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Three Ways The FCC's Open Internet Order Will Harm Innovation

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EXECUTIVE SUMMARY

The Federal Communication Commission's 2015 Open Internet order threatens innovation in three distinct ways. First, by barring paid priority arrangements, the order undermines innovation in the nascent market for real-time applications like telemedicine and HD voice. Second, because sponsored-data plans (including zero-rating plans) may run afoul of its "general conduct" standard, the order could discourage procompetitive offerings that would subsidize Internet access for low income Americans. Third, by reclassifying Internet service providers ("ISPs") as telecommunications providers under Title II of the 1934 Communications Act, the order will likely slow the flow of investment dollars by ISPs, which will adversely affect innovation.

This *Policy Brief* examines the potential harm to innovation in qualitative terms, and where possible, in quantitative terms. The major findings are as follows:

- The nascent markets for certain real-time applications, including telemedicine, virtual reality, and HD voice, are expected to develop into billion dollar industries in the coming years. Although no application needs priority to function per se, there is a class of applications that need a certain level of quality of service that is not always consistently available on networks, especially across wireless networks that are subject to congestion. The ban on payments for priority arrangements could undermine certain collaborations among ISPs and websites/application providers ("content providers"), and thereby thwart a non-trivial portion of these applications from taking root, potentially costing the U.S. economy hundreds of millions of dollars annually.

- By discouraging ISPs and content providers from pursuing different ways to subsidize Internet access for consumers—another form

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of collaboration—the order could deny the poorest Americans hundreds of millions in benefits annually. There are millions of Americans for whom broadband is just out of reach and who would otherwise be eligible for a subsidy in the form of a sponsored-data plan.

- Subjecting telecommunications companies to Title II in the early 2000s caused their capital expenditures to decline by between five and thirteen percent under conservative assumptions. Exposing ISPs to the same regulatory risk could undermine core investment to the same degree. Based on U.S. Telecom's estimated $76 billion in aggregate capex among U.S. ISPs in 2014, such a reduction would amount to between a $4 and $10 billion decline in investment at the core of the network.

In defending his agency's aggressive rules to enshrine the principles of net neutrality, FCC Chairman Tom Wheeler has been remarkably sanguine about their potential impact on innovation. The FCC released a casual assessment that placed the economic impact of the order at over $100 million.[1] Its confidence that the rules will do no harm is based in part on statements of various ISPs, including Google and Sprint, suggesting that public-utility rules grounded in Title II would not dissuade their investment plans. It is also based on the belief that similar rules from 2010 supported a thriving Internet ecosystem (until they were overturned by the D.C. Circuit in January 2014[2]). According to Mr. Wheeler's recounting of economic history, "average annual investment by telecom carriers was 55 percent higher under the period of Title II's application," which ended in 2005 when DSL, their flagship broadband product at that time, was reclassified by the FCC as an information service.[3]

In reality, the order likely will harm innovation and reduce economic output, but will do so in subtle ways that could largely go undetected to the naked eye as they occur, yet will be felt by Internet users for years to come. Although the FCC intended for its restraints to fall on ISPs only, the order also scoops content providers into the ambit of antiquated telephone regulation. The practical effect of the rules—for example, the blanket ban on paid priority or the prospect that sponsored data plans could violate the new "general conduct" standard—is to restrain indirectly the conduct of content providers, as certain innovation in the Internet ecosystem will require collaboration between ISPs and content providers. By discouraging such collaboration, the market for real-time applications and sponsored-data plans will be diminished.

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The order also opens the door to more onerous forms of regulation, including the compulsory sharing of an ISP's network with rivals at regulated wholesale rates ("mandatory unbundling"). ISPs will likely hedge against this new regulatory risk by conserving cash or paying out dividends rather than investing in continued network improvements. This reduction is not academic: In the few months since the Open Internet order was released, several small ISPs announced their intention to abandon investment plans due to the heightened uncertainty injected by reclassification.[4] Because investment in the core networks that comprise the Internet enables innovation in the form of faster connections and new applications, the order's adverse impact on investment will reduce consumer welfare by stunting innovation.

This Policy Brief briefly explains how we got here, and it examines the roads not taken by the FCC. It concludes by outlining two alternative approaches that would ensure the vitality of the open Internet ecosystem without harming innovation.

BACKGROUND

Net neutrality is the principle that ISPs should not discriminate against content providers in ways that undermine innovation at the edge of the network. This discussion applies that principle specifically to "paid priority"—the payment by a content provider to an ISP for priority treatment of the content provider's packets—but the general framework applies to any conduct by ISPs. There are four basic approaches for how the FCC could regulate paid priority arrangements between an ISP and a content provider, in ascending order of intervention: (1) Do nothing, and rely instead on antitrust enforcement; (2) Monitor alleged violations on a case-by-case basis, with a presumption that any priority arrangement between an ISP and content provider is not a violation; (3) Monitor alleged violations on a case-by-case basis, with a presumption that any priority deal is a violation; or (4) Impose a blanket prohibition on all such deals.

For case-by-case approaches, the FCC would rely on a principle or "standard," such as a non-discrimination standard or a non-reasonable standard. If any arrangement between an ISP and content provider is presumptively in violation of the standard, then parties to the deal bear the burden of proving its merits. If any arrangement is presumptively not a violation, then interveners or the FCC bear the burden of proving its demerits. The presumption is critical because, like any default rule, it dramatically affects the outcomes. Under Policy Choice 3, for example, if parties to a deal perceive that proving the merits of their arrangement is too costly, then potentially procompetitive deals could be discouraged.

To regulate pay-for-priority deals, the FCC's 2010 Open Internet order invoked Policy Choice 3, as a compromise between those who endorsed no rules (Policy Choice 1) and Internet activists who favored a blanket prohibition (Policy Choice 4). Although the Notice of Proposed Rulemaking leading up to the 2010 rules "proposed a flat ban on discrimination," the 2010 Open Internet order "leaves interpretation to a case-by-case process" when assessing paid priority arrangements.[5] But in January 2014, the D.C. Circuit in Verizon v. FCC rejected that compromise as being tantamount to a per se common carriage requirement:

> Instead, with respect to broadband providers' potential negotiations with edge providers, the Order ominously declares: "it is unlikely that pay for priority would satisfy the 'no unreasonable discrimination' standard." If the Commission will likely bar broadband providers from charging edge providers for using their service, thus forcing them to sell this service to all who ask at a price of $0, we see no room at all for "individualized bargaining."[6]

It was precisely this room for individualized bargaining that led the D.C. Circuit to rule that the FCC's Data Roaming order, which regulates interconnection disputes among wireless ISPs, "imposed no per se common carriage requirements."[7]

> Although the FCC intended for its restraints to fall on ISPs only, the order also scoops content providers into the ambit of antiquated telephone regulation.

The *Verizon* ruling seemed to confront the FCC with a straightforward choice: Either reclassify ISPs as telecommunications rather than information providers and stick with the 2010 rules, or embrace a less interventionist approach that would permit individualized bargaining for paid priority between ISPs and edge providers. The Commission's May 2014 Notice of Proposed Rulemaking hinted strongly that the FCC was leaning toward the second approach outlined by the D.C. Circuit: "Today, we tentatively conclude that the Commission should adopt a revised rule that, consistent with the court's decision, may permit broadband providers to engage in

individualized practices, while prohibiting those broadband provider practices that threaten to harm Internet openness."[8] But the FCC sharply reversed course, and in February 2015 reclassified ISPs as common carriers. However, it deviated from the choices suggested by the D.C. Circuit by imposing a blanket prohibition on paid priority (or Policy Choice 4 as described above).[9]

> Assuming that a ban on paid priority reduces the number of telemedicine transactions by just five percent relative to its unconstrained levels, the cost to the U.S. economy could be nearly $100 million per year by 2019 in lost output, before considering any multiplier effects.

THE FIRST HARM TO INNOVATION: BANNING PAID PRIORITY ARRANGEMENTS

Although no application strictly needs priority to function, there is a class of applications that need a certain quality of service (QoS) that is not always consistently available on networks, especially wireless networks that are subject to congestion. For certain "elastic" applications such as file transfer, the only thing that matters is how quickly the user receives the last packet. For other "non-elastic" applications such as voice over Internet protocol (VoIP), the relative positioning of all the packets in the transmissions matters. Many real-time applications exhibit this non-elastic property.

Of the many new real-time applications on the horizon, telemedicine may be the most compelling. To take off, however, many telemedicine applications may require a guarantee of high-quality, high-speed Internet service. Imagine a telemedicine provider that wished to connect a network of remote doctors to a hospital in order to monitor a heart procedure for a patient in a distant state. Any diminution in the quality of the transmission would make remote monitoring difficult, to the detriment of the patient. These applications are not hypothetical. Philips has developed an application to monitor sleep apnea;[10] Emerson has an application that permits hospitals to track carts as they move throughout a hospital;[11] and Airstrip's telemedicine application allows caregivers to remotely monitor the condition of patients on their way to the emergency room.[12]

Other real-time applications include high-definition ("HD") voice service and holographic video streaming used for virtual reality, both of which require prioritization by ISPs to ensure HD voice and video quality, respectively. HD Voice uses wideband audio connections to more accurately reproduce the human voice, resulting in more natural sounding speech.[13] These real-time applications require better handling than the best efforts given to all other packets on the Internet. Latency (delays), jitter, and packet loss in the transmission of a communications threaten the value proposition of a real-time service.

Although the demand for priority is likely to be concentrated among real-time app providers, even non-real time applications such as streaming television services have displayed an interest in securing dedicated connections from ISPs.[14] ISPs should be able to negotiate reasonable compensation for such service, particularly for giving special handling to applications that compete against the ISP's own services (for example, video or VoIP). Although the vague language of the ban on paid priority leaves its reach entirely unclear, to the extent the FCC construes the rule to apply to dedicated connections or multi-network QoS, it would be problematic for the reasons identified below.

Aware that some pay-for-priority arrangements could improve consumer welfare, the FCC created a "waiver" process that would permit parties to seek an exemption to the blanket ban.[15] In a footnote, the FCC explains that the waiver request would be subject to public scrutiny: "Its only recourse is to seek a waiver, and that waiver request would

not be decided until the Commission, after public comment and its own investigation, reaches a decision."[16] The FCC makes clear that it would be "entertaining waiver requests under exceptional circumstances."[17] It adopts the following balancing test: "The Commission may waive the ban on paid prioritization only if the petitioner demonstrates that the practice would provide some significant public interest benefit and would not harm the open nature of the Internet."[18] In particular, a party seeking a waiver must provide evidence that the practice does not "materially degrade the broadband Internet access service of the general public," "hinder consumer choice," "impair competition, innovation, consumer demand, or investment," or "impede any forms of expression, types of service, or points of view."[19]

Interestingly, the FCC allows for the possibility that telemedicine could be an exceptional circumstance in which a waiver is granted.[20] In the same breath, it notes that "telemedicine services might alternatively be structured as 'non-BIAS data services,' which are beyond the reach of the open Internet rules."[21] The report defines non-BIAS data services as "services offered by broadband providers that share capacity with broadband Internet access service over providers' last-mile facilities."[22] Examples of such services include the ISP's VoIP and IP-video offerings, as well as "connectivity bundled with e-readers, heart monitors, or energy consumption sensors."[23] So long as the telemedicine service is (1) offered by the ISP, (2) shares capacity with broadband Internet access service over the ISP's last mile facilities, and (3) not used to reach large parts of the Internet,[24] a telemedicine offering would not be subject to the blanket ban on paid priority.[25] Because the 2015 order has created a loophole in the form of non-BIAS services, enterprising content providers seeking priority for their apps could enter into equity arrangements with ISPs, and their applications could share capacity with Internet access service over the ISP's last-mile facilities. Such a framework perversely discourages innovation among independent content providers.

Given the small likelihood that a waiver would be granted, the practical effect of such rules is that few if any content providers would petition the FCC for a waiver in the hopes of qualifying for an exemption to the blanket ban. For example, a paid priority arrangement between one telemedicine provider and an ISP would necessarily "impede the point of view" of a rival telemedicine provider. Moreover, that the intimate details of the priority arrangement between an ISP and content provider would be subject to public scrutiny and potentially shared with rivals further undermines any incentives to innovate in the real-time application space.

> The average pace of innovation in the mobile space is measured in days and weeks, not months. The time it will take the FCC to process and resolve requests for an advisory opinion will likely fall outside the usual timeframe for new products and services to evolve and come to market.

Given the nascent state of the market for real-time applications, it is difficult to know the precise form by which priority would be delivered. For example, priority could take the form of enhanced QoS over multiple networks;[26] alternatively, it could take the form of priority delivery over the ISP's last mile. (Again, it is not clear whether the ban on paid priority extends to multi-network QoS.) Regardless of the precise form that priority will take, the relevant economic question is what fraction of transactions involving real-time applications will be scuttled by the inability of ISPs and content providers to contract for priority at a positive price.

One episode suggests that, at least for certain real-time applications, the fraction of transactions that are vulnerable to a ban on paid priority could be

substantial. VCXC, which offers HD voice service, has sought a stay of the order to prevent the ban on paid priority from taking effect.[27] According to VCXC's petition, certain HD voice providers will need paid prioritization to tie into the future all-IP, all HD voice network. Because the order "prohibits such [paid priority] arrangements, the Order will strand Petitioner's time and investment in his HD voice initiatives."[28]

Even with a ban on paid priority, as noted above, it will still be possible for certain real-time application providers to obtain priority by structuring the arrangement with an ISP as a non-BIAS data service. Still other real-time applications could simply make do without priority in the last mile by, for example, contracting with third-party content delivery networks (perhaps less efficiently). Yet certain transactions inevitably will be undermined by the ban.

> A $1 billion decline represents a 5.5 percent decline relative to the telcos' 1996 capex.

Before the ban on paid priority was contemplated, the consultancy IHS predicted in 2013 the U.S. "telehealth market" would grow from $240 million in revenue to $1.9 billion in 2018.[29] Another consultancy, IBIS, estimated the size of the U.S. telehealth market in 2014 was $585 million.[30] Assuming that a ban on paid priority reduces the number of telemedicine transactions by just five percent relative to its unconstrained levels, the cost to the U.S. economy could be nearly $100 million per year by 2019 in lost output, before considering any multiplier effects.

Similar losses should be expected for other real-time applications, such as HD voice or holographic video streaming used for virtual reality. For example, one forecast estimates the "Global HD voice market" to grow from $815.5 million in 2014 to $2.3 billion in 2019, with North America expected to be the largest market in terms of market size.[31] Global revenue for the "consumer virtual reality" market (hardware and software combined) is estimated to grow from $90 million in 2014 to $5.2 billion in 2018.[32] Virtual reality shipments will create a $2.8 billion hardware market by 2020, up from an estimated $37 million market in 2015.[33] The global "virtual reality in gaming market" was worth $467 million in 2012 and is expected to reach $5.8 billion by 2019, with North America accounting for 37 percent of the total.[34]

In addition to undermining certain real-time applications, a ban on paid priority could lead to more network consolidation to the extent the FCC construes the rule to apply to multi-network QoS. Network providers want to offer the best possible service. They can do that one of two ways: (1) via contract with other network providers, through multi-network QoS service level agreements, or (2) owning the entire network. Paid priority allows every level of the network to monetize the value it provides. Thus, by potentially banning contracting for multi-network QoS (option 1), network operators may be forced to consolidate. Stated differently, the 2015 Open Internet order could perversely lessen network competition, as it makes consolidation a more viable path for serving QoS-needy applications than cooperation.

THE SECOND HARM TO INNOVATION: DISCOURAGING CONTENT-SUBSIDIZED ACCESS

Under a "zero-rating" plan, a mobile operator provides its customers with access to certain online content for "free" in the sense that accessing and interacting with such content does not count against monthly data caps. A "sponsored-data" plan, which is a type of zero-rating, involves content providers directly reimbursing operators for forgone data revenues.[35] For example, under MetroPCS's (now rescinded) zero-rating plan in 2011, subscribers who limited their video downloads to YouTube qualified for a $20 per month discount;[36] it was not clear whether Google (which had acquired YouTube) had subsidized the access rate, or whether MetroPCS was using the plan as a means to tap into price-sensitive segments without lowering their rates across the board (or both). Regardless of their precise form, from an economic perspective, such plans represent a subsidy for price-sensitive broadband users.

With certain notable exceptions, such as T-Mobile's plans for many popular music-streaming services, zero-rating plans are more prevalent outside of the United States. For example, Internet.org is a Facebook-led initiative that seeks to work with ISPs to offer free Internet access to the poor in developing countries. AirTel's "Zero" plans in India, which drew substantial criticism from activists who believe such plans create "unequal access" to consumers, aim to give subsidized access to websites that contribute payments to AirTel.[37] A similar plan offered by Reliance Communications (RCom) gives Indian broadband customers access to Facebook and other websites like OLX, AccuWeather and Dictionary.com, with Facebook paying RCom for the data consumed on the ISP's network.[38] In Australia, Netflix reportedly entered into sponsored-data agreements with two ISPs, Optus and iiNet; the deals offered "quota-free Netflix content."[39] (Netflix attempted to distance itself from those deals in the press.[40])

> The discouragement of sponsored-data plans would prevent certain low-income Americans from connecting to the Internet.

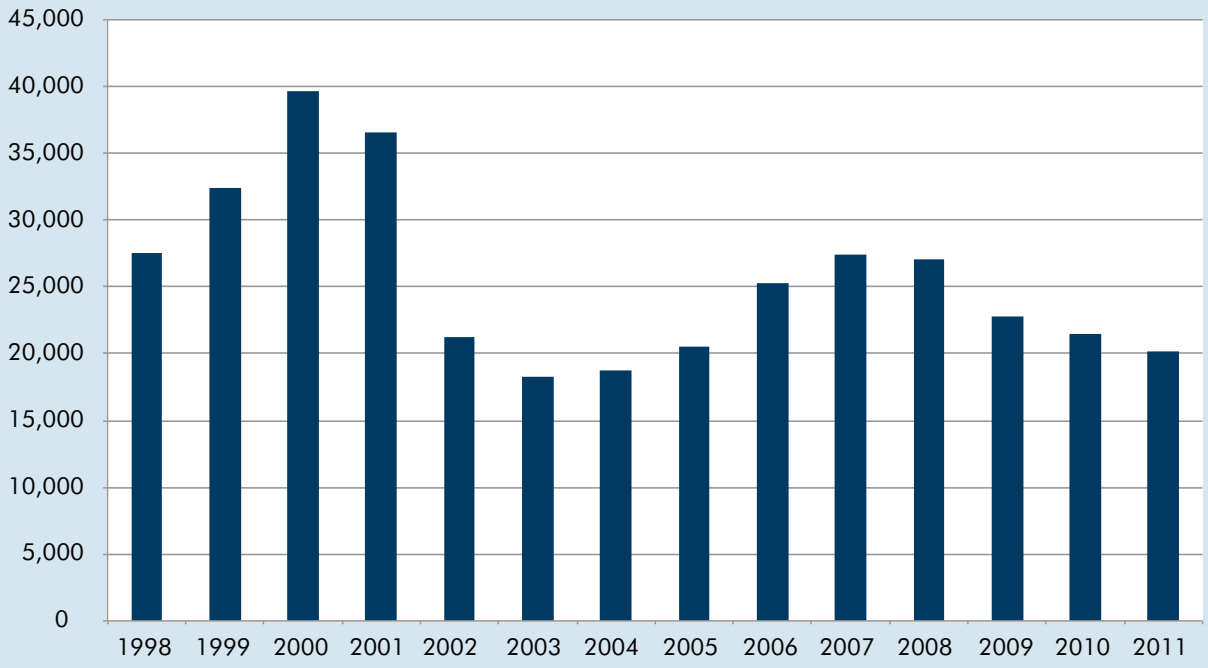
In its 2015 rules, the FCC adopted a general conduct standard, referred to as the "the no-unreasonable interference/disadvantage standard," to govern potentially harmful practices that sit outside of its three bright-line rules (no blocking, throttling, and no paid prioritization). Such conduct would be subject to a case-by-case review according to a set of criteria. Under one criterion, referred to as the "Effect on Innovation," the FCC warns that "practices that stifle innovation . . . would *likely* unreasonably interfere with or unreasonably disadvantage end users' or edge providers' use of the Internet under the legal standard we set forth today."[41] In discussing how sponsored-data plans would be assessed under this standard, the FCC notes that "[t]he record also reflects concerns that such arrangements may hamper innovation and monetize artificial scarcity."[42]

Under another criterion for evaluating general conduct, referred to as "Competitive Effects," the FCC warns that practices that harm competition "would likely unreasonably interfere with or unreasonably disadvantage edge providers' ability to reach consumers in ways that would have a dampening effect on innovation, interrupting the virtuous cycle."[43] Again, while discussing sponsored data plans, the FCC cites comments that exempting selected services from data caps "distorts competition, favors companies with the deepest pockets, and prevents consumers from exercising control over what they are able to access on the Internet."[44]

The order encourages ISPs to seek an "advisory opinion" on whether any conduct that falls outside of its three bright-line rules, including sponsored-data plans, would run afoul of its general conduct standard.[45] The order notes that requests for advisory opinions "must relate to *prospective* or proposed conduct that the requesting party intends to pursue."[46] It warns that details about the proposed plan could be shared with "other parties that may have information relevant to the request or that may be impacted by the proposed conduct."[47] To provide "meaningful guidance to other stakeholders," the order compels the Enforcement Bureau to "publish the initial request for guidance and any associated materials" to the general public.[48] Any advisory opinion is not binding on the Commission: "[B]ecause advisory opinions issued at the staff level are not formally approved by the full Commission, they will be issued without prejudice to the Commission's right to later rescind the findings in the opinion."[49]

The average pace of innovation in the mobile space is measured in days and weeks, not months. The time it will take the FCC to process and resolve requests for an advisory opinion will likely fall outside the usual timeframe for new products and services to evolve and come to market. Accordingly, most wireless firms would avoid seeking an opinion entirely. And because the FCC has signaled that sponsored-data plans may run afoul of its new

FIGURE 1: BELL CAPITAL EXPENDITURES (1998-2011)



Source: USTelecom
Notes: USTelecom imposed an adjustment to remove long-distance-related capex based on trends near the time of acquisition of Qwest (2001 forward) and AT&T and MCI (2006 forward).

general conduct standard, many wireless firms will likely eschew such partnerships with content providers, as the cost of demonstrating that a plan would not harm innovation or competition would be significant. The discouragement of such partnerships represents a real loss in innovation, and not just in the space of sponsored-data plans; collaboration among ISPs and content providers could lead to positive spillovers in other areas.

Although broadband penetration is extremely high in the United States, a recent report by three FCC economists estimate that broadband access is just out of reach for millions of Americans: They estimate that, beginning from an average monthly price of $44 for a fixed broadband subscription, a modest subsidy of 15 percent would trigger a 10 percent increase in broadband subscribers.[50] Given the 94.9 million fixed broadband subscribers in the United States as of June 2014,[51] a 10 percent increase in fixed broadband subscribers would be 9.5 million. Although sponsored-data plans are more prevalent in wireless connections, regardless of their precise form, such plans could play an important role in reducing the digital divide in the United States.

The discouragement of sponsored-data plans would prevent certain low-income Americans from connecting to the Internet. The relevant economic question is what fraction of these non-adopting households would otherwise adopt broadband in the presence of a sponsored-data plan. Assuming hypothetically that, but for the restrictions in the

Open Internet order, one quarter of these 9.5 million (non-adopting) Americans would otherwise qualify for a subsidy in the form of a sponsored-data plan, the order will deny those households roughly $188 million in annual benefits (equal to 15 percent of $44 monthly plan x 12 months x 25 percent of 9.5 million households). Given the robust availability[52] and uptake[53] of zero-rating plans in developing countries, this assumption seems fairly conservative.

THE THIRD HARM TO INNOVATION: SUBJECTING ISPS TO UTILITY REGULATION

Like any decision in economics, network investments by ISPs are made at the margin. Each project has a different expected return. And even within a project, the expected return will vary depending on the city in which the investment would be made. Basic investment theory teaches that a firm invests in a project so long as the internal rate of return (IRR) on a project is greater than the minimum required rate of return, as measured by the firm's the cost of capital. To believe that public-utility-style regulation would undermine investment at the margin, one needs only to believe that reclassification would either (1) increase an ISP's cost of capital or (2) reduce the expected return of a set of ISP investment opportunities. Projects with an IRR above the pre-reclassification cost of capital but below the post-reclassification cost of capital are called the "marginal" investments.

With respect to the first mechanism, an ISP's investment decisions involve participants—namely, the investor community—not entirely under the ISP's employ. External investors could demand a risk premium (over and above what they otherwise would demand) to compensate for the added risk associated with the new rules. An investor may ask: Why should I lend an ISP money for a new project if there is a heightened chance under reclassification that the ISP would be subject to rate regulation or mandatory sharing rules? Through the haggling between an ISP and its investors, the new risk could manifest itself in the form of a higher cost of capital.

Turning to the second mechanism, holding constant the cost of capital, reclassification could reduce the expected return of an array of investment projects by a certain percentage. This would not mean that all such projects would be abandoned. But if Project A's IRR was reduced from 10 to 9 percent, while Project B's IRR was reduced from 6 to 5.4 percent, and if the ISP's cost of capital were 6 percent, then Project B would be abandoned. In a seminal application of this theory, in 2002, Cambridge Strategic Management Group (CSMG) examined the potential effects of mandatory unbundling on fiber to the home (FTTH) deployments by incumbent and competitive providers.[54] CSMG projected that if unbundling were required, all-fiber deployments would pass only 5 percent of U.S. households in a ten-year period. In contrast, if unbundling of fiber loops was not mandated, CSMG estimated that by 2013 FTTH could be economically deployed in 31 percent of households. In 2003, the FCC relied in part on these findings to decide not to mandate unbundled access to FTTH loops, concluding, "We expect that this decision to refrain from unbundling incumbent LEC next-generation networks…will stimulate facilities-based deployment."[53]

The 2015 Open Internet order subjects ISPs to public-utility-style regulation, potentially triggering both investment-reducing mechanisms described above. Although certain ISP rates such as interconnection will be subject to the "just and reasonable" rate-setting standard of sections 201 and 202 of the Communications Act,[56] the order forbears from other provisions of Title II, including sections that would require ISPs to share their networks with resellers on an unbundled basis.[57] The Commission is quick to point out that the record supports an inference that even the more invasive unbundling provisions did not discourage ISP investment, and may have (counter-intuitively) enhanced ISP investment before DSL was reclassified as an information service in 2005.[58] The FCC cites a Free Press filing, which purports to show that "the average annual investment by telecom carriers was 55 percent higher under the period of Title II's application

than it has been in the years since the FCC removed broadband from Title II."[59]

Investment during the prior application of Title II can serve as a proxy for how ISPs will react to Title II. Following the 1996 Telecom Act, the FCC in 1999 required local exchange carriers (LECs) to share a portion of their lines with resellers of DSL service at regulated rates ("line sharing"). Although DSL was not reclassified as an information service until August 2005,[60] the courts largely disemboweled the common-carrier regime well before 2005. The D.C. Circuit Court of Appeals vacated the FCC's Line Sharing Order in May 2002, and the FCC eliminated line sharing as an unbundled network element in August 2003. Other portions of the FCC's unbundling rules were vacated even earlier.

How would an economist go about measuring the incremental effect of the "treatment" variable (Title II)? At the very least, one would have to identify a control group—this avoids the FCC's mistake of reflexively attributing any change in investment to a change in regulation, to the exclusion of myriad additional factors that influence investment decisions. The natural control group for this period consists of cable operators, which served as the telcos' chief broadband rivals. Unlike DSL service, cable modem service was classified as an information service from the get-go, and was never subject to the FCC's onerous unbundling regime.

Economists are fond of difference-in-differences ("DID") analysis because it allows one to control for certain sources of bias. Here, by including cable as a control in a DID model, any bias caused by variables common to telcos and cable are controlled for, even when these variables are unobserved. Under certain technical assumptions, the DID can identify the incremental effect of the treatment.

So what does DID tell us about the effect of Title II on telco investment? According to a report by CITI,[61] cable capital expenditures ("capex") had reached $15.9 billion by 2008 (the earliest date in the CITI sample), and the "major telco wireline" capex (excluding wireless) reached $26.3 billion (Table 14). According to a TIA study,[62] in 1996, cable capex was $6.7 billion, and LEC capex was $18.1 billion. Thus, over the intervening period where telcos were uniquely subject to Title II (with the aforementioned caveats), 1996 through 2008, cable capex increased by $9.2 billion for a compound annual growth rate ("CAGR") of 7.5 percent; telco capex increased by $8.2 billion for a CAGR of 3.2 percent.

If one includes the years 1999 and 2000 as part of the pre-2005 period, then removal of Title II appears to have caused a massive decline in Bell investment.

The simple DID model tells us that Title II was responsible for slowing telco investment by roughly $1 billion per year (equal to the $10.4 billion difference between the two groups in 2008 less the $11.4 billion difference in 1996).[63] A $1 billion decline represents a 5.5 percent decline relative to the telcos' 1996 capex. And the growth rate of cable capex was double that of Title II-regulated telcos over this period (7.5 percent versus 3.2 percent). This is hardly consistent with the FCC's claim that Title II was good for telco investment.

So how can the FCC and Free Press claim that telco investment was "55 percent higher under t he period of Title II's application" than in the later period? The answer turns on the relevant window around the 2005 reclassification of DSL service. In particular, if one includes the years 1999 and 2000 as part of the pre-2005 period, then removal of Title II appears to have caused a massive decline in Bell investment. But those early years are associated with the dot.com boom and long-haul fiber glut, and it is difficult to remove Bell investments in backbone infrastructure from the capex figures. Moreover, investments

during the "bubble" era were driven by what proved to be irrational expectations of growth and keeping up with unregulated competitors (cable, CLECs), which were building to meet that expected demand, while at the same time building infrastructure that could cannibalize the telcos' core voice business (VoIP).

If instead one uses a shorter window around the reclassification event in 2005, which reduces the likelihood of other investment-related factors changing over time (thereby conflating the before-after comparison), then the removal of Title II appears to be associated with an increase in Bell investment. For example, a comparison of the 2002-05 average ($19.5 billion) to the 2006-09 average ($22.0 billion) implies that the application of Title II slowed Bell investment by roughly $2.5 billion per year before controlling for other factors. A $2.5 billion decline represents a 12.8 percent decline relative to Bell capex in 2002-05. Alternatively, a comparison of the 2001-05 average ($22.8 billion) to the 2006-10 average ($21.3 billion) implies that Title II had no material effect on Bell investment. The point of this exercise is that many stories can be told, including the FCC's "55 percent higher" story, depending on expanding or contracting the window around the change in the treatment variable.

CONCLUSION

As the forgoing analysis makes clear, the 2015 Open Internet order will slow broadband innovation. For that reason, progressives who care about investment and growth should not embrace the order as the optimal solution. Nor should they accept the order as a fait accompli: The D.C. Circuit could stay or vacate the FCC's order for legal reasons; it is also possible that some future Republican-controlled FCC could nullify the order. Under either scenario, there would be no Open Internet protections.

What are the alternative solutions? The D.C. Circuit has already pointed toward a compromise to ensure an open Internet that does not require any legislative fixes—namely, permitting ISPs and content providers to bargain individually for special arrangements, while subjecting those bargaining outcomes to case-by-case review. This solution (Policy Choice 2) does not amount to per se common carriage according to the court, and therefore does not need to be grounded in Title II. For example, this framework could be grounded in the FCC's section 706 authority. Unfortunately, the FCC rejected this sensible path.

Another solution would be a bipartisan legislative fix that would codify the 2010 order's net neutrality protections (Policy Choice 3) without imposing old-fashioned telephone rules on the Internet. Stated differently, the legislation would ground the 2010 rules in some alternative source of authority (outside of Title II). In a future Policy Brief, I will outline the key elements of what a legislative compromise might look like.

ENDNOTES

1. Congressional Review Act Abstract (released March 12, 2015), http://www.progressivepolicy.org/wp-content/uploads/2015/04/20150403-CRA-Abstract-Open-Internet-Order.pdf.
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The Progressive Policy Institute (PPI) is an independent research institution that seeks to define and promote a new progressive politics in the 21st century. Through research, policy analysis and dialogue, PPI challenges the status quo and advocates for radical policy solutions.

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