Net Neutrality: Economic Evaluation of Market Developments

Timothy J. Tardiff, PhD  
Principal  
Advanced Analytical Consulting Group, Inc.  
211 Congress Street  
Boston, MA 02110  
timtardiff@aacg.com  
(617) 827-4043

February 27, 2015

Abstract

On February 26, 2015, the Federal Communications Commission (FCC) issued new regulations for the Internet. A significant motivation stated by the Chairman of the FCC for these regulations is the protection and promotion of the quality of Internet service. This paper provides information about the evolution of the quality of Internet service over time, among other topics, providing context for this central stated motivation of Internet regulation.

In December 2010, the FCC adopted new rules for Internet Service Providers (ISPs), such as AT&T, Comcast, and Verizon, which among other provisions, strongly discouraged charging content providers for priority access to end users. These rules, which were a change from the essentially deregulated treatment that had been applied to ISPs, were overturned by the Court of Appeals for the District of Columbia Circuit in January 2014. The FCC subsequently opened a new proceeding to establish rules designed to comply with the DC Circuit’s decision. This proceeding has generated an unusually high level of public attention, which was accelerated by President Obama’s November 10, 2014 statement advocating regulation of ISPs as common carriers pursuant to the Title II of the Communications Act.

This paper focuses on the issue of the economic merits of rules restricting payments by content providers for priority treatment of certain Internet traffic. The history of the FCC’s regulation (or lack thereof) of ISPs is reviewed, the main arguments for and against imposing ex ante price regulation on ISPs are outlined, and data on industry performance, particularly subscribership levels in general and at substantially increasing speeds in particular, are described. This historical experience indicates that apparent insufficiencies in competitive alternatives at the latest available speeds have been ameliorated in fairly short order by new offerings by multiple ISPs. These findings strongly suggest that basing new restrictions on a putative dearth of competition for recently available service levels and transmission speeds is likely to be overtaken by technological and market developments, rendering such ex ante rules superfluous, at best, and counterproductive to competition and innovation, at worst.

1 To be presented at the Advanced Workshop in Regulation and Competition, 34th Annual Eastern Conference, Shawnee on Delaware, Pennsylvania May 13, 2015. I have benefited from discussions with Professor Dennis Weisman.
1 Introduction

Among the most contentious, and perhaps the most contentious, of the economic issues in the Federal Communication Commission’s (FCC) consideration of the need for regulating Internet Service Providers (ISPs) is whether or not charging content providers for higher quality/speed transmission to end use subscribers, e.g., charging Netflix for faster transmission of its video content, should be prohibited. Indeed, the FCC’s 2010 open Internet rules, which were overturned by the United States Court of Appeals for the D.C. Circuit, considered such “pay-for-priority” arrangements as likely violations of the no unreasonable discrimination rule. The effect of a ban on pay-for-priority is tantamount to imposing a uniform price of zero on a particular type of transaction. Significantly, the requirement of a uniform price of zero applied to other industries would preclude arrangements widely used by businesses and accepted by consumers. For example, passengers can pay for higher quality and/or faster service on airlines and Amtrak and shippers can pay more to have their packages delivered in one day. Similarly, in so-called two-sided markets, providers can charge non-uniform, non-zero prices to both sides of the market, e.g., newspapers raise revenues from both subscribers and advertisers.

Opposition to pay-for-priority appears to be driven by two primary concerns. First, if there is insufficient competition among ISPs, under certain conditions, there may be the incentive and ability to discriminate anticompetitively in favor of or against particular content providers, e.g., an affiliate that competes with other content providers. Second, there appears to be a belief by some that pay-for-priority would unduly inhibit the emergence and growth of new Internet enterprises—the proverbial start-ups emerging from garages and dorm rooms.

The FCC’s decision whether or not to impose Internet-specific economic regulation, and the widely-expected legal challenges to any rules so established, has taken place in an environment in which the volumes and applications carried by the Internet and the speed and quality of these transmissions have increased substantially since the early years of the new millennium, when the FCC first considered, but rejected, imposing regulation on ISPs. Section 2 describes the FCC’s basis for imposing more stringent regulation in its 2010 Open Internet Order and in Chairman Wheeler’s proposed order that would apply certain common carrier regulations to broadband access services. Section 3 discusses how the substantial growth in demand and competitive

---

4 See, for example, the statements of Professors Jonathan Baker and Nicholas Economides at the FCC’s October 2, 2014 Open Internet Roundtable – Economics (video available at https://www.youtube.com/watch?v=SF21CICshR8&app=desktop). During the workshop, Professor Thomas Hazlett described how during its start-up period, Google paid AOL to be the default search engine, demonstrating that (1) non-neutral arrangements have always existed in various parts of the Internet and (2) payments for priority do not necessarily stifle the development of innovative content providers. Further, not only would small start-ups benefit from a mandated zero price for content providers, some very large companies advocate and would benefit from such a mandate. A mandated price of zero for content providers can be viewed as an infant industry subsidy, which does not go away even when the start-ups have grown into large companies.
alternatives demonstrate that apparent insufficiencies in competitive alternatives at the latest available speeds have been ameliorated in fairly short order by new offerings by multiple ISPs. Section 4 describes how these findings strongly suggest that basing new restrictions on a putative dearth of competition for recently available service levels and transmission speeds is likely to be overtaken by technological and market developments, rendering such ex ante rules superfluous, at best, and counterproductive to competition and innovation, at worst.

2 The FCC’s Rationale for Regulating Broadband Access Services

The FCC’s rationale for its 2010 Open Internet rules, which the DC Circuit upheld, had three essential elements: (1) that pursuant to Section 706 of the Communications Act, deployment of broadband services was not reasonable and timely, (2) the 2010 rules were designed to facilitate the development of new applications by “edge” (content) providers, resulting in a “virtuous circle” in which broadband access providers would upgrade their networks to accommodate these new uses, and (3) competition was not sufficiently strong to discipline the incentives and ability for anticompetitive acts by broadband providers, e.g., favoring affiliated edge providers and/or engaging in anticompetitive price discrimination.

The FCC concluded that broadband progress was insufficient several months before releasing the 2010 Open Internet order. That determination was based on (1) a redefinition of broadband to require download speeds of 4 Megabits per second (Mbps) and upload speeds of 1 Mbps—an increase from the previous requirement of 0.2 Mbps in both directions, (2) the observation that between 4.5 percent and 7.8 percent of Americans lacked access to broadband, and (3) its conclusion that competition among broadband providers was insufficient, e.g., the FCC reported to the Court that as of December 2009, almost 70 percent of households lived in census tracts with only one of two providers of wireline or fixed wireless broadband service.

The DC Circuit upheld the FCC’s rationale on the grounds that the Commission’s interpretation of Section 706, the available facts, and the FCC’s “virtuous circle” theory manifested reasonable predictive judgment about the effects of the 2010 Open Access rules and consequently “offered

5 Verizon v. FCC. Although the Court upheld the FCC’s reasoning for regulating broadband Internet access services, it overturned the specific rules on the grounds that they imposed common carrier regulation on a service that it had previously determined was not a common carrier service.

6 Federal Communications Commission, Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act, GN Docket No. 09-137, A National Broadband Plan for Our Future, GN Docket No. 09-51, Sixth Broadband Deployment Report, July 20, 2010. The determination that deployment was not reasonable and timely reversed the determination in five previous reports over a span of a decade that such deployment was reasonable and timely.

7 The Sixth Report (¶ 1) reports that between 14 million and 24 million Americans lacked access to broadband. According to Appendix B of that report, the US population was 308.4 million.

8 Verizon v. FCC, p. 40.

9 Verizon v. FCC, p. 34.
a rational connection between the facts found and the choice made.” Significantly, the DC Circuit’s upholding of the FCC’s “virtuous circle” theory is an important component of Chairman Wheeler’s proposal to “replace, strengthen, and supplement” the 2010 Open Internet rules by, among other provisions, defining Internet access service as a telecommunications service, subject to the common carrier provision of Title II. If the full Commission adopts Chairman Wheeler’s proposal, it is almost certain that it will rely on the latest broadband progress report, which (1) again redefined broadband to now require download speeds of at least 25 Mbps and upload speeds of 3 Mbps, (2) observed that 17 percent of Americans lack access to broadband as newly defined, and (3) concluded that broadband is not being deployed in a reasonable and timely fashion.

In light of the FCC’s use of the facts in its 2010 broadband report to support the predictive judgment underlying its pessimistic assessment of the strength of broadband competition and its release of the 2015 broadband report that continues to view broadband competition pessimistically, it is informative to evaluate how broadband access services have developed historically, both in general and since the FCC rendered its predictive judgment in formulating the 2010 Open Access rules.

3 Market Developments under Information Service Classification

Even if increasing regulation of broadband Internet access by classifying it as Title II services ultimately withstands legal challenges, the more fundamental question is whether the benefits imposed by the imposition of common carrier regulation would justify the associated costs. Market developments subsequent to the FCC’s first decision in 2002 to classify broadband Internet as an information service and after the 2010 Open Internet Order are informative in this regard. In particular, has the performance of broadband providers suggested the need for more vigorous regulation?

---

10 *Verizon v. FCC*, p. 44.
3.1 Broadband Demand Growth

Indeed, since the FCC first classified broadband access as an information service, there have been major changes in broadband market characteristics. Table 1 lists the changes in a number of these conditions between 2001 (just before the FCC’s cable modem decision) and 2013 (the most recent year for which FCC broadband data are available).

Table 1: Growth in Internet Access Connections: 2001 to 2013

<table>
<thead>
<tr>
<th></th>
<th>Number (1000s)</th>
<th>% of Connections</th>
<th>Number (1000s)</th>
<th>% of Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>108,209</td>
<td></td>
<td>122,459</td>
<td></td>
</tr>
<tr>
<td>Internet connections</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dial-up</td>
<td>54,646</td>
<td>100.0%</td>
<td>250,471</td>
<td>100.0%</td>
</tr>
<tr>
<td>Cable</td>
<td>42,743</td>
<td>78.2%</td>
<td>3,674</td>
<td>1.5%</td>
</tr>
<tr>
<td>Telco</td>
<td>8,094</td>
<td>14.8%</td>
<td>50,709</td>
<td>20.2%</td>
</tr>
<tr>
<td>Other</td>
<td>3,452</td>
<td>6.3%</td>
<td>34,485</td>
<td>13.8%</td>
</tr>
<tr>
<td>Satellite</td>
<td>357</td>
<td>0.7%</td>
<td>1,643</td>
<td>0.7%</td>
</tr>
<tr>
<td>Fixed Wireless</td>
<td>NA</td>
<td></td>
<td>763</td>
<td>0.3%</td>
</tr>
<tr>
<td>Mobile Wireless</td>
<td>NA</td>
<td></td>
<td>159,197</td>
<td>63.6%</td>
</tr>
<tr>
<td>Total Fixed</td>
<td>54,646</td>
<td></td>
<td>91,274</td>
<td>36.4%</td>
</tr>
<tr>
<td>Fixed broadband</td>
<td>11,903</td>
<td></td>
<td>87,600</td>
<td>35.0%</td>
</tr>
</tbody>
</table>

Sources: Households: US Census

As of 2001, almost 55 million U.S households (50.5 percent of households) had connections to the Internet, with close to 80 percent of these being dial-up access. Of the broadband connections (cable modem, telephone company digital subscriber line (DSL), and other (radio based)), there were about 8 million cable modem connections and 3.5 million DSL connections.

By 2013, while dial-up broadband access had become a mere vestige of its earlier dominant position (less than 10 percent of 2011 volume, accounting for only 1.5 percent of all residential Internet connections), fixed broadband connections (predominantly cable modem, DSL, and fiber to the premises provided by telephone companies) had increased eight-fold, to a level at which about 70 percent of US households subscribed to fixed broadband access services.\(^\text{15}\) Even more striking are the 159 million broadband connections via mobile wireless devices, which

\(^{15}\) 87,600,000 fixed broadband connections/122,459,000 households.
account for more than three out of every five Internet connections. Clearly, there has been substantial growth in broadband Internet access during the period in which the FCC’s classification of such services as information services has been in effect.

3.2 Growth in Competitive Alternatives
Also relevant is the issue of whether there is a sufficient number of competitive alternatives to discipline potential anticompetitive actions on the part of broadband access providers. It appears that publicly available data sources are not necessarily completely consistent in this regard. For example, FCC Chairman Tom Wheeler’s prominent September 4, 2014 “1776 speech” appears to be based on the same data used in the FCC’s 2015 broadband report. Chairman Wheeler’s speech presented a figure (reproduced as Figure 1 below) that shows that at download speeds of 10 Mbps almost 10 percent of homes have no available providers, 30 percent have only one available provider, about one-half have two available providers, but fewer than 10 percent have three or more available providers of fixed broadband service.17

16 In particular, the “25 Mbps” bar from Chairman Wheeler’s speech, reproduced in Figure 1, matches the data reported in footnote 314 of the 2015 broadband report. The results of the FCC’s calculations appear to be quite sensitive to how available alternatives are defined. In particular, for 25 Mbps down/3 Mbps up, Chart 2 of the 2015 broadband report shows 16 percent of US households with no alternatives, 45 percent with one alternative, 27 percent with two alternatives, and 12 percent with three or more (compared to the corresponding percentages of 19 percent, 55 percent, 23 percent, and 2 percent from Chairman Wheeler’s speech). Other suggestions of possible problems with these data are (1) the fact that they are voluntary (2015 broadband report, ¶ 68) and (2) the anomalous result in Table 11 in which the broadband availability for the quartile with highest availability quartile (e.g., the top income quartile) is lower than the average availability.

17 Tom Wheeler, “The Facts and Future of Broadband Competition,” 1776 Headquarters, Washington, D.C., September 4, 2014, p. 2, second from left bar (“1776 Speech”). Chairman Wheeler’s figure identifies NTIA as the source for the availability data. NTIA collects broadband data at the census block level (http://www.broadbandmap.gov/about/technical-overview/assembling-the-data), suggesting that the availability measures are the percentage of households in census blocks with zero, one, two, or three or more broadband providers with service in the census track.
In stark contrast, data released by the FCC itself three months before Chairman Wheeler’s speech suggest much higher levels of availability.\textsuperscript{18} In particular, Figure 2 below, which is a reproduction of Figure 5(a) of the FCC’s report, shows that at speeds of \textit{at least} 10 megabits per second\textsuperscript{19} virtually every residence has at least one available provider of fixed broadband services and more than half have three or more providers.

\textsuperscript{18} Federal Communications Commission, “Internet Access Services: Status as of June 30, 2013, Industry Analysis and Technology Division, Wireline Competition Bureau, June 2014, Figure 5(a).

\textsuperscript{19} The rightmost bar would combine the 10 megabit per second category on Chairman Wheeler’s figure with all higher categories. Also note that the rightmost bar of Figure 2 has a superior upload speed (1.5 Mbps versus 0.768 Mbps per second) compared to the 10 Mbps bar in Figure 1.
Further, the FCC’s data show rather rapid growth in the availability of alternative broadband providers, as demonstrated by the FCC’s latest Internet access report released a few weeks after Chairman Wheeler’s speech.\(^{20}\) Comparing Figures 2 and 3 shows that from June to December

\(^{20}\) Federal Communications Commission, “Internet Access Services: Status as of December 31, 2013, Industry Analysis and Technology Division, Wireline Competition Bureau, October 2014, Figure 5(a) (“October 2014 Internet Access Report”).
of 2013, the percentage of households living in census tracts with three or more fixed broadband providers offering services at download speeds of at least 10 megabits per second increased from 54 percent to 65 percent and the percentage with two or more available providers increased from 92 percent to 94 percent.\textsuperscript{21, 22}

\textsuperscript{21} Figures 2 and 3 show about one percent of households live in census tracts with no available provider.

\textsuperscript{22} The growth in available alternatives over longer periods has also been rapid. For example, in the four years from December 2009 (just before the release of the FCC’s National Broadband Plan in March 2010) to December 2013, the percentage of households living in census tracts with three or more fixed broadband providers offering services at download speeds of at least 10 megabits per second increased from 2 percent to 65 percent and the percentage with more than one available provider increased from 22 percent to 94 percent. Similarly, the percentage with no available alternatives decreased from 21 percent to 1 percent. Federal Communications Commission, “Internet Access Services: Status as of December 31, 2009,” Industry Analysis and Technology Division, Wireline Competition Bureau, December 2010, Figure 3(a) (reproduced as Figure 5 below).
Finally, when broadband mobile wireless is included, Figure 4 shows that more than 90 percent of households live in census tracts with three or more fixed broadband providers offering services at download speeds of at least 10 megabits per second.

**Figure 4: December 2013 Fixed and Mobile Wireless Broadband Availability: FCC’s October 2014 Internet Access Services Report**

![Graph showing broadband availability](image-url)

Columns may not sum to 100% due to rounding.
3.3 Competition at Higher Speeds

While the FCC’s data show growth in both broadband demand and competitive alternatives at increasing speeds, FCC Chairman Wheeler appears to have a somewhat different focus—whether competition is sufficient at very high speeds.\textsuperscript{23}

But even 10 Mbps doesn’t fully capture the increasing demand for better wired broadband, of which downstream speed is, of course, only one component. It’s not uncommon for a U.S. Internet connected household to have six or more connected devices – including televisions, desktops, laptops, tablets, and smartphones. When these devices are used at the same time, as they often are in the evenings, it’s not hard to overwhelm 10 Mbps of bandwidth…

\textsuperscript{23} 1776 Speech, pp. 2-4.
That’s why our focus cannot be on the left half of the chart. A 25 Mbps connection is fast becoming “table stakes” in 21st century communications. Today about 80 percent of American homes have access to a broadband connection that delivers 25 Mbps or better…

At the low end of throughput, 4 Mbps and 10 Mbps, the majority of Americans have a choice of only two providers. That is what economists call a “duopoly”, a marketplace that is typically characterized by less than vibrant competition…

Focus on the chart again. At 25 Mbps, there is simply no competitive choice for most Americans. Stop and let that sink in…three-quarters of American homes have no competitive choice for the essential infrastructure for 21st century economics and democracy. Included in that is almost 20 percent who have no service at all!

Again, as a threshold matter, the data Chairman Wheeler displayed show substantially less competition than the FCC’s Internet access reports, where by the end of 2013, almost two-thirds of households lived in census tracts with three or more fixed broadband alternatives with download speeds of at least 10 megabits per second. Even if this discrepancy is ignored, it is far

24 Comparing Figure 1 reproduced from Chairman Wheeler’s speech with Figures 2 through 5 reproduced from the FCC’s Internet access reports suggests that Chairman Wheeler may well have been overly pessimistic about the extent of competition. Even if his depiction is accurate, the Department of Justice’s 2010 caution against imposing price regulation on broadband services is instructive:

The Department recommends that the Commission monitor carefully those areas in which only a single provider offers—or even two providers offer—broadband service. Although enacting some form of regulation to prevent certain providers from exercising market power may be tempting with regard to such areas, care must be taken to avoid stifling the infrastructure investments needed to expand broadband access. In particular, price regulation would be appropriate only where necessary to protect consumers from the exercise of monopoly power and where such regulation would not stifle incentives to invest in infrastructure deployment.


25 Chairman Wheeler made essentially the same point several days after the FCC announced the redefinition of broadband to require higher speeds and his proposal to regulate broadband under Title II:

Increasing the standard for broadband to 25 Mbps also clarifies one of the biggest challenges facing our broadband future: the lack of meaningful competition. It’s bad enough that 17 percent of Americans have no access to 25 megabit service. But at those speeds, about 75 percent of U.S. households can choose from only one provider. Where there is no choice the market cannot work.

Remarks of Chairman Tom Wheeler, Silicon Flatirons Center, Boulder, Colorado, February 9, 2015, p. 2 (available at http://www.fcc.gov/document/chairman-wheeler-silicon-flatirons-center-boulder-colorado). A not unreasonable translation of this explanation is that the Chairman Wheeler’s conclusion that there is insufficient competition—which from an economic perspective is generally a necessary (but not necessarily sufficient) requirement for increasing regulation—is the result of raising the standard. Further, the purported lack of meaningful competition is a rationale for increasing regulation across-the-board, and not just for very high-speed, fixed services. In particular, under Chairman Wheeler’s proposal:

For the first time open Internet protections would apply equally to both wired and wireless networks. Wireless networks account for 55 percent of Internet usage. For those to whom much is given, much is also expected – especially including an open network.
from obvious that the level of competition at higher speeds today justifies the increased regulation that net neutrality proponents advocate. In fact, Table 2 shows that the level of competition for fixed broadband services at 25 Mbps displayed on Chairman Wheeler’s chart is remarkably similar to the level measured by the FCC’s Internet access reports at the end of 2009 for fixed broadband services at speeds of at least 10Mbps.

Table 2: Fixed Broadband Availability at 10+ Mbps in 2009 (FCC December 2010 Internet Access Report) was Virtually Identical to Availability at 25 Mbps in 2013 (Chairman Wheeler’s “1776” Speech)

<table>
<thead>
<tr>
<th>Providers</th>
<th>FCC December 2009 Data (10+ Mbps)</th>
<th>Chairman Wheeler December 2013 Data (25 Mbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3+</td>
<td>2%</td>
<td>2.4%</td>
</tr>
<tr>
<td>2</td>
<td>20%</td>
<td>22.9%</td>
</tr>
<tr>
<td>1</td>
<td>58%</td>
<td>55.3%</td>
</tr>
<tr>
<td>0</td>
<td>21%</td>
<td>19.4%</td>
</tr>
</tbody>
</table>

In particular, both columns in Table 2 show approximately one-fifth of households with no providers, approximately 80 percent of households with at best one alternative provider, and only about 2 percent of households with more than two alternatives. The fact that only four years later, two-thirds of households have now have three or more alternative providers of fixed services with download speeds 10 Mbps or higher (Figure 3) and 93 percent have 3 or more fixed or mobile wireless alternatives (Figure 4) suggests that a decision to impose substantially greater regulation on broadband in 2010 based on dissatisfaction with the development of competition for services with download speeds of 10 Mbps or higher would have very likely imposed costs that greatly exceeded any possible benefits from such regulation. Indeed, the dissatisfaction with competition at speeds of 3Mbps/768Mbs, which was the basis for the FCC’s concluding that broadband deployment was not keeping pace in 2010, should be substantially ameliorated by market developments since then: the percentage with no alternatives is now de minimis (Figure 3) and the percentage with only one or two alternatives decreased from almost 70 percent in 2009 (Figure 5) to less than 15 percent in 2013 (Figure 3).

4 When (if ever) do you Increase Regulation?: Regulation Based on the Evidence

Viewing the development of broadband services and the availability of competitive alternatives during the first decade and a half of 21st century provides a much different perspective than the snapshot of a moment in time in the FCC’s broadband reports that resulted in a conclusion that broadband has not been deployed in a reasonable and timely manner and that more regulation is needed as a result. In particular, history suggests that to the extent that competition for the newest most advanced services is less than ideal, broadband providers have rapidly invested to
expand service and choice. Indeed, despite its recent determination that broadband deployment has not been reasonable and timely (based on its redefinition of broadband to require speeds that only 29 percent of consumers choose), the FCC acknowledges that large amounts of investment have been forthcoming.

Imposing more stringent regulation of Internet services raises the fundamental issue of when does it make economic and public policy sense to impose regulation on particular sectors of the economy. In his seminal treatise on economic regulation, Professor Alfred Kahn laid out the conditions: (1) the service (or industry) in question is large, both in its own right and as a supplier of essential inputs into other sectors of the economy and (2) competition does not work well. On first glance, Chairman Wheeler’s concerns about the sufficiency of competition seem to address these twin pillars: Internet access at higher and higher speeds, e.g., 25 Mbps may be becoming increasingly essential and in Chairman Wheeler’s opinion competitive alternatives at these higher speeds may not be sufficient.

To the extent that Chairman Wheeler’s static “snapshot” observations about the number of ISPs providing 25 Mbps service had merit and whether they justify increased regulation should also be viewed through the prism of dynamic efficiency. As Professor Weisman explains:

The optimal regulatory policy should recognize the tradeoffs between static and dynamic efficiency and its implications for consumer welfare. Static efficiency entails both allocative and productive (technical) efficiency. Allocative efficiency refers to the relationship between the price of the service and the underlying marginal (incremental) cost of the service at any given point in time. Productive (technical) efficiency is concerned with production at the lowest possible cost. Optimal investment over time in capital formation, cost-reducing innovation, and product innovation is the province of dynamic efficiency. Dynamic efficiency is particularly critical in infrastructure industries that serve as key drivers of economic growth.

26 2015 Broadband Report, Table 3.
27 Chairman Wheeler’s statement attached to the 2015 Broadband Report observed:
First, the good news. Private industry continues to invest billions of dollars to expand America’s broadband -- $75 billion a year by one analysis. Both fixed and mobile providers continue to improve broadband speeds, and current and new entrants to the market are investing and expanding broadband availability to many Americans with speeds in some locations exceeding 1 gigabit per second (Gbps).

Interestingly, the model that Professor Nicholas Economides—one of the strongest opponents of pay-for-priority among economists—described at the FCC’s October 2, 2014 Open Internet Roundtable produces the result that there can be more investment when paid prioritization is allowed. In particular, when that model is enhanced to account for the fact that ISPs routinely invest to increase the capacities of their networks, Professor Economides and his co-author found that when ISPs are able to charge different prices to different content providers, instead of being subject to net neutrality restrictions, they invest more to expand their networks. Nicholas Economides and Benjamin E. Hermalin, “The Economics of Network Neutrality,” RAND Journal of Economics, Vol. 43, No. 4, 2012, p. 619.
29 Weisman, op. cit., p. 933.
Chairman Wheeler’s apparent focus on the number of competitors for a particular level of broadband access at a particular point in time addresses static efficiency, but overlooks dynamic efficiency. The history of broadband availability and customer demand suggests that any transitory shortfalls in static efficiency may be ameliorated in fairly short order as ISPs invest to make broadband services increasingly available and at greater speeds. Narrowly focusing on how many alternatives might now be available at the highest speeds, which only a minority of current users now avail themselves of, to justify the “strongest open internet protections ever”\footnote{30} would ignore the lesson that sufficient competitive alternatives at speeds that previously had been deemed adequate for broadband has heretofore been forthcoming.\footnote{31} Further, basing more rigorous regulation on the newest of services for which demand growth is in its initial stages would be a major departure from the deregulatory environment for new services since the dawn of broadband service, as the FCC explained in its 2002 Cable Modem Order:\footnote{33}

> [W]e believe “broadband services should exist in a minimal regulatory environment that promotes investment and innovation in a competitive market.” In this regard, we seek to remove regulatory uncertainty that in itself may discourage investment and innovation. And we consider how best to limit unnecessary and unduly burdensome regulatory costs.

Market developments since then have (1) been consistent with FCC’s predictive judgment at the time of that order and (2) tended to undermine the FCC’s predictive judgment in the 2010 Open Internet Order. Based on the historical growth pattern of provision of broadband services to date, imposing even greater common carrier regulation would be unnecessary at best and at worst counterproductive to facilitating broadband access providers’ investments as integral players in the “virtuous circle” the FCC aspires to facilitate.

\footnote{30} According to the latest FCC Internet access report, 13.3 percent of fixed and mobile broadband connections are at speeds of 25 Mbps or higher. The corresponding percentage for fixed services is 31.7 percent. October 2014 Internet Access Report, Table 10.

\footnote{31} “FCC Chairman Tom Wheeler: This is How We Will Ensure Net Neutrality,” Wired, February 4, 2015 (available at http://www.wired.com/2015/02/fcc-chairman-wheeler-net-neutrality/).

\footnote{32} For example, Atkinson and Weiser’s “third way” proposal specified that broadband providers with market power be required to offer “best efforts, e.g., service without paid prioritization at a particular service level, with that level defined as download speeds of 2 Mbps. Robert D. Atkinson and Philip J. Weiser, “A ‘Third Way’ on Network Neutrality,” The Information Technology and Innovation Foundation, May 30, 2006. Since 1996 when the proposal was made, it is clear that providers now lack market power at much higher levels of service, e.g., as described earlier, almost two-thirds of households reside in census tracts with three or more fixed broadband providers. When mobile broadband is included the corresponding percentage is over 90 percent.

\footnote{33} Cable Modem Order, ¶ 5.