

Comments on Refreshing the Record in Restoring Internet Freedom and Lifeline Proceedings in Light of the D.C. Circuit’s Mozilla Decision

WC Docket Nos. 17-108, 17-287, 11-42

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**In the Matter of Refreshing the Record in Restoring Internet Freedom
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**COMMENTS OF THE INTERNATIONAL CENTER FOR
LAW & ECONOMICS**

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Introduction

In order to maximize the benefits of broadband to society, including through the provision of public safety communications and services, public policy must promote the proper incentives for broadband buildout. Both the 2015 Title II Open Internet Order (the “OIO”) and the 2017 Restoring Internet Freedom Order (the “RIFO”) were premised on this. But each adopted a different approach to accomplishing this objective.

The OIO premised its rules on the theory that ISPs are “gatekeepers,” poised to kill the golden goose of demand for broadband by adopting business practices that could reduce edge innovation.

The key insight of the virtuous cycle is that broadband providers have both the incentive and the ability to act as gatekeepers standing between edge providers and consumers. As gatekeepers, they can block access altogether; they can target competitors, including competitors to their own video services; and they can extract unfair tolls. Such conduct would, as the Commission concluded in 2010, “reduce the rate of innovation at the edge and, in turn, the likely rate of improvements to network infrastructure.” In other words, when a broadband provider acts as a gatekeeper, it actually chokes consumer demand for the very broadband product it can supply.¹

The RIFO, on the other hand, properly conceives of ISPs as intermediaries in a two-sided market that aim to maximize the value of the market by adopting practices, like pricing structures and infrastructure investment, that increase the value for *both* sides of the market.

We find it essential to take a holistic view of the market(s) supplied by ISPs. ISPs, as well as edge providers, are important drivers of the virtuous cycle, and regulation must be evaluated accounting for its impact on ISPs’ capacity to drive that cycle, as well as that of edge providers. The underlying economic model of the virtuous cycle is that of a two-sided market. In a two-sided market, intermediaries—ISPs in our case—act as platforms facilitating interactions between two different customer groups, or sides of the market—edge providers and end users. . . . The key characteristic of a two-sided market, however, is that participants on each side of the market value a platform service more as the number and/or quality of participants on the platform’s other side increases. (The benefits subscribers on one side of the market bring to the subscribers on the other, and vice versa, are called positive externalities.) Thus, rather than a single side driving the market, both sides generate network externalities, and the platform provider profits by inducing both sides of the market to use its platform. In maximizing profit, a platform provider sets prices and invests in network extension and innovation, subject to costs and competitive conditions, to maximize the gain both sides of the market obtain from interacting across the platform. The more competitive the market, the larger the net gains to subscribers and edge providers. Any analysis of such a market must account for each side of the market and the platform provider.²

In other words, the fundamental difference of approach between the two Orders turns on whether it is *edge innovation*, pushing against ISP incentives to expropriate value from edge providers, that

¹ Report and Order on Remand, Declaratory Ruling, and Order, In the Matter of Protecting and Promoting the Open Internet, GN Docket No. 14-28 (Mar. 15, 2015) [hereinafter “OIO”], at para. 20.

² Report and Order on Remand, Declaratory Ruling, and Order, In the Matter of Restoring Internet Freedom WC Docket No. 17-108 (Jan. 4, 2018) [hereinafter “RIFO”], at para. 119.

primarily drives network demand and thus encourages investment, or whether optimization decisions by *both* ISPs and the edge are drivers of network value. The RIFO rightly understands that ISPs have sharp incentives both to innovate as platforms (and thus continue to attract and retain end users), as well as to continue to make their services useful to edge providers (and, by extension, the consumers of those edge providers' services).

The D.C. Circuit upheld RIFO's fundamental rationale as a supportable basis for the FCC's rules in *Mozilla v. FCC*.³ But it also accepted that three specific concerns were insufficiently examined in the RIFO, and remanded the case to the FCC to address them. Among these was the question of the RIFO's implications for public safety.⁴ In its Public Notice seeking to refresh the record on the remanded issues, the Wireline Competition Bureau asks (among other things):

1. "Could the network improvements made possible by prioritization arrangements benefit public safety applications. . .?";
2. "Do the Commission and other governmental authorities have other tools at their disposal that are better suited to addressing potential public safety concerns than classification of broadband as a Title II service?"; and
3. "[H]ow do any potential public safety considerations bear on the Commission's underlying decision to classify broadband as a Title I information service?"⁵

These are the questions to which this comment is primarily addressed.

In Part I, we discuss how the RIFO fosters investment in broadband buildout, in particular by enabling prioritization and by reducing the effects of policy uncertainty. In Part II, we describe how that network investment benefits public safety both in both direct and indirect ways. In Part III, we highlight the benefits to public safety from prioritization, in particular, which is facilitated by the RIFO.

I. The RIFO creates a regulatory environment that promotes network investment

Facilitating universal access to high-speed, broadband Internet service is the defining communications policy issue of our time. Relevant to this public notice for comment, public safety—like all other uses of broadband networks—benefits from the widespread buildout of high-speed, reliable broadband service. The cable, mobile, and satellite networks themselves are the underlying architecture upon which dedicated public safety networks can be built. These networks also allow for the variety of public safety benefits even outside of dedicated networks for public safety officials.

In order to promote investment in broadband, the RIFO takes a light regulatory touch that incentivizes network investment while still policing potential economic harms to the edge and to consumers. Below, we canvass the theories and evidence undergirding the OIO and the RIFO.

³ 940 F.3d 1 (D.C. Cir. 2019).

⁴ *Id.* at 63.

⁵ Wireline Competition Bureau Seeks to Refresh Record in Restoring Internet Freedom and Lifeline Proceedings in Light of the D.C. Circuit's Mozilla Decision, WC Docket Nos. 17-108, 17-287, 11-42, at 1-2, *available at* <https://docs.fcc.gov/public/attachments/DA-20-168A1.pdf>.

In Part I.A we review the economics of investment, two-sided markets, and paid prioritization and note how theory would predict greater investment by ISPs in broadband networks when they can experiment with business models like paid prioritization. In Part I.B.1 we discuss the economic literature on sunk cost investments under conditions of policy uncertainty and explain why this literature suggests that investment under the OIO regime would likely be lower. Parts I.B.2 & 3 discuss the empirical evidence on investment under the OIO and the RIFO and explain that, while it is a fraught enterprise to identify the direct effects of either regime on overall investment levels, the only sound empirical studies suggest that the RIFO creates a better investment environment.

A. The underlying economics supports the RIFO

In this section, we review the economic literature and find that it supports the approach taken in the RIFO. In Part A.1, we review the economic literature on two-sided markets and prioritization. In Part A.2, we review the economics of pricing and find that paid prioritization could be the best way to maximize value to consumers and to optimize incentives for ISPs to build out their networks.

1. The economics of two-sided markets and prioritization

It has long been known—but also long misunderstood—that net neutrality mandates (including a ban on paid prioritization) amount to an effective subsidy to edge providers, the imposition of which may not maximize the value of the platform. As Tim Wu wrote in 2009:

Of course, for a given price level, subsidizing content comes at the expense of not subsidizing users, and subsidizing users could also lead to greater consumer adoption of broadband. It is an open question whether, in subsidizing content, the welfare gains from the invention of the next killer app or the addition of new content offset the price reductions consumers might otherwise enjoy or the benefit of expanding service to new users.⁶

Gregory Sidak and David Teece emphasize the importance of allowing ISPs to experiment with business models, including those with different variations of prioritization, and how this impacts their investment decisions.⁷ ISPs are best characterized as platforms sitting at the center of a two-sided market. On one side are end users who pay the ISP for access to the Internet; on the other are content providers who want access to the end users. The OIO's ban on paid prioritization assures that the ISP can monetize only one side of the market. Aside from putting upward pricing pressure on end consumers, this also has a detrimental effect on the overall value of the platform for users and content providers alike:

The lost benefits [of bans on paid prioritization] would affect both end users and suppliers of content and applications. Optional business-to-business transactions for QoS will enhance the efficiency of traffic flow over broadband networks, reducing congestion. That enhanced efficiency benefits both the end users receiving content or applications and the content providers whose content or applications are demanded. Superior QoS is a form of product differentiation, and it therefore increases welfare by

⁶ Robin S. Lee & Tim Wu, *Subsidizing Creativity Through Network Design: Zero-Pricing and Net Neutrality*, 23 J. ECON. PERSPECTIVES 61, 67 (2009).

⁷ See J. Gregory Sidak & David J. Teece, *Innovation Spillovers and the "Dirt Road" Fallacy: The Intellectual Bankruptcy of Banning Optional Transactions for Enhanced Delivery Over the Internet*, 6 J. COMP. L. & ECON. 521 (2010).

increasing the production choices available to content and applications providers and the consumption choices available to end users. Finally, as in other two-sided platforms, optional business-to-business transactions for QoS will allow broadband network operators to reduce subscription prices for broadband end users, promoting broadband adoption by end users, which will increase the value of the platform for all users.⁸

To the extent that a ban on paid prioritization means that the overall value of the platform is lower to consumers and edge providers, it also provides less incentive for ISPs to invest in it. This is inherent in the “virtuous cycle” logic underlying both the OIO and the RIFO. Whether because of a reduction in edge innovation or because of higher subscription prices, if fewer users adopt broadband when it is made available, ISPs will invest less in making broadband available in the first place. The key insight from the two-sided markets literature for the purposes of this discussion is that ISPs’ investment incentives are a function not *solely* of edge innovation, but also of prices charged (or subsidies given) to each side of the market. Thus, a ban on paid prioritization—or on any business models that allow for platforms to differentiate between service levels offered on either side of the platform—can decrease the overall value of the network and, therefore, incentives to invest in it.

By forcing ISPs to recoup their investment from subscribers only, a paid prioritization ban essentially treats ISPs as nothing more than “middle men,” extracting a portion of the value consumers derive from services offered by edge providers. This necessarily limits the extent of broadband network investment to that portion of the value created by edge providers. But edge providers control only the services that they offer, so can maximize the overall value only of those *edge services*, not the value of the *overall network*. Allowing for practices, such as paid prioritization, that allow the platform to maximize the value of the overall network by accounting for adoption decisions by users necessarily allows for greater potential investment in the network infrastructure than a policy that allows for maximization of the value of only a portion of that network.

Marc Bourreau and co-authors (including Tommaso Valletti, the former Chief Economist of the Directorate General for Competition at the European Commission) find that a discriminatory regime always increases welfare both because ISPs use revenue from edge providers to increase network capacity and, importantly, because such a regime increases entry by priority-sensitive edge providers.

Our first result is that a switch from the net neutrality regime to the discriminatory regime would be beneficial in terms of investments, innovation and total welfare. First, when ISPs offer differentiated traffic lanes, investment in broadband capacity increases. This is because the discriminatory regime allows ISPs to extract additional revenues from CPs [Content Providers] through the priority fees. Second, innovation in services also increases: some highly congestion-sensitive CPs that were left out of the market under net neutrality enter when a priority lane is proposed. Overall, discrimination always increases total welfare. . . .⁹

⁸ *Id.* at 532-33.

⁹ Marc Bourreau, Frago Kourandi, & Tommaso Valletti, *Net Neutrality with Competing Internet Platforms*, 63 J. INDUS. ECON. 30 (2015), at 3 in pre-publication draft (2015), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2395991.

As Marc Rysman's overview of the economics of two-sided markets concludes, the effects of quality investment will depend on whether the investments generate relatively price-elastic or price-inelastic consumers on the margin.¹⁰ Moreover, the effect of quality investment depends on whether it attracts consumers that are more or less responsive to participation on the other side of the two-sided market.

Nicholas Economides and Benjamin E. Hermalin¹¹ reach a different conclusion from Jay Pil Choi and Byung-Cheol Kim¹² regarding the relationship between ISP price discrimination and ISP bandwidth investment. In particular, where Choi and Kim find an ambiguous relationship, Economides and Hermalin's model finds that allowing price discrimination *unambiguously* increases ISP bandwidth investment. The difference between the two models is that Choi and Kim assume the amount of content supplied to ISPs is independent of an ISP's capacity, while Economides and Hermalin's model assumes that content providers' profits are increasing in the amount of content bought and sold, thus the demand for content increases with increased ISP capacity.

Economides and Hermalin's model seems the more realistic, and the better implementation of two-sided market dynamics, in which demand on *each* side can affect the other side's incentives. This is particularly relevant to the broadband context in which ISP network capacity and quality investments without the ability to lower price may not increase consumers' propensity to *adopt* broadband, which is, among other things, importantly a function of price.¹³ In this case, the ability of an ISP to lower subscription prices and to finance network investments from edge providers (or other sources, if any) would increase network size and network value for all participants.

Martin Nielsen develops a model in which an ISP and a content provider strategically determine the QoS.¹⁴ Nielsen's model concludes that last-mile fees from the content provider to the ISP would be associated with ISP investment in improving QoS. He argues that, if the quality of ISP services and the quality of content are strongly complementary, last-mile fees align ISP's and content creator's investment incentives and work to improve Internet quality:

Last-mile fees promote investment in broadband networks that can support the quality that content providers are ready to develop. The Internet experience will be enhanced for users due to the increased Internet speed and the enhanced content that users are willing to pay for. Last-mile fees offer a means for content providers to subsidize investments in broadband services, and this study finds that content providers are better

Notably, this result is derived in the context of competing ISPs, but, as the authors note, it also holds for monopoly ISPs. See *id.* at 3-4.

¹⁰ See Marc Rysman, *The Economics of Two-Sided Markets*, 23 J. ECON. PERSP. 125, 136 (2009).

¹¹ See Nicholas Economides & Benjamin E. Hermalin, *The Economics of Net Neutrality*, 43 RAND J. ECON. 602, 603, 605, 620 (2012).

¹² See Jay Pil Choi & Byung-Cheol Kim, *Net Neutrality and Investment Incentives*, 41 RAND J. ECON. 446, 448, 449, 459, 466 (2010).

¹³ See Scott Wallsten, *Learning from the FCC's Lifeline Broadband Pilot Projects*, at 14, TECH. POL'Y INST. (Mar. 2016), available at https://techpolicyinstitute.org/wp-content/uploads/2016/03/Wallsten_Learning-from-the-FCCs-Lifeline-Broadband-Pilot-Projects.pdf (suggesting that that "plausible changes in speed have a much smaller positive effect [on broadband adoption decisions] than the negative effect from plausible changes in price").

¹⁴ See Martin Nielsen, *Strategic Investment Dependence and Net Neutrality*, University of Southern Denmark, Discussion Papers on Business and Economics No. 11/2015 (Jun. 26, 2015) available at <http://ssrn.com/abstract=2624517>.

off paying some fees. Hence, there exist last-mile fees that are Pareto-improving for all parties concerned.

* * *

This study shows that last-mile fees can also be used to align investment incentives between content and access providers and promote investments in better broadband services. Hence, last-mile fees can be used to affect the size of the cake and not only its distribution.¹⁵

In general, the weight of economic theory suggests that ISPs should have stronger investment incentives under the RIFO than under the OIO. Under the RIFO, such investments support and allow for the improvement of quality supplied by content providers, *and* enable ISPs to increase network capacity and quality in ways that ensure increased benefit to *both* consumers and edge providers.

2. *The commercial benefits of prioritization*

The discussion above considered the economic effects that paid prioritization could have on ISP investment in network infrastructure. We should also consider the effects that it could have on individual users on both sides of the network. The OIO presents a narrative that suggests paid prioritization is overwhelmingly likely to be harmful to end-users.¹⁶ While that is possible, it cannot be assumed, and paid prioritization could also be beneficial to end-users—even entirely *independent* of the beneficial effects that it could have on investment in network infrastructure.

As an initial matter, on most networks prioritization is not about managing congestion. Most backbone and middle-mile network infrastructure uses redundant network connections on which typical network loads are maintained at well less than 50% utilization, in order to ensure the ability to provide reliable continuity of service in the event that there is a disruption that affects one or the other of the redundant connections.¹⁷ Similarly, network providers seek to maintain sufficient “headroom” on their last mile networks in order to keep their infrastructure upgrade cycle ahead of consumer demand. While there are capacity constrained networks in many parts of the United States, most edge services do not target specific network regions (i.e., most edge services are offered

¹⁵ *Id.* at 16-17.

¹⁶ See OIO, *supra* note 1, at para 19 (“The record demonstrates the need for strong action. The Verizon court itself noted that broadband networks have ‘powerful incentives to accept fees from edge providers, either in return for excluding their competitors or for granting them prioritized access to end users.’ Mozilla, among many such commenters, explained that ‘[p]rioritization . . . inherently creates fast and slow lanes.’ Although there are arguments that some forms of paid prioritization could be beneficial, the practical difficulty is this: the threat of harm is overwhelming, case-by-case enforcement can be cumbersome for individual consumers or edge providers, and there is no practical means to measure the extent to which edge innovation and investment would be chilled. And, given the dangers, there is no room for a blanket exception for instances where consumer permission is buried in a service plan—the threats of consumer deception and confusion are simply too great.”) (internal citations omitted).

¹⁷ See, e.g., Avinatan Hassidim et al., *Network Utilization: the Flow View*, available at <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/41315.pdf> (surveying literature on network utilization and finding that, while average utilization is low, there can be localized bottlenecks where utilization is high). Generally the average link utilization is very low. See *id.* at 2 (“One can see that the average link utilization varies over the day between 17% and 29% with a typical daily pattern.”); Andrew Odlyzko, *Data Networks are Lightly Utilized, and Will Stay That Way*, 2 REV. NET. ECON. 1 (2003), available at <http://www.dtc.umn.edu/~odlyzko/doc/network.utilization.pdf>.

to any broadband user, not just users on capacity constrained networks),¹⁸ which would make paid prioritization an unsatisfactory tool for generalized network management purposes.

This does not mean, however, that paid prioritization could not be a valuable or beneficial service. For instance, TCP/IP and UDP/IP, the standard protocols used to deliver network data, are “best effort” protocols. By design, they do not make, and indeed are incapable of making, any delivery performance guarantees. Most applications are amenable to mere best-effort networks. For instance, services like e-mail or file transfer protocols can readily handle dropped or delayed packets with no effect upon the user; streaming media services like video streaming or Voice over IP can tolerate moderate packet loss or delay with only modest performance impacts on the user. Other services, such as real-time video gaming or real-time operation of physical control systems, however, may require better-than-best-effort service in order for best performance—they may be usable under ordinary performance conditions, but experience significant degradation in the quality of service due to minor drops in performance. It is entirely possible that ISPs could engineer their networks to support prioritization of services to offer better-than-best-effort performance. Critically, such prioritization could prioritize these services over those that would not be affected by a transient decrease in performance (e.g., file transfers) but equally with those that may be affected by them.

At a more general level, to the extent that the concern about paid prioritization is that ISPs may use their “gatekeeper” position to harmfully extract rents from edge providers, it is difficult to see how foreclosing the range of deals that *edge providers* may enter into does not itself potentially harm the very companies such a ban would be intended to protect.¹⁹ Indeed, one of the very few public instances of an ISP negotiating with an edge provider for the carriage of edge content, discussed during oral arguments in the *Verizon* litigation, involved *ESPN* seeking to require *Verizon* to pay *ESPN* to allow *Verizon* customers access to *ESPN* content.²⁰ As explained by *Verizon* counsel, “but for these [the 2010 Open Internet Order] rules, we would be exploring those commercial arrangements.”²¹ It is difficult to understand how *ESPN* benefits from rules that prohibit it from pursuing an agreement that it views as beneficial—and the same would be true for an edge provider that approached an ISP seeking better-than-best-effort treatment of its packets.

Indeed, it is undeniably the case that most large content providers *do* invest significantly in order to ensure better-than-best-effort performance for their traffic. They do this by relying on content delivery networks (CDNs) for the delivery of their content. In some cases, these are private networks owned or leased by large content providers; in other cases, these are private networks owned by third parties that provide CDN services. In either event, these are services that allow content providers

¹⁸ The exception to this may be for services that precisely target consumers who are likely on lower-speed networks, but that could not reliably operate on these networks precisely because they are lower speed. One could imagine, for instance, telehealth or remote education video conferencing applications designed for rural settings where consumers often have access only to lower-speed DSL connections.

¹⁹ See *Schurz Comm. v. FCC*, 982 F.2d 1043, 1051 (7th Cir. 1992) (“The new rules[, which prohibit non-network TV stations from selling their syndication rights to network stations], appear to harm rather than to help outside producers as a whole (a vital qualification) by reducing their bargaining options. It is difficult to see how taking away a part of a seller's market could help the seller.”)

²⁰ *Verizon v. FCC 2014 Helgi Walker Statement*, H3XED (Nov. 22, 2017) (quoting *Verizon* counsel, Helgi Walker, during the *Verizon v. FCC* oral arguments and providing a link to MP3 recording), available at <https://www.h3xed.com/web-and-internet/verizon-v-fcc-2014-helgi-walker-statement>.

²¹ *Id.*

(those that can afford the cost of a CDN, that is) to bypass the vast majority of the public, best-effort, Internet, effectively leap-frogging their packets ahead of those of other companies whose packets are stuck in the best-effort “slow lane.”

Importantly, paid prioritization could be a particularly desirable service for smaller start-up companies and new entrants—especially those offering services that would compete against dominant edge companies that are able to afford to self-prioritize their content via CDNs.

Non-neutrality offers the prospect that a startup might be able to buy priority access to overcome the inherent disadvantage of newness, and to better compete with an established company. Neutrality means that that competitive advantage is impossible, and the baseline relative advantages and disadvantages remain—which helps incumbents, not startups. With a neutral Internet . . . the advantages of the incumbent competitor can’t be dissipated by a startup buying a favorable leg-up.²²

Any presumptive ban on paid prioritization therefore harms both content providers that may want to avail themselves of prioritization services, as well as consumers who may benefit from the increased competition that such services could facilitate.

The OIO barred these types of business models *ex ante* under the assumption they would always harm consumers and edge providers. This is contrary to the approach of antitrust law, embodied in the RIFO, which takes a rule of reason approach to harms from these so-called “vertical restraints.” Antitrust law has developed many tools to analyze vertical foreclosure and determine whether it is harmful to consumers. To differentiate procompetitive from anticompetitive vertical arrangements, antitrust law uses a “rule of reason” adjudication framework that weighs costs and benefits, and recognizes possible losses from enforcement errors that go in either direction. But this always occurs *ex post*, allowing companies to experiment with innovative business models like the many variations of paid prioritization. The RIFO still allows for antitrust policing of paid prioritization to assure it is not harmful to competition or consumers.²³

B. Measuring the investment effects of the OIO and the RIFO

There is substantial debate over whether the empirical evidence supports the theoretical claims regarding broadband investment under either the OIO’s or the RIFO’s policy approach. While the weight of the theoretical literature, in our view, clearly supports the RIFO approach,²⁴ the empirical

²² Geoffrey Manne, *That Startup Investors’ Letter on Net Neutrality Is a Revealing Look at What the Debate Is Really About*, TRUTH ON THE MARKET (May 14, 2014), <https://truthonthemarket.com/2014/05/14/that-startup-investors-letter-on-net-neutrality/>.

²³ Joshua D. Wright, *Antitrust Provides a More Reasonable Regulatory Framework than Net Neutrality*, Geo. Mason L. & Econ. Rsrch. Paper No. 17-35, at 15 (Aug. 15, 2017), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3020068 (“Economic analysis predicted the 2015 Open Internet Order ban on vertical agreements would likely harm consumers and depress investment. Empirical evidence is consistent with those predictions. Reclassifying Internet service providers under Title I restores incentives to invest in broadband markets. A less obvious benefit is that it replaces the 2015 Order’s categorical ban on contract arrangements that benefit consumers – including paid prioritization and other vertical arrangements – with antitrust’s rule of reason. A close look at the antitrust approach shows not only that it can reach the harms envisioned by net neutrality proponents, but also that it is superior to alternatives that would condemn vertical arrangements in broadband markets without proof of harm to competition.”).

²⁴ For a more thorough discussion of the economic literature, see Comments of the International Center for Law & Economics, In the Matter of Restoring Internet Freedom, WC Docket No. 17-108 (Jul. 17, 2017), at 38-66, available at

evidence is at best ambiguous and at worst useless. But this is for good reason: As much as we might like to know the answer, it is both too early to assess the investment effects of either Order, and likely impossible to reliably isolate the influence of either Order on ISPs' multifaceted and complex investment decisions taken over extremely long time periods.

Broadband investment decisions are undertaken over extremely long timeframes, and influenced not only by the regulatory environment (which extends far beyond FCC regulation), but also by the investment decisions of competing ISPs, expected consumer demand, cost, the introduction of rival technologies, and a whole host of other business and technological realities. Inferring anything about a single regulatory decision by looking for correlations over short timeframes with measured investment overall is so unreliable as to be effectively useless. At the same time, investment decisions are not monolithic. Even if a rule change leads to no observable *overall* investment effect, it may cause a *reallocation* or *reprioritization* of investments in ways that decrease the overall value of even an equivalent amount of investment. Finally, it may not be the rule itself that most significantly affects investment decisions, but the regulatory uncertainty entailed by rule change. These effects could be more attenuated and would likely be spread out over a longer timeframe as the regulatory environment in response to a rule change comes into better focus.

In Part B.1 we discuss the important and underappreciated role of regulatory uncertainty in influencing long-term investment decisions. In Part B.2, we discuss the empirical difficulties for studies purporting to show investment increases or decreases under the OIO or the RIFO. In Part B.3, we assess what little reliable empirical evidence there is of the rules' investment effects and conclude that there is no reliable evidence that the OIO increased investment, but that the best evidence that does exist points to decreased investment under the OIO and increased investment under the RIFO.

1. Policy uncertainty leads to lower investment

It is unclear whether ISP investment decisions are acutely affected by any given regulatory regime, at least within the timeframe available to investigate. It is also possible that the various Orders may have no readily observable effect on investment spend overall. But the widely different regulatory philosophies underlying the Orders—that of the RIFO's light-touch regulation under Title I compared to the OIO's more interventionist regulation based on the uncertain whims of a changing political environment under Title II—strongly suggests different levels of regulatory *certainty*. And it is virtually inevitable that the greater regime uncertainty under Title II would contribute to a reduction in investment and/or its less efficient and effectively deployment. Such an effect is likely more attenuated than the acute, immediate response many seem to be looking for. But it may be no less real and no less important.

Sometimes the regulatory cost is worth the gain. And, in theory, it could be that Title II would offer competition and consumer protections sufficient to compensate for the additional burdens it imposes such that net network value would increase. But, as we have discussed, the theory and

https://laweconcenter.org/wp-content/uploads/2017/09/iclc-comments_policy_rif_nprm-final.pdf [hereinafter "ICLE RIFO Comments"].

evidence suggest strongly that the benefits of Title II regulation would be trivial or nonexistent.²⁵ Meanwhile, the costs are very real.

Important among these, Title II creates far more regulatory uncertainty. Where the RIFO rests on long-established antitrust principles to guide the light-handed imposition of regulatory burdens, the OIO's Title II regime would entail an uncertain and complex unfolding of regulation over an extended period. As the D.C. Circuit noted in another context (although it could have been talking about the OIO):

The phenomenon we see in this case is familiar. Congress passes a broadly worded statute. The agency follows with regulations containing broad language, open-ended phrases, ambiguous standards and the like. Then as years pass, the agency issues circulars or guidance or memoranda, explaining, interpreting, defining and often expanding the commands in regulations. One guidance document may yield another and then another and so on. Several words in a regulation may spawn hundreds of pages of text as the agency offers more and more detail regarding what its regulations demand of regulated entities.²⁶

This uncertainty would be further exacerbated by the inherent political discretion involved in enforcing Title II, and the fact that the composition of the Commission can critically change in relatively short periods as elections whipsaw its power centers. Yet firms tasked with constructing future-proof networks need to plan for a decade or more, and they can scarcely be expected to effectively anticipate future political vicissitudes in their long-term network construction decisions.

The OIO's forbearance regime alone, for example, would have been an always-moving target, and its "general Internet conduct" standard would have ensured that every novel network innovation and business practice would be subject to uncertain scrutiny and possibly litigation. Imposition of Title II's rate regulation authority, meanwhile—by no means ruled out under the OIO²⁷—would entail a massive—and massively uncertain—regulatory apparatus.

Indeed, even in the short time it was in effect, the OIO's Title II regime empowered the FCC to engage in, among other things, privacy regulation²⁸ and regulation of set-top boxes.²⁹ The FCC was also empowered under the OIO's general conduct standard to use its far-ranging investigation power to review ISP's business models.³⁰ Thus the FCC sent letters announcing its intention to investigate AT&T, T-Mobile, and Comcast for their sponsored data plans.³¹

²⁵ See generally *id.*

²⁶ *Appalachian Power Co. v. E.P.A.*, 208 F.3d 1015, 1020 (D.C. Cir. 2000).

²⁷ See, e.g., John Eggerton, *Schumer: Consumers May Need Internet Affordability Protections*, MULTICHANNEL NEWS (May 10, 2018), <https://www.multichannel.com/news/schumer-consumers-may-need-internet-price-protections>.

²⁸ See *Protecting the Privacy of Customers of Broadband and Other Telecommunications Services*, 81 Fed. Reg. 87274 (Dec. 2, 2016), available at <https://www.govinfo.gov/content/pkg/FR-2016-12-02/pdf/2016-28006.pdf>.

²⁹ See *Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices*, 81 Fed. Reg. 14033 (Mar. 16, 2016), available at <https://www.govinfo.gov/content/pkg/FR-2016-03-16/pdf/2016-05763.pdf>.

³⁰ See OIO, *supra* note 1, at paras. 136-45.

³¹ See Brian Fung, *Regulators want to talk to AT&T, Comcast, and T-Mobile about sponsored data*, THE WASHINGTON POST (Dec. 17, 2015), <https://www.washingtonpost.com/news/the-switch/wp/2015/12/17/regulators-want-to-talk-to-att-comcast-and-t-mobile-about-sponsored-data/>.

This type of regulatory uncertainty is a substantial source of cost, and the evidence indicates that it leads directly to higher capital prices and lower investment. “The role of future conditions is particularly important when firms must decide on costly irreversible investments.”³²

The notion that uncertainty about the future can have real economic effects—particularly for irreversible decisions (like sunk cost investments)—is long- and well-established in the economic literature.³³ The basic idea is this:

When a firm makes an irreversible investment expenditure, it exercises, or “kills,” its option to invest. It gives up the possibility of waiting for new information to arrive that might affect the desirability or timing of the expenditure; it cannot disinvest should market conditions change adversely. This lost option value is an opportunity cost that must be included as part of the cost of the investment. . . .

Recent studies have shown that this opportunity cost of investing can be large. . . . Also, this opportunity cost is highly sensitive to uncertainty over the future value of the project, so that changing economic conditions that affect the perceived riskiness of future cash flows can have a large impact on investment spending, larger than, say, a change in interest rates.³⁴

Policymakers often add an additional layer of uncertainty through their monetary, fiscal, and regulatory decisions, known as “economic policy uncertainty.”³⁵ Although identifying and measuring causal relationships between policy uncertainty and economic outcomes is fraught, attempts at such measurements have consistently pointed in the same direction. As one brief review sums it up:

We think the weight of the evidence and the lessons of economic theory argue for assigning some weight to the policy uncertainty view. If U.S. policymakers can deliver a policy environment characterized by greater certainty and stability, there will likely be a positive payoff in the form of improved macroeconomic performance.³⁶

Thus the risk created by the open-ended authority to regulate under the OIO and Title II would be expected to reduce the incentive to invest:

The potential effect of public utility regulation on incentives for investment played a major role in the Commission’s decision to restore broadband Internet access service’s

³² Kyle Handley and Nuno Limão, *Trade and Investment Under Policy Uncertainty: Theory and Firm Evidence*, 7 AM. ECON. J.: ECON. POL’Y 189, 189 (2015).

³³ See, e.g., Ben Bernanke, *Irreversibility, Uncertainty and Cyclical Investment*, 98 Q. J. ECON. 85 (1983); Avinash Dixit, *Entry and Exit Decisions Under Uncertainty*, 97 J. POL. ECON. 620 (1989); Robert S. Pindyck, *Irreversibility, Uncertainty, and Investment*, 29 J. ECON. LIT. 1110 (1991); AVINASH DIXIT & ROBERT S. PINDYCK, *INVESTMENT UNDER UNCERTAINTY* (Princeton U. Press 1994); Ricardo J. Caballero & Robert S. Pindyck, *Uncertainty, Investment, and Industry Evolution*, 37 INT’L ECON. REV. 641 (1996); Nicholas Bloom et al., *Uncertainty and Investment Dynamics*, 74 REV. ECON. STUD. 391 (2007); Nicholas Bloom, *The Impact of Uncertainty Shocks*, 77 ECONOMETRICA 623 (2009).

³⁴ Pindyck, *Irreversibility, Uncertainty, and Investment*, *supra* note 33, at 1112.

³⁵ See generally Steven J. Davis, *Regulatory Complexity and Policy Uncertainty: Headwinds of Our Own Making*, Becker Friedman Inst. for Rsrch. in Econ. Working Paper No. 2723980 (April 29, 2017), available at <https://ssrn.com/abstract=2723980>.

³⁶ Scott R. Baker, Nicholas Bloom, & Steven J. Davis, *Has Economic Policy Uncertainty Hampered the Recovery?*, in *GOVERNMENT POLICIES AND THE DELAYED ECONOMIC RECOVERY* (Lee E. Ohanian & John B. Taylor & Ian J. Wright, eds. 2012), *prepublication draft available at* <https://www.semanticscholar.org/paper/Has-Economic-Policy-Uncertainty-Hampered-the-Baker-Bloom/0eb2f1ae9e2b5693043d13ef0b44036fe36d2165>.

classification as a Title I information service. Owners of network infrastructure make long-term, sunk investments. When public utility regulation works well, it allows the firm to earn a rate of return that is equal to its cost of capital, and prevents monopoly profits. In practice, however, public utility regulation can also depress the firm's rate of return below its cost of capital, which reduces the incentive to invest. *The risk that regulation could reduce the rate of return below the cost of capital also creates a disincentive for investment.*³⁷

Moreover, while such regulation would constrain ISPs' profit opportunities and change their investment calculus, it may not result simply in an overall *reduction* in investment. Instead, the effect may be a shift in investment to more remunerative areas—like wealthy urban centers or higher-income suburbs—at the expense of riskier investment in rural and low-income communities. Further decisions may affect both differently situated content providers and consumers differently, as well. And the literature suggests that when content providers are significantly heterogeneous, regulations like those in the OIO are likely to lower consumer welfare on net.³⁸

2. *Studies on investment under the OIO and the RIFO suffer from empirical limitations*

At the time of the OIO's adoption there was no empirical evidence that the prior regime—under which paid prioritization was presumptively allowed—led to a decrease of investment in broadband, and the OIO does not cite any such evidence.³⁹

Several studies have since attempted to quantify the effect of the adoption (and subsequently, the repudiation) of the OIO on broadband investment. This is no easy task: government regulation is just one factor out of many that affect investment decisions,⁴⁰ and investment decisions are often undertaken as part of longstanding and long-term strategies that may not have been altered in any measurable way in the relatively short timeframe since the adoption and repudiation of the OIO.⁴¹ Indeed, at least one very vocal net neutrality supporter recently claimed that the regulatory

³⁷ Jerry Ellig, et al., *Economics at the FCC 2007-2018: International Broadband Pricing Comparisons, and a New Office of Economics and Analytics*, 53 REV. INDUS. ECON. 681, 689-90 (2018) (emphasis added), available at <https://doi.org/10.1007/s11151-018-9672-6>.

³⁸ See, e.g., Benjamin E. Hermalin and Michael L. Katz, *The Economics of Product-Line Restrictions with an Application to the Network Neutrality Debate*, 19 INFO. ECON. & POL'Y 215, 215-48 (2007).

³⁹ See Thomas W. Hazlett & Joshua D. Wright, *The Effect of Regulation on Broadband Markets: Evaluating the Empirical Evidence in the FCC's 2015 'Open Internet' Order*, 50 REV. INDUS. ORG. 487, 490 (2017), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2859570 (“[T]he idea that the market had a strong reaction to the 2010 rules, and adjusted according to new expectations—either with respect to a “virtuous circle” or added enforcement costs—is debatable. . . . The best that can be said for the FCC’s analysis is that it is unconvincing. Even the bare bones framework that is adopted by the FCC shows no positive reaction of ISP capex following the 2010 net neutrality rules.”).

⁴⁰ See, e.g., Christopher Alex Hooton, *Testing the Economics of the Net Neutrality Debate*, TELECOMM'NS POL'Y (Sep. 9, 2019), available at <https://www.sciencedirect.com/science/article/abs/pii/S0308596119300473>. See also USTelecom, U.S. *Broadband Capex Growth Propels Deployment* (Jul. 31, 2019), available at <https://www.ustelecom.org/u-s-broadband-capex-growth-propels-deployment/> (“The question with respect to the impact of regulation is what investment would have been over the long term under different regulatory scenarios, holding relevant factors constant. *Factors include competition, financial market developments, product cycles, government mandates, and taxes.*”) (emphasis added).

⁴¹ See, e.g., Appendix G: Declaration of David S. Evans, Ph. D, paras. 161-73, in DESCRIPTION OF TRANSACTION, PUBLIC INTEREST STATEMENT, AND RELATED DEMONSTRATIONS (Jun. 18, 2018), available at [https://ecfsapi.fcc.gov/file/10618281006240/Public%20Interest%20Statement%20and%20Appendices%20A-1%20\(Public%20Redacted\)%20.pdf#page=280](https://ecfsapi.fcc.gov/file/10618281006240/Public%20Interest%20Statement%20and%20Appendices%20A-1%20(Public%20Redacted)%20.pdf#page=280) (noting that long-term investment in 4G LTE drove dynamic competition among U.S. cellular carriers in the 2010s).

environment has *nothing* to do with network investment decisions, thus significantly undercutting the claimed basis for adopting the OIO in the first place.⁴²

A few studies have attempted to argue that adoption of the OIO did affect network investment. One study of note, authored by Free Press, claims that the OIO *increased* investment by ISPs.⁴³ But the claim is ultimately unconvincing, and the study advances its strongly stated conclusion only by ignoring its own caveats regarding the data.

For example, in support of its assertion that “[a]nyone suggesting [that ‘fears about potential future Title II-based interventions . . . have reduced investment’] is demonstrably wrong,”⁴⁴ the study accurately observes that:

[E]ven if aggregate capital spending does go down in the future, it does not follow that such a decline would stem from fears about vague and unspecified FCC interventions. . . . [The] truth, which actual investors in the sector well understand, is that capital spending is primarily a function of macroeconomic realities outside the FCC’s ambit.⁴⁵

The problem is that anyone suggesting *any* firm conclusion about the effects of the FCC’s Orders based on short-term investment estimates—*especially* without making any effort to control for other causes or even to compare them to “normal” investments—is building on a foundation of sand. Yet that is exactly what this study does, however:

Financial and marketplace evidence demonstrates that the FCC’s 2015 Open Internet Order is an absolute success, accomplishing its stated goal of preserving and promoting the . . . “virtuous cycle of investment.” ISP investments accelerated following the vote. . . .

In sum, the 2015 Open Internet Order and accompanying legal classification decision settled the prior uncertainty about open, nondiscriminatory broadband telecom service access. What followed that decision was a historic period of U.S. investment and innovation.⁴⁶

The flaws with the study that undermine its assertions are manifold. At a first pass, the study’s numbers are not adjusted for inflation, or for unrelated movements in the economy or industry as a whole. Had they been properly adjusted the study’s top-line result would have been *reversed*.⁴⁷ This

⁴² Harold Feld (@haroldfeld), Twitter (Apr. 13, 2020, 4:29 PM), <https://twitter.com/haroldfeld/status/1249796883561754624> (“This is how network investments work. Has nothing to do with regulatory environment.”).

⁴³ See S. Derek Turner, *It’s Working: How the Internet Access and Online Video Markets Are Thriving in the Title II Era*, at 4, FREE PRESS (May 2017), <https://www.freepress.net/sites/default/files/2018-06/internet-access-and-online-video-markets-are-thriving-in-title-II-era.pdf>.

⁴⁴ *Id.* at 6.

⁴⁵ *Id.*

⁴⁶ *Id.* at 1 (emphasis added).

⁴⁷ See George S. Ford, *Reclassification and Investment: An Analysis of Free Press’ “It’s Working” Report*, at 1-2, PHOENIX CTR. PERSP. (May 22, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2982440 (“Once the most basic adjustment to the data is made—accounting for inflation—Free Press’ data show that capital spending fell significantly in 2016 (-2%). . . . Free Press’ own data, therefore, provides support for the \$3.7 to \$5.1 billion investment decline cited by Chairman Pai when announcing his intent to review of the 2015 Open Internet Order.”).

same critical flaw, incidentally, also occurs in the FCC’s own claims in the OIO regarding investment following the 2010 Open Internet Order (the “2010 Order”).⁴⁸

But the principle flaw with the study is the indeterminacy of the causal relationship between its numbers (and even its numbers if properly adjected) the enactment of a single regulatory policy. The decision to invest in broadband is driven by a complicated mix of broad macroeconomic indicators against a backdrop of regulation.

Another recent empirical analysis by Christopher Hooton also properly concludes that resolute claims of investment increases or decreases due solely to any of the 2010 Order, the 2015 OIO, or the 2017 RIFO are statistically invalid:

The results show no evidence of impacts from the NN regulatory actions. The treatment coefficients are not statistically significant and quite small given the level of investment by the telecommunications industry across multiple specifications and robustness tests. Overall, the analytical exercise highlights the difficulty of finding, selecting, and correctly controlling other influencing factors. The results suggest any claim of causal impact in investment decisions (be it up or down) are suspect.⁴⁹

Once again, however, the study’s own empirical analysis—which the author claims is “the only analysis with a full dataset and a sufficient time period of observation to properly examine effects,”⁵⁰—is *also* fatally flawed, and exemplifies the problem of assessing the effect of regulatory changes on complex, long-term investment decisions.

In this case, the study relies upon Capital Expenditures Incurred But Not Yet Paid (CEINYP) as its measure of investment. But, as George Ford’s trenchant critique of the study accurately points out:

[The study’s] chosen measure of capital spending is not capital spending at all. Capital Expenditures Incurred But Not Yet Paid . . . is a *credit* entry for accrued expenses. It does not equal capital spending; it equals, as the name implies, the portion of capital spending incurred in the past to be paid in the future.⁵¹

In other words, the study looks at data reflecting the ongoing payments still owing on *previously* committed capital expenditures to assess the effect of *subsequent* regulatory changes. This is, as Ford’s critique notes, “an exhibition in statistical negligence.”⁵²

But it is also telling. Not only will subsequent changes in circumstance not affect ongoing payments for past investments, they may also have limited effect on new investment decisions, which are also heavily determined by past investments. For example, if previous investments are undertaken to effect a shift to a new technology, recouping those investments may require continued investment to complete the transition, even if the expected return is now lower than it was before because of a

⁴⁸ See Wright & Hazlett, *supra* note 39, at 492-94.

⁴⁹ Hooton, *supra* note 40, at 17.

⁵⁰ *Id.* at 1.

⁵¹ George S. Ford, *Statistical Negligence in Title II Impact Analysis*, PHOENIX CTR. PERSP. 19-05 at 2 (Oct. 1, 2019), available at <https://www.phoenix-center.org/perspectives/Perspective19-05Final.pdf>.

⁵² *Id.*

subsequent regulatory change. In this case, the later investment decisions may well be somewhat smaller (or different) than they would have been, but the effect may be quite attenuated because of the “path dependence” imposed by the firm’s previous investment decisions. The full effect of the policy change may not show up until the next technological shift, or it may show up in the short run only in a smaller set of investments unrelated to larger, paradigm shifting investment programs.

Any number of factors (including, as noted, past investment decisions) other than industry-specific regulatory change will affect ongoing investment decisions, including shifts in consumer demand; entry or exit of competitors, or changes in the services offered by existing competitors; macroeconomic trends and broader policy decisions; as well as, of course, changes in the regulatory landscape. All of these factors can alter decisions on the margin to a greater or lesser extent, and they all feed back on each other, making the weighting of any individual factor exceedingly difficult.

3. *But the most reliable evidence shows a correlation between the risk of Title II reclassification and decreased network investment*

Despite a number of statistically invalid analyses purporting to show that the OIO led to a reduction in investment⁵³—as well as a welter of *horrendous* analyses purporting to show the opposite⁵⁴—appropriately measured, the best evidence does suggest that the threat of Title II reclassification (which, of course, came to fruition in the 2015 OIO) may well have reduced broadband investment.⁵⁵ The FCC cited to these studies in the RIFO, concluding that:

[R]eclassification of broadband Internet access service from Title II to Title I is likely to increase ISP investment and output. *The studies in the record that control the most carefully for other factors that may affect investment (the Ford study and the Hazlett & Wright study) support this conclusion.* Consequently, we disagree with commenters who assert that Title II has increased or had no effect on ISP investment, given the failure of other studies to account for complexity of corporate decision-making and the macroeconomic effects that can play a role in investment cycles.⁵⁶

And the D.C. Circuit upheld this analysis, finding that:

⁵³ See, e.g., Hal J. Singer, *2016 Broadband Capex Survey: Tracking Investment in the Title II Era* (Mar. 1, 2017), <https://halsinger.wordpress.com/2017/03/01/2016-broadband-capex-survey-tracking-investment-in-the-title-ii-era/>; Michael Horney, *Broadband Investment Slowed by \$5.6 Billion Since Open Internet Order*, FREE STATE FOUND. (May 5, 2017), <http://freestatefoundation.blogspot.com/2017/05/broadband-investment-slowed-by-56.html>; Doug Brake, *Broadband Myth Series, Part 1: What Financial Data Shows About the Impact of Title II on Investment ITIF* (June 2, 2017), <https://itif.org/publications/2017/06/02/broadband-myth-series-part-1-what-financialdata-shows-about-impact-title-ii>.

⁵⁴ See, e.g., Turner, *supra*, note 43; Hooton, *supra*, note 40; Christopher Hooton, *An Empirical Investigation of the Impacts of Net Neutrality*, Internet Association Report (Jul. 17, 2017), available at <https://internetassociation.org/publications/an-empirical-investigation-of-the-impacts-of-net-neutrality/>; Internet Association, *Preliminary Net Neutrality Investment Findings* (May 2017), available at <https://internetassociation.org/wp-content/uploads/2017/05/InternetAssociation-NetNeutrality-Facts.pdf>; FCC, *Past, Present and Future of Broadband Investment—Title II and Voodoo Economics* (2017), available at <https://ecfsapi.fcc.gov/file/10510724612672/FCC-Investment%26TitleII-NEWFNL.pdf>.

⁵⁵ See George Ford, *Net Neutrality, Reclassification, and Investment: A Counterfactual Analysis*, PHOENIX CTR. FOR ADVANCED LEGAL & ECON. PUB. POL’Y STUD. (April 25, 2017), <http://www.phoenix-center.org/perspectives/Perspective17-02Final.pdf>; <http://cbpp.georgetown.edu/sites/cbpp.georgetown.edu/files/Kovacs%20-%20Title%20II%20and%20wireless%20investment.pdf>.

⁵⁶ RIFO, *supra* note 2, at para. 98 (emphasis added).

[T]he agency’s position as to the economic benefits of reclassification away from “public-utility style regulation,” which the Commission sees as “particularly inapt for a dynamic industry built on technological development and disruption,” is supported by substantial evidence . . . and so [we] reject Petitioners’ objections.⁵⁷

Economist George Ford’s paper is the only empirical analysis of broadband investment pre- and post-Title II that uses robust and valid statistical methods to derive its results. It contains several necessary estimations, of course (as all statistical analyses of this type must), and, no matter what, we are dealing with short timeframes in which to assess long-term investment decisions. But Ford’s technique is sound and offers the only plausibly reliable assessment of the likely effect on investment of the open Internet rules implemented via Title II reclassification. He finds that, but for the threat of Title II reclassification, capital investment would have been larger (by about \$30B to \$40B more each year).⁵⁸ And this result holds even *with* the threat (or the actuality) of net neutrality rules that did *not* apply Title II.⁵⁹

Importantly, Ford’s analysis is the only one designed to capture the effect on investment of *regulatory uncertainty*. Thus, one of the things that sets Ford’s analysis apart from the meaningless “analyses” offered by the likes of Free Press and the Internet Association is that his assessment looks at investment levels before and after 2010, instead of 2015.⁶⁰ The year 2010 is when the *realistic possibility* of Title II reclassification was first floated by then-Chairman Genachowski (and widely talked about)—after which, according to Ford’s analysis, stock prices of ISPs immediately fell about 10%.⁶¹

Comparisons of investment levels that look at nominal investments of only broadband companies and only in the years immediately preceding and following the OIO (which is to say, most of them) are not useful because they do not reflect the effects of policy uncertainty, cannot adequately control for the effect of other regulatory and non-regulatory factors that could have influenced decision-making and, in any case, must draw conclusions based on a timeframe that is simply too short to yield meaningful results.

But Ford’s analysis shows that the *threat* of reclassification was likely baked into investment decisions in varying degrees in the years leading up to the OIO, and that this threat reduced broadband investment below what it would have been in the absence of the threat (and all else equal).⁶² This is consistent with the idea that economic policy uncertainty is an important factor in such decisions, as discussed above.⁶³

⁵⁷ Mozilla Corp. v. FCC, *supra*, note 3 at 49 (emphasis added).

⁵⁸ Ford, *supra* note 55, at 2.

⁵⁹ *Id.* at 4.

⁶⁰ *Id.* at 5.

⁶¹ *Id.* at 2; see also Press Release, Federal Communications Commission, *The Third Way: A Narrowly Tailored Broadband Framework*, Statement of Chairman Julius Genachowski 4-5 (May 6, 2010) available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-297944A1.pdf.

⁶² *Id.* at 2. Of course, even this conclusion is subject to the caveats discussed above that measurement is difficult, as is pinpointing the effect of a single regulatory policy (even with an extremely well-executed empirical research design).

⁶³ See *supra*, Part I.B.1.

II. Increased investment in broadband benefits public safety uses built upon ISP networks

Investments in building out networks, improving speed, and reducing lags are all necessary for the public safety uses described below, as it is on top of these networks that public safety uses are built. Therefore, there is a strong basis for concluding that the public safety benefits of the RIFO are justified, as well.

A. The RIFO incentivizes mobile buildout, upon which public safety networks like FirstNet are built

For instance, FirstNet—the public safety network first recommended by the 9/11 Commission Report and then created as part of the Middle Class Tax Relief and Job Creation Act—was built by a public-private partnership with AT&T.⁶⁴ AT&T’s mobile broadband is the backbone for this dedicated public safety network.

This network is designed to provide:

[A]ccess to mobile broadband with reliable, dependable, and consistent coverage and sufficient capacity can fundamentally change how first responders work. A principal focus of the FirstNet Authority’s contract with AT&T is to build a robust nationwide broadband network for public safety’s use on Band 14 spectrum. Coupled with public safety’s access to all of AT&T’s commercial spectrum with the same public safety features, public safety agencies have access to the FirstNet network when and where they need it, enhancing their ability to access network services that can transform operations.⁶⁵

As AT&T has repeatedly argued, the regulatory uncertainty under the OIO reduced incentives to build out its network.⁶⁶ The benefits of public safety networks like FirstNet should be credited to a regulatory regime that incentivizes buildout of the underlying mobile network. The RIFO’s classification of wireless ISPs as “private mobile services” with its attendant benefits in lighter regulation do just that.

B. The RIFO incentivizes 5G rollout and the many safety benefits which are built upon it

As Chairman Pai recognized in his statement accompanying the RIFO, 5G rollout will be incentivized by the light regulatory touch of Title I:

Simply put, by returning to the light-touch Title I framework, we are helping consumers and promoting competition. Broadband providers will have stronger incentives to build

⁶⁴ *FirstNet: The History of Our Nation’s Public Safety Network*, FIRSTNET (last accessed Apr. 6, 2020), <https://firstnet.gov/about/history>.

⁶⁵ FIRST RESPONDER NETWORK AUTHORITY ROADMAP at 6 (2020), *available at* https://firstnet.gov/system/tdf/FirstNet_Roadmap.pdf.

⁶⁶ Comments of AT&T, In the Matter of Restoring Internet Freedom, WC Docket No. 17-108, at 49-52 (Jul. 17, 2017), *available at* <https://ecfsapi.fcc.gov/file/10717906301564/AT%26T%20Internet%20Freedom%20Comments.pdf> (arguing Title II rules are vague and unworkable and would result in “deterring productive investment and the free development of innovative, value-enhancing business models”).

networks, especially in unserved areas, and to upgrade networks to gigabit speeds and 5G. This means there will be more competition among broadband providers. It also means more ways that startups and tech giants alike can deliver applications and content to more users. In short, it's a freer and more open Internet.⁶⁷

It is believed that 5G networks will be able to deliver:

- Ultrafast speeds/data rates, which result in much faster data transmission than 4G LTE. These faster speeds will enable the development of 5G public safety applications that use complex and rich media, such as streaming video and augmented or virtual reality applications.
- Low latency, which is essential for the real-time data exchange needed to support autonomous vehicles and video-based robotic bomb diffusion applications.
- High density capacity, which allows for connectivity to thousands of IoT devices, even in urban areas.⁶⁸

Benefits for public safety include:

- **Access to information** – According to IDC, 5G capabilities will help improve the ability of first responders to access critical information. From streaming information collected from smart city sensors to immediate access to patient data while patients are being rushed to the ER, first responders will have access to more information before they arrive on the scene and during their response.
- **Autonomous vehicles, beyond-line-of-site drones, and robots** – 5G will enable better command and control of beyond-line-of-site drones and other unmanned vehicles, allowing public safety professionals to respond faster and gain more situational awareness during emergencies.
- **Real-time video** – 5G's ability to transmit massive amounts of data in real time will help enable new in-car and body-worn camera applications that provide immediate situational awareness to command staff, other responding officers, and other units in the field. With more eyes available to monitor a rapidly evolving situation, public safety professionals will be able to provide more informed support and make better decisions during an emergency.
- **Augmented and virtual reality** – 5G-enabled applications like these will allow public safety agencies to develop realistic simulations of crisis situations for training and testing purposes.⁶⁹

Moreover, as we approach the buildout of 5G capabilities, the Internet of Things is more and more on the horizon. The potential benefits to public safety from IoT are legion. They include better disaster response, law enforcement, health uses, severe weather alerts, and EMS.⁷⁰

⁶⁷ RIFO, *supra* note 2, at p.221 (Statement of Chairman Pai).

⁶⁸ Mike Burrige, *The Facts About 5G for Public Safety*, IoT Blog (Aug. 8, 2019), <https://www.sierrawireless.com/iot-blog/iot-blog/2019/08/5g-public-safety/>.

⁶⁹ *Id.*

⁷⁰ See, e.g., NPSTC, PUBLIC SAFETY INTERNET OF THINGS USE CASE REPORT AND ASSESSMENT ATTRIBUTES (Jun. 2019), available at http://www.npstc.org/download.jsp?tableId=37&column=217&id=4195&file=NPSTC_PSIoT_Use_Cases_Report_190616.pdf.

C. Many other safety-related benefits of Internet connectivity are built upon ISPs' networks

The RIFO incentivizes investment in high-speed, latency-free networks which are enormously beneficial during a pandemic. Comparing the US experience to the EU experience right now is informative. As the Wall Street Journal's editorial board put it:

Americans perhaps take for granted that their internet hasn't slowed during the coronavirus pandemic, unlike in Europe where speeds and streaming quality have been reduced so networks don't collapse. Credit America's larger private business investment and lighter regulation. Europe regulates broadband providers like public utilities similar to the Obama-era net neutrality rule that Mr. Pai rescinded. Americans working at home would be in a much worse position in this pandemic if the Obama rules were still in place.⁷¹

In fact, former FCC Chairman and author of the OIO, Tom Wheeler, also seems to realize the benefits of U.S. ISPs' investments in the buildout of their networks that have prevented the slowdowns experienced in Europe during this COVID-19 pandemic:

Credit is due to the nation's broadband providers. The fact we can work from home is the result of hundreds of billions of investment dollars and construction and operational skill. But the challenge is far from over.⁷²

By allowing for the safe operation of many facets of the economy and society during the unprecedented emergency response to the COVID-19 pandemic, broadband networks are fundamental to ensuring the safety and health of the country. Thus, teleworking with real-time videoconferencing and simultaneous collaboration through Google and Microsoft suites, among other things necessary for much continued economic activity,⁷³ are reliant upon fast and reliable broadband networks. The ability to keep in touch with family, friends, and the surrounding community—essential to ensuring that people refrain from close contact that could spread the virus—are similarly enabled by these networks.⁷⁴ Other network-provided benefits like access to free information⁷⁵ and the facilitation of contactless economic transactions⁷⁶ similarly facilitate social distancing.⁷⁷

⁷¹ The Editorial Board, *Faster Internet Is on the Way*, WALL ST. J. (Apr. 2, 2020), <https://www.wsj.com/articles/faster-internet-is-on-the-way-11585869911>.

⁷² Tom Wheeler, *Why the Internet Didn't Break*, BROOKINGS (Apr. 2, 2020), <https://www.brookings.edu/blog/techtank/2020/04/02/why-the-internet-didnt-break/>.

⁷³ See Dirk Auer, *What Has Big Tech Ever Done for Us? Part I*, TRUTH ON THE MARKET (Mar. 17, 2020), <https://truthonthemarket.com/2020/03/17/what-has-big-tech-ever-done-for-us-imagine-if-covid-19-had-occurred-20-years-ago/>.

⁷⁴ See, e.g., Taylor Barkley, *Can Technology Help Bridge Social Distance*, REALCLEAR POLICY (Mar. 27, 2020), <https://www.realclearpolicy.com/articles/2020/03/27/can-technology-help-bridge-social-distance-487645.html>.

⁷⁵ See Auer, *supra* note 73.

⁷⁶ Dirk Auer, *What Has Big Tech Ever Done for Us? Part Two*, TRUTH ON THE MARKET (Mar. 25, 2020), <https://truthonthemarket.com/2020/03/25/what-has-big-tech-ever-done-for-us-part-two/>.

⁷⁷ See, e.g., Jennifer Huddleston, *How Technology Policy Enables COVID-19 Responses*, AMERICAN ACTION FORUM (Mar. 25, 2020), <https://www.americanactionforum.org/insight/how-technology-policy-helps-enables-covid-19-responses/>.

Indeed, it is fair to say that the success of the primary emergency response to the pandemic is predicated on access to reliable and fast Internet.

III. Prioritization is especially important to public safety in times of crisis

As we wrote in our RIFO comments, the OIO's assumption that

consumers and competition generally are better off when content providers face no incentive to take account of congestion externalities, or when users have little incentive to take account of their own usage, runs counter to basic economic logic and is unsupported by the evidence. In fact, contrary to such claims, nonlinear and two-sided pricing—usage-based pricing, congestion pricing and sponsored content (among other nonlinear pricing models), on the one hand, and non-zero, differential content termination fees, on the other—would generally be expected to increase overall welfare and further incentivize networks to expand capacity (not create artificial scarcity). Significantly, restraints on ISP pricing freedom may deter the use and thus the construction of faster networks and result in lower consumer welfare.⁷⁸

As one of the DOJ's former chief economists, Aviv Nevo, and coauthors explained:

[U]sage-based pricing is an effective means to remove low-value traffic from the Internet, while improving overall welfare. Consumers adopt higher speeds, on average, which lowers waiting costs. Yet overall usage falls slightly. The effect on subscriber welfare depends on the alternative considered. If we hold the set of plans, and their prices, constant, then usage-based pricing is a transfer of surplus from consumers to ISPs. However, if we let the ISP set price to maximize revenues, then consumers are better off.⁷⁹

As important as incentivizing network investment is to enabling public safety uses, as described above, another extremely important aspect to the RIFO is allowing ISPs to prioritize public safety uses of their networks during a crisis. This is a clear benefit to public safety that flows from the RIFO. One of the most important aspects of the RIFO was allowing prioritization where it would have been illegal under the OIO.

Below we will canvass different examples of how prioritization is helpful not only to those who work in public safety, but also for society as a whole during a time of crisis.

A. FirstNet is prioritization in action

AT&T's public safety network FirstNet is a textbook case of prioritization. An illustration is instructive:

“We have the ability today to give [FirstNet public-safety users] preferential treatment. What we'll have by the end of the year is what we call ‘relentless pre-emption,’ such that if there's capacity for 10 calls and 10 calls are being used, and a firefighter gets on, one

⁷⁸ ICLE RIFO Comments, *supra* note 24, at 47.

⁷⁹ Aviv Nevo, et al., *Usage-Based Pricing and Demand for Residential Broadband*, 84 *ECONOMETRICA* 411 (2016), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2330426.

of the 10 people gets booted off and the firefighter gets in,” he said. “Quite frankly, I don’t think they thought about it [when crafting net neutrality guidelines]. The FirstNet process has been around since 9/11. It came out of the 9/11 events, and so that had been out there for a long time, and so I don’t even think it was even considered.”⁸⁰

The entire point of a dedicated network is that first responders have priority on it over others. In emergencies, where networks often experience congestion, this is especially important.

For instance, in Europe right now, streaming services like Netflix, YouTube, and Amazon Prime are being asked by telecom companies to switch to standard definition in order to preserve bandwidth.⁸¹ Not only is the United States benefitted by superior investment by ISPs, as described above, but the advantage of the RIFO is it that it explicitly protects prioritization by ISPs for network management purposes like this.

B. Paid prioritization signals to both edge services and network providers the importance of services during network disruption

The basic challenge of public safety and similar applications is that they need to work under circumstances that, by assumption, deviate from normal. Networks may experience unanticipated congestion during times of emergency as people turn to them to seek out information, call for help, or reach out to check on or communicate with others. Emergency responders themselves dramatically increase the load on network resources, especially in circumstances where large numbers of responders using data-intensive applications converge on a single area or even where they are responding in an already-underserved region (e.g., a remote area with limited cellular coverage). And, of course, emergency responders may be responding to circumstances that directly affect network infrastructure.

Ensuring satisfactory operation of such critical applications is best accomplished by the providers of *both* the relevant edge services and network operators working together. The assumption of the OIO—that consumers and competition generally are better off when content providers face no incentive to take account of congestion externalities—is *least* valid in this setting, where content providers out to be designing their services precisely to operate on networks experiencing congestion and other operational deficiencies that may make render other services largely unusable.

The availability of paid prioritization, or similar technologies, serves as a signal to those designing services to remind them that “best effort” networks may not provide typical-quality performance during times of emergency—and, indeed, that they make no performance guarantees even during normal operation. This signal should thus encourage edge providers to design their services with the assumption of the possibility of degraded performance. At the same time, the availability of paid prioritization, or similar technologies, offers application designers a useful tool that may *allow* them to design tools and services that offer better quality services during times of network degradation.

⁸⁰ Mike Dano, *AT&T CFO: FirstNet’s Prioritized Service for Public Safety ‘A Challenge’ to Net Neutrality*, FIERCEWIRELESS (Aug. 8, 2017), <https://www.fiercewireless.com/wireless/at-t-cfo-firstnet-s-prioritized-service-for-public-safety-a-challenge-to-net-neutrality>.

⁸¹ See Hadas Gold, *Netflix and YouTube are Slowing Down in Europe to Keep the Internet From Breaking*, CNN BUSINESS (Mar. 20, 2020), <https://www.cnn.com/2020/03/19/tech/netflix-internet-overload-eu/index.html>.

As with all price signals, the information offered by paid prioritization is bidirectional: it is also a way of telling *network operators* that certain services require greater service commitments than others. If the designers of these applications are told (by the FCC) that prioritization is unavailable, they may feel no need to, or otherwise just not think to, reach out to ISPs about the possibility of prioritization. Indeed, while ISPs may technologically and legally be able to, and desire to, prioritize public safety services, there is nothing inherent in the technology or its application that identifies it to the network as relating to public safety. The availability of prioritization as a service creates a mechanism by which the developers of applications used for public safety—or other high-priority functions—can identify themselves to network operators. Indeed, this would facilitate joint development opportunities where the network operators may be able to help optimize the design of specific applications for real-world network environments.

This raises a final consideration about the value of paid prioritization as an edge-facing service: edge-facing prioritization services provide network operators a way of making prioritization and other resource-allocation decisions without need for input from end users. This can be particularly important where end users may not have the knowledge or time necessary to engage directly with a network provider, and especially where end-users may not have service contracts suitable to their public safety needs. For instance, volunteer emergency responders may rely on personal cell phones (on consumer-focused retail service plans) during times of emergency, or cash-strapped public safety agencies may unwittingly rely on service plans with limitations (such as data caps) that will only become exigent in the midst of a crisis.⁸² And, in any event, the worst possible time for issues such as these to be discovered, and for public safety officials to attempt to address them, is in the midst of responding to an emergency. Edge-facing paid prioritization shifts the burden of these considerations from the end-user and to the edge provider, who is better situated to understand the needs of its particular services.

C. Internet users could greatly benefit from prioritization during a time of social distancing

As noted above, times of social distancing may require business models that prioritize content that is more important if networks experience congestion from greater use. This applies beyond just explicit public safety uses to other uses that ease social distancing.

One of the most important values of prioritization is its rationing effect. As we argued in our RIFO comments:

this means that, particularly where there is congestion, the socially optimal solution is for broadband providers to encourage users to prioritize, not necessarily to maximize, their data usage. Deterring or prohibiting innovative broadband business models that seek to offer content via programs like zero rating and sponsored data undermines not only optimal policymaking, but also net neutrality proponents' own stated aim to enhance "the value of [] broadband to consumers." It also means that the socially optimal

⁸² See Berin Szoka, *False Alarm: Verizon's Fire Department Customer Service Fail Has Nothing to Do with Net Neutrality*, MEDIUM (Aug. 8, 2018), <https://medium.com/@BerinSzoka/false-alarm-verizons-fire-department-customer-service-fail-has-nothing-to-do-with-net-neutrality-3b9a2d770e5b> (noting that, in the case of the high-profile case in which the Santa Clara Fire Control District's (FCD) cellular service was throttled in the midst of fighting the largest wildfire in California's history, Verizon offered service plans suitable to the FCD's needs but the FCD had elected to use a much lower-cost plan with limited data).

solution is for broadband providers to encourage content providers to prioritize their offerings, which runs counter to the very logic of the 2015 OIO’s version of net neutrality. Not all content is created equal, and policies aimed at indiscriminately maximizing content “may actually lead to inefficient entry and lower quality and diversity of content.” At the margin, by mandating free terminating access for content providers, the Order’s content-maximization strategy will tend to lead to an inefficient mix of content offerings because unmetered access “is particularly valuable to applications that make wasteful use of bandwidth.”⁸³

The particular benefits of prioritization during the COVID-19 pandemic has been noted by commentators:

The value of internet traffic varies along more dimensions than just streaming and not streaming. It is becoming apparent how different types of internet service and guarantees can benefit different types of activities.

It is important to ensure that Americans can have immediate access to critical care, public safety, education, and other high-value services by allowing them to have priority over other uses that can tolerate delay.

Consider telehealth. The federal government and many states have dropped regulations that made telehealth more difficult to practice. Some practitioners, like psychologists and others who can work from home, find themselves competing with kids and spouses for bandwidth. Many providing medical care from home would likely value the ability to connect with their patients without their connections buffering or freezing.

Distance learning, too, could benefit from such actions. Much of it does not require any prioritization—downloading assignments, writing essays, and even one-way video streaming, for example. Other parts of distance learning might benefit. Low latency for interactive lectures. An ability to put a particular student’s video in higher definition when she has a question or for one-on-one time with a teacher.

Other activities are also likely benefit from connections optimized in specific ways. Even online entertainment, including streaming and gaming, is more important for many than it had been. Depending on their preferences, some people may want faster speeds, lower latency, or improvement on other dimensions of connectivity. They may even have different preferences at different times of day.⁸⁴

Conclusion

The RIFO fosters investment in the buildout of high-speed, high-quality broadband by reducing regulatory uncertainty for ISPs. While the OIO prohibits behavior—such as paid prioritization—that would be associated with increased investment, the RIFO has no such investment stifling prohibitions. In addition to encouraging investment, the reduced regulatory risk allows for—and provides incentives for—experimentation with paid prioritization in ways that could benefit public safety. In particular, edge-facing prioritization services can provide network operators a way of

⁸³ ICLE RIFO Comments, *supra* note 24, at 45 (citations omitted).

⁸⁴ Scott Wallsten, *A New Normal for Broadband Prioritization*, TECH. POL’Y INST. (Mar. 23, 2020), <https://techpolicyinstitute.org/2020/03/23/a-new-normal-for-broadband-prioritization/>.

making prioritization and other resource-allocation decisions without need for input from end users. In these ways, as well as others discussed in this comment, it is reasonable to conclude that the RIFO promotes public safety both directly and indirectly.