

# **Net Neutrality and the Effects on Consumers**

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### **Executive Summary**

New state and federal legislative proposals are being considered that would impose new regulations on Internet services, Internet Service Providers (ISPs) and network providers. These proposed regulations go far beyond the Federal Communications Commission (FCC) announced net neutrality principles, which included basic access to other networks, content and applications, as well as permitting interconnection with various network devices. Under these legislative proposals, new regulations would constrain how private Internet firms price their services, differentiate their high-speed services and manage traffic loads on their network. Internet regulations also would require that consumers pay the full cost of the Internet and any network enhancements that would improve applications, strengthen security and upgrade service quality.

Proponents of expanding net neutrality believe that stripping away pricing and service flexibility will leave the network a simple transmission pipe that will encourage a freer Internet and increase innovation by content, applications and services providers at the network's edge. Opponents see these regulations impeding investment, which will ultimately reduce innovation. These opponents say there is no problem that needs solving and, if a problem were to arise, the FCC or the Federal Trade Commission could address it under existing authority.

This study explores these issues and their effects on consumers. Specifically, this study reviews the literature and provides new empirical evidence that estimates how net neutrality regulations affect consumers, broadband subscribership and deployment of broadband network infrastructure. In reviewing the literature, every net neutrality study that has measured consumer

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\* This paper was written for American Consumer Institute Center for Citizen Research, an independent non-partisan nonprofit educational and research institute.

welfare has, without exception, found Internet regulations to reduce consumer benefits. In addition to this literature, the major findings of this study are as follows:

- This study finds that restrictions on price, product and service differentiation would result in higher prices for lower income broadband consumers, which would result in significantly lower industry demand and revenue, deterring investments in next generation network and reducing consumer welfare.
- This study also finds that restrictions on multi-sided market pricing would mean that consumers lose \$69 billion in potential benefits over the next 10 years. In effect, net neutrality regulations would require consumers to pay all of the upgrade costs of the next generation Internet and prohibit voluntary commercial agreements that would lower consumer broadband prices.
- Net Neutrality regulations would also increase the price of broadband services, because it increases the cost of the network that provides those services. Because broadband services are very price sensitive, just a \$5 increase in price could lead to a 15% drop in total broadband subscribership and a 60% decline in demand for lower-income, price sensitive consumers.

In summary, this study finds that Internet regulations would harm consumers and agrees with an earlier finding by the FCC<sup>1</sup> – namely, that Internet regulations would impede investment, reduce broadband demand and raise consumer prices. In summary, net neutrality is not, by all accounts, about helping consumers.

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<sup>1</sup> This is discussed on pages 7-8 of this study.

## Net Neutrality and the Effects on Consumers

### I. Introduction

#### A. Purpose of this Study

A common belief is that broadband services are capable of providing enormous economic benefits, so much so that Congress directed the Federal Communications Commission (FCC) to promote the timely deployment of these advanced communications services.<sup>2</sup> According to this belief, the presence of broadband services works to facilitate the advancement of innovative applications, thereby fulfilling many needs common to peoples' daily lives, including communications, entertainment, games, computing, productivity, security, and information needs.<sup>3</sup> Examples of applications and services include online training, telemedicine, distance learning, public safety, support for the disabled<sup>4</sup> and real time sign language interpreting.<sup>5</sup> While dialup Internet services can provide some of the same applications and services, broadband services permit faster downloading and uploading of bandwidth-rich applications, including video, music, pictures, voice communications and data.

State and federal proposals are being contemplated that would regulate the Internet. Through a review of the literature and new evidence, this study investigates the consequences of this regulation on consumers.

#### B. Proposal to Regulate the Internet

Legislation to impose regulations on the Internet and broadband network providers has been innocuously referred to *net neutrality*. Initially, net neutrality seemed like a few common sense provisions that would keep the Internet open by guaranteeing consumers access to the web.

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<sup>2</sup> The Telecommunications Act of 1996 in §706, Pub. L. 104-104, Title VII, Feb. 8, 1996, 110 Stat. under 47 U.S. C. 157.

<sup>3</sup> Case studies on some of these topics can be found in Matthew D. Bennett, "A Broadband World: The Promise of Advanced Services," Co-sponsored by the Alliance for Public Technology and The Benton Foundation, 2003 (available at <http://apt.org/confer/broadband-world.pdf>); and "Advance Services, Enhanced Lives," Alliance for Public Technology, 2002, (see <http://www.apt.org/publica/casestudy.pdf>).

<sup>4</sup> For example, see Frank G. Bowe, "A Hofstra Professor's Adventures in Policy Research," Hofstra, Department of Counseling, Research, Special Education and Rehabilitation, Spring 2003, available at [http://www.hofstra.edu/pdf/ORSP\\_Bowe\\_Spring03.pdf](http://www.hofstra.edu/pdf/ORSP_Bowe_Spring03.pdf).

<sup>5</sup> For example a video interpreting program is available at <http://signlanguage.com/clients/video.php>.

In 2004, former FCC Chairman Michael Powell best described what would become the “four principles” of net neutrality – principles that would permit consumers and others: 1) access to other networks; 2) access to content; 3) access to applications; and 4) interconnection of network devices.<sup>6</sup> While network service providers and the High Tech Broadband Coalition accepted these four principles, other interests, including large web-centric companies such as Google and Yahoo, have pressed to expand these principles significantly and codify them into law.

Recently, the FCC issued a notice of inquiry (NOI) into the market practices and behavior of broadband service providers. In the NOI, the FCC investigation looks beyond its original four principals to include:

- *“How broadband providers are managing Internet traffic on their networks today*
- *Whether providers charge different prices for different speeds or capacities of service*
- *Whether our policies should distinguish between content providers that charge end users for access to content and those that do not*
- *How consumers are affected by these practices”<sup>7</sup>*

Consistent with the expanded scope of the FCC inquiry and recent legislative proposals to impose Internet regulations, this study assesses how these regulations will affect consumers, and consumer welfare, a well recognized and accepted measure of economic benefits and losses.<sup>8</sup> To generalize, this study will focus on the potential regulations that may result from expanding and codifying the net neutrality principles, including:

- Prohibiting multi-sided pricing. A multi-sided market consists of market that has a number of groups that jointly benefiting from the same platform-like service, much like newspapers being supported by both readers and advertisers. Net neutrality regulations would presuppose that there are no interdependencies between online end-

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<sup>6</sup> Michael Powell, Speech at Voice on the Net (VON) conference, October 19, 2004.

<sup>7</sup> “FCC Launches Inquiry into Broadband Market Practices,” News Release, Federal Communications Commission, Washington, DC, March 22, 2007, regarding Docket No. 07-52.

<sup>8</sup> Besides bills introduced last years in the U.S. Congress, this year’s Congressional debate will likely include Internet regulation bills sponsored by Rep. Markey in the House, as well and Sen. Dorgan and Sen. Snowe in the Senate.

users, advertisers, suppliers and others – effectively prohibiting practices that would reduce consumer prices.

- Preventing price, quality and service differentiation. With Internet regulations, network providers could not provide some customers with faster, more dependable and feature-rich services without providing the same level of service to all consumers.
- Preventing network prioritization. Under net neutrality, network providers could not use intelligent traffic controls, quality of service guarantees or offer services for some types of traffic. The effect would mean that Internet service providers could not, for instance, ensure that real-time medical monitoring and emergency services are delivered with higher priority than say music download services.

If these regulations were imposed, they would give power to some regulatory body, like the FCC or state public service commission, and that regulatory body would promulgate rules to assure that the principles of net neutrality are met. This may require Internet network companies to monitor, measure and report traffic to and from various web sites, applications, service providers and others, as a means to assure that traffic is balanced and fair. It may make customizing consumer services illegal, which would thwart innovative services, such as those to the disabled and for medical use.<sup>9</sup> It would mean undercharging some consumers, who use the Internet extensively, while overcharging others, who use the Internet less. It would mean that consumers pay for all the cost, as bandwidth heavy applications and content providers get a free ride on the Internet without investing in the network. By adding unnecessary regulations that: 1) restrict the offering of network enhancements on a commercial basis and allow the offering of differentiated products and services to consumers; 2) inhibit innovation in the network under the presumption that all innovation happens at the Internet's edge; 3) forcing consumers to buy one size and one quality standard; and 4) preventing voluntary partnerships between content, application and network providers, some contend that innovation will be stifled, network investment will be reduced and consumer prices will be increased. That result, according to opponents of net neutrality, would hurt the internet community, America's international competitiveness and consumer welfare.

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<sup>9</sup> "The American Consumer Institute Finds Regulation Will Harm Consumers: Proposal to Regulate the Internet Threaten Lower Cable Prices," *ConsumerGram*, The American Consumer Institute, Reston, VA, 2006.

Proponents for net neutrality believe that Internet service providers (ISPs) should provide high-speed access to the Internet and nothing more, and that Internet innovation will occur at the edges of the network and not at the hands of ISPs. They contend – out of fairness and openness – that ISPs should not be permitted to differentiate or prioritize based on traffic, web site, service, content or customer. Proponents believe that consumers are better off when they receive a dumb network pipe through which they can access their choice of innovative content, applications and services.

This study will evaluate these positions by analyzing the available empirical evidence and providing new estimates of how Internet regulations might affect consumer broadband benefits.

## II. Evaluating the Market

### A. The Internet is a Global Private Network

The U.S. Networking Council defines the Internet as the global information system capable of communicating using a common protocol.<sup>10</sup> While the creation of Internet was, in large part, supported by government research during the 1970s and 1980s, its success, growth and popularity is owed in large part to its privatization in the mid-1990s.<sup>11</sup> While the term “public Internet” can be useful to distinguish the Internet from private Internet Protocol (IP-based) networks, the term should not create a false impression that the Internet operates as some sort of public utility. The fact is that the Internet is made up of thousands of privately owned and interconnected networks. It works and exists due to the recognition by organizations (including ISPs) of the value of the Internet to their companies and customers, and in the willingness and competitive interest of these organizations to interconnect to exchange traffic. As a global information system, the Internet is made up of many components – including your desktop, hosts, transmission facilities, network access points, servers and routers – with notable investments made by the network providers that provide last mile and backbone facilities connecting organizations and their networks.

### B. The FCC Found That Regulating the Internet Would Reduce Investment and Harm Consumers

The FCC had recognized, early on, that minimizing regulations would increase private network investment and spur Internet growth and development. In this regards, the FCC writes:

*The Internet has evolved at an unprecedented pace, in large part due to the absence of government regulation. Consistent with the tradition of promoting innovation in new communications services, regulatory agencies should refrain from taking actions that could stifle the growth of the Internet. During this time of rapid telecommunications liberalization and technology innovation, unnecessary regulation can inhibit the global development and expansion of Internet infrastructure and services. To ensure that the Internet is available to as many persons as possible, the FCC has adopted a "hands-off" Internet policy. We*

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<sup>10</sup> This is an abbreviated summary of the U.S. Networking Council definition of the Internet from its resolution dated October 24, 1995.

<sup>11</sup>For a history of the Internet see, Robert E. Kahn and Vinton G. Cerf, “What Is the Internet (And What Makes It Work) [sic], December, 1999. Available at [www.cnri.reston.va.us/what\\_is\\_internet.html](http://www.cnri.reston.va.us/what_is_internet.html).

*are in the early stages of global Internet development, and policymakers should avoid actions that may limit the tremendous potential of Internet delivery.*<sup>12</sup>

However, proposals to regulate the Internet appear to target the major private investors of network and transmission infrastructure – affecting the very investment that the FCC urged other regulators to keep their “hands off.” Moreover, if the lack of FCC intervention encouraged private investment, as the FCC claims, then the Internet’s overwhelming success, in terms of exponential growth and innovative applications, belies the need for intervention now.

### C. Is there Competition?

Market failure is the only suitable economic rationale for this kind of regulation. If some failure exists in the Internet market, government intervention would make sense, but only if the benefits of intervention exceed costs. Even imperfect markets can be better than regulation.<sup>13</sup>

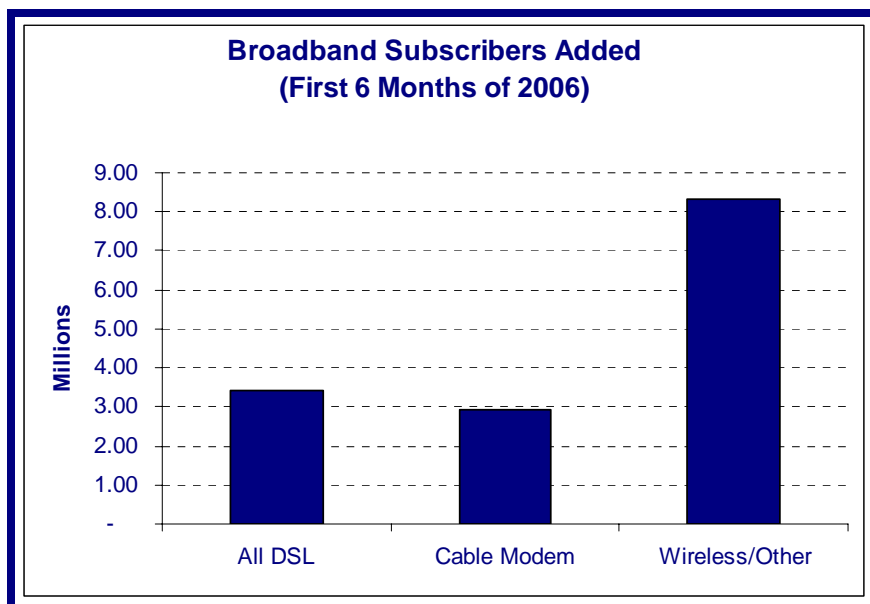
However, there has been no evidence presented that a market failure exists which would justify regulation. Instead, proponents of net neutrality raise hypothetical problems, none of which have actually occurred. There have been no studies demonstrating that net neutrality regulations would produce benefits that exceed costs. In fact, there have been no empirical studies showing that net neutrality regulations would benefit consumers, while, to be discussed later in this paper, there are many studies showing that consumer are worse off by these regulations.

Every new market begins with one producer, which is hardly a reason to regulate. The important consideration is that, overtime, other producers are able to enter the market, fight for customers, compete away any excess profits, if any, and reduce consumer prices. The most successful ISP, like any successful firm, will be the ones that best provide consumers with the services they demand.

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<sup>12</sup> “Connecting the Globe: A Regulators Guide to Building a Global Information Community,” FCC document available at [www.fcc.gov/connectglobe/](http://www.fcc.gov/connectglobe/).

If measured by market share, the broadband market has become increasingly competitive. When combining all cable providers, high-speed cable modem services now account for 44% of the market, according to FCC's most recent data,<sup>14</sup> and a similar figure accounts for all DSL providers.<sup>15</sup> These market shares continue to decline is evidenced by the fact that DSL and cable modem subscribers no longer make up the majority of broadband subscribers added. For example, depicted in the chart below, FCC data for the latest six month period (the period ending June 30, 2006) shows that wireless broadband services have added over 8 million subscribers, which exceeds the combined total of DSL or cable modem subscribers added during the same period. Besides wireless broadband services, other broadband services were added as well, including power line broadband services. Because industry concentration is declining, consumers are less at risk, which means that imposing new regulations now would be mistimed and unnecessary.



<sup>13</sup> Historically, regulations were deemed to be in the public's interest, with no verifiable means to determine if this is, in fact, so. However, since the 1960s, cost/benefit analyses that measure consumer welfare measurement have been among the rigorous tools available to economist that can determine whether regulations have benefits that exceed costs. This point is discussed in Clifford Winston, "Government Failure Versus Market Failure: Microeconomics Policy Research and Government Performance, AEI-Brooking Joint Center for Regulatory Studies, Washington, DC, 2006, p. 7.

<sup>14</sup> "High-Speed Services for Internet Access: Status as of June 30, 2006," Industry Analysis and Technology Division, Wireline Competition Bureau, FCC, Washington, DC, January 2007.

<sup>15</sup> 2007 Consumer Pulse Survey, the American Consumer Institute, Reston, VA, 2007.

Moreover, the data on broadband competition show a vibrant, expanding competitive industry. The FCC data show that the number of subscribers increased by 52% over the last 12 months.<sup>16</sup> While there are thousands of dial-up ISPs, the FCC reports the number of high-speed providers to be 1,323 as of June 2006, up by more than three times the number reported in June 2003. The FCC reports that 99.3% of zip codes have at least one broadband provider, 87.4% of zip codes have two or more providers, 76.1% have three or more providers, and 63% have four or more providers. So, choices are available to most consumers, and that choice has continued to increase. In fact, nearly 20% of zip codes are served by ten or more providers. The increase in Wi-Fi, broadband over power lines, wireless broadband and other high-speed services show the market to be diverse, vibrant and growing.

#### D. Broadband Prices are Decreasing

The structure-conduct-performance paradigm shows that market concentration is not as relevant as industry performance. Regardless of market structure, if market prices are decreasing or stable, then consumers are not at risk from market power. Falling prices give evidence that companies are entering and competing for consumers. Without this evidence of market power, there is no economic justification for government intervention.

What is the empirical evidence regarding the change in broadband prices? Evidence suggests that broadband prices are, in fact, decreasing. One study reported that a DSL provider has decreased its broadband service prices by 81% in the last three years.<sup>17</sup> Another measure of online prices comes from the United States Bureau of Labor Statistics (BLS) Consumer Price Index for Internet and information provider services. According to BLS data, Internet service prices fell from February 1998 to February 2007 by 27%.<sup>18</sup> From February 2006 to February 2007, as the FCC data reports soaring intermodal competition and increasing bandwidth speeds, the BLS reports that Internet prices declined by 22%, while all other consumer goods and

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<sup>16</sup> Ibid, Table 1, comparing all high-speed lines from June 2006 to June 2005. Also see Tables 7, 15 and 16 of this FCC report for the remaining data cited in this paragraph.

<sup>17</sup> J. Gregory Sidak, "A Consumer Welfare Approach to Network Neutrality Regulations of the Internet," forthcoming in the *Journal of Competition Law & Economics*, Oxford Press, Vol. 2:3, p. 400. Sidak shows one provider 1.5 mbps DSL service price declined by 81% during the last five years.

services saw an increase in price of 2.4% for the same period.<sup>19</sup> Therefore, online service prices are declining as broadband speeds have increased – all to the benefit of consumers.

In summary, there is ample evidence that the broadband market is a vibrant, expanding market. Competitive entry is increasing and service prices are decreasing. Based on these findings, regulation is not justified and could potentially harm consumers.

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<sup>18</sup> The BLS figures are compared over the same month, since the data is not seasonally adjusted. The data cover all urban consumers for Internet services and electronic information providers. Data was downloaded on March 19, 2007.

<sup>19</sup> Ibid.

### III. The Need to Encourage Private Network Investments

#### A. The Evolution of Digital Services and the Need for the Next Generation Broadband Services

During the mid-1990s when the Internet backbone was privatized,<sup>20</sup> the Internet grew at a rapid pace. Firms began to offer Internet access services, and Netscape and others went public. On July 1995, there were 71,000 domain names, and in two years there would be 1.3 million.<sup>21</sup> As of March 2007, there were 110 million domain names, an increase of 1.6 million just from the previous month.<sup>22</sup>

The growth in broadband services has been remarkable. The FCC reported 2.5 million high-speed subscribers for the period ending in December 1999, with most seeing speeds between 200 kbps and 1 mbps. As of June 2006, there were 65 million high-speed subscribers, with more than 70% with speeds exceeding 2.5 mbps.<sup>23</sup> Broadband services have become mainstream.

Hidden in these statistics is the change in the composition of traffic. When the Internet was privatized, much of the traffic was text. Later, web pages included more complex images, and soon after pictures and applets – all demanding faster download speeds. As the Internet grew, it has posed challenges for backbone providers and ISPs. Today, users have moved toward more bandwidth intensive applications, such as downloading music and movies. The amount of data that can be transferred over the Internet seems limitless and is growing exponentially. According to IDC, the equivalent of one million times the storage of the Library of Congress would be needed to house just the digital information that was created last year.<sup>24</sup> A far cry from the days when traffic was predominantly text and emails, the increase in bandwidth-intensive applications, and the resulting traffic, threatens to overwhelm the current backbone capacity of the Internet, in what one *Wall Street Journal* commentary referred to as the *Exaflood*.<sup>25</sup>

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<sup>20</sup> Rajiv C. Shah and Jay P. Kesan, “The Privatization of the Internet’s Backbone Network,” National Science Foundation Grant, No. ITR-0081426 & IIS-0429217.

<sup>21</sup> See [www.zakon.org](http://www.zakon.org) for various estimates of Internet growth and a description of measurement methods.

<sup>22</sup> See Netcraft’s Web Server Survey results at <http://news.netcraft.com>.

<sup>23</sup> “High-Speed Services for Internet Access: Status as of June 30, 2006,” Industry Analysis and Technology Division, Wireline Competition Bureau, FCC, Washington, DC, January 2007.

<sup>24</sup> Brian Bergstein, “Tech Researchers Calculate Digital Info,” *The Associated Press*, March 6, 2007.

<sup>25</sup> Bret Swanson, “The Coming Exaflood,” *Wall Street Journal*, Commentary, January 20, 2007, p. A11.

Downloading videos and movies has and will become a challenge to network operators who need to efficiently handle the traffic growth, as well as ensure quality and security. To put the increased demand in perspective, downloading a high-definition movie takes the equivalent traffic of downloading 35,000 web pages. If amateur video goes high-definition, the result would increase Internet's traffic by 10 times.<sup>26</sup>

Consumers have an appetite to buy their movies over the web and new services are coming online to facilitate that end. Adams Media Research estimates that consumer spending for video downloads will go from \$111 million in 2006 to \$4 billion in 2011, fueled by new services such as Apple TV.<sup>27</sup> By one report, YouTube streams in three months the combined data in "of the world's radio, cable and broadcast television channels;"<sup>28</sup> and, by another report, YouTube now serves 100 million video downloads per day.<sup>29</sup> Sony has plans to offer video downloads to 20 million customers with its PlayStation Portable,<sup>30</sup> which comes on the heels of Xbox, which is now offering TV and movie downloads, including some in bandwidth-laden high-definition format.<sup>31</sup> Amazon has its Unbox video download service and Sling Media has its Slingbox, both permitting watching movies on portable devices.<sup>32</sup> Besides a couple dozen peer-to-peer downloading services where consumers can swap movies, subscription services are also available from CinemaNow, MovieFlix, Starz Vongo, BitTorrent, Totalvid, Starz Real Movies and Movielink – all of which permit full movie downloads from the Internet, including some in high-definition format. Then consider that Wal-Mart, which accounts for 40% of the DVDs sold in the U.S., now sells downloadable movies that you can watch on your PC.<sup>33</sup> Of course, there are many other services that sell downloadable games and music. All combined, the result is that the Internet, particularly the Internet's backbone and last mile facilities, will require increased

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<sup>26</sup> Ibid.

<sup>27</sup> "Spending on Video Downloads to Survey: Study," *Reuters*, February 21, 2007.

<sup>28</sup> Swanson (2007).

<sup>29</sup> Marshall Kirkpatrick, "YouTube Serves 100m Videos Each Day," Tech Crunch, July 17, 2006, downloaded from [www.techcrunch.com](http://www.techcrunch.com).

<sup>30</sup> Matthew Garrahan, "Sony to Enter Video Download Market," *Financial Times*, December 17, 2006.

<sup>31</sup> Daniel Terdiman, "Xbox Cues up TV, Movie Downloads," *CNET News*, November 6, 2006.

<sup>32</sup> Rob Pegoraro, "Slingbox Video Streaming Not Perfect, but Remarkable," *Washington Post*, March 23, 2006, p. D5.

<sup>33</sup> David Lieberman, "Curtain's Finally Rising on Movie Downloading: Wal-Mart's Entry into the Biz Signals It's Hitting Big Time," *USA Today*, March 8, 2007, page 1B.

investment and improved technologies that ensure speed, quality and strengthen security protections.<sup>34</sup>

### B. Demand Meets Supply: The Need for a Fiber Diet

The increase in demand places enormous pressure on network providers to upgrade their investments to next generation high-speed services. But, in the face of calls for regulation, answering these capacity limits with increased investment has Wall Street concerned.<sup>35</sup> Capacity alone cannot guarantee better service delivery, and Internet regulations add risk to an enormous investment.<sup>36</sup> If regulations limit the ability of network investors to differentiate their services, find innovative pricing solutions, prioritize and manage network traffic, network costs will increase and make investment less attractive, which will reduce network investment. Less investment means poorer service quality, and higher network costs means rising broadband service prices. Higher broadband prices can result in depressed demand, which will raise the cost of service for remaining consumers.

Compared to traditional communications technologies, such as DSL and cable modem services, the next generation of Internet access services will permit significant increases in bandwidth to consumers and businesses. However, building the next generation network could be quite costly, approximating the cost of reproducing the current network.<sup>37</sup> The typical example of a robust network is a broadband passive optical network (B-PON or more generically PON), which brings fiber as close to customers as possible.<sup>38</sup> This network is often described as *fiber-to-the-home* or some variation. PON will support switched wavelength services with bandwidth to the customer at rates, such as 622 Mbps (Megabits per second) downstream and 155 Mbps upstream. Aside from speed, PON offers improved security performance and transmission reliability, suitability for interactive and distributive services, and true bandwidth-

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<sup>34</sup> Jon Van, "Videos Have Net Bursting at the Seams," *Chicago Tribune*, February 23, 2007.

<sup>35</sup> Lucas Van Grinsven, "Google and Cable Firms Warn of Risks from Web TV," *Reuters*, February 7, 2007. For more discussion about Wall Street's concerns about the profitability of fiber investments, see Darby (2006), p. 18 and fn. 27-29.

<sup>36</sup> Darby (2006) for a discussion, pp. 16-20.

<sup>37</sup> Testimony by Timothy J. Regan, Senior Vice President of Corning, Before the House Committee on Energy and Commerce, April 25, 2001.

<sup>38</sup> There are other PON technologies, such as gigabit PON or G-PON.

on-demand. The increase in speeds is likely to encourage development of new services, applications, software and content.

In addition, because PON technology would speed up Internet services for customers, allowing customers to send and download ever larger files in shorter time, it would be necessary for network owners to make significant upgrades in the backbone as well. This would require fiber networks to upgrade from OC48 (2.44 Gbps) to OC192 (10 Gbps), and (in time) OC768 (40 Gbps), as well as accompanying equipment. These upgrades are not trivial capital investments, and as such carry significant risks borne by network providers.

Building a high-speed network that connects people is the first step in addressing the pent-up demand for advanced consumer equipment, and bandwidth-intensive applications, services, and content – all of which will benefit consumers. These innovative applications will enhance communications, entertainment (including downloading music and movies), healthcare, games, computing, business productivity, security, education, job training and many other areas common to people's daily lives. Where these innovations occur, there will be additional ripple effects throughout the economy that will create permanent jobs, increase discretionary spending and improve quality of life. However, as the FCC pointed out, Internet infrastructure investments are more likely to take place in the absence of regulation, making net neutrality an added risk for investors, network owners and operators, and, ultimately, consumers. This means that regulations would discourage backbone and last mile investments and force private network owners to charge only end users for its upgrade costs. Reducing investment will mean that consumers will not see the next generation of services, and higher prices will mean that consumer broadband penetration will lag. These sentiments have also been expressed by a few of the Internet's early developers.<sup>39</sup>

### C. Preventing Network Management Would Increase Consumer Broadband Prices

The Internet is a best effort network. The increase in video downloading and intensive-bandwidth applications by some users will soak up any excess capacity used by other users,

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<sup>39</sup> Andrew Orłowski, "How *Saving the Net* May Kill It," *The Register*, Interview with Richard Bennet, July 17, 2006; and Andrew Orłowski, "Father of Internet Warns Against Net Neutrality," *The Register*, Interview with Robert Kahn, January 18, 2007.

particularly during peak hours. If everyone pays the same price and receives the same service quality level for an “all you can eat service,” as some net neutrality proponents would suggest, the only solution for ISPs would be to raise the price of all consumers, rather than the few that utilize most of the network’s capacity.<sup>40</sup> This is what MIT calls the *broadband incentive problem*,<sup>41</sup> which, without some pricing solutions, premium services or some market segmentation, there will be higher network costs per user (and ultimately higher services prices for all consumers), which discourages network investment.

Because IP telephony and health monitoring services need to be real time, whereas other services can continue to be best effort and operate effectively with modest delay (such as emails and Internet browsing), an across-the-board decline in service quality will affect all services equally, completely impairing time-sensitive services. Because net neutrality requires that all services be treated the same and would prevent network management and prioritization, real time applications would suffer. Under net neutrality, upgrading the network to guarantee real time traffic would require allocating resources for other traffic not needing these service guarantees. The result would mean the over-provisioning of investment and result in a prohibitively expensive network. For instance, one study found that an unmanaged IP video capable network would cost consumers between \$350 and \$400 monthly per subscriber, compared to an intelligent network that manages and prioritizes its traffic.<sup>42</sup> Therefore, net neutrality would increase the price of consumer services, because it increases in the cost of the network that provides these services.

In summary, prohibiting network prioritization and guarantees means that no consumer will receive better service, leaving the Internet in what has been described as a state of mediocrity.<sup>43</sup> In other words, unable to manage network traffic and resources efficiently, consumers would not made better off. The next section will look at the empirical evidence and how consumers are affected by these regulations.

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<sup>40</sup> Jeremy Penston, “What’s the real cost of Internet Video?” *The Register*, April 20, 2007.

<sup>41</sup> “The Broadband Incentive Problem,” Broadband Working Group, MIT Communications Futures Program, Cambridge University Communications Research Network, September 2005.

<sup>42</sup> George Ford, Thomas Koutsky and Lawrence Spiwak, “The Efficiency Risk of Network Neutrality Rules,” Phoenix Center, Public Policy Bulletin No. 16, May 2006.

<sup>43</sup> Steven Titch, “Net Neutrality Really Means Internet Mediocrity,” Reason Foundation, April 19, 2007.

## IV. Net Neutrality: Effects on Consumers

### A. Studies Report that Net Neutrality Would Harm Consumers

This section briefly reviews the literature on the effects of neutrality regulation on consumers. As previously mentioned, there have been no cost/benefit studies demonstrating the need for Internet regulation, and no market failures have been identified. In fact, consumer welfare studies have shown the exact opposite – that Internet regulations would harm consumers. By prohibiting multi-side market pricing, Darby found that Internet regulations would impede investment, raise consumer prices and decrease consumer welfare by \$24 to \$32 billion over 10 years.<sup>44</sup> Sidak evaluated and modified Darby’s figures, estimating that the welfare loss to be in the range of \$3.4 to \$7.4 billion per year.<sup>45</sup> Litan and Singer estimated that prohibiting intelligent traffic controls and quality of service controls would raise consumer prices and lead to consumer losses totaling \$5 billion per year.<sup>46</sup> In summary, all of the studies estimating consumer welfare effects on consumers have found that net neutrality regulations would harm consumers.

### B. New Evidence: Price, Product and Quality Differentiation Encourages Broadband Use and Investment

No consumers are exactly alike and they often demand differences in quality and quantity in a good or service. By offering pricing options – off-peak, niche discounts, brand names, coupons, sales, volume discounts, term agreement and others – consumers are better able to get the level and quantity of service they want and need at a price better suited to their liking. These differentiated options are commonly referred to in economics as *price discrimination*, a term of art meaning that companies offer different prices and service features to meet different consumer needs. Darby and others have noted and demonstrated that price discrimination is a normal part of competition, may be a requirement of competition, is prevalent in competitive markets and would increase consumer benefits.<sup>47</sup>

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<sup>44</sup> Larry F. Darby, “Consumer Welfare, Capital Formation and Net Neutrality: Paying for the Next Generation Broadband Networks,” Darby Associates, June 6, 2006, p.2.

<sup>45</sup> J. Gregory Sidak, “A Consumer Welfare Approach to Network Neutrality Regulations of the Internet,” forthcoming in the *Journal of Competition Law & Economics*, Oxford Press, Vol. 2:3, 2006. p. 465.

<sup>46</sup> Robert E. Litan and Hal J. Singer, “Unintended Consequences of Net Neutrality Regulation,” forthcoming *Journal on Telecommunications & High Technology Law*, p. 26, 2007.

<sup>47</sup> Larry Darby, “FAQs about Price Discrimination and Consumer Welfare,” *ConsumerGram*, The American Consumer Institute, 2006.

Consumers want the market to have these differentiated services. In January 2006, the American Consumer Institute asked 1,000 households the following question<sup>48</sup> – “in addition to continuing to offer standard Internet service, do you think that Internet companies should also offer consumers premium services that are faster, safer and more reliable?” Of the 684 consumers with Internet access in their home, 572 (83.6%) responded yes, 63 (9.2%) responded no and 49 (7.2%) did not answer or did not know. In other words, the vast majority of consumers do not mind the offering of services at different levels of speed, safety and reliability.

To illustrate how price and product differentiation can improve the development of the broadband market, consider three services – early adopter, mass market and price-sensitive consumer services.<sup>49</sup> Also assume that the early adopter service is targeted toward consumers that want maximum speed and highest level of service, at any cost. These consumers have high bandwidth needs, expect faster downloads and intensive usage. These consumers are not very price sensitive and only want the best and fastest service available. Let’s say that the service sells for \$35 per month and gives the early adopters 50 megabits per second (Mbps) of bandwidth, as well as optional security features.

Continuing with the illustration, assume that mass market consumers are attracted to a less expensive service with only moderate speeds, say \$30 per month for 5 mbps. These consumers are average broadband consumers and desire a middle-of-the-road service. They are more price sensitive than early adopters, but want access to occasional high bandwidth services, applications and content.

On the low-end, some consumers are drawn to a low-end quality of service, offered at \$25 per month for 768 kilobits per sec (Kbps). Compared to the others in this illustration, these broadband consumers are very sensitive to price, as well as possibly having the lowest income, and would likely move to dial-up services (or disconnect) if prices were increased. This

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<sup>48</sup> 2006 Consumer Pulse Survey, the American Consumer Institute, January 2006.

<sup>49</sup> This illustration is conservative in that prices will be assumed to vary only by a few dollars. Greater variance in price would likely to produce greater welfare changes.

assumption is supported by demographic data collected by the American Consumer Institute's 2006 consumer pulse survey.

Before continuing with the illustration, consider **Table 1**, which shows that broadband services are used by consumers across a wide range of incomes. However, broadband use does increase as income increases, and dialup subscription (as the only source of online service) decreases as income increases. This suggestion that these services affect income groups differently and dialup is a poor quality substitute for broadband service. As **Table 1** shows, 13% of broadband consumers and 19% of dialup consumers earn less than \$25,000 per year. On the other hand, 19% of broadband households and 7% of dialup households earn over \$100,000 per year. Therefore, as with any normal good, as incomes increase, consumption of high-speed services increase. As a result, it is reasonable to assume that low-income consumers are more price-sensitive to broadband services than high-income consumers.

	<u>Broadband</u>	<u>Dialup Only</u>	<u>Total Internet</u>
<b>Less than \$25K</b>	13%	19%	15%
<b>\$25K to \$49K</b>	23%	37%	28%
<b>\$50K to \$74K</b>	26%	26%	26%
<b>\$75K to \$100K</b>	18%	11%	16%
<b>Greater than \$100K</b>	19%	7%	15%
<b>Total Households</b>	100%	100%	100%

	<u>Broadband</u>	<u>Dialup</u>	<u>Total Internet</u>
<b>Less than \$25K</b>	54%	46%	100%
<b>\$25K to \$49K</b>	52%	48%	100%
<b>\$50K to \$74K</b>	63%	37%	100%
<b>\$75K to \$100K</b>	73%	27%	100%
<b>Greater than \$100K</b>	81%	19%	100%
<b>Households</b>	63%	37%	100%
			0%

Source: 2006 Consumer Pulse Survey, American Consumer Institute

Based on this, **Table 2** illustrates a differentiated service offering:

**Table 2: Broadband Price Discrimination -- Illustration**

	Speed	Elasticity	P <sub>0</sub>	P <sub>1</sub>	Q <sub>0</sub>	Q <sub>1</sub>
Early Adopters	50 Mbps	- 1.0	\$35	\$30	100	114
Mass Market	5 Mbps	- 2.0	\$30	\$30	100	100
Price Sensitive	768 Kbps	- 3.0	\$25	\$30	100	40

Assume that net neutrality requires broadband providers to offer all of their services at \$30 per month, effectively equalizing the quality, speed and price of all services across all consumer groups. This would raise price for price sensitive consumers, while lowering them for early adopters. This means that, under net neutrality regulations, early adopters do not get the higher speeds, better features and better quality of service that they demand, and it also means that price-sensitive and lower income consumers would pay more than they want. In both cases, the lack of choice harms consumers.

Based on an average of several studies, broadband services appear to a very price sensitive service, as measured by price elasticity. Based on these elasticity studies, a 1% decrease in price will lead to a 2% increase in quantity, and a 1% increase in price will lead to a 2% decrease in quantity.<sup>50</sup> As the table above shows, in terms of price elasticity, lower income consumers are more price-sensitive, while early adopters are less price-sensitive. The initial market is assumed to have 300 subscribers.

Because, under net neutrality, all broadband services are undifferentiated in terms of quality and speed, prices become equalized to \$30 per month – a price decline for early adopters, but an increase for price-sensitive customers. Early adopters will react to the price change by

buying 14% more service, 60% of price-sensitive consumers will drop their broadband service. In the example, mass market consumers are not affected, since their average price did not change.

This illustration paints a bleak picture of what net neutrality regulation would do to consumers, because total demand falls from 300 consumers to 254 – a 15% drop in total subscribership. In short, net neutrality regulations that bar price, service and quality differentiation would unequivocally reduce broadband penetration rates. The policy would also force early adopter to accept lower service quality and force the remaining budget-minded (typically lower-income) consumers to pay more. If the original industry price in the three markets reflected market costs, then averaged for the three services would be a departure from equilibrium and allocative efficiency. That would mean that total social welfare (the sum of consumer and producer benefits) would decrease. For the layman, a less abstract and equally important point can be made – that, when differentiation is barred, industry output and revenue falls. In this example, broadband subscribers and sales fell by 15%. That market atrophy would discourage future investment in next generation broadband services and run counter to public policies advocating broadband deployment. Prohibiting different levels of performance and priority could prevent service innovations such as medical monitoring, emergency safety and telemedicine services.

Regulating service quality will also inhibit innovation of new services and products. For example, assume that an Internet software company develops a new game that requires 15 Mbps to operate in high-definition. Since few consumers subscribe to high-speed services capable of operating at that speed, the software company would have an uphill battle trying to bring its service to market. Even if a faster Internet speeds were available, consumers may not be willing to buy a faster Internet service just for the occasional use of one game. Now assume a broadband service provider could offer a new innovative burst service that would only operate when customer accessed the software company's web site? The gaming company might be willing to pay the cable company a fee to offer such a premium service. In this example, the

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<sup>50</sup> Sidak estimates this elasticity of -2.0 based on a composite of many studies. See J. Gregory Sidak, "A Consumer Welfare Approach to Network Neutrality Regulations of the Internet," forthcoming in the *Journal of Competition Law & Economics*, Oxford Press, Vol. 2:3, 2006, p. 465 at fn. 450.

software company now has access to the consumer market that it otherwise did not have, and consumers have access to a high-definition game without paying for a higher level of service. Unfortunately, net neutrality would prohibit this activity and discourage development of this burst technology service.

In summary, net neutrality would reduce broadband penetration, revenues and service innovation, all of which would discourage network investments and threaten higher prices for all.

### C. New Evidence: Multi-sided Pricing Would Increase Consumer Benefits

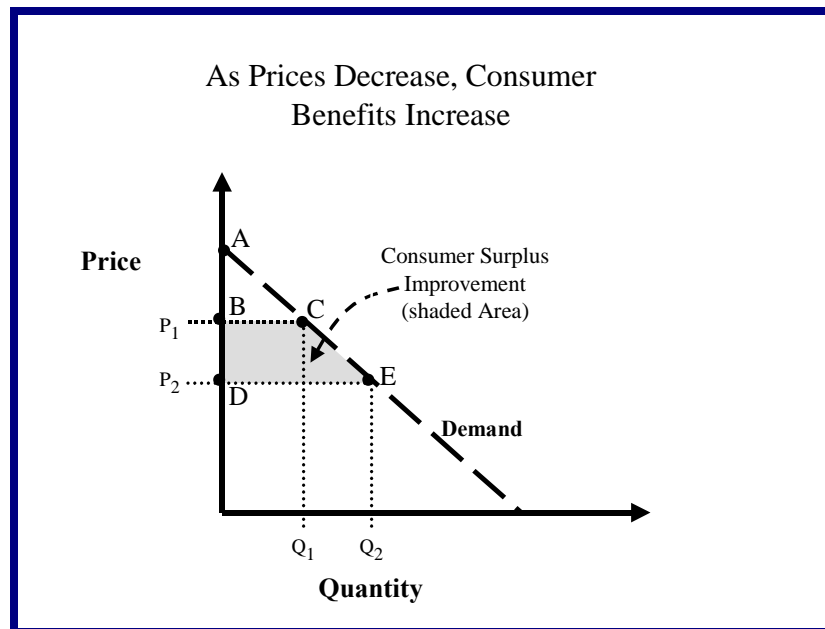
Darby and others found that consumer welfare would increase as a result of multi-sided pricing for broadband services. Multi-sided pricing occurs when a product or service is paid for by more than just the end-user.

There are many examples of multi-sided markets – including newspapers, credit cards, Internet services and yellow page directories. For instance, consumers only pay a portion of the cost of a newspaper and magazine subscriptions, because advertisers typically pay a significant portion of the costs. Credit card companies often give consumers free credit cards, and merchants pay the credit card companies. Some dialup Internet services are subsidized or free, because of sponsors and pop-up ads that defer costs. Over the air TV and radio is free to consumers, because of sponsors and advertisers. Telephone book directories (like the Yellow Pages) are typically free to consumers and are fully supported by advertisers.

These markets would not exist to the extent that do, if it were not for multi-sided pricing. Today, all consumers have yellow pages delivered to their homes. However, how many consumers would have a telephone directory, if they had to buy it at its full cost? Would the Yellow Page directories even exist if consumers had to pay all of the costs of its publishing and printing? It may be that multi-sided pricing has allowed for services to come to market that would not otherwise have been viable. It may also be that online content and applications providers may want to enter into commercial arrangements with network providers to offer services that may not otherwise reach consumers. These commercial arrangements may help network providers pay for network upgrades and spare these costs from reaching consumers.

However multi-sided pricing practices would be prohibited under net neutrality regulations – requiring consumers to pay for all the costs of network upgrades.

Do these regulations help or hurt consumers? Consumer effects from shifting costs upstream to content and application providers can be quantified by measuring consumer surplus.<sup>51</sup> Assuming “consumers pay all” of the upgrade costs for the next generation network, an initial price for the future network is calculated (and reflected in the chart below as  $P_1$ ).



Now assume a new price reflecting the shift of next generation investment costs away from consumers to upstream content and applications providers, as would occur from multi-side pricing. In the graph above, this is represented by the fall in consumer prices from  $P_1$  to  $P_2$ , which produces a corresponding stimulation of demand from  $Q_1$  to  $Q_2$ . Because shifting costs lowers consumer prices, consumer surplus increases and, as depicted in the chart above, is measured by the area  $\triangle ADE$ . The change in consumer benefits resulting recovering investment costs from upstream providers is measured as the change in consumer surplus and is shown in

<sup>51</sup> This study uses the term *upstream* to account for all of the Internet’s other players, excluding consumers, ISP and other network providers. These upstream players would include content, applications and service providers, as well as advertising-related services.

the chart as the area of the trapezoid BCED and is labeled *consumer surplus improvement*. From the graphical illustration, consumers clearly benefit from multi-side pricing.

To illustrate the improvement in consumer welfare, this study uses Bernstein investment data,<sup>52</sup> which estimates upgrade costs for the last mile to be approximately \$1,400 per home passed. Assuming an average plant life and build out rate of 12 years, the cost of the upgrade would be about \$10 per month. If the network is upgraded and a super fast Internet service became available for, say, \$50 per month, but the \$10 per month upgrade costs were pushed upstream, consumers would clearly benefit from an effective price decrease from \$50 to \$40 per month. In other words, consumers clearly benefit from multi-side pricing, approximately \$9.3 billion dollars in consumer welfare benefits per year. Using a 5% discount rate, this amounts to \$69 billion dollars of benefits for consumers in the next 10 years. However, are producers worse off?

For mid-year 2006, the FCC reported 65 million broadband users in the U.S.<sup>53</sup> Nielsen/NetRates found that 78% of Internet households had broadband services.<sup>54</sup> These broadband users spend more time on the Internet and download twice as many pages.<sup>55</sup> This means that there are about 83 million web users, 18 million of whom use only dial-up services.<sup>56</sup> According to Interactive Advertising Bureau, in 2006, Internet advertising revenues accounted for \$16.8 billion dollars.<sup>57</sup> Since it is appropriate to compare an end-of-year revenue figure with a year average subscriber figure,<sup>58</sup> the average Internet advertising revenue per subscriber was \$16.96 per month. Taking into account that dial-up users visit only download half as many pages, the average Internet advertising revenue per dial-up user was \$9.53 per month. As for broadband users, the average Internet advertising revenue per user was \$19.05 per month.

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<sup>52</sup> “The Couch Potato Wars: Assessing the Impact of Bell Entry into the Consumer Multichannel Video Market,” May 2005. This source was used in Darby (2006).

<sup>53</sup> “High-Speed Services for Internet Access: Status as of June 30, 2006,” Industry Analysis and Technology Division, Wireline Competition Bureau, FCC, Washington, DC, January 2007

<sup>54</sup> “Three Quarters of Web Users on Broadband,” *Associated Press*, Dec. 12, 2006.

<sup>55</sup> *Ibid.*

<sup>56</sup> This is consistent with another estimate of approximately 20 million dial-up users. See, Jeffrey Bartash, “Broadband Wars: Wielding a Price Hatchet,” *MarketWatch*, March 2, 2007.

<sup>57</sup> See [www.iab.net](http://www.iab.net) for historical industry advertising revenue surveys conducted by Pricewaterhousecoopers.

<sup>58</sup> As a general rule, variables that are described as a *flow concept* are appropriately analyzed in terms of its end-of-year value, while variables that are described as a *stock concept* are analyzed as a mid-year or year average.

Why is all of this important? If we assume that a \$50 per month service upgraded broadband service would be lowered by \$10 by charging upstream providers, then consumer prices would fall by 20%. Based on the earlier estimate for price elasticity, demand would be stimulated and broadband services would expand by 40%. This means that broadband subscribers would increase from 64.6 million to 90.2 million. In short, the market would expand dramatically, adding nearly 26 million more broadband customers which advertisers can target. Based on the average advertising revenue per broadband user, these 26 million customers would bring in an additional \$6 billion in advertising revenue, offsetting most, but not all, of the increase in upstream charges. Across all of the producers in the market – ISPs, other network providers, upstream providers and online advertisers – industry revenue would remain nearly unchanged, while consumer welfare benefits would increase by \$9.3 billion per year.

Therefore, multi-sided pricing, particularly based on voluntary agreements between network providers and upstream providers, would provide huge consumer benefits, increase the size of the market, and increase advertising revenues for the benefit of upstream providers. However, net neutrality regulations would prevent these consumer benefits and prevent voluntary agreements between providers. The bottom line is that these regulations raise consumer prices and provide no additional benefit for consumers.

#### **IV. Conclusion**

A number of studies have looked at how net neutrality would affect consumer benefits and all find that regulations would harm consumers. This study adds to this body of literature by looking at the effects of prohibiting multi-side pricing and service differentiation. In every case, we find that consumers are harmed by Internet regulations.

Specifically, this study shows that price and product differentiation are practices would likely maximize social welfare, and that these practices are prevalent in other competitive markets today. This study also shows that prohibiting product and pricing differentiation would harm the most price sensitive consumers, particularly those with lowest incomes. Furthermore, net neutrality regulations would reduce total market demand and revenues, which would discourage network investment when it is most needed to meet the increase in bandwidth-intensive applications.

In terms of multi-sided pricing practices, the benefits to consumers are substantial, while the negative effects on network and upstream providers would be minimal, in part due to the increase demand for broadband services and increase in advertising revenues. On the other hand, regulations that require consumers “pay it all” would not develop broadband networks nor would it encourage broadband use. In addition, restrictions on network management would raise consumer prices, because they increase the costs of the networks that provide these services.

In summary, this study finds that Internet regulations would harm consumers – reduce demand, raise consumer prices and deter much needed infrastructure investment. This finding agrees with earlier research studies and the FCC’s earlier recommendation that – for the benefit of consumers – Internet regulations should be minimized and network investment be encouraged. Net neutrality would accomplish neither of these recommendations, and would raise consumer prices, thereby reducing the benefits of broadband services.