he identifies make it likely that broadband service providers will not be able to appropriate fully the benefits that their networks create, potentially leading to underinvestment in broadband networks. The use of sophisticated pricing, such as two-sided pricing and offering menus of service options, can allow network owners to earn greater returns on their investments, potentially stimulating efficient investment.

44. Credit card networks provide an example in which two-sided pricing strategies and price discrimination promoted widespread user adoption. As discussed above, merchant fees are used to subsidize consumers, and this subsidization encourages consumers to obtain and use credit cards. Another feature of credit card pricing is that different classes of merchants pay different fees. For example, because they have such low operating margins, supermarkets pay lower fees than do many other classes of merchants. These low fees made it practical for supermarkets to begin accepting credit cards, thus providing consumers with additional payment options.

⁵⁸ Fifty-nine percent of African-Americans and 49 percent of Hispanics have broadband at home, compared to 69 percent of Whites. But 39 percent of African-Americans and 39 percent of Hispanics have used a cell phone or smart phone to access the Internet, compared to 27 percent of Whites. (John B. Horrigan, *Broadband Adoption and Use in America*, OBI Working Paper Series No. 1, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296442A1.pdf, site visited March 27, 2010, at 13 and 22.)

45. Like Professor Hogendorn, Professor Economides drags the network effects red herring across the trail. According to Professor Economides,⁵⁹

The existence of network effects and other spillovers means that the market will undersupply innovation in content and applications, relative to the socially optimal level. Because broadband providers do not internalize the value from network effects or other spillovers to consumers and society in general, their pricing decisions when charging content and application providers do not take its full societal impact into account.

Professor Economides apparently fails to recognize that the same argument implies that application providers will not be willing to pay network infrastructure providers enough to stimulate the socially optimal level of network innovation and investment. In other words, his argument supports the policy conclusion that application providers should be taxed in order to subsidize broadband service providers.⁶⁰ His claim is also rather odd given that he later claims that the Internet transport market is efficient,⁶¹ despite the fact that his argument would apply in that market too. Lastly, Professor Economides fails to establish that most applications have strong network effects that fail to be internalized. Consider Web 2.0, or social networking, applications. Such applications often exhibit network effects—the value of the social network typically increases with the number of participants—but it does not follow that there is significant under-adoption due to network externalities. In many instances,

⁵⁹ *Economides White Paper* at 3. [Internal footnote omitted.]

⁶⁰ I am not advocating this policy. Rather, I am illustrating the inappropriateness of using (as Professor Economides does) the observation that the market is unable to attain the first-best outcome as an argument for stringent regulation.

⁶¹ *Economides White Paper* at 4.

consumers can easily belong to multiple networks simultaneously at little cost. Moreover, many applications are not subject to network effects at all.⁶²

IV. CONSUMER-WELFARE EFFECTS OF HAVING MENUS OF SERVICES

46. Some commenters express concern that, if broadband Internet access service providers are allowed to offer a range of options, or menu of services, then some end users and/or content and application providers will be relegated to low-quality offerings. These commenters seek public policies that would limit broadband service providers' abilities to offer multiple grades of service on the theory that such limits would protect small end users or application providers. In reality, menus of service options can be important means of giving consumers more choice, thus increasing the chances that consumers will find broadband adoption desirable.

A. CONSUMERS VALUE CHOICE

47. Public policies promote consumer welfare when they create an economic environment in which firms have incentives to engage in investment and innovation that satisfy consumer demands. The demands of broadband Internet access service end users are complex. Broadband Internet access services have multiple characteristics about which consumers and content and application providers care, including bit rate, latency, packet delay variation, and packet loss rates. Consumers and content and application providers differ widely in the relative importance that they attach to these different characteristics of broadband

⁶² For the reasons discussed by Mankiw and Whinston (1986), from an efficiency perspective, the extent of entry by applications may be excessive. (N. Gregory Mankiw and Michael D. Whinston (1986), "Free Entry and Social Inefficiency," *RAND Journal of Economics* 17(1), 48-58.)

connectivity. For example, some customers prefer to use applications, such as email, that are relatively insensitive to the underlying network characteristics. Other customers prefer to make use of bandwidth-intensive applications requiring low latency, such as some online games.

48. Given the diversity of consumer preferences in the user population and the wide variation in the demands that different applications place on access networks, consumer welfare is maximized when consumers and content and application providers are free to choose from among a range of different service offerings. When greater choices are available, it is more likely that an individual end user and the content and application providers with which that end user interacts will find services that closely match the consumer's preferences. Moreover, it is important to observe that the availability of a menu of service options can facilitate the creation of additional content and applications as the providers of different types of content and applications choose the levels of service that are most appropriate for their offerings. End users can be expected to benefit as the availability of more delivery options increases the amount and variety of content and applications offered.

49. The complexity and variety of consumer demands thus implies that public policies that significantly restrict the set of offerings available to end users and the content and application providers with which end users communicate via broadband Internet access connections are likely to harm consumer welfare by limiting consumer choice. Consequently, public policies such as the Commission's proposed rules are very unlikely to serve consumer interests when they substitute regulatory mandates for providers' business judgments regarding which

services to offer and which business models to pursue, including the degrees of network management and the structures of their revenue models.

50. Professor Economides asserts that, “If broadband providers are able to engage in paid prioritization schemes, the ‘winner’ [sic] in the market would be the application or content providers that are able to afford to pay for prioritization.”⁶³ In making this claim, Professor Economides ignores the fact that application and content providers *already* pay for improved access by making use of content distribution networks (CDNs) or private network facilities, which interconnect with the Internet at points that are beneficial for the application provider having its own network.⁶⁴ There is nothing anticompetitive or discriminatory about these practices. Instead, they are tangible evidence of what should be an obvious fact: consumers value choice.

B. AN EQUILIBRIUM ANALYSIS IS NECESSARY TO UNDERSTAND THE EFFECTS OF PRIORITIZATION

51. Commenters fail to conduct a full analysis when they simply assert that some or all end users and/or content and application providers must be harmed when a broadband Internet access service provider markets a range, or menu, of service-quality offerings to content and application providers.⁶⁵ Such commenters do not consider whether banning such menus would prevent the efficient allocation of capacity among competing uses and—through

⁶³ *Economides White Paper* at 6.

⁶⁴ *Katz Network Neutrality Declaration*, § II.A.

⁶⁵ Quality is a useful shorthand for several different characteristics, including bandwidth, latency, and reliability. In practice, the heterogeneity of consumer preferences implies that there is no single, scalar measure of quality that will be appropriate for all consumers.

adverse effects on network investment incentives—would lead to lower average service quality overall. What is needed is a full, equilibrium analysis. Such an analysis demonstrates that product-line restrictions can harm investment decisions and/or drive out of the market content and application providers that otherwise would have purchased a low-quality option.⁶⁶

52. One reason that price discrimination can be attractive to suppliers is that it can expand the number of customers for their services by allowing them to charge relatively high prices to customers who have relatively high willingness to pay, while at the same time charging relatively low prices to customers who have relatively low willingness to pay. This latter group of users might be priced out of the market in the absence of a targeted offer. Stated slightly differently, an economically rational broadband Internet access service provider with sufficient information will charge lower prices to those content and application providers that otherwise might not utilize broadband services to reach the access provider’s end-user customers. In this way, price discrimination is a means of encouraging adoption and use by content and application providers. It follows that restrictions on price discrimination can discourage adoption.

53. According to Professor Economides “allowing broadband providers to charge content providers for prioritized access creates an incentive to invest *less* in capacity and distorts

⁶⁶ A model exhibiting these characteristics is presented in Benjamin E. Hermalin and Michael L. Katz (2007), “The Economics of Product-Line Restrictions with an Application to the Network Neutrality Debate,” *Information Economics and Policy*, **19**(2): 215-248.

incentives to upgrade the network.”⁶⁷ Consideration of a hypothetical example is sufficient to demonstrate the lack of a sound logical foundation for Professor Economides’ claims.

54. Consider a market in which there is a monopoly provider of broadband Internet access service that has the technological ability to offer high- or low-latency service. The monopolist faces two types of application providers. There are 40 application providers that are sensitive to latency and are willing to pay \$30 for low-latency access but only \$10 for high-latency access. There are 100 application providers that are insensitive to latency. These application providers are willing to pay \$20 for either high- or low-latency access. Lastly, suppose that the capacity to provide high-latency access costs \$10 per application and the capacity to offer low-latency access costs \$15 per application.

55. Simple calculations reveal that, if forced to offer only a single service level, the monopolist would offer high-latency access at a price of \$20.⁶⁸ Latency-sensitive application providers would exit the market, and the monopolist would invest in capacity sufficient to provide 100 units of high-latency service.⁶⁹ If the access provider were allowed to offer a menu of services, however, it would offer high-latency access for \$20 and low-latency access for \$30. Consequently, the access provider would invest in capacity sufficient to provide 100 units of high-latency access and 40 units of low-latency access. In other words, contrary to

⁶⁷ *Economides White Paper* at 13. [Emphasis in original.]

⁶⁸ I assume also that the monopolist must offer a single price for whatever service the firm offers (*i.e.*, it cannot price discriminate between different types of application providers purchasing the same service).

⁶⁹ For other values of the costs and number of each type of application provider, the broadband Internet access provider would choose to supply 40 units of low-latency access at a price of \$30 and price the latency-insensitive applications out of the market.

Professor Economides' claim, allowing the broadband Interact access provider to offer a menu of services to application providers would result in greater capacity investment and expenditures on upgraded facilities.

56. The hypothetical example just discussed also provides insight into the fallacy of a claim made by Free Press, which asserts that⁷⁰

[a]ny discrimination slows or blocks some traffic, and neither the level of harm imposed by the discrimination nor the need to engage in such harmful activity can be categorically predetermined for all fact patterns -- as a result, the Commission should clarify that any discrimination, no matter how trivial or potentially beneficial, should be evaluated through a framework of reasonable network management, and not categorically or automatically permitted or exempted.

This argument is fundamentally unsound for two reasons.

57. First, this claim fails to recognize the fundamental fact that, in many instances, so-called "discrimination" is actually a mechanism for *expanding* consumer choice. As the hypothetical example above demonstrates, the practices that would be prohibited by the Commission's proposed non-discrimination rule could well lead to greater choice and improved options for all consumers.

58. The second reason that the Free Press argument is fundamentally unsound is that even the internal logic of the argument is flawed. To see this fact, observe that the Free Press logic could just as well be used to reach the policy conclusion that the Commission should compel broadband Internet access providers to engage in as much network management as possible absent a detailed showing that less stringent network management would be beneficial.

⁷⁰ *Free Press Comments* at 75. [Emphasis in original.]

Consider the following argument, which essentially replaces *discrimination* with *failure to manage traffic*:

[a]ny failure to manage traffic slows or blocks some traffic, and neither the level of harm imposed by the lack of management nor the need to avoid engaging in such beneficial activity can be categorically predetermined for all fact patterns -- as a result, the Commission should clarify that any lack of network management, no matter how trivial or potentially beneficial, should be evaluated through a framework of reasonable network management, and not categorically or automatically permitted or exempted.

59. More broadly, Free Press mistakenly asserts that “the routing of Internet packets is a zero-sum-game; during times of congestion, prioritizing one packet deprioritizes all others.”⁷¹

This claim ignores the investment benefits that can flow from paid prioritization. As demonstrated by the hypothetical example above, paid prioritization can lead to increased investment and need not result in any end user or application’s receiving slower service than it would absent paid prioritization. Second, Free Press’s claim also ignores the fact that some end users and applications may have little need for priority, so that the gains enjoyed by the end users and application providers using priority services outweigh the losses, if any, suffered by end users and application providers using the “deprioritized” services. With paid prioritization, those applications that value priority can pay to ensure they obtain it, while those applications for which priority is not important can benefit from lower prices by choosing a lower-price, lower-priority option.

60. Free Press is not alone in misunderstanding the distributional effects of service menus on end users and content and application providers. According to Professor Economides,

⁷¹ *Free Press Comments* at 3.

allowing broadband Internet access providers to charge application and content providers for reaching the providers' end-user customers could be particularly harmful to applications and content providers that are small businesses, startups, or individuals.⁷² In making this assertion, Professor Economides ignores the fact that economic analysis shows that such application and content providers are likely to benefit when broadband Internet access providers offer menus of options because those menus can contain low-cost or free options for such applications and content providers.⁷³

61. Professor Economides argues that allowing paid prioritization would raise entry costs and increase the probability that network effects in the provision of applications and content will lead to lock-in.^{74, 75} In making these claims, he fails to recognize that paid prioritization could *reduce* the costs of entry by providing entrants with a range of options, for example by eliminating the need for a new entrant to replicate the existing facilities of an incumbent application provider that has built a large private network and/or set of server farms in order to overcome some of the problems inherent in best-effort Internet services. Professor

⁷² *Economides White Paper* at 4.

⁷³ For an example of a formal analysis making this point, see Benjamin E. Hermalin and Michael L. Katz (2007), "The Economics of Product-Line Restrictions With an Application to the Network Neutrality Debate," *Information Economics and Policy*, **19**(2): 215-248.

⁷⁴ *Economides White Paper* at 6.

⁷⁵ As a general matter, network effects can give rise to *lock-in*, whereby users continue to patronize their current application provider even though another provider offers an application that would be superior if many consumers switched to it. Network effects can trigger lock-in because, in the presence of network effects, few users may want to patronize an application provider that does not have a large pool of existing users. If users cannot coordinate their actions, they may all continue to patronize the leading application provider even though they would be better off if they were all to switch to a rival application provider. The consequence for competition is that it can be hard for rival suppliers with small or non-existent pools of existing users to displace a market leader with a large pool of existing users.

Economides also fails to offer any analysis of actual applications where network effects would potentially create lock-in.⁷⁶

62. Professor Economides asserts that allowing broadband access providers to offer menus of options to application providers will lead broadband access providers to customize their networks to the needs of the market leader.⁷⁷ In making this claim, Professor Economides ignores that facts that: (a) meeting customer needs is typically beneficial; and (b) to the extent that such customization would lock broadband Internet access providers into serving a specific application provider and thus weaken the access providers' future bargaining positions with that application provider, access providers would have economic incentives to avoid such lock-in and the potential for being "held up" in this way.⁷⁸

63. Professor Economides makes the following argument:⁷⁹

[O]nce successful innovations have occurred at the edge of the network, a network operator with market power has an incentive to exercise its control of the network to raise its access price to innovators who have succeeded. This significantly dampens the *ex ante* incentives for such innovations to occur.

⁷⁶ He identifies online search as one application for which these effects arise but provides no basis for his assertion. (Economides *White Paper* at 6.)

⁷⁷ *Economides White Paper* at 6.

⁷⁸ Suppose that a network owner makes an investment that is valuable only to a particular application provider. Once the network owner has made its investments and the associated costs are sunk, the application provider can threaten to cease purchasing the services. Because, by hypothesis, the investments have little value in alternative uses, the network owner will be in a weak bargaining position. The process by which the application provider can take advantage of this fact is known as hold-up. For a recent discussion of the hold-up problem and its investment implications, see Benjamin E. Hermalin and Michael L. Katz (2009), "Information and the Hold-Up Problem," *RAND Journal of Economics* 40(3): 405-423.

⁷⁹ *Economides White Paper* at 6.

As Professor Benjamin Hermalin and I have shown elsewhere, this argument is incomplete and, consequently, incorrect.⁸⁰ Intuitively, it misses the point that such pricing could be a form of insurance to entrants: if an entrant is unsuccessful, then it is charged less than if it is successful.

64. Professor Economides offers the following scenario as an argument against allowing broadband Internet access providers to charge application and content providers for priority access:⁸¹

Suppose that a broadband provider offers prioritization guaranteeing that, for example, video content providers in the priority lane arrives a few seconds before all other providers in the standard lane. This can be done just by slowing the standard lane down by a few seconds without making any data move faster. Given the prospect of losing almost all their customers if they stay in the slow lane, every video content provider that can afford it will choose to pay to be in the ‘priority lane.’ What is the result? The video content of the remaining active firms would all arrive at the same speed as before, competition would remain the same among the firms that can afford the payment, but all these firms would pay a higher price to broadband providers. The companies that cannot afford to pay die. Both surviving and foreclosed firms are worse off. Consumers are worse off as they now have fewer choices on the content and applications side of the market. Allocative efficiency is reduced since content providers now pay additional fees over and above the cost-based fees that they already pay for connection to the Internet.

Remarkably, in his examination of this scenario, Professor Economides misses the point that the prioritization in his hypothetical is completely irrelevant. Under Professor Economides’ claimed equilibrium outcome, all video content providers purchase the same lane of service. Hence, the broadband provider could simply raise the price of its standard lane service to

⁸⁰ Benjamin E. Hermalin and Michael L. Katz (2009), “Information and the Hold-Up Problem,” *RAND Journal of Economics* **40**(3): 405-423.

⁸¹ *Economides White Paper* at 7. [Internal footnote omitted.]

generate exactly the same effects that Professor Economides incorrectly attributes to the use of a menu of offerings. Moreover, Professor Economides' hypothetical assumes away any potential efficiency benefits of prioritization. In contrast to Professor Economides' assumption, some application providers may value high-priority service, and some may not care. It is efficient to allow those application providers that value high-priority services to purchase those services.

65. Professor Economides warns against “exclusive prioritization” and the use of “identity-based discrimination (based on source or ownership of content) and exclusive contracts to identify a ‘winner’ on the content side and then charge them for the privilege.”⁸² Professor Economides provides no analysis of whether such contracts would, in fact, be used by broadband Internet access providers facing competition from one another. This is an important omission because there are reasons to believe that they would not: an access provider engaging in such contracting would be offering its end-user customers less choice and, if doing so were inefficient, could suffer economic losses from doing so. Professor Economides is correct that the use of exclusive contracts can, in certain circumstances, harm economic efficiency, competition, and consumer welfare. But in many other circumstances, exclusive contracts can promote consumer welfare by supporting competitive investment and innovation. This is precisely why such exclusive dealing is subject to federal antitrust law under a rule-of-reason approach. In contrast to Professor Economides' blanket condemnation

⁸² *Economides White Paper* at 6 and 7. Even Professor Economides acknowledges that this is an “extreme” outcome. To my knowledge, no major broadband Internet access provider has proposed engaging in exclusive dealing with application and content providers.

of any pricing contracts between content providers and broadband Internet access providers, antitrust policy distinguishes between those contracts that promote competition and consumer welfare and those that harm it.

C. THE WRONG SOLUTION TO A PERCEIVED PROBLEM

66. Professor Economides points to economic theory indicating that a provider that possesses market power and offers a menu of service offerings can have economic incentives to reduce the quality of one or more of those offerings in order to facilitate price discrimination.⁸³ Although this is a logically consistent theory, Professor Economides does not demonstrate that the conditions required for this effect to arise are present in the broadband access industry. For example, competition severely limits the incentives of firms to engage in such strategies. Rather than block multiproduct strategies that can promote efficiency and consumer welfare, the Commission should promote competition. As I next discuss, the proposed rules would have the opposite effect.

V. THE PROPOSED RULES WOULD HARM COMPETITION

67. Professor Economides argues that the concerns that network neutrality regulation ostensibly addresses are heightened by a lack of competition in the provision of last-mile broadband Internet access services.⁸⁴ However, Professor Economides fails to recognize that the Commission's proposed rules can be expected to have (unintended) adverse effects on competition. For the reasons discussed in my earlier declaration, the rules would discourage

⁸³ *Economides White Paper* at 8.

⁸⁴ *Economides White Paper*, § 2.7.

and distort competition, especially from wireless networks.⁸⁵ Hence, the proposed rules would have the effect of reducing the power of market forces to promote consumer welfare.

68. The *National Broadband Plan* poses the question of whether wireless broadband Internet access will be able to compete with wireline access.⁸⁶ The *Plan* also expresses concern that there might be insufficient investment by non-cable, wireline broadband Internet access providers to provide robust competition for cable companies in the provision of very high speed access.⁸⁷ The *Plan* goes on to say that, “[a]s with fixed-mobile substitution, how the evolution of network capabilities affects competition depends on how pricing, consumer demand, technology and costs evolve over time.”⁸⁸

69. The *National Broadband Plan* is correct to identify these different factors as playing potentially important roles, but the *Plan* fails to observe that the evolution of network capabilities will depend in large part on access providers’ investments and that these investments would very likely be adversely affected by the rules the Commission has proposed in the present proceeding. These effects are likely to be particularly important for the reasons identified in my initial declaration⁸⁹ and because—as the *National Broadband Plan* observes—wireline broadband access networks require large fixed and sunk investments, which makes investments risky and makes it more difficult for multiple wireline

⁸⁵ *Katz Net Neutrality Declaration*, §§ IV.A-IV.C and V.A.3.

⁸⁶ *National Broadband Plan* at 40 and 41.

⁸⁷ *National Broadband Plan* at 42.

⁸⁸ *National Broadband Plan* at 42.

⁸⁹ *Katz Net Neutrality Declaration*, § V.A.3.

competitors to be commercially viable.⁹⁰ As the *National Broadband Plan* observes, experience to date suggests that competition among facilities-based broadband service providers tends to spur network upgrades.⁹¹ This finding, in turn, suggests that the best way to promote additional investment is to avoid regulations—such as the rules proposed in the present proceeding—that would distort and, ultimately, attenuate competition.

70. In addition to reducing investment, there are other, more subtle ways in which the proposed rules could harm competition. For example, limitations on network management could make it more difficult for relatively low-capacity networks to compete with relatively high-capacity networks. And, if Commission restricted the ability of broadband Internet access providers to offer menus of service options to content and application providers, then broadband Internet access providers might specialize by each offering a different grade of service. This could lead to *less* competition because different networks would not offer services that competed as directly against one another on a head-to-head basis on any particular quality-of-service.⁹²

VI. TITLE II TREATMENT

71. Some parties have asserted that the Commission should consider reclassifying broadband Internet access services as Title II services.⁹³ Here, I focus on the economic merits

⁹⁰ *National Broadband Plan* at 36.

⁹¹ *National Broadband Plan* at 38.

⁹² In addition, for the reasons discussed in Section IV above, consumers would have fewer and less attractive options available to them.

⁹³ Letter from Ben Scott, Free Press, to Julius Genachowski, Federal Communications Commission, RE: Preserving the Open Internet, GN Docket No. 09-191; Broadband Industry

of applying Title II regulation to broadband Internet access services. I do not address the legal issues.

72. Conducting a full economic analysis of the effects of Title II regulation is difficult in part because, at this point, it is unclear how the Commission would interpret Title II regulation in the context of regulating broadband Internet access providers. The full Title II, common-carrier regulation of traditional phone service included price regulation, tariffs, mandatory unbundling, and other elements. Application of such regulations to markets with multiple suppliers can harm consumers by distorting competition and weakening investment and innovation incentives. For this reason, such regulations are best suited to situations in which there is a monopoly provider and relatively stable technology.

73. Unintended adverse consequences would be especially likely in the case of broadband access services because there are many different competitors, rapid technological change, dramatically shifting demand conditions, and many opportunities for complementary investments. All of these factors make it more difficult to impose pervasive regulation without distorting market outcomes in unintended ways that harm consumer welfare.

Practices, WC Docket No. 07-52; A National Broadband Plan for Our Future, GN Docket No. 09-51, February 24, 2010; Letter from Richard S. Whitt, Google Inc., to Marlene H. Dortch, Federal Communications Commission, RE: Authorized Ex Parte Contact – GN Docket No. 09-51; GN Docket No. 09-191; WC Docket No. 07-52, March 22, 2010. *See also*, Comments of Public Knowledge, Media Access Project, The New America Foundation, and U.S. PIRG, *In the Matter of a National Broadband Plan for Our Future*, GN Docket No. 09-51, June 8, 2009, at 24-25; Comments of the Consumer Federation of America and Consumers Union, *In the Matter of a National Broadband Plan for Our Future*, GN Docket No. 09-51, June 8, 2009, at 1-2 and 17-20.

74. In theory, the Commission might forbear from some elements of full Title II regulation, although whether the Commission would find that the statutory standards for forbearance were satisfied—and how quickly and for which particular provisions of Title II—inherently creates uncertainty. If Title II were to mean application of interconnection requirements and the prohibition of unreasonable discrimination, then it *might* be less stringent than the Commission’s proposed network neutrality rules. In this regard, a prohibition of unreasonable discrimination would be less harmful to competition and consumer welfare than would the flat ban on “discrimination” called for by one of the Commission’s proposed rules in the present proceeding.⁹⁴ That said, even a prohibition on unreasonable discrimination would be problematical from the perspective of competition and consumer welfare.

75. It is far from clear how the Commission would interpret “unreasonable discrimination” in the context of broadband Internet access. This lack of clarity would create needless uncertainty for consumers and investors, which likely would result in a loss of consumer welfare. The vagueness surrounding the meaning of unreasonable discrimination by a broadband Internet access provider further highlights the fact that broadband services are much more complex than plain old telephone service. Broadband services have much greater potential to offer a variety of services, are subject to rapid innovation, continue to require very large investments in network infrastructure, and are offered by competing service providers.

⁹⁴ As discussed below, an unreasonable discrimination standard is also problematical. It is important to recognize that the fact that this standard might not be as bad for consumer welfare as would the proposed non-discrimination rule does *not* imply that imposing Title II regulation would promote consumer welfare.

All of these factors dramatically increase the likelihood that an unreasonable discrimination standard would distort competition and unintentionally harm consumer welfare. More broadly, the uncertainty about what would be the resulting scope of Title II regulation as well as the specific impacts of those elements of Title II regulation imposed in such a complex competitive situation would reasonably be expected to distort competition and unintentionally harm consumer welfare even when regulation does not entail the full array of potential Title II rules.

76. Although they reach the opposite of what my analysis indicates is the correct policy conclusion, the authors of the *Free Press Comments* also identify significant costs of the vagueness associated with the Title II approach:⁹⁵

[T]he standard of “unjust and unreasonable discrimination” of Section 202(a) of Title II is neither substantively nor procedurally appropriate for Internet access service, for several reasons. ... Such a standard would be far more vague and arbitrary than a clear and unambiguous rule against discrimination. ... A vague and arbitrary standard would create more uncertainty for investors, content providers, users, and the service providers themselves; would create opportunities for harmful anti-consumer and anti-competitive loopholes; and would render effective enforcement far more difficult. Such a standard cannot be meaningfully applied to a generative, multi-purpose network such as the Internet...

77. The loss of consumer welfare due to increased uncertainty—a problem shared with the proposed rules—would be far from the only costs of this approach. To the extent that the Commission read Title II as imposing the requirements embodied in its six proposed network neutrality rules, all of the consumer welfare harms associated with those rules would also

⁹⁵ *Free Press Comments* at 79 and 80. [Internal footnotes omitted.]

arise under Title II regulation. Merely changing labels would do nothing to cure the problems inherent in the proposed regulations.

78. One form of Title II regulation would require broadband service providers to offer transport service separately from ISP information services, with the transport service subject to full Title II regulation.⁹⁶ Attempts to commoditize transport in this way would, if successful, very likely undermine investment incentives—an industry with high fixed costs and commodity products is unlikely to be an attractive investment for multiple suppliers.^{97, 98} Moreover, proponents of such regulation ultimately would be likely to seek price regulation or to demand strong structural separation between the transport and ISP services, which could destroy the realization of economies of scope. The result would be higher-cost and less-efficient services offered to consumers. The loss of economies of scope and the benefits of coordination could also be expected to undermine investment and innovation. Moreover, some consumers might find it inconvenient and costly to have to piece together various

⁹⁶ Prior to 2005, telephone companies providing wireline broadband Internet access did so through a separate, underlying transport service that was sold to ISPs—including the telephone companies’ own ISP affiliates—under Title II. In 2005, the Commission determined that the separation requirement did not apply to broadband services. (Federal Communications Commission, Report and Order and Notice of Proposed Rulemaking, FCC 05-150, rel. September 23, 2005, ¶¶ 5, 23-46.)

⁹⁷ See Testimony of George S. Ford, Ph.D., Chief Economist, Phoenix Center for Advanced Legal & Economic Public Policy Studies, Before the Federal Communications Commission Open Meeting on Network Neutrality and Broadband Network Management, Stanford University, April 17, 2008, at 5-6; Christopher S. Yoo (2005) “Beyond Network Neutrality,” *Harvard Journal of Law & Technology*, Volume 19, Number 1, § III.A.2.a.

⁹⁸ For a recent empirical study that found Title II regulation undermines broadband investment incentives, see Thomas W. Hazlett and Anil Caliskan (2008), “Natural Experiments in U.S. Broadband Regulation,” *Review of Network Economics*, 7(4), 460-480, available at <http://www.bepress.com/rne/vol7/iss4/2/>, site visited April 1, 2010.

components rather than being able to purchase an integrated bundle (*i.e.*, transaction costs would rise).

VII. CONCLUSION

79. As I explained in my initial declaration, the Commission should employ a pro-consumer approach to policies that address the broadband industry. In order to benefit consumers, the costs and harms associated with the proposed rules would have to be outweighed by any incremental benefits to society of imposing sector-specific regulation on top of existing antitrust and consumer protection regulation. There are compelling reasons to conclude, however, that the proposed rules would generate net harms, not net benefits. Instead of imposing the rules, the Commission should continue to monitor the industry to determine whether there are widespread problems for which existing policies are insufficient. To date, the record supports the conclusion that such problems do not exist.

I declare, under penalty of perjury, that the foregoing is true and correct.



Michael L. Katz

April 6, 2010