

Be Careful What You Wish For: Why Europe Should Avoid the Mistakes of US Internet Access Policy

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Overview

Over the last few years, policy makers in the EU have elevated the digital agenda to the highest tier of regional objectives. The implementation of a Digital Single Market is one of the European Commission's top ten priorities -- including reforms of telecommunications law and the promotion of technology start-ups.¹ This strategy is focused on integrating the EU's fractured markets for digital products and services, facilitating increased infrastructure investment, and catalyzing entrepreneurship so as to reverse Europe's lagging performance in the global IT sector.

To reach these goals, EU policy makers have looked at the results in the US high-speed Internet access market to find insights and alternative regulatory approaches. Over the last fifteen years, the US has taken a markedly different approach to Europe in high-speed Internet access policy. Some industry analysts have praised American high-speed Internet access policy as highly attractive and even argued that Europe should adopt the American model of consolidation, less competition, and higher revenue.² This view is shared and promoted by many of Europe's largest telecommunications companies.³

The EU's top digital policy official, Guenther Oettinger, echoed these ideas in a 2014 speech: „So far, we have ensured that consumers benefit from the liberalisation of telecoms markets. From now on our actions must be more geared more toward allowing companies to make fair profits.“⁴ Proponents argue that the American model will strengthen European network operators, drive infrastructure investment, and improve Europe's competitive position in the global digital economy across market segments.

The public interest benefits of this thesis are based largely wishful thinking. Market data and analysis do not support these conclusions.

On the contrary, the data demonstrate systemic problems in the US market for high speed Internet access. It would be a serious mistake for the EU to move towards the American model.

Our message to European policy-makers is a simple one: “be careful what you wish for.” The high-speed Internet access policy model that the US government chose 15 years ago abandoned shared infrastructure competition to focus on competition between different modes of access -- fiber, copper, cable, and wireless.

1 “Commission Priority -- Digital Single Market,” http://ec.europa.eu/priorities/digital-single-market/index_en.htm

2 See for example: Christopher Yoo, “U.S. vs. European Broadband Deployment: What Do the Data Say?,” University of Pennsylvania, 2014, available at <http://ssrn.com/abstract=2510854>; Roslyn Layton, “The European Union's Broadband Challenge,” 19 February 2014, <http://www.aei.org/publication/the-european-unions-broadband-challenge/>; and Richard Bennett, Luke Stewart, and Robert Atkinson, “The Whole Picture,” 12 February 2013, <http://www.itif.org/publications/2013/02/12/whole-picture-where-america%E2%80%99s-broadband-networks-really-stand>

3 Ruth Bender and Shayndi Raice, “European Telecom Companies Race to Merge,” 1 June 2015, WSJ, <http://www.wsj.com/articles/european-telecom-companies-race-to-merge-1433160138>; Julia Fioretti, “European Telecom Firms See Return to Growth in 2016,” 10 December 2014, Reuters, <http://uk.reuters.com/article/2014/12/10/uk-eu-telecommunications-growth-idUKKBNOJ023620141210> Leila Abboud and Robert-Jan Bartunek, 13 October 2013, Reuters, <http://www.reuters.com/article/2013/10/13/net-us-europe-telcos-idUSBRE99713120131013>

4 Quoted in Ian Scales, “Back to the Future,” 27 October 2014, TelecomTV, <http://www.telecomtv.com/articles/policy-and-regulation/back-to-the-future-oettinger-sounds-like-neelie-phase-one-11868/>

The theory was that this type of competition would serve consumers, especially when combined with price deregulation and a permissive attitude towards mergers and consolidation. Instead, this model has delivered a small number of very lucrative telecommunications networks that largely do not compete with one another. For the country as a whole, the gamble has not paid off. It turns out that where consolidation is possible, competition is impossible. These policies have terminated competitive pressure, left consumers paying high prices in monopoly and duopoly markets, depressed adoption rates, and offered no clear path to a universal, future-proof fiber-based infrastructure for tomorrow's economy.

This policy brief offers a summary analysis of data from the US and EU high-speed Internet access markets to highlight the relationship between policy choices and market outcomes. Our purpose is to debunk the mythology about the robust success of American high-speed Internet access policy and to support clear-eyed decisions in Brussels that will foster a robust Digital Single Market. Far from reversing course and following the US down the road to divided markets, high prices, and sluggish upgrades, the EU has the opportunity to continue promoting the competitive market framework that has served European consumers well.

The goal of policy in this arena, after all, is not investment for its own sake but, rather, investment within the context of a competitive market that prompts the delivery of better services and spurs greater adoption. Most importantly, adoption should be the primary objective, because that is what drives widespread economic activity. But without the lower prices for better services that competition will bring, adoption will not increase. This competitive framework also has the virtue of better promoting the creation of new digital businesses and thus supporting European innovation.

The main findings of this paper support six key conclusions:

1. Over the past 15 years, the US and the EU have pursued remarkably different high-speed Internet access competition policies. The results have not been favorable for American consumers. The US market is a duopoly at best for most consumers and competitive pressures all but disappear for high-capacity connectivity. The future market for advanced digital services is a lightly regulated monopoly for most households.
2. The policy-relevant comparisons between the US and EU high-speed Internet access markets are often misunderstood and incorrectly interpreted. Comparative capital investments in telecommunications networks in the US and EU stand at similar levels. The proportion of connections in high speed tiers is also similar. It is on price where the US and the EU have diverged -- and Europe, where consumers pay far lower prices for higher-speed tiers, has the advantage.
3. Americans pay higher prices than Europeans for similar high-speed Internet access products, and these differences are growing at an increasing rate over time. The result is that America has gotten stuck on a plateau of adoption, meaning that there is downward pressure on the adoption of advanced digital services among low- and middle-income communities that are an important catalyst of economic growth. Affordability and adoption should be the most important metrics for policy-makers.
4. Although it is often claimed that deregulation in the US high-speed Internet access market caused increased investment in communications infrastructure, market data do not support this claim. The most successful network operators in the US market have reduced capital expenditures (as a percentage of their ever-increasing revenues) in the years since deregulation.

lation. Rather, it is consumer demand for high-bandwidth content and services that is highly correlated with investment and increased speed in the access tiers offered by ISPs. Where it exists in the US, competition has also driven increased investment -- or, at least, promises of future increased investment.

5. Consolidation among access networks in the US high-speed Internet access market has led to significant market distortions and consumer harms, including divided markets, discriminatory pricing, and interconnection points that are highly congested due to commercial disagreements. Similar market forces in the EU are predictive of similar outcomes.

6. EU policy designed to strengthen telecommunications network operators against America's market-dominant content providers (such as a soft Net Neutrality rule) may deliver revenues to existing European network owners. But these policies will likely have the counter-productive effect of further weakening the EU's own marketplace for digital products and services. This tension at the center of Europe's digital policy agenda has not been addressed.

European high-speed Internet access policy has long benefited from the recognition that advanced digital networks and the markets they support are not merely commercial inputs in the regional economy. They are the crucial infrastructures that support modern societies and combine the values of public goods and commercial value creation. The policy framework that seeks to support and increase these assets must therefore aim to balance the interests of what is best for the industries in this market and what is best for the public and the future of the overall economy.

This commitment to both public and private sector goals was abandoned in American high-speed Internet access policy for a decade. The results have been disappointing. They have produced a market structure that will not achieve optimal results for this essential infrastructure -- leaving high prices and no clear path to fiber optic last-mile networks for most of the country.

The lesson for Europe is that consolidated scale in networks without regulatory oversight and reductions in competitive pressure are great for incumbent network owners, but that these policies do not necessarily support the goals of society.

US policy makers are now recognizing these problems, but the course they chose years ago will be very difficult to reverse.

Europe stands at an important crossroads for its Digital Agenda. It is not too late to learn from the mistakes of the US and turn those lessons into success in the EU. Multi-purpose, shared, future-proof infrastructure remains the key to successful telecommunications policy. These competition policies should be bolstered and paired with strong Net Neutrality and interconnection requirements. The package of proposals to foster investment in next-generation networks should focus on adoption goals and combine incentives with subsidies to cover the gap between what private capital will invest and what is required for robust, ubiquitous deployment. Europe should build on its successful policy foundation and avoid the temptation of false promises drawn--often misleadingly--from the US example.

1.0 -- US Market Structure -- Monopoly and Duopoly

To assess whether the US model of high-speed Internet access policy and market structure is a positive or negative example for Europe, it is necessary to track how modern American regulatory theory developed over time. The starting point is 1996, when Europe and the US shared a similar approach.

In that year, Congress passed the Telecommunications Act. The central feature of the 1996 Act was competition policy. The Act required line-sharing. It opened the networks of incumbent telecommunications companies to competitive access. The model was very similar to what exists in most of Europe today. The result was robust price competition in local telephone services but also in the emerging market of dial-up Internet access and later DSL over copper phone lines. The regulatory theory of telecommunications markets was simple: Open existing facilities to competition, drive down prices, increase quality of service, and lift the levels of technology adoption.

Meanwhile, in the late 1990s, cable companies were busy building out hybrid fiber-coaxial cable networks in every urban area to offer very lucrative multi-channel video products to compete with emerging satellite video offerings. When they began bundling cable TV with Internet access through cable modem services, the regulatory picture became complicated. There was litigation over whether cable modem Internet access service should be regulated in the same manner as DSL over telephone lines. The Federal Communications Commission (FCC) decided in 2002 that cable modem would be regulated differently than DSL and would not be subject to competitive access requirements. A federal appeals court overturned this decision in 2003, but the Supreme Court then upheld the FCC's classification decision in 2005.⁵

Shortly thereafter, the FCC removed DSL and all other Internet access services from regulations requiring competitive line-sharing, universal service, reasonable prices for utility services, and other requirements for nondiscriminatory provision of service. At the same time, the cable industry developed technology that permitted upgrading their infrastructure to much faster speeds without the significant costs of replacing copper with fiber that were facing the telcos. With the removal of regulatory requirements and the withdrawal of the telcos from much of their head-to-head Internet access competition with the cable industry, the competition the FCC had been hoping would protect American consumers from unconstrained prices and other abuses began to dry up.⁶

This series of FCC decisions marked not only a decisive point in the history of American high-speed Internet access markets, but also a shift in regulatory theory away from what Congress intended in the 1996 Act. The FCC argued that the premise of market development and infrastructure investment would not be based on the idea of competition within the same facility (i.e. multiple providers of DSL over the same copper network). Rather, competition would be exclusively between networks -- cable would compete with DSL, fiber-optics, 4G mobile, and broadband-over-powerline (BPL).

5 "Supreme Court Rules in Brand X Case," Tech Law Journal, 27 June 2005, <http://www.techlawjournal.com/topstories/2005/20050627b.asp>

6 Susan Crawford, "Captive Audience," Yale University, 2013; S. Derek Turner, "Changing Media," Free Press, http://www.freepress.net/sites/default/files/fp-legacy/changing_media.pdf; Susan Crawford, "Response to Harold Furchtgott-Roth," Federal Communications Law Journal, Vol. 65, p 341-2, <http://www.fclj.org/wp-content/uploads/2013/09/65-3-Crawford.pdf>

Today's market has not achieved the desired result. Instead, the shift in regulatory theory resulted in the reduction of competition, consolidation among network operators, higher prices for high-speed Internet access services, and greatly reduced incentives to invest in fiber to homes and businesses. A duopoly (at best) market structure dominates nationwide and threatens to become a monopoly for much of the country for the services Americans need to compete in the 21st century.

Looking back, we can see how and why the theory of market competition broke down. For starters, alternative technologies like BPL never developed. And wireless, with its low data caps on usage, proved too expensive and too slow to become a substitutable product for wired broadband services. The vast majority of Americans who own a smartphone also have a wire at home--demonstrating that, for those who can afford both, wireless and wired services are complementary. This leaves at most two options for American consumers for high-speed Internet access services -- telephone and cable companies. The competitive industry of line-sharing services that emerged after the 1996 Act has all but disappeared.

And with the very notable exception of Verizon's FTTH deployments in the urban northeast and in a few isolated spots in California and elsewhere⁷--in total, accounting for just over 8% of broadband subscribers⁸--there have been few fiber optic deployments. Therefore, for most customers, the competitive landscape is cable modem versus ADSL or VDSL.

In this head-to-head challenge, cable has unbeatable advantages. The network was built on the strength of cable television revenues and most of its digital pipe is devoted to its pay TV services. But the cost to shift the allocation of digital traffic over the cable pipe from pay TV to high-speed Internet access is relatively low. And with the latest channel-bonding technologies, cable can easily offer a 100+ mbps download service without significant infrastructure spending.⁹ In other words, without digging up and replacing its wires, a cable company can update its Internet access offering substantially.

Telephone companies looking to upgrade their copper lines to VDSL, more advanced vectoring, or FTTx face more expensive investments. Wall Street has, by and large, been uninterested in supporting the installation of fiber-optic networks in markets where cable is already present, preferring to focus on immediate dividends and higher share prices rather than long term investments. As a result, telephone companies in much of the country have opted to focus on their wireless products and leave the wired customers to cable.¹⁰ Since 2008, cable has been making steady market share gains against DSL.

As demand for higher speed services has increased in the last few years, cable's dominance has grown; in recent calendar quarters, the cable industry has signed up more than 90% of net new high-speed Internet access subscribers.¹¹ Meanwhile, companies selling cable high-speed Internet access connections as part of bundles with pay TV services have both conso-

7 The emergence of community owned fiber networks as well as the appearance of Google Fiber in a handful of markets have been brighter spots in an otherwise dark competitive outlook.

8 FCC, MB Docket No. 14-57: Exhibits, FCC Form 477 Data, Exhibit 4, Dec. 2013, https://apps.fcc.gov/edocs_public/attachmatch/DOC-330922A2.pdf

9 See, Saul Hansell, "World's Fastest Broadband at \$20 per Home," 3 April 2009, New York Times, <http://bits.blogs.nytimes.com/2009/04/03/the-cost-to-offer-the-worlds-fastest-broadband-20-per-home/?r=0>

10 See: Peter Kafka, "Comcast and Verizon Merge Without Merging," All Things D, 2 Dec. 2011, <http://allthingsd.com/20111202/comcast-and-verizon-merge-without-merging/>

11 See Leichtman Research, 15 May 2015, Press Release, <http://leichtmanresearch.com/press/051515release.html>

olidated and divided markets among themselves. The large cable companies never enter each others' territories having, years ago, swapped systems among themselves in order to cluster their markets by geography. As a result, in most metro areas a single cable company provides services to the majority of the market.

The market division that exists in much of the US should be a key focus in Europe. The only real competition faced by the cable industry in America comes from Verizon's FiOS and other new (still very rare) alternative fiber networks installed at the city level. Where FiOS is present, it is usually the preferred choice of consumers who can afford it. But there is very little FiOS in the US: Verizon stopped expanding FiOS in 2010, recently sold its lines in California, Florida, and Texas to second-tier telco Frontier, and now sells FiOS to fewer than 12 million Americans.

AT&T's U-Verse product provides fiber only to neighborhood nodes, with sharply capacity-constrained copper running from there into homes. So far, U-Verse has not been an effective head-to-head competitor with cable modem services. Should AT&T's merger with DirecTV be approved, AT&T will likely move its pay TV services onto satellite, freeing up 20 Mbps of its U-Verse wires for data transport. Still, however, U-Verse will not be able to keep up with cable or FTTH without substantial capital expenditures by AT&T. As a result, Comcast (one of the nation's largest providers of high-speed Internet access, with 41 million customers, mostly in urban markets) faces direct competition in just 14% of its territory--where FiOS exists. „New Charter“ (the cable company that will likely result from the merger of Charter, Time Warner Cable, and Brighthouse, and will serve about 37 million households) faces competition from FiOS in just 12% of its territory. In this context, wherever FiOS isn't these two enormous companies (which never enter each others' territories) have both the unconstrained power to set prices and unconstrained ability to avoid any pressure to upgrade their lines to fiber.

Similarly, second-tier telcos Frontier, Windstream, and CenturyLink, all of which primarily operate in rural areas of the US and usually sell DSL services, face little competition from major cable companies. Even after it absorbs the FiOS systems in California, Florida, and Texas, Frontier will face competition from New Charter in just 18% of its territory and from Comcast in just 8% of its territory. CenturyLink, which covers the former USWEST territory in 14 Western US states, faces competition from Comcast in just 18% of its territory and from New Charter in just 9% of its territory. As a result, many Americans in rural areas have few choices other than now-obsolete DSL services sold by companies that can charge whatever they want.¹²

These market-division strategies have reduced both competitive pressure and the speed of upgrade from legacy products. The fastest tier speeds (>25 mbps) have the least competition. For the majority of American households (75%), only one ISP is available (if any) that can offer a high-speed Internet access service of 25 mbps or better.¹³

That provider is almost always the local cable monopoly, which can charge whatever it wants for this service. And about twenty percent of Americans cannot buy this service at any price. As FCC Chairman Tom Wheeler put it: "At 25 Mbps, there is simply no competitive choice for most Americans."¹⁴ According to FCC data, cable operators account for 90% of the high-speed Internet access subscribers that purchase at least the 25 mbps speed tier -- compared to an

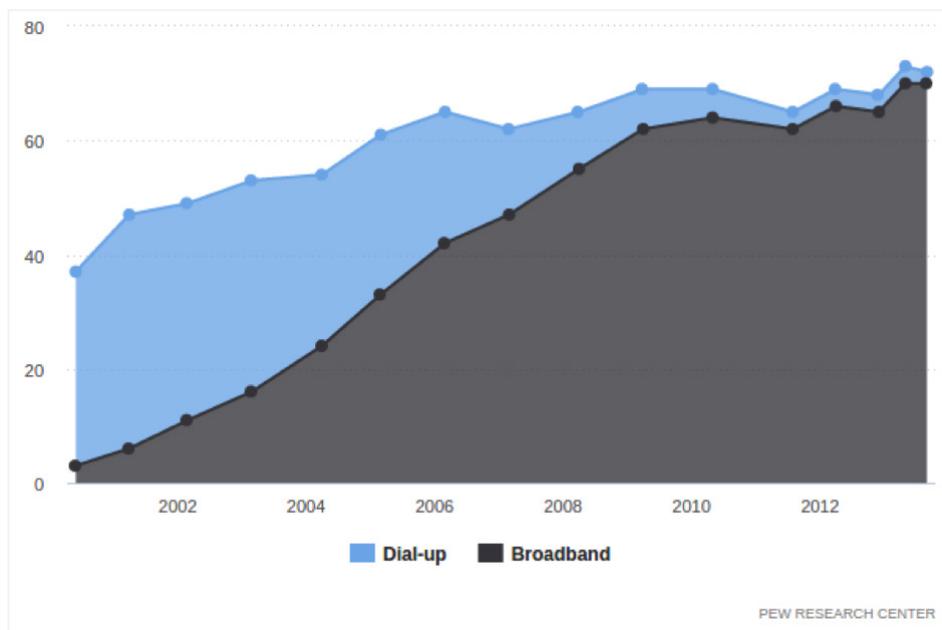
12 Market analysis and statistics of overlapping service footprints of these operators is taken from the authors' copy of a non-public 2015 report from investment analytics firm Bernstein.

13 Tom Wheeler, "The Facts and Future of Broadband Competition," 4 Sept. 2014, https://apps.fcc.gov/edocs_public/attachmatch/DOC-329161A1.pdf.

14 Ibid.

overall market share of 58% for all fixed line high-speed Internet access products.¹⁵ Yet increasingly, 25 mbps or faster is a necessary requirement for providing a household with sufficient bandwidth. The FCC recently ruled that connections slower than 25 mbps will no longer qualify as high-speed Internet access in regulatory metrics.¹⁶ In this context, Americans are fleeing DSL, which has become the new dial-up. In markets where cable competes with legacy DSL (sub-10 mbps download speeds), cable has a 78% share of subscribers.¹⁷ Meanwhile, cable high-speed Internet services are extraordinarily lucrative for the companies offering them. According to cable analyst Craig Moffett, „cable broadband is an almost comically profitable service.“¹⁸

Consolidation and the monopolization of many metro markets in the US has consequences. As we detail below, prices are rising. These rising prices result in downward pressure on adoption rates -- which should be the most important metric for policy-makers. In fact, recent studies have shown that American adoption of high-speed Internet access services plateaued around 70% of households beginning in 2009. The chart below¹⁹ plots data from surveys conducted by the Pew Research Center that shows the percentage of American adults with a high-speed Internet connection at home. The level of adoption found by Pew matches similar data (68%) from the Census Bureau.²⁰



15 See: FCC, MB Docket No. 14-57: Exhibits, FCC Form 477 Data, Exhibit 4 and Exhibit 5, Dec. 2013, https://apps.fcc.gov/edocs_public/attachmatch/DOC-330922A2.pdf

16 Brendan Sasso, "Shaming Cable Giants," National Journal, Jan. 29 2015, http://www.nationaljournal.com/tech/shaming-cable-giants-fcc-demands-faster-internet-20150129?ref=tech_edge

17 See: FCC, MB Docket No. 14-57: Exhibits, FCC Form 477 Data, Exhibit 5, Dec. 2013, https://apps.fcc.gov/edocs_public/attachmatch/DOC-330922A2.pdf

18 Brad Reed, "Cable companies' 'comically profitable' margins said to provide little incentive to invest in fiber," BGR, 6 Feb. 2013, <https://news.yahoo.com/cable-companies-comically-profitable-margins-said-little-incentive-052317517.html>

19 Chart and data from "Broadband vs. Dial-up Adoption Over Time," The Pew Research Center, Sept. 2013, <http://www.pewinternet.org/data-trend/internet-use/connection-type>

20 See: American Community Survey, Table B28002, Census Bureau, 2013, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>

This adoption plateau is an indicator that we are suffering the consequences of a cable modem monopoly in much of America. Although researchers disagree to what extent price is the central factor in limiting adoption (relevance and digital literacy are clearly important), there is no doubt that price plays a critical role. Recent surveys show price is the most important factor inhibiting adoption for up to 30% of households.²¹ A very recent study conducted by the Federal Communications Commission (FCC) demonstrated that price is a determinative factor in driving adoption decisions -- more than other considerations such as digital literacy.²² These results bolstered the case for the FCC's recent decision to subsidize low-income access to high-speed Internet service.²³ Lack of access is strongly correlated with lower socio-economic status. For example, in New York City, 36% of low-income households don't have a wire at home.²⁴ According to the US Department of Commerce, across the country, just 48% of households making less than \$25,000 use the Internet at home, compared to 95% of households making \$100,000 or more.²⁵

This price barrier US policy makers are now struggling to overcome for low and middle income households is the result of the regulatory theory that traded away competition for the false promises of deregulation. Meanwhile, the path to a competitive fiber-optic future -- a network infrastructure, with its unlimited capacity and low operating cost, that most experts agree is a central component of competitiveness in the future global economy -- is foreclosed for much of the country.

2.0 -- Infrastructure Investment in the US and EU

It appears to be conventional wisdom among many policy-makers that US investment in infrastructure is substantially better than in the EU and that higher investment numbers indicate stronger market outcomes.

The claim appears in numerous studies and speeches.²⁶ Although the argument is superficially correct, its conclusions are based on misleading statistics. More serious scrutiny reveals more complex results that should have quite different consequences for regulatory choices.

21 See discussion in Allan Holmes and Chris Zubak-Skees, "US Internet Users Pay More and Have Fewer Choices Than Europeans," The Center for Public Integrity, 1 April 2015, <http://www.publicintegrity.org/2015/04/01/16998/us-internet-users-pay-more-and-have-fewer-choices-europeans>

22 See: FCC, "Low-Income Broadband Pilot Program Staff Report," WC Docket No. 11-42, Wireline Competition Bureau, 15 May 2015, http://transition.fcc.gov/Daily_Releases/Daily_Business/2015/db0522/DA-15-624A1.pdf

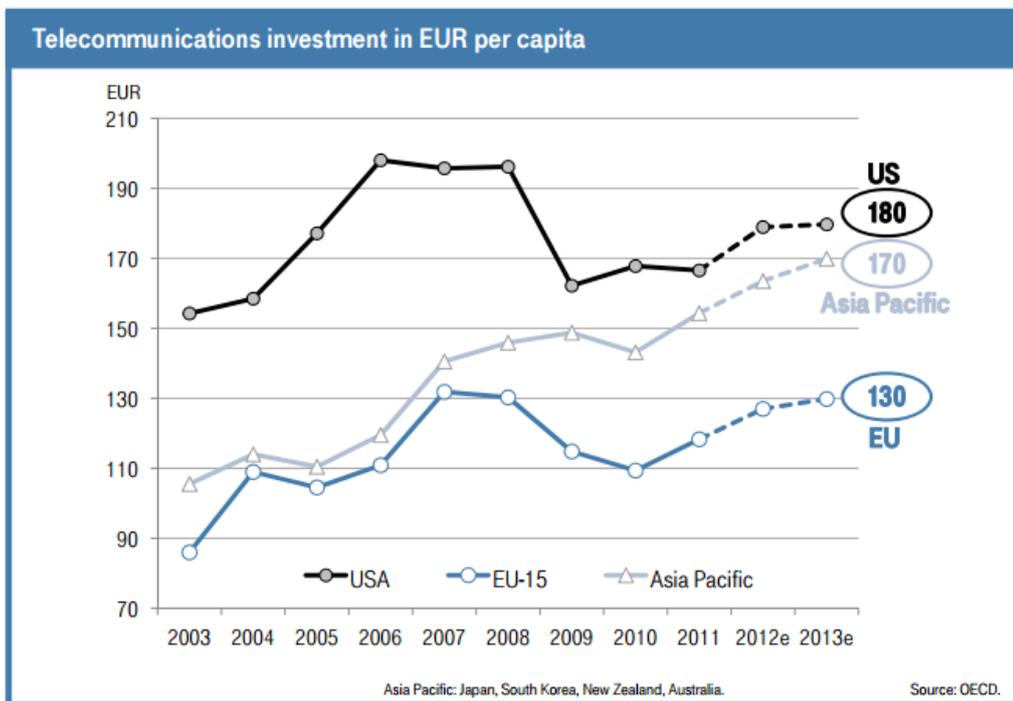
23 Allan Holmes, "FCC Says Price Counts," The Center for Public Integrity, 5 June 2015, <http://www.publicintegrity.org/2015/06/05/17446/fcc-says-price-counts-announcing-new-broadband-plan>

24 See: "De Blasio Administration Releases Audit Report of Verizon's Citywide FiOS Implementation", 18 June 2015, <http://www1.nyc.gov/office-of-the-mayor/news/415-15/de-blasio-administration-releases-audit-report-verizon-s-citywide-fios-implementation>

25 US Department of Commerce, NTIA, Exploring the Digital Nation, October 2014, p. 16, http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_embracing_the_mobile_internet_10162014.pdf (Note -- Data from 2012.)

26 See, for example: Fred Campbell, "Impact of Title II Regulation on Communications Investment," Internet Innovation Alliance, Special Reports, June 3 2015, <http://www.internetinnovation.org/library/special-reports/impact-of-title-ii-regulation-on-communications-investment>; Op Cit, Layton; Everett Ehrlich, "The State of U.S. Broadband," Progressive Policy Institute, June 2014, <http://www.progressivepolicy.org/wp-content/uploads/2014/06/2014.06-Ehrlich-The-State-US-Broadband-Is-it-competitive-are-we-falling-behind.pdf>

To begin, it is misleading to make a direct comparison of infrastructure investment between the US and the EU if the only data point is the absolute value of capital expenditures. See, for example, how this data is presented as one of the eight key trends in a much discussed slide deck -- "Europe's Digital Economy at Risk"²⁷ -- reflecting the views of incumbent network operators.



The data is correct and based on OECD sources. And it shows that the US is far above the EU in infrastructure investment. This figure is not meaningless, but it is nonetheless not a very useful comparison because of the major differences in the market structures involved. There are many variables that must be isolated or accounted for in order to have an apples-to-apples comparison between investment in the EU and the US.

For example, the way that capital expenditure is calculated varies from place to place and may include factors that distort a straightforward reading. US network operators count the cost of Customer Premises Equipment (CPE) as capital expenditure (capex), which means that cable modems and set top boxes (STBs) that are leased to consumers with subscriptions are included. These modems and STBs are not the same as improvements in the physical plant. In recent years, this CPE capital expenditure on modems and other non-plant costs represented the vast majority of capex for US cable networks.

Since 2005, non-plant capital expenses accounted for more than 80% of capex for the cable industry. And yet policy makers have mistakenly praised these companies for recent infrastructure improvements that have yielded market dominance. In fact, most investment in the physical infrastructure of cable networks happened many years ago, peaking in 1999. Today, US cable operators are investing less than 1% of their revenues in upgrades to existing

27 "Europe's Digital Economy at Risk", available at <http://www.wiwo.de/downloads/9057438/2/Europe%E2%80%99s%20Digital%20Economy%20at%20Risk>

plant.²⁸ Likely most policy makers gazing with approving eyes on the investment numbers of these companies are thinking about wires in the ground and not millions of replacement devices in consumers' homes.

But most important -- and decisive when looking at the US/EU investment figures -- is the comparative scope of deployment of cable networks in the US market. In Europe, 43% of residents have access to cable modem services in addition to DSL or fiber from incumbent telecom services.²⁹ The majority of Europeans have only one wire into the home. By contrast, cable plays an enormous role in the US market. At least 93% of residents have access to a cable wire in addition to a telephone wire.³⁰ Therefore, US investment is naturally going to be substantially higher on a per household basis because two wires are passing each home more than twice as often as in Europe.

But investment in and of itself is not necessarily beneficial to residents. The more important question is whether it translates into more competitive pressure, lower prices, better quality of service, or greater adoption. In the US market -- as we have shown -- it does not. Investment is a means to an end, not an end in itself.

Raw investment numbers alone are not good proxies for comparison of market structures, or the policies that create those market structures, or the lived experience of actual customers.

This analysis begs the question whether there is a better metric that should be used to compare the levels of investment in the US and EU in order to make valid comparisons between the two markets. One useful measure -- which is often used by the industry itself -- is "capital intensity." This is the ratio of investment divided by revenues, or, otherwise stated, the percentage of income that is reinvested in capital expenditures. The capital intensity metric normalizes the differences between nations on variables that are difficult to compare -- for example, purchasing power parity, the cost of labor, and the extensive existing market penetration of American cable networks.

The high-speed Internet access infrastructure business tends to produce about a 15% capital intensity. The CEO of AT&T, Randall Stephenson, validated this conclusion in a recent interview with Thomson Reuters: "And I have said consistently when people ask me, what should I think about in terms of capital requirements for this business? I say take our normal service revenues, multiply it times 15%, and if you're in a spreadsheet, do a click-and-drag as far as you want to forecast, and 15% is kind of where we live."³¹

Comparing capital intensity for the US and the EU telecommunications markets demonstrates that they are similar in their level of relative investment. According to the European Commission's figures for all member states for 2011, capital intensity in the market was 14%

28 S. Derek Turner and Matthew S. Wood, "In the matter of Protecting and Promoting the Open Internet, Framework for Broadband Internet Service, Preserving the Open Internet," Free Press Comments, 17 July 2014, p. 108-9, http://www.freepress.net/sites/default/files/resources/Free_Press_14-28_Comments_7-18-2014.pdf [Hereafter, Turner and Wood, "Open Internet."]

29 See: European Commission, "Trends in European Broadband Markets 2014," Digital Agenda Scoreboard, 2014, available at <http://ec.europa.eu/digital-agenda/en/news/scoreboard-2014-trends-european-broadband-markets-2014>

30 National Cable & Telecommunications Association, "America's Internet Leadership," available at <https://www.ncta.com/positions/americas-internet-leadership>

31 Comments of Randall Stephenson from Wells Fargo Technology, Media and Telecom Conference, 12 Nov. 2014. Cited in Free Press Ex Parte, Federal Communications Commission, GN Docket No. 14-28, 10-127, 21 Nov 2014, p. 5, http://www.freepress.net/sites/default/files/resources/Free_%20Press_11-20-2014_ex_parte_USTA%20Investment%20Study_Final.pdf

compared to 14.1% for the US. And in 2012, the numbers were 15% for the EU and 14.6% for the US.³²

This capital intensity analysis demonstrates that a simple reading of the investment data does not fully illustrate the reality on the ground. The truth is that real investment levels in infrastructure in the US and the EU are quite similar. The market outcomes they produce in terms of high-speed Internet access services offered to subscribers are also similar. There are variations, of course, particularly across the fragmented markets of the European states. But, as we will show in the next section, the data indicate that the most significant difference between the US and European high-speed Internet access networks is not in results per unit of investment. It is, rather, with respect to price per unit of speed. Particularly in the higher speed tiers most relevant for today's digital economy, American consumers pay more for the same high-speed Internet access products available in Europe.

3.0 -- Availability and Adoption Relative to Speed and Price

From a policy perspective, investment in high-speed Internet access networks is a means to the ends of availability and adoption of world-class services. The similarity between capital intensity levels in the US and the EU shows up again in the result of those expenditures: the performance of the networks and purchasing behavior of consumers. In this sense, availability, adoption, speed (both upload and download), capacity, and price levels are more illustrative of the vitality of the high-speed Internet access market. Investment is an imperfect proxy.

Using these more telling metrics, we find the US and the EU have similar figures for availability and adoption rates across different speed tiers of high-speed Internet access service. The US enjoys an advantage in the availability of >25 mbps because of wider deployment of cable networks. But -- as expected -- this speed advantage is a price disadvantage because of cable's ability to set monopoly rates. Americans pay substantially more than Europeans do for similar products.

Availability. By the end of 2013, basic wireline high-speed Internet access was available to 97% of European homes. Advanced high-speed Internet access services (>30 mbps) was available to 62% of European homes.³³ In the US, these figures were 94% (availability of at least 4 mbps) and 80% (availability of >25 mbps). Notably -- of this 80%, 55% must buy this level of service from a monopoly provider.³⁴

Adoption. According to European Commission data as of 2013, 76% of EU homes subscribed to a wireline high-speed Internet access service. Comparative data from the US Census Bureau in October 2013 put US subscription rates at 68%.³⁵ Data from the end of 2013 show similar levels of subscription to >10 mbps service -- 66% for Europe and 67% for the US.

32 European Commission, "State of Telecommunications Sector," 2013, available at <http://ec.europa.eu/digital-agenda/fast-and-ultra-fast-internet-access-analysis-and-data>; U.S. Census Bureau, "Annual Capital Expenditures Survey," 2011 and 2012 revised data, supra note 10; Analysis of capital intensity and statistical citations from Free Press Ex Parte, Federal Communications Commission, GN Docket No. 14-28, 10-127, 19 Feb. 2015, p 4-5, http://www.freepress.net/sites/default/files/resources/free_press_feb_19_2015_final.pdf [Hereafter Free Press Ex Parte]

33 European Commission, "Trends in European Broadband Markets 2014," Digital Agenda Scoreboard, 2014, available at <http://ec.europa.eu/digital-agenda/en/news/scoreboard-2014-trends-european-high-speed-internet-access-markets-2014>

34 Op Cit, Wheeler.

35 See: American Community Survey, Table B28002, Census Bureau, 2013, available at <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>

For higher speed services -- >30 mbps -- the US exceeded EU subscription rates 33% to 21% (again reflecting the US cable network advantage). Ultra-fast FTTH/FTTB services were also comparable -- 6% for the EU and 8% for the US.³⁶

Price. The variations in purchasing power, service bundling, discounting and exchange rate make comparing US and EU prices challenging. Further, while most large US ISPs price nationally, there is wide variation among price levels across the EU member states. However, the trend lines of the data are sufficient to show significantly higher prices in the US that are increasing -- while lower prices in the EU are falling.

The European Commission reported that median price (adjusted for Purchasing Power Parity) for a stand-alone high-speed Internet access service between 30 and 100 mbps in 2014 was Euro 34 -- down from Euro 43 in 2009. The same service bundled in a "triple play" (television, telephone, Internet) carried a median price of Euro 62, down from Euro 92 in 2009.³⁷ This data reflects the reality that the US has consistently ranked behind the leading European nations in high-speed Internet access speed and price in recent years.³⁸ US prices for similar services are considerably higher and rising.

Analysts at SNL Kagan showed price increases for major network operators like Comcast and Verizon between 2009 and 2013 -- including 52% for Comcast and 40% for Verizon.³⁹ According to other recent data, prices for stand-alone high-speed Internet access services at the 30 mbps level were around \$55 in US markets -- rising to \$60 for 50 mbps and \$70 for 100 mbps.⁴⁰

New America's Cost of Connectivity report demonstrates the range of comparative data points. This study samples the price of stand-alone high-speed Internet access service across a variety of cities across the globe. Its findings are not easily generalizable, but the trend lines and price intervals grant valuable insights into how the markets are moving. For entry level Internet access products (i.e. low speeds), US prices are comparable with the EU, but as the speeds go up (and therefore competitive service-providers are fewer), the cost differentials go up. This chart⁴¹ from the study is illustrative.

36 Figures based on FCC, Form 477, Dec. 2013 and EU Indicators Data from the European Commission -- compiled and cited in Op Cit, Free Press Ex Parte, p. 7.

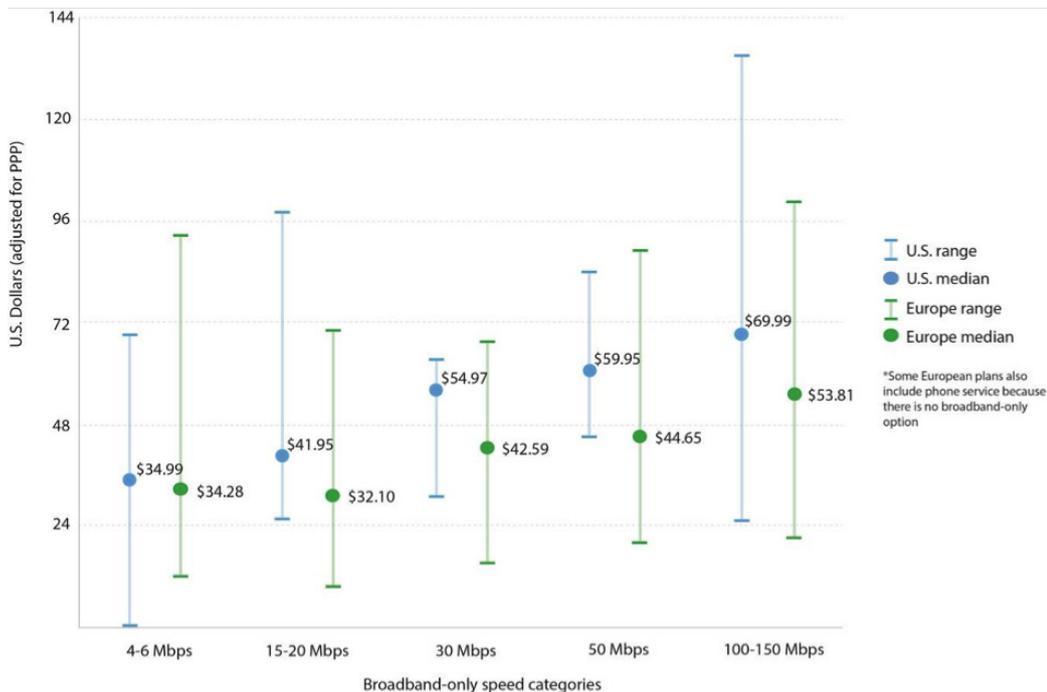
37 European Commission, "Trends in European Broadband Markets 2014," available at <http://ec.europa.eu/digital-agenda/fast-and-ultra-fast-internet-access-analysis-and-data>, p. 26-27

38 Op Cit, Crawford, "Response to Harold Furchtgott-Roth," p 345-8.

39 SNL Kagan data, cited in Op Cit, Free Press Ex Parte, p. 8, fn 31.

40 Data from Nick Russo and Robert Morgus, Cost of Connectivity 2014, Open Technology Institute at New America, p. 14, <https://static.newamerica.org/attachments/229-the-cost-of-connectivity-2014/OTI-The-Cost-of-Connectivity-2014.pdf>

41 Ibid, 14.



Why do Americans pay more than Europeans for the same service? This is likely the result of monopoly (or at best duopoly) market structure for higher-tier high-speed Internet access services in the US -- and comparatively robust competition among VDSL providers in Europe. The American regulatory strategy of eliminating shared network competition in favor of competition between networks has failed, as providers have divided markets and consolidated.

And the predictable result is higher prices for services available exclusively from a single provider. A recent study of French and American high-speed Internet access prices by the Center for Public Integrity (CPI) demonstrated the results of these divergent policies. The CPI study demonstrated that US prices were as much as three and a half times higher for US consumers. And isolating the cost per-megabit of actual throughput delivered to consumers showed that French ISPs were about 25% less expensive.⁴²

Even in those markets where FTTH networks exist in competition with cable, meaning there are two ultra-high-speed lines to the home -- prices are still climbing.⁴³

Duopoly markets do not produce downward pressure on prices either. No market in the US appears poised to offer more than two ultra-high-speed providers in any foreseeable future, and most will continue to offer only a single, monopoly provider.

One bright spot is the emergence of community fiber networks -- often financed by municipal government -- to over-build cable and copper with fiber networks and deliver world class service to the public. In a recent report, the White House praised these developments as delivering ultra high-speed services and bringing needed competitive pressures to the market.⁴⁴

42 Allan Holmes and Chris Zubak-Skees, "US Internet Users Pay More and Have Fewer Choices Than Europeans," The Center for Public Integrity, 1 April 2015, <http://www.publicintegrity.org/2015/04/01/16998/us-internet-users-pay-more-and-have-fewer-choices-europeans>

43 See for example: Bob Fernandez, "Comcast rates rising 3.4 percent," Philly Inquirer, 1 Jan. 2015, available at http://articles.philly.com/2015-01-01/news/57561592_1_price-increases-subscribers-new-york-company

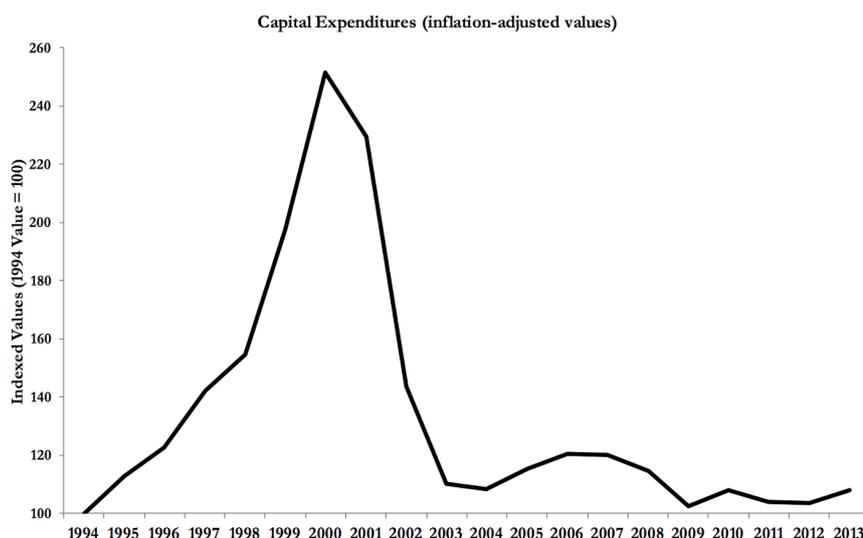
44 The Executive Office of the President, "Community-based high-speed Internet access solutions," Jan.

Consider that a primary goal for high-speed Internet access policy is to shape a market structure that will deliver universal, affordable service to all consumers in order to grant access to new technologies that drive economic growth. The high prices of duopoly and monopoly markets result in lower rates of adoption, thus directly conflicting with this key goal. This is a particular problem in low-income urban areas. According to the most recent US Census Data (2013), more than 25 American cities have over 40% of households with no fixed high-speed Internet subscription. Several -- including Detroit and Cleveland -- have over 50% of households on the wrong side of the digital divide.⁴⁵

The conclusion here is that American companies invest more; but American consumers also pay more; and at the end of the day, American and EU residents get similar results. The policy question is then not about which market structure (EU vs. US) has achieved superior results to date (in fact, neither has achieved its goals), but which one is more likely to do so in the future. In this category, Europe has the advantage because its markets retain competitive pressure to drive further infrastructure improvements while maintaining downward pressure on prices.

4.0 -- Mythology of US Deregulation/Investment Nexus

The US policy of deregulation -- betting on facilities-based competition rather than shared network access -- is often credited as the causal driver for investment in infrastructure and the provision of higher-speed Internet access products to more customers. Again, market data show this to be a myth. In fact, the majority of infrastructure improvements were made before the major deregulatory decisions of the early 2000s. This chart shows the capital expenditures (inflation adjusted) for major US telephone and cable companies from 1994 to 2013.⁴⁶

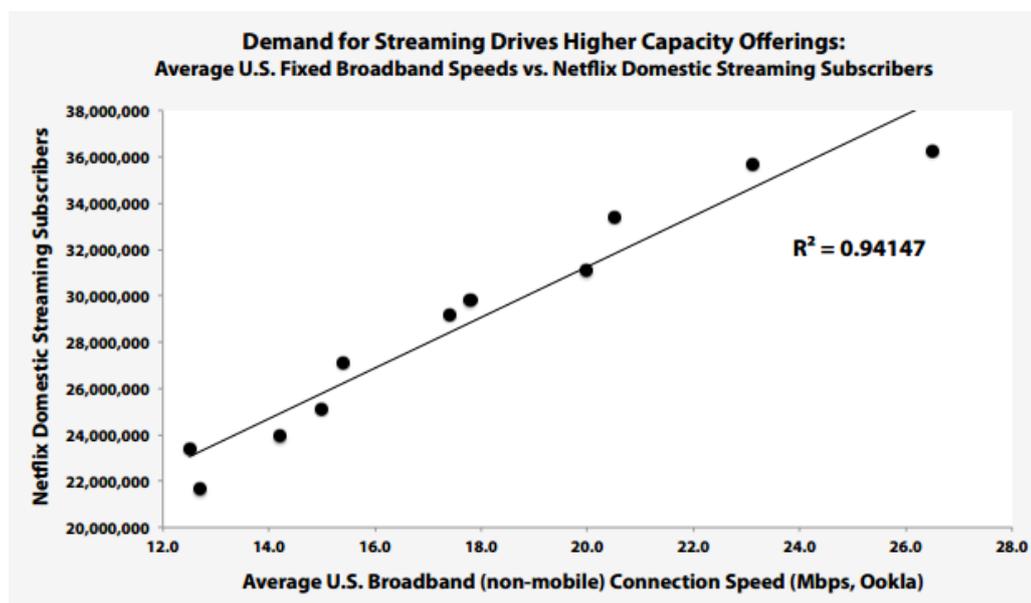


2015, available at https://www.whitehouse.gov/sites/default/files/docs/community-based_high-speed_internet_access_report_by_executive_office_of_the_president.pdf

45 "Detroit and Cleveland are among the 25 worst-connected U.S. cities," Connect your Community 2.0, 4 Nov. 2014, available at <http://connectyourcommunity.org/detroit-and-cleveland-are-among-the-25-worst-connected-u-s-cities/#more-399>

46 Research and chart from Op Cit, Turner and Wood, "Open Internet", p. 103.

In recent years, strong evidence suggests it is not deregulatory liberalization but rather consumer demand that is driving offerings of higher speeds and more expensive products. In particular, a variety of streaming video offerings have prompted consumers to upgrade service to a higher speed tier. This chart -- created in connection with the merger proceeding in the recently abandoned combination of Comcast and Time Warner Cable -- demonstrates a near perfect correlation of Netflix subscriber growth with ISPs offering higher speed tier services.⁴⁷



Source: Free Press Research, based on analysis of company reports, Ookla Net Index.

This data could not provide a better demonstration of how a market is supposed to work. It represents a virtuous economic cycle. Innovators develop content and applications that consumers want and make it available online. Consumers are attracted to the products and upgrade their high-speed Internet access services (and pay higher prices) in order to achieve higher quality of service. The network owner has an incentive to reinvest in the infrastructure to maximize the amount of bandwidth available to consumers. Unfortunately, because of the monopoly power of cable in most US markets, and the absence of either competitive pressure or regulatory oversight, this increase in speeds has not been accompanied by any discipline on prices.

5.0 -- Network Consolidation, Market Distortion, and Negative Effects on Innovation

The consequences of market consolidation and deregulation are not limited to higher prices and the absence of competition in the market. Concentrated market power among access ISPs in the US has also created disruptions in the interconnection market upstream and caused very significant consumer harms. A dispute over interconnection between Netflix, Cogent, and

⁴⁷ This figure is based on research and analysis by Free Press. See: S. Derek Turner and Matthew Wood, "In the matter of Applications of the Comcast Corp. and Time Warner Cable Inc for Consent to Assign or Transfer Control of Licenses and Authorizations," Free Press, Petition to Deny, 25 August 2014, p. 42, available at [http://www.savetheinternet.com/sites/default/files/resources/Free%20Press 14-57 Petition%20to%20Deny_Final.pdf](http://www.savetheinternet.com/sites/default/files/resources/Free%20Press%2014-57%20Petition%20to%20Deny_Final.pdf)http://www.freepress.net/sites/default/files/resources/Free_Press_14-28_Comments_7-18-2014.pdf

nearly all of the major ISPs in 2013/2014 resulted in nine months of disrupted service for tens of millions of households and businesses. In many cases, quality of service for a >25 mbps high-speed Internet access product dropped below 1 mbps.⁴⁸

The FCC responded by explicitly placing interconnection points under its regulatory authority in the agency's recent Net Neutrality ruling.⁴⁹

This is a remarkable development. The market of transit-to-access-ISP interconnection has been competitive and largely frictionless up to now. Most interconnection agreements have long been handled under "settlement free" contracts. Content providers paid transit providers to deliver traffic from their data centers to the nearest point of interconnection to a customer's access ISP -- and then the access ISP delivered the packets down the last mile to the requesting customer (whose subscription fees paid for this service).

Massive consolidation in access ISPs in the US has changed the economics of this market. Consolidated access ISPs (the five largest control 75% of wireline subscribers in the US)⁵⁰ are now demanding additional payments from the transit ISPs (and through them, the content providers) for access to end user customers. Content and transit providers are resisting. If no deal is struck, the links at the point of interconnection become congested when they are not upgraded to handle increasing demand. Congested links lead to degraded quality of service for the end-users, and end-users have no idea why this is happening.

For as long as the dispute lasts, the end-users are essentially held hostage as the access ISP gambles (not without good odds) that its customers have no alternative for high-speed Internet access service and must simply wait until the content and transit companies make a deal and pay up. Even if there are grounds for renegotiating interconnection agreements, this method of doing business cannot be acceptable under a reasonable standard of consumer protection.

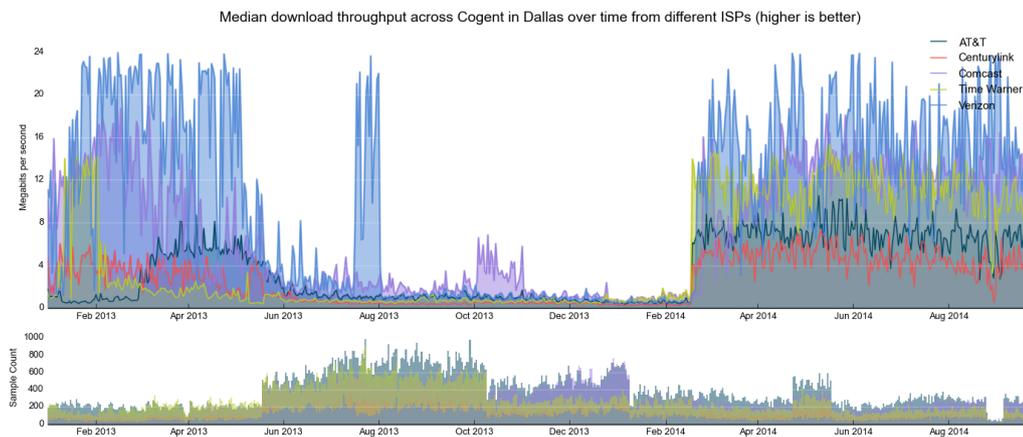
The results of these disputes can be dramatic. The Netflix dispute resulted in major degradation of quality of service over many months for almost all of the largest American ISPs. The premise that competitive pressure would cause ISPs to avoid delivering poor quality of service to customers proved wrong. The chart below -- from the Measurement Lab open data research platform -- shows the sharp drop in quality of service when links between transit and access ISPs were intentionally congested. And it shows the rapid resumption of reasonable service levels when the feuding companies reached a deal nine months later.⁵¹

48 Susan Crawford, "The Cliff and the Slope," Medium, 30 Oct. 2014, available at <https://medium.com/backchannel/jammed-e474fc4925e4>

49 FCC, "In the Matter of Protecting and Promoting the Open Internet," GN Docket No. 14-28, para. 194-206, available at https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-24A1.pdf

50 Calculation derived from 2015 Q1 Leichtman Research Group Data, available: <http://www.leichtmanresearch.com/press/051515release.html>

51 Chart and analysis from Measurement Lab, "ISP Interconnection and its Impact on Consumer Internet Performance," October 2014, http://www.measurementlab.net/blog/2014_interconnection_report



Nothing as dramatic as the Netflix interconnection dispute has occurred in Europe. However, these kinds of problems are not without precedent. In 2013, the European Commission's Directorate-General for Competition conducted unannounced inspections at the premises of Deutsche Telekom, Orange and Telefónica to investigate potential abuses in traffic exchange agreements.⁵² DG Competition feared that these companies would abuse their dominant position by throttling and degrading traffic from third party networks at the point of interconnection. And the logic of consolidation and reduced competition in European policy thinking suggests the same problems may occur more frequently in the future.

EU regulators appear to be aware of the impending problem. In the recent acquisition of cable operator Ziggo by Liberty Global in the Netherlands, the conditions applied to the merger agreement included a requirement that the new entity maintain at least three uncongested paths into their networks in the Netherlands to ensure customers would have unfettered access to over-the-top content and services.⁵³

There is a corollary problem in the EU with the theory that deregulation will lead to greater investment. The argument in favor of reducing competition and encouraging consolidation is also often paired with a case against Net Neutrality. The premise is that removing regulatory oversight will increase investment and permit increased revenue through new business models. This is a particularly appealing argument among European network owners because the market of selling "paid prioritization" (i.e. selling priority access to congested links in the network) is designed to collect additional rents from large Internet content and service providers, most of which are American companies. Taking money from American tech giants to fund European network build-out through pay-for-play fees has strong political appeal. However, the logic of such a policy carries a major internal contradiction with other EU policy priorities aimed at promoting innovation and the growth of European digital content and service companies.

⁵² Laurent Godfrond and Stéphane Hautbourg, "The European Antitrust Review 2015 - Telecoms and Media," Global Competition Review, 2015, available at <http://globalcompetitionreview.com/reviews/62/sections/209/chapters/2466/telecoms-media/>

⁵³ European Commission, "Mergers: Commission clears acquisition of Dutch cable TV operator Ziggo by Liberty Global, subject to conditions," press release, 10 Oct. 2014, available at http://europa.eu/rapid/press-release_IP-14-1123_en.htm

If the EU allows discriminatory, pay-for-play business models for carrying traffic on the Internet, it may strengthen the revenues of the incumbent telecommunications companies. But it will be at the expense of the nascent European Internet industry. The new fees required for guaranteed quality of service would apply to European companies as well -- none of which can match the ability of their Silicon Valley competitors to pay. Such a path would exacerbate the competitive weakness of European technology companies. Further, the monetization of congestion by local incumbent network operators could reduce incentives for expanding high-speed Internet access capacity. If there is a lucrative business selling priority access to congested routers, the prospects of network operators eliminating that business by expanding capacity with an expensive fiber-optic build out is questionable.

Following this logic, the EU's top line goals on technology policy include inherent contradictions. On one hand, Brussels appears sympathetic with incumbent telecommunications network owners who seek deregulation, permission to consolidate, and authorization to violate net neutrality. On the other hand, Europe is very committed to growing its own "Silicon Valley" and cultivating an entrepreneurial ecosystem of innovators that create new business, win global market-share, and generate consumer demand for Europe's online products. These goals are not easily made compatible.

Conclusion

This policy brief is designed as a reality check on regulatory theory and market analysis that may lead European policy makers to look favorably on the US market and the policy choices that created it. Our message -- "Be Careful What you Wish For" -- is clearly supported by the data and arguments presented here. The US regulatory model is based on a fundamentally flawed assumption that competition among modes of access will deliver the best outcomes for consumers. It has not. On the contrary, 75% of the country has (at best) a monopoly for the highest speed tier of Internet access service that can accommodate a modern suite of applications and services. Prices are high and rising. And this has the consequence of a plateauing level of high-speed Internet access adoption -- particularly among low and middle income households. This may be an acceptable outcome for shareholders but it should not be for policy makers. The central challenge of the American story is that fifteen years of this policy direction has created a market that is very difficult to alter.

Europe has not yet embraced the false hope of consolidation and deregulation as handmaidens of investment, adoption, and public interest benefit. The EU should stick to its strengths -- competitive markets. With similar levels of capital intensity, Europe has achieved similar results to the US in terms of high-speed Internet access adoption. This is due to competitive pressures on price that make even the most advanced Internet access products affordable. Placing adoption as the top priority goal remains the right choice for policy-makers. Furthermore, the evidence from the US does not suggest that deregulation and consolidation will lead to dramatic investment -- and what gains are achieved may be offset by declines in competition and affordability. The cable monopoly facing much of the US market, and the absence of a path towards a national upgrade to fiber, were clearly not the intended outcomes of this regulatory theory.

The best path forward for Europe is to maintain a competitive market structure and create incentives for network operators to maximize the amount of bandwidth available in their infrastructure. Wholesale open access fiber--where multiple competitive access providers share core infrastructure--remains the leading method of producing world class speeds at reason-

nable prices. A strong Net Neutrality rule is a needed corollary. Demand for high-bandwidth services -- not discriminatory pricing for priority access to congested networks -- is the best predictor of consumer purchase of faster and more expensive services. Both open access to competitive access providers and nondiscriminatory treatment of all Internet content have the added benefit of supporting robust market development in content, applications and service markets -- a parallel goal in the European Digital Agenda. But the path to fiber will require strong public policy and concerted collaboration among public and private sector leaders. Left by itself, EU private market forces will not make the full transition to fiber for many years. EU policies should seek to speed the exit from copper, incentivize the creation of open access fiber networks, and work with network operators, investors, and public financing options to tip market forces towards building the networks Europe will need to succeed in the 21st Century digital economy.

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Policy Brief

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of US Internet Access Policy

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