



THE FREE STATE FOUNDATION

A Free Market Think Tank for Maryland.....Because Ideas Matter

Perspectives from FSF Scholars
October 25, 2017
Vol. 12, No. 36

Net Neutrality Regulation, Investment, and the American Internet Experience

by

James E. Prieger *

Introduction and Summary

Under what type of government oversight will the Internet ecosystem flourish best? The Federal Communications Commission is currently wrestling with this question as it considers whether to move beyond its 2015 *Open Internet Order* that placed Internet service providers (ISPs) under heavy-handed public utility regulation. On one side, supporters of such strict net neutrality claim that the recently promulgated rules promote investment, encourage innovation, and create jobs.¹ On the other side, proponents of light-touch regulation that would allow ISPs more freedom claim the opposite. The latter group — including many academic economists (a group of which I am a member) — argues that letting Internet service providers manage their networks efficiently as they see fit and allowing them freedom to offer paid prioritization or other differential treatment of data will lead to the best outcomes. Permitting ISPs to offer a variety of practices, terms, and conditions in their contracts gives greater flexibility to satisfy the wants and needs of content providers and end users.

¹ See, for one example, the regulatory comments of Free Press summarized at <https://www.savetheInternet.com/press-release/76056/free-press-clear-net-neutrality-rules-will-promote-investment-innovation-and>

I joined a group of fourteen prominent economists recently in a [review of the evidence](#) that concluded that stricter regulation of ISPs would harm investment, innovation, and the economy, contrary to the claims of net neutrality boosters.² This group of economists has centuries of collective research experience studying exactly these issues. Having myself studied how regulation affects innovation in telecommunications and related industries for twenty years, I am highly skeptical of claims that strict net neutrality regulation will benefit the Internet ecosystem by spurring innovation. A lot of history at home and abroad suggests the opposite will occur. In this Free State Foundation *Perspectives*, I review that evidence, consider whether net neutrality rules outside the United States have encouraged innovation, and address some of the costs for the economy that would follow from hampering incentives to investment.

Allowing the rules in the *Open Internet Order* to remain in place would run counter to much research demonstrating that heavy-handed communications regulation threatens investment and innovation. Several econometric examinations of mine have shown that, in varied U.S. regulatory settings, increased regulation discourages the creation and introduction of new communications services.³ Other economists studying the rate of telecommunications patenting and communications investment similarly conclude that heavier regulatory burdens are associated with less innovation and investment. The lessons from the economic literature on regulation apply to net neutrality rules such as the ban on paid prioritization of traffic and the saddling of ISPs with old-style public utility regulation. It is no surprise, then, that broadband investment has fallen in the U.S. since the *Open Internet Order* was imposed, during a period in which investment elsewhere in the economy was rising.

Those who foresee dire consequences for the future of the American Internet seem to ignore the great success and continued growth of the Internet over the past two decades – growth that occurred (until 2015) in the absence of net neutrality regulation. Whether looking at growth in usage of the Internet, how ubiquitous usage is today, growth in the number and quality of broadband access lines, or the emergence and now dominance of the mobile broadband experience, the rapid ascendance of the Internet in the U.S. is nothing short of amazing. And yet somehow now the Internet ecosystem is supposed to be in peril without net neutrality regulation? It is hard to see how increasing the regulatory burdens on broadband service providers during the past two decades would have led to better industry performance or consumer satisfaction.

While the negative consequences for innovation and investment by ISPs is clear, it is also important to examine how net neutrality regulation affects innovation by content providers and app developers — the so-called “edge” of the network. The evidence — as opposed to the

² John W. Mayo, Michelle Connolly, Ev Ehrlich, Gerald R. Faulhaber, Robert Hahn, Robert Litan, Jeffrey T. Macher, Michael Mandel, James E. Prieger, Robert J. Shapiro, Hal J. Singer, Scott Wallsten, Lawrence J. White, and Glenn A. Woroch, “[An Economic Perspective of Title II Regulation of the Internet](#),” Georgetown University McDonough School of Business Economic Policy Vignette, July 2017 (hereafter An Economic Perspective). In this article I review some of the arguments made in An Economic Perspective but I do not claim to speak for any of the other authors.

³ For the specific studies and references of the research mentioned in the remainder of this summary, see the discussion and footnotes in the subsequent sections.

opining — here is scant. But one study comparing two European countries with differing net neutrality regimes concludes that lighter-touch regulation is associated with more innovation at the edge.

The stakes are large. Government actions that discourage broadband investment have significant deleterious effects. Broadband is highly important to the U.S. economy, the productivity of businesses, and the satisfaction of consumer wants. The investment that enables broadband services adds directly to the economy through spending on capital goods and the jobs involved with network installation and maintenance. Broadband investment also has a multiplied effect on the economy and job creation through stimulation of supplying industries. Among other things, this implies that regulatory impingement on investment behavior will also negatively affect the economy outside the communications industry.

For all of these reasons, which are addressed in much more detail in the body of my *Perspectives*, the FCC should follow the empirical evidence and return to light-touch regulation in the Internet ecosystem.

Looking Back: Experience with Regulation, Investment, and Innovation

Investment and innovation is highly sensitive to changes in communications policy. Regulatory policy such as stringent net neutrality rules that restrict how investing firms can gain returns on their investment will push some potential projects into the red, so that businesses will not pursue these opportunities.⁴ While the resulting social costs of such onerous regulation do not show up in any accountant's ledger, the negative impact on consumers and firms is nonetheless real. Here are some examples that illustrate the impacts of regulation on innovation.

In one of the earliest comparisons of telecommunications innovation rates under lighter and heavier regulatory regimes, I studied the experiences of the major telecom service providers in the 1990s (the “Baby Bells” and AT&T) when they were introducing then-new services such as voice mail and data services to their customers.⁵ My study found that the number of services created during the period of lighter FCC regulation was 60-99 percent higher than the model predicted would have been introduced to consumers if stricter regulation had remained in place.

In other research, I examined the effect of allowing dominant telecom firms more freedom to profit from their investment and innovation, which increases the incentives to innovate. In one Midwestern state I studied, allowing the incumbent telephone companies more freedom to set prices and to escape long regulatory delays when attempting to introduce new services spurred

⁴ James E. Prieger, “[Investment in Business Broadband in Rural Areas: The Impacts of Price Regulation and the FCC's Blind Spot](https://ecfsapi.fcc.gov/file/10809108333211/160808%20Invest%20in%20Broadband%20for%20America%20Letter%20FINAL.pdf),” filed by Invest in Broadband for America to the FCC in the matter of Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans, Special Access Rates for Price Cap Local Exchange Carriers, and Business Data Services in an Internet Protocol Environment, August 2016 (<https://ecfsapi.fcc.gov/file/10809108333211/160808%20Invest%20in%20Broadband%20for%20America%20Letter%20FINAL.pdf>).

⁵ James E. Prieger, “Regulation, Innovation, and the Introduction of New Telecommunications Services,” *Review of Economics and Statistics*, November 2002, pp. 704-715.

innovation.⁶ I estimated that the dominant company in the area created new services 2 to 4.5 times faster than it did under the previous heavy-handed regulatory regime. Moreover, the firm would have introduced up to twelve times as many services had reform been enacted at the beginning of the observed period.

Another study I co-authored assessed how differences in state communications regulation affected investment in broadband infrastructure in the early 2000s.⁷ We found evidence consistent with stricter regulation dampening the incentive to deploy broadband infrastructure and service, compared to alternative, lighter-touch regulation.

Many other economists have also studied how regulatory stringency can decrease investment and innovation.⁸ One study compared the United States and Japan in the 1980s and 1990s, a time of deregulation in telecommunications in these countries, with Germany, France, and the United Kingdom, which maintained stricter telecom regulation in place.⁹ In the U.S. and Japan, the growth rate of new communications patents was higher than in the European countries. In other research, several economists studied a multi-country sample and concluded that the stricter the regulatory regime, the lower the investment in the communications industry and in the economy at large.¹⁰

While each regulatory regime examined in these studies is unique, the basic message that increased communications regulation discourages investment and innovation appears to be a consistent theme. Whether looking at old-style rate-of-return regulation from the 20th century or the heavy-handed net neutrality regulation under discussion today, the fundamental economic fact remains – the more onerous the regulation in the communications sector, the less investment and innovation there is likely to be.

We can see another example of this principle illustrated by the differing treatment of cable modem and DSL service between 1996 and 2005 in the U.S. This example is particularly germane to the *Open Internet Order*, because, by virtue of a regulatory quirk, DSL service providers were subject to heavy-handed “Title II” regulation (the 20th Century public utility obligations that the 2015 Order imposed on all ISPs) but cable service providers were not. One

⁶ James E. Prieger (2001). Telecommunications regulation and new services: A case study at the state level. *Journal of Regulatory Economics*, 20(3), 285-305.

⁷ Prieger, J.E., & Lee, S. (2008). Regulation and the deployment of broadband. In Y.K. Dwivedi, et al. (Eds.), *Handbook of Research on Global Diffusion of Broadband Data Transmission* (pp. 241-259). Hershey, PA: IGI Global.

⁸ See Theodore R. Bolema, “[Too Much Unnecessary Regulation Is Impeding Telecom Investment](#),” *Perspectives from FSF Scholars*, Vol. 12, No. 13, Free State Foundation, April 17, 2017, for a good discussion of how communications regulation is linked to investment, with citations to the large literature on this subject.

⁹ See OECD, *Communications Outlook 1995*, OECD Publishing.

¹⁰ Alberto Alesina, Silvia Ardagna, Giuseppe Nicoletti, and Fabio Schiantarelli, “[Regulation and Investment](#),” *Journal of the European Economic Association*, June 2005, pp. 791-825.

recent econometric study showed that the application of Title II regulation retarded investment by DSL service providers by about \$1 billion per year, a reduction of about a 5.5 percent.¹¹ That study is new but the message is not. That the regulatory disparity between DSL and cable was responsible in part for the early market dominance of cable modem service in the Internet access market has been known at least since the work of MIT economist Jerry Hausman and his co-authors examining the early Internet period.¹²

Given all these empirical links between heavier regulatory burdens and lower investment and innovation, the experience of the U.S. broadband industry after the *Open Internet Order* is no surprise. Since Title II was imposed, U.S. broadband investment has dropped. Theodore R. Bolema explains in [another Free State Foundation Perspectives](#) why the ban on paid prioritization in the FCC's 2015 *Open Internet Order* has held back investment in broadband infrastructure.¹³ Another examination shows that broadband investment in 2016 declined by \$3.6 billion compared to 2014 levels.¹⁴

Now, investment may rise and fall in industries for many reasons, but it is important to note that capital expenditure in the aggregate in the U.S. has been rising every year since the end of the recession in 2009.¹⁵ Clearly, something diminished the incentives to invest in broadband infrastructure that did not affect other industries across the board. Dr. Bolema also discusses why this prohibition on ISPs offering “fast lanes” to content providers who wish them will hold back future investment and innovation in certain industries for which high levels of end-to-end reliability are critical.

Looking at Today: Did Lack of Net Neutrality Regulation Stunt the Growth of the Internet?

We can also consider the great success of the development, provision, and continued growth of the Internet in the United States in the past two decades. Until 2015, when the FCC's *Open Internet Order* imposed burdensome net neutrality rules on the industry, there were no formal rules restricting ISPs' ability to manage networks efficiently and contract freely with content providers. Thus, the strong growth of fixed and, more recently, mobile Internet access, usage,

¹¹ See Hal J. Singer, “Three Ways the FCC's Open Internet Order Will Harm Innovation,” Progressive Policy Institute, May 2015, available at: <http://www.progressivepolicy.org/issues/economy/three-ways-the-fccs-open-Internet-order-will-harm-innovation/>.

¹² See Jerry A. Hausman, “Internet-related services: the results of asymmetric regulation.” In *Broadband—Should We Regulate High-Speed Internet Access*, (2002), 129-156, AEI-Brookings Joint Center for Regulatory Studies; and Jerry A. Hausman, J. Gregory Sidak and Hal J. Singer, “Cable Modems and DSL: Broadband Internet Access for Residential Customers,” *The American Economic Review*, Vol. 91, No. 2, (May, 2001), pp. 302-307.

¹³ Theodore R. Bolema, “[Allow Paid Prioritization on the Internet for More, Not Less. Capital Investment](#),” *Perspectives from FSF Scholars*, Vol. 12, No. 16, Free State Foundation, May 1, 2017.

¹⁴ See <https://haljsinger.wordpress.com/2017/03/01/2016-broadband-capex-survey-tracking-investment-in-the-title-ii-era/>.

¹⁵ See Organization for Economic Co-operation and Development (OECD), *Gross Domestic Product by Expenditure in Constant Prices: Gross Fixed Capital Formation for the United States* [NAEXKP04USA652S], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/NAEXKP04USA652S>, October 15, 2017.

and content occurred under exactly the conditions that critics claim will stymie innovation and freedom on the Internet. Given that present-oriented bias always threatens to skew the picture of the current Internet landscape, it is important to remember how far we have come in such a short time.

Starting from the introduction of the World Wide Web in 1993, Internet usage in the U.S. grew at an explosive rate.¹⁶ Within ten years, 62% of Americans were using the Internet – a rate of adoption almost without precedent in the history of technology. The number of people online has risen and today about 88% of Americans use the Internet in some fashion.¹⁷ One recent study found that an average of 92 percent of adults in the U.S. connect to the Internet over the course of the day.¹⁸ In short, the eager adoption of the Internet in this country in such a brief period has been nothing less than amazing.

To serve this rapidly growing market, ISPs and network operators expanded Internet infrastructure and provision at equally brisk rates. Since 1999, the compound growth rate in broadband lines has averaged an astounding 33.3% per year in the nation. By midyear 2016, there were 370 million broadband Internet access connections, up from only 380,000 in 2005.¹⁹ Virtually every census block (the smallest unit of geography at the Census Bureau) where people live has fixed broadband service available at some speed, even without counting mobile or satellite-based services.²⁰ About 72% of all broadband Internet access lines were mobile broadband connections, which did not even exist as a consumer service when the FCC first began collecting broadband statistics in 1999.

Merely counting lines obscures the great quality improvements ISPs have made. In 2010, only one in seven fixed broadband lines exceeded 6 Mbps, while in 2016 more than four out of five fixed broadband lines were faster than 10 Mbps.²¹ The greatest relative gains in download speed have come in the mobile market. Remember how painfully slow accessing the Internet was on your mobile phone ten years ago? The technologies available in 2007 typically allowed download speeds of no more than about 0.5 Mbps under laboratory conditions,²² whereas by 2015 the median actual LTE download speeds of all four nationwide mobile network operators

¹⁶ The statistics cited here are from James E. Prieger, “[The Growth of the Broadband Internet Access Market in California: Deployment, Competition, Adoption, and Challenges for Policy](#)” (2016), Pepperdine University, School of Public Policy Working Papers, Paper 63 (<http://digitalcommons.pepperdine.edu/sppworkingpapers/63>), updated as necessary. See that publication for sources of the statistics.

¹⁷ See <http://www.Internetworldstats.com/stats14.htm>.

¹⁸ See Jeffrey T. Macher, John W. Mayo, Olga Ukhaneva, and Glenn Woroch, “From Universal Service to Universal Connectivity,” *Journal of Regulatory Economics*, August 2017, Volume 52, Issue 1, pp 77–104.

¹⁹ FCC, *Internet Access Services: Status as of June 30, 2016* and FCC, *Internet Access Services: Status as of June 30, 2009*.

²⁰ *Ibid.*, Figure 4.

²¹ See Federal Communications Commission, Industry Analysis and Technology Division Wireline Competition Bureau, *Internet Access Services: Status as of June 30, 2016*, April 2017; and *Internet Access Services: Status as of December 31, 2013*, October 2014.

²² See FCC, *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services (12th CMRS Competition Report)*, January 28, 2008.

were in the range of 6 to 15 Mbps. All this while the price of Internet services fell by roughly 11 percent in official indexes (which do not even adequately account for quality improvements) compared to the overall Consumer Price Index from 2010 to 2017.²³

Make no mistake: any critic faces a daunting task when arguing that somehow the lack of strict public utility-style net neutrality regulations has led to a less-than-robust broadband ecosystem and high-quality Internet experience for Americans. It is easy to come up with a wish list of how the situation could be improved. One could wish rural broadband were always just as fast and ubiquitous as in urban areas or one could wish that prices were always even lower and quality even higher. However, it is difficult – if not impossible – to see how saddling the Internet service providers with more regulation would have encouraged the additional investment necessary to move those margins.

Looking Across: The International Experience with Net Neutrality

At times the debate about net neutrality regulation appears to be a war of competing claims about investment and innovation. The literature discussed above clearly points out the potential for ill-conceived regulation to hamper investment in the network by ISPs and other network providers. What about innovation “on the edge” of the network, however? Some supporters of net neutrality regimes claim that without such regulation app developers and content providers would not innovate as copiously. Given the great success of the Internet to date, largely in the absence of codified, much less public utility-style net neutrality regulation, this seems like an unpromising case to advance. Nevertheless, let’s consider whether the evidence backs it up. As I discussed in a [previous FSF Perspectives](#),²⁴ the theoretical evidence on this point in the economics literature is mixed. When theory does not indicate clearly which of two possible outcomes is expected, it becomes doubly important to consider empirical evidence – i.e., actual outcomes.

While the relatively recent nature of formalized net neutrality regimes means that empirical studies are just beginning to be performed, evidence is starting to be gathered and assessed. Dr. Roslyn Layton has placed net neutrality regulatory regimes around the world into three categories: hard regimes, in which net neutrality practices are regulated or legislated; soft net neutrality, where self-regulation is the main approach; and places where there are no net neutrality policies or practices. She then compared the experiences of Denmark, with its relatively soft net neutrality rules, and the Netherlands, which has a hard regime.²⁵ In Denmark, the ISPs and mobile network operators largely regulate themselves regarding net neutrality, which means that while operators do not discriminate based on (for example) the intellectual or political content of the Internet traffic, they are able to offer free data plans that target particular services such as Facebook (i.e., so-called “zero rating” plans). In the Netherlands, on the other hand, net neutrality rules were legislated during the period studied.

²³ See U.S. Bureau of Labor Statistics, Consumer Price Index, Series IDs: CUUR0000SA0, CUUS0000SA0, and CUUR0000SEEE03. This statistic is cited in *An Economic Perspective*, op. cit.

²⁴ James E. Prieger, “[What Do Economists Know About Net Neutrality Regulation? Quite a Lot, and the FCC Should Pay Attention](#),” *Perspectives from FSF Scholars*, Vol. 12, No. 29, Free State Foundation, Sept. 6, 2017.

²⁵ Roslyn Layton, “[Does Net Neutrality Spur Internet Innovation](#),” American Enterprise Institute publication, August 2017 (<http://www.aei.org/publication/does-net-neutrality-spur-internet-innovation/>).

Dr. Layton first examined the 250 most used mobile apps within each of these two countries at two points in time (for a total of 1000 apps), and examined which were developed locally (i.e., within the country). This allows her to address the question of which set of practices around net neutrality actually stimulated more innovation around the edge of the network. She found that during 2011-2016, Denmark produced 13% more of the top apps in these countries than did the Netherlands (115 apps were from the former while 102 were from the latter). Furthermore, during this time Denmark was increasing its local share of top apps while that share was falling in the Netherlands. Thus, the differential impact on edge innovation was rising the longer hard net neutrality rules were in place in the latter country.

Dr. Layton also looked at other countries of origin of the top mobile apps used in Denmark and the Netherlands. Strikingly, almost all top apps from outside the U.S.²⁶ came from countries with either no net neutrality rules or those with soft rules such as self-regulation. Only 20 of the top apps across both these countries – a mere 3.9% of top non-American apps for which the country of origin could be determined – came from countries with hard net neutrality regimes.

While there may be other factors involved in this comparison – after all, this was not a randomized experiment performed in a sterile laboratory setting – it is striking how poorly fares the claim that hardline net neutrality regulation will unleash innovation at the edge of the network. On the other hand, the “permissionless innovation” that mobile network operators and ISPs enjoyed in Denmark meant that they could entice many more users onto next-generation mobile networks with innovative plans involving zero rating. Rather than demonizing zero rating, as net neutrality advocates are wont to do, it appears better to view it as offering something that consumers want at a price they like (free), which increases the size of the network, and which in turn makes the market more attractive for app developers (both those included and those not part of the zero rating).

Looking Ahead: The Costs of Delayed or Deterred Investment

Each dollar of forgone investment destroys valuable economic activity, and not just from the large ISPs.²⁷ Users of broadband are harmed, as well as the economy generally from lost economic activity. Let’s begin with the potential impacts on broadband users. From the literature discussed above, it is clear that by restricting which business arrangements are allowed with an ISP’s subscribers and edge developers, ISPs’ incentives to invest in next-generation networks can be harmed. Lower quality or less-available broadband access and capacity hurts current and potential broadband users.

Consider business users for the moment. If local businesses have less access to high quality, reliable broadband, or fewer possibilities to adopt services enabled by next-generation networks, their productivity will be harmed. The links between businesses’ productivity and their usage of

²⁶ Dr. Layton analyzes apps from the U.S. separately, given the unique dominance that the U.S. has always had in the market for mobile apps.

²⁷ This section draws heavily from a similar discussion in another work of mine: James E. Prieger, [Investment in Business Broadband in Rural Areas](#), op. cit.

broadband and other forms of information and communications technology (ICT) are well established in the economic literature.

One study found that when businesses invest an additional 10% in ICT, their average labor productivity growth goes up by 0.6%.²⁸ Broadband adoption in particular is known to increase firms' productivity by 7-10%.²⁹ Advanced broadband applications of the kind that benefit highly from high-speed broadband networks, such as video communication, virtual private networks, and supply chain management, increase productivity the most.³⁰ These forgone productivity enhancements for firms can aggregate to significant negative economic impacts in the economy at large, since the positive links between investment in ICT and broadband and economic growth are well attested.³¹

There are other negative economic impacts from reduced investment by Internet service providers. Any investment not undertaken due to overly strict net neutrality regulation will have a multiplied negative impact on the economy. The reason is straightforward: every dollar not invested in communications infrastructure destroys more than a dollar of economic activity in the aggregate. As with any form of investment, spending on broadband infrastructure contributes to economic performance through direct and indirect channels. The direct impacts are obvious, as money is spent on the infrastructure and jobs are created or sustained to deploy and maintain the infrastructure.

However, there are also several indirect negative impacts on the economy, because the lost spending on infrastructure and employment creates ripple effects. When ISPs purchase additional network equipment, the suppliers of the inputs need more inputs themselves to produce their goods. Similarly, those input purchases stimulate demand for inputs in the supporting upstream industries, and so on. Thus, the investment expenditure by ISPs and network operators results in many rounds of new spending because the inputs used by the intermediate and final industries are the outputs of the supplying industries. Similarly, the extra earnings going to workers involved with deploying or maintaining infrastructure stimulate consumption in the broader economy.

²⁸ See M. Cardona, T. Kretschmer, and T. Strobel, "[ICT and productivity: conclusions from the empirical literature](#)," *Information Economics and Policy*, vol. 25 (2013), pp. 109–125.

²⁹ See A. Grimes, C. Ren, and P. Stevens, "The need for speed: impacts of Internet connectivity on firm productivity," *Journal of Productivity Analysis*, vol. 37 (2012), pp. 187–201.

³⁰ See M.G. Colombo, A. Croce, and L. Grilli, "ICT services and small businesses' productivity gains: An analysis of the adoption of broadband Internet technology," *Information Economics and Policy*, vol. 25 (2013), pp. 171–189.

³¹ See L. Holt and M. Jamison, "[Broadband and contributions to economic growth: Lessons from the U.S. experience](#)," *Telecommunications Policy*, vol. 33 (2009), pp. 575–581; N. Bloom, M. Draca, T. Kretschmer, et al., "[The economic impact of ICT: Final report](#)," Centre for Economic Performance, London School of Economics, 2010; F. Biagi, "[ICT and Productivity: A Review of the Literature](#)," European Commission Joint Research Centre, Institute for Prospective Technological Studies, Digital Economy Working Paper 2013/09; and M. Cardona, T. Kretschmer, and T. Strobel, [op. cit.](#), for reviews of the sizeable literature on the positive links between economic growth and ICT, broadband investment, and Internet usage.

Putting all the pieces together, researchers have calculated that each dollar invested in network infrastructure creates about three dollars' worth of economic activity overall.³² There is also a multiplier for employment: each job created for broadband network construction or maintenance leads to total job creation of between 1.4 and 3.6 jobs after accounting for the supporting industries.³³ And for those predisposed to downplay economic activity by "big business," it is important to note that about half of these jobs come from small businesses.³⁴

Conclusion

This guided tour through the economic research, recent history of the Internet market, exploration of the differential impacts of net neutrality on innovation at the edge, and the economic costs of discouraging investment through poor policy now concludes. Against the hypothetical argument that strict net neutrality regulation would spur innovation, investment, or job creation, we have a solid case, based on empirical analysis, showing that the more strict forms of regulation typically lead to worse outcomes, not better. Against the wishful thinking of the "how good it could be" pro-regulatory advocates, which is divorced from marketplace reality, we have actual evidence in varied U.S. regulatory settings of "how good it has been" in the absence of heavy-handed regulation.

The FCC should come down on the side of the evidence and return its oversight of ISPs to light-touch regulation.

* James E. Prieger is Professor of Economics and Public Policy at the Pepperdine University School of Public Policy and a member of the Free State Foundation's Board of Academic Advisors.

The Free State Foundation, an independent, nonpartisan free market-oriented think tank located in Rockville, Maryland.

³² J.A. Eisenach, H. Singer, and J.D. West ("Economic effects of tax incentives for broadband infrastructure deployment," Fiber-To-The-Home Council, 2009) calculate output multipliers of 2.8–3.1 for fixed broadband investment. See also Theodore R. Bolema ("[An Assessment of the FCC's Proposal to Conduct a Cost-Benefit Analysis](#)," Perspectives from FSF Scholars, Vol. 12, No. 23, Free State Foundation, July 14, 2017), who suggests that a multiplier in the range of 1.25 to 1.75 as a conservative estimate based on current research.

³³ See R. Katz and S. Suter, "Estimating the economic impact of the broadband stimulus plan," Columbia Institute for Tele-Information Working Paper 7.

³⁴ See R.D. Atkinson, D. Castro, and S.J. Ezell, "The digital road to recovery: a stimulus plan to create jobs, boost productivity and revitalize America," The Information Technology and Innovation Foundation, Washington, DC, 2009.