

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Inquiry Concerning Deployment of Advanced)	GN Docket No. 17-199
Telecommunications Capability to All)	
Americans in a Reasonable and Timely)	
Fashion)	

COMMENTS OF INCOMPAS

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INCOMPAS hereby submits these comments in response to the Federal Communications Commission’s (“Commission” or “FCC”) Notice of Inquiry¹ soliciting comment and information to help guide the Commission’s analysis on whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.

I. INTRODUCTION AND SUMMARY

INCOMPAS is the preeminent national industry association for providers of Internet and competitive communications networks, including both wireline and wireless providers in the broadband marketplace. We represent companies that provide residential broadband Internet access service (“BIAS”), as well as other mass-market services, such as video programming distribution and voice services in urban, suburban, and rural areas. We also represent companies that are providing business broadband services to schools, libraries, hospitals and clinics, and businesses of all sizes; transit and backbone providers that carry broadband and Internet traffic,

¹ *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely*, Notice of Inquiry, FCC 17-109 (rel. Aug. 8, 2017) (“*Section 706 NOI*”).

and online video distributors (“OVDs”) which offer video programming over BIAS to consumers. Each of these members are providing and/or relying upon broadband capability, and the Commission’s role in encouraging broadband deployment and protecting and promoting broadband competition is key to ensuring that residential and business customers will have choice for their broadband provider, as well as the services and applications they may choose to take over those broadband connections.

The Commission is mandated to annually measure the availability of advanced telecommunications services—which the Commission has long referred to as broadband.² When it is not being reasonably and timely made available, then the FCC has a mandate to take immediate action to accelerate deployment by removing barriers to investment and promoting competition.³ In addition to Section 706, in the 1996 Act, Congress also required the Commission to promote competition and consumer choice, and to protect consumers in the provision of communications services.⁴ Significant investment in the networks have been made by incumbents and competitors alike in the two decades since the 1996 Act, and the services offered to consumers and businesses over those networks have been dramatically altered in that timeframe. Many, but not all Americans, use broadband at home via fixed networks and on the go via mobile networks. Today the American economy is more broadband dependent than ever before. The expectation is that the demand for broadband will continue to increase over time,

² 47 USC § 1302(b).

³ *Id.*

⁴ *See* 47 USC § 151.

especially as more consumers and businesses use connected devices and cloud services to conduct their business, entertain themselves, and manage their day-to-day lives.

Despite these significant advances in the broadband networks and the services and applications provided over them, there is still a significant digital divide. Fixed and mobile broadband networks do not reach every American, and competition is still considerably lacking for fixed (wireline) broadband networks for residential consumers, as well as businesses who rely on dedicated broadband service. Moreover, there are still many Americans who cannot afford broadband service and, therefore, do not subscribe to broadband.

The Commission has numerous ongoing proceedings that directly relate to lowering the barriers to broadband deployment. INCOMPAS has been steadfast in its efforts to participate in those proceedings in order to represent its members who are working each day to deliver competitive broadband networks to consumers and the competitive services and applications that run over those networks (which help drive consumer demand for faster and more robust networks). Below, we discuss the following:

- Broadband networks and services must be actually physically available and affordable for purposes of Section 706.
- The availability of both fixed and mobile broadband networks to all Americans is critical for enabling access to advanced telecommunications services. The Commission should not reverse course on its previous finding that benchmarks for each should be met.
- The Commission's metrics for determining if fixed broadband is sufficient should take into account competitive offerings, current advertising by broadband providers, and future network needs. Gigabit service is here and will support future uses. It is time for the FCC to update the speed for fixed broadband to 1 Gig.
- The Commission's Section 706(b) authority is important for addressing the nation's network needs and completing the FCC's ongoing rulemakings:

- To lower the barriers to deployment in its wired, wireless, and access to MTEs proceeding; and
- To promote the availability of wholesale input services, an open internet, and competitive OVD services.

II. BROADBAND NETWORKS AND SERVICES MUST BE ACTUALLY PHYSICALLY AVAILABLE AND AFFORDABLE FOR PURPOSES OF SECTION 706.

Without affordable access to robust high-speed broadband connections, Americans cannot avail themselves of the important benefits of the advanced telecommunications services over those networks, including access to jobs, healthcare, education, and information that are required for many facets of everyday life. INCOMPAS urges the Commission to approach its Section 706 Inquiry so that *all* Americans benefit from broadband networks and the services that are provided over those networks—as intended by Congress.

Section 706 requires that the Commission annually determine “whether advanced telecommunications capability is being deployed to all Americans and in a reasonable and timely fashion.”⁵ To that end, INCOMPAS posits that broadband connections and services must be actually physically available to consumers and affordable so that they can subscribe to broadband service. It is important that the Commission measure the availability of the broadband networks and the subscribership of broadband service over those networks. In doing so, INCOMPAS believes that the Commission should consider service to residential customers, small and mid-sized businesses, businesses with multiple locations, community anchor institutions such as schools, libraries, and hospitals, and the availability of both fixed and mobile networks.

⁵ 47 U.S.C. § 1302(b).

III. THE AVAILABILITY OF FIXED AND MOBILE BROADBAND NETWORKS TO ALL AMERICANS IS CRITICAL FOR ENABLING ACCESS TO ADVANCED TELECOMMUNICATIONS SERVICES.

The definition of “advanced capability” must reflect technological progress and ever evolving consumer demands. As the Commission has found previously, and it is still true today, there are “inherent differences in key capabilities provided by the two [fixed and mobile] services”⁶ and “both services provide necessary components of advanced telecommunications capability.”⁷ Access to both fixed and mobile broadband are necessary to meet the needs of consumers; and therefore, the Commission should not reverse course on its previous finding that benchmarks for each should be met.

American consumers have adopted both fixed and mobile broadband; and as we discuss further below, the Commission’s high cost USF supports both fixed and mobile broadband networks—recognizing that consumers need access to both to be fully connected. Such connection is important for economic growth and opportunity. From the realtor who uses mobile access as she is showing homes to clients to the pharmaceutical sales rep who uses her company’s mobile app as she is making her sales rounds to the millions of households who connect their mobile devices to their fixed service over Wi-Fi—almost every industry has been affected by both fixed and mobile broadband and the many services that are now offered over

⁶ *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, 2016 Broadband Progress Report GN Docket No. 15-191, ¶ 2 (2016) (“2016 Broadband Progress Report”).

⁷ *Id.* ¶ 12.

those networks. The expectation is that transformation of industries will continue as more devices are connected and communicate over broadband networks.

As the Commission acknowledges in its NOI, 80 percent of American mobile subscribers used smartphones in 2016, and that number is likely to continue to rise.⁸ The Commission has found that consumers expect to have mobile broadband, and that is further evidenced by mobile broadband providers' plans to expand their mobile networks, including upgrading to 5G and fixed broadband providers' investment in Wi-Fi capabilities. Nonetheless, as Dr. David S. Evans demonstrates in the attached paper, mobile broadband, satellite and DSL access are not substitutes for fixed high-speed broadband access.⁹ First, he discusses how mobile broadband access has some important limiting factors. For example, mobile broadband plans are subject to usage limitations, even where mobile providers offer "unlimited" plans.¹⁰ Specifically, users of some unlimited data plans may have their traffic de-prioritized after using 22-23GB of data in a month. Some users will find that only 10GB can be used on a "tethered" connection—i.e., shared with another device. Assuming no other data usage, a mobile broadband subscriber can use 10GB by streaming about 3 hours of HD video a month. Contrast these usage limitations to the

⁸ See Section 706 NOI at ¶ 6.

⁹ David S. Evans, *Economic Findings Concerning the State of Competition for Wired Broadband Provision to U.S. Households and Edge Providers* (Aug. 29, 2017), attached as Exhibit A ("Evans White Paper"), available at <http://www.competitioninstitute.org/Portals/0/Evans%20White%20Paper%20on%20Economics%20of%20Wired%20Broadband%2029Aug2017%20Final%20for%20Publication%20%28002%29.pdf>.

¹⁰ *Id.* at 15.

Commission’s determinations that the average household uses 57GB a month with their fixed broadband service.¹¹

Second, Dr. Evans discusses how wireless connections are less reliable than wireline and that there are not comparable offerings by the mobile companies for broadband connectivity devices for home use. Dr. Evans finds that “[m]ost households that have a [fixed broadband provider subscription] . . . have one or more household members that have a [] mobile subscription with a broadband data plan.”¹² As such, he concludes that consumers do not view mobile broadband as a substitute. If it were so, subscribers would choose (and pay for) fixed or mobile, not both.

The USF has long supported mobile service,¹³ and numerous Congressional members have highlighted the importance of their constituents having access to both high-speed fixed and mobile networks¹⁴—further supporting a finding the Commission should hold steady in its

¹¹ *Id.* at 15-16 n.30.

¹² *Id.* at 16.

¹³ *See, e.g., USF/ICC Transformation Order*, 26 FCC Rcd 17663, ¶¶ 1 & 3 (2011) (“Today the Commission comprehensively reforms and modernizes the universal service and intercarrier compensation systems to ensure that robust, affordable voice and broadband service, both fixed and mobile, are available to Americans throughout the nation.” “Fixed and mobile broadband have become crucial to our nation’s economic growth, global competitiveness, and civic life.”) Earlier this year the Commission affirmed its commitment to preserve and advance mobile broadband through Mobility Fund II. *See Connect America Fund Universal Service Reform – Mobility Fund*, Report and Order and Further Notice of Proposed Rulemaking, FCC 17-11, ¶ 12 (2017).

¹⁴ *See, e.g.,* Senators to FCC: Close the Rural Broadband Gap; Wicker, Manchin Lead Bipartisan Call to Expand Mobile Network in Rural America (July 11, 2016), *available at* <https://www.wicker.senate.gov/public/index.cfm/press-releases?ID=31B66AB0-57A7-4937-90BE-A5A31B6CF516> (“Delivering high-speed mobile wireless service in underserved areas is

determination that access to *both* fixed and mobile networks should be met for purposes of Section 706. Similarly, Craig Moffett, an industry analyst stated this year after mobile providers announced their unlimited plans that:

We conclude that the risk (to wired broadband providers) of wireless substitution from the wireless industry’s new unlimited LTE data plans is lower than intuition might suggest. The compromises one would have to make in order to go ‘wireless only’ simply aren’t economically compelling. It’s not hard to understand why. Cellular broadband typically offers lower speeds and weaker reliability than its wireline counterparts.¹⁵

Even future wireless technologies cannot be viewed as substitutes yet—indeed, one NTCA study reveals, “wireless technologies should [continue to] be viewed as a complement . . . rather than a viable widespread substitute for [fixed] broadband networks”¹⁶ because of the increased demands for broadband capabilities.

The prevalence of mobile devices does not support arguments that fixed and wireless broadband are close substitutes. As Dr. Evans states, “about 42 percent of smartphone traffic and 90 percent of tablet traffic use Wi-Fi instead.”¹⁷ And Wi-Fi depends heavily on fixed

critical to growing the economy, creating jobs, delivering quality health care, and helping farmers deploy precision agriculture technology in the field.”)

¹⁵ Comcast, other cable ISPs face limited near-term cord-cutting risk from wireless LTE, analyst says, *available at* <http://www.fiercecable.com/cable/comcast-other-cable-isps-face-limited-near-term-cord-cutting-risk-from-wireless-lte-analyst>; Unlimited Wireless No Threat to Fixed ISPs (Yet), Analyst Says, *available at* <http://www.dslreports.com/shownews/Unlimited-Wireless-No-Threat-to-Fixed-ISPs-Yet-Analyst-Says-139362>.

¹⁶ Larry Thompson & Warren VandeStadt, *Evaluating 5G Wireless Technology as a Complement or Substitute for Wireline Broadband*, Vantage Point, at 5 (Feb. 2017), *available at* https://www.ntca.org/images/stories/Documents/Press_Center/2017_Releases/02.13.17%20fcc%20ex%20parte-ntca%20letter%20submitting%202017%20technical%20paper%20wc%2010-90.pdf.

¹⁷ Evans White Paper at 16 (citing data from The Economist).

broadband access; and of course, access to robust mobile networks are heavily reliant on robust wired networks for backhaul.

Finally, satellite and DSL cannot be considered substitutes for high-speed fixed service. Satellite Internet access has usage limitations, high costs, and low speed and suffers from latency issues.¹⁸ DSL similarly suffers from low speeds and is not a substitute for fixed broadband access.¹⁹

IV. THE COMMISSION'S SECTION 706 ANALYSIS SHOULD CONSIDER ADVANCED BROADBAND DEPLOYMENT TO ANCHOR INSTITUTIONS AND MAIN STREET AMERICA.

As part of its inquiry, INCOMPAS urges the Commission to examine whether advanced telecommunications capabilities are being deployed to the nation's anchor institutions, including schools, libraries, and hospitals, small and mid-sized businesses, as well as businesses with multiple locations. Given the importance of these entities to each community, it would otherwise be difficult to suggest that the Section 706 standard had been met absent a showing that these entities have advanced telecommunications capabilities.

With respect to the Commission's statutory obligation to evaluate the deployment of high-speed broadband in America's elementary and secondary schools and classrooms, the agency should continue to set sufficient standards so that public schools can best serve the nation's children. At a minimum, the Commission should continue to use its short-term and long-term goals of 100 Mbps per 1,000 students and staff and 1 Gbps per 1,000 students and staff, respectively in determining whether Section 706 has been met.

¹⁸ *Id.* at 12-13.

¹⁹ *Id.* at 13-14.

Students and teachers are increasingly (and sometimes exclusively) relying on digital resources in their educational curricula, and the public interest will be served by ensuring that schools and classrooms have access to sufficient broadband capacity to meet this digital demand. Similarly, the Commission should examine the deployment of advanced telecommunications capabilities in the nation's libraries to ensure that constituents who can only gain access to broadband from their local public library are able to take advantage of this technology to improve their lives and economic opportunities. Citizens across the nation, including low-income consumers, routinely rely on computer and broadband resources available at public libraries to access the Internet because they cannot afford broadband access—even where it is offered. It is critical that the Commission's policies keep pace with the capacity demands at these anchor institutions and that the agency continues to support universal service programs like E-Rate so that schools and libraries have affordable access to next generation broadband. Additionally, it should be noted that participation in the E-Rate program has been critical to broadband deployment as several INCOMPAS members have leveraged the chance to serve anchor institutions into greater opportunities to serve residential and commercial interests throughout the community.

The Commission should also evaluate the degree with which the country's hospitals and clinics are adopting broadband-enabled solutions such as mHealth and health information technology. As America's population ages and the country faces the kind of health care shortage identified in the Commission's *Public Notice* this spring on advancing broadband-enabled

healthcare,²⁰ ensuring that hospitals and clinics have advanced broadband capabilities will be critical to meeting the health-related needs of the nation. Similarly, those in rural America will be better served by connected hospitals and clinics. As INCOMPAS member Telequality Communications has indicated, “[t]he challenges faced by rural healthcare providers are significant and numerous.”²¹ Telequality’s assessment that one hurdle for rural healthcare providers is that “broadband access throughout rural America is missing”²² is an important indicator that advanced telecommunications capabilities still need to be deployed before the Commission can find that its obligation under Section 706 has been met.

Finally, INCOMPAS urges the Commission to take all necessary steps to bring high-speed broadband connectivity to main street America and the small and mid-sized businesses, as well as businesses with multi-location customers, which make up a majority of the economic activity in the country. Small businesses fuel the American economy, and it’s important that the Commission ensure that the needs of America’s businesses are being met. Among many other parties, the Small Business Administration, Office of Advocacy, raised significant concerns regarding the actions of the Commission with regards to business data services—a broadband connection that is critical for many of the country’s small businesses and businesses with

²⁰ *FCC Seeks Comment and Data on Actions to Accelerate Adoption and Accessibility of Broadband-Enabled Health Care Solutions and Advanced Technologies*, Public Notice, GN Docket No. 16-46, at 4 (Apr. 24, 2017).

²¹ Comments of Telequality Communications, Inc., GN Docket No. 16-46, at 1 (May 24, 2017).

²² *Id.* at 2.

multiple locations.²³ Namely, that the Commission’s actions in the BDS proceeding could result in diminished quality of service,²⁴ higher prices,²⁵ and insufficient competitive build.²⁶ As SBA, Office of Advocacy stated, “it is imperative that small businesses be able to keep the same

²³ Letter of Major L. Clark III and Jamie Belcore Saloom, U.S. Small Business Administration, Office of Advocacy, WC Docket Nos. 16-143, 15-247, 05-25, RM-10593, at 3 (April 13, 2017) (“SBA Letter”).

²⁴ As the FCC has noted, cable “best efforts” service is not the same product as BDS, and cable companies do not represent a significant segment of the BDS market at this time. *Business Data Services in an Internet Protocol Environment; Technology Transitions; Special Access for Price Cap Local Exchange Carriers; AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, WC Docket No. 16-143, GN Docket No. 13-5, WC Docket No. 05-25, RM-10593, Report and Order, 32 FCC Rcd 3459, ¶¶ 21 & 31 (2017). *See also* Letter of Major L. Clark III and Jamie Belcore Saloom, SBA Letter, at 3. Comcast explains that its “[e]thernet services provided over its HFC network are *not* competitive substitutes for the vast majority of BDS customers; even where HFC facilities are present, demand for HFC-based services has been limited.” Comments of Comcast Corporation, WC Docket Nos. 16-143, 15-247, 05-25, RM-10593, at 20 (June 28, 2016) (“Comcast June BDS Comments”).

²⁵ The grant of pricing flexibility to ILECs in the past has resulted in rate increases by the ILECs of as much as 64 percent and, on average, 25 percent. *See* Letter of Paul Margie, Counsel to Sprint Corporation, to Marlene H. Dortch, WC Docket Nos. 16-143, 15-247, 05-25, RM-10593, at 22 (Mar. 22, 2017). These services are already “high margin” services. *See* CenturyLink, *FQ1 2016 Earnings Call Transcripts*, at 11 (May 4, 2016), available at <http://ir.centurylink.com/Cache/1500085040.PDF?Y=&O=PDF&D=&fid=1500085040&T=&iid=4057179>. (CenturyLink’s Chief Financial Officer, Stewart Ewing describing BDS as “the wholesale revenue basically, and its [sic] high margin”).

²⁶ SBA Letter at 2 (“The record contains affidavits from competitive local exchange carrier (CLEC) executives stating that building last mile facilities to compete with ILECs for DSIs and DS3s is not economically feasible. Simply put, demand for DSIs and DS3s may not support facilities based competition, but those services remain important to small business customers.”). *See also* Comcast June BDS Comments at 20 (“Despite substantial infrastructure investments by Comcast and other cable providers, and growth in cable BDS revenues of approximately 20 percent annually, cable providers remain new entrants with limited market share and geographic reach for their BDS services. As the Commission has recognized, by the end of 2016, cable providers are still expected to generate less than eight percent of total BDS revenues.”).

level of service at the same or lower prices.”²⁷ The same is true for larger businesses with multi-locations. Whether in urban, suburban, or rural areas, U.S. businesses need to connect to broadband which provides access to the global market. As such, INCOMPAS believes it is important for the Commission to collect and assess information about these connections and subscriptions.

As indicated above, the Commission’s universal service programs help support high-speed broadband networks in rural and underserved communities. Once a service provider deploys facilities to anchor institutions, they will often take the opportunity to connect residential and commercial customers to their facilities. Connecting a small or mid-sized business to high-speed broadband can be vital to their long-term success and can have the effect of creating new jobs where opportunities might have otherwise been scarce. As the Commission examines this benefit of next generation networks deployment, it should also appropriately assess whether or not the federal government is providing appropriate funding levels and resources to keep American businesses competitive globally.

²⁷ BDS is already a major portion of the operating expenses of these entities, and they cannot afford an increase in the already inflated rates they are being charged by the incumbent local exchange carriers—nor can the economy bear this, as increases in operating expenses can harm these entities’ ability to grow their businesses, serve their customers, and hire more employees. *See* Letter of Karen Reidy, INCOMPAS, to Marlene Dortch, WC Docket Nos. 05-25, 16-247, 16-143, RM-10593, at 1, n. 1 (March 29, 2017). Indeed, AT&T already eliminated some discount plans—resulting in increased prices. *See* Petition of Windstream Services, LLC to Reject or Suspend and Investigate AT&T Tariff Filings, Transmittal Nos. 1861, 1862, 131, 302, 554, and 3445 (Sept. 5, 2017) and Letter from Karen Reidy, Vice President, Regulatory Affairs, INCOMPAS, to Marlene H. Dortch, Secretary, FCC, Transmittal Nos. 1861 and 1862, 131, 302, 554, and 3445 (Sept. 12, 2017).

V. THE COMMISSION’S METRICS FOR DETERMINING IF FIXED BROADBAND IS SUFFICIENT SHOULD TAKE INTO ACCOUNT COMPETITIVE OFFERINGS, CURRENT ADVERTISING, AND FUTURE NEEDS—1 GIG IS HERE AND WILL SUPPORT FUTURE USES.

As INCOMPAS has previously noted, the residential BIAS marketplace is highly concentrated, and competition is woefully inadequate.²⁸ However, where new entrants like our members Sonic, Rocket Fiber, and Google Fiber enter the BIAS market with fiber to the home, there are significant consumer benefits that flow. Indeed, Dr. Evans observes that, “[i]n the rare instances in which [competitive] high-speed broadband has taken place, incumbents have responded with lower prices and improved service.”²⁹ For example, where competitive fiber providers challenge incumbent telco and cable companies, they offer 1 Gig speeds (upload and download) for about \$70 a month. Incumbents have responded by upgrading their infrastructure, delivering higher speeds, and lowering their prices for BIAS. For example, in Kansas City, AT&T responded by matching Google Fiber’s gigabit speed and pricing, and Time Warner Cable tripled its broadband speeds without increasing prices.³⁰ In Austin and in Raleigh-Durham, Time Warner Cable increased its broadband speeds by up to three times and six times

²⁸ See Reply Comments of INCOMPAS, WC Docket No. 17-108, at 24 (Aug. 30, 2017) (citing Evans White Paper). See also Reply Comments of INCOMPAS, WT Docket No. 16-138, *et al.*, at 8-9 (Jan. 3, 2016).

²⁹ Importantly, Dr. Evans also notes that this “demonstrates that the incumbent providers had significant market power before entry occurred. It also shows the extent to which barriers to entry, many of which arise from political rent seeking, protect their market power.” Evans White Paper at 35.

³⁰ Jacob Davidson, *Google Fiber Has Internet Providers Scrambling to Improve Their Service*, TIME (Apr. 13, 2015), available at <http://time.com/money/3820109/google-fiber-has-internet-providers-scrambling-to-improve-their-service/>.

respectively without increasing its prices.³¹ AT&T announced and began building fiber to the home in Austin. More generally, AT&T offers its gigabit service at \$70 in regions where Google Fiber is present, matching its pricing, versus \$110 elsewhere.³²

Dr. Evans explains that the benefits of competition are further confirmed by an econometric analysis undertaken by the FCC in reviewing the Charter-Time Warner Cable merger based on data submitted by the parties to that transaction. There, the FCC found that there were significant competitive responses by BIAS incumbents when faced with competition from high speed alternatives:

Evidence in the record confirms that fiber, FTTP, and FTTN are reasonable substitutes for cable BIAS, while other technologies are not. The evidence shows that the Applicants alter their pricing and product offerings materially in response to FTTP and FTTN offerings from companies like Google (Google Fiber), Verizon (FiOS), and AT&T (U-Verse) but not in response to other technologies. As described in the attached Economic Appendix, the Applicants' predicted pricing behavior is most affected when the companies are in competition with providers that are able to match or exceed the download speeds of the Applicants' BIAS product offerings.³³

³¹ Jon Brodtkin, *Google Fiber Plans Expansion, Then TWC Makes Speeds Six Times Faster*, ARS TECHNICA (Apr. 13, 2015), available at <https://arstechnica.com/information-technology/2015/04/google-fiber-plans-expansion-then-twc-makes-speeds-six-times-faster/>; Time Warner Cable, *Time Warner Cable Begins Major Internet Speed Increases in Austin and Surrounding Communities* (May 21, 2014), available at <https://www.timewarnercable.com/en/about-us/press/twc-begins-major-internet-speed-increase.html>; Time Warner Cable, *Time Warner Cable Takes Next Step to Transform TV and Internet Experience in the Charlotte Area* (Apr. 8, 2015), available at <https://www.timewarnercable.com/content/twc/en/about-us/press/twc-to-transform-tv-internet-in-charlotte-area.html>.

³² Brodtkin, *supra* note 31.

³³ FCC Charter-TWC Merger Order, at ¶ 57.

When there are more than two fixed providers in the market, speeds dramatically increase, and consumers respond, demonstrating demand for higher speeds than the current 25/3 Mbps fixed broadband definition. It is evident that the Commission's current definition is out of date in these markets, but it is also telling that several large incumbent BIAS providers are promoting speeds higher than 25/3 Mbps generally. For example, Charter is offering consumers "fast internet speeds starting at 60 Mbps."³⁴ AT&T advertises "with speeds up to 50 Mbps, you can stream video, download music and photos, and stay connected to everything you love."³⁵ And Verizon FIOS is offering its 50 Mbps and Gigabit plans for its Internet only service,³⁶ and for its bundled products, it is promoting its Gigabit plans.³⁷ Of course, this is not surprising given that many households now have multiple family members using multiple mobile devices via Wi-Fi.

Moreover, as more devices are connected to networks, robust broadband networks will be in high demand, and as more services are delivered via broadband, robust networks will be essential for the nation. There is a significant reliance by most businesses and consumers on broadband networks already, and the expectation is that such demand will accelerate. More

³⁴ See GET CHARTER SPECTRUM INTERNET™, available at <http://charterbundledeals.com/INTERNET>.

³⁵ See AT&T INTERNET YOU DESERVE 99% RELIABILITY, available at <https://www.att.com/internet/>.

³⁶ See Shop FIOS Plans, Internet Only, available at <http://fios.verizon.com/fios-plans.html>.

³⁷ See Shop FIOS Plans, Bundles, available at <http://fios.verizon.com/fios-plans.html>.

consumers and businesses are using cloud services,³⁸ over the top video (OVD) services,³⁹ and interconnected devices⁴⁰ than ever before. It is important that the Commission's definition of broadband should take into account these changes which we already are experiencing, as well as what is being forecasted. In addition, the U.S. needs to remain competitive internationally. The Akamai State of the Internet Report indicates that the U.S. is currently 10th globally in the average connection speed.⁴¹ It is important that our nation set goals to promote the networks the U.S. will need to compete in the future. As such, INCOMPAS supports the Commission

³⁸ See Barb Darrow, *Cloud Adoption Is Growing But Forecasts Differ on How Much*, FORTUNE (Feb. 22, 2017), available at <http://fortune.com/2017/02/22/cloud-growth-forecast-gartner/> (reporting that overall demand for cloud computing will grow 18% this year); Louis Columbus, *2017 State of Cloud Adoption And Security*, FORBES (Apr. 23, 2017, 12:00 PM), available at <https://www.forbes.com/sites/louiscolumbus/2017/04/23/2017-state-of-cloud-adoption-and-security/#bd19fd18483b> (quoting a report published by McAfee that hybrid cloud adoption grew threefold in the last year).

³⁹ One report notes that OVD subscriptions in the U.S. are up to 49% of U.S. households in 2016—up from 10 percent in 2009. Cord-cutting isn't happening — this report explains why, CNBC, March 22, 2017, available at <https://www.cnbc.com/2017/03/21/cord-cutting-not-happening-deloitte-survey-shows.html>. See also Sarah Perez, *Over-The-Top Streaming Video Services To Surge To 330 Million+ Subscribers By 2019*, TECHCRUNCH (May 18, 2015), available at <https://techcrunch.com/2015/05/18/over-the-top-streaming-video-services-to-surge-to-330-million-subscribers-by-2019/>; *Over-the-Top Video will Overtake TV within Five Years*, LEVEL 3 COMMUNICATIONS, available at <https://www.multivu.com/players/English/8085051-level-3-ott-video-services-study/> (citing a study conducted by Level 3, Streaming Media, and Unisphere showing that total over-the-top viewership hours will surpass traditional broadband TV within the next five years).

⁴⁰ Press Release, *Gartner Says 8.4 Billion Connected "Things" Will Be in Use in 2017, Up 31 Percent From 2016*, GARTNER (Feb. 7, 2017), available at <http://www.gartner.com/newsroom/id/3598917>.

⁴¹ Akamai Technologies, AKAMAI'S STATE OF THE INTERNET Q1 2017 REPORT, 12 (Vol. 10, No. 1 2017).

revisiting the current 25/3 Mbps definition for fixed broadband and revising it to reflect where the market is when there's a third competitor in the market—to 1 Gig.

Relatedly, as part of its assessment, INCOMPAS believes that the Commission should measure and include in its 706 Report whether businesses and consumers have facilities-based competitive options for their broadband services. For residential consumers, the Commission should measure and report the number of facilities-based fixed BIAS and mobile BIAS providers that offer sufficient high-speed capacity. In its 2016 Report, for example, the Commission provided an estimated percentage of Americans with multiple fixed options. The Commission should expand this reporting to include fixed and mobile (separately), and the percentage of Americans with one, two, three and up to four or more BIAS options at the minimum broadband speed. In addition, as GAO recommended this week in its Broadband Competition Report, the Commission should assess its actions to promote broadband competition and how varying levels of competitive broadband deployment (or the lack thereof) affect prices and service quality.⁴²

Moreover, as previously discussed, many businesses require dedicated broadband service. The Commission should collect data and report on the extent those offerings are available on a competitive basis. As suggested by GAO, the Commission should also assess the impact of competition (or lack thereof) on pricing and service quality.⁴³

⁴² Broadband: Additional Stakeholder Input Could Inform FCC Actions to Promote Competition, GAO-17-742, at 26 (Sept. 2017) *available at* <https://www.gao.gov/assets/690/687244.pdf>.

⁴³ See Table 6 of the 2016 Broadband Progress Report.

VI. THE COMMISSION’S SECTION 706(B) AUTHORITY IS IMPORTANT FOR ADDRESSING THE NATION’S NETWORK NEEDS.

There is significant lack of access to competitive fixed broadband, and Section 706(b) is an important statutory tool for the Commission to use in addressing the significant deployment barriers that remain. Indeed, INCOMPAS believes that this tool is important for the Commission’s role (and current proceedings) in enabling competitive deployment, in addition to addressing universal access, and it should not leave it on the table.

In fact, INCOMPAS has offered a number of solutions in the Commission’s ongoing deployment proceedings for Commission adoption as our members face significant barriers to deploy both competitive fixed and mobile broadband networks. It is critical that those solutions are adopted and successful *before* the FCC finds that the 706 standard has been met.

a. Lowering the Barriers to Competitive Broadband Deployment for Both Fixed and Mobile Networks Generally.

For one, network builders’ ability to timely add equipment on reasonable terms and conditions to a utility pole, duct, conduit, or right-of-way, i.e., pole attachments, is a critical factor in their deployment of new networks. The make-ready process is a frequent source of delay in the deployment of new pole attachments and, accordingly, a delay in the deployment of new and competitive networks. The Commission’s 2011 four-stage timeline for access to space on utility pole is insufficient in meeting the objective of providing speedy deployment because (1) the lack of an adequate enforcement mechanism leads to frequent noncompliance with the intervals,⁴⁴ and (2) even if there were enforcement, each attacher generally waits for another to

⁴⁴ See Comments of the Fiber Broadband Association, WC Docket No. 17-84, at 4 (June 15, 2017) (“In too many instances, pole owners simply ignore the Commission’s mandated timelines. In effect, the pole owner ‘dares’ the entity seeking to attach to bring an enforcement action, knowing that it is costly to pursue a complaint and virtually impossible to have it resolved

begin and complete their work to move attachments to make room for new attachers, resulting in a multitude of make-ready time intervals being stacked on top of each other, multiple trips to the pole and unpredictable costs for new attachers.⁴⁵ Successful reform of this process, amongst other things, is needed for the Commission to find advanced services are being deployed in a timely manner. As INCOMPAS and many others advocated in the Commission’s wireline infrastructure proceeding, the Commission should adopt rules that provide new attachers the option to invoke a one-touch make-ready (“OTMR”) process for pole attachments.

Secondly, deployment of new wireless infrastructure is not keeping up with the enormous and accelerating demands for broadband services on existing mobile wireless networks due to the explosion of the Internet of Things, mobile streaming, smart communities, smart farming, connected cars and other new data intensive capabilities. As CCA has stated, “the industry is feeling the negative impact of various local siting policies on next generation deployment. The consequences of these roadblocks, delayed or denied connectivity opportunities, are quickly realized, to the detriment of consumers and competition.”⁴⁶ Given the critical need for the deployment across the country of a vast number of small cells, in particular, to meeting wireless telecommunication services’ needs, the Commission must take action to address the regulatory

in a timely fashion.”); *see also* Letter of Chip Pickering, CEO of INCOMPAS, to Chairman Pai, FCC, WC Docket Nos. 16-132, 05-25, 16-143, WT Docket No. 16-138, PS Docket No. 16-128, IB 16-131, RM-10593, at 2-3 (Feb. 9, 2017).

⁴⁵ *See* Letter of Kristine Laudadio Devine, Counsel to Google Fiber, Inc., to Marlene H. Dortch, FCC, WC Docket No. 17-84, at 3 (July 3, 2017).

⁴⁶ Comments of the Competitive Carriers Association, WT Docket No. 17-79, at 3-4 (June 15, 2017).

barriers carriers are facing prior to making a positive finding as to the availability of these services and timeliness of deployment. The needed actions include the following: (1) exempt small cell deployment from Section 106 Review; (2) clarify fee related aspects of the historic review process; (3) strengthen shot clocks applicable to wireless siting applications, and (4) limit ROW use charges and siting application fees, consistent with Sections 253 and 332.

b. Lowering the Barriers to Competitive Broadband Deployment in MTEs.

While INCOMPAS remains concerned about high market concentration in the market for residential broadband access in all categories of residential and commercial properties,⁴⁷ this market trend is exacerbated in MTEs such as apartment buildings, condominiums, and commercial venues where residents have little control over which providers are permitted access to deploy services. Service providers are selected by and enter into commercial arrangements with the owner of the building meaning that residents and tenants in these properties typically have fewer options for broadband service that tend to be slower and more expensive. New offerings, such as competitive fiber and wireless last mile services, are simply unavailable to many MTE residents.

To address this issue, INCOMPAS has encouraged the Commission to examine the commercial agreements between incumbent service providers and property owners. These agreements can stifle competition and reduce landlords' incentives to allow competitive options,

⁴⁷ See Reply Comments of INCOMPAS, WT Docket No. 16-138, et al., at 8-9 (Jan. 3, 2017) (citing estimates from the FCC's *2016 Broadband Progress Report* that 10 percent of Americans have no choice of providers for fixed advanced telecommunications capability, 51 percent of Americans have only one option, and only 38 percent of Americans have a choice of more than one provider).

even where demand for an alternate service is high.⁴⁸ For instance, graduated revenue sharing agreements establish a formula setting out a variable percentage of the revenue earned by the provider based on both penetration rates and revenue per unit which is paid back to property owner on a quarterly or monthly basis.⁴⁹ These agreements are rarely tied to the actual costs for the provider's use of the property and when competitive broadband providers are unwilling or unable to participate they are denied access to a property. Similarly, exclusive wiring arrangements, which allow communications providers to obtain the exclusive right to access and use wiring in a building when such wiring is not being used, amount to an end run around the Commission's existing cable inside wiring rules that were adopted to promote competition and

⁴⁸ A number of state and local governments have taken notice of how these commercial arrangements distort the competitive landscape in MTEs and have adopted mandatory access laws that direct property owners to permit reasonable access to competitive providers for the purposes of delivering high-speed broadband. These pro-competitive measures promote broadband deployment by reducing barriers to entry for new providers. As an example, the City of San Francisco adopted an ordinance that requires building owners to provide access to all communications providers who qualify under the law. *See* Article 52 of the San Francisco Police Code, Ordinance No. 250-16. This ordinance offers a refined solution that is consistent with the Commission's rules on inside wiring, bulk billing, and exclusive marketing, protects incumbents' services, honors the property rights of owners, and accommodates competitors who abide by the law's requirements. As a result of the city's actions, INCOMPAS members like Sonic Telecom have gained access to more than 300 buildings to provide a gigabit fiber service to hundreds of customers that were seeking an alternative option. *See* Reply Comments of CALTEL, GN Docket No. 17-142, at 5 (Aug. 22, 2017). The ordinance is currently the subject of a Petition for Preemption at the Commission, and INCOMPAS has urged the Commission to deny that request as it would send a competition killing message to other cities and governments that are following San Francisco's example. *See* Petition for Preemption, Multifamily Broadband Council, MB Docket No. 17-91 (Feb. 24, 2017) ("Petition"). Instead, Article 52 should be examined as a potential model for state and local governments interested in improving access to MTEs by competitive broadband providers.

⁴⁹ *See* Susan Crawford, *The New Payola: Deals Landlords Cut With Internet Providers*, WIRED (June 26, 2016), available at <https://www.wired.com/2016/06/the-new-payola-deals-landlords-cut-with-internet-providers/>.

consumer choice.⁵⁰ Rooftop exclusivity agreements are fundamentally identical to wiring exclusivity agreements, in that they prevent competitors from gaining access to space that would allow them to deploy facilities for point-to-point wireless services. Incumbent providers have also used exclusive marketing agreements, which restricts certain forms of advertising from reaching MTE residents, as a method to dilute the odds of a competitive provider being able to achieve penetration rates that bring an acceptable return on investment.

As INCOMPAS discussed in its reply comments, there are a number of statutory provisions that the Commission may invoke to address these issues, including its Section 706(b) authority—which is an important statutory tool for the Commission to ensure that it can address the deployment and competition mandates in the Act. Furthermore, INCOMPAS has proposed that the Commission open a new rulemaking proposing to prohibit the use of graduated revenue sharing arrangements as well as wiring and rooftop exclusivity agreements by all video, telecommunications, and broadband providers.⁵¹ Additionally, the Commission should conduct a thorough investigation of practices that it has previously allowed, like exclusive marketing and bulk billing agreements, that are now used as artificial barriers to deny competitors access to MTEs. Should the Commission continue to permit such arrangements, it must ensure that they are not used to prevent competition and harm consumers.

⁵⁰ See *Exclusive Use of Inside Wiring Clauses in Cable ROE Agreements*, Carl Kandutsch Law Office (May 2, 2014), available at <http://www.kandutsch.com/blog/exclusive-use-of-inside-wiring-clauses-in-cable-roe-agreements>.

⁵¹ See Reply Comments of INCOMPAS, GN Docket No. 17-142, at 4 (Aug. 22, 2017).

c. Promoting and Enabling an Open Internet

As INCOMPAS set forth in its comments in the Commission’s open internet proceeding, the websites, services, and applications provided over the internet have transformed American businesses and personal lives.⁵² Moreover, the protections afforded in the 2015 Open Internet Order, as well as in the Commission’s review of large BIAS providers’ merger proceedings, have addressed the incentives large, fixed BIAS providers have to harm consumers and the development of competitive services offered over the internet, including for example, video. The availability of alternative, competitive services and applications over the Internet—especially video—is important for consumers, but also competitive, fixed BIAS providers—who are at significant disadvantages for offering bundled video/Internet service to consumers due to the fact they must pay significantly more than large BIAS providers for video service. With the development of competitive OVDs, however, there is the possibility that competitive broadband providers can focus on the delivery of broadband, without incurring the cost of offering video itself.

INCOMPAS has demonstrated in the record that large, fixed BIAS providers have the incentive and ability to thwart OVD competition without open internet protections, and we have urged the Commission to maintain the 2015 Order’s protections and rules.

The Commission has previously relied upon its Section 706(b) authority for its open internet rules. However, should the Commission reclassify BIAS (which INCOMPAS opposes)

⁵² See Comments of INCOMPAS, WC Docket No. 17-108, at 1-3 (July 17, 2017).

and decides to maintain open internet protections (which INCOMPAS believes it should), Section 706(b) will be a critical statutory tool the Commission will need.⁵³

VII. CONCLUSION

As the Commission aims to meet its statutory obligation to evaluate the deployment of advanced telecommunications capabilities, it is telling that the agency has spent the better part of this year renewing its commitment to bridging the digital divide. Despite the best efforts of industry and the government to deploy next generation networks, fixed and mobile broadband networks do not reach every American. Moreover, in those areas where advanced telecommunications capabilities are actually physically available, competition is severely limited for fixed residential and business services. As such, the Commission should not find that the goals of Section 706 have been met.

Providers face significant barriers to deploy both competitive fixed and mobile broadband networks. Addressing these barriers, such as improving access to poles, right-of-way, and MTEs, and ensuring the current protections established in the 2015 Open Internet Order, as well as the availability of wholesale input services at reasonable prices, terms and conditions, is critical to deploying new networks. The Commission's Section 706(b) authority permits it to take immediate steps to address these barriers based upon a finding that broadband is not being deployed to all Americans in a reasonable and timely fashion—the Commission should maintain and use that authority—to enable all Americans to access competitive fixed and mobile providers of their choice.

⁵³ Nonetheless, INCOMPAS maintains that Title II is the strongest legal authority the Commission has for the current Open Internet protections which it fully supports.

Respectfully submitted,

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ECONOMIC FINDINGS CONCERNING THE STATE OF COMPETITION FOR WIRED BROADBAND PROVISION TO U.S. HOUSEHOLDS AND EDGE PROVIDERS

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Abstract

The Federal Communications Commission and the U.S. Department of Justice, in the course of considering mergers and acquisitions as well as other policy matters, have conducted detailed investigations of the wired broadband business, and the intertwined business of providing linear programming. This paper summarizes the economic findings reached by the FCC and the Justice Department and their implications for public policy. These authorities have identified two significant market failures based on empirical studies, reviews of company documents, and other evidence. The first market failure results from the fact that large wired broadband providers are bottlenecks between edge providers and households and therefore able to exercise significant market power over edge providers by restricting access to households. The second market failure results from the fact that the large wired broadband providers also own large linear programming providers. The evidence shows that the companies that have common ownership over these related services have the incentives and abilities to harm edge providers that compete with their linear programming businesses. To prevent making these market failures from worsening, the FCC and Justice Department have blocked mergers or imposed conditions on the merging parties. The FCC and Justice Department findings are relevant for considering public policy towards the provision of wired broadband services to households and edge providers.

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I. Introduction

The Federal Communications Commission (FCC) and the Antitrust Division of the U.S. Department of Justice (DOJ) have had the opportunity in the course of several merger reviews, as well as other regulatory proceedings, to conduct detailed economic analyses of the provision of wired broadband to subscribers and the online companies those subscribers want to connect with. Their work provides insights into the state of competition for the provision of wired broadband and the extent to which the companies that provide wired broadband to households have the abilities and incentives to harm online competition and consumers.¹ The findings of these agencies provide relevant background for discussions concerning public policies regarding the provision of wired broadband and video programming, including current discussions concerning net neutrality in the United States.

This paper reviews the FCC's and DOJ's economic findings.² For the purposes of this paper we use the following terminology: an “edge provider” refers to a business that provides its products or services over the Internet. End users typically consume digital products or online services using a desktop or mobile web browser or a mobile app. A broadband internet access service (“BIAS”) provider enables households to connect to the Internet. The paper focuses on high-speed wired BIAS providers—ones that offer download speeds of at least 25 Mbps and upload speeds of at least 3 Mbps—which, as of now, is what most households require to use

¹ The main FCC and DOJ findings, and related documents, relied upon in this paper are listed in Appendix A.

² In some cases, this paper relies on material that is not part of the public record from the FCC or DOJ but provides empirical support to the conclusions reached by these agencies. In particular, this paper relies on economic analyses I submitted to the FCC or DOJ in their reviews that support the conclusions reached by these agencies. I rely on the publicly available versions of these submissions and not on any confidential information.

high-quality voice, data, graphics, and video applications.³ The paper would reach similar conclusions using broader definitions of wired broadband speed.⁴ Households obtain linear programming using a Multichannel Video Programming Distributor (MVPD), which delivers programming over its local network and not over the Internet. Most households have access to a wired BIAS provider, which is typically offered by a cable or telco company, and that company usually has an MVPD service that offers linear programming.

The paper is organized as follows. Section II presents empirical background on the wired broadband choices available to households and the implications of local competition for edge providers. Section III summarizes the ownership relationships between wired BIAS providers, MVPDs, and video programmers. Section IV examines the extent to which there are barriers to entry, or expansion, for wired BIAS providers given political barriers to entry and the extent of integration into MVPDs. Section V summarizes the FCC and DOJ findings concerning the degree to which wired BIAS providers can exercise significant horizontal market power over access fees to edge providers. Section VI reviews the findings of these agencies concerning the extent to which vertically integrated firms, that operate wired BIAS

³ In its 2015 Broadband Progress Report, the FCC concluded that in order for a service to qualify as an “advanced telecommunications service,” it would need download speeds of at least 25 Mbps and upload speeds of at least 3 Mbps. This was a change from its previous benchmark of 4 Mbps downloads and 1 Mbps uploads. For a discussion of the rationale for this benchmark, see Federal Communications Commission, “2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment,” GN Docket No. 14-126, February 4, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-10A1.pdf (“FCC 2015 Broadband Progress Report”), at ¶¶ 19-62. This benchmark threshold remains the same through the current FCC Broadband Progress Report. Federal Communications Commission, “2016 Broadband Progress Report,” GN Docket N. 15-191, January 29, 2016, https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf (“FCC 2016 Broadband Progress Report”), at ¶ 19.

⁴ When given the choice, households predominantly use high-speed broadband providers which indicates that slower-speed providers do not impose significant competitive constraints. DSL, satellite, fixed wireless, and other wireline technologies (excluding cable, fiber, and AT&T’s hybrid U-Verse technology) accounted for just 15.7 percent of broadband connections as of June 30, 2016, compared to the 84.3 percent for cable, fiber-to-the-premises, and AT&T’s hybrid U-Verse technology. This 15.7 percent is only modestly larger than the 7 percent of the US population which lacks access to any provider of high-speed broadband.

providers, MVPDs, and video programmers, have the incentives and abilities to inflict competitive harm on online video distributors (OVDs), and potentially other edge providers, and thereby harm consumers. Section VII examines the implications of the FCC and DOJ findings for considering the benefits and costs of policies towards wired BIAS providers.

The FCC and DOJ have reached several key findings, which the remainder of this Introduction summarizes, concerning the state of competition for wired broadband service and the business strategies adopted by the large firms that have common ownership over wired BIAS providers and MVPDs. Their conclusions are based on extensive economic analyses, including empirical studies prepared by staff and parties before them, as well as the review of internal documents from these parties.⁵ Many of these findings were reached based on the state of competition as recently as 2015. They remain relevant because the fundamental market conditions have not changed significantly since then, as shown below.

It is useful to group the FCC and DOJ findings into two categories: those that relate to a horizontal market failure arising from the lack of competition among two-sided platforms for households and edge providers; and findings that relate to a vertical market failure arising from the fact that companies that own large wired BIAS providers also own large MVPDs.

A. Horizontal Market Failure

1. There is little competition in the supply of high-speed wired BIAS to households. Households typically have only one or two choices for high-speed wired BIAS and there are high switching costs when there is another choice available. There are significant barriers to entry into local markets including political barriers, some of which have resulted from lobbying efforts by large cable and telco providers of high-speed wired BIAS. Slower-speed wired broadband providers, when available, do not

⁵ Many of their findings are consistent with the conclusions of empirical studies and other economic analyses I have conducted related to the issues discussed in this paper and presented to the FCC and DOJ. I reference the public version of relevant submissions I have made below.

impose significant competitive constraints on high-speed providers. Wireless, and fixed satellite also do not impose significant competitive constraints. This finding, concerning lack of competition at the local level, is fundamental to the other conclusions reached by the FCC and DOJ. This paper presents an empirical study that confirms that this lack of choice remains true today.

2. Several large wired BIAS providers, which together account for 71.7 percent of households, have significant bargaining leverage over edge providers, particularly those that provide long-form streaming video, online gaming, and download services, which households consume at home over wired BIAS connections and typically not on mobile devices. The substantial bargaining leverage results from these large BIAS providers being able to block edge providers from reaching a significant fraction of households, thereby preventing those edge providers from realizing various economies of scale.
3. Large wired BIAS providers can use their control over access to households, together with other technical features involving interconnection, to impose termination fees on edge providers. They have done this by degrading the quality of the connection between the targeted edge provider and their households. They do not face penalties from lost subscribers because households have limited choices and do not necessarily know that their wired BIAS provider was degrading their service. Most wired BIAS providers, which are smaller, cannot and do not impose access fees.

B. Vertical Market Failure

1. Large wired BIAS providers also own large MVPDs and earn significant profits from the supply of linear video programming to household subscribers. Edge providers, in particular OVDs and Over-the-Top (OTT) distributors, pose a long-term competitive threat to those profits.
2. Large wired BIAS providers have the incentives to harm OVDs and OTT distributors to protect their MVPD profits. That finding is based on economic theory, empirical studies and internal documents from these companies.
3. The large wired BIAS providers have the ability to impose harm for two related reasons. They can use their control over the supply of high-speed BIAS to households to raise the costs to OVDs and OTT distributors, increase the cost to their subscribers of using those services, or reduce the quality of these competing services. They can also use their position as large MVPDs to impose vertical restraints on video programmers to reduce the supply of video programming to competing streaming video providers.

C. Policy Implications

The DOJ and FCC have taken these market failures into account in their review of proposed mergers of cable and telco systems starting with the review of AT&T's proposed

consolidation of wired broadband suppliers in 2000. In some cases, such as Comcast's proposed Time Warner Cable acquisition in 2015, the FCC, DOJ, or both agencies have effectively prevented those acquisitions from proceeding.⁶ In other cases, such as Charter's acquisition of Time Warner Cable in 2016, the FCC and DOJ have imposed conditions on the merging parties to prevent the consolidation from exacerbating the market failures identified above.⁷

Public policy, including cost-benefit analyses, concerning high-speed wired BIAS, and the intertwined supply of linear video programming, should, as an economic matter, account for these market failures as well.⁸ That includes developing economic models and empirical studies that recognize the realities of competition for these businesses.⁹

⁶ Devika Krishna Kumar, "Comcast Drops Time Warner Cable Bid After Antitrust Pressure," Reuters, April 23, 2015, <http://www.reuters.com/article/us-comcast-timewarnercable-idUSKBN0NE2D220150424>.

⁷ Federal Communications Commission, Memorandum Opinion and Order in the Matter of Applications of Charter Communications Inc., Time Warner Cable, Inc., and Advance/Newhouse Partnership for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 15-149, May 10, 2016, https://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0510/FCC-16-59A1.pdf ("FCC Charter-TWC Merger Order"), at Appendix B; US v. Charter Communications Inc. et al, 1:16-CV-00759, Final Judgment, September 9, 2016, <https://www.justice.gov/atr/file/891506/download>; Time Warner Cable, "Charter, Time Warner Cable and Bright House Networks Receive Final Regulatory Approval for Transactions," May 12, 2016, <http://ir.timewarnercable.com/investor-relations/investor-news/financial-release-details/2016/Charter-Time-Warner-Cable-and-Bright-House-Networks-Receive-Final-Regulatory-Approval-for-Transactions/default.aspx>; Time Warner Cable, "Charter Communications, Time Warner Cable and Bright House Networks Complete Transactions," May 18, 2016, <http://ir.timewarnercable.com/investor-relations/investor-news/financial-release-details/2016/Charter-Communications-Time-Warner-Cable-and-Bright-House-Networks-Complete-Transactions/default.aspx>.

⁸ Of course, these findings are reached at a particular point in time and public policy should also account for changes in market conditions, including changes facilitated by regulatory policy. This paper shows, however, that the fundamental lack of competition for household broadband service is likely to persist as a result of barriers to entry.

⁹ Several economists have made submissions on behalf of the incumbent cable and telco companies in the Restoring Internet Freedom matter, Federal Communications Commission (Wireline Competition Bureau), "Wireline Competition Bureau Opens WC Docket No. 17-108," April 27, 2017, https://apps.fcc.gov/edocs_public/attachmatch/DA-17-396A1_Rcd.pdf. See Mark A. Israel, Allan L. Shampine, and Thomas A. Stemwedel, "Declaration before the Federal Communications Commission," In the Matter of Restoring Internet Freedom, WC Docket No. 17-108, July 17, 2017, <https://ecfsapi.fcc.gov/file/10717906301564/Econ%20Declaration.pdf> ("Israel et al Declaration"); Andres V. Lerner and Janusz A. Ordover, "An Economic Analysis of Title II Regulation of Broadband Internet Access

II. Wired BIAS Market Structure

A wired BIAS provider—usually a cable company or a telco—extends a wire into the home that provides a connection to the Internet. Those households can then connect devices directly to their broadband service or set up a Wi-Fi network in their home and use devices wirelessly. A wired BIAS provider also makes connections to the Internet through relationships with one or more entities that connect to the Internet backbone. Millions of edge providers distribute their content over the Internet and that content reaches the wired BIAS provider through the entities that it connects to.

Wired BIAS providers are two-sided platforms that connect consumers and edge providers.¹⁰ On one side, wired BIAS providers serve consumers in local areas where those providers have laid networks. They typically charge households a monthly fee for service, which may be bundled in with other services offered by the BIAS provider. On the other side, wired BIAS providers serve edge providers that want to reach consumers in these households. A few large wired BIAS providers charge edge providers to reach households, but most wired BIAS providers do not, as discussed below.

Providers,” In the Matter of Restoring Internet Freedom, WC Docket No. 17-108, July 17, 2017, <https://ecfsapi.fcc.gov/file/10717390819816/2017%2007%2017%20Verizon%20comments%202017%20Open%20Internet%20Notice.pdf> (“Lerner and Ordover Declaration”); Christian M. Dippon, “Public Interest Repercussions in Repealing Utility-Style Title II Regulation and Reapplying Light-Touch Regulation to Internet Services,” in the Matter of Restoring Internet Freedom, WC Docket 17-108, July 17, 2017, <https://ecfsapi.fcc.gov/file/107171777114654/2017-07-17%20AS-FILED%20Comcast%202017%20Open%20Internet%20Comments%20and%20Appendices.pdf> (“Dippon Declaration”). As I discuss below, they mainly ignore economic findings, including extensive findings of fact, in recent FCC and DOJ investigations of wired BIAS providers and MVPDs. They do not offer any empirical evidence that would cast doubt on the FCC findings and that hasn’t already been reviewed and rejected by the FCC. Nor do they offer rebuttals of the FCC’s grounds for rejecting their previously submitted analyses.

¹⁰ For a non-technical introduction to multisided platforms see David S. Evans and Richard Schmalensee (2016), *Matchmakers: The New Economics of Multisided Platforms*, (Boston: Harvard Business Review Press).

The FCC has found that most American customers have access to a small number of high-speed wired BIAS providers that supply adequate speeds for active Internet users.¹¹ This paper reports a recent analysis of the state of competition that shows that the average household has access to two high-speed wired BIAS providers. Mobile wireless connections are not good substitutes for wired BIAS for households. They are less reliable in delivering the speeds needed for active Internet users. Moreover, the usage limitations in place, even on so-called “unlimited” plans, make them inadequate for household use.

Based on current information, four wired BIAS providers account for 71.7 percent of households with individual shares ranging from 7.1 percent (Verizon) to 25.4 percent (Comcast).¹² By using their ability to limit access to a sizable fraction of households, large wired BIAS providers have bargaining power over edge providers and have been able to charge access fees, according to the findings reached by the FCC and DOJ.¹³

¹¹ FCC Charter-TWC Merger Order, at ¶ 50; FCC 2016 Broadband Progress Report, at ¶ 86.

¹² Share calculations are based on subscribers as of March 31, 2017. The number of subscribers for each ISP is from Leichtman Research Group, “About 960,000 Added Broadband in 1Q 2017,” May 19, 2017, <http://www.leichtmanresearch.com/press/051917release.html>. The total number of wired Internet connections is based on the same source, which states that the subscribers of the covered providers account for approximately 95 percent of all wired broadband subscribers. Note that in past periods, the total number of US wired broadband subscribers derived from Leichtman Research Group have been slightly lower than those reported by the FCC. Compare Leichtman Research Group, “About 190,000 Added Broadband in 2016 Q2,” August 16, 2016, <http://www.leichtmanresearch.com/press/081616release.html> (91.9 million); Federal Communications Commission (Industry Analysis and Technology Division, Wireline Competition Bureau), “Internet Access Services: Status as of June 30, 2016,” April 2017, https://apps.fcc.gov/edocs_public/attachmatch/DOC-344499A1.pdf, at 2 (104.0 million). The discrepancy is possibly due to differences in the speed threshold. The FCC counted all residential wired Internet connections over 200 Kbps in at least one direction, and the Leichtman Research Group may have used a more demanding standard. The FCC data on the number of broadband subscribers has not been released for periods more recent than 2016 Q2, so I have not used it here.

¹³ As discussed below the ability to deny access also depends upon having significant control over the Internet pipes coming into the system. The large BIAS providers have peering connections which enable them to congest traffic coming from specific content providers flowing through their networks to the household.

A. Household Subscribers

There are several types of wired BIAS providers, including cable companies, telcos, and, in limited areas, overbuilders.¹⁴ Since laying cable is expensive, and often requires governmental approvals, these wired BIAS providers are usually available only in particular neighborhoods. A household can only use those wired BIAS providers that have extended their networks very close to the home. That determines, as the FCC has recognized, the available competitive choices.

1. Availability of Wired BIAS Providers to Households

Wired BIAS providers operate systems that serve households in many different geographic areas. Often a company has a franchise for a city, or significant parts of a city, and builds its network out to some, or all, of that area. Large companies have many franchises. Table 1 shows the number of household subscribers for 13 of the largest wired BIAS providers. They account for 90.1 percent of U.S. subscribers and the largest four account for 71.7 percent. Some of the companies compete head-to-head for households in the same geographic area.

¹⁴ In this context, an overbuilder is a cable company, telco, or fiber provider that offers broadband service to households already served by incumbent cable and telco providers. For example, an overbuilder like RCN is a company that offers wired BIAS via coaxial cable to households in areas already served by an incumbent cable provider.

Table 1: Subscribers and Shares for Largest BIAS Providers, March 31, 2017

	Broadband Subscribers	Share of all Broadband Subscribers
Comcast	25,131,000	25.4%
Charter	23,051,000	23.3%
AT&T	15,695,000	15.9%
Verizon	7,011,000	7.1%
CenturyLink	5,945,000	6.0%
Frontier	4,164,000	4.2%
Altice	4,002,000	4.0%
Mediacom	1,179,000	1.2%
Windstream	1,047,600	1.1%
WideOpenWest (WOW)	729,000	0.7%
Cable ONE	523,327	0.5%
Cincinnati Bell	307,400	0.3%
FairPoint	305,353	0.3%
Total (These Providers)	89,090,680	90.1%
Total (All Providers)	98,863,874	100.0%

Source: Leichtman Research Group, “About 960,000 Added Broadband in 1Q 2017,” May 19, 2017, <http://www.leichtmanresearch.com/press/051917release.html>.

Note: This list omits Cox, who subscriber count is more difficult to estimate from public data, but is probably in the range of 1 to 5 percent.

Although precise data on household choices are not available, it is possible to get a good approximation from data on the availability of wired BIAS providers at the census block level. A census block is a small area that usually consists of up to 100 households, although some very dense census blocks can have nearly 20,000 residents. Table 2 shows the percent of the population that have access to various numbers of high-speed wired BIAS providers as of June 30, 2016. About 7.0 percent of the population do not have access to a high-speed wired BIAS provider. Of those who have at least one option, the average person had two high-speed wired BIAS provider choices. The most common situation, accounting for 40.8 percent of people, is two high-speed wired BIAS choices. Of people who have at least one high-speed wired BIAS provider, about 31.9 percent only have one alternative and 75.8 percent have one

or two. These figures are generally consistent with findings the FCC has reached using earlier and similar data.¹⁵

Table 2: Subscribers and Shares for the Largest Wired BIAS Providers, June 30 2016

Number of High-Speed Wired BIAS Providers in Census Block	Share of Population	Share of Population with at Least One High-Speed Wired BIAS Provider
0	7.0%	-
1	29.7%	31.9%
2	40.8%	43.8%
3	19.0%	20.4%
4	3.1%	3.3%
5	0.4%	0.5%
6+	0.1%	0.1%
Weighted Average Number of Providers	1.83	1.97

Source: Federal Communications Commission (2017), “Fixed Broadband Deployment Data from FCC Form 477: Data as of June 30, 2016 (Version 2),” <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477> (“FCC Form 477 Data”); US Census.

The typical household has access to one cable company and one telco provider. The cable companies generally offer fast broadband with download speeds of 150 Mbps or more. The telcos provide fiber optic cable with similar speeds in some areas and DSL with relatively low download speeds, about 20 Mbps, in others.

The FCC has found that consumers face significant costs in switching from their current wired BIAS provider.¹⁶ Switching generally requires scheduling a service call to install new

¹⁵ FCC 2016 Broadband Progress Report, at ¶ 86; Federal Communications Commission, Report and Order In the Matter of Preserving the Open Internet Broadband Industry Practices, GN Docket No. 09-191 and WC Docket No. 07-52, December 23, 2010, https://apps.fcc.gov/edocs_public/attachmatch/FCC-10-201A1_Rcd.pdf (“FCC 2010 Open Internet Order”), at ¶ 32.

¹⁶ Tom Wheeler (FCC Chairman), “The Facts and Future of Broadband Competition,” September 4, 2014, https://apps.fcc.gov/edocs_public/attachmatch/DOC-329161A1.pdf (“Once consumers choose a broadband provider, they face high switching costs that include early-termination fees, and equipment rental fees. And, if those disincentives to competition weren’t enough, the media is full of stories of consumers’ struggles to get ISPs to allow them to drop service.”); FCC 2010 Open Internet Order, at ¶ 34 (“In addition, customers may incur significant costs in switching broadband providers because of early termination fees; the inconvenience of ordering, installation, and set-up, and associated deposits or fees; possible difficulty returning the earlier broadband provider’s equipment and the cost of replacing incompatible customer-owned equipment; the risk of

service, and provide a new cable box, which requires that someone be at home for a significant block of time. Since most wired BIAS customers obtain MVPD services from the same provider they need to switch both services and associated equipment. Some wired BIAS providers also place obstacles for their customers to switch providers, including service reps that sometimes refuse disconnection requests or employ aggressive win-back techniques, and often require the subscriber to return the set-top box or modems to a remote location.¹⁷ Moreover, consumers face uncertainty over the quality of service they will receive from a new provider. As a result, the FCC has found that “BIAS subscribers infrequently switch their service to another local competitor.”¹⁸

2. Satellite, Mobile Wireless, and DSL Alternatives

Fixed satellite providers also offer BIAS services. The FCC has found, however, that consumers do not view fixed satellite as a good substitute for a wired BIAS provider. The satellite providers, partly as a result of their technical limitations, have monthly usage allowances that wired BIAS providers usually do not have. They generally have lower download speeds—between 5 and 15 Mbps—than high-speed wired BIAS providers. Table 3, which reports the median sustained download and upload speeds by technology as measured by the FCC in September 2015, shows satellite broadband was much slower than cable and fiber.

temporarily losing service; the risk of problems learning how to use the new service; and the possible loss of a provider-specific email address or website.”) (internal footnotes omitted); Federal Communications Commission, “Broadband decisions: What drives consumers to switch - or stick with - their broadband Internet provider,” Working Paper, December 2010, https://apps.fcc.gov/edocs_public/attachmatch/DOC-303264A1.pdf.

¹⁷ See Section V.A.5 below.

¹⁸ FCC Charter-TWC Merger Order, at ¶ 111; FCC 2010 Open Internet Order, at ¶ 34. For further discussion concerning switching costs and the frequency of switching see David S. Evans, “Economic Analysis of the Impact of the Comcast/Time Warner Cable Transaction on Internet Access to Online Video Distributors: Response to Opposition to Petitions to Deny and Response to Comments,” MB Docket No. 14-57, December 23, 2014, <https://ecfsapi.fcc.gov/file/60001011066.pdf> (“Evans Comcast Declaration II”), at ¶¶ 240-258 and FCC Charter-TWC Merger Order, at ¶ 43.

Moreover, satellite broadband “suffers from latency issues, making it an impractical service for uses such as real-time gaming.”¹⁹ As of June 30, 2016, only about 3.1 percent of residential BIAS subscribers used a satellite or fixed wireless provider.²⁰

Table 3: Median Sustained Download and Speeds by Technology, September 2015

	Median Sustained Download Speed (Mbps)	Median Sustained Upload Speed (Mbps)
Cable	52.30	7.08
Fiber	52.22	54.61
DSL	11.40	1.30
Satellite	10.73	2.92

Source: Federal Communications Commission, Office of Engineering and Technology and Office of Strategic Planning and Policy Analysis, 2016 Measuring Broadband America: Fixed Broadband Report, December 1, 2016, <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/charts-measuring-broadband-america-2016#block-menu-block-4>, Charts 12.1 and 12.2.

Note: Speeds are measured during peak times (Monday to Friday, 7 pm to 11 pm).

DSL and other wireline technologies (excluding cable and fiber) are typically quite slow as well. An analysis by the FCC found that the speed of DSL connections was a much smaller fraction of maximum advertised speeds than was the case for cable and fiber subscribers.²¹ As of June 30, 2016, less than 5 percent of all residential connections using DSL or other slow wireline technologies were high speed (at least 25 Mbps down and 3 Mbps up), compared to over 81 percent for cable and 78 percent for fiber. Table 3 shows that the average upload and download speeds for DSL were much lower than for cable and fiber. The FCC has concluded, these speeds are insufficient for households that wish to use high-quality online services, such as high-quality voice, data, graphics, video, home security, VoIP, and smart phones using Wi-

¹⁹ FCC Charter-TWC Merger Order, at ¶ 55.

²⁰ Federal Communications Commission, Internet Access Services: Status as of June 30, 2016, April 2017, https://apps.fcc.gov/edocs_public/attachmatch/DOC-344499A1.pdf, at 17.

²¹ Federal Communications Commission, *2014 Measuring Broadband America Fixed Broadband Report*, Chart 7 (2014), available at <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-broadband-america-2014>.

Fi.²² DSL and other slow wireline technologies accounted for 2.2 percent of residential high speed connections, compared to 83.5 percent for cable and 14.2 percent for fiber.²³

Consumers seldom choose DSL, satellite, fixed wireless, and other wireline technologies (excluding cable, fiber, and AT&T's hybrid U-Verse technology) when they have better alternatives. These technologies, taken together, accounted for just 15.7 percent of broadband connections as of June 30, 2016, compared to the 84.3 percent accounted for by cable, fiber-to-the-premises, and AT&T's hybrid U-Verse technology.²⁴ This 15.7 percent is only modestly larger than the 7 percent of the US population which lacks access to any provider of high-speed broadband.²⁵

Consumers can also access edge providers through mobile wireless plans that provide Internet connections over 3G/4G/LTE networks. Mobile wireless providers are not close substitutes to wired BIAS providers. The plans offered by mobile wireless providers offer substantially less data usage than those offered by wired BIAS providers. As the FCC noted, “[f]ixed broadband services generally do not face the same limitations regarding capacity and congestion that affect mobile broadband networks and, some fixed broadband providers offer

²² FCC, 2015 Broadband Progress Report, at ¶¶ 47, 50.

²³ Federal Communications Commission (Industry Analysis and Technology Division, Wireline Competition Bureau), “Internet Access Services: Status as of June 30, 2016,” April 2017, https://apps.fcc.gov/edocs_public/attachmatch/DOC-344499A1.pdf, at 17, 22.

²⁴ FCC (2017), Internet Access Services: Status as of June 30, 2016, https://apps.fcc.gov/edocs_public/attachmatch/DOC-344499A1.pdf, at Figure 13. This data includes AT&T's U-Verse with other, slower forms of asymmetric DSL. The number of DSL subscribers attributable to U-Verse was taken from AT&T, 10-Q for the Quarter Ending June 30, 2016, at 28.

²⁵ Calculation based on FCC (2017), “Fixed Broadband Deployment Data from FCC Form 477: Data as of June 30, 2016 (Version 2),” <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477>.

consumers unlimited data usage plans at a given connection speed for a flat monthly fee.”²⁶ By contrast, many mobile wireless plans are subject to monthly data caps of less than 10 GB.²⁷

Even mobile wireless plans that are advertised as “unlimited” are subject to usage “limitations”—at 22-23 GB in total for most unlimited plans, of which only 10 GB of usage can be used on a “tethered” connection on a smartphone to share with other device.²⁸ The 10 GB limitation on mobile tethering is, for example, only enough for about 3 hours of HD streaming for the entire month for devices other than the subscriber’s smartphone assuming no other data usage.²⁹ These usage limitations, which may result in the deprioritizing of a user’s traffic, are not close to being sufficient for the estimated average household usage of 57 GB a

²⁶ FCC 2016 Broadband Progress Report, at ¶ 32.

²⁷ Verizon, “Unlimited Data Plans for Talk & Text,” <https://www.verizonwireless.com/plans/verizon-plan/>; AT&T, “Mobile Share Plans Configurator,” <https://www.att.com/shop/wireless/plans/planconfigurator.html>.

²⁸ The “limitations” are not absolute caps, rather mobile networks set a usage limit above which subscriber traffic may be handled differently from that of other users. The two largest mobile network operators, Verizon and AT&T, begin this process at 22 GB for total traffic (based on Verizon’s higher tier “Beyond Unlimited” plan). AT&T has a 10 GB limitation on mobile tethering usage and Verizon has a 15GB limitation. Verizon also limits video streaming on smartphones to 720p quality. Sprint has a 23 GB limitation for total traffic and the same 10 GB limitation for mobile tethering usage. T-Mobile has a 32 GB limitation for total traffic and restricts mobile tethering usage to 3G speeds. Subscriber usage above the total plan limitation is subject to de-prioritizing, where the subscriber’s connection will receive lower priority than other users who have not exceeded their usage limitations in periods of congestion. For Verizon, AT&T and Sprint, mobile tethering usage above the usage limitation is limited to 2G speeds or below. Verizon, “Unlimited Data Plans for Talk & Text,” <https://www.verizonwireless.com/plans/verizon-plan/>; Verizon, “Beyond Unlimited FAQs,” <https://www.verizonwireless.com/support/beyond-unlimited-faqs/>; AT&T, “Mobile Share Plans Configurator,” <https://www.att.com/shop/wireless/plans/planconfigurator.html>; T-Mobile, “Cell Phone Plans,” <https://www.t-mobile.com/cell-phone-plans>; Sprint, “Unlimited Data Plans,” <https://www.sprint.com/en/shop/plans/unlimited-cell-phone-plan.html>. In cases where wired BIAS providers have experimented with data caps, the caps have been set at between 250 GB and 600 GB, an order of magnitude above the usage limitations described here. FCC 2016 Broadband Progress Report, at fn. 98.

²⁹ Netflix, “How Can I Control How Much Data Netflix Uses?” <https://help.netflix.com/en/node/87>.

month the FCC reported (which is exclusive of mobile wireless usage).³⁰ About 42 percent of smartphone traffic and 90 percent of tablet traffic use Wi-Fi instead.³¹

Moreover, mobile wireless connections are less reliable than wired connections and depend on how many subscribers are trying to access the same cell tower and other factors. As the FCC has found, “[m]obile transmissions are subject to environmental factors that fixed line transmissions do not encounter and, thus, cannot achieve the same kinds of consistent speeds at the current level of technology.”³²

The evidence on the way mobile wireless plans are used confirms that consumers do not view them as close substitutes for wired BIAS providers. About 77 percent of U.S. adults have mobile smartphones.³³ Mobile smartphones usually have a mobile data plan that covers Internet connectivity. About 51 percent of U.S. adults have a tablet, and some of those consumers also have separate mobile broadband plans for their tablets.³⁴ Most households that have a wired BIAS provider, which costs an average \$69.93 a month, have one or more household members that have a smart mobile subscription with a broadband data plan.³⁵ They therefore do not act as if mobile broadband is a substitute.

³⁰ FCC 2016 Broadband Progress Report, at ¶ 37, citing Sandvine (2014), “Global Internet Phenomena,” <https://www.sandvine.com/downloads/general/global-internet-phenomena/2014/2h-2014-global-internet-phenomena-report.pdf>, at 5.

³¹ The Economist, “When Wireless Worlds Collide,” November 17, 2014, <https://www.economist.com/news/science-and-technology/21632739-wi-fi-hotspots-become-ubiquitous-who-needs-cellular-wireless-when-wireless-worlds>.

³² FCC 2016 Broadband Progress Report, at ¶ 29.

³³ Pew Research Center, “Mobile Fact Sheet,” January 12, 2017, <http://www.pewinternet.org/fact-sheet/mobile/>.

³⁴ Pew Research Center, “Mobile Fact Sheet,” January 12, 2017, <http://www.pewinternet.org/fact-sheet/mobile/>.

³⁵ The average monthly price of stand-alone wired Internet service for the United States is taken from Federal Communications Commission, Fifth Report in the Matter of International Comparison Requirements Pursuant to the Broadband Data Improvement Act (International Broadband Data Report), GN Docket No. 15-191, January 29, 2016, https://apps.fcc.gov/edocs_public/attachmatch/DA-16-97A1.pdf, at 22.

Moreover, the devices sold by major US mobile operators and used by subscribers are mobile smartphones and, to a much lesser extent, mobile hotspots. If mobile wireless data plans were marketed and used as substitutes for wired broadband at home, we would see much broader use of fixed wireless modems/routers designed for home use and offer wired ports that provide a broadband connection for a home's WiFi network. The four major US operators do not offer such home cellular devices.³⁶

B. Edge Providers

Edge providers offer their content online, using servers in the cloud. Consumers interact with edge providers by downloading and uploading data to those servers over their BIAS connections. A consumer might send a request to Netflix to stream a movie on their television, or stream a Facebook Live video using their smart mobile phone, both while connected to the home wireless network. Various entities handle such requests by the consumer and help move the data between the consumer and the edge provider. Large edge providers often use Content Delivery Networks (CDNs) which host copies of their content in close proximity to households to speed up delivery and some operate their own CDNs.

The request for edge provider content initially goes from the consumer to a switch at the household's wired BIAS provider. The wired BIAS provider sends the consumer request

³⁶ For examples of such home cellular devices, see Netgear "LB2120," <https://www.netgear.com/home/products/mobile-broadband/lte-modems/LB2120.aspx>; TP-Link, "300 Mbps Wireless N 4G LTE Router," http://www.tp-link.com/la/products/details/cat-4691_TL-MR6400.html. Such devices do not appear to be offered by Verizon, AT&T, Sprint or T-Mobile. Verizon, "Mobile Hotspots," <https://www.verizonwireless.com/internet-devices/>; AT&T, "AT&T Mobile Broadband Computers, Tablets, Modems, Hotspots from AT&T," <https://www.att.com/shop/wireless/devices/internetdevices.html>; Sprint, "Data Card and Wi-Fi Hotspot," http://shop.sprint.com/mysprint/shop/phone_wall.jsp?flow=&tabId=dt_mbc&INTNAV=TopNav:Shop:Hotspots More; T-Mobile, "Mobile Hotspots," <https://www.t-mobile.com/landing/mobile-hotspots-and-connected-devices.html>.

through entities it has relationships with, as discussed in more detail below. That request eventually reaches the edge provider or its CDN. The edge provider then downloads the content requested by the consumer. Of course, from the consumer’s perspective this process usually happens in what appears to be real time and ideally involves a seamless experience using a website.

Up until roughly 2014, wired BIAS providers charged subscribers but did not generally charge edge providers.³⁷ This business model—free to one side, paid to the other side—is common for two-sided platforms.³⁸ In fact, it is the business model that many edge providers themselves have; many provide content to users for free and make money from advertisers. Starting around 2013, some large wired BIAS providers decided to secure payment from select edge providers by degrading the quality of the connection that households received when they tried to one of these edge providers.

These wired BIAS providers had two features that enabled them to insist on payments. They had the ability to limit the reliability of the connection between the subscriber and certain large edge providers who relied on transit providers or CDNs to deliver content requested by households while continuing to get most of the edge provider traffic through peering relationships they had. Smaller BIAS providers do not have the ability to target large edge

³⁷ The approximate date when wired BIAS providers began charging edge providers is based on the experience of Netflix. David S. Evans, “Economic Analysis of the Impact of the Comcast/Time Warner Cable Transaction on Internet Access to Online Video Distributors,” MB Docket No. 14-57, August 25, 2014, <https://ecfsapi.fcc.gov/file/7521819696.pdf> (“Evans Comcast Declaration I”), at ¶¶ 142-145.

³⁸ David S. Evans and Richard Schmalensee (2016), *Matchmakers: The New Economics of Multisided Platforms*, (Boston: Harvard Business Review Press). Some multisided platforms charge prices to both sides that exceed marginal costs. Economic theory shows that multisided platforms may set privately profit-maximizing prices to each side above or below marginal cost although the price to at least one side has to be above marginal cost to generate profit.

providers.³⁹ The large wired BIAS providers also control such a large share of households that edge providers could face severe financial problems if they lost access to these households, as discussed in more detail below.⁴⁰

Table 4 identifies the wired BIAS providers that based on public records charged for access, and gives their shares of subscribers immediately prior to the closing of the Charter-TWC merger. As of that time, five BIAS providers, accounting for 71.2 percent of all subscribers, had imposed access fees on some edge providers. The hundreds of smaller BIAS providers do not impose access fees. Since the Charter-TWC merger, the combined entity has stopped charging for access, as a result of a merger condition imposed by the FCC.⁴¹

Table 4: Share of U.S. Broadband Subscribers for BIAS Providers Charging for Access as of 2016Q1

	Subscriber Share, 2016 Q1
Comcast	24.7%
AT&T	16.4%
Time Warner Cable	14.2%
Verizon	9.6%
CenturyLink	6.3%
Total (These Providers)	71.2%

Sources: Leichtman Research Group, “Nearly 1.1 Million Added Broadband in 1Q 2016,” May 16, 2016, <http://www.leichtmanresearch.com/press/051616release.html>.

³⁹ FCC Charter-TWC Merger Order, at ¶¶ 116-117.

⁴⁰ FCC Charter-TWC Merger Order, at ¶ 115; Nicholas Hill, Nancy L. Rose, and Tor Winston (2015), “Economics at the Antitrust Division 2014-2015: Comcast/Time Warner Cable and Applied Materials/Tokyo Electron,” Review of Industrial Organization, 47:425-435 (“DOJ Economists Comcast-TWC Paper”), at 428.

⁴¹ In its public interest statement, Charter announced an interconnection policy under which it wouldn’t charge edge providers. In the FCC merger order, the FCC imposed a version of settlement-free interconnection on Charter (FCC Charter-TWC Merger Order, Appendix B, Section III), which was very similar to the policy that Charter had preemptively announced.

C. Summary of Market Structure for Wired BIAS Providers

The market for high-speed wired BIAS services is not very competitive based on the analyses conducted by the FCC and DOJ and the recent data presented above.⁴² Consumers have few choices—two on average—with 75.8 percent of households having just one or two. Edge providers have one choice for reaching a particular subscriber, since that subscriber is unlikely to switch providers, at least in any relevant time period. Large wired BIAS providers can insist on access fees for making that connection and some have done so for certain edge providers.⁴³ The FCC and DOJ have found, as discussed in Section IV below, that entry barriers and switching costs decrease the competitive pressure on the small number of wired BIAS providers available to households.

⁴² Israel et al, Lerner and Ordovery, and Dippon have made submissions in the Restoring Internet Freedom matter which addresses the extent of competition for wireless carriers and wired BIAS providers. They report economic evidence concerning wireless, where there are at least four national carriers competing in almost all markets, and wired BIAS. They provide substantial economic evidence of competition in cellular wireless including evidence on price competition and switching. By comparison they offer little evidence on competition in wired BIAS provision and much of the evidence they point to, such as on the ease and frequency of switching, has been considered and rejected by the FCC and DOJ as discussed below.

⁴³ Israel et al. and Dippon, in their submission to the Restoring Internet Freedom matter, argue the wired BIAS providers are not gatekeepers—or equivalently “terminating access monopolies” or “competitive bottlenecks”—between edge providers and end users. They repeat claims that they, or others, have previously made to the FCC that the wired BIAS providers do not have the ability and incentive to block edge providers. The FCC and DOJ have found based on their investigations, including the review of internal documents, that the large wired BIAS providers have both the ability and incentive to block edge providers. These economists do not respond to the arguments and evidence presented by the FCC and DOJ for rejecting previous articulations of their claims. For example, they assert that large wired BIAS providers are technically incapable of blocking edge provider traffic. See Israel et al. Declaration, at ¶ 69. The FCC specifically found in its Charter order that they were capable of doing so because of their peering relationships and lack of dependence on transit providers. FCC Charter-TWC Merger Order, at ¶¶ 116-117. These economists also claim that wired BIAS providers lack incentives to block edge providers because subscribers would switch to another provider and that switching is frequent. Israel Declaration, at ¶ 67; Lerner and Ordovery Declaration, at ¶¶ 83-91; Dippon Declaration, at ¶¶ 15-16. In their investigations, the FCC and DOJ found to the contrary. FCC Charter-TWC Merger Order, at ¶ 111; DOJ Economists Comcast-TWC Paper. Finally, these economists do not respond to evidence that consumers face uncertainty over the cause for degradation of service and that this asymmetric information reduces the likelihood of consumer switching. It does not appear that these economists have offered any new evidence or arguments that were not considered in previous FCC and DOJ investigations.

III. Wired Broadband and Vertical Integration into Video Distribution and Programming

An MVPD is a two-sided platform that connects video programmers with households. The MVPD negotiates licensing deals with video programmers, which ordinarily involves per-subscriber payments, and then licenses bundles of channels to households for monthly subscription fees. Many wired BIAS providers are owned by companies that also own an MVPD.

Cable companies almost always operate as an MVPD as well as a wired BIAS provider. Large telcos, such as AT&T and Verizon operate MVPDs, and smaller companies sometimes do so as well, either through their own service, or through a partnership with a DBS provider. In these cases, the wire coming into the home provides both wired broadband and MVPD services and these are installed with one service call.

Consumers can also choose between two satellite-based MVPDs. Direct TV, which is owned by AT&T, and DISH Network. AT&T also bundles Direct TV linear programming into its wired service. Satellite-based MVPDs are available more or less nationally.

Some of the large companies that own MVPDs also own video programmers. Comcast owns NBC-Universal. Charter owns a variety of regional sports networks, local news channels, and lifestyle community channels.⁴⁴ AT&T is seeking approval to purchase Time Warner.

The FCC and DOJ have found that wired BIAS providers have incentives to harm OVDs as a result of their profit interest in MVPDs and from the prospect that OVDs could compete with MVPDs at least in the long run.

⁴⁴ CCO Holdings (New Charter), 10-K for the Year Ended December 31, 2016, <http://ir.charter.com/phoenix.zhtml?c=112298&p=irol-sec>, at 8.

A. Households

As with wired BIAS providers, households can only use wired MVPDs that operate in their neighborhoods and can extend a wire to their house. Many households can also use a DBS service so long as their home has a direct line of sight and local zoning laws allow it. Therefore, roughly speaking, households have, on average, access to two wired MVPDs and two DBS providers.⁴⁵

The most important difference between MVPDs, however, concerns bundling. Cable and telco providers typically bundle broadband service, video programming, and telephone service together, and consumers have a preference to purchase these services from a single provider. The cable and telco providers usually establish pricing schedules that give households significant financial incentives—discounts off of the stand-alone prices—to purchase the bundle of services. One reason for doing so is that consumers are more sticky—that is, less likely to change providers—when they subscribe to the bundle.⁴⁶

As with wired BIAS providers, cable and telco firms operate MVPDs in a number of local markets. Table 5 shows the number and share of households for nine large MVPDs that account for 90.6 percent of all MVPD subscribers in 2017Q1. For each MVPD, the table also reports the share that the MVPD owner has of BIAS subscribers. The top three MVPDs account for 66.3 percent of MVPD subscribers and 64.6 percent of wired BIAS provider subscribers.

⁴⁵ FCC 2010 Open Internet Order, at ¶ 22; Federal Communications Commission, Eighteenth Report in the Matter of Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, January 17, 2017, https://apps.fcc.gov/edocs_public/attachmatch/DA-17-71A1_Rcd.pdf, at ¶ 21.

⁴⁶ Federal Communications Commission, Eighteenth Report in the Matter of Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, January 17, 2017, https://apps.fcc.gov/edocs_public/attachmatch/DA-17-71A1_Rcd.pdf, at ¶¶ 51-52.

Table 5: Subscribers and Shares for the Largest MVPD Providers, 2017Q1

	MVPD Subscribers	Share of U.S. MVPD Subscribers	Share of U.S. Wired BIAS Subscribers
AT&T-DirecTV (Inc. NOW)	24,435,000	25.9%	15.9%
Comcast	22,549,000	23.0%	25.4%
Charter	17,147,000	17.5%	23.3%
DISH (Inc. Sling TV)	13,528,000	13.8%	*
Verizon	4,681,000	4.8%	7.1%
Altice	3,500,000	3.6%	4.0%
Frontier	1,065,000	1.1%	4.2%
Mediacom	832,000	0.8%	1.2%
Cable ONE	307,187	0.3%	0.5%

Sources: Leichtman Research Group, “Major Pay-TV Providers Lost About 410,000 Subscribers in 1Q 2017,” May 18, 2017, <http://www.leichtmanresearch.com/press/051817release.html>; Leichtman Research Group, “About 960,000 Added Broadband in 1Q 2017,” May 19, 2017, <http://www.leichtmanresearch.com/press/051917release.html>.

Note: This list omits Cox, who subscriber count is more difficult to estimate from public data, but is probably in the range of 1 to 5 percent. DISH is also a BIAS provider (under its dishNET brand), but it has only a small number of subscribers.

B. Video Programmers

MVPDs mainly bundle television channels that have linear programming for which shows appear at fixed time slots. Some of these channels are provided specifically for MVPDs. Others consist of local broadcast station programming, which typically include network programming, such as from ABC, as well as local programming. In addition, MVPDs often have a video-on-demand service, which makes movies and reruns of television series available to subscribers at the time of their own choosing. Some of these offerings are included in the price of their subscriptions.

Video programmers, including local broadcast stations, want to distribute their content to households. They typically charge licensing fees to MVPDs, which recover those fees from their household subscription fees, and they also sell advertising. Generally, the only way they can reach a household is through the MVPD that services that household. Only 17 percent of

US households watch television through over-the-air broadcasting; those households tend to be poorer and younger than households that pay for access.⁴⁷

The FCC and DOJ have found that large MVPDs have significant bargaining power over video programmers. The threat by MVPDs to pull programming deprives the video programmer of access to customers, which results in a loss of license fees as well as advertising revenue. However, the MVPD may lose subscribers, particularly to competing MVPDs, when it blocks programming. Overall, however, larger MVPDs pay significantly lower per subscriber licensing fees to video programmers as a result of their greater bargaining power relative to smaller MVPDs.

In late 2015, Comcast, the largest MVPD at that time, paid 28 percent less than Cablevision, a mid-size MVPD. Time Warner Cable paid 20 percent less and Charter 8 percent less than Cablevision.⁴⁸ In the Charter-Time Warner Cable merger, I submitted a regression analysis that showed that differences in size are a substantial and statistically significant determinant of differences in programming costs, and that analysis was cited by the FCC in its order in that matter.⁴⁹ Staff economists at the DOJ reached the same conclusion, controlling for more factors in their regressions.⁵⁰ The FCC has concluded that large MVPDs benefit from

⁴⁷ Deborah D. McAdams, “Survey: 17 Percent of U.S. Households Are OTA-Only,” TV Technology, July 13, 2016, <http://www.tvtechnology.com/news/0002/17-percent-of-us-households-are-otaonly/278987>.

⁴⁸ David S. Evans, “Economic Analysis of the Impact of the Proposed Merger of Charter, Time Warner Cable, and Bright House Networks on Video Programming Prices and Broadband Entry and Competition,” Declaration in the Matter of Applications of Charter Communications Inc., Time Warner Cable Inc., and Advance/Newhouse Partnership for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 15-149, January 15, 2016, <https://ecfsapi.fcc.gov/file/60001406054.pdf> (“Evans Charter Declaration I”), at ¶ 59, citing data from SNL Kagan.

⁴⁹ Evans Charter Declaration I, at ¶¶ 57-58; FCC Charter-TWC Merger Order, at ¶ 215.

⁵⁰ Robert Aarons and Alexander Raskovich (2016), “Do Bigger Firms Get Better Terms? Evidence from Pay TV,” Working Paper, https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=IIOC2016&paper_id=465.

increased negotiating strength with programming providers, resulting in volume discounts that are unavailable to smaller MVPDs.⁵¹ That differential places smaller MVPDs that compete with them at a competitive disadvantage and poses barriers to entry by smaller MVPDs, a topic that is discussed in more detail below.

C. Vertical Integration into Video Programming

Several large cable and telco providers have also acquired video programmers. The FCC and DOJ have reviewed these acquisitions. In all cases the FCC, the DOJ, or both expressed concerns over the possibility that these companies would use their control over video programming to disadvantage smaller MVPD rivals, or OVDs, and imposed conditions on those firms.

The FCC has identified four cable and telco providers that own substantial video programming assets: AT&T, Charter, Comcast/NBC Universal, and Cox.⁵² When AT&T acquired DirecTV in 2015, the FCC required that it not discriminate in favor of its own video programming services, and that it disclose details of its interconnection agreements.⁵³ When Charter acquired Time Warner Cable, the FCC required that it offer settlement-free interconnection agreements, and that it not impose data caps or usage-based pricing for mass

⁵¹ Federal Communications Commission, Eighteenth Report in the Matter of Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, January 17, 2017, https://apps.fcc.gov/edocs_public/attachmatch/DA-17-71A1_Rcd.pdf, at ¶ 32.

⁵² Federal Communications Commission, Eighteenth Report in the Matter of Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, January 17, 2017, https://apps.fcc.gov/edocs_public/attachmatch/DA-17-71A1_Rcd.pdf, at Table B-1. Note that since the FCC published this table, Cox has divested its interest in the Travel Channel, one of its cable networks. Scripps Networks, “Scripps Networks Interactive Takes Full Ownership of Travel Channel,” February 25, 2016, <http://www.scrippsnetworksinteractive.com/newsroom/company-news/Scripps-Networks-Interactive-Takes-Full-Ownership-of-Travel-Channel/>.

⁵³ Federal Communications Commission, Memorandum and Opinion and Order in the Matter of Applications of AT&T Inc. and DIRECTV for Consent to Assign or Transfer Control of Licenses or Authorizations, MB Docket No. 14-90, July 8, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-94A1_Rcd.pdf, at Appendix B.

market customers.⁵⁴ When Comcast acquired NBC Universal, the FCC mandated commercial arbitration for carriage disputes, the offering of a standalone BIAS at reasonable market-based prices, and the continued provision of content to Hulu. It also forbade or restricted discrimination against non-affiliated video programming vendors, exclusivity/windowed of video programming distributed through OVDs, and the offering of a specialized BIAS with just Comcast-NBCU content.⁵⁵

D. Summary

The companies that own wired BIAS providers typically also own MVPDs. All of the eight largest wired BIAS providers, accounting for 87.2 percent of residential BIAS subscribers, also operate MVPDs as of 2017 Q1. The MVPDs owned by these eight wired BIAS providers accounted for 76.6 percent of residential MVPD subscribers and 85.0 percent excluding DBS subscribers as of 2017 Q1. Four large BIAS providers, accounting for 64.6 percent of broadband subscribers and 66.3 percent of MVPD subscribers, own video programmers. The FCC and DOJ have found that the common ownership of wired BIAS providers and MVPDs can result in incentives to harm OVDs.

⁵⁴ Federal Communications Commission, Memorandum Opinion and Order in the Matter of the Applications of Charter Communications, Time Warner Cable, and Advance/Newhouse for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 15-149, May 10, 2016 (“FCC Charter Order”), at Appendix B.

⁵⁵ Federal Communications Commission, Memorandum Opinion and Order in the Matter of Applications of Comcast Corp., General Electric Company and NBC Universal Inc. for Consent to Assign Licenses and Transfer Control of Licenses, MB Docket No. 10-56, January 20, 2011, https://apps.fcc.gov/edocs_public/attachmatch/FCC-11-4A1.pdf at Appendix A.

IV. Barriers to Entry and Expansion for BIAS and MVPD Providers

The typical American adult, 18 years and older, spends 4.9 hours per day watching television and 1.0 hours per day online using a desktop or laptop.⁵⁶ These two activities account for 38.7 percent of the time Americans adults aren't sleeping and 50.0 percent of the time they aren't sleeping or working.⁵⁷ Across all American adults this amounts to 530.1 billion hours a year.

Households prefer to get wired broadband (BIAS) and linear programming (MVPD) services from the same company. As shown above, however, they have limited choices when it comes to getting wired Internet service at fast enough broadband speeds. Almost a third of households only have one high-speed broadband alternative and another 44 percent have just two alternatives.

These limited choices for American households are likely to continue as a result of barriers to entry into local markets, as the FCC has recognized.⁵⁸ New entrants typically have to obtain an approval from a local authority. There are regulatory, political, and other barriers to obtaining that authorization. Getting approval is often contentious and sometimes not successful. The costs of laying a physical network are substantial, upfront, and are sunk. The entrant faces risks in securing a return on this investment. A significant problem is that firms need to offer both wired broadband and linear programming to attract most consumers who want both. Large MVPD competitors, however, have secured video programming at much

⁵⁶ Nielsen, "The Nielsen Total Audience Report, Q4 2016," April 3, 2017, <http://www.nielsen.com/us/en/insights/reports/2017/the-nielsen-total-audience-report-q4-2016.html>, at 10.

⁵⁷ Time spent sleeping and working is from US Bureau of Labor Statistics, 2016 American Time Use Survey, June 2017, <https://data.bls.gov/cgi-bin/srgate>, Series TUU10101AA01017866 (A) (Avg hrs per day - Sleeping, 18 yrs and over) and Series TUU10101AA01019222 (Avg hrs per day - Working, 18 yrs and over).

⁵⁸ FCC Charter-TWC Merger Order, Appendix C (Economic Appendix), at ¶ 63.

lower costs than is available to a new entrant. As a result, the entrant faces a significant cost disadvantage, which can prevent it from operating profitably. These problems deter significant entry into the provision of local wired broadband services.

A. Political and Regulatory Barriers to Entry

Installing a physical network, such as coaxial cable or fiber, generally requires using public rights-of-way, such as digging up the streets in urban areas or installing poles and wires in non-urban areas. Companies often need to secure permission to dig up streets from local governments. Typically, deploying a network requires obtaining space on existing utility poles as a result zoning restrictions, environmental regulations, and start-up costs.⁵⁹ This process is often complex as there is no one set of regulations that new entrants may rely upon—it often varies based on geographic area and whether federal, state, and/or local rules apply. It also requires securing the cooperation of pole owners, and other providers, some of which may be competing systems, as well as possibly local authorities.

These requirements set up the opportunity for incumbents to use political rent seeking to deter or slow entry or to raise the costs of entry to competitors.⁶⁰ According to William Baer, speaking as head of the DOJ’s Antitrust Division at the time,

Sometimes the concern with undue restrictions on competition stems from incumbents seeking laws and regulations that would impede opportunities for rivals to challenge their control over the pipeline. We see that debate playing out in efforts by some

⁵⁹ See *Gulf Power Co. v. FCC*, 208 F.3d 1263 (11th Cir. 2000) (“[C]able television industry has attached its cables to the utility poles of power and telephone companies. . . .because factors such as zoning restrictions, environmental regulations, and start-up costs have rendered other options infeasible. . . .[Additionally,] utility poles afforded [telecommunications providers] the only feasible means for stringing their wires.”); See also S. Rep. No. 580, 95th Congress, 1st Sess. at 13 (1977) (1977 Senate Report), *reprinted in* 1978 U.S.C.C.A.N. 109.

⁶⁰ FCC NC-TN Preemption Order.

internet service providers to seek state laws precluding local communities from encouraging alternatives to local broadband monopolies.⁶¹

In the case of the state restrictions that prevented the municipal provider in Wilson, NC from expanding its operations, the FCC found that those regulations were “largely sponsored and lobbied for by incumbent providers.”⁶² These laws had the effect of raising the economic cost of operating new systems and imposed delays in securing approvals for these systems.⁶³

New entrants also must seek access to multiple dwelling units (“MDUs”) which often requires negotiating with property owners and/or managers. About 30 percent of U.S. households live in MDUs.⁶⁴ However, arrangements with incumbent providers, including for example, exclusive marketing agreements, graduated revenue sharing arrangements, and

⁶¹ Bill Baer (Assistant Attorney General, Antitrust Division, US DOJ), “Video Competition: Opportunities and Challenges,” Remarks as Prepared for the Duke Law Center for Innovation Policy, Fall Conference on the Future of Video Competition and Regulation, Washington DC, October 9, 2015, <https://www.justice.gov/opa/file/782401/download>.

⁶² FCC NC-TN Preemption Order, at ¶ 37. The FCC further cited an industry report finding that “many of the states with laws restricting or barring the ability of municipalities to build broadband networks passed similar laws between 2004 and 2006 ‘under pressure from national cable companies, telephone companies, and the American Legislative Exchange Council (ALEC)’” and that the membership of ALEC included Time Warner Cable and AT&T.

⁶³ FCC NC-TN Preemption Order. The North Carolina statute, for example, limited the ability of the municipal system from engaging in price competition, by imposing restrictions that tend to raise retail prices, and increasing the costs of doing business. The FCC found that removing these state restrictions would “promote competition by bringing additional choices to the marketplace so that consumers are served with more choices, lower prices, and higher quality. Statement of Chairman Tom Wheeler, Re: City of Wilson, North Carolina Petition for Preemption of North Carolina General Statute Sections 160-240 et seq., WC Docket No. 14-115, The Electric Power Board of Chattanooga, Tennessee Petition for Preemption of a Portion of Tennessee Code Annotated Section 7-52-601, WC Docket No. 14-116, March 12, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-25A2.pdf, at ¶ 7. The FCC’s order was overturned by the Sixth Circuit on the grounds that the FCC had exceeded its statutory authority. The court noted, however, that its finding was “limited” and that it did not “question the public benefits that the FCC identifies in permitting municipalities to expand Gigabit Internet.” *Tennessee and North Carolina v. Federal Communications Commission*, Case No. 15-3291/35555 (6th Cir., August 10, 2016), <http://www.opn.ca6.uscourts.gov/opinions.pdf/16a0189p-06.pdf>.

⁶⁴ See table from the U.S. Census Bureau’s 2010-2014 American Community Survey 5-Year Estimates, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_13_5YR_B25024&prodType=table (“American Community Survey”) (showing that thirty percent of American homes are in multifamily buildings).

exclusive wiring arrangements in MDUs may impact the ability of new entrants to gain access to buildings to provide broadband service, limiting their reach to consumers.⁶⁵

The web of federal, state and local rules also provides incumbents with the opportunity to use litigation to prevent, or delay, competition. When cities or states have adopted pro-competitive policies to facilitate pole or MDU access they have typically faced litigation or regulatory challenges from incumbent cable and telco companies, or their representatives, that result in slowing the adoption of these policies.⁶⁶ Nashville, for example, passed an ordinance to accelerate the deployment of new broadband entrants deploying fiber.⁶⁷ AT&T and Comcast, which are incumbents operating in Nashville, both sued to block it shortly after the ordinance was passed in September 2016.⁶⁸ The case is still pending in the courts. Similarly, San Francisco passed a local ordinance that enables new entrants to gain access to MDUs where tenants have requested alternative services. That ordinance is now being challenged at the FCC by an entity whose membership includes incumbent providers.⁶⁹

The provision of wired broadband and linear programming is therefore well removed from the competitive markets that prevail in most parts of the economy. State and local laws,

⁶⁵ See, e.g., Comments and Reply Comments of INCOMPAS, GN Docket No. 17-142 (July 24, 2018 & Aug. 22, 2018), available at <http://www.incompas.org/files/INCOMPAS%20Comments%20on%20MTE%20NOI.pdf> and at <http://www.incompas.org/files/INCOMPAS%20Reply%20Comment%20GN%2017-142.pdf>.

⁶⁶ *BellSouth Telecommunications, LLC v. Louisville/Jefferson Cty. Metro Gov't*, No. 3:16cv00124 (W.D. Ky. Oct. 31, 2016); *Comcast of Nashville I, LLC, v. Metro. Gov't of Nashville & Davidson Cty., Tenn.*, No. 3:16cv2794 (M.D. Tenn. Oct. 25, 2016).

⁶⁷ *Mayor Barry Statement on One Touch Make Ready Ordinance*, NASHVILLE.GOV, Sep. 20, 2016, <https://www.nashville.gov/News-Media/News-Article/ID/5686/Mayor-Barry-Statement-on-One-Touch-Make-Ready-Ordinance.aspx>.

⁶⁸ Jamie McGee and Joey Garrison, "Comcast Sues Nashville over Google Fiber-Backed Pole Ordinance," *The Tennessean*, October 25, 2016, <http://www.tennessean.com/story/news/local/2016/10/25/comcast-sues-metro-over-google-fiber-backed-pole-otmr-ordinance/92748490/>.

⁶⁹ Media Bureau Seeks Comment on Petition for Preemption of Article 52 of the San Francisco Police Code Filed By the Multifamily Broadband Council, Public Notice, FCC 17-149 (rel. Apr. 4, 2017).

lobbying by the incumbent carriers, and political rent seeking restrict entry, expansion, and competition.

B. Simultaneous Entry and Video Programming

At least in the current environment American households prefer to use the same company for their wired BIAS provider and their wired MVPD service.⁷⁰ In reviewing the AT&T/DirecTV acquisition, the FCC found that “bundles of broadband and video are more attractive to consumers”, citing evidence that “78 percent of basic cable video subscribers purchase a bundle of services” and that “more than 97 percent of AT&T’s 5.7 million video customers subscribe to bundled services.”⁷¹ Almost all wired MVPDs also provide wired broadband services and almost all wired BIAS providers also provide a linear programming option.⁷² Generally, companies offer bundles of these services and consumers take the services together.

To have a viable offering for consumers, companies that want to enter into the provision of wired broadband have to offer linear video programming as well. That means that, in addition to laying down wires in a local market, they have to enter into licensing deals with video programmers to have competitive offering.

⁷⁰ DOJ Economists Comcast-TWC Paper, at 430.

⁷¹ Federal Communications Commission, Memorandum Opinion and Order in the Matter of the Applications of AT&T Inc. and DIRECTV for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 14-90, July 28, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-94A1_Rcd.pdf (“FCC AT&T-DirecTV Merger Order”), at ¶ 157. The FCC also found that DirecTV was at a competitive disadvantage because it could not provide a bundled offering, other than by partnering with broadband providers to offer a “synthetic” bundle, which was viewed significantly less successful. FCC AT&T-DirecTV Merger Order, at ¶ 156.

⁷² This is the case for all major providers. A review of small BIAS providers found that almost all offered linear video programming. Evans Charter Declaration I, at fn. 79.

This presents a competitive obstacle to them. As noted above large MVPDs have the bargaining power, resulting from their control of access to large shares of households, to negotiate relatively low rates from video programmers. Entrants, including companies like Google Fiber, lack that bargaining power and have to pay much higher rates.

That cost wedge puts the entrants at a significant disadvantage when they compete head-to-head with a local system operated by a very large MVPD. The entrant has to meet, at least roughly, the bundled prices offered by the competition. It may not be able to do that profitably though.

The FCC recognized the competitive disadvantage that AT&T faced as an MVPD in its review of AT&T's acquisition of DirecTV. AT&T was a smaller MVPD, even though it had nearly 6 million MVPD subscribers, well in excess of the subscriber base a new entrant would have.⁷³ Moreover, the large MVPD can lower its price, and still earn a profit, to compete with the entrant given their cost advantage on video programming.

Justice Department economists pointed to the need for simultaneous entry and the cost wedge as a serious barrier to entry.⁷⁴

Overbuilders, however, have a problem: many consumers want to purchase both video and broadband service. This may require overbuilders to offer both video and broadband service in a discounted bundle if they wish to compete with the incumbent cable companies—but providing video service is more expensive for overbuilders than for the large, incumbent cable companies because the former typically pay higher programming costs. The high cost of video service, indeed, has likely slowed the expansion of overbuilders, limiting the introduction of their beneficial broadband competition mostly to densely populated, high-income areas. Some traditional telephone providers may have limited the footprints for their highspeed Internet offerings for the same reason.

⁷³ FCC AT&T-DirecTV Merger Order, at ¶ 3.

⁷⁴ DOJ Economists Comcast-TWC Paper, at 421.

C. Sunk Capital Investment Costs

It is expensive to lay physical networks. The costs include purchasing the pipes (co-axial cable or fiber) and the labor of installing the infrastructure often in densely populated areas. In principle, this just requires money and access to capital markets. However, the investment in laying a physical network is a sunk, upfront cost. The returns take place over time. This investment is risky.

For a local entrant that doesn't plan to grow into a national provider the video programming cost differential creates uncertainty. The entrant's success depends on whether its wired BIAS offering is sufficiently better than the competition to support prices that are sufficient to offset the video programming cost disadvantage. Further the entrant faces risk that the incumbent systems, if owned by large providers, will selectively lower their prices in regions where they face competition from entrants, which they are able to do given their video programming cost advantage. Incumbents have done so as discussed below when faced with competition. The ability of incumbents to selectively target regions with new entry significantly limits the profitability of entry even when prevailing prices are significantly above competitive levels. These risks tend to dissuade entrants from making the capital investment.

National entrants would face less risk if they could expect to secure a large enough base of subscribers to secure similar concessions on video programming prices. Because of the political barriers to entry, and the time it takes to lay a physical network, it would take

considerable time to develop a national competitor from scratch and securing the necessary approvals would create uncertainty.⁷⁵

The experience of Google Fiber demonstrates that even a very well capitalized, and seemingly motivated firm, finds that the risks are great. Google announced efforts to enter the provision of high-speed broadband in March 2011.⁷⁶ It launched its first system in November 2012 in Kansas City, MO and has since established service in Atlanta, GA; Austin, TX; Charlotte, NC; Huntsville, AL; Kansas City, KS; Nashville, TN; Orange County, CA; Provo,

⁷⁵ Israel et al. claim that, “Economics teaches that in markets such as broadband Internet access, the presence of two competitors is likely to result in effective competition. In particular, the presence of high sunk costs in this industry means that competition is likely to be intense, even with only two providers.” Israel Declaration, at ¶ 53. Their claim is not consistent with the facts found by both the FCC and DOJ. If there was such intense competition we would expect to observe significant switching between large BIAS providers, which we don’t, and we would not expect to see cable and telco providers ranked at the bottom of companies in terms of consumer service, which we do (Section VII.A). Moreover, we would not expect to see significant price reductions and improvements of quality in the rare instances in which incumbent high-speed wired BIAS providers face an additional competitor as discussed below. As noted above, while Israel et al. offer significant evidence of intense competition for cellular providers they offer little for wired BIAS providers and much of what they offer has been rejected by the FCC in previous investigations.

In support of his claim that two firms is sufficient to ensure competitive outcomes, Israel et al. cites to an earlier filing (Mark Israel, Daniel Rubinfeld, and Glenn Woroch, “Analysis of the Regressions and Other Data Relied Upon in the Business Data Services FNPRM And a Proposed Competitive Market Test,” Competitive Analysis of the FCC’s Special Access Data Collection,” August 9, 2016, WC Docket No. 05-25, at 2), in which Israel and his co-authors cited three FCC decisions as support. None of those three decisions actually support their claim. Two of them simply note that exclusionary tactics are likely to be ineffective against a firm with significant sunk investments. FCC (1999), “Fifth Report & Order & Further Notice of Proposed Rulemaking, Access Charge Reform; Price Cap Performance Review for Local Exchange Carriers,” 14 FCC Rcd. 14221, 14264, ¶ 80; WorldCom, Inc. v. FCC, 238 F.3d 449, 458-59. The third is a merger consent decree in which the FCC allowed the merging parties to not divest business in buildings where a) the merger would reduce the number of providers from two to one, but b) there was another provider in an adjacent building that could easily enter. FCC (2007), “Memorandum Opinion & Order,” AT&T Inc. & BellSouth Corp., Application for Transfer of Control, 22 FCC Rcd. 5662, 5682-83, ¶¶ 41-42. All three of these decisions fall far short of supporting a general proposition that, with substantial sunk costs, two firms are sufficient to ensure competitive outcomes.

Economic theory does not, in fact, support their claim, as a general matter, that two firms with sunk costs is enough for effective competition. Economic theory shows that this depends on a number of factors. Jean Tirole (1988), *Theory of Industrial Organization* (Cambridge, MA: MIT Press), at 314-336. This section of the classic *Industrial Organization* textbook starts by presenting a model in which sunk costs deter entry by committing the incumbent to aggressive competition in the case of entry. It then proceeds to generalize the example, showing that sunk investments can either raise or lower the aggressiveness of the incumbent in the event of entry, depending on how sunk investments shift its reaction curve.

⁷⁶ Google, “Ultra High-Speed Broadband Is Coming to Kansas City, Kansas,” Google Official Blog, March 30, 2011, <https://googleblog.blogspot.no/2011/03/ultra-high-speed-broadband-is-coming-to.html>.

UT; Raleigh-Durham, NC; and Salt Lake City, UT.⁷⁷ This entry was extremely time consuming and costly. For example, it took Google Fiber almost twenty months to lay enough fiber to pass (but not connect) 149,000 households in Kansas City.⁷⁸ Industry estimates placed the cost of entry in each city at more than \$1 billion.⁷⁹ In October 2016, Google Fiber announced that it was going to stop upcoming rollouts that had been planned.

D. Competitive Benefits of Entry and the Threat of Entry

In the rare instances in which high-speed broadband has taken place, incumbents have responded with lower prices and improved service. That demonstrates that the incumbent providers had significant market power before entry occurred. It also shows the extent to which barriers to entry, many of which arise from political rent seeking, protect their market power.

High-speed broadband entry has taken place in several cities as a result of Google Fiber, municipal electric companies, and others. In one decision, the FCC found that in both municipalities it considered, the municipal provider had spurred competitive responses from incumbents. Time Warner Cable had raised rates for almost all of its services in areas around Wilson, NC, but held them steady in Wilson.⁸⁰ Time Warner Cable also increased the top broadband speed tier in Wilson, NC and attributed the change to the competitive environment.

⁷⁷ Google Fiber, “Google Fiber Cities & Locations,” <https://fiber.google.com/newcities/>.

⁷⁸ “Will Google Fiber Waste \$28 Billion?,” *Forbes* Aug. 21, 2012 (available at <http://www.forbes.com/sites/petercohan/2012/08/21/will-google-fiber-waste-28-billion/>); TechCrunch, “Analyst: Google Will Spend \$84M Building Out KC’s Fiber Network to 149K Homes; \$11B If It Went Nationwide,” April 8, 2013 (available at <http://techcrunch.com/2013/04/08/google-fiber-cost-estimate>).

⁷⁹ Mark Bergen, “Google Fiber Is the Most Audacious Part of the Whole Alphabet,” *Re/Code*, May 11, 2016, <https://www.recode.net/2016/5/11/11613308/google-fiber-alphabet>.

⁸⁰ FCC NC-TN Preemption Order, at ¶ 52.

Similarly, the FCC found that entry of the municipal provider in Chattanooga, TN led Comcast to improve its broadband speed offerings and to limit its rate increases.⁸¹

The evidence from Google Fiber's entry provides further evidence of competitive benefits for consumers from competition among BIAS providers. In Kansas City, AT&T responded by matching Google Fiber's gigabit speed and pricing and Time Warner Cable tripled its broadband speeds without increasing prices.⁸² Similarly in Austin and in Raleigh-Durham, Time Warner Cable increased its broadband speeds by up to three times and six times respectively without increasing its prices.⁸³ AT&T announced and began building fiber to the home in Austin. More generally, AT&T offers its gigabit service at \$70 in regions where Google Fiber is present, matching its pricing, versus \$110 elsewhere.⁸⁴

This benefits of competition are further confirmed by an econometric analysis undertaken by the FCC in reviewing the Charter-Time Warner Cable transaction based on data

⁸¹ FCC NC-TN Preemption Order, at ¶¶ 50-51.

⁸² Jacob Davidson, "Google Fiber Has Internet Providers Scrambling to Improve Their Service," Time, April 13, 2015, <http://time.com/money/3820109/google-fiber-has-internet-providers-scrambling-to-improve-their-service/>.

⁸³ Jon Brodtkin, "Google Fiber Plans Expansion, Then TWC Makes Speeds Six Times Faster," Ars Technica, April 13, 2015, <https://arstechnica.com/information-technology/2015/04/google-fiber-plans-expansion-then-twc-makes-speeds-six-times-faster/>; Time Warner Cable, "Time Warner Cable Begins Major Internet Speed Increases in Austin and Surrounding Communities," May 21, 2014, <https://www.timewarnercable.com/en/about-us/press/twc-begins-major-internet-speed-increase.html>; Time Warner Cable, "Time Warner Cable Takes Next Step to Transform TV and Internet Experience in the Charlotte Area," April 8, 2015, <https://www.timewarnercable.com/content/twc/en/about-us/press/twc-to-transform-tv-internet-in-charlotte-area.html>.

⁸⁴ Jon Brodtkin, "Google Fiber Plans Expansion, Then TWC Makes Speeds Six Times Faster," Ars Technica, April 13, 2015, <https://arstechnica.com/information-technology/2015/04/google-fiber-plans-expansion-then-twc-makes-speeds-six-times-faster/>.

submitted by the parties. The FCC found that there were significant competitive responses by BIAS incumbents when faced with competition from high speed alternatives:⁸⁵

Evidence in the record confirms that fiber, FTTP, and FTTN are reasonable substitutes for cable BIAS, while other technologies are not. The evidence shows that the Applicants alter their pricing and product offerings materially in response to FTTP and FTTN offerings from companies like Google (Google Fiber), Verizon (FiOS), and AT&T (U-Verse) but not in response to other technologies. As described in the attached Economic Appendix, the Applicants' predicted pricing behavior is most affected when the companies are in competition with providers that are able to match or exceed the download speeds of the Applicants' BIAS product offerings.

In most local markets, new high-speed broadband providers have not entered and there is no credible threat that they will. The empirical evidence illustrates how consumers are harmed from the current lack of competition. The incumbent cable and telco providers do not offer the same level of high-speed BIAS options, and charge higher prices, than they would if they faced entry or the threat of it. This situation results in part from state and local entry restrictions some of which have been promoted by the very large cable and telco systems.

E. Summary

Households have limited choices for wired BIAS providers and for ones that also operate MVPDs. That situation does not appear likely to change as a result of barriers to entry. Significant barriers arise, not just from fundamental economic factors such as scale, but from political rent seeking at the local and state level. The large cable and telco companies, which account for a large share of households nationally, have thwarted entry through lobbying and litigation.

⁸⁵ FCC Charter-TWC Merger Order, at ¶ 57. The competitors considered in the data analyzed by the FCC included fiber and DSL competitors but did not appear to include competition from cable overbuilders.

V. ISP Market Structure, Access Prices, and Bargaining Leverage

The FCC and DOJ, in the course of their investigations into proposed mergers, have found that the largest wired BIAS providers have considerable leverage over edge providers and have used that leverage to impose interconnection fees on them.⁸⁶ This leverage results from several interrelated factors.⁸⁷

- First, the largest wired BIAS providers have the technical ability to degrade the quality of the connection between an edge provider and end user subscribers and, in the extreme, to prevent the edge provider from reaching its customers.
- Second, many edge providers achieve economies from widespread distribution as a result of indirect network effects, higher advertising prices for achieving wider reach, fixed costs of programming, and other demand-side and cost-side scale effects.
- Third, the largest wired BIAS providers are the only feasible ways for edge providers to reach a significant fraction of consumers who are using smart televisions, gaming consoles, desktops, and other devices at home to consume content and can therefore prevent edge providers from securing a critical mass of customers.
- Fourth, when wired, BIAS providers degrade the quality of connection it is not clear to the consumer whether the problem is caused by the BIAS provider or by the edge provider or some other cause; as a result, wired BIAS providers can limit customer churn resulting from degradation strategies.
- Fifth, many households have no, or a poorer alternative, to the large wired BIAS engaging in this strategy, which further limits possible churn. In the Census blocks served by AT&T, Charter, Comcast, and Verizon, 43.2 percent of the population has no alternative high-speed wired broadband provider with greater or equal download speeds. And an additional 46.4 percent of the population lives in Census blocks with only one alternative high-speed wired broadband provider.

⁸⁶ William P. Rogerson, “Economic Theories of Harm Underlying Regulatory Concerns with the Proposed Comcast/TWC Transaction,” 8th Annual FTC Microeconomics Conference. November 12-23, 2015, Washington D.C., https://www.ftc.gov/system/files/documents/public_events/633601/rogerson_keynote.pdf (“Rogerson (FCC) Comcast-TWC Speech”); DOJ Economists Comcast-TWC Paper, FCC Charter-TWC Merger Order.

⁸⁷ Israel et al., Lerner and Ordoover, and Dippon reject the existence of one or more of these factors. They do not, however, provide any arguments or evidence to rebut the findings by the FCC and DOJ that these factors are economically important.

These factors indicate the larger the wired BIAS provider the larger the interconnection fee it can impose. Empirical studies conducted by the FCC and DOJ have confirmed that relationship.

This section describes these factors in more detail and their implication for access pricing. These same factors, however, enable large wired BIAS providers to engage in vertical foreclosure strategies against OVDs, and other edge providers, which is the subject of the next section.

A. The Five Factors Behind the Bargaining Leverage by Large Wired BIAS Providers

1. Technical Ability to Degrade Connections

An edge provider that distributes significant amounts of content typically uses a CDN. The CDN maintains content for edge providers in geographically dispersed locations. That provides greater latency—that is less time between the request for content and the delivery of content—and allows the CDN to balance traffic across multiple server locations. Some large edge providers, such as Netflix, may effectively operate their own CDNs and deliver content to BIAS providers directly when they have a peering agreement or through a transit provider.

The CDN delivers the content requested by a subscriber to the subscriber's BIAS provider directly if it has a peering agreement with the BIAS provider to exchange traffic, which is common for large BIAS providers. For BIAS providers for which the CDN does not have a peering agreement, the CDN will use a transit provider to deliver the content requested by the BIAS provider's subscriber. Transit providers are the in the business of connecting parties without direct peering agreements. In either case, when content is delivered to the BIAS provider, the provider then moves the content across its network to the household.

Large wired BIAS providers have peering relationships with each other, with third-party and edge provider-operated CDNs, and with transit providers. Only a small portion of a large BIAS provider's traffic comes from any given CDN or transit provider. By contrast, medium sized and smaller BIAS providers commonly rely on a transit provider to exchange much of their Internet traffic.

The quality of connection between the switching facility and the household depends in large part upon whether there is enough port capacity at the switching facility to handle the traffic. Wired BIAS providers typically expand ports, which are not very expensive, to ensure there is enough capacity to handle the downloads requested by their subscribers. Wired BIAS providers that rely mainly on transit providers to handle traffic would find that households would have difficulty accessing all Internet traffic if they didn't expand their port capacity enough. Most BIAS providers have therefore expanded port capacity in line with the expansion of traffic requested by their households.

Large wired BIAS providers hold significant bargaining power with respect to a given CDN or transit provider. If the BIAS provider made too little port capacity available to a given CDN or transit provider, the BIAS provider's households would not experience significant problems in consuming most content, which would still come over its other uncongested peering relationships. For medium sized or smaller BIAS providers, if they did not provide enough port capacity, a large portion of their subscribers' content would be affected.

The FCC recognized this phenomenon in its review of Charter's proposed acquisition of Time Warner Cable.⁸⁸ Charter relied on transit providers to exchange much more of its Internet

⁸⁸ FCC Charter-TWC Merger Order, at ¶117.

traffic than Time Warner Cable, which had extensive peering relationships with other BIAS providers and with CDNs, as well as with transit providers. The FCC concluded that the combined company would have more bargaining leverage over edge providers because Charter would gain access to the peering relationships which would reduce the impact of congesting a particular transit provider.

2. Demand-Side and Cost-Side Scale Economies for Edge Providers

Edge providers typically benefit from demand-side and cost-side scale economies. According to economists at the DOJ, based on the agency's investigation on the proposed acquisition of Time Warner Cable by Comcast, "[c]ontent providers need access to customers. The more end users that a content provider can reach, the easier it is to monetize investments (e.g., in programming), cover fixed costs, and permeate the national consciousness." The FCC concluded, in its review of Charter's acquisition of Time Warner Cable, that "edge providers would need access to New Charter subscribers," which would account for a fifth of wired broadband households, "to remain viable as a business."⁸⁹

On the demand-side, edge providers typically have direct or indirect network effects so that each user realizes more value the more other users there are. Edge providers that connect users (people or businesses) benefit from ubiquity so that users can connect with other users no matter where they live. Many edge providers are ad supported; advertisers pay higher per-impression advertising prices to edge providers that reach more people. It is particularly important that ad-supported edge providers reach major urban areas such as New York and Los Angeles.

⁸⁹ FCC Charter-TWC Merger Order, at ¶114.

On the supply side, edge providers typically have high fixed costs and low marginal costs. For many edge providers, the main costs involve software design and programming. Marginal costs of adding users are typically low and they realize profits from amortizing these fixed across a large base. OVDs sometimes incur significant fixed costs to procure programming; most of Netflix’s cost of programming, for example is fixed.⁹⁰ They require large-scale distribution to recover these costs.

Importantly, edge providers are generally competing with other edge providers that have ubiquitous distribution and benefit from these demand-side and cost-side scale effects.

3. Large BIAS Providers and Access to Households

As a result of these scale effects, the decision by a large BIAS provider to block an edge provider from reaching its subscribers could ruin the edge provider’s business. The edge provider would lose a significant amount of scale and would face competition from other edge providers that have not been blocked.

The FCC and Justice Department recognize that, by serving as gatekeepers to such large portions of households, these large BIAS providers have significant bargaining leverage over edge providers. The FCC imposed conditions on Charter’s acquisition of Time Warner Cable because of its concern that the new company would be the “gatekeeper for 20% of the national market.”⁹¹ Similar concerns were one of the bases for the DOJ to oppose Comcast’s acquisition of Time Warner Cable.⁹²

⁹⁰ Evans Comcast Declaration I, at ¶¶ 129-130.

⁹¹ FCC Charter-TWC Merger Order, at ¶113.

⁹² DOJ Economists Comcast-TWC Paper, at 427-428; Bill Baer (Assistant Attorney General, Antitrust Division, US DOJ), “Video Competition: Opportunities and Challenges,” Remarks as Prepared for the Duke Law Center

The edge provider would have more bargaining leverage if the BIAS provider lost significant numbers of subscribers as a result of degrading service or blocking the edge provider altogether. As a result of the next two factors, very large BIAS providers are not likely to face much risk.

4. Lack of Transparency Over Reasons for Degradation

When a large BIAS provider degrades the quality of connection to an edge provider, its subscribers may not know that the BIAS provider has taken actions that result in increased buffering, latency, or reductions in the quality of their connection. The household might think that it is possible that the edge provider was responsible for the reduction in the quality of the connection or that it is caused by computer issues, especially because most of her other Internet content is not affected by the congestion of a particular CDN or transit provider. As a result, consumers may lack confidence that the situation would improve if they switched wired broadband providers.⁹³

The situation is unlike blackouts of programming that occur in negotiations between MVPDs and video programmers. In those cases, it is widely publicized that either MVPD or video programmer has blocked the channel. Households also can have confidence that if they switch to an MVPD that carries the channel they will then have access to it.

for Innovation Policy, Fall Conference on the Future of Video Competition and Regulation, Washington DC, October 9, 2015, <https://www.justice.gov/opa/file/782401/download>, at 6-7.

⁹³ Federal Communications Commission, Report and Order on Remand, Declaratory Ruling, and Order in the Matter of Protecting and Promoting the Open Internet, GN Docket 14-28, March 12, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-24A1.pdf (“FCC 2015 Open Internet Order”), at ¶81.

5. Limited Switching

Subscribers of very large wired BIAS providers have few alternative providers of high-speed broadband. Table 7 reports the average number of alternative high-speed broadband providers for each of the large wired BIAS providers. Across the combined footprint of all four large wired BIAS providers, 25.8 percent of households had no alternative to their current provider, 46.9 percent had 1, and the average household had 1.07. Households could switch to a few additional slow broadband providers, but would then have to weigh the cost of having a lower speed for all of the Internet consumption in order to avoid the poor quality they are getting for a particular edge provider.

Table 6: Percentage of Population of Counts of High-Speed BIAS Alternatives to Major BIAS Providers, June 30, 2016

	Comcast	Charter	AT&T	Verizon	Combined
0	25.6%	29.7%	1.3%	0.1%	25.8%
1	50.0%	39.5%	44.0%	83.7%	46.9%
2	20.3%	25.1%	45.2%	13.8%	22.7%
3	3.6%	4.8%	7.9%	1.6%	3.9%
4	0.4%	0.8%	1.4%	0.1%	0.6%
5+	0.1%	0.1%	0.2%	0.0%	0.1%
Population-Weighted Average	1.03	1.08	1.65	1.16	1.07

Source: FCC Form 477 Data; US Census.

Even those people who have access to an alternative high-speed wired BIAS provider have only a limited selection. Table 7 shows, for each of the four largest wired BIAS providers and for their combined footprint, the percentage of the U.S. population in the providers' service area that has access to an alternative provider offering equal or greater download speeds. Most Comcast and Charter subscribers, who together account for 48.7 percent of subscribers, generally do not have an equal or faster alternative while most AT&T and Verizon subscribers,

who together account of 23.0 percent of subscribers, generally have access to one equal or faster alternative.

Table 7: Distribution of Population of Counts of High-Speed BIAS Alternatives to Major BIAS Providers, Equal or Greater Download Speed, June 30, 2016

	Comcast	Charter	AT&T	Verizon	Combined
0	86.9%	65.2%	11.2%	3.5%	43.2%
1	12.1%	29.5%	73.4%	85.3%	46.4%
2	0.9%	5.0%	13.4%	9.7%	8.1%
3	0.0%	0.2%	1.7%	1.4%	1.3%
4	0.0%	0.0%	0.2%	0.0%	0.8%
5+	0.0%	0.0%	0.0%	0.0%	0.1%
Population-Weighted Average	0.14	0.40	1.06	1.09	0.71

Source: FCC Form 477 Data; US Census.

Furthermore, as discussed above, switching wired broadband providers costs households time and inconvenience. The FCC, in its 2015 Open Internet Order concluded that “broadband Internet access providers have the ability to use terms of interconnection to disadvantage edge providers and that consumers’ ability to respond to unjust or unreasonable BIAS provider practices are limited by switching costs.”⁹⁴ As we discuss below, large BIAS providers found that the risk of losing subscribers was not serious enough to deter them from degrading connections for popular edge providers, such as Netflix, for many weeks.

B. Empirical Evidence on Degradation Strategies

Large BIAS providers started demanding access payments from large edge providers in around 2009 and in earnest in 2013, and ultimately entered into a series of contracts with several of them. One large edge provider, Netflix, asserted that the large BIAS providers degraded the quality of its connections to their subscribers as part of a bargaining strategy to

⁹⁴ FCC 2015 Open Internet Order, at ¶ 205.

force this OVD to agree to pay access fees. The company claimed that Comcast forced several transit providers to stop carrying Netflix traffic and then caused significant congestion on the remaining transit providers by failing to provide enough port capacity for the traffic. Comcast and Time Warner Cable denied they had done anything to degrade Netflix's signal to their households.⁹⁵

An investigation by the New York State Attorney General (NYAG), however, found evidence that Time Warner Cable and another unidentified wired broadband provider that operates in New York State engaged in degradation strategies as part of their bargaining with edge providers.⁹⁶ The NYAG found that “from at least 2013 to 2015, major BIAS providers made the *deliberate business decision* to let their networks’ interconnection points become congested with Internet traffic and used that congestion as leverage to extract payments from backbone providers and edge providers, despite knowing that this practice lowered the quality of their customers’ Internet service.” (emphasis in original).⁹⁷

⁹⁵ Comcast Corp., Letter to FCC, MB Docket 14-57, November 26, 2014, <https://ecfsapi.fcc.gov/file/60000988775.pdf>, at Response to Question No. 3, p. 8 (“It was Netflix, not Comcast, that deliberately created congestion issues that degraded the performance of Netflix for Comcast customers (and customers of other ISPs) in an effort to force Comcast (and others) to provide Netflix with free interconnection services”); Jennifer Khoury (Comcast SVP of Corporate and Digital Communications in Public Policy), “Comcast Response to Netflix,” Comcast Voices, April 24, 2014, <http://corporate.comcast.com/comcast-voices/comcast-response-to-netflix> (“As at least one independent commentator has pointed out, it was not Comcast that was creating viewability issues for Netflix customers, it was Netflix’s commercial transit decisions that created these issues”). I made several submissions on this topic before the FCC during its consideration to Comcast’s acquisition of Time Warner Cable. I concluded based on information from the record, and from Netflix, that Comcast’s claims that it had not deliberately congested the interconnection points were implausible. Evans Comcast Declaration II, at ¶¶ 90-100.

⁹⁶ People of the State of New York, Comments on the May 23, 2017 Notice of Proposed Rulemaking in the Matter of Restoring Internet Freedom, WC Docket No. 17-108, July 16, 2017; FCC Form 477 Data.

⁹⁷ Id. at 1. The New York Attorney General does not identify the other BIAS provider by name but the main providers in New York State during 2010-2015 were Verizon, Cablevision (now Altice), and Frontier, in addition to Time Warner Cable (now Charter).

According to the NYAG investigation, the interconnection points became severely congested. A survey conducted by the company, and obtained by the NYAG, found that "... more than a quarter of customers that responded to a survey [Time Warner Cable] conducted in 2015 reported experienced 'interruptions[s] in Internet service,' 'buffering problem[s] or '[i]ssues with streaming video content' in the prior 30 days."⁹⁸ Once Netflix agreed to pay access fees, the Netflix speed jumped 28 percent. The NYAG concluded that the other major BIAS provider engaged in similar practices, but has redacted the details since these practices were uncovered in an investigation of unrelated issues.

C. Empirical Relationship between Access Fees, Bargaining Leverage and Size

The Netflix interactions with the large BIAS providers provide further empirical insight evidence on the five factors described above and the extent to which degradation is a viable strategy for exercising bargaining leverage. Netflix was a highly successful OVD during the 2013-2015 period. It had around 31.7 million paid subscribers in the U.S. at the end of 2013, who paid roughly \$9 per month for streaming movies and television shows.⁹⁹ It accounted for 34.2 percent of peak-period North American Internet traffic in the first half of 2014.¹⁰⁰ Many of its subscribers were hooked on its service. It therefore had much more bargaining leverage than most edge providers because blocking its service would matter to many of a BIAS provider's

⁹⁸ Id. at 8.

⁹⁹ Netflix, 10-K for Year Ended December 31, 2013, <http://files.shareholder.com/downloads/NFLX/4887182540x0xS1065280-14-6/1065280/filing.pdf>, at 19.

¹⁰⁰ Sandvine, "Global Internet Phenomena Report 1H 2014," May 15, 2014, <https://www.sandvine.com/downloads/general/global-internet-phenomena/2014/1h-2014-global-internet-phenomena-report.pdf>, at 5.

subscribers and could, in principle, lead to switching, or price resistance, that could harm the BIAS provider's profits.

The large BIAS providers nevertheless made business decisions to degrade the quality of the service that their subscribers were getting, for extended periods of time, to press Netflix to pay access fees. They determined that the profits lost from their subscribers switching to another provider, or having lower demand for packages, were smaller than the profits gained from securing access fees. Netflix, which has vociferously resisted paying access fees, ultimately caved in to the demands of each of the very large BIAS providers from the smallest, Verizon with a 9.8 percent share, to the largest, Comcast with a 22.9 percent share of wired broadband subscribers.¹⁰¹ That provides significant empirical evidence that the large BIAS providers had the ability to degrade access to their subscribers and that household switching was not material enough to alter their profit incentives to do so.

The economic analysis of the role of the five factors in relative bargaining leverage, and similar analyses conducted by the FCC and Justice Department in several matters, implies that larger BIAS providers should be able to extract higher payments from edge providers. Economists at the Justice Department, during the course of its investigation of Comcast-Time Warner Cable merger, tested this theory. They collected data on the various contracts that large BIAS providers had negotiated with edge providers. They then used econometric methods to estimate the relationship between BIAS provider size and access fees while controlling for

¹⁰¹ These share calculations are based on data for the end of 2014 Q1, approximately the time frame in which these agreements were being negotiated and signed. Leichtman Research Group, "Nearly 1.2 Million Add Broadband in the First Quarter of 2014," May 20, 2014, <http://www.leichtmanresearch.com/press/052014release.html>.

other differences between providers, including quality. DOJ economists, including the Antitrust Division's chief economist, concluded that,¹⁰²

...Under a wide range of specifications, the relationship between size and fees was found to be positive, statistically significant, and economically meaningful. While such a finding could also be due to larger [BIAS providers] offering higher-quality interconnection, staff was able to test and reject this possibility empirically by controlling directly for the quality of the interconnection.

Their conclusion was similar to that reached by the FCC in the subsequent Charter-Time Warner Cable merger.¹⁰³

Our economic analysis suggests that the ability of a BIAS provider to charge for access to subscribers increases with the number of subscribers; the great[er] the number of subscribers, the more the BIAS provider can charge on a per-subscriber basis.

The empirical evidence available to, and examined by, the FCC and DOJ pertained to OVDs. Large wired broadband providers have the same incentives and ability to raise prices to other edge providers.

D. Summary

Up until recently the wired broadband providers had a conventional two-sided pricing model. They charged subscribers for access to their platforms and enabled edge providers to access those subscribers at no cost. That pricing model still prevails for the many small wired broadband providers in this country.

Starting in earnest in 2013, several large wired BIAS providers decided to impose access fees on at least some edge providers. These large BIAS providers secured access prices in a way that is at least disturbing. They intentionally degraded the quality of the connections

¹⁰² DOJ Economists Comcast-TWC Paper.

¹⁰³ FCC Charter-TWC Merger Order, at ¶115.

between their subscribers, who had paid for unlimited access to the Internet, and the targeted edge providers. They did not let their subscribers know they were doing this, and in fact, have denied doing so.¹⁰⁴ Their bargaining leverage ultimately comes down to the fact that they control access to large numbers of households and those households have little, if any, practical alternative if they want high-speed BIAS.¹⁰⁵

VI. ISP Market Structure, Vertical Integration, and Vertical Foreclosure

The FCC and the DOJ, following investigations of several cable mergers in 2014-2016, have concluded that large cable companies have the incentive and the ability to restrain OVDs, and other OTT providers, from competing with their MVPD businesses. They have also found evidence that large cable companies have implemented strategies to reduce the quality or raise the cost for OVDs. These conclusions are based on detailed studies, including empirical

¹⁰⁴ Comcast Corp., Letter to FCC, MB Docket 14-57, November 26, 2014, <https://ecfsapi.fcc.gov/file/60000988775.pdf>, at Response to Question No. 3, p. 8 (“It was Netflix, not Comcast, that deliberately created congestion issues that degraded the performance of Netflix for Comcast customers (and customers of other ISPs) in an effort to force Comcast (and others) to provide Netflix with free interconnection services”); Jennifer Khoury (Comcast SVP of Corporate and Digital Communications in Public Policy), “Comcast Response to Netflix,” Comcast Voices, April 24, 2014, <http://corporate.comcast.com/comcast-voices/comcast-response-to-netflix> (“As at least one independent commentator has pointed out, it was not Comcast that was creating viewability issues for Netflix customers, it was Netflix’s commercial transit decisions that created these issues”); David Young (Verizon), “Why Is Netflix Buffering? Dispelling the Congestion Myth,” Verizon Blog, July 10, 2014, <http://www.verizon.com/about/news/why-is-netflix-buffering-dispelling-the-congestion-myth> (“Netflix sends out an unprecedented amount of traffic... For whatever reason (perhaps to cut costs and improve its profitability), Netflix did not make arrangements to deliver this massive amount of traffic through connections that can handle it”).

¹⁰⁵ Nuechterlein and Yoo observe, correctly, that the existence of a terminating access monopoly—sometimes referred to as a competitive bottleneck—is highly contingent on other market facts.” Jonathan E. Nuechterlein and Christopher S. Yoo (2015), “A Market-Oriented Analysis of the ‘Terminating Access Monopoly’ Concept,” *Colorado Technology Law Journal* 14(1): 21-36, at 35. As shown above, however, the FCC and DOJ have found based on detailed analyses of market fact, that the large wired BIAS providers have significant bargaining leverage over OVDs partly as a result of their being able to effectively deny these edge providers access to a significant number of customers. As noted above the NYAG found evidence that Time Warner Cable intentionally degraded the connection between large edge providers and its subscribers, to secure access fees, and that the possibility of its subscribers switching to a competing system did not discipline this behavior.

analyses, as well as internal documents from the cable companies that have adopted these strategies.

The authorities found that the large cable companies have the ability to foreclose OVDs from two key inputs. As BIAS providers, they can make it difficult for OVDs to access households. As MVPDs, they can use their bargaining leverage over video programmers to impose contractual constraints on those programmers that makes it difficult for them to supply OVDs.

The FCC and DOJ also found that large cable companies have the incentives to foreclose OVDs from these inputs because doing so protects their significant MVPD profits from competition from OVDs. They have found that the profits gained from the MVPD business by pursuing these strategies exceed the costs to the BIAS businesses. That is because customers face significant switching costs and seldom switch even in the face of deteriorating service. These authorities also uncovered evidence that large cable providers have acted on these incentives or have expressed an interest in doing so because of the long-term threat they face from OVDs.

The DOJ's economists noted that the OVDs represented "a significant potential threat" to MVPDs.¹⁰⁶ They found that the proposed Comcast-Time Warner Cable merger would likely have led to higher fees for OVDs to access households and would likely have "reduced competition from a class of innovative firms in the consumer video market, resulting in lower-quality products or higher prices."¹⁰⁷

¹⁰⁶ DOJ Economists Comcast-TWC Paper, at 429.

¹⁰⁷ DOJ Economists Comcast-TWC Paper, at 429.

These conclusions resulted in both agencies objecting to Comcast’s acquisition of Time Warner Cable and the imposition of conditions to deter harmful behavior in the cases of several other mergers. As the former head of the Antitrust Division put it:

So many consumers’ only option for high-speed internet service is the cable company—the same cable company that derives revenues from its cable television business. This means that as online video distribution increases the cable companies have both the incentives and means to use their gatekeeper power to slow innovation to protect their video profits. In this way, the high-speed internet market and the video distribution market are inextricably intertwined.¹⁰⁸

A. Competitive Threat to MVPDs

Consumers can stream video content over the Internet from a variety of sources. They include OVDs, such as Amazon, that provide diverse programming including original content; video programmers, such as CBS, that make their content available “over-the-top” (OTT) in addition to, or instead of, through MVPDs; and edge providers, such as YouTube, Facebook Live, and Vimeo that provide a mix of user-generated and professional content. Streaming video content likely substitutes for MVPD programming to various degrees.

There is little question at this point that MVPDs compete with streaming video for consumer attention. It is widely acknowledged that MVPDs are losing subscriber revenue as a result of consumers reducing how much they spend on cable bundles (“cord-shavers”); consumers dropping their MVPD service (“cord-cutters”); and, particularly younger consumers, not getting an MVPD service (“cord-nevers”). Analysts have published studies on

¹⁰⁸ Bill Baer (Assistant Attorney General, Antitrust Division, US DOJ), “Video Competition: Opportunities and Challenges,” Remarks as Prepared for the Duke Law Center for Innovation Policy, Fall Conference on the Future of Video Competition and Regulation, Washington DC, October 9, 2015, <https://www.justice.gov/opa/file/782401/download>.

this phenomenon.¹⁰⁹ Video programmers and MVPDs have noted the challenge this is presenting them.¹¹⁰

The FCC and DOJ have concluded that OVDs pose a competitive threat to MVPDs from investigations partly based on internal documents from the companies discussing this competition from MVPDs that were subject to those investigations.¹¹¹ In the context of Charter's proposed acquisition of Time Warner Cable, the Justice Department noted, "Numerous internal documents reflect Defendants assessment that OVDs are growing quickly and pose a competitive threat to traditional forms of video programming distribution."¹¹²

As the online streaming video industry grows it is possible that it could pose an existential threat to MVPDs. Video programmers can bypass MVPDs by going directly to consumers, which could reduce their cost of distribution. OVDs, such as Netflix and Amazon,

¹⁰⁹ David Lieberman, "Pay TV Cord Cutting Poised To Accelerate Based on 2016 Data, Analyst Says," *Deadline*, March 29, 2017, <http://deadline.com/2017/03/pay-tv-cord-cutting-accelerate-snl-kagan-forecast-1202054979/>; *Fast Company*, "Cord-Cutting Spikes Fivefold in Cable TV's Worst Quarter Ever," May 3, 2017, <https://news.fastcompany.com/cord-cutting-spikes-fivefold-in-cable-tvs-worst-quarter-ever-4036578/>; Jon Lafayette, "Analyst Sees 31M Homes Cutting Cord in Decade," *Broadcasting & Cable*, July 24, 2017, <https://www.broadcastingcable.com/news/currency/analyst-sees-31m-homes-cutting-cord-decade/167378>.

¹¹⁰ Bob Fernandez, "Comcast CEO Roberts: Cord-Cutting Is 'Happening,'" *Philly.com*, June 14, 2017, <http://www.philly.com/philly/business/comcast/comcast-ceo-roberts-cord-cutting-is-happening-20170614.html>; Paul Bond, "Charter CEO Talks Cord-Cutting, Merging with Time Warner Cable," May 17, 2017, <http://www.hollywoodreporter.com/news/charter-ceo-talks-cord-cutting-merging-time-warner-cable-1004622>; Greg Sandoval, "Verizon CEO: Cord Cutting Is Real," *CNET*, September 23, 2010, <https://www.cnet.com/news/verizon-ceo-cord-cutting-is-real/>; Zach Epstein, "Verizon Exec in Charge of FiOS TV Confesses that She Cut the Cord," *BGR*, December 9, 2015, <http://bgr.com/2015/12/09/cord-cutting-options-fios-exec-admission/>; *CNBC*, "AT&T CEO: Cord Cutting Is No Surprise," May 4, 2017, <https://www.cnbc.com/video/2017/05/04/att-ceo-cord-cutting-is-no-surprise.html>.

¹¹¹ DOJ Economists Comcast-TWC Paper, at 429; Bill Baer (Assistant Attorney General, Antitrust Division, US DOJ), "Assistant Attorney General Bill Baer Delivers Remarks at the Chatham House Annual Antitrust Conference," June 18, 2015, <https://www.justice.gov/opa/speech/assistant-attorney-general-bill-baer-delivers-remarks-chatham-house-annual-antitrust> ("The merged entity would have had a strengthened "ability to block the adoption of innovative products, including 'over-the-top' video services that threaten the traditional cable business model."

¹¹² *US v. Charter Communications Inc. et al*, 1:16-CV-00759 (RCL), Competitive Impact Statement, May 10, 2016, <https://www.justice.gov/atr/file/850161/download> ("DOJ Charter-TWC Competitive Impact Statement"), at 10.

have moved quickly from distributing old movies and television series, to developing original content including award-winning television shows and movies. In principle, OVDs could displace MVPDs as the means by which consumers obtain video programming.

B. Economic Impact of Common Ownership

For most households, the company that provides them with a high-speed broadband connection that enables them to stream video content is also the company that provides them with their MVPD service. As the head of the Antitrust Division at DOJ put it, "... the high-speed internet market and the video distribution market are inextricably intertwined."¹¹³

Economists have examined whether a market failure could arise when a company that supplies both a product (call it A) and a key input (call it B) into that product. It turns out that firms do not necessarily have an incentive to harm a rival by restricting their access to the input. The reason is simple. The firm makes profit from supplying both the product and the input. The firm therefore has to balance the increased profits it would earn from product A by restricting the supply of input B against the decreased profits it would earn from selling input B.

Even if a firm has an incentive to restrict competitors it may or may not have the market power to do so. If there are other suppliers of the input, for example, then the competitor could just turn to them. Therefore, for a market failure to arise, the company has to have both the incentive to engage in input foreclosure strategies as well as the ability to do so.

¹¹³ Bill Baer (Assistant Attorney General, Antitrust Division, US DOJ), "Video Competition: Opportunities and Challenges," Remarks as Prepared for the Duke Law Center for Innovation Policy, Fall Conference on the Future of Video Competition and Regulation, Washington DC, October 9, 2015, <https://www.justice.gov/opa/file/782401/download>.

Thus, as a matter of economics, it is not possible to assume that just because a company supplies an input to a competitor it could, or would, use that input to harm that competitor. The FCC and the Justice Department have therefore conducted in-depth factual inquiries into whether the large cable companies have both the incentives and the ability to engage in input foreclosure strategies and whether they in fact have done so.

C. Incentives and Ability to Foreclose OVDs from Access to Households

1. Incentives to Engage in Access-Restriction Strategies Against OVDs

Large cable companies earn significant profit margins from their MVPD businesses. In 2016, for example, Comcast had \$22.4 billion of revenue from residential video, more than 65 percent greater than its \$13.5 billion of revenue from residential Internet. Its gross residential video profits, net of \$11.6 billion in programming costs, were \$10.8 billion, which are comparable to its Internet revenues.¹¹⁴ Similarly, in 2016 Charter had \$12.0 billion of revenue from residential video, more than 29 percent greater than its \$9.3 billion of residential Internet revenue. Its gross residential video profits, net of \$4.4 billion in programming costs, were \$7.6 billion, which are comparable to its Internet revenues.¹¹⁵

As DOJ staff economists have concluded, the substantial revenue cable companies earn from their video operations makes online video distributors a significant threat.¹¹⁶ Large cable

¹¹⁴ Comcast Corp., 10-K for the Year Ending December 31, 2016, <http://files.shareholder.com/downloads/CMCSA/4886859002x0xS1193125-17-30512/1166691/filing.pdf>, at 48.

¹¹⁵ CCO Holdings, LLC (Charter), 10-K for the Year Ending December 31, 2016, <http://ir.charter.com/phoenix.zhtml?c=112298&p=irol-sec>, at 40, 43.

¹¹⁶ DOJ Economists Comcast-TWC Paper, at 429 (“Online video distributors give households the option of cancelling video service and purchasing only broadband service from cable or telephone companies (‘cutting the cord’) or reducing their use of video services like on-demand video (‘cord shaving’). This represent a significant potential threat to traditional video providers: according to public reports, in 2014 Comcast earned \$20 billion in revenue selling video while Time Warner Cable earned \$10 billion.”).

companies earn significant margins on their MVPD businesses, in part because their control over access to significant numbers of subscribers, enables them to pay much less for video programming than smaller MVPDs.

The DOJ and FCC found from their review of internal documents that large cable companies have been concerned about the impact of OVD and OTT providers on their MVPD businesses. DOJ's antitrust chief at the time of the proposed acquisition by Comcast of Time Warner Cable referred to "Comcast's understandable incentive to reduce the competitive threat posed by over-the-top programmers or streaming services."¹¹⁷ The FCC found internal documents detailing Charter's anxiety concerning OTT substitutes for MVPD services.¹¹⁸

Large cable companies also earn profits from their wired BIAS businesses. The revenues from these businesses are growing as a result of the increased demand for wired broadband. Large cable companies would need to balance their incentives to protect their MVPD profits against possible losses to their BIAS profits. Strategies that interfere with the consumption of OVDs over the cable company's BIAS—by degrading the quality of the connection—could result in subscribers switching wired broadband providers thereby resulting in a loss of revenue and profit. The FCC found that large cable companies would not experience significant switching because most households do not have a good alternative and they would be uncertain whether the cable company is responsible for the problem as discussed

¹¹⁷ Bill Baer (Assistant Attorney General, Antitrust Division, US DOJ), "Video Competition: Opportunities and Challenges," Remarks as Prepared for the Duke Law Center for Innovation Policy, Fall Conference on the Future of Video Competition and Regulation, Washington DC, October 9, 2015, <https://www.justice.gov/opa/file/782401/download>.

¹¹⁸ FCC Charter-TWC Merger Order, at ¶ 80.

above.¹¹⁹ It also pointed to evidence that Time Warner Cable did not lose significant numbers of subscribers during the period of time it degraded Netflix's connection.

Larger cable companies have greater incentives to engage in strategies that would foreclose OVDs from providing video programming competition in the long term. When a cable company invests in a strategy to harm an OVD other large MVPDs capture part of the benefits. The foreclosure strategy generates positive externalities for other large MVPDs. As cable companies become larger, however, it captures a greater portion of these benefits; that is, it internalizes more of the externality. Therefore, larger cable companies are more likely to invest in strategies to hobble OVDs.

Smaller cable and telco providers lack these incentives to harm OVDs.¹²⁰ They make little, if any, profit from their MVPD businesses as a result of paying much higher video programming fees than larger systems. They operate MVPDs because they need to offer households a video-programming package to sign them up for their wired broadband service. In fact, they benefit from the development of OVDs and OTT services because it enables their households to obtain video programming over their wired broadband connections and limits their need to license video programming directly.

¹¹⁹ FCC Charter-TWC Merger Order, at ¶ 43.

¹²⁰ In reviewing the AT&T acquisition of DirecTV, the FCC noted the post transaction the merged entity would have an increased incentive to disadvantage unaffiliated OVDs. FCC AT&T-DirecTV Merger Order, at ¶ 205. Similarly, in the Charter-Time Warner Cable transaction, the complaint filed by DOJ noted that the combined company would have an increased ability and incentive to disadvantage competing OVDs. *US v. Charter Communications Inc. et al*, 1:16-CV-00759, Complaint, April 25, 2016, <https://www.justice.gov/atr/file/844831/download>, at ¶¶ 30-31.

2. Ability to Engage in Access-Restriction Strategies Against OVDs

The FCC and the Justice Department have also found that large cable companies have the ability to engage in foreclosure strategies to weaken competition by OVDs and other OTT providers. Their power comes ultimately from being able to prevent streaming video providers from securing access to a large fraction of households. They can do this in at least three ways.¹²¹

First, they can increase the access fees for reaching the cable system's households. A large BIAS provider operating as a stand-alone business would impose access fees on OVDs to maximize its BIAS profits.¹²² A company that owns both a BIAS provider and an MVPD could impose even higher access fees to account for the increased profits its MVPD would derive from reducing competition with OVDs.

Second, they can degrade the quality of the connections between OVDs and households.¹²³ They can engage in this strategy not to seek access fees but simply to reduce the demand for OVDs. Degrading quality can impose significant harm on the OVD if households come to believe that their problems are the result of the OVD rather than their BIAS provider.

¹²¹ Rogerson (FCC) Comcast-TWC Speech, at 16.

¹²² DOJ Economists Comcast-TWC Paper, at 427-428; FCC 2015 Open Internet Order, at ¶ 205 (“...broadband Internet access providers have the ability to use terms of interconnection to disadvantage edge providers and that consumers’ ability to respond to unjust or unreasonable broadband provider practices are limited by switching costs”).

¹²³ FCC Charter-TWC Merger Order, at ¶ 128 (“The record suggests that Time Warner Cable may have used this strategy [of congesting its interconnections with Netflix] in 2014 to pressure Netflix into a paid peering arrangement, demonstrating its ability to use interconnection to harm OVDs”).

Third, they can impose data caps or measured service plans that raise the subscriber's cost of using OVD, and other OTT, services.¹²⁴ This strategy increases the relative cost of consuming content using an OVD, which is subject to the caps, and the MVPD, which is not subject to similar limitations.

D. Incentives and Ability to Restrict OVD Access to Video Programming

The FCC and the Justice Department have also determined that the large MVPDs have the ability to restrict the supply of video programming content to OVDs. Large MVPDs have significant bargaining leverage over video programmers because they can prevent these programmers from reaching a significant portion of the national audience. The FCC and Justice Department have concluded from empirical analyses that larger MVPDs pay significantly less for video programming.¹²⁵

Large MVPDs can use that bargaining leverage to impose restrictions that limit the ability of video programmers to make their content available to OVDs.¹²⁶ The FCC and DOJ have focused on two particular kinds of restrictions. Alternative Distribution Method (ADM) clauses limit the ability of a video programmer to provide their content to OVDs. Cherry-picking—or unconditional—MFNs require video programmers to give the same price terms

¹²⁴ “BIAS providers such as New Charter can hinder third-party online video competition through practices such as data caps, usage-based pricing (UBP), and discriminatory stand-alone residential BIAS pricing.” FCC Charter-TWC Merger Order, at ¶ 48; “Further, the Company will have an increased incentive to limit subscriber demand for competitors’ online video content, including through discriminatory usage-based allowances, commonly known as ‘data caps.’” FCC AT&T-DirecTV Merger Order, at 160.

¹²⁵ DOJ Economists Comcast-TWC Paper, at 428-429; Robert Aarons and Alexander Raskovich (2016), “Do Bigger Firms Get Better Terms? Evidence from Pay TV,” Working Paper, https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=IIOC2016&paper_id=465, at 17 (“A finding by Division staff that the merging parties would likely have gained bargaining leverage over program suppliers played a significant role in the Division’s investigation.”); Evans Charter Declaration at ¶¶ 56-59.

¹²⁶ FCC Charter-TWC Merger Order, at ¶ 219.

that an OVD has received without paying additional consideration that an OVD paid for those terms.

Their incentive to use bargaining leverage to impose restrictions balances two considerations. By limiting the success of OVDs the restrictions can increase MVPD profits for the reasons discussed above. However, the cable system may have to give other benefits up in its deal with video programmers in return for their agreement to these concessions, such as lower subscriber fees.

The FCC and the Justice Department found evidence that large cable systems had acted on these incentives. The FCC reports that, “Time Warner Inc. alleges that Charter representatives have made statements, both in the course of programming negotiations and in public forums, indicating a willingness to retaliate against programmers that pursue over-the-top distribution.”¹²⁷ Sling TV informed the FCC that it “has frequently been informed that certain programmers’ agreements with certain cable operators prohibit them from, or restrict them in, granting such rights.”¹²⁸

The DOJ concluded that Time Warner Cable, which was the second largest cable system at the time of the investigation, was very aggressive in imposing ADM restrictions on video programmers.

The Department’s review of hundreds of programming contracts and ordinary course business documents revealed that TWC has obtained numerous ADM [alternative distribution means clauses] that limit distribution to paid OVDs. ... TWC’s success in seeking and obtaining ADMs is likely attributable in part to its bargaining leverage over video programmers; although such programmers might disfavor such restrictions because they require the programmer to forsake

¹²⁷ FCC Charter-TWC Merger Order, at ¶ 210.

¹²⁸ FCC Charter-TWC Merger Order, at ¶ 210.

opportunities to earn revenues from OVDs, they are more likely to agree to a large MVPD such as TWC's demand to include them because they do not want to lose access to TWC's millions of cable subscribers.¹²⁹

The Justice Department also found that cable operators were using cherry-picking MFNs.

Although MFN provisions are ubiquitous in the industry – for example, many MVPDs use MFN provisions entitling the MVPD to the lowest license fee that the programmer offers to any other MVPD – the Department's investigation revealed that some MVPDs were utilizing certain provisions that, while referred to as "MFNs," actually require much more than equal treatment. Specifically, some provisions, commonly referred to as "unconditional MFNs" or "cherry-picking MFNs," require that a programmer provide an MVPD the most favorable term the programmer has offered to any other distributor, even if that other distributor agreed to additional payment or other conditions in exchange for receiving that term. As a result of an unconditional MFN, the programmer may be reluctant to license the additional content to the other distributor in the first place."¹³⁰

The DOJ was concerned that the combination of Charter and Time Warner Cable would increase the ability and incentive of these companies to impose ADMs and cherry-picking MFNs to reduce competition with OVDs.¹³¹ The FCC had similar worries. "With its larger scale, New Charter would see more benefit flow back to it from provisions that go beyond protecting its investment and programming and instead seek to disadvantage its online rivals, making it more likely that Charter would seek such provisions."¹³² As a condition of not challenging the merger, the Justice Department prohibited the new company from using the ADM or cherry picking MFNs for a period of 7 years as a condition of not challenging the merger.

¹²⁹ DOJ Charter-TWC Competitive Impact Statement, at 12.

¹³⁰ DOJ Charter-TWC Competitive Impact Statement, at 16.

¹³¹ DOJ Charter-TWC Competitive Impact Statement, at 16-17. The FCC had similar concerns. See FCC Charter-TWC Merger Order, at ¶ 221.

¹³² FCC Charter-TWC Merger Order, at ¶ 221.

E. Summary

American households that want both high-speed broadband service and linear video programming from the same provider have limited choices. They can typically turn to a cable company or, in some cases, a telco that has invested in fiber optics. Not surprisingly, that lack of competition has resulted in consumers paying high prices, getting notoriously poor customer service, and experienced less innovation that they see in many other parts of their lives.

Unfortunately, as investigations by the FCC and DOJ have uncovered, this market structure also gives the large systems the ability, and the incentives, to limit competition by OVDs, OTTs, and other edge providers that offer households substitutes for linear programming. As the large systems move into the provision of other services, such as home security, it is possible that they will have incentives to limit competition with other edge providers have offerings that are, or could become, substitutes.¹³³

VII. Policy Implications

Since 2000, in evaluating proposed mergers and acquisitions for companies that operate BIAS providers and MVPDs, as well as other public policies towards these firms, the FCC and DOJ have conducted detailed empirical analyses of the market structure and performance of these industries. As part of these analyses they have examined the extent to which cable and telco providers of these services have the incentive and ability to harm competition and consumers. That work has provided the foundation for decisions to block mergers, to impose conditions, and to pursue other public policies involving the provision of broadband and video programming.

¹³³ As always, in the case of vertical restraints, whether they would in fact have an incentive to do so is an empirical question, the answer to which could vary depending upon the particular service being considered.

The FCC and DOJ have identified two significant market failures concerning BIAS and MVPD providers. The first market failure results from the fact that large BIAS providers, which account for more 71.7 percent of residential subscribers, are bottlenecks between edge providers and households, and thereby able to exert market power over both.¹³⁴ The second market failure results from the fact that the large BIAS providers also own large MVPDs which gives them incentives to use these bottlenecks to harm edge providers that compete with their MVPDs. In blocking mergers, or imposing conditions, these authorities have tried to prevent making these market failures worse.

As an economic matter, public policy involving the provision of wired BIAS services to households and edge providers, as well as cost-benefit analyses of proposed policies, needs to account for these market failures as well. First-best policies, of course, would eliminate them. The structural and ownership relationships that give rise to these market failures, together with local and state barriers to entry, however, are not easily remedied. The evaluation of public policies therefore has to take them as given. That means choosing among imperfect—what economists refer to as second-best—alternatives. Doing so requires careful evidence-based cost-benefit analysis grounded in economic theory that accounts for the market realities of wired BIAS and video programming provision in the U.S.

A. Market Failures

Society can generally count on competition to promote economic efficiency and welfare. Technically, economists refer to situations in which markets do not do this as “market

¹³⁴ The share of residential broadband subscribers accounted for by the very large BIAS providers (Comcast, Charter, AT&T, and Verizon) is calculated based on data from Leichtman Research Group, “About 960,000 Added Broadband in 1Q 2017,” May 19, 2017, <http://www.leichtmanresearch.com/press/051917release.html>.

failures”. Common market failures arise from externalities, such as pollution and monopolies protected by entry barriers. In practice, few markets look perfect in the ways economists describe in textbooks, yet they work pretty well, often as a result of dynamic competition. Economists, therefore, focus on situations in which market failures are severe and there is some confidence that fixing the failure would improve economic welfare.

Unfortunately, the markets by which American households, by and large, obtain wired BIAS services and linear video programming are dysfunctional as a result of the lack of horizontal competition in BIAS provision and the cross-ownership of MVPDs by BIAS providers. The dysfunction is seen, in part, from the disdain that American households have for their cable or telco providers. In 2016, the American Customer Satisfaction Index reported that, of the 43 industries it covered, subscription television service had the second-worst customer satisfaction ratings, and internet service providers had the worst.¹³⁵

1. The Lack of Horizontal Competition Among BIAS Providers

The FCC and DOJ have found that most households lack a good alternative to their provider of high-speed BIAS. As we saw earlier, based on the most recent data, 31.9 percent of people with access to an incumbent residential high-speed BIAS provider only have one choice and 75.8 percent only have one or two. Switching, when there is another choice, is costly, inconvenient, and sometimes annoying.

Limited competition is partly natural because of the high cost of laying cable and fiber and the resulting economies of density. More competition, that would lower prices and improve

¹³⁵ American Customer Satisfaction Index, Benchmarks by Industry (All Industries), http://www.theacsi.org/index.php?option=com_content&view=article&id=147&catid=&Itemid=212&i=all&sort=Y2016.

service, could occur, however, were it not for political barriers to entry. Large incumbent cable and telcos have lobbied for laws and regulations that prevent or raise the cost of entry.

Wired broadband is important to households for online activities that take up a considerable part of their time and involve downloading large amounts of data. That includes streaming video, playing online games, and video chats. Engaging in these activities using a mobile plan on a mobile device is not a good option because of the relatively low cost of data plans, the limitation of consuming content on smartphones or tablets, usage limitations that may apply to users on on mobile wireless plans, even on “unlimited” plans, and the relative lack of reliability of mobile connections.

This situation results in the large BIAS providers, which provide high-speed broadband to most households, acting as bottlenecks. They stand between households and edge providers. Households do not have a good alternative for getting Internet content, and many edge providers do not have a good alternative to reaching these households. The FCC, Justice Department, and New York Attorney General’s office have all reached this conclusion. The best evidence of the strength of these bottlenecks is that when large BIAS providers degraded the quality of Netflix’s connections subscribers did not drop their BIAS provider, and Netflix had to agree to make access payments after vehemently opposing these payments for several years.

By themselves these bottlenecks result in households and edge providers paying higher prices, getting poorer service, and less innovation than they would with more competition. While hardly inconsequential, those are routine harms from lack of horizontal competition.

2. Common Ownership Over MVPDs and Incentives to Harm Competing Edge Providers

The more troubling market failure results from the fact that the large BIAS providers also own large MPVDs. Economists have shown that the mere fact of common ownership, and generally a vertical relationship, does not necessarily result in a market failure. However, investigations by the FCC and DOJ have found that the common ownership of large BIAS providers and MVPDs gives these companies the incentive and ability to harm competitors to their MVPD businesses.

As shown above, MVPDs see the distribution of video programming by OVDs and OTT as a long-term competitive threat. The benefits from protecting their MVPD businesses outweigh adverse effects to their BIAS businesses. By controlling the access of edge providers through their BIAS providers and the access of video programmers through their MVPD to their household subscribers, they have a set of tools for limiting competition by OVDs and OTT providers. Those tools could be applied to other services these companies provide, such as home security, that compete with services offered by edge providers.

B. Policy Analysis

Sound policy analysis should, as an economic matter, take these market realities into account. One should not underestimate the challenge in doing that. To begin with, there are no apparent market or technological forces that will, by themselves, eliminate these market failures in the foreseeable future. Google Fiber's effort to introduce high-speed broadband competition provided some hope that there would be national competitive pressure on large BIAS providers. But in the end, Google Fiber faced too many challenges including political barriers to entry. There is no reason to believe that the common ownership of BIAS providers

and MVPDs will cease to be a fundamental feature of the American model for providing these services. The continued consolidation of this sector is likely to increase these market failures once conditions for approving mergers expire.

In evaluating policies, economic analyses therefore need to take these market failures as given.¹³⁶ As a starting point, economic models of firm behavior should account for market realities including, most importantly, the common ownership of large wired BIAS providers, which are bottleneck facilities, and MVPDs, which may also have considerable market power over access to households. Then, empirical evidence needs to be considered in light of these market realities as well. While one might disagree with their analyses on some points, the FCC and DOJ have adhered to these principles in their investigations related to wired broadband and video programming for many years. Doing so is essential for evaluating the prospective impact of public policies on consumer welfare, economic efficiency, and innovation.

¹³⁶ Economic analysis also needs to account BIAS providers and MVPDs are two-sided platforms as Greensetin et al. observe. See Shane Greenstein, Martin Peitz, and Tommaso Valletti (2016), “Net Neutrality: A Fast Lane to Understanding the Trade-offs,” *Journal of Economic Perspectives*, 30(2): 127-150. The fact that some multi-sided platforms charge prices in excess of marginal cost to both sides of the platform cannot by itself settle the policy debate over whether a change in pricing policy would increase or decrease social welfare. The assessment of socially optimal pricing in the case of multi-sided platforms is complex and involves both setting the pricing levels as well as the structure of prices for both sides. See David S. Evans and Richard Schmalensee (2014), “The Antitrust Analysis of Multisided Platform Businesses,” in Roger D. Blair and Daniel Sokol (eds.), *Oxford Handbook of International Antitrust Economics*, Vol. 1, 404-448, at 411-414.

Appendix A: FCC and DOJ Documents Relied Upon

Federal Communications Commission, Memorandum Opinion and Order in the Matter of the Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorization from MediaOne Group Inc., Transferor, to AT&T Corp, Transferee, CS Docket No. 99-251, June 6, 2000, <https://transition.fcc.gov/Bureaus/Cable/Orders/2000/fcc00202.pdf> (“FCC AT&T-MediaOne Merger Order”).

Federal Communications Commission, Report and Order In the Matter of Preserving the Open Internet Broadband Industry Practices, GN Docket No. 09-191 and WC Docket No. 07-52, December 23, 2010, https://apps.fcc.gov/edocs_public/attachmatch/FCC-10-201A1_Rcd.pdf (“FCC 2010 Open Internet Order”).

Federal Communications Commission, Memorandum Opinion and Order in the Matter of Applications of Comcast Corp., General Electric Co. and NBD Universal Inc. for Consent to Assign Licenses and Transfer Control of Licenses, MB Docket No. 10-56, January 20, 2011, https://apps.fcc.gov/edocs_public/attachmatch/FCC-11-4A1.pdf (“FCC Comcast-NBC Universal Merger Order”).

Federal Communications Commission, “2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment,” GN Docket No. 14-126, February 4, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-10A1.pdf (“FCC 2015 Broadband Progress Report”).

Federal Communications Commission, Report and Order on Remand, Declaratory Ruling, and Order in the Matter of Protecting and Promoting the Open Internet, GN Docket 14-28, March 12, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-24A1.pdf (“FCC 2015 Open Internet Order”).

Federal Communications Commission, Memorandum Opinion and Order in the Matter of the Applications of AT&T Inc. and DIRECTV for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 14-90, July 28, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-94A1_Rcd.pdf (“FCC AT&T-DirecTV Merger Order”).

Federal Communications Commission, “2016 Broadband Progress Report,” GN Docket N. 15-191, January 29, 2016, https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf (“FCC 2016 Broadband Progress Report”).

Federal Communications Commission, Memorandum Opinion and Order in the Matter of Applications of Charter Communications Inc., Time Warner Cable, Inc., and Advance/Newhouse Partnership for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 15-149, May 10, 2016, https://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0510/FCC-16-59A1.pdf (“FCC Charter-TWC Merger Order”).

Federal Communications Commission (Industry Analysis and Technology Division, Wireline Competition Bureau), “Internet Access Services: Status as of June 30, 2016,” April 2017, https://apps.fcc.gov/edocs_public/attachmatch/DOC-344499A1.pdf (“FCC IAS Report”).

Federal Communications Commission (2017), “Fixed Broadband Deployment Data from FCC Form 477: Data as of June 30, 2016 (Version 2),” <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477> (“FCC Form 477 Data”).

Nicholas Hill, Nancy L. Rose, and Tor Winston (2015), “Economics at the Antitrust Division 2014-2015: Comcast/Time Warner Cable and Applied Materials/Tokyo Electron,” Review of Industrial Organization, 47:425-435 (“DOJ Economists Comcast-TWC Paper”).

William P. Rogerson, “Economic Theories of Harm Underlying Regulatory Concerns with the Proposed Comcast/TWC Transaction,” 8th Annual FTC Microeconomics Conference. November 12-23, 2015, Washington D.C., https://www.ftc.gov/system/files/documents/public_events/633601/rogerson_keynote.pdf (“Rogerson (FCC) Comcast-TWC Speech”).

US v. AT&T Corp. and MediaOne Group Inc., 1:00-CV-01176, Competitive Impact Statement, May 25, 2000, <https://www.justice.gov/atr/case-document/file/487331/download> (“DOJ AT&T-MediaOne Competitive Impact Statement”).

US et al c. Comcast Corp. et al, 1:11-CV-00106, Competitive Impact Statement, January 18, 2011, <https://www.justice.gov/atr/case-document/file/492251/download> (“DOJ Comcast-NBC Universal Competitive Impact Statement”).

US v. Charter Communications Inc. et al, 1:16-CV-00759 (RCL), Competitive Impact Statement, May 10, 2016, <https://www.justice.gov/atr/file/850161/download> (“DOJ Charter-TWC Competitive Impact Statement”).