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REDACTED—FOR PUBLIC INSPECTION

December 23, 2014

By ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

Re: Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 14-57

Dear Ms. Dortch:

Pursuant to the *Second Amended Modified Joint Protective Order*[1] ("*Joint Protective Order*") in the above-captioned proceeding, Netflix, Inc. ("Netflix") herby submits a public, redacted version of its December 23, 2014 Reply. The "{{ }}" symbols denote where Highly Confidential Information has been redacted, and the "[[ ]]" symbols denote where Confidential Information has been redacted. The Highly Confidential and Confidential versions of this filing are being simultaneously filed with the Commission and will be made available pursuant to the terms of the *Modified Joint Protective Order.*

[1] Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations, Docket No. 14-57, *Second Amended Modified Joint Protective Order*, DA 14-1639 (Nov. 12, 2014) ("*Modified Joint Protective Order*").

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Please contact me with any questions.

Respectfully submitted,

Markham C. Erickson
Counsel to Netflix, Inc.

Enclosure

REDACTED—FOR PUBLIC INSPECTION

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Applications of Comcast Corp., and Time Warner Cable Inc.	)	MB Docket No. 14-57
	)	
For Consent to Assign or Transfer Control of Licenses and Authorizations	)	

REPLY OF NETFLIX, INC.

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December 23, 2014

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TABLE OF CONTENTS

I. INTRODUCTION AND SUMMARY 1

II. THE TRANSACTION WOULD HARM COMPETITION AND CONSUMER CHOICE BY INCREASING COMCAST'S ABILITY AND INCENTIVE TO HARM OVDS 4

A. The Transaction Would Increase Significantly Comcast's Ability to Leverage Its Market Power Over OVDs 5

1. Comcast Has The Power To Foreclose Edge Providers At Interconnection And Has Already Done So 5

a. Comcast Misrepresents Its Exercise Of Market Power Over Netflix 7

b. Comcast Deflects From Its Exercise Of Market Power By Blaming Netflix For Congestion 14

c. Direct Interconnection With Comcast Did Not Decrease Netflix's Costs 16

d. Comcast's Ability To Exercise Its Market Power Over OVDs Would Increase Significantly If This Transaction Were Approved 19

2. Comcast Failed To Rebut That It Has The Requisite Market Power To Harm OVDs Through Data Caps And Set Top Box Restrictions 21

B. There Are No Competitive Constraints On Comcast's Market Power 25

C. Comcast Fails To Address The Content Distribution Side Of The Market, Which is National 27

III. TERMINATING ACCESS FEES ARE ABOUT MARKET POWER—NOT COST RECOVERY OR EFFICIENCIES 34

A. Comcast's Terminating Access Fees Are Not Efficiency-Based 35

B. The Current Terminating Fees Are The Camel's Nose Under The Tent 39

IV. CONCLUSION 44

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REPLY OF NETFLIX, INC.

I. INTRODUCTION AND SUMMARY

The proposed transaction (the "Transaction") between Comcast Corporation ("Comcast") and Time Warner Cable, Inc. ("TWC") (collectively, the "Applicants") would combine two of the largest cable operators and broadband service providers in the United States and significantly increase the combined entity's market power. The record amassed in this proceeding demonstrates that the combined entity's increased size would give it the incentive and ability to exercise its market power over video distributed over its broadband services—particularly video content. The Application before the Commission requires that it consider the continued viability of the nascent and innovative online video marketplace in the face of further cable consolidation.

From the enactment of the 1996 Telecommunications Act, the Commission has sought to promote competition in the video marketplace. Since then, facilities-based providers have engaged in some competition along the margins in the market for video programming, but the competition that policymakers hoped for remained largely unrealized. It was not until online video distributors ("OVDs") emerged in the market offering high quality, long form video content delivered via the open Internet that the range of market participants significantly expanded. These new participants have fomented innovation and increased consumer choice in

the video marketplace. Netflix pioneered online video services in 2007. Since then, Hulu, Google, Apple, Sony, and many others have begun offering online video services directly to the public. DISH, HBO, CBS, and Lionsgate/Tribeca recently have announced that they too will offer their own nationwide OVD services.

The ability of these services to thrive, and promote Congress' goal of video competition, depends in large measure on ensuring that vertically integrated gatekeeper Internet Service Providers ("ISPs"), such as the Applicants, cannot use their facilities and their market power to limit or inhibit that competition. Other streaming video service providers have joined Netflix in its concerns regarding the ability of the Applicants to demand terminating access fees that "are not subject to market competition" and which "may reverse the historical decline in transit and content delivery network prices that have allowed companies like Vimeo [and others] to bring new and innovative services to customers."[1]

Consumers have many choices for Internet TV. They do not have meaningful choice for broadband providers.[2] As leading professors from across the country noted in their recent letter to the Commission, "the dream of real broadband competition has not been realized in the present marketplace" and "[o]ther high-speed alternatives are not now a significant competitive

---

[1] Letter from Michael A. Cheah, Vimeo, LLC, to Marlene Dortch, FCC, MB Docket No. 14-57, at 1 (Oct. 24, 2014) ("Vimeo Letter"). Vimeo explains that, "[t]hrough interconnection fees, ISPs are able to artificially limit their own consumers' access to our content in a way that is rarely if ever apparent to their own subscribers." *Id.* at 2 (citing Comments of Vimeo, *Protecting and Promoting the Open Internet*, GN Docket No. 14-28, at 18 (filed July 15, 2014) ("A broadband provider's arrangements as to traffic entering its network . . . can be as significant as its decisions within the 'last mile.'").

[2] Remarks, *The Facts and Future of Broadband Competition*, Chairman Tom Wheeler,FCC at 1 (Sept. 4, 2014), *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-329161A1.pdf.

constraint on cable broadband."[3] Further, they explain that "[d]istribution of video content over the Internet is among the many important uses of broadband, and the national market for broadband distribution of content over the Internet is the market that would be most profoundly affected by the proposed merger."[4]

Empirical evidence shows that further consolidation through the proposed Transaction would not be in the public interest because it would increase Comcast's incentive and ability (both of which it already has) to harm OVDs and other content providers seeking broad distribution of their content.[5] Despite its 800+ page response, Comcast's Opposition does not disturb the weight of the record that the combined entity's market power could thwart the growing online video market.[6]

Rather than re-hashing each issue or responding to Comcast's arguments that already were addressed in Netflix's Petition to Deny, this Reply and attendant declarations will: (1) correct Comcast's misrepresentation of the facts and circumstances that led to it degrading its own customers' access to Netflix, as well as other OVDs' services; (2) refute Comcast's mischaracterization of the law regarding the appropriate market definition for the distribution of

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[3] Letter from Professors Rebecca Haw Allensworth et al., to Chairman Tom Wheeler, Commissioners Mignon Clyburn, Jessica Rosenworcel, Ajit Pai, and Michael O'Rielly, FCC, MB Docket No. 14-57, at 3 (Oct. 20, 2014) ("Professors' Letter").

[4] *Id.* at 4.

[5] Amended Petition to Deny of Netflix, Inc., MB Docket No. 14-57 (Aug. 27, 2014) ("Netflix Petition to Deny"); *see also* Professors' Letter at 7 ("The proposed merger would substantially increase the power of the merged firm to hamper competition from OVDs."); Vimeo Letter at 2 ("Comcast operates its own OVD service and naturally has an incentive to favor its OVD services over independent ones. In order to let the nascent OVD industry flourish, the Commission should take necessary steps to prevent Comcast and other large ISPs from degrading their interconnection points in order to extract terminating access fees.").

[6] Opposition to Petitions to Deny and Response to Comments, *Applications of Comcast Corp., and Time Warner Cable Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations*, MB Docket No. 14-57 (Sept. 23, 2014) ("Opposition").

content via broadband; and (3) offer an expanded economic analysis showing how the Transaction would increase Comcast's incentive and ability to maintain its monopoly power, which would negatively impact consumers' ability to access competitive and innovative Internet services.

II. THE TRANSACTION WOULD HARM COMPETITION AND CONSUMER CHOICE BY INCREASING COMCAST'S ABILITY AND INCENTIVE TO HARM OVDS

Comcast's core argument in support of the Transaction rests on the assertion that there is no difference in the market power between one of several non-overlapping regional monopolies, and a single nationwide monopoly. According to Comcast, the combination of the two largest cable ISPs in the United States does not enhance Comcast's market power or facilitate its exercise. By Comcast's logic, it could acquire all of the other remaining non-overlapping wired ISPs in the country with no adverse effect on competition. Comcast claims that this nationwide bottleneck monopoly, which would control Internet access for most Americans, would have no more power than Comcast already has today.

This prediction is at odds with the facts, economics, and law. The horizontal combination of the Comcast and TWC ISP businesses would expand and entrench Comcast's market power over all content providers, including OVDs. This enhanced market power and bargaining leverage would lead to significantly increased connection fees as a toll that online content providers would have to pay for access to Comcast's subscribers—subscribers who cannot readily switch to another broadband provider because most have few or no comparable choices.

A. The Transaction Would Increase Significantly Comcast's Ability to Leverage Its Market Power Over OVDs

Comcast already has the technical ability and economic incentive to harm OVDs. It has manipulated interconnection capacity to induce Netflix to pay Comcast for the carriage of Netflix traffic—traffic requested by Comcast's own subscribers—over Comcast's last mile. The proposed Transaction would provide the combined entity with increased ability and incentive to degrade OVD traffic to either divert consumers to Comcast's own services or increase its terminating access fees to raise the costs of rival OVDs. Comcast's own internal data demonstrates that executing this strategy would be costless for the combined entity.

1. Comcast Has The Power To Foreclose Edge Providers At Interconnection And Has Already Done So

Comcast has used its control over the exchange of traffic at interconnection points and allowed its interconnection ports for transit providers carrying Netflix traffic to congest.[7] This congestion degraded the quality of Netflix movies and TV shows requested by Comcast subscribers. The congestion was alleviated only after Netflix agreed to pay Comcast a terminating access fee to directly connect to its network.

Comcast denies that it allowed transit links to Netflix to congest and instead argues that the degradation of Netflix's traffic was self-imposed to pressure Comcast to enter into a direct commercial arrangement with Netflix. Comcast argues that Netflix "adopted a self-serving strategy of using limited transit providers that never purchase interconnection service from their destination ISP"[8] and ignored numerous other "transit suppliers with available capacity and

[7] Netflix Petition to Deny at 52-60.

[8] Opposition at 210.

potentially comparable market pricing."[9] Comcast maintained in its Opposition that "40 routes into Comcast's network are settlement free," and Netflix could have "negotiate[d] with [those] transit providers with no influence by Comcast."[10] Comcast has since revised the "40" down to {{ }}, but still maintains that sufficient settlement-free routes existed.[11] In actuality, the competitive options for transit services to high-bandwidth customers in the United States number only six—Cogent, Level 3, Tata, TeliaSonera, XO, and NTT.[12] Netflix used all six, either directly or indirectly via other carriers.

It does not matter whether Comcast has 4, 40, or 400 "settlement-free" routes available. Comcast alone sets the terms and conditions for settlement-free access and does so in a way that ensures that no content provider of any scale can meet those criteria. Netflix utilized six of the largest and most capable transit providers to bring its traffic to Comcast's network. Each of these partners had settlement-free paths to Comcast. Once Netflix became a customer of these transit providers, Comcast ceased accepting traffic on a settlement-free basis from those providers by letting the links to Comcast's network congest unless fees were paid.

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[9] *Id.*

[10] *Id.* at 219.

[11] Letter from Francis Buono, Counsel for Comcast Corp., to Marlene Dortch, FCC, at 6 (Dec. 8, 2014) ("Comcast Dec. 8 Ex Parte"). Comcast has designated this list of settlement-free routes as highly confidential in this proceeding. As Mr. Florance, Netflix's Head of Content Delivery, confirms, Comcast has never provided Netflix with any information regarding which routes into Comcast's network are settlement-free. It would be difficult, if not impossible, for Netflix and other OVDs to take advantage of something they are not supposed to know about.

[12] Reply Declaration of Ken Florance, MB Docket No. 14-57, ¶ 31 (Dec. 23, 2014) ("Florance Reply Declaration"); Letter from Robert Cooper, Counsel to Cogent, to Marlene Dortch, FCC, at 6 (filed Nov. 18, 2014) ("Cogent Nov. 18 Ex Parte").

a. Comcast Misrepresents Its Exercise Of Market Power Over Netflix

Comcast does not dispute that it has the *technical* ability to block or degrade OVD services, only whether it has the incentive to do so. Comcast has both the ability and incentive to degrade its customers' access to Netflix and has already done so. Comcast maintains that it does not have the incentive to foreclose OVDs, because it would need to close all of the settlement-free routes into its network, which would severely limit its connectivity to the broader Internet and effectively undermine the most valuable part of its service offerings.[13] Comcast's principal accusation is that Netflix chose to use "only six 'transit providers'—but . . . omits dozens of other transit options with adequate capacity to reach Comcast's network."[14] Comcast argues that there are "over 40 settlement-free routes into its network,"[15] which it claims allow edge providers to "negotiate with [these] transit providers with no influence by Comcast."[16] According to Comcast, the existence of so many free routes into its system means that an edge provider can jump from one settlement-free route to another,[17] and that Comcast would have to block or congest "a substantial number of these links" to apply pressure to an OVD.[18]

Comcast does not need to block or degrade all of the settlement-free routes into its network to target an OVD for degradation; it need only degrade the settlement-free "transit" routes *actually* available to third-party OVDs, such as Netflix. Those routes into Comcast can

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[13] Opposition at 216.

[14] Declaration of Kevin McElearney, MB Docket No. 14-57, ¶ 23 (Sept. 19, 2014) ("McElearny Declaration").

[15] Opposition at 217. Comcast has since lowered its claim that there are 40 settlement-free routes available to Netflix. Comcast Dec. 8 Ex Parte at 6.

[16] Opposition at 219.

[17] *Id.* at 217.

[18] *Id.*

be, and were, congested without undermining Comcast's broadband service generally. Even if an alternative settlement-free route were available to an OVD, the terms of Comcast's agreements with its peering partners give it wide latitude to de-peer them or to push that route out of ratio and then demand payment. The number of routes that Comcast could congest to target an OVD for degradation is fairly modest—meaning that most of Comcast's routes to the Internet will remain completely unaffected by the degradation of routes available to an OVD.[19]

Comcast Can Apply Significant Pressure to Its Transit Providers. Even if all {{ }} settlement-free routes into Comcast's network actually were known and available to OVDs, Comcast reserves for itself, through its Peering Policy, the ability to change the settlement-free status of those transit routes unilaterally and at *any time*. There is no other way to reach Comcast's customers except via access to Comcast's last mile network. Interconnection with Comcast—either directly through an agreement with Comcast or indirectly through a transit provider—is necessary to provide service to Comcast's broadband customers.[20] Comcast's ability to close particular routes or to pressure its peering partners into payment is restricted only by the modest constraints in its existing contracts with those partners.

Of the now {{ }} settlement-free routes cited by Comcast as being available during the dispute, only {{ }} are based on formal agreements.[21] The bulk of Comcast's settlement-

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[19] Netflix used the six largest transit providers in the world, and yet, Comcast still had the market power to degrade these providers' access to Comcast's network. Florance Reply Declaration ¶¶ 14, 27.

[20] *Id.* ¶¶ 12, 34.

[21] {{ }} Similarly, TWC's response shows that {{ }}. {{ }} Thus, merging Comcast and TWC will not significantly expand the range of settlement-free routes that cannot be foreclosed from OVDs.

free routes are based on a mere "handshake."[22] Of those agreements that are "papered" under a formal contract, many have short terms or allow Comcast to terminate the peering relationship with just {{ }}—making a formal, settlement-free, contractual agreement with Comcast little better than a handshake.[23]

Few of the formal agreements actually limit Comcast's ability to pressure its peers into not carrying traffic from specific content providers:

- only {{ }} language prohibiting Comcast from monitoring the links for specific traffic (contrary to Comcast's suggestion);[24]
- {{ }} specify low traffic ratios,[25] while the remainder merely refer to Comcast's general peering policy requiring a "general balance" in incoming and outgoing traffic; and
- all but {{ }} appear to provide Comcast with significant latitude if it wanted to manipulate traffic to push a peer out of ratio.[26]

Further, Comcast has designed its network to operate asymmetrically, reflecting the reality that consumers have and use far more download than upload capacity.[27] At the same

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[22] Notably, {{ }} settlement-free transit providers that offer high-bandwidth service—{{ }}—do not have formal agreements with Comcast for settlement-free capacity.

[23] {{ }}

[24] Comcast Opposition at 217 n.661. Only Comcast's peering agreements with {{ }} includes such language. {{ }}

[25] {{ }}

[26] Comcast's agreement with {{ }} does not accept a traffic imbalance greater than {{ }}. {{ }}

time, Comcast requires its settlement-free peering partners to "maintain a traffic scale between its network and Comcast that enables a general balance of inbound versus outbound traffic."[28] Yet, because Comcast's subscribers consume content asymmetrically—i.e., they download more content than they upload—Comcast's settlement-free peers are often naturally out of balance.

While Comcast claims it generally uses a {{ }} ratio for its settlement-free peers,[29] the lack of contractual constraints (as demonstrated in the table below) means that Comcast is free to use a far lower ratio when dealing with any given peer. Comcast has deemed the more generous {{ }} ratio to be Highly Confidential Information in this proceeding, suggesting that the ratio is not common knowledge to Comcast's peers and likely could not be relied upon in a business dispute.[30] For those peers, the actual ratio used by Comcast is likely a mystery that varies depending on Comcast's corporate goals, and a requirement that a given peer may at any moment already be violating—potentially resulting in its de-peering.

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[27] Opposition at 203-204.

[28] McElearney Declaration ¶ 7.

[29] Comcast Responses to the Commission's Information and Data Request, Response to Request No. 69, at 183 ("Balance of traffic is a fluid concept that is reviewed on a monthly basis, and while ratios are not specified, in Comcast's experience a persistent ratio of {{ }} or more over a prolonged period of time is generally understood as an indication that a settlement-free relationship is no longer in balance.").

[30] {{ }}

Table 1: Comcast's Settlement-Free Contractual Terms {{

}}

Without meaningful constraints, Comcast can "de-peer" with settlement-free providers (or threaten to do so) with little or no prior notice. Comcast already is the largest destination network. Disruption in service to Comcast has serious business consequences for any transit provider or CDN. Threatening the settlement-free status on which the economic terms of the transit provider's long-term contracts with its customers depend is likely enough for Comcast to make a particular route unavailable to a competing OVD. Netflix's experience with {{ }} are examples of this dynamic.[31]

This Transaction would make that threat and the consequences of de-peering significantly larger for transit providers and CDNs because Comcast would control access not only to its subscribers but TWC's subscribers as well. As Netflix already has discovered, a transit provider's status as a settlement-free peer is not durable and does not impede Comcast once it decides to demand a terminating access fee from a transit provider carrying traffic that Comcast does not want sent over settlement-free routes into its network.

Comcast also exaggerates an OVD's ability to use paid transit providers to avoid Comcast's ability to foreclose access to its network. Comcast's paid interconnection agreements are generally only {{ }} in duration, and for almost half of those agreements ({{ }}), the initial term has expired, making the agreement merely {{ }} unless and until it is renegotiated. Contracts of such limited duration provide little protection to transit providers or CDNs who receive even modest pressure from Comcast, and the lack of certainty makes it unattractive for OVDs that need to forecast their costs beyond {{

[31] Florance Reply Declaration ¶ 32. {{ }} do not have a contract with Comcast, and {{ }} is the lone transit provider paid by Comcast, at least for some traffic. Consequently, those parties have a great deal to lose by opposing a demand from Comcast. Mr. McElearney does not dispute Mr. Florance's assertion that Comcast threatened {{ }} to foreclose direct access to Comcast's network through that transit provider.

}} months.[32] From a business perspective, these transit providers or CDNs must always have an eye on the terms of their next contract, and anything perceived as threatening those future terms is likely to be taken as creating a significant business risk. This allows Comcast to apply pressure to nearly any transit provider or CDN without waiting for the term of each contract to expire.

Netflix Does Not Have 40 Settlement-Free Routes Available Into Comcast. Despite Comcast's initial claim that there are at least 40 settlement-free routes into its network, which it has since acknowledged is incorrect and revised to {{ }}, very few of those routes are *actually* available to third-party OVDs, such as Netflix. Netflix cannot force any entity with a settlement-free agreement with Comcast to provide it with transit into Comcast's network; it can only put out a request for bids to provide those services and see who responds. Netflix also must evaluate those bids in terms of their competitiveness not only on price, but on their ability to provide the required services—transit not only into Comcast's network, but to many other networks as well.

Comcast now admits that at least {{ }} of the 40 routes are held by entities that "likely do not currently sell wholesale transit services."[33] But the list must be whittled down much further. Of the {{ }} remaining settlement-free routes that Comcast claims were available to Netflix during the congestion episode, many are with foreign terminating ISPs, which generally reserve their settlement-free arrangements with Comcast for their own traffic or do not generally

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[32] Evans Reply Declaration ¶ 97 n.80.

[33] Comcast Dec. 8 Ex Parte at 3 (excluding {{

}}).

provide transit services to domestic content companies.[34] Some routes are held by large domestic terminating access ISPs that either similarly reserve their settlement-free capacity for their own subscriber-generated traffic or also seek terminating access fees from competing OVDs.[35] Other routes are held by companies that do not generally provide "bare" (i.e., stand alone) transit services—including enterprise-service and content providers—or that would only provide capacity at exorbitant rates.[36]

The competitive options for transit services to high-bandwidth customers in the United States number only six—Cogent, Level 3, Tata, TeliaSonera, XO, and NTT.[37] Netflix used all six, either directly or indirectly via other carriers.[38] In its recent ex parte, Cogent suggests that five additional entities—Sprint, PCCW, Telecom Italia, GTT, and Zayo—are "[s]econdary competitors" for high-bandwidth customers.[39] As Mr. Ken Florance, Netflix's Head of Content Delivery, explains in his declaration, Netflix inquired of each of these transit providers, but none was willing or able to make its capacity, such as it was, available to Netflix. {{ }} indicated that they had no capacity to offer; {{ }}, by contrast, expressly refused to offer service to Netflix because it would put them in conflict with Comcast.[40]

b. Comcast Deflects From Its Exercise Of Market Power By Blaming Netflix For Congestion

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[34] Florance Reply Declaration ¶¶ 29-30.

[35] *Id.* ¶ 30.

[36] *Id.* ¶ 29.

[37] *Id.* ¶ 32; Cogent Nov. 18 Ex Parte at 6.

[38] Florance Reply Declaration ¶ 32.

[39] Cogent Nov. 18 Ex Parte at 6.

[40] Florance Reply Declaration ¶ 32.

Comcast accuses Netflix of mischaracterizing the events that led to Netflix's switching the bulk of its traffic to Level 3 in 2010 and then to Cogent in 2012. Comcast suggests that Netflix re-routed its traffic on the spur of the moment without notice to Comcast or an opportunity to provision sufficient capacity to meet Netflix's requirements. That is not true. Efficient and reliable network operations are essential to Netflix's business—its entire online video service depends upon it—and so it always has coordinated the moving of data carefully.

Shifts in routing, even for large amounts of traffic, are fairly routine. Contracts are created and expire, and traffic shifts as a result.[41] The ability to switch quickly among myriad competing transit providers differentiates the transit market from interconnection to large terminating access monopoly networks, such as Comcast.[42] Technology enables these shifts in traffic to happen quickly, but such shifts are rarely, if ever, a surprise.[43] These events are well-coordinated beforehand.[44]

Comcast did not discover that Netflix's traffic had abruptly shifted.[45] It was well-informed of future changes in Netflix traffic flows.[46] This shift was not exclusive to Comcast's network, but involved nearly every ISP whose customers use the Netflix service. With the exception of Comcast, AT&T, and Verizon, no terminating ISP objected or issued any concerns, including much smaller terminating ISPs with more limited resources and technical capabilities

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[41] *Id.* ¶ 39.

[42] *Id.*

[43] *Id.*

[44] *Id.*.

[45] *Id.* ¶¶ 40-41.

[46] *Id.*

than Comcast.[47] Comcast did not raise concerns with Netflix, or with its chosen transit providers, about a lack of middle-mile facilities to handle that traffic.[48]

c. Direct Interconnection With Comcast Did Not Decrease Netflix's Costs

Comcast also alleges that Netflix created the congestion episode purposefully to force Comcast to negotiate a direct interconnection agreement with Netflix that would allow Netflix to "cut out the middleman" and save money.[49] That is false. The opposite is true. Netflix did not cut out the middleman when it decided to pay Comcast for direct interconnection; Netflix internalized the costs and functions it previously paid third parties to provide and then was forced to pay Comcast new access fees to alleviate congestion created by Comcast's refusal to provide sufficient capacity for Netflix to respond to requests from Comcast customers. In fact, Netflix did not save money by directly connecting with Comcast.

In directly interconnecting with Comcast, Netflix still must pay (1) a transit provider to transport data necessary to keep the Open Connect appliances up-to-date across the country to reach each of the interconnection points with Comcast, (2) engineers to develop and maintain its Open Connect appliances, (3) equipment manufacturers for the hardware, and (4) the interconnection-facility owner for rent, electricity, and air conditioning. The additional access fee Comcast charges Netflix to transport data over the consumer's broadband Internet access service is 150% more than all of those other costs combined—comprising over 60% of Netflix's total cost of delivering traffic to Comcast's customer.

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[47] *Id.* ¶ 41.

[48] *Id.*

[49] Opposition at 232.

The vast majority of ISPs do not charge Netflix to interconnect directly with their networks—either at a public internet exchange point ("IXP") or at a facility deeper within the ISP's own network. Because Netflix covers the costs associated with Open Connect, there is no incremental cost increase for the ISP to connect with the Open Connect appliance instead of relying on a transit provider. At the same time, the deeper into the ISPs network that Netflix is able to interconnect, the lower the cost to Netflix (and to the ISP). For example:

- Interconnecting with {{ }} at the IXP costs Netflix approximately {{ }}[50] per Mbps; interconnecting with {{ }} inside of the ISP's network, however, costs Netflix far less—approximately {{ }}[51] per Mbps.[52]
- Absent Comcast's intervention, Netflix conservatively estimates that it would have paid {{ }} approximately {{ }} per Mbps[53] for CDN services.

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[50] That estimate consists of {{ }} per Mbps of IXP costs, {{ }} per Mbps of CDN headcount costs, and {{ }} per Mbps of estimated allocation of general and administrative expenses.

[51] The {{ }} Mbps estimate consists of {{ }} per Mbps of hardware costs, {{ }} per Mbps of CDN headcount costs, and {{ }} per Mbps of estimated allocation of general and administrative expenses. The cost per Mbps of cache servers generally decreases as ISP size increases.

[52] Netflix's costs for larger ISPs would be at or below the cost for {{ }}; Netflix's costs for smaller ISPs would be significantly higher. The average across all embedded ISPs is {{ }} per Mbps. In both the {{ }}cases, because Netflix does not provide CDN services to third parties, it does not incur certain costs that some third-party CDNs would incur, such as sales and marketing expenses. Third-party CDNs would need to cover such costs in their fees. A full comparison between a self-supplied CDN and a third-party CDN would need to account for such differences.

[53] The {{ }} estimate uses the {{ }} per Mbps traffic rate from the agreement for 4Q 2013 as the current rate, without adjusting for further decreases in rates to the present. Both estimates use estimated storage costs of {{ }} per Mbps based on a {{ }} ratio for Netflix of CDN storage fees to CDN traffic fees in 2013 (last year of significant CDN use at Netflix). These are conservative lower-bound estimates in that they assume no decrease in traffic or storage rates after 4Q 2013. In addition, to the extent that the contract rate was influenced by access fees, the estimate will understate the rate that would have prevailed in the absence of access fees.

Far from cutting out a middleman to save money, Comcast's intervention into the transit and CDN markets significantly *increased* Netflix's costs of delivering content to Comcast's subscribers. Netflix interconnects with Comcast at IXPs, meaning that its costs are the same as those in the example of {{ }}, but with the addition of a {{ }} per Mbps terminating access fee imposed by Comcast.[54] So under Netflix's agreement with Comcast, Netflix's costs are between:

- {{ }} per Mbps more than with many other large- and medium-sized ISPs; and
- {{ }} per Mbps more than Netflix would have paid {{ }} to provide the same services—absent Comcast's intervention.

Table 3: Netflix's Costs of Delivering Traffic Using Its CDN and Third-Party CDNs {{

}}

Thus, Comcast's accusation that Netflix purposefully congested Comcast's interconnection ports to force a direct interconnection really amounts to a claim that Netflix used nefarious means to obtain a relationship with Comcast that increased Netflix's costs between {{

[54] The Comcast access fee is calculated based on {{ }} peak traffic and an assumed {{ }} ratio of peak to 95th percentile traffic.

}} relative to its prior CDN agreements and between {{ }} above its costs with other medium- and large-sized ISPs.

Comcast is essentially arguing that Netflix—the company that was forced to pay off Comcast to avoid a deteriorating consumer experience—subjected its consumers to a deteriorating experience to game Comcast. Throughout this proceeding and during the episode at issue, Netflix has been motivated by preserving its consumer's experience. The beneficiary of the consumer congestion was decidedly Comcast, and to find the congestion's source, the Commission need merely follow the money.

d. Comcast's Ability To Exercise Its Market Power Over OVDs Would Increase Significantly If This Transaction Were Approved

Even without resolving the significant factual dispute between Comcast and Netflix as to Comcast's specific technical abilities, the fact remains that Comcast is one of only a handful of terminating ISPs that have the requisite market power to extract a terminating access fee from edge providers like Netflix. And of these ISPs, Comcast has been able to extract the highest fee, by a wide margin. As Dr. Evans explains, "[t]he size of the club that an ISP wields in negotiation depends on the number of subscribers it can foreclose from the OVD."[55] Comcast currently controls edge providers' access to 21.1 million households; the Transaction would increase the size of this terminating access monopoly by 40 percent to 29.6 million households.[56]

Comcast's post-merger ability to seek higher interconnection fees would not be just a cumulative increase with TWC's ability to seek such fees. Using data on Netflix's four interconnection agreements, plus data for the six largest wired ISPs whose demands for access

[55] Evans Reply Declaration ¶ 34.

[56] Letter from Francis Buono, Counsel to Comcast, to Marlene Dortch, FCC, at 3 (filed June 27, 2014).

fees Netflix has successfully rebuffed, Dr. Evans finds that the Transaction (including the divestiture) would result in a {{ }} increase in the expected Comcast terminating access fee (from {{ }} to {{ }}) and a {{ }} increase in the TWC terminating access fee (from {{ }} to {{ }}) with a weighted average increase, for the combined entity, of {{ }}.[57] This is a conservative estimate. As Dr. Evans explains, "[t]here are sound economic reasons to believe that Comcast did not seek the profit-maximizing price—that is, did not exercise its full market power—because of the intense scrutiny of both the merger (announced shortly after the Netflix deal) and the net neutrality debate (which was heating up at the time)."[58]

Comcast's economic expert attempts to sidestep the obvious implications of this analysis by suggesting that the difference in payments is the result of "the fact that Comcast and TWC are known to differ in the quality of their networks and interconnection services."[59] This observation is irrelevant. As Mr. Florance explains in his declaration, "there is no such thing as quality differentiated interconnection"—the only quality that Netflix takes into consideration when negotiating an agreement is "whether the ISP can provide sufficient bandwidth to fulfill the needs of our subscribers. That quality, in Netflix's experience, does not vary across ISPs, and certainly did not vary across the four ISPs [Netflix] ultimately [was] forced to pay."[60] Comcast was selling, and Netflix was buying, uncongested access to consumers, but ultimately the value of that uncongested access to Netflix was based entirely on the number of an ISP's subscribers.[61]

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[57] Evans Reply Declaration ¶ 139.

[58] *Id.* ¶ 21.

[59] Israel Declaration ¶ 170.

[60] Florance Reply Declaration ¶¶ 17, 21.

[61] Evans Reply Declaration ¶ 66.

Moreover, the larger number of interconnection points is itself a function of an ISP's "size." As a terminating ISP grows its number of subscribers, it also must grow its network and its available interconnection services to accommodate this increase in users. In addition, subscriber growth is often created through geographic expansion, which also naturally requires an ISP to better develop its middle-mile network and its available interconnection services. As Dr. Evans explains, Dr. Israel "is in fact adding in highly correlated measure of size [into the regression and] creating a classic multicollinearity problem in which {{

}}."[62]

2. Comcast Failed To Rebut That It Has The Requisite Market Power To Harm OVDs Through Data Caps And Set Top Box Restrictions

In addition to increasing the leverage it wields over interconnection to its last mile network, the Transaction would compound Comcast's ability to use its control over data caps and restrictions on set top boxes to harm OVDs. This provides yet another pressure point to apply to edge providers to either obtain fees or push consumers to Comcast's services. Rather than denying its power to do so, Comcast readily admits that it will bypass data caps for its own content when provided through a "managed IP path."[63] In other words, Comcast maintains that its Xfinity content will not count against a subscriber's data cap, but that Netflix and other OVD services will.

Comcast also argues that the data caps that it is trialing in various markets are sufficiently robust so as not to affect most users, and those it does affect have willingly paid the overage fees.[64] Consumers do complain, however, at Comcast's rationing their broadband service.[65]

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[62] *Id.* ¶ 218.

[63] Opposition at 237.

[64] *Id.* at 237-38.

Comcast's customers do not have realistic options for switching to another broadband access provider.[66] Consequently, the willingness of those customers to keep their data consumption low, for fear of hitting the data cap, or to pay the overage fee when they hit the cap, is likely more the result of necessity than anything else. Moreover, customers that rely heavily on OVDs for their video are the most likely to hit the data cap, meaning that Comcast's data caps are a disincentive to further consumer reliance on OVDs.

Even if Comcast's explanations were correct, Comcast's current trialing of data caps does not prevent it from adopting far more aggressive usage-based restrictions in the future. Such a tactic would be relatively harmless for Comcast's own video services, because, as noted above, Comcast largely will be able to avoid even the most restrictive data caps through the use of "managed" data streams.

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[65] *See, e.g.*, Customer Service, Comcast Help and Support Forums, My Account, Customer Service: New Data Cap Plan, Comcast (Oct. 21, 2013, 2:05 PM), http://forums.comcast.com/t5/Customer-Service/New-data-cap-plan/td-p/1885615 ("How is your new data cap plan anything other than an attempt to steal customers back from Netflix/Hulu/other online streaming services? . . . Don't start charging us for using streaming. I can't believe it's 2013 and I'm about to have to start rationing my internet usage."); Customer Service, Comcast Help and Support Forums, My Account, Customer Service: Data Cap, Comcast (Sept. 10, 2013, 04:45 AM), http://forums.comcast.com/t5/Customer-Service/Data-Cap/m-p/1824205/highlight/true#M42198 ("Comcast, my family has been a lifelong customer of you guys since the very begining. What I am seeing coming into play is very disturbing.. My entire family ((5 people)) love and live on technology, and 99% of that connects to the internet. You guys capping our already unlimited service and then trying to charge us 10$ per 50gigs its rediculous! I keep getting spammed on EVERY SINGLE webiste i surf to or try to view stating that im reaching my Comcast Data Limit. Guess what guys???? that was on the 3RD day of the month!!!"); Customer Service, Comcast Help and Support Forums, My Account, Customer Service: Comcast 300Gb data caps, How long can they do this?, Comcast (July 21, 2014, 07:40 AM), http://forums.comcast.com/t5/Customer-Service/Comcast-300Gb-data-caps-How-long-can-they-do-this/td-p/2239248 ("So I have a family of 3, myself my 4 year old and my wife. Now with the Data caps I have to be a stickler to bandwidth. 4 year old can't use Youtube or Netflix anymore, Wife has to watch her netflix useage. . . . This is a horrible way to use the internet. How can Comcast realistically think 300 GB is enough these days?").

[66] Netflix Petition to Deny at 37-42.

Comcast also has failed to demonstrate that it cannot and would not harm OVDs through actions aimed at limiting their access to set-top boxes. Comcast admits that it intends to firmly control the applications available on its set-top boxes and that it is weighing whether to restrict the "X1 platform to apps closely linked to the core of Comcast's Title VI cable offering."[67] Given Comcast's track record of favoring affiliated content, the fact that Comcast will not commit to providing an open X1 platform in its Application should concern the Commission. If Comcast is willing to state in this closely scrutinized proceeding that it is still determining whether to restrict the X1 platform to affiliated offerings, the Commission can be sure that, if the Application were approved, Comcast would not hesitate to close the X1 platform to unaffiliated content.

Comcast's ability to pressure programmers and foreclose access to third-party devices continues to raise concerns. For years,[68] Comcast refused to allow its own customers to access HBO Go through the popular Roku device without any meaningful explanation—simply indicating that {{

}}.[69] Strategically, Comcast allowed its own customers to authenticate the HBO Go app over Roku[70] only after prolonged regulatory[71] and public

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[67] Opposition at 191.

[68] Karl Bode, *Comcast Still Blocking HBO Go on Roku (And Now Playstation 3), Incapable of Explaining Why*, TechDirt (Mar. 7, 2014), https://www.techdirt.com/articles/20140305/14254626446/comcast-still-blocking-hbo-go-roku-now-playstation-3-incapable-explaining-why.shtml.

[69] {{

}}.

[70] On December 15, 2014, Comcast and Roku announced that they had "entered into an agreement pursuant to which Comcast has, among other things, agreed to authenticate the HBO GO and Showtime Anytime apps on Roku video streaming devices for Comcast's subscribers whose subscriptions entitle them to access the content and services made available through such

pressure.[72] Comcast customers, however, still cannot authenticate HBO Go over other popular devices, such as the Sony PlayStation 3 and PlayStation 4 devices.[73] The idea that {{ }} is at the core of Netflix's concern about Comcast's ability to control the distribution of content, even content as popular as HBO's, over their own OVD platforms on third-party devices.

Given the concerns surrounding Comcast's ability to pressure programmers to foreclose access to third-party devices, Comcast's decision to make its X1 software development kit ("SDK") available under a licensing regime to other equipment manufacturers raises more concerns than it alleviates. It is entirely possible, and in line with Comcast's prior actions, that Comcast will seek to leverage its SDK to the detriment of competing services. So whether Comcast's providing its SDK to third-party manufacturers will expand, rather than contract, consumer choice will depend very much on the strings Comcast attaches to that license, and Comcast has every incentive to use those strings to favor its own content and services.

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apps." Letter from Jonathan Kanter to Marlene Dortch, FCC, GN Docket No. 14-28 (filed Dec. 15, 2014).

[71] FCC Information and Document Request to Comcast Corporation, Question 43(f) (Aug. 21, 2014).

[72] Karl Bode, *Comcast Still Blocking HBO Go on Roku (And Now Playstation 3), Incapable of Explaining Why*, TechDirt (Mar. 7, 2014), https://www.techdirt.com/articles/20140305/14254626446/comcast-still-blocking-hbo-go-roku-now-playstation-3-incapable-explaining-why.shtml.

[73] Karl Bode, *Comcast Still Blocking HBO Go On Third Party Devices, Never Bothers To Explain Why*, TechDirt (Dec. 17, 2014), https://www.techdirt.com/articles/20141216/04312629447/comcast-still-blocking-hbo-go-third-party-devices-never-bothers-to-explain-why.shtml.

B. There Are No Competitive Constraints On Comcast's Market Power

High switching costs and lack of viable high-speed broadband options mean that consumers faced with degraded OVD service cannot and do not switch away from Comcast.[74] In response, Comcast's three primary arguments are that: (1) a study Comcast commissioned suggests that 71% of its subscribers "would switch to an alternative ISP if their provider were to try to block, slow down, or charge more for" OVDs;[75] (2) Comcast's own churn data suggests that switching ISPs is so easy that, "over the course of a single year, approximately {{ }} of Comcast's broadband subscribers churn";[76] and (3) when there is an issue with their OVD content, consumers complain to Comcast.[77] Each of these responses is misleading.

The GSG survey[78] commissioned by Comcast is questionable at best. As Dr. Evans notes, the GSG survey appears to suffer from a number of basic methodological problems and a general lack of clarity in the questions posed.[79] These problems result in unreliable results that are plain from the survey responses. For example, as Dr. Evans notes,

> [N]early [[ ]] respondents who answered yes to 'Do you have a wireless data plan for your smartphone' answered no when asked 'Do you have a wireless or mobile broadband service that allows you to connect to the Internet with a mobile device . . . .' Anyone answering yes to the first question should answer yes to

[74] Netflix Petition to Deny at 40-42.

[75] Response 74 of Comcast Corp. to the Commission's Information and Data Request (Sept. 11, 2014), Attachment 74.3 at 5.

[76] Opposition at 204.

[77] *Id.*

[78] Response 74 of Comcast Corp. to the Commission's Information and Data Request (Sept. 11, 2014), Attachment 74.3.

[79] Evans Reply Declaration ¶¶ 240-247.

> the second, yet nearly [[ ]] respondents appeared not to understand and/or failed to pay attention to these questions.[80]

Even putting aside the fundamental problems with the study, the fact that consumers want to switch does not mean they can. Netflix's own study—commissioned in the ordinary course of business, not for purposes of this proceeding—concluded that {{

}}[81]

Comcast's own churn data backs up Netflix's ordinary-course-of-business study. Comcast's own internal evaluation of its churn data indicates that voluntarily switching away from Comcast is, in fact, rare. {{

}}[82] {{

}}[83] Looked at in this light, Comcast's churn figures look decidedly different.[84] Dr. Evans estimates that Comcast's average voluntary churn rate is actually closer to {{ }} per year, not {{ }} as Comcast suggests.[85] Notably, this makes Comcast's actual voluntary churn rate about {{ }} the 11.6% figure from the FCC's study on consumer switching.

Because of the lack of competitive options, when consumers complain to Comcast about the quality of delivery of their chosen OVD's content, there is little threat that they will actually

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[80] *Id.* ¶ 246.

[81] Netflix Petition to Deny at 41.

[82] {{ }}

[83] {{ }}

[84] As Dr. Evans points out, even without these necessary adjustments, Dr. Israel appears to have significantly overstated Comcast's yearly churn by unnecessary rounding errors and the use of the wrong equation.

[85] Evans Reply Declaration ¶ 253.

leave. That conclusion is verified by analyzing Comcast's churn data for the period during which Comcast's subscribers had significantly diminished access to Netflix's content.

C. Comcast Fails To Address The Content Distribution Side Of The Market, Which is National

The market for *content distribution over broadband* is national. In its Opposition, the Applicants recast the "no overlap, no problem" theme in support of the Transaction, ignoring the Transaction's anticompetitive effects on OVDs and edge providers that seek broad, national distribution of their content. The Applicants continue to divert attention from the content distribution side of the broadband market by stressing the lack of horizontal competition between Comcast and TWC in the provision of residential broadband Internet access to consumers.[86] This argument fails to address the other side of the two-sided broadband platform: the national market for high-speed distribution of edge provider content. In this platform, the Application raises substantial horizontal concerns.

The Department of Justice ("DOJ") and the Commission recognized and relied upon this national market in the *AT&T-MediaOne* transaction, which was challenged by the DOJ, and permitted to close only after both agencies imposed a substantial divestiture, and other conditions, to address the competitive concerns arising from that merger.[87] The Opposition fails to demonstrate otherwise and instead mischaracterizes Netflix's argument, the DOJ's challenge to the *AT&T-MediaOne* transaction (as originally structured), and the Commission's conditional approval of that transaction.

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[86] *See* Opposition at 144.

[87] *See* Netflix Petition to Deny at 24-27.

The Opposition argues that neither the Commission nor the DOJ identified a national market for broadband content distribution in *AT&T-MediaOne*,[88] while at the same time acknowledging that DOJ did define the market "for aggregation, promotion, and distribution of broadband content and services."[89] Despite the plain language of the DOJ's complaint, the Opposition argues that DOJ focused on the "market for providing 'portal service' to ISPs,"[90] and that Excite@Home and Road Runner were Internet portals and *not ISPs* in the current sense of the term.[91] This argument mischaracterizes the DOJ's challenge to the *AT&T-MediaOne* transaction.

In 2000, Excite@Home and Road Runner were the nation's two largest residential ISPs—a term that continues to carry the same meaning today—providing broadband service over cable systems to residential customers.[92] The DOJ described Excite@Home as "the largest provider of residential broadband service"[93] and Road Runner as "the second largest provider of residential broadband service in the United States."[94] Likewise, the Commission described Excite@Home and Road Runner as "the nation's two largest cable broadband Internet service

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[88] *See* Opposition at 20, 118-121.

[89] *Id.* at 118-119.

[90] *Id.* at 118.

[91] *Id.*

[92] Excite@Home had the exclusive right to provide residential broadband service over the cable facilities of its three principal equity holders, AT&T, Cox Communications, and Comcast. MediaOne, along with then-Time Warner Entertainment and other entities, owned the second largest residential broadband provider, Road Runner. Competitive Impact Statement, *United States v. AT&T Corp.*, No. 1:00-cv-01176, at 4-5 (D.D.C. May 25, 2000).

[93] Complaint, *United States v. AT&T Corp.*, No. 1:00-cv-01176, at 3 ¶ 5 (D.D.C. May 25, 2000) ("*AT&T-MediaOne Complaint*").

[94] *Id.* at 4 ¶ 8.

providers."[95] Moreover, Excite@Home and Road Runner did not contract with cable operators to be the exclusive provider of an Internet portal, as the Opposition argues;[96] they contracted to be the exclusive provider of "*high-speed Internet access service*" over the systems of cable operators.[97] Thus, the Applicants' contention that neither Excite@Home nor Road Runner was an ISP in the current sense of the term is incorrect.

The Opposition's claim that the DOJ's mention of other portals (namely Yahoo and Lycos) confirms that "[the DOJ] was not focused on the residential broadband business" is unavailing.[98] In *AT&T-MediaOne*, the DOJ focused on the *content distribution* side of the broadband market, not the residential Internet access side, and defined the former as a *national* market.[99] The DOJ defined this market as the national market[100] for "aggregation, promotion, and distribution of broadband content and services."[101] In challenging the transaction, the DOJ expressed concerns that AT&T could "exploit[] its 'gatekeeper' position in the residential

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[95] Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations from MediaOne Group, Inc., to AT&T Corp., *Memorandum Opinion and Order*, 15 FCC Rcd. 9816, 9821 ¶ 5 (2000) ("*AT&T-MediaOne Order*"). The Commission further described Excite@Home as a service that "allows subscribers to connect their personal computers via cable modems to a high-speed network developed and managed by Excite@Home, and obtain access to the public Internet and other online content." *Id.* at 9826 ¶ 21.

[96] Opposition at 119.

[97] *See AT&T-MediaOne Complaint* at 4 ¶ 6, 5 ¶ 9; *AT&T-MediaOne Order*, 15 FCC Rcd. at 9827 ¶ 21, 9832 ¶ 28.

[98] Opposition at 119.

[99] *AT&T-MediaOne Complaint* at 9-11 ¶¶ 24-27.

[100] *Id.* at 11 ¶ 28.

[101] *Id.* at 9 ¶ 25.

broadband *content market* to extract anticompetitive terms and to disfavor certain content providers."[102]

This Transaction raises nearly identical competitive concerns. Today, "broadband providers have the ability to act as *gatekeepers*."[103] Comcast and TWC seek to become the nation's largest broadband provider—of both the underlying cable system and the ISP service—which would give the combined company unrivaled market power to exploit its gatekeeper position in the national broadband content distribution market over content providers seeking access to consumers.[104]

In *AT&T-MediaOne*, the DOJ's complaint focused on two services that Excite@Home and Road Runner provided to content providers: portals and caching. As the Opposition notes, the importance of portals—which aggregated and promoted content through prominent links[105]—has indeed diminished.[106] However, the gateway function that Excite@Home and Road Runner provided still exists today but has been taken over by Comcast and TWC. The ISP's ability to act as a gatekeeper for online content was relevant to the DOJ's concern then and remains

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[102] *Id.* at 2 (emphasis added).

[103] Preserving the Open Internet, *Report and Order*, 25 FCC Rcd. 17905, 17919 ¶ 24, 17935 ¶ 50 (emphasis added) ("*Open Internet Order*").

[104] The Commission analyzed this gatekeeper power in the Open Internet proceeding, and the D.C. Circuit affirmed the Commission's analysis. *See Verizon v. FCC*, 740 F.3d 623, 646 (D.C. Cir. 2014) (citing *Open Internet Order*, 25 FCC Rcd. at 17919 ¶ 24) (because all end users generally access the Internet through a single broadband provider, that provider functions as a "'terminating monopolist,' with power to act as a 'gatekeeper' with respect to edge providers that might seek to reach its end-user subscribers.").

[105] *AT&T-MediaOne Complaint* at 9 ¶ 25.

[106] While the prominence of portals has diminished over time, Applicants' ability to control the user experience on customer premises equipment such as set top boxes, as well as the ability of Applicants to control the last-mile delivery of content absent open Internet rules, raise the same competitive concerns today as the use of portals did in 2000.

relevant now. This gatekeeper power is clearly evident in Comcast's and TWC's control over caching, which facilitates the distribution of content and remains critically important to content providers, such as OVDs, today. The DOJ explained that:

> [C]ontent providers seek network services such as caching that will facilitate the distribution of their data so as to enhance the quality and accessibility of their content. Caching stores a content provider's content at various locations throughout the country, closer to end users, thereby improving speed and performance. This is a particularly important service for broadband content providers who must rely on the rapid delivery of large quantities of data in order to provide the most attractive content.[107]

In this case, Netflix, through Open Connect, provides caching and storage functionalities, which the DOJ stressed as "valuable services to content providers that heavily influence [content providers'] success or failure in the content market."[108] The ability of these services to be successful, however, is totally dependent on whether Comcast will allocate sufficient interconnection capacity to allow these caching services to function as intended. When Comcast imposes access fees on the inputs to Netflix's provision of caching services to Comcast and its customers, such fees impede the caching service from working the way it is intended.[109] The DOJ recognized in *AT&T-MediaOne* that control over both portal and caching services would have given the combined entity power over inputs crucial to the efficient, high-quality delivery of content. Those same concerns regarding the power to exclusively provide the gateway to broadband access service and to harm content providers' ability to efficiently cache content near an ISP's last-mile network have become manifest in Comcast's ability to demand that Netflix

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[107] *Id.* at 10 ¶ 27.

[108] *Id.* at 11 ¶ 28.

[109] As explained below, Netflix has offered to place its content even closer to Comcast's subscribers by embedding its Open Connect caches inside Comcast's network, but Comcast has refused Netflix's offer to do so.

pay an access fee to directly connect its cache of content to Comcast's network. In sum, acknowledging the national market for content distribution over broadband is not only consistent with the DOJ's finding in *AT&T-MediaOne*, it remains the appropriate market definition for assessing and addressing bottleneck power that Comcast and TWC can exercise over online content providers.

The Opposition also attempts to obfuscate the DOJ's concerns about the transaction's anticompetitive impacts on content providers by mischaracterizing the remedy imposed on the merging parties. The Opposition's incomplete quotation of the DOJ press release announcing the lawsuit and proposed remedy incorrectly suggests that the DOJ did not challenge broadband service at all.[110] The full quotation states:

> 'The merger as proposed would have had an anticompetitive impact on the emerging *broadband market*. . . . The divestiture assures that AT&T will not acquire undue leverage in its dealings with *broadband content providers*, and American consumers will be the ultimate beneficiaries.' Under the terms of the proposed consent decree, AT&T is required to exit the Road Runner joint venture no later than December 31, 2001.[111]

Therefore, the Opposition's argument that the DOJ did not challenge the *AT&T-MediaOne* transaction to prevent anticompetitive effects in the broadband market for content providers is wrong.

Although the Commission ultimately approved the *AT&T-MediaOne* transaction, it did so only because the DOJ's imposed conditions, including AT&T's divestiture of its interest in Road

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[110] Opposition at 119.

[111] Press Release, U.S. Dep't of Justice, *Justice Department Requires AT&T to Divest MediaOne's Interest in Road Runner Broadband Internet Access Service*, at 2 (May 25, 2000), http://www.justice.gov/atr/public/press_releases/2000/4829.pdf (emphasis added).

Runner[112] and the merging parties' commitment to open their cable network to unaffiliated ISPs, mitigated the combined firm's "ability and the incentive to discriminate against unaffiliated content providers."[113] Today, there are no such factors to mitigate Comcast's ability and incentive to harm edge providers. If anything, the competitive concerns identified by the DOJ in *AT&T-MediaOne* are heightened in this Transaction.[114] The cable industry has significantly consolidated since 2000 and, unlike *AT&T-MediaOne*, the proposed Transaction does not involve an acquisition of partial ownership. Comcast would have complete ownership of TWC. At the time of *AT&T-MediaOne*, the market appeared to be open for intermodal competition among ISPs; cable operators were experimenting with various business models for offering broadband Internet access service to consumers.[115] This is not the case today. Comcast and TWC each have market power in local broadband access markets,[116] and are not currently required to offer their facilities to unaffiliated ISPs.

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[112] The consent decree also required the merged firm to obtain prior approval before entering into agreements including those that "would prevent the inclusion of any content in a cable modem service offered by either party or that would prevent either party from providing preferential treatment to content provided by others." *AT&T-MediaOne Order*, 15 FCC Rcd. at 9871 ¶ 122; see also *United States v. AT&T Corp.*, No. 1:00-cv-01176, Proposed Final Judgment (D.D.C., filed May 25, 2000).

[113] *AT&T-MediaOne Order*, 15 FCC Rcd. at 9871 ¶ 123.

[114] Netflix Petition to Deny at 75.

[115] For example, some cable operators offered cable modem service in conjunction with ISPs not financially affiliated with any cable operator, and some operators began a multiple ISP-approach, offering consumers a choice of broadband service provider. Inquiry Concerning High-Speed Access to the Internet over Cable and Other Facilities, *Declaratory Ruling and Notice of Proposed Rulemaking*, 17 FCC Rcd. 4798, 4812-18 ¶¶ 20-30 (2002). Further, the Commission found it noteworthy that cable modem subscribers were able to obtain many functions from companies with whom cable operators did not have a contractual relationship thanks to "click-through" access. *Id.* at 4815 ¶ 25.

[116] Netflix Petition to Deny at 35-42.

In sum, *AT&T-MediaOne* provides support for the national market for high-speed broadband distribution of edge provider content. The proposed Transaction raises nearly identical competitive concerns to those identified by the Commission and the DOJ in *AT&T-MediaOne*: the increase in concentration in the national market for high-speed broadband distribution of edge provider content would give Comcast an increased ability and incentive to harm edge providers, including OVDs such as Netflix.

III. TERMINATING ACCESS FEES ARE ABOUT MARKET POWER—NOT COST RECOVERY OR EFFICIENCIES

Comcast argues that terminating access fees are (1) necessary to ensure that "those who send large amounts [of] traffic do so efficiently," (2) required to efficiently divide the costs of transmitting edge-provide traffic over its network, and (3) reflect an informal assessment of how much a given entity has "contributed to the Internet networks through direct investment in end-to-end facilities that other providers can utilize."[117] This is incorrect. Comcast has adamantly refused to permit Netflix to implement the most network- and cost-efficient mechanism for interconnection,[118] and Netflix has already demonstrated that the price of interconnection fees is derivative of a terminating ISP's size, not its costs.

Comcast's interconnection charge is not for transit services, servers or storage. It is, in other words, a pure terminating access charge to deliver content requested by Comcast's own customers. Stripped of the veneer of creating efficiencies, terminating access fees serve only one purpose: to charge content providers, directly or indirectly, for the transmission of data over the last mile broadband access services of its own customers. Terminating access fees serve only

[117] McElearney Declaration ¶¶ 8-26.

[118] Florance Reply Declaration ¶ 16.

one purpose: to pad the profits of ISPs who are deploying capital at historically low rates.[119] This is precisely the behavior that the Commission sought to prevent through the *2010 Open Internet* rule.[120]

A. Comcast's Terminating Access Fees Are Not Efficiency-Based

Terminating access fees are not about recouping costs of interconnecting. The Applicants admit that the price of physical interconnection is low, generally involving the transmission of data "a couple feet."[121] Comcast admits that the cost for the physical components required for interconnection (e.g., a 10GigE port and a cable) make up only a few thousand dollars of the millions of dollars in terminating access fees that it charges.[122] The remainder of the toll paid by transit providers, CDNs, or content providers is, according to

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[119] *See, e.g.*, Susan Crawford, *The Facts*, SCrawford.net (May 24, 2013), *available at* http://scrawford.net/the-facts/ ("[n]one of the large companies (AT&T, Verizon, Comcast, Time Warner Cable) has any incentive to invest in a fiber upgrade for the country: They have made their capital investments, divided markets ('you take wireless, I'll take wired'), and are in harvesting mode."); Briand Fung, *ISPs Are Spending Less on Their Networks As They Make More Money Off Them*, Washington Post (July 24, 2014), *available at* http://www.washington post.com/blogs/the-switch/wp/2014/07/24/isps-are-spending-less-on-their-networks-as-they-make-more-money-off-them/ (reporting that "as a percentage of the money they pull in, ISPs have generally spent less on infrastructure over time—from a high of 37 percent of revenue in some cases to a low of around 12 percent more recently.").

[120] *See Open Internet Order*, 25 FCC Rcd. at 17943-44 ¶ 67 ("To the extent that a content, application, or service provider could avoid being blocked only by paying a fee, charging such a fee would not be permissible under these rules.").

[121] Response 72 of Comcast Corp. to the Commission's Information and Data Request (Sept. 11, 2014), at 191.

[122] *See* Declaration of Constantine Dovrolis at 16 (Sept. 23, 2014) ("Depending on the capacity of [the router] ports and the number of physical locations at which the interconnection is taking place, [the cost of a bilateral access service interconnection] may be from two to three hundred dollars to a few tens of thousands of dollars.").

Comcast, intended to defray the cost of transporting data from the interconnection points to the consumer.[123] This is the very fee that the Commission's *2010 Open Internet Order* prohibited.[124]

This second charge for transporting data across Comcast's network to Comcast's consumers illustrates Comcast's market power over edge providers, including OVDs such as Netflix. A consumer who purchases a 25 Mbps connection should not have that service throttled or expanded by their terminating ISP based on the particular content provider's (or its chosen transit or CDN provider's) willingness or ability to pay a terminating access fee. This is the same position the Commission took in the *2010 Open Internet Order*.[125]

While Comcast praises the Commission's Open Internet rules, it attempts to distract from the underlying justifications for the *2010 Open Internet Order*. The *2010 Open Internet Order* found that broadband providers have the "incentive and ability to engage in self-interested practices" including charging "unreasonable additional fees"[126] or "inefficiently high fees to edge providers"[127] for faster delivery of content. Comcast argues, however, that transporting third-party data requested by Comcast's users across its network without charging such access fees would "unfairly impose the sending party's costs on *all* of Comcast's customers."[128] Comcast's argument was rejected by the Commission when it adopted the Open Internet

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[123] Opposition at 235; Dovrolis Declaration at 23-24.

[124] *See Open Internet Order*, 25 FCC Rcd. at 17943-44 ¶ 67 ("To the extent that a content, application, or service provider could avoid being blocked only by paying a fee, charging such a fee would not be permissible under these rules.").

[125] *Id.*; *see also id.* at 17919-21 ¶¶ 24-26; Netflix Petition to Deny at 68-70.

[126] *Open Internet Order*, 25 FCC Rcd. at 17975 ¶ 128.

[127] *Id.* at 17919 ¶ 25.

[128] McElearney Declaration ¶ 26 (emphasis in original).

Order.[129] Seemingly, Comcast believes that it is entitled access fees regardless of whether those fees reflect the cost to Comcast of delivering its own customers' requested content.

If merely recouping costs were the issue, Comcast would standardize the costs involved and seek deals that minimized the traffic burden on its network. But neither is true. Comcast rejected Netflix's offer to internalize nearly all of the actual costs of transmitting data to Comcast's customers by embedding Netflix's Open Connect appliances deep in Comcast's network.[130]

Terminating access fees are not designed to create efficient network operations. Comcast's interconnection experts allege that settlement-free peering would create significant network inefficiencies.[131] They argue that free interconnection would "compel Comcast not only to accept traffic for free from any content provider or network operator on the Internet but also to do so with respect to as *much* traffic as any provider wants to send onto Comcast's network."[132]

Comcast's fear that content providers would suddenly dump traffic onto its network is unfounded. Edge providers, such as Netflix, only send traffic specifically requested by Comcast's broadband access customers.[133] The speed at which those customers receive that content is governed by the speed tier purchased by each Comcast subscriber. Absent intervention by Comcast, and assuming direct interconnection between the edge provider and Comcast, Comcast's own customer decides how much data an edge provider sends to Comcast's network.

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[129] *Open Internet Order*, 25 FCC Rcd. at 17930 ¶ 43.

[130] Florance Reply Declaration ¶ 16.

[131] McElearney Declaration ¶ 26 (emphasis in original).

[132] *Id.* ¶ 25 (emphasis in original).

[133] Florance Reply Declaration ¶¶ 4, 12.

Content providers have an equal incentive to minimize the bandwidth their services utilize. Netflix incurs significant costs associated with the transmission and storage of data prior to the data's reaching Comcast's network, and those costs increase whenever Netflix needs to augment capacity to respond to increased consumer demand. For every 10 gigabit port that Comcast adds to provide capacity for demand, Netflix must also add parallel capacity itself and pay the costs of storing the data that will flow over that capacity. Because the market for over-the-top ("OTT") content is competitive, content providers are also disciplined by consumers themselves, whose connection speeds vary significantly and who commonly utilize their broadband connections to perform more than one task at a time. The more inefficient the service provided by a content provider; the smaller the share of the broadband market that content provider can reach; the greater the probability that existing consumers will seek an alternative, more efficient source for their content and service.

The clearest evidence that Comcast's interconnection policies are unrelated to network efficiency is Comcast's unwillingness to enter into more efficient network arrangements that minimize the costs to its network. The most efficient way to run the network in this case would be for Netflix to embed its Open Connect appliances deep within Comcast's network to ensure minimal use of Comcast's middle-mile facilities.[134] Comcast, however, has refused Netflix's offer to install those boxes without charge to Comcast, {{

[134] *Id.* ¶ 16.

[135] *See* EchoStar Commc'ns Corp. v. Comcast Corp., *Memorandum Opinion and Order*, 14 FCC Rcd. 2089, 2092-93 ¶ 8-9 (1999), *aff'd,* DirecTV, Inc. v. Comcast Corp., *Memorandum Opinion and Order*, 15 FCC Rcd. 22802 (2000), *aff'd, EchoStar Commc'ns Corp.* v. *FCC*, 292 F.3d 749 (D.C. Cir. 2002) (foreclosing video distribution competition in the Philadelphia market by withholding must have programming).

}}[136]

B. The Current Terminating Fees Are The Camel's Nose Under The Tent

The danger of terminating access fees is that they provide Comcast with an unchecked ability to harm content providers by charging arbitrary and undisciplined rates for mere access to Comcast's network. Comcast alleges that its terminating access fees are limited by the market for transit and CDN services.[137] This is incorrect. The transit and CDN services provided by a number of other companies are not substitutes for last mile access. They do not and cannot discipline access fees charged by Comcast because these services do not carry data to consumers over the last mile of Comcast's (or any ISP's) network. While Netflix may choose among competitive providers (as well as self-provision) to bring its data *to Comcast's last mile network*, only Comcast can send content *across its last mile* to its subscribers. Third-party providers of transit cannot restrain what Comcast charges for taking traffic from Comcast's doorstep to the subscriber's doorstep, because they do not provide those services. Only Comcast can send content from its doorstep to its subscribers. For that reason, not only is Comcast unconstrained by competition in the transit market, it has the power to demand interconnection fees from transit providers and to set a price floor in the adjacent (and otherwise competitive) transit market.

Comcast also argues that its terminating access fees are so small (as a percentage of Netflix's total costs) that they should not be of concern.[138] This attempt to sidestep and distract

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[136] Florance Reply Declaration ¶ 16.

[137] Opposition at 148.

[138] *See id.* at 225 (arguing that "for large content providers like Netflix, the modest interconnection fees charged by Comcast are an immaterial portion of their costs, and are therefore hardly likely to impact an OVD's 'viability'").

from Comcast's exercise of market power ignores that these fees are unconstrained by competitive forces and that current charges are a mere marker for what Comcast may demand post-merger. Regardless, as Dr. Evans explains:

> There is no authority for taking a price increase, calculating it as a percentage of overall revenue and costs for a company, and concluding that it is not relevant because it is small. Under that calculation even the most egregious attempt to monopolize a component of production would pass muster since increasing the price of a component, that itself constitutes a small fraction of the overall cost of the product, would be "miniscule."[139]

Given Comcast's claim that their consumers have suffered, holding out for such a small amount of money suggests that it was not harmed as much. Comcast was willing to allow its own consumers to suffer in order to force Netflix to pay a fee to Comcast, and it did so during a time of relatively high regulatory scrutiny—with the FCC's Open Internet Notice of Proposed Rulemaking and its review of the present Transaction on the immediate horizon. This suggests that the current fees imposed by Comcast do not fully represent even its current market power; rather, Comcast's greater interest was in breaking the "zero-price" barrier with Netflix and setting a business precedent for other OVDs and other edge providers in the future. As Dr. Evans explains, "[b]reaking the zero barrier places Comcast in a position to increase fees going forward. Just crossing that barrier, with one of the strongest opponents of terminating access fees, was a significant victory."[140]

Crossing that barrier with Netflix is part of a strategic shift in how Comcast treats those who provide its subscribers with content that began in 2008. Until 2006, Comcast actually paid

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[139] Evans Reply Declaration ¶ 19.

[140] *Id.* ¶ 109.

AT&T for links to public IXPs,[141] and thus likely obtained little to no revenue from direct interconnection. According to the agreements disclosed in this proceeding by Comcast, beginning around 2008, Comcast began establishing a general practice of charging for interconnection. Comcast initiated {{ }} new paid interconnection agreements in 2008 and {{ }} in 2009. In fact, over those first two years Comcast initiated {{ }} of the interconnection agreements it currently has—including agreements with major content providers and CDNs {{

}}.[142] Until that point, those parties do not appear to have paid Comcast for access to its network. These new payments were not part of a general change in the market—they were an exercise of market power. Even today, only the four largest ISPs—those with sufficient market power—charge Netflix for interconnection.

Comcast's ability to force paid interconnection from {{ }} was significant given that {{

}}. {{

[141] McElearney Declaration ¶ 28.

[142] {{

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}}[143] {{

}} A year later, Comcast's agreement with {{ }} changed significantly—{{

}}. {{

}}

Comcast's ability to leverage its terminating access monopoly and existing size to "break zero" have already yielded Comcast new terminating access fees. Netflix paid Comcast {{ }} million last year to access Comcast's network. That is only the camel's nose under the tent, as Comcast faces few competitive and short-term contractual impediments to demanding increased fees under its paid agreements or to de-peering existing settlement-free routes into its network.

With this Transaction, Comcast's ability to draw increasing revenue from content providers, either directly or indirectly, would increase significantly. The Commission has yet to issue rules that clearly prohibit Comcast's leveraging its terminating access monopoly at the point of interconnection. Because the combined entity would control such a large portion of the

[143] {{

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high-speed national broadband distribution market, content providers would have little choice but to reach Comcast's network—whatever the cost. That means that as Comcast has continued to break the "zero-price" barrier with other OVDs, CDNs, and transit providers, Comcast is in a position to set the general price floor for transit to its network, and would likely begin to increase the overall price per-Mbps of that transit.

That means that as Comcast has continued to break the "zero-price" barrier with other OVDs, CDNs, and transit providers, Comcast is in a position to set the general price floor for transit to its network, and would likely begin to increase the overall price per-Mbps of that transit.

Moreover, the Commission is charged with evaluating the proposed merger's impact on the video distribution marketplace as a whole and not just as it relates to one company. Now that Comcast has demonstrated its ability to foreclose access to Netflix, it will be easy to threaten smaller OVDs with a similar fate in order to obtain relatively greater terminating access fees from them. Those additional fees could be a significant barrier to entry for new OVDs and inhibit further growth and expansion by existing ones.

The terminating access fee charged by Comcast is already more than {{ }} of Netflix's costs in delivering content to Comcast subscribers. Post transaction, Dr. Evans estimates that those access fees are likely to expand by {{ }}.[144] That calculation, however, is based on Comcast's current exercise of its market power and so may significantly understate the potential for fee increases.

Because Comcast's market power is undisciplined by competitive constraints, Comcast can "turn the dial" to harm an edge provider in whatever manner it desires—either through

[144] Evans Reply Declaration ¶ 139.

degradation to push consumers toward its own video services or through increased terminating access fees to raise a rival's costs. Consolidation with TWC would only provide Comcast with more unchecked market power to leverage.

IV. CONCLUSION

Rather than rebutting the significant issues raised in the Petitions to Deny, Applicants create a significant factual dispute surrounding their technical ability to foreclose traffic at the point of interconnection. Resolving this dispute is central to the Commission's public interest determination here and deserves designation for hearing.[145] Even without resolving that particular dispute, however, the Applicants have failed to show that this Transaction would not result in significant harm to consumer choice and the currently vibrant market for OVD and OTT content. For those reasons, Netflix urges the Commission to deny this Transaction.

Respectfully submitted,

/s/

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December 23, 2014

[145] Netflix Petition to Deny at 3, 7-8.

REDACTED—FOR PUBLIC INSPECTION

DECLARATION

I declare under penalty of perjury that the facts contained within the foregoing Reply and its appended material, except for those facts for which official notice may be taken and those that other parties have submitted to the Federal Communications Commission confidentially under the protection of the *Protective Orders* in MB Docket No. 14-57, are true and correct to the best of my information, knowledge, and belief.

Executed on December 22, 2014

Corie Wright
Director of Global Public Policy
Netflix, Inc.

REDACTED—FOR PUBLIC INSPECTION

REPLY DECLARATION OF KEN FLORANCE

1. My name is Ken Florance. I am the Vice President of Content Delivery at Netflix. I have held the position of Vice President of Content Delivery since 2012. In this role, I am responsible for the seamless delivery of more than one billion hours each month of streaming video content to more than 50 million Netflix members in over 40 countries. In connection with these responsibilities, I oversee Open Connect, Netflix's single-purpose content delivery network ("CDN") designed for Netflix streaming video. I have led the network architecture efforts for Netflix's streaming video service since its launch in 2007.

2. The purpose of this declaration is to respond to the Declarations of Kevin McElearney and Professor Constantine Dovrolis, which were submitted by Comcast as part of its Opposition in this proceeding. My views are based on my review of the redacted, public versions of those Declarations, as well as my many years of experience in network management.

Technical Background

3. Wired broadband Internet Service Providers ("ISPs") operate local networks. A local network consists of wires that extend from residential locations to network routers, which control the movement of traffic back and forth between the ISP and subscriber. In large ISP networks, those local networks, in turn, are often connected to regional data centers, and eventually, connect to one or more Internet Exchange Points ("IXPs").

4. For consumers, the point of purchasing a broadband subscription is to be able to request, and then to receive, content from the multiplicity of networks that make up the Internet. When a consumer requests content from Netflix, for example, a signal is sent from the consumer's equipment through cable (coax, fiber, etc.) to a network router at a local facility. The consumer's ISP then sends that request across its owned or leased intermediate cables and routers until it reaches the IXP, at which point one of several backbone providers will take the

request to its intended recipient or edge provider—which often resides on another local network. The edge provider then sends the requested content back to the ISP, which relays the content back across the intermediate cables and routers and finally to the household that made the request.

5. Interconnected transit providers move traffic from edge providers either to an ISP or between ISPs themselves. To better rationalize the use of backbone capacity and improve the end-users' experience, CDNs allow content providers to place servers closer to residential consumers. A CDN connects to an ISP either at an IXP or at some other mutually agreed-upon connection point.

6. ISPs are under no obligation to interconnect with any particular transit provider or CDN. To provide access to most Internet destinations, an ISP must interconnect with a number of global transit providers, but an ISP does not need to interconnect with all of them to provide Internet access to its subscribers. ISPs can pick and choose which transit providers they want to negotiate with and which they want to exclude.

7. ISPs are gatekeepers for all information that passes over their networks—meaning that the ISP ultimately controls what goes from the household to the edge provider and what comes from the edge provider to the household. An ISP can reject any traffic at any router on its network, up to and including the point of interconnection; the largest ISPs can do this without otherwise impairing their access to the Internet as a whole.

Netflix Does Not Purchase Network-to-Network ("Off-Net") Transit—or Any Other Service—from Comcast

8. Mr. McElearney's Declaration contains a fundamental error. Mr. McElearney contends that Netflix's primary interest is in delivering "as *much* traffic as [Netflix] wants" or

"the most traffic possible" onto Comcast's network.[1] Netflix does not send a single bit of data to Comcast's network that is not specifically requested by Comcast's own broadband subscribers. Because Comcast is selling access to the Internet, and Netflix is a widely-used service on the Internet, Comcast is selling its users, among all of the other amazing things on the Internet, access to Netflix.

9. Mr. McElearney conflates transit services ("off-net") and interconnection ("on-net") agreements.[2] Netflix pays transit providers to connect Netflix to all of the networks that make up the Internet. By contrast, interconnection agreements only provide access to the terminating ISP's own subscribers. Comcast is not a transit provider for Netflix. Netflix does not pay Comcast to carry traffic to any other ISP. Comcast does not provide Netflix with storage or servers. Netflix pays Comcast merely for access to Comcast's network to fulfill the requests for content from Comcast's own broadband subscribers.

10. The distinction between transit and interconnection is critical both as a technical matter and in terms of economics. Transit providers charge Netflix to haul its data and guarantee its delivery to virtually every network across the globe. In Comcast's view, as articulated by Comcast's declarant, Professor Dovrolis, the interconnection charge assessed by terminating ISPs like Comcast is intended to pay for two things: (1) physically connecting two networks—i.e., router ports and a bit of cabling; and (2) transporting the data from the interconnection point, over the ISP's broadband access network, and finally to the subscriber who requested the data.[3] In truth, however, the interconnection fee Comcast imposes on Netflix is an access charge,

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[1] Declaration of Kevin McElearney ¶¶ 15, 30 (Sept. 19, 2014) ("*McElearney Decl.*").

[2] *Id.* ¶ 4.

[3] Declaration of Constantine Dovrolis, *The Evolution and Economics of Internet Interconnection*, at 16 (Sept. 21, 2014) ("*Dovrolis Decl.*").

unrelated to the actual expense of interconnection.

11. The lion's share of Netflix's payment to Comcast (which reflects an exertion of Comcast's market power) is for an access charge for delivering content requested by Comcast's subscribers over the broadband connection they pay Comcast to provide. As explained in my previous declaration, and as Professor Dovrolis confirms, the costs of physical interconnection are minor.[4] The total cost of "physical" interconnection is generally a non-recurring charge of a few thousand dollars or less for each 10 or 100 Gbps port and cross-connect cable.[5] Symmetrical costs are borne by Netflix, which also must purchase a 10 or 100 Gbps port for each port added by Comcast. Additionally, Netflix pays the cabling fee charged by the co-location facility to cross-connect to Comcast's ports. Netflix also pays all third party charges unilaterally related to connecting to the Comcast network at locations of their choosing. Netflix purchases largely the same hardware for its CDN as that used by large ISPs, and therefore I have good visibility into those costs. Hardware costs are an incredibly small portion of the overall interconnection charge and are not the source of conflict in interconnection disputes.

12. Comcast has suggested that its market power (both pre- and post-merger) and ability to set prices for access to its subscribers are disciplined by the competitive market for transit service, and that the cost of transit has been decreasing on a per megabit basis. Even if transit costs are decreasing—and as discussed below, it is unclear they will continue to do so—those cost trajectories are irrelevant to whether, and how much, Netflix must pay just to access Comcast's network. Netflix pays large ISPs like Comcast only for access to that ISP's network—not for transit between or among networks. In essence, Comcast is selling its broadband subscribers access to the Internet, and then charging companies like Netflix for

[4] *Id.*; Declaration of Ken Florance ¶ 46 (Aug. 25, 2014) ("*Florance Decl.*").

[5] Declaration of Henry Kilmer ¶¶ 18-19 (Aug. 25, 2014) ("*Kilmer Decl.*"); *Florance Decl.* ¶ 46.

sending the content those subscribers request. And, as Dr. Evans explains in his Declaration, Netflix's net costs increase as a result of paying Comcast the terminating access fee it demands.[6]

13. The market for transit services cannot discipline what Comcast charges for access to its subscribers. Although the market for transit services to most ISPs is generally competitive, that does not hold true for transit services delivering traffic to Comcast because of its artificial constraint on settlement-free capacity into its network. Under the terms of Comcast's ratio-based, unilaterally imposed Peering Policy, a settlement-free peer is limited in the volume of traffic it may deliver to Comcast's network. If, to respond to consumer demand, a settlement-free peer of Comcast's needs to deliver traffic volume to Comcast that exceeds the settlement-free capacity Comcast has allotted to that peer, then Comcast requires that peer to pay a terminating access fee for traffic volumes that exceed the settlement-free allocation. Settlement-free peers that refuse to pay Comcast's terminating access fee face congestion, as happened to Cogent, until that peer either reduces its traffic volume to Comcast or agrees to pay. Other transit providers might face congestion and the threat of being outright de-peered, as happened to {{ }}. For all of these reasons, the market for transit services could not possibly constrain Comcast's terminating access fees because the transit providers themselves are also subject to those fees.

14. Content providers can and do contract with the transit providers of their choice. The providers from which Netflix purchased transit services are among the largest and most capable in the industry. Netflix used the six largest transit providers in the world and then balanced the traffic load across them as necessary. Comcast allowed each of these previously

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[6] Declaration of David S. Evans, *Economic Analysis of the Impact of the Comcast/Time Warner Cable Transaction on Internet Access to Online Video Distributors*, ¶¶ 26-30, 141-48 (Aug. 25, 2014) ("*Evans Decl.*").

generally reliable routes to become congested to force Netflix (or its chosen transit provider) to pay an access fee.

Our Interconnection Agreement Improves Comcast's Network Efficiencies, Not Those of Netflix

15. As I detailed in my first declaration, Netflix does not pay access fees to the vast majority of ISPs and every settlement-free interconnection agreement we enter into provides significant mutual benefits and cost savings for ISPs and Netflix, as well as better service for consumers.[7]

16. Comcast has declined to more efficiently use its middle-mile network resources by accepting Netflix's offer to install Open Connect appliances—free of charge—deeper into Comcast's footprint. This would have allowed Comcast, at virtually no cost to it, to reduce the distance on its network that Netflix traffic must traverse to reach requesting consumers. Instead, Netflix interconnects with Comcast at {{ }} interconnection points spread across Comcast's network. Due to this arrangement, Comcast's subscribers must use more of Comcast's middle-mile facilities when accessing a Netflix Open Connect appliance, than one located in Comcast's metro area. {{

}}

17. Comcast suggests that its ability to secure access fees from Netflix is not an exercise of its market power, but rather is due to the number and quality of its peering facilities. The number and quality of interconnection facilities was irrelevant to Netflix's negotiations or to the value of direct interconnection with Comcast. First, there is no such thing as quality differentiated interconnection. As I described above, and in my previous declaration,

[7] *Florance Decl.* ¶¶ 19, 22, 43, 60.

interconnection consists of straightforward hardware arrangements. Second, as to the number of interconnection locations, Netflix and Comcast did not negotiate the number and location of interconnection points until after we had agreed on the price term of the agreement. I maintain that the access fees derive from Comcast's ability to limit capacity and constrain Netflix's ability to deliver content to millions of our customers and Netflix's need to pay to resolve the persistent degradation problem for our members on Comcast's network.

18. Comcast's economist claims that "[g]reater ISP connectivity to the Internet reduces the costs of direct interconnection with the ISP because of the presence of more interconnection options for edge providers and because of the reduced distance between servers."[8] Netflix paid Comcast to interconnect directly to mitigate the unacceptable and continued quality decline of Netflix content to Comcast subscribers, not to reduce Netflix's costs. In Netflix's experience, multiple interconnection points may create efficiencies for the ISP—e.g., the ISP has to build and maintain less infrastructure to haul traffic than it would with more interconnection points—but it does not reduce Netflix's expenses or increase our ability to provide high quality service.

19. A large ISP like Comcast is more likely to be geographically spread out, and it will naturally connect to more (and likely the closest) public exchange points to bolster its own network efficiency and resiliency. So, for example, if an ISP were to provide service in both Boston and Chicago, it has every incentive to interconnect to the public IXPs in Boston and Chicago—particularly if that ISP were not generally paying for transit. By interconnecting at both cities, the ISP avoids the costs of hauling the traffic itself and places those costs on others.

20. While Netflix is willing (and has offered) to connect with Comcast at any and as

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[8] Reply Declaration of Dr. Mark A. Israel Declaration ¶ 154 (Sept. 22, 2014) ("*Israel Decl.*").

many points as it requests, our actual costs rise with every additional point of interconnection, due to the costs of placing additional servers (which we provide free of charge) at multiple locations. Moreover, interconnecting at more locations can be less efficient, and thus more expensive, for Netflix. With each additional location, the costs associated with placing and maintaining each location—e.g., servers, routers, rent, cabling costs—are spread across a smaller amount of capacity. At the same time, we do not design our systems to run at peak capacity at all times; we must build in a certain amount of excess capacity ("headroom") to ensure stable operations. In the end, the sum of that headroom required to operate over multiple locations may exceed the headroom required for an equal amount of traffic at a single location—requiring us to acquire more capacity than we would otherwise need.

21. Moreover, because of the nature of streaming video and buffering technology, our service is incredibly resilient to latency. As a result, the only "quality" of an interconnection service we take into consideration in negotiating an agreement is whether the ISP can provide sufficient bandwidth to fulfill the needs of our subscribers. That quality, in our experience, does not vary across ISPs, and certainly did not vary across the four ISPs we ultimately were forced to pay. In sum, while Netflix will bring content to an ISP in as many places as the ISP requests to make delivery of content more efficient, it is incorrect to suggest that doing so reduces Netflix's costs or benefits its own service.

Comcast Mischaracterizes the Congestion Episode with Netflix

22. Mr. McElearney has mischaracterized Netflix's actions during the congestion episode imposed upon it by Comcast. He suggests that Netflix was responsible for the congestion that occurred because Netflix did not properly utilize the transit providers available to it. He further asserts that Netflix purposefully degraded its streaming service to Comcast subscribers. Mr. McElearney's allegations are false and completely inconsistent with

economically rational action.

23. First, Netflix—or its transit providers—could not possibly be responsible for causing congestion at any interconnection point unless we refuse to add reciprocally required hardware to accommodate increased capacity at a rate that is slower than that of the network with which we are connecting. Instead, it was Comcast who refused to augment capacity with Cogent and the other transit providers delivering Netflix traffic. It was Comcast that allowed each settlement-free path into Comcast's network to congest, leaving Netflix with little alternative but to pay Comcast to reverse the continued degradation of the connection.

24. Second, Mr. McElearney's principal contention, that Netflix chose to use "only six 'transit providers'—but . . . omits dozens of other transit options with adequate capacity to reach Comcast's network" is specious.[9] Mr. McElearney claims that Comcast has sufficient settlement-free capacity over all of its routes to have handled Netflix's traffic, suggesting that Netflix would not have paid an interconnection fee if Netflix had contracted with additional or different transit providers.[10]

25. At the height of our interconnection dispute with Comcast, we were able to send approximately {{ }} of traffic onto Comcast's network. By contrast in October 2014, we were able to send approximately {{ }} of data onto Comcast's network through our direct connection agreement with Comcast. This suggests that at the time of the dispute we were facing an interconnection deficiency of around {{ }} into Comcast's system. Put differently, at peak congestion, Comcast was refusing to terminate over half of the traffic requested by their subscribers.

26. While Netflix can determine what routes are available into Comcast's network,

[9] *McElearney Decl.* ¶ 23.

[10] *Id.* ¶¶ 24, 36.

we are not in a position to know—with regard to every transit provider—which routes into Comcast's network are settlement-free. Nor is a content provider obligated to explore all possible routes into an ISP's network, much less those routes of which the content provider is not even aware. Indeed, when Netflix's routes into Time Warner Cable ("TWC") became congested, TWC provided Netflix with a list of all of the available, settlement-free routes into that ISP's network. TWC told Netflix the corresponding available capacity on each of those routes and told us to go buy what we could. That is what a rational ISP would, and should, do if its objective is to provide the best possible service to our mutual customers. By contrast, Comcast, through Mr. McElearney, told us to just stop using settlement-free routes and instead conclude a paid interconnection agreement with AT&T. Even now, Comcast has designated its list of settlement-free routes and their capacities as "highly confidential information" in this proceeding, prohibiting any Netflix employee, myself included, from seeing the list of settlement-free routes it claims were available to Netflix. It is unclear why Comcast believes that Netflix would have information that it has barred Netflix from reviewing, or how Netflix could have taken advantage of this "highly confidential information" in our selection of transit services.

27. While Netflix did not have an exhaustive list of who has a settlement-free route into Comcast, we were able to get a good sense as to what routes into Comcast's network were *available* to us. Network operators meet regularly—at least once a quarter—at conferences organized by the North American Network Operators' Group ("NANOG") and the Pacific Telecommunications Council ("PTC"). These conferences are convenient for coordinating network operations, including the buying and selling of transit services, and coordinating changes in transit routes with affected ISPs. Prior to our agreeing to pay Comcast for interconnection, Netflix scoured these conferences seeking additional capacity to augment what

we had been able to use from the six largest transit providers. Netflix purchased all the settlement-free capacity we were able to reasonably obtain.

28. While I do not know all of the settlement-free routes into Comcast's network, I strongly suspect that virtually all of the settlement-free routes referenced by Comcast were not entities that could have or would have sold Netflix transit services to Comcast's network. Congestion into Comcast's network was a well-known issue within networking circles. Given Netflix's active participation in NANOG and PTC, among others, I would expect that if some transit provider felt it had sufficient capacity to provide transit services to Netflix into Comcast's network, that such a provider would have approached Netflix with an offer. Yet no such provider made itself known.

29. For example, terminating ISPs and transit providers lacking a robust presence in the United States will generally reserve their settlement-free capacity for their own international traffic. The same is true of small operators providing niche services, such as application specific backhaul or enterprise services. While we approached many of them to find additional paths into the Comcast network, most declined to sell us this capacity. Those providers that would offer routes into Comcast's network, offered too little capacity to be usable and at prices significantly higher than what was typically offered by large transit providers for services into ISPs that do not artificially constrain settlement-free capacity into their networks.

30. Similarly, domestic terminating ISPs usually do not have significant settlement-free transit routes for sale because they reserve their settlement-free routes for their own traffic. Other large terminating ISPs, like AT&T, seek terminating access fees—for access to their subscribers—as part of any agreement to access Comcast's network. This means neither is a viable option.

31. Once foreign transit providers, niche-service providers, and domestic terminating ISPs are removed, I believe that Mr. McElearney's list could include only a handful of domestic and international transit providers such as: Level 3 Communications, Cogent, Tata Communications, Sprint, PCCW, Telecom Italia, GTT and Zayo. TeliaSonera, XO Communications, and NTT Communications are often available for other networks, but during the time of our dispute with Comcast, those three transit providers were interconnecting to Comcast indirectly through Tata.

32. To reach Comcast, Netflix used Cogent, Level 3, Telia, NTT, XO, and Tata—variously directly and indirectly via other carriers. {{

}} Some other carriers, including {{

}}, told us that they did not have sufficient capacity. And other carriers, such as {{ }}, would not sell us capacity because they were concerned about damaging their relationship with Comcast.

Comcast's Interconnection Policies Ensure There Is Never Enough Settlement-Free Capacity Available

33. There are no technical reasons why an ISP would object to a content provider's choice of transit providers so long as they are capable of delivering that traffic to the ISP. The transit services used by Netflix successfully brought Netflix data to Comcast's doorstep. Capacity constraints into Comcast's network arose because of Comcast's refusal to augment interconnection ports sufficient to accommodate the data requests made by its subscribers. Capacity constraints into Comcast's network and the resulting congestion those constraints

caused were not the result of any deficiency of the transit services paid by Netflix.

34. Comcast unilaterally and arbitrarily imposes a ratio-based Peering Policy on all of its settlement-free peers. Specifically, its Peering Policy provides that, among other qualifications to be a settlement-free peer of Comcast, a putative peer must, "maintain a traffic scale between its network and Comcast that enables a general balance of inbound versus outbound traffic."[11] Any network carrying content from edge providers—CDNs, transit providers, and edge providers themselves—would by definition almost always be out of balance with Comcast under the Peering Policy's arbitrary ratio-based term. A residential ISP's download speeds are faster, and volumes larger, than its corresponding upload speeds and volumes because end-users consume significantly more content than they create and push out into the world. And every residential ISP's service packages reflect that reality both in terms of data volume and advertised speeds "down" and "up."[12] Comcast has suggested that traffic ratio imbalance is a technical justification for charging termination fees, yet it has not provided any substantiation for this spurious claim. Rather, ratio-based peering is simply another manner in which Comcast is able to exercise its enormous power in the market to extract terminating access fees. Comcast alone sets the terms and conditions for access to Comcast subscribers. Comcast can refuse to provide capacity to any network at any time, constraining the ability for Comcast users to use the services they want. Under the terms of its Peering Policy, settlement-free peers wishing to fulfill the traffic demands of Comcast's end users must pay for "overages" if their traffic volumes go outside of Comcast's unilaterally imposed ratio definition. In addition, under the Peering Policy, those networks falling out of ratio risk being de-peered and forced entirely

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[11] *Comcast Settlement-Free Interconnection (SFI) Policy*, Comcast, http://www.comcast.com/peering (last visited Dec. 16, 2014).

[12] *See Evans Decl.* ¶ 137.

into a paid agreement.

35. If, as Mr. McElearney suggests, Comcast was willing to accept Netflix's traffic destined for Comcast's subscribers over settlement-free routes, it could have done so, either by expanding the settlement-free capacity available to Level 3 and Cogent or through a settlement-free direct interconnection agreement with Netflix. But, where Comcast controls both which transit providers may peer with it, and how much settlement-free capacity each of those transit providers is permitted to use without facing a terminating access fee or disconnection, there is nothing about the transit market that can constrain the price that Comcast charges for direct interconnection. For all of these reasons, the market for transit services to Comcast is neither competitive nor does it have a disciplining effect on Comcast's pricing and behavior.

36. Netflix has the technical ability to be in compliance with Comcast's ratio requirements—but Comcast does not. Netflix could engineer its content delivery so that for every bit down an end user requested, the consumer's streaming device would send a corresponding bit back up. Netflix has not designed its content delivery in that manner, nor would it, because it is unnecessary and inefficient. But Comcast, by its own design, cannot be in ratio with Netflix or most content providers. Comcast's network—like most residential ISPs'—is not engineered to actually be capable of sending the same volume of traffic up that its end users request down. If Netflix were to comply with the letter of Comcast's Peering Policy, it would immediately result in network failure for Comcast in the short run, and substantially increased costs to Comcast—to build out upstream capacity—in the long run.

37. As Comcast's Peering Policy makes clear, when Comcast designates a route as settlement-free, that does not mean that the route will remain settlement-free. Not only does Comcast reserve for itself the ability to act in that unilateral manner, it in fact has. Netflix has

purchased transit services from providers with settlement-free routes to Comcast only to be later informed that those routes have been converted over to paid routes because those routes are now utilized for transit of Netflix data. As I detailed in my last declaration, this is effectively what happened to both Akamai and Level 3 when Netflix started using their transit services.[13]

38. Mr. McElearney's claim that Netflix degraded its streaming service to Comcast subscribers on purpose is also false. He mischaracterizes the events that led up to our switching the bulk of our content delivery to Level 3 in 2010 and then to Cogent and Tata in 2012. Netflix did not, as Comcast claims, intentionally degrade service to the {{ }} customers Netflix and Comcast share, nor did we "dump" traffic unexpectedly on Comcast's network. Furthermore, Mr. McElearney suggests that switching the bulk of our transit to Level 3 in 2010 and then to Cogent in 2012 was done on the spur of the moment, without notice to Comcast or an opportunity to provision sufficient capacity to meet Netflix's requirements. Nothing could be further from the truth. Efficient and reliable network operations are essential to Netflix's business model—our entire online video service depends upon it—and so we have always coordinated the moving of data carefully.

39. Of course, shifts in routing, even for large amounts of traffic, are fairly routine, but they are generally well-coordinated beforehand. Contracts are created and expire, and traffic shifts as a result. It is the ability to switch quickly among transit providers to find the better, more cost-efficient, or just more competitive option available that differentiates transit services from interconnection to a terminating access ISP. Because of the nature of modern technology, these shifts in traffic can and necessarily do happen quickly, but they are not a surprise either in fact or volume. Comcast never woke up one day to discover that Netflix's traffic had suddenly

[13] *Florance Decl.* ¶¶ 32, 36-37.

shifted or that its end users were requesting many times more traffic from Netflix than they had the day before. These events are well coordinated beforehand.

40. For example, when Level 3's capacity became insufficient due to significant increases in the traffic demanded by Comcast's subscribers, we first offered to coordinate with Mr. McElearney and his colleague, Barry Tishgart, as early as February 2012 regarding our need to begin using additional transit providers. They were unwilling to undertake any planning with us, however, unless we were willing to do a direct-connect deal with Comcast. We continued to attempt to coordinate the movement of our traffic with Comcast in discussions with Mr. McElearney and Mr. Tishgart throughout 2012. We and Cogent, of course, closely coordinated with Mr. McElearney himself when we first began using Cogent. As Mr. McElearney explained to us, "I am not aware of any performance issues since your changes. I'd recommend starting with normal channels by reaching out to your rep at Cogent for analysis. We have all the right direct relationships there from Ops and [Ren Provo (Comcast)] to work through any issues."[14]

41. Netflix did not migrate its traffic on Comcast's network alone; we did so with traffic bound for nearly every ISP in the United States. Netflix's migration of traffic onto the networks of Tata, Telia, NTT and Cogent in 2012, for example, was coordinated well ahead of time with all affected ISPs. With the exception of Comcast, AT&T, and Verizon, no terminating ISP objected or issued any concerns, including much smaller terminating ISPs that have more limited technical capabilities than does Comcast. At no time did Comcast raise concerns with us, or to my knowledge with our chosen transit providers, about a lack of capacity—including in middle-mile facilities—to handle our traffic.

* * *

[14] Email from Kevin McElearney, Comcast, to David Temkin, Netflix (Dec. 18, 2012).

REDACTED—FOR PUBLIC INSPECTION

The foregoing declaration has been prepared using facts of which I have personal knowledge or based upon information provided to me. I declare under penalty of perjury that the foregoing is true and correct to the best of my information, knowledge, and belief.

December 17, 2014

Ken Florance
Vice President of Content Delivery
Netflix, Inc.

REDACTED—FOR PUBLIC INSPECTION

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

EVANS DECLARATION II

David S. Evans

December 23, 2014

Executive Summary

The Antitrust Issues Raised by the Transaction and Why It Should Be Blocked[1]

Comcast is proposing to merge the first and third largest wired Internet Service Providers (ISP) in America and is doing so under a theory, supported by its economists, that the merger of non-overlapping wired ISPs poses no competitive concern whatsoever. Under this theory, Comcast could consolidate the remaining non-overlapping cable ISPs into a monopoly bottleneck that would stand between edge providers and more than {{ }} of American households with wired broadband connections. Given the migration of DSL subscribers to cable, and the slowdown in fiber investment, that monopoly bottleneck would control access to more than {{ }} of households with wired broadband connections in 2019.

This Transaction poses a fundamental question concerning the market structure of the wired broadband providers that play a critical role in the distribution of Internet content. How that question is answered could have enormous practical consequences for households that want to consume Internet-based content and edge providers that want to provide that content. Based on my economic analysis, I recommend that the Federal Communications Commission (FCC) block this Transaction and reject a theory that could lead to the consolidation of wired ISPs into a massive national monopoly bottleneck between households and edge providers.

This Transaction, by itself, would tend to create a monopoly and substantially lessen competition in the provision of wired broadband connections between households and edge providers. It would do so as a result of horizontal and vertical competitive effects. The further

[1] The support for the statements in this section is provided in the body of this declaration.

consolidation that could be allowed under the permissive theory advanced by Comcast would exacerbate those effects and cause considerable public harm.

A. Horizontal Unilateral Effects

The horizontal combination of the first and third largest wired ISPs would result in a significant increase in Comcast's already substantial market power over edge providers and enable Comcast to increase significantly the terminating access fees that it charges edge providers for transporting content from the edge of its closed network to the subscriber households that request that content. Comcast and the three other very large wired ISPs charge "terminating access fees" for transporting content from the edge of their closed networks, across their closed networks, over the "last mile," to a subscriber that has requested that content. Comcast would be able to demand even larger terminating access fees than it does now if it also controlled access to the Time Warner Cable subscribers. Those horizontal unilateral effects are demonstrable.

Substantial and consistent empirical evidence, generated from the "natural experiments" of negotiations between wired ISPs and edge providers, shows that larger wired ISPs charge significantly higher terminating access fees. Most of the more than 400 wired ISPs in the United States cannot charge terminating access fees at all because the edge providers can do without any one of these small wired ISPs. It is much harder for edge providers to walk away from large ISPs and becomes even harder the larger the ISP. The negotiations between edge providers and the largest wired ISPs bear this out. Comcast, for example, charges Netflix {{ }} as high a terminating access fee as Time Warner Cable charges Netflix. Comcast is able to secure such high fees mainly because it controls access to 77 percent more subscribers than Time Warner Cable does.

The empirical evidence generated by these natural experiments shows that it is likely that Comcast would charge a significantly higher price for access to edge providers following the merger. The combined firm would likely charge a price for access that would be significantly higher than the separate firms charge now. The Comcast terminating access fees would increase, for example, by {{ }} and the Time Warner Cable terminating access fees would increase by {{ }} for a weighted average price increase of {{ }}, based on the relationship between terminating access fees paid by Netflix and the share of Netflix hours {{ }}.

This price increase would result from Comcast increasing its market power over distribution substantially. It would be able to threaten to disrupt a greater portion of the customer relationships for edge providers and, in the extreme case, block edge providers from a greater portion of the market. Comcast would secure, through merger, the ability to prevent edge providers from accessing {{ }} of households with wired broadband right after the merger compared with {{ }} today. As noted above, if Comcast is allowed to further consolidate all of the remaining non-overlapping cable ISPs, it would account for {{ }} of wired broadband households, and a greater percent over time, rising to more than {{ }} by 2019, based on projections I have done.

Comcast's increased monopoly power results from the fact that edge providers would have fewer choices for constructing their networks and therefore more difficulty walking away from the consolidated firm. Edge providers compete nationally with each other and also need scale given their fixed costs. It is easier to walk away from a wired ISP that has {{ }} of wired broadband households, as Comcast does pre-merger, or {{ }} of wired broadband households, as Time Warner Cable does pre-merger, than to walk away from a

wired ISP that has {{ }} of wired broadband households, as Comcast would have post-merger.

The merger reduces the choices that edge providers have in building their networks. Today, an edge provider can get access to {{ }} of households with wired broadband readily from the more than 400 wired ISPs that do not charge for access. Then it has four other wired ISPs that it can add to its network. After the merger, these options disappear. AT&T and Verizon are together much smaller than post-merger Comcast would be. As a result, the options described above for playing Comcast off against the other large wired ISPs drop from three (Time Warner Cable plus Verizon; Time Warner Cable plus AT&T; and Verizon plus AT&T) to zero. The loss of Time Warner Cable as a separate actor may limit an Online Video Distributor's (OVD) ability to bargain with AT&T and Verizon as well. After the merger an edge provider that needs to reach more than {{ }} of American wired broadband households to have a compelling business model for itself and investors would have no choice but to deal with Comcast.

B. Vertical Effects

The Transaction will also help Comcast maintain its significant market power in the provision of linear programming and video-on-demand and in the provision of broadband services. Comcast is the largest Multichannel Video Programming Distributor (MVPD) in the country; Time Warner Cable is the second largest, excluding satellite providers, and fourth largest overall. Comcast and Time Warner Cable are also the first and third largest wired broadband ISPs. Their joint control over access to subscriber households has resulted in both earning a stream of profits that makes them both highly valuable companies. Combined, these two companies have a market value of $186 billion, which would make the merged firm the

17th most valuable American firm. That is remarkable because Comcast and Time Warner Cable earn virtually all of their profits in only a small portion of the United States – covering only 21 percent (Time Warner Cable) and 35 percent (Comcast) of the United States population.

The emerging OVD industry threatens those profits because it diverts consumers from MVPDs. As the supply of OVD content expands, consumers will increasingly end their subscriptions to MVPDs or downgrade their MVPD packages. Comcast, and other MVPDs, in the face of this shift in demand, will lose revenue from having fewer customers and from being forced to charge lower prices to retain consumers. Comcast faces a serious risk that in the long term its customers will be able to get most linear programming and video on demand, a la carte, from OVD or other Over-the-Top (OTT) providers that make content available over the Internet.

Comcast cannot replace those MVPD profits by increasing broadband prices. Comcast likely earns significant profits from its use of extensive price discrimination based on its video programming packages. It will lose that ability as OVDs replace MVPDs for an increasing share of most programming. Comcast would also likely face significant regulatory obstacles if it sought to replace its MVPD profits by drastically increasing its broadband prices. Furthermore, such large price increases would likely prompt municipalities and states to remove regulatory barriers to entry to providing competing broadband services. Comcast's internal business documents show that it recognized the gravity of this threat and the need to develop strategies to blunt the development of OVDs. {{

}}[2]

Control over access to subscribers enables Comcast to slow and reduce competition by OVDs. Most people, for example, watch OVDs on television sets and do so in addition to watching linear programming and video on demand from their MVPD. Comcast has significant control over the set top box that households must use to access its content.

Comcast can preserve more of its profits from its MVPD business by slowing and reducing the growth of the OVD industry; by disadvantaging OVDs that are particular threats by virtue of their size and impact on viewing Comcast's own content; and by making it more difficult for OVDs to reach Comcast households. Comcast has numerous tools at its disposal to carry out these strategies including, raising terminating access fees; degrading the quality of service; refusing to provide upgrades to its network necessary for supporting innovation in OVD delivery; imposing data caps that weigh more heavily on OVDs than its own content; insisting that programmers keep programming out of the hands of OVDs that pose the most serious threat; and using its set-top boxes to make consuming OVD content inconvenient.

Comcast can also preserve more of its profits from its ISP business by slowing and reducing the growth of the OVD industry and making OVDs less competitive with its own MVPD offerings. The expansion of the OVD industry would significantly lower barriers into providing broadband in local areas. Entrants face two related challenges in competing with existing wired ISPs that offer both broadband and video programming bundles: they must

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[2] *See* {{
}}

invest in developing competitive video-programming packages; and they face a significant disadvantage in doing that compared with much larger incumbents such as Comcast, which can secure much lower license fees from program providers. A thriving OVD industry that provides consumers with substitutes for much MVPD content drastically reduces those barriers to entry.

The Transaction increases Comcast's ability and incentive to engage in tactics to preserve its significant market power as an MVPD and wired ISP. Comcast, for example, would be able to foreclose OVDs from a larger portion of American households by increasing the portion of households to which it controls access by 40 percent. Comcast would realize the benefits of these tactics to restrain the growth of the OVD industry over a larger base.

* * *

I recommend that the FCC block this Transaction. The Transaction would create a massive monopoly bottleneck that would stand between edge providers and households. It would enable Comcast to raise terminating access fees for edge providers significantly and would help Comcast maintain its significant market power as an MVPD and broadband provider. Accepting the theories Comcast has presented would enable Comcast to acquire even more non-overlapping cable ISPs, thereby achieving control over {{ }} of American broadband wired broadband households initially and more than {{ }} in a few years as cable's share of broadband expands.

Table of Contents

I. Introduction and Overview of Reply Declaration 3

A. Overview of Response to Comcast's Economists 4

1. The "Degradation" Natural Experiment 7

2. Comcast's Contract with Netflix and Its Implications for Market Power 10

3. The Source of Comcast's Market Power and Its Implications for the Competitive Effects from Acquiring Time Warner Cable 13

B. Impact of Transaction on Competition and Consumers 15

C. Organization of Declaration 21

II. Antitrust Analysis of the Transaction 24

A. Economic and Technical Background 24

1. The Movement of Content to Wired ISP Networks and Within Wired ISP Networks 24

2. Provision of Ports by Wired ISPs for Content Delivery 27

3. Wired ISPs As Two-Sided Platforms and Their Pricing Strucutre 29

B. Market Definition 32

C. Competitive Constraints on Market Power 38

1. Comcast subscribers' ability to switch to another ISP 39

2. The Ability of an OVD to Reach Comcast Subscribers Without Paying a Toll 41

3. The Comcast Degradation Episode 45

4. The Significance of the Terminating Access Fees 49

D. Change in Market Power from Transaction 54

E. Horizontal Unilateral Effects of Transaction on Terminating Access Fees 59

1. The Impact of the Transaction on Comcast's Prices to OVDs for Interconnection 60

2. The Impact on Netflix Given Its Long-Term Contract 64

3. The Role of "See-Saw" Effect in Limiting Competitive Harm 67

F. Impact of Transaction on Comcast's Incentive and Ability to Harm OVD Competition 70

1. The Evolution of the Nascent OVD Industry 71

2. The Long-Term Impact of the OVD Industry on Comcast's MVPD Business 75

3. The Ability of Comcast to Recover Lost MVPD Revenues from Its ISP Platform 78

4. Comcast's Strategies for Stemming Long-Term Losses from OVDs 81

5. Impact of the Transaction on Comcast's Incentives and Ability to Harm OVDs 84

6. The Role of OVDs in Broadband Competition 86

III. Detailed Response to Dr. Israel 88

A. Impact of Transaction on Terminating Access Fees 90

1. Empirical Evidence 90

2. Dr. Israel's Flawed Claims Regarding Comparisons to Comcast's Access Fee 94

3. Commission Decision in Comcast-NBC Universal 102

B. Claimed Harm to Comcast's Service from Degradation 104

C. Comcast's Churn Rate 105

D. Comcast Survey 108

1. Survey Methodology Is Unreliable 109

2. Impact of Comcast Degradation 112

3. Mobile 114

E. DSL and Mobile Wireless 117

1. DSL Growth 117

2. Mobile Wireless 120

IV. Conclusion 123

I. Introduction and Overview of Reply Declaration

1. My name is David S. Evans and I am an economist. At the request of Counsel for Netflix, I have previously submitted a declaration ("Evans Declaration I") concerning the proposed acquisition of Time Warner Cable by Comcast Corporation ("Transaction").[3]

2. In my previous declaration, I concluded that the Transaction would harm competition and consumers by significantly raising terminating access fees paid by OVDs, and by significantly increasing Comcast's ability and incentive to retard the development of competing OVDs. Economic analysis I have conducted since submitting that declaration, which is discussed below, reinforces my conclusion that the Transaction would substantially lessen competition and tend to create a monopoly as a result of both horizontal and vertical competitive effects.

3. I also found that the economic arguments and evidence presented by Comcast's economist, Dr. Mark Israel, in his initial declaration, in support of his conclusion that the Transaction did not raise competitive concerns were not valid. Dr. Israel claimed that households have many choices in ISPs when in fact they do not; that Comcast does not have an ability or incentive to foreclose OVDs, when, through its actions, Comcast has already demonstrated that it does; and that the Transaction would not increase terminating access fees because he claims that a larger firm would not be able to extract a higher price, when in fact there is a strong positive relationship between the size of wired ISPs and the terminating access prices they charged.

[3] Declaration of David S. Evans, August 25, 2014 ("Evans Declaration I"). My professional background and curriculum vitae are provided there.

4. Comcast, in its "Opposition to Petitions to Deny and Response to Comments," has submitted two new declarations that respond to my economic analysis, one by Dr. Israel, and the other by Professor Dennis Carlton. Dr. Israel's second declaration presents substantial new economic evidence and arguments. Professor Carlton's declaration makes some theoretical observations based on his understanding of the record. Counsel for Netflix has asked me to review the economic evidence and arguments presented by Comcast's economists in these latest submissions, which I do in this Declaration.[4] What follows is a brief summary of my conclusions.

A. Overview of Response to Comcast's Economists

5. The Transaction would aggregate the largest and third-largest wired ISPs in the country, resulting in an entity that would have a terminating access monopoly over 29 million wired broadband households. That is 40 percent more than Comcast has today.[5] After the Transaction, Comcast would control access to {{ }} of wired broadband households.[6] That share would likely increase over time with the migration from DSL to cable and as fiber deployment slows.

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[4] My declaration relies in part on a declarations of Mr. Ken Florance of Netflix. *See* Declaration of Ken Florance, December 23, 2014 ("Florance Declaration II"); and Mr. Florance's prior declaration, Declaration of Ken Florance, August 25, 2014 ("Florance Declaration I").

[5] Calculation based on Letter from Francis M. Bruno, Comcast, to Marlene H. Dortch, Federal Communications Commission, MB Docket No. 14-57 (June 27, 2014) ("Comcast June 27 Letter"). Stated more precisely, the entity would have a terminating access monopoly over 29 million customer accounts, where in some cases there may be multiple customer accounts in a household, or more than one household using a customer account, or business customer accounts that do not correspond to a household. For simplicity, I refer to customer accounts of all types as "households" in this report.

[6] Calculations based on Comcast June 27 Letter, p. 2; Supplemental Data to Comcast June 27 Letter, MB Docket No. 14-57 (June 27, 2014) ("Comcast Supplemental Data"); Internet Access Services: Status as of June 30, 2013, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (June 2014), available at https://apps.fcc.gov/edocs_public/attachmatch/DOC-327829A1.pdf ("June 2013 FCC IAS Report"). The number of pre-merger subscribers comes from the Comcast Supplemental Data, which is based on Form 477 data for June 30, 2013 from Comcast and TWC. The number of broadband divestitures comes from page 2 of the Comcast June 27 Letter. The denominator is the number of fixed broadband connections reported in the June 2013 IAS Report, excluding satellite and fixed wireless

6. Comcast's share of households following the Transaction actually understates the competitive significance of the Transaction. Comcast would have a monopoly bottleneck over so many households that it would dictate success or failure for existing and, more importantly, new OVDs. It would substantially lessen competition and tend to create a monopoly in two ways.

a. Horizontal Unilateral Effect. The combination of these two very large ISPs would result in a significant increase in terminating access fees as a result of increased bargaining power. This is a standard unilateral price effect from a horizontal combination. The Transaction would consolidate two of the major input suppliers to OVDs and other edge providers of broadband connections to subscriber households.

b. Vertical Effect. The combination of these very large ISPs would increase Comcast's incentive and ability to slow and reduce OVD competition to maintain its significant market power over the provision of MVPD and broadband services. That effect results from the fact that OVDs provide significant long-run competition for Comcast's MVPD business, and that a successful OVD industry will increase the likelihood of competitive entry into broadband in the long term.

These harms are national, significant, and enduring.

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connections. Note that the count of subscribers for Comcast and TWC used here differs from the count of subscribers reported on page 2 of the Comcast June 27 Letter. The latter figure is based on data from Comcast for March 31, 2014 and from TWC for April 17, 2014. In general, when I compare Comcast or Time Warner Cable subscribers to an industry aggregate, I used the Comcast June 2013 FCC Form 477 data, which is directly comparable to the most recent industry aggregates reported in the June 2013 FCC IAS Report. When I am not comparing their subscriber counts to an industry aggregate, I use the subscriber counts reported in the Comcast June 27 Letter, as this data is more recent. In all cases, I use the number of divestitures reported in the Comcast June 27 Letter, as this appears to be the most reliable data for that number. Note that this approach understates the significance of the merger, since the number of subscribers in the divested footprint in 2014 Q1 is likely to be larger than the number of subscribers in that footprint in 2013 Q2. Thus, when I calculate the share of the combined entity using the June 2013 subscriber counts with the 2014 Q1 divestiture counts, I overstate the relative magnitude of the divestiture. Also, note that the count of divestitures in the Comcast June 27 Letter is different from the count of divestitures used by Dr. Israel in his share calculations. The exact reason for the difference between Comcast's Letter and Dr. Israel on the number of net divestitures is unclear. Also, note that in this Declaration, I do not restrict attention to connections above a minimum speed threshold, other than the minimum speed required to be included in the FCC's broadband reports (200 Kbps in at least one direction). This is different from my calculations in Evans Declaration I, where I used speed thresholds to show that Comcast and Time Warner faced very limited competition from ISPs with comparable speeds. In this Declaration, I have defined a national broadband market that does not include any size thresholds and have used shares that are consistent with that definition. The shares of Comcast, Time Warner Cable, and the combined entity would be even larger if a speed threshold were to be imposed and the merger was considered in a narrower market.

7. Dr. Israel and Professor Carlton have presented an economic analysis that not only supports this Transaction, and denies the significant horizontal and vertical effects I have identified, but necessarily implies that a merger of all non-overlapping cable ISPs in this country would raise no competitive issues whatsoever.[7] Comcast could, under their analysis, consolidate all the non-overlapping cable ISPs. That would give Comcast a more than {{ }} share of wired broadband households today and more than a {{ }} share in five years as DSL subscribers migrate to cable and fiber deployment slows.[8] Their thesis is extreme and has no meaningful limiting principle.

8. A key point of contention between us concerns the "degradation episode" which provides a natural experiment for comparing Comcast's ability and incentive to foreclose

[7] The merging cable systems need not be literally non-overlapping before the merger, provided that they make appropriate divestitures to remove the overlap as part of the merger transaction(s).

[8] For this calculation, I started with the set of all cable ISPs in the United States, based on the technology codes in the NTIA's national broadband map. For Comcast and TWC, I took the number of subscribers from the Comcast Supplemental Data. For the other large cable ISPs, I took the number of subscribers reported by the Leitchman Research Group. For the smaller cable ISPs, I took the total number of cable broadband connections reported by in the FCC's Internet Access Services, subtracted the number accounted for by the large cable ISPs, and divided the remainder across each small cable ISP in proportion to the population of their footprint (which was calculated by matching the coverage data from the NTIA National Broadband Map to population data from the U.S. Census). Each cable ISP's subscribers were distributed across the Census blocks in the ISP's footprint in proportion to the block's population. The hypothetical non-overlapping cable monopolist gets all of the customers of all of these ISPs, with the exception of blocks served by more than one cable ISP. In those blocks, the hypothetical monopolist gets the customers from only one of the ISPs. I performed this calculation two ways: by giving the monopolist the subscribers of the cable ISP with the most in that block, and by giving the monopolist the subscribers of the cable ISP with the fewest in the block. The denominator is the number of fixed broadband connections reported in the June 2013 FCC IAS Report, excluding satellite and fixed wireless. The two methods yields shares that were very close (respectively, {{ }} of all broadband connections, or {{ }} of all broadband connections). To extrapolate this number forward, I estimated the rate of subscriber growth for each technology. For each technology other than FTTP, I assumed that the subscriber growth (CAGR) in each year going forward would equal the CAGR over June 2011 to June 2013. For FTTP, that assumption is inappropriate, as its rate of growth has been slowing. Instead, for FTTP, I set the growth rate going forward equal to the growth rate of cable. Modelling the decline in growth rate by measuring the current deceleration of growth would yield similar results. I assumed that the ratio the non-overlapping cable monopolist subscribers to all cable subscribers remained constant. The result was an estimate of the share of the non-overlapping cable monopolist of {{ }} in June 2019. All references below to the share of the non-overlapping cable monopolist in this declaration are based on the methodology described in this footnote.

competition with other smaller wired ISPs. I argue that this episode shows that Comcast has the ability and incentive to foreclose OVDs pre-merger; Dr. Israel disputes that.

1. The "Degradation" Natural Experiment

9. In November 2013, Netflix had approximately {{ }} customers who relied on Comcast for the broadband service to their homes.[9] Early that month the average quality of Netflix's streaming service to households served by Comcast dropped sharply.[10] Streaming quality declined through the holiday season, which is a particularly important time of year for Netflix. Consumers watch more video then and are more likely to sign up for accounts.

10. Comcast customers who wanted to watch Netflix had much poorer viewing experiences than the customers of smaller cable ISPs that wanted to watch Netflix from the pre-degradation period (January to October 2013) to the nadir of the degradation (January to late February 2014). As a result of the degradation, Netflix saw a spike in support calls from customers that used Comcast as their wired ISP compared with other smaller wired ISPs. Some customers cancelled their subscriptions.[11] In work completed after my first declaration, I have found that Comcast's practices resulted in {{

}}.[12] The average quality of Netflix's streaming service improved almost immediately after Netflix

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[9] The number of Netflix customers using Comcast is based on information from Netflix.

[10] Evans Declaration I, ¶¶ 106-111; Florance Declaration I, ¶ 47.

[11] Florance Declaration I, ¶ 51.

[12] Calculation based on Netflix data. {{

}}

agreed to pay Comcast a terminating access fee to provide sufficient capacity to reduce the congestion and resulting degradation in late February 2014.

11. This natural experiment is important because it refutes the position taken by Dr. Israel that Comcast does not have the ability or incentive to foreclose edge providers from subscribers and would continue to lack that ability after the Transaction. Dr. Israel dismisses the relevance of this episode for assessing Comcast's ability and incentive to impose terminating access fees based on two claims made by Comcast.

12. Comcast claims that Netflix did this to itself.[13] It says that Netflix had more than 40 settlement-free paths to send traffic to Comcast but chose not to use them.[14] As explained in Netflix's Reply, there were only six competitive options for transit services for high-bandwidth customers in the United States.[15] Netflix used all six, either directly or indirectly via other carriers.[16] Each of these partners had settlement free paths to Comcast.[17] Once Netflix became a customer of these transit providers, Comcast let those connections congest unless Comcast was paid an access fee. Comcast's peering policies ensured that any transit provider that carried Netflix traffic would have to pay a terminating access fee to avoid congestion. If it did not agree to pay Comcast a terminating access fee, Netflix would face either congestion or

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[13] Comcast Corp., Opposition to Petitions to Deny and Response to Comments, September 23, 2014 ("Comcast Opposition"), p. 216; Declaration of Kevin McElearney, September 19, 2014 ("McElearney Declaration"), ¶ 25.

[14] *Id.*

[15] Netflix, Inc., Reply of Netflix, Inc., December 23, 2014 ("Netflix Reply"), p. 14; Letter from Robert M. Cooper, Cogent, to Marlene H, Dortch, Federal Communications Commission, MB Docket No. 14-57, November 18, 2014 ("Cogent Ex Parte Letter"), p. 6.

[16] Netflix Reply, p. 14. In its recent ex parte, Cogent suggests that five additional entities—Sprint, PCCW, Telecom Italia, GTT, and Zayo—are "secondary competitors" for high-bandwidth customers. Cogent Ex Parte Letter, p. 6. Netflix inquired of each of these transit providers, but none was willing or able to make its capacity, such as it was, available to Netflix. {{ }} indicated that they had no capacity to offer; {{ }} refused to sell capacity to Netflix because they were concerned about their relationship with Comcast. *See* Netflix Reply, p. 14; Florance Declaration II, ¶ 32.

[17] Netflix Reply, p. 6; Florance Declaration II, ¶ 32.

would pay a transit provider or CDN that itself paid a terminating access fee that it would pass through to Netflix.

13. Comcast also accuses Netflix of purposefully degrading its streaming service to Comcast subscribers. Mr. McElearney, a Senior Vice President of Comcast, claims that Netflix dumped traffic on Comcast's network without notice, and that Netflix was using unethical and deceptive maneuvers to reduce its costs. Netflix does not dump traffic on to the Comcast network or other wired ISPs. All of the traffic Netflix delivers to the doorstep of Comcast, and other wired ISPs, consists of content that the ISP's customer requested from Netflix and that the ISP is supposed to deliver to the customer as part of its broadband contract with that customer.

14. As a matter of economics, Comcast's assertions that Netflix intentionally degraded service to {{ }} of its customers, for four months, during the highly valuable holiday season, are inconsistent with rational profit-maximizing behavior. I have not seen any evidence from Comcast, nor in my review of documents from Netflix, that support Comcast's claims that Netflix intentionally degraded service to its own customers.[18] Quite to the contrary, Netflix was deeply concerned about the impact of the congestion episode on its business.

15. Comcast therefore does not have any credible basis for dismissing the evidence from the degradation natural experiment and that natural experiment is fatal to many of the claims made by Dr. Israel and Professor Carlton. The degradation episode confirms that Comcast has the ***ability*** to foreclose Netflix from accessing Comcast subscribers because, in fact, it did foreclose Netflix from accessing Comcast subscribers. Comcast determines the port capacity

[18] *Id.* ¶ 19. Dr. Israel does not report having reviewed any contemporaneous business documents supporting Comcast's claim that it believed Netflix was intentionally degrading service to its own customers.

available for providing uncongested routes within its network to its subscribers. Other large ISPs, excluding those three that engaged in a degradation strategy to secure access fees, have generally provisioned sufficient port capacity to ensure that their subscribers can watch Netflix streams that those subscribers have requested.

16. The degradation natural experiment also shows that Comcast has the ***incentive*** to foreclose Netflix from accessing Comcast subscribers. Comcast's decisions on providing port capacity were not, in fact, blunted by fear that its subscribers would switch ISPs, or switch to lower priced services, as Dr. Israel claims. Comcast chose to degrade service to subscribers who wanted to watch Netflix despite the possibility of lost profits, if any, from its subscribers. That possibility was not sufficiently threatening to deter Comcast from degrading Netflix service to its own subscribers—many of whom no doubt blamed Netflix for the poor service.

2. Comcast's Contract with Netflix and Its Implications for Market Power

17. Virtually all wired ISPs provide Netflix access to their subscribers at no charge. Comcast and the other three largest wired ISPs forced Netflix to pay terminating access fees starting in early 2014. Comcast was able to increase the terminating access fee from the zero price that edge providers typically pay for access to subscribers to a positive amount. By increasing price above the market level, Comcast demonstrated that it possessed, and was exercising, market power.

18. In their reply, Comcast and its economists dispute that Comcast has market power over terminating access fees. They claim that Netflix did not pay for access to subscribers and that Netflix ended up paying less as a result of the contract. That is not correct. Netflix is paying Comcast an additional fee to provide uncongested paths between the edge of Comcast's

network to Comcast households that have requested Netflix content. It is not paying Comcast for transit or Content Delivery Network (CDN) services. That is seen most directly by comparing Comcast to the more than {{ }} other wired ISPs that Netflix interconnects with directly.[19] Netflix does not pay for transit or third-party CDN services to get its content to these wired ISPs. It also does not pay terminating access fees to these wired ISPs for transporting content within their networks to households that requested it. In fact, Netflix, based on estimates discussed below, is paying {{ }} per Mbps more in total to reach Comcast subscribers than it is paying to reach subscribers at other large cable ISPs that have not imposed terminating access fees.

19. Dr. Israel and Professor Carlton also claim that the size of the terminating access fees were too small to matter and show affirmatively that Comcast does not have market power. Dr. Israel claims, for example, that "[t]he small size of Comcast's charges for interconnection refutes any theory that Comcast's large size as an ISP parlays into anti-competitive power over edge providers or their agents."[20] Professor Carlton makes a similar point. That analysis is wrong as a matter of antitrust economics. Their conclusion is based on a finding that the terminating access fees as a fraction of overall revenue and costs are small. There is no authority for taking a price increase, calculating it as a percentage of overall revenue and costs for a company, and concluding that it is not relevant because it is small. Under that calculation even the most egregious attempt to monopolize a component of production would pass muster since increasing the price of a component, that itself constitutes a small fraction of the overall cost of the product, would be "miniscule."

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[19] I am not including in this comparison the next three largest wired ISPs, after Comcast, that have also secured terminating access fees.

[20] Israel Declaration II, ¶ 12. Dr. Israel refers to "anti-competitive power." I assume he means market power since anti-competitive power is not a term of art in antitrust.

20. The standard approach in antitrust analysis is to ask whether a firm can increase price significantly over the competitive level for that product or service.[21] Comcast did in fact increase the cost to Netflix of reaching Comcast subscribers that wanted to use Netflix from 0 to {{ }} per Mbps.[22] The Transaction would lead to a substantial increase in that price given the empirical evidence described below.

21. The relevant base for assessing the impact of the Transaction is even higher. There are sound economic reasons to believe that Comcast did not seek the profit-maximizing price—that is, did not exercise its full market power—because of the intense scrutiny of both the merger (announced shortly before the Netflix deal) and the net neutrality debate (which was heating up at the time). Comcast won, and Netflix lost, a significant battle fought publicly and privately over several years to cross the zero price line. Having won that battle, and having crossed that line, Comcast can march forward now and seek higher prices.

22. Dr. Israel and Professor Carlton also point to the fact that Comcast and Netflix entered into an {{ }}, and argue that this contract eliminates any possibility of competitive harm going forward. For the purposes of evaluating the competitive effects of the Transaction, the focus by Dr. Israel and Professor Carlton on the duration and dollar value of the Netflix contract is misplaced. The contract is relevant for assessing whether Comcast has the ability and incentive to impose terminating access fees. Beyond that, the issue is whether the Transaction would result in an increase in the terminating access fees to OVDs and to other

[21] Or, in the context of a merger, whether the combination will increase the current price for the product or service significantly. U.S. Department of Justice and Federal Trade Commission (2010), "Horizontal Merger Guidelines," available at http://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf, § 1, .

[22] This calculation is described below. *See*, *infra*, n. 113.

edge providers, including those that have not yet been forced to pay Comcast a terminating access fee.

23. In fact, Netflix is not immunized from the effects of the proposed Transaction because of the length of its contract with Comcast. Netflix enters into long-term contracts for programming, including {{ }}. Between now and the expiration of the contract with Comcast, Netflix will negotiate and enter into numerous content licensing agreements that will extend well beyond the expiration of the Comcast contract. Netflix can expect that after the Comcast contract expires, therefore, it will face the threat of dramatically increased fees that must be contemplated even today as it negotiates licensing deals for content.

3. The Source of Comcast's Market Power and Its Implications for the Competitive Effects from Acquiring Time Warner Cable

24. Comcast has significant market power over terminating access fees today. I showed in my earlier declaration that Comcast's ability and incentive to extract payments from Netflix results from the fact that it controls access to about 21.1 million customers.[23] These households sit behind interconnection points that act as gateways through which content requested by Comcast's customers gets to Comcast households. Comcast controls what goes through those gateways.

25. The Transaction would increase the size of this terminating access monopoly by about 40 percent to 29.6 million households, after accounting for the proposed divestitures.[24] The economic analysis and evidence I presented in my previous declaration shows that Comcast

[23] Comcast June 27 Letter, p. 2.

[24] Comcast June 27 Letter, p. 2.

would have significantly more market power after the Transaction and would be able to use that bargaining power to secure significantly higher terminating access fees. The increase in bargaining power would increase Comcast's market power and result in a significant increase in price.

26. Dr. Israel rejects the above conclusion regarding increased bargaining power in his second declaration, as he did in the first, by citing a ***particular*** economic model that ***assumes*** that the increase in the size of a firm does not convey more bargaining power. Actual experience shows that firms that control significantly more demand or supply have greater bargaining power, extract higher prices as sellers, or get lower prices as buyers.

27. Dr. Israel then claims that the empirical evidence I put forward does not show a relationship between price and size because I have not controlled for quality. He is wrong. His claimed measures of quality are either not relevant to the contract negotiations, or they are measures of size—and proxies for bargaining power—rather than quality. He mainly uses the number of interconnection points for a wired ISP as a measure of quality. Larger wired ISPs have more interconnection points largely because they operate in more localities. As I discuss below, additional interconnection points have nothing to do with quality of service for Netflix.[25]

28. Under the theory put forward by Dr. Israel, Comcast would have no more bargaining power than a small ISP, even if Comcast owned the largest ISP in every part of the country and therefore controlled access to more than half of the households with broadband service in the country. Further research I have conducted has found consistent and substantial evidence that, in fact, larger ISPs charge higher terminating access fees on a per unit of traffic basis.

[25] Florance Declaration II, ¶¶ 17, 21.

29. The remainder of my declaration provides more detailed responses to those claims and to other claims made by Dr. Israel and Professor Carlton. I note, however, that Dr. Israel and Professor Carlton do not dispute most of the economic evidence I presented in my first declaration, including:

- A detailed empirical analysis of the wired ISP providers available to Comcast and Time Warner Cable customers, which shows that these subscribers typically have one, often poor, alternative;
- Evidence on the facts of switching based on an FCC study and the likelihood of switching based on the obstacles subscribers face;
- The effect of the degradation episode on the quality of Netflix transmissions to Comcast's subscribers; and,
- The financial impact to Netflix of foreclosure.

They do, of course, dispute the interpretation of this evidence, and its weight, for analyzing the competitive effects of the Transaction and present other evidence in rebuttal.

B. Impact of Transaction on Competition and Consumers

30. Counsel for Netflix has asked me to expand my economic analysis on why the Transaction would significantly harm competition and consumers. I have concluded that the Transaction would harm competition and consumers based on the following analysis.

31. ISPs are two-sided platforms that connect subscribers and edge providers.[26] As with other two-sided platforms, ISPs can, in principle, set prices to both sides. The price to an individual side can, whether set by competition or by monopoly, be positive, negative or zero.[27]

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[26] There is no dispute among most of the economists who have submitted declarations on this point. Israel Declaration II, ¶¶ 181-5; Declaration of Joseph Farrell, August 25, 2014 ("Farrell Declaration"), ¶¶ 26-27. As I will show below, Comcast's economists are selective in analyzing the implication of ISPs being two-sided platforms on the competitive effects of the Transaction.

[27] David S. Evans and Richard Schmalensee (forthcoming), The Antitrust Analysis of Multisided Platform Businesses, in Roger Blair and Daniel Sokol (eds.), Oxford Handbook on International Antitrust Economics, Oxford: Oxford University Press, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2185373. The

The total price charged by the ISP is the sum of the prices that it charges subscribers and edge providers for connection. For the purposes of this declaration, I focus on the impact of the Transaction on OVDs that distribute long-form content. These OVDs compete with Comcast for providing programming to consumers and for procuring programming from producers and distributors.[28] OVDs currently constitute a large fraction of edge provider traffic and are likely to constitute an even higher fraction in years to come.

32. ISPs that lack significant market power charge subscribers for Internet access, but do not separately charge OVDs, or the CDNs or transit providers that OVDs may use, to deliver content to the ISP's subscribers. In recent years, some very large ISPs with significant market power, including Comcast, have sought to break this zero-price equilibrium and to charge OVDs (and the CDNs and transit providers used by OVDs and other edge providers) a terminating access fee. I am not expressing any opinion concerning whether their doing so is or is not contrary to public policy, nor am I taking any position on the net neutrality debate. My focus here is entirely on whether the Transaction, and in particular Comcast's increase in subscribers, would substantially lessen competition, tend to create a monopoly, and harm consumers.[29]

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fact that profit-maximizing prices can be below marginal cost on one side, or below zero, is a prediction that is robust across the leading theoretical models of two-sided platforms and is true as an empirical matter. There is no controversy in the economics literature over this point.

[28] I therefore do not address whether and to what extent the Transaction could have a significant effect on non-OVD edge providers.

[29] The term "consumers" in antitrust analysis refers to buyers of services, including business buyers. In the case of ISPs, there are two groups of consumers: households and edge providers, including OVDs, who connect to each other. When Professor Carlton uses the term "consumer" in his declaration, he is referring to only one of these groups of consumers—the households—and is excluding the other group of consumers—the edge providers. His analysis of the horizontal effects of the merger therefore excludes one side of the platform entirely. The other way to put this point is that the Transaction involves B2C providers on side and B2B providers on the other side. Professor Carlton's analysis of horizontal effects ignores the consolidation of the B2B input providers.

33. My analysis does not depend on defining a precise relevant antitrust market and calculating shares in that market.[30] I have found, however, that an appropriate relevant antitrust market for evaluating this Transaction consists of wired ISPs that operate in the United States. A hypothetical monopolist consisting of all such ISPs in the United States would have enormous bargaining power over OVDs. It would be able to prevent OVDs from obtaining access to 94.2 million broadband customers.[31] It would therefore be able to increase the total connection fee paid by OVDs for access to the ISP's subscribers significantly above the competitive level. This national market is consistent with how Comcast and other very large ISPs have negotiated interconnection agreements with OVDs. Comcast, for example, negotiated contracts with several OVDs, which operate nationally, for access to Comcast subscribers regardless of geographic location.[32]

34. In what follows, an ISP is said to "foreclose" an OVD from accessing the ISP's subscribers if the ISP can significantly decrease the quality of ("degrade") the connection between the subscriber and the OVD, the subscriber cannot switch to an alternative ISP in a reasonable amount of time, and the OVD cannot find an alternative way to reach the subscriber. Therefore, the term "foreclose" includes partial foreclosure. An ISP's market power over OVDs depends on its ability to foreclose an edge provider since, by foreclosing access, or

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[30] Contrary to the claims of Dr. Israel (Israel Declaration II, ¶ 17), I have not used market shares (or market-share based measures such as HHIs) to assess market power or the impact of the merger. In fact, because the market power for an ISP comes from its control over access to individual households, and at least in the short run it is not possible to substitute one ISP for another, market share figures understate market power over OVDs and over the total connection price.

[31] June 2013 FCC IAS Report, p. 17. As I discuss below, a hypothetical monopolist could raise price significantly if it controlled an even narrower market such as all non-overlapping wired ISPs in the US.

[32] Dr. Israel and Professor Carlton reach the wrong conclusion on the issue of market definition because they ignore the OVD side of the ISP platform. Their emphasis on the fact that Comcast and Time Warner Cable do not compete with each other in local markets on the subscriber side of the platform is misplaced. The impact of this Transaction on the price of connecting edge providers and subscribers is a result of consolidating the multiple, local, non-competing terminating access monopolies of Comcast and Time Warner Cable across the country.

threatening to foreclose access, the ISP can demand and secure payment from the OVD. The size of the club that an ISP wields in negotiation depends on the number of subscribers it can foreclose from the OVD.[33]

35. An ISP has significant market power if it can impose a high enough cost on an OVD to force that OVD to pay a terminating access fee that exceeds the competitive level. An ISP can successfully impose those costs on an OVD—thereby exercising its market power—where the ISP can degrade the connection between the OVD and its subscribers; the ISP's subscribers cannot easily switch to another ISP; and OVDs that provide long-form content cannot otherwise reach these consumers. Comcast can do this for 21.1 million subscribers, comprising {{ }} of all U.S. wired broadband households.[34] That is how Comcast forced large OVDs, which have opposed having to pay terminating access fees, to do so. Therefore, Comcast has significant market power over OVDs today.

36. Comcast's degradation of the connection between Comcast subscribers and Netflix confirms that Comcast already has significant market power. Prior to the degradation, Netflix did not pay Comcast or any other ISP a terminating access fee for delivering content to that

[33] It is important to distinguish the role of market power and bargaining power in the analysis. Market power refers to the ability of a firm to charge prices over the competitive level; the question in merger analysis is whether the merger would result in an increase in market power. Bargaining power refers to how the gains to trade are split between two parties. Firms routinely bargain with each other. The fact that one party has more bargaining power for various reasons is unremarkable and does not necessarily reflect market power as that term is used in antitrust. However, an increase in bargaining power can result in an increase in market power and thereby cause competitive harm. *See* Aviv Nevo, Deputy Assistant Attorney General for Economics, Antitrust Division, U.S. Department of Justice (2014), "Mergers that Increase Bargaining Leverage," Remarks as Prepared for the Stanford Institute for Economic Policy Research and Cornerstone Research Conference on Antitrust in highly Innovative Industries, January 22, 2014, available at http://www.justice.gov/atr/public/speeches/303149.pdf.

[34] The number of Comcast subscribers comes from the Comcast June 27 Letter, p. 2. Since the total number of U.S. interconnections is not available for the same time period as this letter, the share calculation is based on data from an earlier time period. Specifically, the number of Comcast subscribers comes from the Comcast Supplemental Data. This is divided by the total number of U.S. fixed internet connections (excluding satellite and fixed wireless) as reported in June 2013 FCC IAS Report, p. 17.

ISP's subscribers. By degrading the connection between Netflix and Comcast subscribers that wanted to watch Netflix, Comcast was able to break the zero-price equilibrium, adhered to by all wired ISPs historically, and impose a significant charge.

37. The Transaction would result in Comcast securing a significant increase in that market power. The number of subscribers to which it controls access would increase from 21.1 million to 29.6 million. Its bargaining power would increase substantially because it could foreclose, or threaten to foreclose, 40 percent more subscribers than it could before the Transaction.[35] The fact that Comcast and Time Warner Cable do not compete on the other side of the market—for subscribers in local areas—does not alter this conclusion. They each have large terminating access monopolies over their subscribers on one side of the market. The combination of these large terminating access monopolies would result in a significant increase in market power on the other side of Comcast's ISP platform—the OVD side.

38. Comcast's increased monopoly power results from the fact that OVDs have fewer choices for constructing their networks and therefore more difficulty walking away from the consolidated firm. OVDs compete nationally with each other and also need scale given their fixed costs. It is easier to walk away from a wired ISP that has {{ }} of wired broadband households, as Comcast does pre-merger, or {{ }} of wired broadband households, as Time Warner Cable does pre-merger, than to walk away from a wired ISP that has {{ }} of wired broadband subscribers, as Comcast would have post-merger.

39. The merger reduces the choices that OVDs have in building their distribution networks. Today, an OVD can reach {{ }} of wired broadband subscribers readily from the 400+ wired ISPs that do not charge for access. Then it has four other wired ISPs that it can add

[35] Comcast June 27 Letter, p. 2.

to its network. After the merger, these options disappear. AT&T and Verizon are together much smaller than post-merger Comcast. As a result, the options described above for playing Comcast off against the other large wired ISPs drop from three (Time Warner Cable plus Verizon; Time Warner Cable plus AT&T; and Verizon plus AT&T) to zero. The loss of Time Warner Cable as a separate actor may limit the ability to bargain with AT&T and Verizon as well. After the merger, an edge provider that needed to reach more than {{ }} of American wired broadband households to have a compelling business model for itself and investors has no choice but to deal with Comcast.

40. Comcast could use this increased market power in several possible ways to harm competition and consumers. With its greater bargaining power, it could demand and secure a higher terminating access fee from edge providers, including OVDs. The empirical evidence, based on natural experiments, I presented in my previous declaration demonstrates this. Most ISPs do not control enough subscribers to demand and secure terminating access charges, so that the terminating access fee that they charge is zero. Of the handful of very large ISPs that do charge a positive price, the larger ones have secured higher prices. Comcast has 1.8 times as many broadband subscribers as Time Warner Cable, and was able to secure a terminating access fee that was {{ }} times higher than what Time Warner Cable secured on a per-unit (Mbps) basis. Professor Farrell showed a similar price-size relationship for the fees that ISPs pay Cogent, a transit provider—in this case the payment goes from the ISP to Cogent and smaller ISPs pay more. I present further evidence in support of this price-size relationship below.

41. Comcast's increased market power also would substantially increase Comcast's ability and incentive to suppress competition by OVDs. The increasing supply of OVD content

reduces Comcast's ability to earn profits from offering MVPD services to its captive subscribers. As households gain more programming choices, Comcast loses revenue from customers paying for less video-on-demand, moving to lower-priced packages with less content, and dropping MVPD services altogether. It can make some of this revenue back from raising broadband prices to households and increasing terminating access fees to OVDs. However, it loses the ability to use different bundles of MVPD services to engage in highly refined price discrimination. It would likely face regulatory resistance to the price increase to broadband households needed to offset the loss of MVPD profits, and if it did increase prices substantially it would likely prompt municipalities and states to lower regulatory barriers to entry into providing broadband.

42. A successful OVD industry also increases the risk to Comcast of competitive entry into its broadband business. Broadband entrants such as Google Fiber have found that they need to provide a strong video programming bundle to persuade consumers to switch from cable providers that offer a bundle of broadband and video programming.[36] This barrier to entry would fall if consumers could obtain most content online.

C. Organization of Declaration

43. This declaration consists of two main sections in addition to this Introduction (Section I) and a brief conclusion (Section IV).

44. Section II uses the standard economic framework for mergers to organize my analysis of the impact of the Transaction on competition and my responses to Comcast's economists. It presents my analysis of market definition, market power, and anticompetitive effects. It

[36] Brian Fung, "Here's the Biggest Thing Holding Google Fiber Back," *Washington Post*, October 6, 2014, available at http://www.washingtonpost.com/blogs/the-switch/wp/2014/10/06/video-is-holding-google-fiber-back/.

incorporates additional empirical work I have conducted concerning the impact of the degradation episode on Netflix and Comcast customers and on the relationship between terminating access fees and subscribership levels for wired ISPs.

45. Section III presents a detailed response to Dr. Israel's declaration generally in the order that he presents his arguments. I respond to Professor Carlton's arguments, which are largely theoretical, in this section as well.

46. As I stated in my previous declaration, my analysis is ongoing, and I reserve the right to supplement my analysis. The fact that I have not responded to claims made by Comcast or its economists does not mean that I agree with those claims.[37]

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[37] In my previous declaration, I had a brief footnote that observed that the economic literature on the relationship between firm size, investment and innovation did not support the efficiency defense of the merger offered by Drs. Rosston and Topper on behalf of Comcast. It said: "Comcast's economists, for example, base their conclusion that the Transaction would result in increased efficiency on the proposition that the amount of investment and innovation by a firm increases more than in proportion to its size. They provide no empirical support in the economic literature for this proposition nor do they provide any meaningful evidence that the rate of investment and innovation by Comcast has increased more than in proportion to its size as it has grown over the last decade. The relationship between firm size and innovation is an extremely well trod subject in economics. There is certainly no consensus among economists that the rate of innovation increases more than proportionately with firm size. *See* Wesley M. Cohen (2010), "Fifty Years of Empirical Studies of Innovative Activity and Performance," *Handbook of the Economics of Innovation*, Amsterdam: North Holland Elsevier, Vol. 1, 129-213. There is an extensive business and management literature that identifies and offers remedies for precisely the opposite problem: that larger firms have trouble innovating. *See*, for example, Clayton M. Christensen (1997), *The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business*, Boston, MA: Harvard Business School Press. Although I am not expressing any opinion on the efficiency of the Transaction, I do not believe that the conclusion by Comcast's economists that the Transaction would necessarily generate efficiencies is based on credible economic theory or empirical evidence." *See* Evans Declaration I, n. 12 (internal citations to Comcast economists' filings omitted).

Drs. Rosston and Topper claim that "Dr. Evans provides one theoretical criticism that narrowly assumes that the benefit of increased innovation due to economies of scale can occur only if the amount of investment and innovation increases more than in proportion to firm size." *See* Declaration of Gregory L. Rosston and Michael D. Topper, September 20, 2014 ("Rosston/Topper Declaration II"), ¶ 13. I disagree. Drs. Rosston and Topper claim that, as a result of Comcast's increased size, more projects will exceed its hurdle rate (the minimum required return on investment) and therefore it will do more innovation. The implication of that proposition is that bigger firms are more innovative. All else equal, the bigger firm has more projects that exceed the hurdle rate. They are claiming that "bigger is better." As a purely theoretical proposition, divorced from what happens empirically, there is nothing wrong with the proposition. The problem is that the implication that bigger is better, which is what they rely on to claim efficiencies as a theoretical matter, does not have support, as a matter of consensus, in the economics literature on innovation. Comcast's economists do not cite any general empirical support in their initial declaration or in their reply declaration, including as a set of references to the

sentence claiming that I ignore "support in the economics literature"—they cite no support at all. *See* Rosston/Topper Declaration II, ¶ 13.

Drs. Rosston and Topper then go on to say, "Consider a simple example. Suppose Comcast's scale justified it investing $1 billion to develop its Xl set-top box platform and TWC's scale justified it investing $500 million to develop its own set-top box platform with fewer features. Even if the level of investment scaled only proportionally with firm size, the combined company would have the scale to justify investing $1.5 billion in a set-top box platform. This platform, which would be more advanced than either the Comcast or TWC platforms in isolation, would be available to all customers in the former Comcast and TWC service areas. As we described in our April Report, the difficulties involved in contracting between MVPDs preclude Comcast and TWC from achieving this benefit of scale absent the transactions. Therefore, customers would benefit from economies of scale even though investment increases in proportion to firm size, providing a counter example to Dr. Evans' assertion." *See* Rosston/Topper Declaration II, ¶ 14. I do not think this illustration proves their point. The implication is that the bigger firm generates more innovation because it is spending more money. Presumably, it is not spending more money to get less innovation.

Drs. Rosston and Topper provide some anecdotal evidence on Comcast's investments and innovation but have provided no systematic evidence that that Comcast's acquisitions have resulted in a higher rate of innovation relative to smaller cable companies. I would have expected that economists putting forth the claim that the merger of two large cable companies will result in more investment and innovation than in the absence of the merger would have presented empirical studies based on a cross-sectional analysis of investment and innovation across the wide-size distribution of cable companies or a time series analysis of investment and innovation for Comcast, which has grown through numerous mergers over time, or a panel study that looks at both temporal and cross-section dimensions. Instead, Drs. Rosston and Topper, and Dr. Israel, provide a series of examples of claimed efficiencies.

As a result, I did not find the lengthy discussions by Drs. Rosston and Topper, or by Dr. Israel, of the efficiency benefits conveyed by the Transaction in their initial declarations as having any significant empirical substance as a matter of economics. In any event, I chose not to focus on the "specific efficiencies" (see Declaration of Dennis W. Carlton, September 22, 2014 ("Carlton Declaration"), ¶ 8) they offered and their efficiency arguments are not the focus of this or my earlier declaration.

II. Antitrust Analysis of the Transaction

47. This section shows the Transaction would have:

- Horizontal unilateral effects that would raise the total price for connecting OVDs and households and reduce the output of OVDs; and
- Vertical effects that would tend to foreclose OVDs from competing with MVPDs, raise the price and restrict the output of OVD and MVPD programming, and maintain substantial market power in the provision of broadband.

A. Economic and Technical Background

1. The Movement of Content to Wired ISP Networks and Within Wired ISP Networks

48. Wired ISPs operate local networks. The local network consists of wires that extend from residential locations to routers that control the movement of traffic back and forth between the ISP and the subscriber.[38] Wired ISPs that operate many local networks connect those local networks to high-level routers that connect traffic between edge providers and local networks. Many wired ISPs connect at Internet Exchange Points (IXPs) or other interconnection locations.

49. Consumers at residential locations that subscribe to an ISP can send a request for content to an edge provider. The ISP receives that request at a router and makes various provisions for sending that request over the Internet to the edge provider. The edge provider then sends the content to the ISP that then transports it to the household that made the request. The wired ISP, as a technical matter, ultimately controls what goes from the household to the edge provider and what comes from the edge provider to the household. Virtually all wired ISPs transport content to the household without any charge to the content provider and provide paths that are generally uncongested to that content, as I will discuss below.

[38] This discussion is based on my understanding from Netflix.

50. A wired ISP is therefore akin to an island fortress that has a monopoly on intra-island transport and that suppliers can reach by one or more bridges or ports. The island fortress has the ability to limit traffic on those bridges and to those ports. It also has the ability to impose bridge tolls and port fees. It can, if it wants, build more bridges, expand its ports, and add ports. It can also, if it wants, limit the amount of traffic that gets through the bridges (e.g., it can close off lanes or reduce capacity at terminal points) or that comes through the ports (e.g., it can limit the number of landing slots or the hours of operation). Households on the island fortress can order supplies. Those supplies are delivered to the points of entry. Those who control the island then take responsibility for deliveries to the households.

51. There is a relatively competitive market for transporting traffic to and from ISPs. Interconnected transit providers move traffic to and from edge providers to ISPs. The transit delivery to the ISP often happens at an IXP. Sometimes it is convenient to move and store content that is likely to be needed close to the ISP's "last mile" network, so that it does not need to be transited. CDNs provide that service. A CDN connects at the IXP or another designated connection point.

52. Although the analogy is not exact, transit providers to ISPs are like railroads and ferry services to the fortress island. The transit providers make it possible to move content back and forth between ISPs and edge providers. However, the transit providers terminate at the border of the ISP, just as a railroad would terminate at the end of the bridge going into an island fortress, or the ferry would terminate at an island port.

53. A transit service does not transport traffic directly from or to a residence. The ISP takes the content from the transit provider and transports it over the "last mile" to the residence. It similarly takes content from the residence and moves it back across the same "last mile"

infrastructure to the transit provider. CDNs are like a warehouse facility at the terminus of the bridge or at the port. Just as the island fortress picks up supplies at a warehouse near its edge, ISPs take the traffic from the CDNs. (CDNs may themselves transport traffic to ISPs and/or rely on transit providers to do so—I use "transit providers" generally to refer to firms that haul Internet traffic.)

54. Comcast and its economists make it seem as if the ISP is not an island fortress at all, and that there is a public road system that enables any supplier to get to any household that has ordered those supplies. In Comcast's description, anyone who comes to a bridge or a port can go right through the gates of the island and get to the household more or less unimpeded. If a particular gate is congested, according to Comcast, the supplier merely needs to switch routes to any number of other gates. Comcast makes it seem as if their network is like Washington, D.C. Any trucker can just drive into the city and deliver packages anywhere it wants.

55. It does not work that way. Comcast operates a closed network in which it controls what goes through its routers to its residential customers, and controls what goes from its residential customers to its routers. To use my analogy, it controls all of the bridges and the ports for its island and it has a monopoly on intra-island transport. Virtually all wired ISPs charge their residential customers to provide intra-island transport for services their customers have requested, but they do not additionally charge outside service providers for this intra-island transport. Comcast and three other very large ISPs, however, do charge for an additional fee to outside service providers.

56. I showed in my previous declaration that Comcast's customers cannot readily switch to another ISP and that OVDs cannot reach those subscribers in any other way. As a result, Comcast has a "terminating access monopoly"[39] or "bottleneck facility".[40]

2. Provision of Ports by Wired ISPs for Content Delivery

57. A wired ISP must have enough capacity at the edge of its network, and in the network leading to the subscriber's home, to carry the traffic requested by subscribers. Capacity at the edge of an ISP's network is typically measured in terms of ports, which are physical connection points that can each handle a certain maximum amount of traffic. I f ISPs do not have enough port capacity, their customers will encounter delays in downloading and, in the case of bandwidth-intensive video, they will encounter problems such as poor picture quality, delays in starting the stream, and interruptions in the stream. Virtually all ISPs add enough capacity to ensure that their subscribers can download content from the Internet at the speeds they have committed to in their agreement with those subscribers.

58. The amount of content that American households download over the Internet has increased dramatically over time. Table 1 shows the amount of data transmitted over the Internet from 1992-2013, with the projected growth through 2018. The compound annual growth rate was 134 percent over 1992-2013 and 71 percent over 2007-2013. In recent years increasing consumption of online video, online video games, and video calling have contributed to greater demands on broadband capacity. Generally, ISPs have added enough capacity to deal with the increasing demands from their subscribers for content.

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[39] Mark Armstrong (2002), "The Theory of Access Pricing and Interconnection," in M. Cave, S. Majumdar, and I. Vogelsang (eds.), *Handbook of Telecommunications Economics*, Vol. 1, 297-386, Amsterdam: North-Holland; OECD Competition Committee (2004), "Access Pricing," available at http://www.oecd.org/regreform/sectors/27767944.pdf.

[40] Joshua S. Gans (2001), "Regulating Private Infrastructure Investment: Optimal Pricing for Access to Essential Facilities," *Journal of Regulatory Economics*, 20(2): 167-189.

Table 1: Growth in Global Internet Traffic

Year	Global Internet Traffic
1992	100 GB per Day
1997	100 GB per Hour
2002	100 GB per second
2007	2000 GB per second
2013	28,875 GB per second
2018 (Forecast)	50,000 GB per second

Source: Cisco (2014), The Zettabyte Era – Trends and Analysis, available at http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/VNI_Hyperconnectivity_WP.pdf, p. 4.

59. Netflix's experience is a good illustration of how ISPs have kept pace with the increase in traffic. Between October 2011 and August 2014, the total number of hours streamed by American households from Netflix increased by about {{ }}, and the total amount of data being streamed increased by about {{ }}.[41] Despite the pronounced increase in broadband demand, Netflix customers obtained higher average bitrates at virtually all ISPs, reflecting the fact that ISPs had more than enough capacity to accommodate the increase.

60. Figure 1 shows the average bitrates and the total number of hours viewed over the 16 largest ISPs that did not degrade Netflix's traffic during 2013.[42] The average bitrate of Netflix traffic increased from {{ }} to {{ }} between the week ending October 9, 2011 and the week ending June 29, 2014 for these 16 wired ISPs.[43] These Netflix customers therefore got increasingly better viewing quality over time, despite their increased used of broadband capacity.

[41] Calculations based on data from Netflix.

[42] The largest 20 wired ISPs, including these 16 and the 4 wired ISPs that did degrade traffic, accounted for {{ }} of Netflix's hours.

[43] {{

}}

Figure 1: Total Hours per Week and Average Bitrate at 16 Non-Degrading Large Wired ISPs

{{

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3. Wired ISPs As Two-Sided Platforms and Their Pricing Strucutre

61. Wired ISPs are two-sided platforms. Economists who have written in support of and in opposition to the Transaction agree on this characterization.[44] Dr. Israel has cited my work on two-sided platforms, including my survey paper of this area co-authored with Professor Richard Schmalensee.[45] That literature finds that to evaluate competitive effects concerning platforms, economists must examine both sides of the platform.

62. It is well known in the literature on two-sided platforms that the profit-maximizing prices to customers on the two sides of the platform are interdependent. It is also well

[44] Israel Declaration II, ¶¶ 181-5; Farrell Declaration, ¶¶ 26-27.

[45] Israel Declaration II, nn. 210, 217, 230.

established that the profit-maximizing price to one side of the platform may be less than marginal cost, zero, or less than zero.[46]

63. Most wired ISPs in the United States charge consumers a monthly fee for connecting to the Internet; some may impose variable charges based on the amount of bandwidth used. In return for these fees, ISPs send requests from the household to the edge provider. The edge provider then uses its CDNs and transit relationships to pay to deliver the requested content to the doorstep of the ISP. That doorstep is usually at an IXP, where ISPs have decided to make connections available to third parties. At that point, the ISP carries the content across its network to the household that requested it. ISPs generally do not charge edge providers, including OVDs, terminating access fees for, in effect, opening the door to allow the traffic to be delivered to the household.[47] Therefore, from the standpoint of an ISP, the residence pays for Internet access but the edge provider does not pay for connection to the ISP's network.

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[46] This result also means that comparing price and marginal cost does not provide meaningful evidence on market power. David S. Evans and Richard Schmalensee (forthcoming), "The Antitrust Analysis of Multisided Platform Businesses," in Roger Blair and Daniel Sokol (eds.), *Oxford Handbook on International Antitrust Economics*, Oxford: Oxford University Press, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2185373; Marc Rysman (2009), "The Economics of Two-Sided Markets," *Journal of Economic Perspectives*, 23(3), 125-143; Jean-Charles Rochet and Jean Tirole (2006), "Two-Sided Markets: A Progress Report," *RAND Journal of Economics*, 37(3): 645-667. As a result Dr. Israel's claim that Comcast charges terminating access fees that are less than marginal cost does not provide any evidence on whether increasing those fees from zero to a significant positive amount reflected an exercise of market power. *See* Israel Declaration II, ¶ 12. A competitive equilibrium among two-sided firms could result in a price to one side being substantially less than marginal cost. It is possible that a two-sided firm could increase that price significantly but that the price would still be less than marginal cost.

[47] For a direct connection between an edge provider and an ISP, the ISP does not generally charge an access fee. For a connection between an edge provider and an ISP that goes through a CDN and/or a transit provider, the ISP does not generally charge the entity with which it is interconnected an access fee. Only the very largest ISPs charge access fees. *See* Florance Declaration I, ¶ 60.

64. That particular pricing structure—one side pays the ISP, the other side does not—is a very common pricing structure for two-sided platforms. It is the market equilibrium in many industries based on two-sided platforms.[48]

65. Up until recently, all of the more than 400 wired ISPs in the United States charged their customers for uploading and downloading content, but did not charge terminating access fees to Netflix, or the CDNs or transit providers used by Netflix, for carrying the traffic from the doorstep of an ISP's network to the household.[49] In the last several years, a few very large wired ISPs in the United States, including Comcast, have sought to change that pricing model by charging certain OVDs (or their CDNs or transit providers), including Netflix, an additional fee for delivering from its doorstep to the subscribers' household content that the subscriber household has requested.[50]

66. Netflix, starting in the first half of 2014, agreed to pay terminating access fees demanded by the four largest wired ISPs in the country. As a result, in these four cases, Netflix pays to get its traffic to the front door of the ISP, as it always has, and then pays an additional fee to get the ISP to open its door and allow traffic through that the ISP's subscribers have requested. For all of the other more than 400 other ISPs in the country, Netflix incurs costs for getting its traffic to the front door of the ISP, but incurs no additional fee for any of those ISPs to open the door and transport content to the ISP's subscribers who have asked for it. Positive

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[48] David S. Evans and Richard Schmalensee (forthcoming), The Antitrust Analysis of Multisided Platform Businesses, in Roger Blair and Daniel Sokol (eds.), Oxford Handbook on International Antitrust Economics, Oxford: Oxford University Press, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2185373.

[49] Florance Declaration I, ¶¶ 6, 26.

[50] I am not claiming that seeking these fees is anticompetitive, nor am I offering any opinion that their doing so is, or is not, contrary to sound public policy. My focus is entirely on the impact of the Transaction on competition.

terminating access fees are the exception; virtually all wired ISPs do not charge edge providers for transport from their doorsteps to the households that have requested content.

67. With that background on the wired ISP business, I turn to market definition.

B. Market Definition

68. Market definition is a useful way to organize information on an industry and the competitive constraints that firms in an industry, including the subject of an investigation, face. Many economists, including me, agree that antitrust economics should avoid rigid approaches to market definition.[51] Ultimately, the market should be defined to help shed light on, and not obscure, whether or not a particular business practice (such as a merger) has competitive effects. There is no reason that market definition must result in rigid boundaries, which seldom apply in the real world.[52] Ultimately, as the antitrust agencies have recognized, it is a tool to assess whether there are competitive effects.[53]

69. Market definition for industries involving two-sided platforms requires particular care.[54] Platforms compete with each other on both sides, and these sides are interdependent. For a merger of two-sided platforms, market definition needs to identify the competitive constraints

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[51] See David S. Evans (2010), "Lightening Up Market Definition," in Einer Elhauge (ed.), *Research Handbook on the Economics of Antitrust Law*, New York: Edward Elgar; Joseph Farrell and Carl Shapiro (2010), "Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition," *B.E. Journal of Theoretical Economics*, 10(1); Dennis W. Carlton (2007), "Market Definition: Use and Abuse," *Competition Policy International*, 3(1).

[52] Contrary to what Dr. Israel suggests, there is no disagreement among us on this point. Israel Declaration II, ¶ 17. Unfortunately, Comcast and its economists use market definition to obscure the analysis by insisting that the only relevant market involves the local competition that takes place on the subscriber side of the platform.

[53] U.S. Department of Justice and Federal Trade Commission (2010), "Horizontal Merger Guidelines," available at http://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf, § 4 ("The Agencies' analysis need not start with market definition. Some of the analytical tools used by the Agencies to assess competitive effects do not rely on market definition, although evaluation of competitive alternatives available to customers is always necessary at some point in the analysis.")

[54] David S. Evans (2009), "Two-Sided Market Definition," ABA Section of Antitrust Law, Market Definition in Antitrust: Theory and Case Studies, available at http://ssrn.com/abstract=1396751.

that would limit the ability of the merging platforms to increase the price on either side of the platform and to increase the total price paid by both.[55]

70. My focus is on whether the Transaction could result in an increase in the price for connecting OVDs and other edge providers.[56] I consider an informal application of the hypothetical monopolist test to assess the relevant antitrust market. As is well known, the test involves determining the minimum set of providers, that if they were hypothetically combined into a single firm, would be able to raise price profitably by a small but significant amount for a non-transitory period of time. At that boundary, competitive constraints are not strong enough to prevent a profitable price increase.

71. Let me begin by describing the extent to which different wired ISPs impose competitive constraints on each other. OVDs may want to use all of the wired ISPs to reach the ISPs' customers and distribute content to them. The more the better, so long as the price is right. Nevertheless, the OVDs can play the wired ISPs off against each other and, if necessary, forgo distribution to some small subset of consumers. They can do that because they have other wired ISPs (and thus other potential customers) that they can choose to work with. The competitive constraint on wired ISPs arises from the fact that OVDs can choose to select enough wired ISPs to reach enough consumers to operate their businesses profitably. The ability of OVDs to walk away from a wired ISP and pursue its business accessing other

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[55] Eric Emch and T. Scott Thompson (2006), "Market Definition and Market Power in Payment Card Network," Review of Network Economics, 5(1); David S. Evans (2009), "Two-Sided Market Definition," ABA Section of Antitrust Law, Market Definition in Antitrust: Theory and Case Studies, available at http://ssrn.com/abstract=1396751; Elena Argentesi and Marc Ivaldi (2007), "Market Definition in Printed Media Industries: Theory, Practice, and Lessons for Broadcasting," in Paul Seabright and Jurgen von Hagen (2007), *The Economic Regulation of Broadcasting Markets*, Cambridge, UK: Cambridge University Press, 225-254. Alternatively, if the investigating authority decides to conduct single-sided market definition it needs to consider both sides and the interdependencies.

[56] I also consider the effect of the Transaction on overall prices.

subscribers through other wired ISPs is the reason why small wired ISPs cannot charge access fees and why even among the very large ISPs the smaller of those very large ISPs charge less the largest ones do.

72. The greater bargaining power of the larger wired ISPs comes from the elimination of choice of dealing with smaller wired ISPs and the elimination of access to the subscribers of those ISPs. Consider the situation in which there are four wired ISPs of equal size. An OVD can choose among 15 different bundles of the four to get more or less coverage. For example, it can walk away from any one of the four and still have coverage of 75 percent of households. The edge provider loses those choices when the wired ISPs are consolidated into a single wired ISP. It goes from 15 options to just one.

73. In the wired ISP case, in other words, just as in a differentiated product case, a merger eliminates a constraint on prices that results from having separate firms and tends to increase the market power of the merging firms and raise price by substantially lessening competition among the firms.[57] The fact that one case involves the elimination of direct substitution possibilities, and the other is based on the elimination of choices of other providers,[58] is a distinction without a difference when it comes to competitive harm.

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[57] The substantial lessening of competition for the merger of non-overlapping wired ISPs is not exactly like what happens in the common case of a merger of firms that produce differentiated products. In the differentiated product case the possibility that consumers will use the product of firm A instead of the product of firm B if firm A raises its price, and vice versa, constrains the prices of both firms before the merger. The merger results in an increase in market power and price, assuming the substitution effect between the two products is strong enough, by allowing the merged firm to capture the benefits of the diversion of sales. The competitive constraint on differentiated product producers arises from the fact that consumers are using one product instead of another, at least at the margin, and that a producer that raises its price will cause some consumers to use another producer's product.

[58] The wired ISPs, however, may also be substitutes in demand thereby providing a further competitive constraint. Depending on the prices being charged by different wired ISPs, edge providers may decide by build their distribution networks by substituting between different wired ISPs and substituting greater expenditure on marketing in the territory of one wired ISP rather than another. In theory, there may be cases in which it is profit maximizing to do deals with every wired ISP. However, for firms that have scarce capital and

74. We can see the impact of the consolidation of wired ISPs on OVDs by considering what likely happens when we move from a highly fragmented industry to a consolidated one. With a highly fragmented industry there are a large number of small wired ISPs, each operating in a local area. No individual small wired ISP is essential to a national OVD. The OVD can reach virtually the entire country and secure scale economies even if any one edge provider declines to distribute it. No single wired ISP has significant bargaining power except over its household customers, who are a small fraction of the nation. In this case, the OVD faces the profit-maximizing price from these small-wired ISPs, which experience from many small ISPs over more than a decade strongly shows would be zero in the absence of significant bargaining power. That is the competitive equilibrium in the market.

75. At the other extreme, there would be a single national broadband monopolist that would provide wired ISP services to all subscriber households. A national broadband monopolist could threaten to withhold access to an OVD. That would effectively prevent the OVD from operating its business, since it would not be able to reach any household. The national broadband monopolist would stand as a bottleneck facility between OVDs and all households. The threat of foreclosure would enable the national broadband monopolist to extract a significant toll from OVDs.[59] The national broadband monopolist would be able to demand and secure a significant increase in terminating access fees to OVDs (or to the CDNs and transit providers who serve those OVDs) over and above the level that would occur in the

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management time (a situation that describe most new ventures) there may be practical limits on how many wired ISP relationships to have, and therefore the firm may substitute between a limited number of ISPs. This situation has not arisen yet because most wired ISPs have not charged for access.

[59] To simplify matters, I am going to assume that the national monopoly does not change prices to households as a result of controlling overlapping wired ISPs and therefore focus entirely on the impact of the consolidation on the edge provider side. The point is that even abstracting from any impact on the price that households pay for connection, the merger raises the total connection price between OVDs and households by raising the price to OVDs.

absence of this consolidation.[60] OVDs would not have any other feasible way to reach those subscribers.

76. The hypothetical national monopolist of all wired ISPs would have extraordinary bargaining power over OVDs. As I showed in my previous declaration, larger ISPs impose higher terminating access fees. Comcast was 1.8 times as large as Time Warner Cable and imposed a terminating access fee that was {{ }} times larger than the terminating access fee Time Warner Cable imposed on Netflix.[61] The hypothetical national broadband monopolist would be {{ }} times the size of Comcast and {{ }} times the size of Time Warner Cable.[62] As a result, the hypothetical national broadband monopolist would be able to profitably raise OVDs terminating access fees significantly.

77. It is unlikely that a national broadband monopolist that could engage in price discrimination and has significant market power over subscribers would pass through much of this toll revenue to subscribers in the form of lower prices. Thus, the total price paid to the intermediary for connection would be higher than in the multiple small ISPs case. Also, because their costs have gone up, some OVDs would likely raise the prices they charge to consumers (and/or reduce the quality of the service they provide to consumers).

78. As I noted above, most ISPs in the United States do not charge positive terminating access fees. Therefore, I take zero as the competitive level that would exist in the absence of

[60] This hypothetical monopolist would also be able to increase subscription prices to households because it would eliminate local competition. I put that effect to one side and focus solely on the impact of the consolidation on the price to the OVD side of the market. Focusing just on the OVD side, it is highly plausible, as discussed below, that the increased fees would not result in a significant reduction in subscription fees so that the total price for connection paid by both sides of the platform would go up as well.

[61] Comcast June 27 Letter, p. 2; *infra*, n. 113; and Table 2.

[62] Comcast Supplemental Data; June 2013 FCC IAS Report.

the consolidation. The hypothetical monopolist would be able to raise profitably the terminating access fee, and to raise it significantly.[63]

79. A smaller hypothetical monopolist than the one I have just described would also likely impose a significant increase in the terminating access fee over the competitive level. One interesting candidate to consider is a hypothetical monopolist of all non-overlapping wired cable ISPs in the country since, under Comcast's theory, a merger that resulted in such a firm would pose no competitive problems.[64] That hypothetical monopolist would control access to approximately {{ }} subscribers, accounting for {{ }} of households using wired ISPs with download speeds of at least 200 Kbps. It would account for more over time as DSL subscribers migrate to cable and fiber deployment slows. Based on the evidence discussed below, I would expect that the hypothetical monopolist would be able to profitably raise terminating access fees significantly.

80. Dr. Israel's and Professor Carlton's objections to this definition of the relevant market are wrong as a matter of antitrust economics. They insist that the only relevant antitrust market for considering the impact of the merger is a local market in which households decide how to obtain broadband services.[65] That approach ignores the potential impact of a merger of ISPs on the edge providers on the other side of the platform. There is no economic reason why one would exclude the impact on edge providers from an analysis of ISP mergers. That is

[63] Dr. Israel disagrees with this conclusion. He argues that larger ISPs would not charge higher connection fees. Therefore, under his analysis a merger to monopoly of ISPs would not result in an increase in bargaining power. I discuss why his analysis is wrong in detail below.

[64] See, *supra*, n. 7.

[65] Israel Declaration II, ¶¶ 19-21; Carlton Declaration, ¶ 9.

especially true given that several ISPs, including Comcast and Time Warner Cable, have imposed terminating access fees on OVDs.[66]

81. Nothing in my analysis, however, depends on a precise boundary of that market. What does matter critically is that the analysis recognizes that there is another side to ISPs—the edge providers' content that consumers want to access using their chosen ISP.

82. I now examine whether the Transaction would result in the merged company realizing a significant increase in market power over OVDs. I proceed in two steps. First, to help identify competitive constraints, I examine the extent to which Comcast currently has market power over OVDs. Second, I examine how the Transaction would change Comcast's market power over OVDs.[67]

C. Competitive Constraints on Market Power

83. I consider whether it is possible for Comcast and Time Warner Cable, individually, to obtain a significant increase in access fees charged to OVDs by degrading or threatening to degrade an OVD's video stream and thereby demanding and securing a significantly higher terminating access fee.[68] To answer that question, it is necessary to look at the potential competitive constraints on Comcast and Time Warner Cable. Those constraints come from

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[66] I note that Dr. Israel has a discussion of how it may be optimal for an ISP to impose charges, including differential ones, on edge providers. *See* Israel Declaration II, ¶¶ 186-197.

[67] Dr. Israel and Professor Carlton criticize me, and other experts for the opponents to the Transaction, for examining Comcast's market power. *See* Israel Declaration II, ¶ 38 and Carlton Declaration, ¶ 9. Those criticisms are misplaced since that analysis, whether they agree with its conclusions or not, is helpful for assessing whether there are competitive constraints on the ability of Comcast and Time Warner Cable to raise terminating access fees. The extent, and nature, of these competitive constraints are relevant for assessing the change in market power resulting from the Transaction.

[68] In my analysis, the increase in price results from individual negotiations with OVDs and not an increase in a posted price.

both sides of their platforms. In the discussion below, for brevity, I refer to Comcast. However, unless otherwise noted, a similar analysis applies to Time Warner Cable.

84. I first examine the ability of Comcast subscribers to switch to another broadband provider in the face of degradation in the quality of OVD streaming. I then examine Comcast's recent claim that Netflix, and other OVDs, have many ways of reaching subscribers on Comcast's network that do not require payment for access. Third, I document the extent to which Comcast's congestion of its network made it difficult for its subscribers to watch Netflix. Finally, I respond to Comcast's claims that the terminating access fee that it negotiated with Netflix is too small to worry about or is affirmative evidence of Comcast's lack of market power.

1. Comcast subscribers' ability to switch to another ISP

85. I showed in my previous declaration that Comcast subscribers have essentially nowhere to turn. They typically have one wired broadband alternative. Their choices are even more limited, if as is likely true for heavy users of OVD services (as well as other services such as games and video conferences), they want fast broadband connections. Moreover, the costs of switching are high. To put it colloquially, it is a pain to switch cable providers, and people seldom do unless they move. As a result, I conclude that if Comcast significantly degraded the quality of service to an OVD, Comcast would likely not lose a material number of customers.[69]

[69] Dr. Israel points out that many people do move and when they do they have to decide which wired ISP to choose. He suggests that Comcast faces a competitive constraint because people could choose another wired ISP when they move. It is true that people do not have switching costs in this case. However, the only households that are relevant are those that are moving to a residential location that Comcast serves. I have shown that in most cases there is only one alternative available to Comcast and often not a very good one.

86. Dr. Israel describes an alternative universe in which it is common and easy for customers to switch from Comcast. Dr. Israel's evidence for this assertion is not reliable.[70] Specifically:

- The Global Strategy Group ("GSG") Survey results Dr. Israel reports suffer numerous methodological and substantive problems and are flatly inconsistent with other studies of consumer behavior and the real world results of Comcast's and Time Warner Cable's degradation of Netflix's services. The GSG Survey finds that more than 70 percent of consumers would switch away from their ISPs if the ISP degraded Internet traffic under various scenarios. If such unprecedented switching had taken place, it would not have been hard to document. Yet, Dr. Israel provides no such evidence.

- Dr. Israel overstates churn for Comcast's services substantially by including "those whose service is disconnected for failure to pay." Dr. Israel's approach implies that over five years, more than {{ }} people who are subscribers today, and who do not move, will drop Comcast.[71] In fact, Comcast's data show that a very small fraction of broadband customers (approximately {{ }} a year[72]), who are not moving, voluntarily leave Comcast. That figure is consistent with the FCC's study on switching after accounting for switching from DSL to cable.

- Dr. Israel incorrectly cites to increases in Comcast's call-center volume as "real world" evidence of consumers' willingness to switch. Dr. Israel provides no evidence on the impact to Comcast, and no details from the transcripts of these calls to determine whether Comcast, for example, benefited by using these calls as opportunities to sell more expensive broadband packages.[73] By contrast, Netflix has provided transcripts, some of which I excerpt below, that show {{

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87. An OVD could resist Comcast's increase in interconnection fees if it had another viable way to reach the ISP's subscribers. Consumers typically have a mobile wireless ISP in addition to a wired ISP. One possibility posited by Comcast is to reach consumers through mobile

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[70] These findings are described in detail in Section III.C.

[71] Israel Declaration II, ¶ 94.

[72] Comcast data produced in {{ }}. This calculation is described in more detail below in Section III.C.

[73] Israel Declaration II, ¶ 56.

wireless. That alternative is not feasible for providers of long-form video, as I explained in my previous declaration. Data caps on mobile wireless make this prohibitively expensive. According to the Consumerist, streaming all of the episodes of *Breaking Bad* (46.5 hours) in HD in a single billing cycle would cost $1200 to $2200 using LTE due to fees for exceeding data caps, even if the user used the cellular connection for no other data.[74]

88. Aside from the cost, households may not want to watch a long-form video on a mobile device or be able to connect their mobile wireless to a television set. Data from Netflix on viewing habits confirms that mobile wireless ISPs are not a feasible or desirable alternative for households. Only {{ }} of Netflix hours are streamed using a mobile wireless ISP. Dr. Israel's claims that mobile wireless is becoming a realistic alternative to wired broadband for OVD subscribers are wrong, when it comes to viewing movies, television shows, and other long-form content.[75]

89. Comcast's broadband subscribers therefore do not have a feasible way to watch OVDs without relying on Comcast to provide a reliable broadband connection.

2. The Ability of an OVD to Reach Comcast Subscribers Without Paying a Toll

90. I next examine whether OVDs can find a realistic way to send content to Comcast subscribers without paying for access.

91. Comcast decides whether it will pick up content that gets delivered to the front door of its network and transport that content to its household subscribers. It can decide whether or not

[74] Consumerist, "Comcast Says Mobile Data Is Competitive, But It Costs $2k to Stream Breaking Bad Over LTE," August 18, 2014, available at http://consumerist.com/2014/08/18/comcast-says-mobile-data-is-competitive-but-it-costs-2k-to-stream-breaking-bad-over-lte/.

[75] See discussion below in Section III.E.2.

to connect to a transit provider or CDN and it can decide how much capacity to make available to that transit provider or CDN. Comcast is thus like the island fortress described earlier. It controls the transportation network on the island. Those off of the island fortress can send things to the edge of the island by various means. But once those things get to the edge of the island—the bridges or ports—the authorities in charge of the island fortress take over to move things to households within the island. Netflix found in 2013 that every major way into Comcast's island fortress either had a toll or was congested.

92. Comcast says, in effect, that there is a public road system running across the island with no tolls and no congestion so that anyone can get things to households without going through the island authority. Dr. Israel bases his response to my economic analysis of Comcast's market power on this description of how cable ISPs work.

93. Specifically, Comcast claims that Netflix could have reached Comcast's subscribers by using any of at least 40 settlement free paths offered by transit providers and that therefore Comcast has no market power over Netflix, or other OVDs, for connecting with its subscribers.[76] In fact, Netflix attempted to use all six of the largest transit providers in the world, all of which had settlement-free routes into Comcast's network.[77] In each case, Comcast critically impeded Netflix's ability to serve Comcast subscribers' requests for traffic by threatening to raise prices to the transit provider if it carried significant Netflix traffic, or by degrading traffic. Comcast, for example, was able to pressure {{ }} into not providing

[76] Comcast Opposition, pp. 217, 219. Comcast has since revised the "40" down to {{ }}. Letter from Francis Buono, Counsel for Comcast Corp., to Marlene Dortch, FCC, at 6 (Dec. 8, 2014).

[77] Netflix Reply, p. 6; Florance Declaration II, ¶ 32.

Netflix with its available capacity, and it was able to force Level 3 into a paid peering arrangement for some of Netflix's traffic.[78]

94. Given this experience, Netflix had no reason to believe that it would have a different experience with other transit providers. Under the peering policies adopted by Comcast, every smaller transit provider that Netflix did not try would have faced the same issue as the larger ones that Netflix did try: delivering Netflix's traffic via a smaller transit provider would have put that transit provider out of ratio, and therefore out of Comcast's so called "settlement free peering" policy, which is discussed below. Comcast would have therefore demanded that the transit provider drop Netflix, face congestion, or pay terminating access fees.[79]

95. Comcast also claims that a competitive market for transit prevents Comcast from exercising market power. That is wrong because transit providers do not have the ability to transport content within the closed walls of Comcast's network and therefore cannot provide that service to OVDs. While an OVD may choose among competitive transit providers to bring its data to Comcast's last mile network, only Comcast can "open the door" and transport content from its doorstep to its subscribers who requested that content. Comcast therefore has the power to set the capacity levels any given transit provider has into Comcast's network either through direct agreements or through Comcast's peering policy. That, in turn, allows Comcast to demand, and unilaterally set, interconnection fees from transit providers.

96. Comcast can set a price floor in the competitive transit market at least for traffic above certain ratio levels determined by Comcast. This is similar to the island fortress authority imposing a weight-based toll on truckers crossing a bridge to deliver their wares at the island

[78] Florance Declaration II, ¶ 37; Florance Declaration I, ¶¶ 38, 49.

[79] Florance Declaration II, ¶ 34.

depot. That toll is a cost to the truckers and in a competitive market would be passed on to the customers in the form of higher transportation prices.

97. Competition in the transit market therefore cannot discipline the fees Comcast imposes for interconnection access for the simple reason that all traffic requested by Comcast's subscribers must cross through Comcast's ports.[80] Comcast could charge the transit provider who will pass the cost on to the OVD or it can charge the OVD directly.[81] Competition in the transit market no more disciplines Comcast's interconnection fees than competition in the trucking market disciplines the tolls on the bridges coming into Manhattan.

98. A further technical issue that bears on competitive constraints is whether an ISP can target the traffic of a particular OVD and make a credible threat to degrade the quality of that OVD's traffic without reducing the ability of its subscribers to access the Internet so much that they do switch to another broadband provider. My understanding is that due to the characteristics of different types of Internet traffic, Comcast was able to degrade Netflix's traffic without reducing the ability of its subscribers generally to access the Internet. [82]

99. I conclude from this analysis that Comcast has market power over interconnection to their subscribers by OVDs. The "Comcast degradation" natural experiment confirms this conclusion, and I turn to that next.

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[80] Florance Declaration II, ¶ 13.

[81] In addition, {{

}} Small transit and enterprise-services providers are likely very sensitive to the possibility of losing access to Comcast's network or of increases to the costs of interconnecting with Comcast. Larger entities, such as the largest transit providers, would be less sensitive to pressure from Comcast. But, as Comcast's efforts against Cogent and Level 3 demonstrate, even large transit providers have been unable to resist Comcast's efforts to increase the cost of interconnection.

[82] Comcast did impose some collateral damage on customers other than the ones using Netflix. Cogent has explained to the FCC that employees of one of Cogent's business customers had significant problems in working remotely from home as a result of Comcast's actions. *See* Cogent Ex Parte Letter, pp. 5-6.

3. The Comcast Degradation Episode

100. Starting in the autumn of 2013, Netflix found that the streaming quality for Comcast subscribers was getting worse, and the quality continued to worsen through the holiday season. In some cases, the degradation of the viewing experience was so severe that subscribers were not able to watch at all. There was a rapid increase in the number of support calls coming from its customers that used Comcast over the final weeks of 2013 and beginning of 2014.[83] To correct for seasonal effects, I compared Comcast with Charter since subscribers of these two systems experienced similar viewing quality prior to the degradation episode.[84] The support calls from Comcast subscribers {{ }} relative to Charter.

101. Several excerpts of online chat transcripts between customer support personnel and Netflix customers describe the difficulties encountered by Netflix customers who used Comcast. The following quotes are verbatim from the transcripts:

- {{ }}
- {{ }}
- {{ }}

[83] I obtain similar results to those described below when we compare Comcast to the eight largest cable ISPs (excluding Time Warner Cable, which also degraded the quality of service during a portion of the time considered).

[84] The data in Figure 2 is monthly. We have shown Feb-2014 as not being in the shaded degradation period, when in fact approximately the first half of February was over before Comcast and Netflix reached their agreement.

- {{

  }}
- {{

  }}
- {{

  }}
- {{

  }}

102. My econometric analysis finds that Comcast customers experienced a sharp decline in their average viewing quality for Netflix. {{

}}[85] This enabled users to view videos at a quality level {{

}}. The average weekly bitrates were also highly correlated as noted above; the two series had a correlation coefficient of {{

}}.

103. Starting in November 2013, the average bitrate obtained by customers of these two systems diverged. Charter held steady. Comcast nosedived. Between the last week of October

[85] {{

}}

2013 and the last week of December 2013 the average weekly bitrate fell {{ }} for Comcast customers and rose {{ }} for Charter customers. I found that {{ }} of Comcast customers saw their average weekly bitrates decline between October 2013 and January 2014. Most Comcast customers therefore had their viewing experiences degraded. In some cases that degradation involved having great viewing quality become less good and in other cases that involved average viewing quality becoming poor and in some cases unwatchable.

104. Figure 2 shows the ratio of average weekly bitrates for Charter and Comcast for December 31, 2012 through June 29, 2014, with the ratio in the week ending February 23, 2014 normalized to 1. These figures are based on a statistical method—known as difference-in-differences estimation—that isolates the effect of a treatment on one group (Comcast customers in this case) relative to a control group (Charter customers in this case). The estimation method controls for seasonal and other factors that could influence the results. It is apparent that the degradation started around the week ending November 3, 2013. Average bitrates for Comcast customers returned to normal about a week after Netflix and Comcast signed the contract for additional port capacity.

Figure 2: Ratio of Average Bitrates (Comcast/Charter), Relative to Week Ending 2/23/2014

{{

}}

105. Netflix executives saw the deterioration in viewing quality for its Comcast subscribers as a serious business concern.[86] {{

}}

106. {{

[86] Florance Declaration I, ¶¶ 52-53 and conversations with Netflix executives.

}}

107. For Netflix, there was only solution to the problems caused by the degradation: to pay Comcast to ensure that there was an uncongested path between the edge of its network and the households of its subscribers. Netflix acquiesced to Comcast's demands. Under the contract signed February 18, 2014, Netflix agreed to pay Comcast to provide sufficient capacity for Comcast subscribers to stream Netflix. Almost immediately after the contract was signed, Comcast opened up significant port capacity and Netflix observed that the streaming quality for its Comcast customers rapidly went back to normal.

4. The Significance of the Terminating Access Fees

108. Comcast's success in securing terminating access fees and Netflix's acquiescence to these fees was a significant event. The *New York Times* described it as "as a milestone in the history of the Internet, where content providers like Netflix generally have not had to pay for access to the customers of a broadband provider."[87] Reflecting its notoriety, the keywords "Netflix Comcast deal February 23 2014" yields 118,000 results on Google Search.[88]

109. It is likely that the fees that Comcast has negotiated recently with Netflix, among others, do not reflect its full market power. Comcast has been waging a battle for several years to break the zero-price equilibrium for edge providers. Breaking the zero barrier places Comcast

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[87] Edward Wyatt and Noam Cohen, "Comcast and Netflix Reach Deal on Service," *New York Times*, February 23, 2014, available at http://www.nytimes.com/2014/02/24/business/media/comcast-and-netflix-reach-a-streaming-agreement.html.

[88] Based on a search query I submitted to Google Search on December 18, 2014.

in a position to increase fees going forward. Just crossing that barrier, with one of the strongest opponents of terminating access fees, was a significant victory.[89]

110. At the same time Comcast was negotiating these fees, it was pursuing two other initiatives that could have been adversely affected if it demanded and secured much higher fees that fully reflected its market power. It was planning this Transaction, which it knew would go before the FCC, a reviewing authority that had expressed serious concerns over charging edge providers, and the U.S. Department of Justice. It was also still immersed in the ongoing debate over net neutrality.[90]

111. Nevertheless, Comcast demanded and secured a significant terminating access fee from Netflix. Comcast and its economists claim that Comcast saved Netflix money and that the fees are so small they actually show Comcast lacks market power. That is not the case.

a. The Impact of the Comcast Contract on Netflix's Cost of Providing Content to Comcast Subscribers

112. The contract imposed an incremental cost on Netflix solely for the purpose of Comcast agreeing to provide uncongested routes between the edge of its network to the subscribers on

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[89] David Crow, "Netflix Wants to Put Comcast Genie Back in 'Fast Lane' Bottle," *Financial Times*, November 9, 2014, available at http://www.ft.com/cms/s/0/0bc54d54-639e-11e4-8216-00144feabdc0.html#axzz3MYtZkjxn ("The agreement [between Comcast and Netflix] he [Reed Hastings] made was so important because it set a precedent that content companies like Netflix should pay companies like Comcast to access their customers, and led to a string of similar agreements with other internet providers including Verizon."); Chris Morran, "Netflix Agrees to Pay Comcast to End Slowdown," *Consumerist*, February 23, 2014, available at http://consumerist.com/2014/02/23/netflix-agrees-to-pay-comcast-to-end-slowdown/ ("The question is what sort of precedent this Netflix/Comcast deal sets for the rest of the marketplace. By making this deal with the nation's largest cable company (which is trying to become even larger with its plan to purchase Time Warner Cable), Netflix will likely need to reach a similar paid-peering arrangement with Verizon, TWC, and others. If a company wants to get into the streaming video business, paid-peering would now have to be considered part of the price for entry into the marketplace. Which is another reason one should be concerned about the proposed Comcast/TWC merger. By combining the country's two largest ISPs, you'd create a single entity that could effectively set all the standards and rates for paid-peering arrangements; if a company wants to reach the home audience, Comcast would determine how much it will cost.").

[90] While Comcast publicly supports the FCC's 2010 Open Internet rules, it opposes application of those rules to points of interconnection, so Comcast's statement of support is irrelevant relative to the terminating access fees discussed here.

its network. The contract made the total cost to Netflix for reaching Comcast subscribers higher than it would have been if Comcast had not charged a terminating access fee.

113. Dr. Israel argues that the fact that only Comcast and the other three largest ISPs charge access fees "does not establish that {{ }}; only that it pays more *to the ISP itself*, with which it connects directly."[91] This claim is wrong.

114. None of the more than 400 ISPs other than the four largest ones charge access fees. In more than {{ }} cases, Netflix connects directly to the ISP and Netflix pays zero to interconnect. That compares to the approximately {{ }} per Mbps it has to pay Comcast.[92] In each of these more than {{ }} cases, Netflix bears the costs of making its content available at the interconnection points and the ISP agrees to take the content and transmit it to its subscribers who have requested it.[93] Netflix connects to Comcast in the same way; it bears the costs of making its content available at the interconnection points, without use of a middleman, yet Comcast charges an access fee.

115. In Section III below, I show that the total costs Netflix incurs to reach other ISPs' subscribers, including Netflix's costs of operating as its own CDN, are lower than it incurs to

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[91] Israel Declaration II, ¶ 166 (emphasis in original).

[92] Of these more than {{ }} ISPs, more than {{ }} interconnect with Netflix at IXPs, as does Comcast. And more than {{ }} interconnect with Netflix using Open Connect appliances that are embedded in the ISP's network, which is less costly to Netflix as it does not bear the cost of maintaining servers at an IXP.

[93] For the other more than {{ }} other ISPs, Netflix uses a transit provider, which takes the traffic to another location at which it has agreed to interconnect with the ISP. These are typically smaller ISPs that do not have a presence at IXPs so that they cannot connect with Netflix at an IXP. Such an ISP takes traffic at the point at which it connects to the Internet (through its transit provider, which it pays) and does not charge either the transit provider or Netflix for interconnection. These ISPs therefore also demonstrate that the norm is to not charge an access fee. The fact that Netflix pays a transit provider to take traffic to the point at which these ISPs connect to the Internet is irrelevant to a comparison with Comcast, as Netflix takes its traffic to the IXPs at which it connects to Comcast. Moreover, as I discuss below, even though the comparison is irrelevant, Netflix's total costs of connecting to these ISPs even including the transit fee is still less than the total cost of connecting to Comcast.

reach Comcast's subscribers. I present this comparison only to respond to Comcast's misleading claims that it has lowered Netflix costs. Such comparisons are unnecessary because we can directly observe the price of interest—the access fee. Comcast's access fee of about {{ }} per Mbps is significantly above the zero fee that it used to charge and above the zero fee that the more than {{ }} ISPs other than the four largest ones charge.

b. Comcast's Argument that Terminating Access Fees are Too Small to Worry About Is Spurious

116. Dr. Israel claims that the terminating access fees paid by Netflix and other edge providers are so "miniscule" as a percent of total sales that they show that Comcast does not have any market power:

> The small size of Comcast's charges for interconnection refutes any theory that Comcast's large size as an ISP parlays into anti-competitive power[94] over edge providers or their agents. ... More generally, the amount of money at issue in Comcast's interconnection agreements is {{ }}. For example, Netflix's {{ }}.[95]

He supports this conclusion by calculating the ratio of interconnection payments as a percent of costs and revenues.[96] Professor Carlton makes a similar point.[97]

117. The comparison between the terminating access fees and total revenue is not sensible as a matter of economics and is not consistent with how merger analysis is conducted by antitrust agencies.[98] Suppose that producers of inputs that comprise a small portion of total costs could merge and raise prices. The total cost of production would rise if that happened for many

[94] I assume Dr. Israel meant "market power" instead of "anti-competitive power" which is not a term of art that is typically used in antitrust analysis.

[95] Israel Declaration II, ¶ 12.

[96] Israel Declaration II, ¶ 135.

[97] Carlton Declaration, ¶ 14.

[98] The approach taken by Dr. Carlton and Dr. Israel is not endorsed in the U.S. Department of Justice and Federal Trade Commission (2010), "Horizontal Merger Guidelines," available at http://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf, or by any other authority on merger analysis that I am aware of.

inputs. Sound merger analysis examines whether the price of the inputs that are the subject of the merger increases and not on their impact on overall revenues.[99]

118. Dr. Israel also claims that the terminating access fees are lower than the marginal cost of serving traffic and therefore cannot reflect the exercise of market power.[100] That inference, even if it were true, is wrong in the case of two-sided platforms. As noted earlier, a standard result for two-sided platforms, predicted by theory and confirmed in practice, is that the price to one side of a two-sided platform could be less than marginal cost, zero, or less than zero even if the platform is run by a monopolist. Comcast increased the terminating access fee from zero to an amount significantly more than zero and significantly more than other very large ISPs were charging. This departure from the standard price of zero charged by other ISPs was not the result of differences in costs that Comcast incurred for interconnecting with OVDs that other ISPs did not.[101]

119. I conclude that Comcast's successful effort to break the zero-price equilibrium shows that it has significant market power over the terminating access fees it chrges to connect OVDs and subscribers. Its efforts resulted in Comcast charging positive fees for terminating access,

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[99] This mistake is reflective of a more general analytical error made by Dr. Israel and Professor Carlton in not analyzing the horizontal unilateral effects of the merger on the edge provider side of the market and therefore not applying standard merger analysis to the B2B side of the market. It is routine for the enforcement agencies to object to mergers in B2B markets that increase the price of inputs by small but significant amounts with complete disregard for the impact of those price increases on total revenues or total costs. See, e.g., Complaint, In the Matter of Verisk Analytics, Inc., Insurance Service Office, Inc., and EagleView Technology Corporation, Docket No. 9363, Dec. 16, 2014 (Proposed combination of the two largest providers in the U.S. of rooftop aerial measurement services and reports – services sold to insurance companies so that they may estimate rooftop damage – 35% of all real property insurance claims in the U.S. The parties abandoned the transaction.); Complaint, United States v. Continental AG and Veyance Technologies, Inc., No. 1:14-cv-02087 (D.D.C. filed Dec. 11, 2014) (Proposed combination of the two largest providers in North America of commercial vehicle air springs – products sold to OEMs for truck, trailer, and bus suspension systems. Divestiture ordered.).

[100] Israel Declaration II, ¶¶ 136-138. See Section III.A.2 below for more details on the flaws in Dr. Israel's approach.

[101] See, *supra*, n. 45.

unlike many other ISPs in the United States, and unlike its longstanding prior practice of not charging for interconnection.[102]

120. I next analyze whether the Transaction would result in a significant increase in the market power held by Comcast and thereby lead to an increase in terminating access fees to OVDs.

D. Change in Market Power from Transaction

121. The Transaction will increase the number of subscribers controlled by Comcast from 21.1 million to 29.6 million, a 40 percent increase. In negotiations with OVDs, Comcast would be able to degrade, or threaten to degrade, streaming service for 8.5 million more subscribers than it can today.[103] In my previous declaration, I showed how that would increase Comcast's bargaining power, and its ability to demand and secure a higher price.

122. I will start with a brief summary of what I found.

a. I interviewed executives at Netflix who were involved in the negotiations. Netflix, which has negotiated with a number of very large ISPs, and entered into paid interconnection agreements with four very large ISPs, has indicated that a key consideration in the negotiations is the size of the ISP and its ability to affect service to Netflix's subscribers. Netflix's view is hardly surprising, and is consistent with common business perceptions of the importance of size in negotiations.

b. I conducted an economic analysis of Netflix's business—which bears similarities to many other OVD businesses—and showed that the financial impact of being foreclosed from subscribers increased dramatically with the number of subscribers foreclosed. The ultimate, if unstated, threat from each of the very large ISPs that Netflix negotiates with is that it will disrupt Netflix's traffic on the ISP's network. Because of the high fixed costs of content, and the virtuous circle I described in my previous declaration, a loss of subscribers has a huge impact.

[102] Time Warner Cable also has significant market power as reflected in its ability to secure terminating access firms from Netflix and other edge providers in contrast to smaller wired ISPs.

[103] Comcast June 27 Letter, p. 2.

c. I then examined the terminating access fees that Netflix pays the four very large ISPs. I showed that below a size threshold, ISPs are unable to demand and secure a terminating access fee. It requires significant market power to do so. The four largest wired ISPs have succeeded in doing just that. In their case, there is a strong relationship between price per Mbps and the number of subscribers. Other factors weigh in as well, but they are consistent with the factors that Netflix says are important in negotiations. I showed that Comcast, with 1.8 times as many subscribers as Time Warner Cable, was able to secure a terminating access fee that was {{ }} times higher than Time Warner Cable's terminating access fee.[104]

123. Dr. Israel responds that there is no evidence—at all—that the size of ISPs matters. Much larger ISPs cannot, he concludes, demand and secure higher terminating access fees despite their ability to foreclose an OVD from a far greater number of subscribers. That is a remarkable proposition. It is also wrong and without meaningful support.

124. First, Dr. Israel claims that my conclusion is "atheoretic." Let us begin with why Dr. Israel apparently believes he is being "theoretic." He has referenced a game-theoretic model that shows that, under certain unproved assumptions, an increase in the size of one party would not necessarily result in an increase in the share of the gains to trade they are negotiating over. That model ***assumes that bargaining power does not depend on size***. I detailed in my previous declaration that other authors have shown that relaxing various assumptions of that model, including the one pertaining to bargaining power, reverses the perverse result that size does not matter in cases, like this one, where there could be scale economies in cost or demand.

125. The reason that economists have written papers responding to that model is because they recognize that the result is counter-intuitive and inconsistent with experience.[105] Common

[104] The ratio of subscribers is based on data from the Comcast June 27 Letter, p. 2. The ratio of terminating access fees is based on calculations from the Netflix agreements with Comcast and with Time Warner Cable.

[105] Nodir Adilov and Peter J. Alexander, Horizontal Merger: "Pivotal Buyers and Bargaining Power," 91 *Economics Letters* 307 (2006) ("Chipty and Snyder (1999) assume that bargaining power will be unaffected by merger and argue that the shape of supplier's gross surplus function provides sufficient guidance for regulatory purposes. Raskovich (2003) argues that the post-merger pivotal nature of the firm will diminish its bargaining

experience would suggest that an increase in size increases bargaining power and, therefore, how much the party whose size has increased can demand and secure.[106] When one party gets bigger it can make threats that, if carried out, impose greater costs on the other party—such as walking away from the deal.

126. Economists can—should—also take into account practical experience in reaching judgments. Speaking for myself, I have encountered many business negotiations over the years where size matters greatly and none where bigger firms—as predicted by Dr. Israel's model—actually get worse deals than smaller firms as a result of their size. Just because we use math does not mean that economists have to ignore common sense and practical experience. Likewise, the fact that one rejects a particular model, based on assumptions that are neither plausible nor tested, and that generates perverse predictions that do not seem to make sense, does not make one "atheoretic."

127. Dr. Israel then attempts to deal with the facts. He disputes the evidence that Professor Farrell and I have provided showing that larger ISPs are able to demand better terms. Dr. Israel argues that the number of interconnection locations is a measure of quality that needs to be taken into account when comparing ISP size and access fees. He claims that after including the number of interconnection locations in Professor Farrell's regression analysis, Professor

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position. We show that if there are asymmetries in bargaining power, these results may not hold. On the contrary, the newly merged pivotal firm may find its bargaining position significantly enhanced by merger. This result may be of interest to antitrust and regulatory agencies, in particular the Justice Department and the Federal Communications Commission."). *See* also Stéphane Caprice (2007), Upstream Competition and Buyer Mergers, Working Paper, available at https://www.diw.de/sixcms/detail.php/86150; Howard Smith and John Thanassoulis (2012), "Upstream Uncertainty and Countervailing Power," *30 International Journal of Industrial Organization* 483-495 (2012).

[106] Christopher M. Snyder, "Why do larger buyers pay lower prices? Intense supplier competition," 58 *Economic Letters* 205-209, 205 ("The popular press frequently reports that, relative to small buyers, large buyers have more 'clout' in their negotiations with suppliers. It is commonly reported, for example, that retail superstores are able to extract price concessions from manufacturers. The formal empirical literature generally supports these claims." (internal citations omitted)).

Farrell's finding that {{

}} goes away.

128. Dr. Israel's purported measure of ISP quality is highly correlated with ISP size. Larger ISPs generally have more interconnection locations because they typically cover a larger geographic footprint. The greater number of interconnection points of larger ISPs is mainly because they are larger, not because they provide interconnections closer to their subscribers. As I discuss below, from Netflix's perspective, the number of interconnection points does not significantly affect the quality of interconnection. {{

}}.[107] By adding the number of interconnection locations into Professor Farrell's regression analysis, Dr. Israel is in fact adding a measure that is highly correlated with size. By doing so, he creates a classic multi-collinearity problem in which {{

}}.

129. As I discussed above, Dr. Israel also argues that the evidence I presented in my initial declaration that {{

}} conflates which party is being paid (an ISP versus a CDN or transit provider) versus how much is being paid. And, as I explained above, we can observe directly that none of the more than 400 ISPs other than the four largest charge access fees. Moreover, for the more than {{ }} ISPs that Netflix connects to directly to the ISP—so that there is no middleman involved—Netflix pays zero to interconnect other than for the four largest ISPs.

130. Since completing my first declaration, I have reviewed additional evidence on interconnection agreements that demonstrate the relationship between price and size. From the

[107] Florance Declaration II, ¶ 17.

interconnection rates reported by Dr. Israel for OVDs and CDNs for Comcast and Time Warner Cable, it is clear that Comcast charges {{ }} for interconnection. Table 2 shows the comparison.[108]

Table 2: Comparison of Access Fees Charged by Comcast and Time Warner Cable Access Fees

{{

}}

131. It is clear from Table 2 that {{

[108] {{ }} *See* Response to Specification 54, Response of Time Warner Cable Inc. to the Commission's Information and Data Request, September 11, 2014. The rates reported in the table are the rates underlying the summaries reported by Dr. Israel in Table 7 of Israel Declaration II. {{ }}

The fees reported in Table 2 are based on contracted capacity, so that the fees reported will significantly exceed $/Mbps fees based on actual 95th percentile usage (as in common in the industry) for two reasons. First, it is not desirable to use anything close to the full capacity of a port. It is common to increase capacity when capacity utilization is above 70 percent to avoid congestion. *See* Declaration of Henry (Hank) Kilmer, August 25, 2014, ¶ 62. Moreover, 95th percentile usage is less than peak capacity usage. {{ }} This is why {{ }} is significantly lower than the {{ }} If the $/Mbps estimates are calculated on a consistent basis across contracts, it does not generally pose an issue to use contract capacities as for the rates reported in Table 2—indeed it may be helpful or necessary, such as when data on actual usage are not available.

}}

132. These negotiations provide natural experiments for assessing the impact of the merger on prices. They tell a consistent story that larger wired ISPs are able to negotiate higher prices. In addition we know that several wired ISPs smaller than these have demanded access fees unsuccessfully from Netflix. The vast majority of smaller wired ISPs generally do not even raise the issue.

133. Those natural experiments are consistent with the hypothesis that beyond a size threshold, wired ISPs that have more subscribers secure higher access fees because the cost of walking away from these wired ISPs becomes increasingly costly to the edge providers.

134. With the preceding results in hand, I turn to the horizontal and vertical effects of the Transaction.

E. Horizontal Unilateral Effects of Transaction on Terminating Access Fees

135. I first show that the Transaction would result in a significant increase in the terminating access fees paid by OVDs and the other price paid by OVDs and households for broadband connections. Based on the natural experiments discussed above, I would expect that the

[109] {{

}}

Transaction would result in the merged entity increasing the terminating access fee by about {{ }} relative to what Comcast would charge in the absence of the merger, and by about {{ }} relative to what TWC would charge in the absence of the merger. I then discuss the claim by Comcast's economists that Netflix, at least, does not need to worry about this because it has a long-term contract. Finally, I respond to Dr. Israel's claim that we could ignore any increase in price to edge providers because it will lead to a countervailing decrease in price to households.

1. The Impact of the Transaction on Comcast's Prices to OVDs for Interconnection

136. I have concluded above that Comcast and Time Warner Cable are two-sided ISP platforms that participate in a national broadband market that connects edge providers and households. Comcast and Time Warner Cable both have substantial market power today. A merger would significantly increase the market power that each holds individually today. The combined firm, which would account for {{ }} of wired broadband households, would have about {{ }} more wired broadband households than Comcast has today and about {{ }} more wired broadband households than Time Warner Cable has today.[110] Those figures will likely increase over time given the migration of households from DSL to cable and the slowing of fiber deployment.[111]

[110] Comcast June 27 Letter, p. 2.

[111] For more details on the slow growth of DSL due to the migration of households from DSL to cable, see *infra*, Section III.E.1. The growth of fiber has been slowing and is likely to slow even further, given that Verizon, the leading deployer of fiber broadband, has stated that it does not plan to expand its fiber footprint. See Roger Cheng, "Verizon to End Rollout of FiOS," *Wall Street Journal*, March 30, 2010, available at http://www.wsj.com/news/articles/SB10001424052702303410404575151773432729614; Karl Bode, "Verizon: 30% or More of Our Users Will Never Get FiOS," *DSLReports*, May 7, 2014, available at http://www.dslreports.com/shownews/Verizon-30-or-More-of-Our-Users-Will-Never-Get-FiOS-128862.

137. Given the price-size relationship I have documented among ISPs, it is likely that the Transaction would result in a significant increase in price. This increase in price does not come from the elimination of competition between Comcast and Time Warner Cable for household subscribers. It comes, on the other side of the platform, from the elimination of choices that OVDs have for building their networks—in particular the ability to negotiate separately with Comcast and Time Warner Cable and walk away from either of them—that it will not have following the proposed Transaction.

138. The Transaction would increase the economic significance of the threat that Comcast could make to OVDs that refuse to pay higher terminating access fees. Using Netflix as an example, the ultimate threat—full foreclosure—would result in eliminating {{ }} of Netflix's operating margin after the Transaction compared with {{ }} before.[112] Mr. Florance confirms that, consistent with his experience in negotiating interconnection deals, including one with Comcast, he would expect Netflix to accede to a higher terminating access fee as a result of the greater threat.[113]

139. I have examined the relationship between the terminating access fees and size (measured by the share of Netflix viewing hours) for the four deals that Netflix negotiated to provide an indication of the extent to which the Transaction could affect terminating access fees for OVDs. I have used data on the {{

[112] This calculation is similar to ones I describe in Evans Declaration I, ¶ 131, except that in this report I calculate the share of Netflix streaming potentially excluded by Comcast without imposing any speed threshold.

[113] Florance Declaration I, ¶ 62.

}}[114] I find that even in this small sample of ten ISPs, the share of Netflix hours has a large and statistically significant effect on the interconnection price. The expected interconnection fee rises from {{

}}. Given this relationship, I find that the Transaction (including the divestiture) would result in a {{ }} increase in the expected Comcast terminating access fee (from {{ }} to {{ }}) and a {{ }} increase in the Time Warner Cable terminating access fee (from {{ }} to {{ }}) with a weighted average increase, for the combined entity, of {{ }}.[115] I am not claiming that this

[114] For this analysis, for those ISPs with positive fees, I used estimates of the effective monthly access fee based on 95th percentile usage, which is commonly used in the industry. The monthly payment (in dollars) made by Netflix to each ISP is based on Netflix's contract with that ISP. For a measure of traffic usage, for Comcast, I used actual data on its peak usage in August 2014, divided by 1.2, a ratio that Netflix uses to estimate 95th percentile usage based on peak usage, to obtain an estimate of 95th percentile usage. I divide the monthly payment (in dollars) by the estimated 95th percentile traffic (in Mbps) to estimate the monthly fee in $/Mbps. {{

}} The calculated access fees for these ISPs using this approach have the same ratio to each other and to Comcast as using the contract capacities, which is the approach Dr. Israel used in Table 7 of Israel Declaration II. The percentage changes I report from the regression results would be essentially the same using the contract rates, as used by Dr. Israel. I report the effective rates for greater comparability with third-party CDN rates, which I report elsewhere in this declaration.

[115] These results are based on a Tobit censored regression with 10 observations: the four ISPs that charge an access fee (Comcast, AT&T, TWC, and Verizon), and the next six largest wired ISPs (CenturyLink, Charter, Cox, CableVision, BrightHouse, and Frontier). Including additional ISPs (all of which would have an very small number of hours and an interconnection price of zero) would have only make the results even more statistically significant, and would have only a modest effect on the measured magnitude of the effect. The dependent variable is the access fee, measured in dollars per Mbps. The explanatory variable is the share of Netflix viewing hours in August 2014 (the most recent period for which we have the data). The marginal effects of share on the expected fee are non-linear because of the censoring at 0. In calculating the share of the post-Transaction combined entity, I assume that the combined entities share equals the combined share of Comcast plus TWC, reduced by the fraction of broadband subscribers included in the divestiture (as reported in the Comcast June 27 letter). For the weighted percentage increase in fee for the combined entity, I calculate the average pre-Transaction fee for Comcast and Time Warner, using their pre-Transaction shares as weights. I tested the appropriateness of the Tobit specification by calculating the LM-statistic for the test against the alternative of a model that is non-linear in the regressors and contains an error term that can be heteroskedastic

analysis provides precise predictions of the impact of the Transaction on terminating access fees for OVDs, but only that it is indicative that the impact is likely to be significant relative to standards ordinarily used in merger analysis.

Table 3: Tobit Regression of Interconnection Price on Share of Netflix Hours

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140. The resulting increase in terminating access fees that Comcast will be able to charge as a result of the Transaction is likely to be substantial in absolute terms for several reasons.

141. First, I would expect for the reasons discussed above that, in the absence of regulatory provisions that prevent Comcast from effectively charging OVDs for access, Comcast would charge much higher terminating access fees in the future. Therefore, the base from which the Transaction-specific increase is calculated would be larger as would the Transaction-specific increase. For example, if Comcast demanded a terminating access fee of {{ }} from Netflix—more than {{ }} times higher than today—Netflix would be better off paying

and non-normally distributed, with critical values calculated using a parametric bootstrap. The test did not reject the null hypothesis, which supports my use of the Tobit model.

the fee than giving up the revenue from Netflix customers who are dependent on Comcast as their ISP.[116] The same is true for other OVDs with similar business models.

142. Second, market observers predict that the OVD business will expand significantly in the coming years. Consumers have shown that they like the viewing and pricing models offered by OVDs, and Netflix has demonstrated that it is possible to serve these consumers profitably. I would expect that the existing OVDs—Amazon, Hulu, YouTube, VIMEO, Crackle, Blip, Vudu, and Redbox Instant—will expand and that others will enter. Cisco projects that the total size of the global Internet video industry in 2018 will be 69,972 Petabytes per month, 3.6 times the volume in 2013.[117] According to PricewaterhouseCoopers, electronic home video streaming is expected to reach $10.1 billion in 2018, up from $3.3 billion in 2013.[118] The Transaction would result in a significant increase in terminating access fees to a much wider group of market participants in the future.

2. The Impact on Netflix Given Its Long-Term Contract

143. Dr. Israel and Professor Carlton claim that the fact that Comcast and Netflix agreed to a {{ }} demonstrates that Netflix has no cause for concern and that Comcast does not have significant market power.[119] {{

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[116] For this calculation, I started with the effect on Netflix's operating margin from a complete loss of Comcast subscribers, based on the calculation reported above in ¶ 138. I took this to be the maximum Netflix would be willing to pay ($432 million in 2013). I divided this by Comcast's 95th percentile traffic in August 2014 ({{ }}), estimated using the method described above in footnote 113 to get a price of {{ }} annually, or {{ }} monthly. I compared the $430 million to the contracted price in 2014 ({{ }}, which is less than {{ }} of $432 million).

[117] Cisco (2014), "Cisco Visual Networking Index: Forecast and Methodology, 2013-2018," available at http://www.cisco.com/c/en/us/solutions/collateral/service-provider/ip-ngn-ip-next-generation-network/white_paper_c11-481360.pdf, p. 10.

[118] Gary Krakow, "Streaming Movie Revenue Forecast to Surpass Box Office Totals," *TheStreet.com*, June 5, 2014, available at http://www.thestreet.com/story/12734638/1/streaming-movie-revenues-forecast-to-surass-box-office-totals.html.

[119] Israel Declaration II, ¶ 174, Carlton Declaration ¶ 15.

}}. The length of this contract does not reduce the risks the Transaction poses to competition and consumers.

144. To begin with, for the purposes of evaluating the Transaction, the relevant question is what OVDs that have not already entered into long-term contracts with Comcast will pay. Comcast will be negotiating those terms after having established the precedent of positive terminating access fees, and outside of the glare of regulatory scrutiny coming from its proposed acquisition of the second largest cable system in the country and the current heated debate over net neutrality. Indeed, approval of this Transaction may well be taken by Comcast as vindication of its absolute right to charge for interconnection, which could embolden it to more fully exercise its market power and increase access fees. I would expect that OVDs and other edge providers will obtain significantly less favorable terms than Netflix and other OVDs obtained in the shadow of the merger filings for this Transaction.

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146. Second, Comcast's agreement to provide port capacity does not preclude it from imposing higher costs on Netflix, in other ways, for connecting with Comcast's subscribers relative to other ISPs with less market power. Comcast could demand payments from Netflix to end these practices as well. Comcast can employ other tactics for reducing the ability of its subscribers to stream content from Netflix, and it can charge Netflix for modifying those tactics. Netflix, for example, has partnered with a number of U.S. MVPDs to make Netflix accessible on their set-top boxes.[120] Consumers benefit when they can more easily access Netflix or other OVDs with a single-click from the set-top box they are using for linear programming and video-on-demand. {{

}} Netflix has not entered into a deal with Comcast for access to the set-top box. Comcast could use its increased market power to exact higher fees for access to its set-top boxes than it would have in the absence of the Transaction.

147. A contract for interconnection also does not necessarily prevent Comcast's use of differentiated data caps. Comcast has the technical ability to place different data caps on different services or to exclude entirely its own video services from those data caps. This

[120] Based on information from Netflix.

would have the effect of rationing consumers' use of disfavored third-party OVDs and pushing those subscribers to use Comcast's video services or to use an OVD that has negotiated an agreement with Comcast to avoid those data caps.

3. The Role of "See-Saw" Effect in Limiting Competitive Harm

148. Dr. Israel claims that the "see-saw" effect for two-sided platforms implies that even if Comcast increased terminating access fees that would not cause competitive harm. In effect, he is claiming that an increase in the price to OVDs would be matched by an equal decrease in the price to consumers. There is no basis in the economics of two-sided platforms for such a fortuitous result. In this case, it is unlikely that Comcast would pass back much if any of the revenue gain from OVDs to its subscriber much less ***all*** of the revenue gain.

149. As I discussed earlier, two-sided platforms choose prices for each side. Those prices are interrelated because the demands by the two sides are interdependent. Following a change in demand or cost, a profit-maximizing firm may decide to reduce the price to one side and to increase the price to another side.[121] The existence of the "see-saw" effect, however, does not provide an efficiency justification for the exercise of market power by Comcast in imposing terminating access fees in February 2014—i.e., increasing the price to the edge provider side of the market, with respect to some OVDs, from zero to a positive amount. Nor does it provide a justification for the increased terminating access fees that would result from the Transaction.

150. The competitive equilibrium for wired ISPs—reflected in the pricing decisions by wired ISPs in the United States—involves charging subscribers for access to the Internet, and then

[121] The "see-saw" effect is often discussed in the context of regulation. When a regulator imposes a cap on the price on one side, and forces that price down, a profit-maximizing platform may increase the price on the other side. For example, I have shown that this occurs in the case of regulatory interventions in payment cards.

permitting those subscribers to download and upload content to the Internet, and not charging edge providers for providing content requested by those subscribers.

151. Starting around 2009, as discussed in my previous declaration, Comcast began taking steps to break this pricing equilibrium and assess terminating access fees on edge providers, including OVDs. The most plausible explanation for why Comcast was able to do that is that it had gained market power as a result of increasing the number of subscribers that it controlled (including through acquisitions) and decreasing its reliance on transit providers to connect to the Internet.[122] The same was true for other very large ISPs that followed Comcast's approach. I have seen no evidence that Comcast sought to establish a different pricing model than smaller ISPs because it was efficient for Comcast to do so, but not efficient for others to do so.

152. That does not complete the analysis, however. When a two-sided platform obtains additional market power on one side of the platform it is possible, although not necessary,[123] that it will choose to increase price to that side while decreasing the price to the other side. Ordinarily we would expect that the total price would go up as a result of increased market power, although it is possible that the price to the other side could go down somewhat. The price decrease on one side would generally not offset the price increase on the other side so the

[122] A substantial share of Comcast's growth in subscribers has come through acquisitions, including Maclean Hunter in 1994 (550,000 subscribers), E.W. Scripps in 1995 (800,000 subscribers), Jones Intercable in 1998 (1 million subscribers), Prime Communications in 1998 (430,000 subscribers), Greater Philadelphia Cablevision (79,000 subscribers), Lenfest Communications in 2000 (1.3 million subscribers), select AT&T Broadband cable systems in 2001 (585,000 subscribers), Baltimore AT&T Broadband in 2001 (112,000 subscribers), Adelphia Communications in 2005 (1.7 million subscribers), Susquehanna Communications in 2005 (225,000 subscribers), and Patriot Media in 2007 (81,000 subscribers). Comcast, "Comcast Timeline," available at http://corporate.comcast.com/news-information/timeline.

[123] E. Glenn Weyl (2010), "A Price Theory of Multi-Sided Platforms," *American Economic Review*, 100(4): 1642-1672.

total price would go up.[124] Therefore, there is a strong presumption that in an increase in price to one side as a result of a merger will result in an increase in the total price.

153. In this particular case, it is unlikely that Comcast would reduce prices materially to subscribers because it is able to engage in extensive price discrimination and faces little competition for broadband services. A higher terminating access fee increases the value of a subscriber for Comcast and therefore provides an incentive to charge a lower price to subscribers at the margin. However, Comcast could introduce new pricing tiers to attract households that were not willing to subscribe to its ISP service at current prices. It would prefer not to lower prices to existing subscribers if it can avoid it. Comcast might also have an incentive to lower the prices of fast broadband service to encourage subscribers to consume more OVD content for which it receives a terminating access fee. It would prefer to do this in a targeted way. Therefore, I would not expect a significant decrease in Comcast's prices to its subscribers as a result of the increased terminating access fee revenue, much less the complete offset claimed by Dr. Israel. The Transaction would increase the total price for connections as well as the price to OVDs.

154. I conclude from this analysis in this section that Comcast would likely increase terminating access fees significantly if the Transaction were approved, and that the increased fees would be economically significant. The Transaction substantially lessens competition for connecting edge providers and households and gives Comcast a monopoly in the national market for broadband access. The serious vertical effects I discuss next would exacerbate this

[124] There is no theoretical or empirical basis for believing that there would be an exact offset except in highly unusual circumstances that do not apply here.

competitive harm in the national broadband market and extend the competitive harm to the MVPD business.

F. Impact of Transaction on Comcast's Incentive and Ability to Harm OVD Competition

155. Comcast and Time Warner Cable earn considerable profits as a result of facing little competition for households. These two companies have a combined market cap of $186 billion.[125] That makes the combined company the 17th most valuable American company.[126] The valuation is remarkable given that Comcast and Time Warner Cable operate broadband and MVPD services in only a portion of the United States, with footprints covering only 35 percent and 21 percent of the United States population, respectively.[127] Their profits come from having cable franchises that, as we have seen, face little competition in the case of broadband and limited competition when it comes to MVPD services and no near term prospect of competitive entry in local areas.

156. The rapidly evolving OVD industry places those profits at risk for two reasons that I discuss below. Left unimpeded, OVDs will tend to displace linear programming and video on demand thereby reducing the profitability of Comcast and Time Warner Cable's MVPD businesses. In the long term, a robust OVD industry would make it easier for companies to enter broadband in local areas. Entrants today have to incur considerable expense to provide a video offering to compete with incumbents and are at a significant competitive disadvantage

[125] Calculation based on data from Bloomberg on closing prices and shares outstanding for December 18, 2014.

[126] For a list of the 50 largest American companies by market capitalization as of December 18, 2014, *see* http://www.iweblists.com/us/commerce/MarketCapitalization.html, visited December 20, 2014.

[127] National Telecommunications and Information Administration, National Broadband Map, December 2013, available at http://www.broadbandmap.gov/about-provider/comcast-corporation/nationwide/ and http://www.broadbandmap.gov/about-provider/time-warner-cable-inc/nationwide/

relative to Comcast, which pays much less for programming because of its significant bargaining power.

157. The Transaction increases the ability and incentives of the merging parties to slow and restrict OVD growth to maintain their significant market power in the provision of MVPD and broadband services.

1. The Evolution of the Nascent OVD Industry

158. Video programming is a major source of entertainment for Americans. The average adult watched almost 40 hours a week in the second quarter of 2014 according to Nielsen.[128] Until a few years ago, consumers got virtually all of that programming from their MVPD—a local cable, telco, or direct satellite-provider—or from fixed media such as DVDs. Technically, many could have streamed programming since the early 2000s. But during most of the first decade of the century broadband speeds were not fast enough for streaming movies and television shows and no business had succeeded in making what was then called "Internet TV" compelling for consumers.

159. That changed towards the end of the decade. An increase in average broadband speed and improvements in streaming technology made high quality streaming of long-form content at home possible. Around the same time, several innovative business models provided increased value to consumers. OVD entrants gave consumers almost instant access to large quantities of video and thereby eliminated the transaction costs of going to a video rental store

[128] Nielsen (2014), "Shifts in Viewing: The Cross-Platform Report September 2014," available at http://www.nielsen.com/us/en/insights/reports/2014/shifts-in-viewing-the-cross-platform-report-q2-2014.html. U.S. adults age 18 and up spent a total of 39 hours and 51 minutes per week watching video content. This total includes the reported times for traditional television, time-shifted television, DVD/Blu-Ray devices, multimedia devices, Internet video, and smartphone video. It excludes the 1 hour and 10 minutes spent per week using video game consoles, which includes both time spent watching video content, time spent playing games, and time spent consuming other media content.

or even dealing with DVDs by mail. Some OVDs offered people a new way of consuming television that many found appealing—"binge watching" multiple episodes over a short period of time rather than periodic installments, and with no advertising.

160. The new OVD industry, following the pattern of information-technology businesses over the last 40 years, disrupted existing industries and threatened the survival of the incumbents. The economic impact was first seen in the video rental industry. Streaming OVD content was a direct substitute for video rental. Companies that specialized in renting from physical locations faced serious difficulties. Blockbuster, the largest chain, filed for bankruptcy in 2010, as did Movie Gallery (the parent company of the Hollywood Video chain).[129] More than 24 thousand video rental stores closed between 2004 and 2013.[130]

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[129] "Movie Gallery Files for Bankruptcy," *New York Times* (February 4, 2010), available at http://dealbook.nytimes.com/2010/02/04/movie-gallery-files-for-bankruptcy/; "Blockbuster Files for Bankruptcy," *New York Times* (September 23, 2010), available at http://dealbook.nytimes.com/2010/09/23/blockbuster-files-for-bankruptcy/.

[130] As of December 31, 2004, Blockbuster had 5,803 stores in the United States, including both company-operated and franchised stores. Blockbuster, 10-K for Period Ending December 31, 2004, available at https://www.sec.gov/Archives/edgar/data/1085734/000119312505063510/d10k.htm. As of January 8, 2008, that number had declined somewhat to 4,855. Blockbuster, 10-K for Period Ending January 6, 2008, available at https://www.sec.gov/Archives/edgar/data/1085734/000119312508048757/d10k.htm. In November 2013, Blockbuster closed the last of its company-owned stores, leaving it with just 50 remaining franchise stores. Marc Graser, "How Fitting: 'This Is the End' the Last Movie Rented from Blockbuster," *Variety* (November 11, 2013), available at http://variety.com/2013/biz/news/this-is-the-end-blockbuster-1200820318/. As of January 2, 2005, Movie Gallery had 2,511 stores in North America, plus another 2,000 stores from its pending acquisition of Hollywood Entertainment. Movie Gallery, 10-K for Period Ending January 2, 2005, available at https://www.sec.gov/Archives/edgar/data/925178/000110465905012029/a05-1900_110k.htm. As of December 1, 2008, its total number of stores in North America had declined somewhat to 3,290. Movie Gallery, 10-K for Period Ending January 6, 2008, available at https://www.sec.gov/Archives/edgar/data/925178/000119312508255936/d10k.htm. It announced the liquidation of its remaining U.S. stores in May 2010 and its remaining Canadian stores in June 2010. Mike Spector and Peter Lattman, "Hollywood Video Closes Its Doors," *Wall Street Journal*, May 3, 2010, available at http://online.wsj.com/articles/SB10001424052748704608104575522037042952886 4; "Movie Gallery Liquidating All 181 Stores in Canada," *Bloomberg Businessweek* (June 16, 2010), available at http://www.businessweek.com/ap/financialnews/D9GCJ00O0.htm. Independent video stores in the United States declined from 24,000 in 2004 to 10,000 in 2013. Gary Moskowitz, "Comedy Nights and Party Supplies: How Local Video Stores Are Struggling to Survive," *Time* (November 15, 2013), available at http://entertainment.time.com/2013/11/15/film-camp-and-party-supplies-how-local-video-stores-are-scrambling-to-survive/.

161. The disruption for MVPDs has just begun, however, because the OVD industry has just started to offer direct substitutes for MVPDs. Current OVDs do not offer much of the video programming that households particularly desire—such as live sports, news, and other live television. According to recent estimates, consumers spend only 5-10 percent of the time they spend watching video at home watching online video.[131] Moreover, history teaches us that it will take time for the OVD industry to reach its potential. New industries take a long time before they reach maturity[132] and that has proved true for Internet-based ones. For example, 15 years after the start of the commercial Internet, e-commerce is only 6.4 percent of all retail sales.[133] And, categories such instant messaging, social networking, and portals have evolved enormously over that period.

162. Even at this early stage, however, it is clear the OVDs are as much a threat to the long-run viability of MVPDs as they were to short-run viability of the video rental industry. The FCC found in its analysis of video programming competition that OVDs are increasingly competing head-to-head with MVPDs. A small percentage of households are replacing MVPDs with OVDs (cord-cutters), other new households are using OVDs instead of MVPDs (cord-nevers), and still others are downgrading their MVPD packages (cord-shavers).[134]

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[131] Nielsen (2014), "Shifts in Viewing: The Cross-Platform Report September 2014," available at http://www.nielsen.com/us/en/insights/reports/2014/shifts-in-viewing-the-cross-platform-report-q2-2014.html. Nielsen reports the time spent per week for adults 18+ based on the device used, not the service. Some devices such DVD/Blu-Ray players and game consoles can be used for OVD content, non-OVD content, or non-video content. To get the lower bound on the share of online video in all home video, I assumed that al time spent with DVD/Blu-Ray and game consoles was spent on non-online video. To get the upper bound, I assumed that all of the time spent with these devices was spent on online-video. For both numbers, traditional and time-shifted TV was counted as non-online video, and multimedia devices, internet video, and smartphone video was counted as online video.

[132] Michael Gort and Steven Klepper (1982), "Time Paths in the Diffusion of Product Innovations," *Economic Journal*, 92(367): 630-653.

[133] U.S. Census Bureau, "Quarterly Retail E-Commerce Sales, 2nd Quarter 2014," (August 15, 2014) available at https://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf.

[134] FCC, 15th Report on Video Competition, 2013, ¶¶ 316-318.

163. Meanwhile the OVD industry is beginning to introduce more content that directly substitutes for MVPD content. Several programming providers have announced that they are considering or experimenting with providing content online through their own services or by licensing their content to others.[135] OVDs are also developing substitutes for the news and talk shows currently available only through MVPDs. Netflix, for example, has started a talk show hosted by comedian Chelsea Handler, and Yahoo News hired television anchor Katie Couric to provide news features.[136] In November 2014, CBS launched CBSN, a 24/7 streaming news network.[137]

164. As the OVD industry evolves over a time, and as there is an increasing supply of content through OVDs, it is likely that consumers will increasingly substitute consuming video content from OVDs for consuming video content on MVPDs. Some consumers will subscribe

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[135] In September 2014, DirecTV began offering NFL Sunday Ticket as a standalone streaming service, targeting customers in multi-unit residences that do not allow satellite dishes. ("NFLSUNDAYTICKET.TV for Apartment Dwellers at New, Low Prices," *NFL.com*, September 3, 2014, available at http://www.nfl.com/news/story/0ap3000000388471/article/nflsundaytickettv-for-apartment-dwellers-at-new-low-price.) That same month, ESPN suggested that it is considering offering a stand-alone streaming service, albeit one that would not carry content that duplicates their broadcasts. (Jared Newman, "ESPN Still Pondering Standalone Streaming Service, But Not the One You Want," TechHive, September 12, 2014, available at http://www.techhive.com/article/2607024/espn-still-pondering-standalone-streaming-service-but-not-the-one-you-want.html.) In mid-October, HBO announced that it would launch a stand-alone version of its HBO Go streaming service in 2015 in the United States. (Joe Flint and Shalini Ramachandran, "HBO To Launch Stand-Alone Streaming Service," *Wall Street Journal*, October 15, 2014, available at http://online.wsj.com/articles/hbo-to-launch-standalone-streaming-service-1413385733.) The next day, CBS announced a subscription streaming service for its network shows, and Univision suggested that it was working on a stand-alone streaming service. (CBS, "CBS Brings Programming Direct to Consumers with New Multi-Platform Digital Subscription Service," October 16, 2014, available at http://www.cbspressexpress.com/cbs-interactive/releases/view?id=40966; Joe Flint, Shalini Ramachandran, and Keach Hangey, "Cable Cord-Cutters Beware: Prices Could Be Higher, Not Lower," *Wall Street Journal*, October 16, 2014, available at http://online.wsj.com/articles/prices-add-up-with-a-la-carte-tv-1413501679.) In November, CBS announced a stand-alone Showtime streaming service for 2015. (Tess Stynes and Joe Flint, "CBS Promises Streaming Service as Earnings Jump," *Wall Street Journal*, November 5, 2014, available at http://online.wsj.com/articles/cbs-earnings-jump-on-gain-from-outdoor-spinoff-1415223505.)

[136] Netflix, "Chelsea Handler Teams with Netflix to Revolutionize the Talk Show," June 19, 2014, available at https://pr.netflix.com/WebClient/getNewsSummary.do?newsId=1356; Yahoo, "Yahoo Announces Deal with Katie Couric," November 25, 2013, available at https://tv.yahoo.com/news/yahoo-announces-deal-katie-couric-171545451.html.

[137] CBS News, "CBSN: About the Streaming Network," November 6, 2014, available at http://www.cbsnews.com/news/about-the-cbsn-live-streaming-video-channel/.

to a single MVPD and will have access to multiple OVDs. They will be able to substitute between cable channels and video on demand from the MVPD and the multiple OVDs. Other consumers will find that they can get by without an MVPD especially as more programming, such as sports and news, moves to OVDs. The key transformation is that households will move from a world in which they must single-home on an MVPD, which provides all of their programming, to a world in which they can multi-home on OVDs in addition to, or in lieu of, the single choice they have today.

165. All of this assumes, of course, that the OVD industry will be able to evolve unfettered by restrictions on competition imposed by incumbents threatened by the disruption to their long-time business models.

2. The Long-Term Impact of the OVD Industry on Comcast's MVPD Business

166. The long-term development of the OVD industry presents multiple financial threats to Comcast.[138] The company has noted that more and more competitors are entering the OVD market, "positioning themselves as full or partial competitors to MVPDs" with growing numbers of subscribers.[139] It recognizes OVDs as a serious competitive threat.[140]

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[138] Dr. Israel claims that a broadband customer generates a higher incremental margin. Israel Declaration II, ¶¶ 59-60. That phenomenon results, however, from the fact that broadband is a high fixed cost, but low variable cost business. In order for Comcast to remain in that business, it must incur incremental fixed costs. Comcast, as I discuss below, bundles MVPD services with broadband services and uses programming and broadband bundles as part of its price discrimination strategy. Given these circumstances, it is not possible from the information in the public record, and that I have seen so far in the confidential submissions to the FCC, to estimate accurately either the incremental profitable of MVPD and broadband or their relative contributions to overall profits.

[139] Applications and Public Interest Statement, In re Applications of Comcast Corporation and Time Warner Cable Inc. for Consent to Transfer Control of Licenses and Authorizations, FCC, MB Docket No. 14-57 (Apr. 8, 2014) ("Comcast Application"), p. 144 ("Along with new wireline MVPD entrants, like Google Fiber, a number of online businesses like Netfiix, Apple, Google, Amazon, Hulu, Sony, and a host of smaller companies, are entering the online video space and positioning themselves as full or partial competitors to MVPDs."); *id* p. 5 ("Competition has only increased since this ruling. . . . For example, Netflix now has over 33 million customers in the United States alone, with another 11 million international customers; Google's video websites now attract over 157 million unique viewers each month who watch nearly 13 billion videos; Apple iTunes viewers

167. Indeed, Comcast's MVPD profit stream, and its market value, is affected in at least six ways by the evolution of the OVD industry.

168. First, OVDs directly reduce the revenue Comcast receives from subscribers. The company loses video-on-demand (VOD) and pay-per-view (PPV) revenue as consumers decide to watch OVD programming rather than paying for a VOD movie or PPV event. {{

}}[141] It also loses advertising revenue. Many of Comcast's deals with programmers provide it with advertising slots, against which it sells advertising.[142]

169. Second, Comcast would have to pay more for programming for two reasons. Programming distributors typically receive income from selling advertising. If they have fewer viewers, they will get less revenue, and therefore demand more in other programming fees, all

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purchase over 800,000 TV episodes and over 350,000 movies per day. Apple has launched Apple TV and seems poised to launch a more comprehensive set-top box product. Likewise, Amazon currently offers a streaming video service and just announced the planned release of Amazon Fire TV, an advanced video set-top device."); *id* p. 146 ("Indeed, OVDs are increasingly an outlet for original programming that is succeeding with millions of viewers on online platforms with no MVPD carriage at all."); Declaration of Gregory L. Rosston and Michael D. Topper, April 8, 2014 ("Rosston/Topper Declaration I"), ¶ 171 ("In addition, Netflix, Apple, Google, Amazon, Hulu, Sony, and other smaller online companies are entering or have entered online video provision and are positioning themselves as competitors to MVPDs for at least some services (like VOD) or are even poised to offer full linear replacement services.").

[140] Comcast has argued that the merger would make it a stronger competitor against national OVDs. *See* Rosston/Topper Declaration I, ¶ 83 ("In addition to making Comcast a better competitor with its traditional facilities-based MVPD and broadband rivals, the increased investment in advanced video services due to the transaction will allow Comcast and cable providers generally to be stronger competitors to major national and global technology companies and OVDs like Apple, Samsung, Sony, Google, Netflix, Amazon, and others who also sell video products, technologies, and services to consumers—and who serve many more users and employ many more developers than Comcast and TWC combined."); Comcast Application, p. 27 (pro-merger economist noting that the merger would result in "a better competitor and innovator in the *competitive cage match* in which providers of connectivity, devices, apps, services and content fight for a share of the value the broadband world creates." (emphasis added).

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[142] In 2013, Comcast's advertising revenue from these deals amounted to 11 percent of its revenue from residential video, and 5 percent of its overall cable revenues. Comcast Corp., 10-K for the Period Ending December 31, 2013, p. 53.

else equal.[143] Comcast also claims that the increased demand for OVD programming reduces its bargaining leverage over programmers and thereby increases its costs.[144]

170. Third, the availability of OVD programming reduces the willingness of customers to pay for access to MVPD services, including linear programming. It therefore reduces the maximum that any given consumer is willing to pay for the MVPD service, which forces Comcast to choose between lower prices or fewer subscribers, reducing its profitability even with extensive price discrimination.

171. Fourth, the growth of OVDs reduces the number of households who will subscribe at all to Comcast's MVPD services. Comcast loses the incremental revenue and profit from these cord-cutters and cord-nevers.[145]

172. Fifth, the development of the OVD industry reduces Comcast's competitive advantage as a programming provider relative to other competing MVPDs. Currently Comcast competes with other local providers through its programming offering. As consumers have access to

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[143] In the context of a la carte pricing, the U.S. General Accounting Office has noted that since advertising accounts for about half of the revenue for cable networks, declining advertising revenues could cause cable networks to increase the fees they charge cable operators. U.S. General Accounting Office (2003), "Issues Related to Competition and Subscriber Rates in the Cable Television Industry," GAO-04-8, available at http://www.gao.gov/new.items/d048.pdf, pp. 6, 30, 34-36, 38.

[144] Rosston/Topper Declaration I, ¶ 188 ("The number of hours Americans spend watching video over the Internet has grown 70% since June 2010. Surveys of TV households show that the percentage of TV watching time that is spent on viewing of Internet streaming to computers, TV sets, and handheld devices more than quadrupled, from 3% in 2011 to 13% in 2013. Approximately 53 million households used online video viewing in 2013. As OVD providers continue to grow, especially as they begin to offer linear programming, they will give content providers even more ways to distribute their programming and remain viable, which limits Comcast's bargaining leverage in acquiring programming. Indeed, OVDs are increasingly an outlet for original programming that is succeeding – with millions of online customers even though the programming is not carried by any traditional MVPD.").

[145] Experian (2014), "Cross Device Video Analysis," available at http://www.experian.com/marketing-services/cross-device-video-analysis.html?intcmp=emsblog, pp. 6-7; Keach Hagey and Suzanne Vranica, "Nielsen to Measure Netflix Viewing," *Wall Street Journal*, November 19, 2014, available at http://www.wsj.com/news/article_email/nielsen-to-measure-netflix-viewing-1416357093-lMyQjAxMTA0MDE2OTYxNzk1Wj.

more programming over OVDs, the relative difference between Comcast and its local competitors will decline.

173. Sixth, the development of the OVD industry will increase the amount that Comcast will have to pay content owners for exclusive programming in cases where it is competing for such rights with OVDs. OVDs like Netflix are already competing with Comcast for programming, and that competition is likely to intensify.[146] A similar effect will raise the amount that Comcast will have to pay in cases where Comcast purchases carriage rights from cable networks that compete with Netflix for programming rights.

174. The evolution of the OVD industry therefore poses a highly significant financial threat to Comcast's MVPD business. Facing that threat, Comcast needs to decide how to respond. Should it invest in strategies that would reduce the seriousness of the risk to its MVPD business by slowing and reducing the growth of the OVD industry?

3. The Ability of Comcast to Recover Lost MVPD Revenues from Its ISP Platform

175. One possible answer to this question, which seems to be the one proposed by Comcast and its economists, is that Comcast should be happy, or at least indifferent, about the evolving OVD industry.[147] A key argument is that OVDs benefit Comcast's broadband customers, and that Comcast should be able to charge those broadband customers enough to generate at least as

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[146] *See* Shalini Ramachandran and Amol Sharma, "Cable Fights to Feed 'Binge' TV Viewers: Comcast, Verizon FiOS Vie with Netflix, Amazon for Rights to Show Complete Series," *Wall Street Journal*, September 20, 2013, available at http://www.wsj.com/news/articles/SB10001424127887324807704579083170996190590?mg=reno64-wsj&url=http%3A%2F%2Fonline.wsj.com%2Farticle%2FSB10001424127887324807704579083170996190590.html; Andrew Wallenstein, "The Deal That Could Dim Netflix's Emmy Afterglow: Potential Fox-Comcast Pact Portends Troubling Trend for SVOD Biz," *Variety*, September 24, 2013, available at http://variety.com/2013/digital/news/the-deal-that-could-dim-netflixs-emmy-afterglow-1200660976/ .

[147] Carlton Declaration, ¶¶ 11-12, Israel Declaration II, ¶¶ 12, 116-129. Drs. Rosston and Topper, on the other hand, argue that Comcast needs to increase its size in order to compete with the OVD industry. See Rosston/Topper Declaration II, ¶¶ 11, 33.

much profits in its broadband business as it would lose on its MVPD business.[148] That theory runs into several obstacles in the particular circumstances that present themselves in this matter.[149]

176. First, Comcast would face significant risk in assuming that it will be able to completely, or largely, offset lost MVPD profits with higher broadband profits. It is highly uncertain how the OVD industry will evolve, what types of programming it will offer, what business models it will operate, how many players and what size it will tolerate, and precisely how it all could affect Comcast. Comcast has an incentive to reduce its risk by remaining vertically integrated into the distribution of programming—that is, protecting its existing MVPD business—and preventing competition from OVDs for its MVPD subscribers. That is particularly the case if the best Comcast can do is cover its MVPD losses.

177. Second, the theory that Comcast can replace MVPD profits with broadband profits ignores the extent to which Comcast relies on its MVPD business to engage in price discrimination. Comcast offers different video packages and bundles of video packages and broadband speed to its customers. As a result, Comcast has a total of {{ }} different product offerings, including those involving VoIP, as of June 2014.[150] These offerings can target different demand levels (willingness to pay) by consumers. In addition, Comcast's customer service representatives further customize these offerings through individual

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[148] Carlton Declaration, ¶¶ 11-12, Israel Declaration II, ¶¶ 12, 116-129.

[149] Professor Carlton and Dr. Israel do not explain how, in practice, Comcast would recoup the losses on its MVPD business from its broadband business and Comcast does not offer any insights into this either.

[150] {{ }} To be conservative, this count combines a) commercial and residential versions of a product, and b) bulk and non-bulk versions of a product. If these are both counted separately, the total count of products rises to {{ }}. If bulk and non-bulk products are combined but commercial and residential products are counted separately, the count is {{ }}. If residential and commercial products are combined but bulk and non-bulk products are treated separately, the count is {{ }}.

negotiations.[151] As a result, Comcast can approach first-degree price discrimination, which involves extracting the entire surplus from each individual consumer based on his or her individual demand schedule. If the MVPD business shriveled it would not be able to make up the profits lost from a reduced ability to engage in such extensive price discrimination.

178. Third, the theory assumes that Comcast would be allowed by regulators to raise broadband prices enough to compensate for the loss in MVPD profits. It would have to raise broadband prices significantly to compensate for lost MVPD profits based on current figures. Given the lack of local competition for broadband service and the history of cable and communications regulation in this country, it is likely in my view that regulators would object to such increases, or that the price increase would result in legislation to impose regulation, or that local regulators would lower regulatory barriers to entry into local broadband markets or establish municipal broadband providers.[152]

179. Fourth, Comcast does not believe the theory endorsed by its economists and therefore is unlikely to act as if it does. Internal documents show, understandably, that Comcast is extremely concerned about the long-run impact of the OVD industry on its profitability. The Commission noted in the Comcast/NBCU Order that:

> [Comcast's] internal documents and public statements demonstrate that they consider OVDs to be at least a potential competitive threat. The record here is replete with e-mails from Comcast executives and internal Comcast documents showing that Comcast believes that OVDs pose a potential threat to its

[151] Timothy B. Lee, "Comcast's Pricing Shell Game," *Forbes*, June 6, 2012, available at http://www.forbes.com/sites/timothylee/2012/06/06/comcasts-pricing-shell-game/.

[152] Some municipalities have shown concern about the high prices of broadband, and have already started to take steps to encourage entry. *See* Brian Heaton, "Cities to FCC: Remove Barriers to Broadband Competition," *Governing: The States and Localities*, July 25, 2014, available at http://www.governing.com/news/headlines/cities-to-fcc-remove-barriers-to-broadband-competition.html.

businesses, that Comcast is concerned about this potential threat, and that Comcast makes investments in reaction to it.[153]

180. {{

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That is inconsistent with the prediction from the theory put forward by Comcast's economists.

181. Comcast's own behavior is not consistent with the sanguine—and counter-intuitive—view of Dr. Israel and Professor Carlton that Comcast prefers to embrace rather than extinguish OVDs, even though OVDs threaten its basic business model.

4. Comcast's Strategies for Stemming Long-Term Losses from OVDs

182. Comcast can invest in a number of strategies that could harm OVDs. These strategies could be used to pursue any or all of the following three goals:

a. Slow and restrict the overall growth of the OVD industry. The longer Comcast can protect its MVPD profits, and develop its own OVD substitute, the better for it.

b. Disadvantage OVDs that are particular threats because of their size or degree of substitutability with Comcast's programming and thereby restrict the OVD industry.

c. Make it difficult for OVDs to provide content to Comcast's subscribers, in particular OVDs that provide content that is more substitutable with Comcast's content. Even if OVDs succeed outside its walls, Comcast has an incentive to keep them out.

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[153] Memorandum Opinion and Order, *In the matter of Application of Comcast Corporation, General Electric Company, and NBC Universal, Inc. For Consent to Assign Licenses and Transfer Control of Licensees*, MB Docket No. 10-56, January 20, 2011 ("Comcast-NBCU Order"), ¶ 85.

[154] {{

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183. Pursuit of these goals would not require that Comcast effectively destroy any particular OVD, or the third-party OVD industry, to make this a profitable strategy for Comcast. They just require that the benefits that Comcast gets from slowing or reducing the growth of the OVD industry are large enough to offset any costs.

184. Comcast has at least six different tactics at its disposal to execute one or more of the three strategies above:

1. Increase terminating access fees above the normal profit maximizing level[155] as a part of a raising-rivals cost strategy to slow the growth of OVDs.

2. Reduce the quality and consistency of the signal between the OVD and the household, thereby reducing the substitutability with its own content and reducing OVD demand.

3. Refuse to provide necessary upgrades to support innovations in the delivery of OVD content to its subscribers.

4. Impose data caps that result in higher costs for the delivery of OVD, or particular OVD, programming than Comcast's MVPD or own OVD programming. These discriminatory data caps could be applied to either side of the platform or both sides: consumers and OVDs.

5. Pay a premium for certain important programming to prevent OVDs from acquiring that programming, pay for the rights to programming to deny that programming to particular OVDs, or pay for most-favored-nation clauses to deny exclusives to OVDs.

6. Use its set-top box to increase the difficulty and lower the quality of consuming content from OVDs relative to its own MVPD or OVD services, including refusing to allow OVDs to appear as an application of the set-box box and be as convenient for the television user as a channel, or impose contract restrictions on third-party set-top boxes that restrict subscriber access to some OVDs.

185. Comcast has demonstrated its ability to employ these tactics. The degradation episode discussed earlier shows that Comcast can choke off OVD access to subscribers and that it perceives the cost to itself of choking off access as minimal. Comcast has also imposed data caps. Comcast's own MVPD services and its Xbox 360 Xfinity On-Demand application are

[155] That is, above the profit-maximizing level that it would charge in the absence of considering the benefits of foreclosing MVPD competition.

unaffected by its data caps, which has the effect of allowing its consumers to use OVDs to supplement its MVPD services, but not to replace them entirely.[156] Comcast is aggressively competing against OVDs for exclusive rights to new programming.[157] {{

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186. The cost of implementing tactics that impair the ability of OVDs to reach Comcast's customers is very low, as I showed earlier. Comcast subscribers have nowhere to turn and OVDs that supply long-form video have no feasible alternatives for reaching Comcast subscribers.

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[156] Comcast, "FAQs: Xbox 360," available at http://xbox.comcast.net/faqs.html; Jacob Minne (2013), "Data Caps: How ISPs Are Stunting the Growth of Online Video Distributors and What Regulators Can Do About It," *Federal Communications Law Journal*, 65(2): 233-260; "Kneecapping the Future: Comcast's Unjustified Internet Caps and the Plan to Kill Video Competition," *Freepress*, available at https://www.freepress.net/sites/default/files/resources/Comcast%20New%20Caps%20Factsheet_FINAL.pdf; Serdar Yegulalp, "Welcome to the Internet's New Toll Lane," *InfoWorld Tech Watch*, January 15, 2014, available at http://www.infoworld.com/article/2609716/net-neutrality/welcome-to-the-internet-s-new-toll-lane.html. Note that Comcast's MVPD service is not IP-based. Also, note that Comcast's data caps are currently mostly being imposed on a trial basis in a large but limited portion of it footprint (Huntsville and Mobile, Alabama; Atlanta, Augusta and Savannah, Georgia; Central Kentucky; Maine; Jackson, Mississippi; Knoxville, Nashville and Memphis, Tennessee; Charleston, South Carolina; Tucson, Arizona). Comcast, "Questions & Answers About Our Data Usage Plan Trials," December 5, 2014, available at http://customer.comcast.com/help-and-support/internet/data-usage-trials/. Note that Comcast has stated that it expects to impose data caps throughout all of its footprint within the next five years. Thomson Reuters StreetEvents, "CMCSA – Comcast Corporation at MoffetNathanson Media & Communications Summit," Interview with David Cohen (Comcast EVP), May 14, 2014, available at http://files.shareholder.com/downloads/CMCSA/3168999141x0x754850/059910f6-e9e0-4ec8-b2c2-05cabdfcc644/Comcast%20at%20MoffettNathanson%20Transcript.pdf, p. 13 ("...I would predict that in 5 years Comcast at least would have a usage-based billing model rolled out across its footprint.")

[157] Shalini Ramachandran and Amol Sharma, "Cable Fights to Feed 'Binge' TV Viewers: Comcast, Verizon FiOS Vie with Netflix, Amazon for Rights to Show Complete Series," *Wall Street Journal*, September 20, 2013, available at http://www.wsj.com/news/articles/SB10001424127887324807704579083170996190590?mg=reno64-wsj&url=http%3A%2F%2Fonline.wsj.com%2Farticle%2FSB10001424127887324807704579083170996190590.html; Andrew Wallenstein, "The Deal That Could Dim Netflix's Emmy Afterglow: Potential Fox-Comcast Pact Portends Troubling Trend for SVOD Biz," *Variety*, September 24, 2013, available at http://variety.com/2013/digital/news/the-deal-that-could-dim-netflixs-emmy-afterglow-1200660976/.

187. The success of the strategies depends on the fact that Comcast has a terminating access monopoly that covers 21.1 million American subscribers, which constitutes about {{ }} of American wired broadband households. I am not suggesting that Comcast would prevent the survival and emergence of any particular OVD. However, it has a large enough number of subscribers to reduce the number of viewers of OVDs and, through the vicious circle of reduced operating capital and reduced ability to purchase programming, significantly decrease the quality of programming OVDs provide their remaining viewers. Comcast also could affect the likelihood of survival for some OVDs. Most new entrants in any industry fail to achieve critical mass. Comcast's tactics could prevent some new OVDs from entering the market or surviving. Comcast benefits from slowing and reducing the rate of growth of OVDs. It has incentives to do that up to the point where marginal benefits of further investments equal marginal costs.

5. Impact of the Transaction on Comcast's Incentives and Ability to Harm OVDs

188. The Transaction results in a significant increase in the ability of Comcast to pursue strategies and employ tactics that would substantially lessen competition and tend to create a monopoly, thereby harming competition and the public. The merged firm would control 40 percent more subscribers than it does today.[158] Each of the tactics described above would impose proportionately more harm on OVDs as a result of the Transaction. There is a bigger club behind every tactic. Table 4 explains why.

[158] Comcast June 27 Letter, p. 2.

Table 4: Impact of Transaction on Effectiveness of Tactics to Harm OVDs

Tactic	Effect of Transaction
Increasing terminating access fee	Raises cost of access to larger portion of OVD customers
Reducing quality and consistency of signal	Forecloses access to larger proportion of OVD customers
Refusing to provide upgrades to support innovation	Reduces value of demand-increasing quality improvement to larger proportion of OVD customers
Imposing data caps	Forecloses access to larger proportion of OVD customers
Paying premium to withhold exclusive content to slow OVDs	Increases bargaining power that helps deny exclusive to OVDS
Using set-top box and other software and hardware assets	Forecloses access to larger proportion of OVD customers

189. The Transaction also results in a significant increase in the incentive to engage in these tactics. The benefit of pursuing each tactic increases as a result of the Transaction. First, each tactic causes proportionately more harm to OVDs and therefore increases the likelihood that the tactic will slow or reduce the growth of OVDs. Second, the benefits of pursuing these strategies accrue to a larger base of subscribers. Third, Comcast internalizes the benefits of its strategy that would flow to Time Warner Cable in the absence of the Transaction.[159]

190. In short, the merged firm imposes more harm, realizes the benefits of imposing that harm across more subscribers, and internalizes more of the benefits.

191. The cost of pursuing each tactic decreases for two reasons. First, as a result of the Transaction, Comcast is able to average the fixed costs of the tactics across a larger subscriber base, thereby increasing its return. Second, as a result of the Transaction, the costs of engaging

[159] By contrast, smaller cable companies, including possibly Time Warner Cable, would not have the ability to affect the OVD industry and would not benefit from engaging in the tactics described above. Smaller cable companies may therefore find it in their individual profit interests to embrace the OVD industry even though each might be better off if the OVD industry did not thrive.

in some of these tactics drops dramatically for Time Warner Cable since the combined company, using Comcast's transit relationships, will incur minimal costs from pursuing strategies that congest some access points to the network.

192. This analysis shows that Comcast has the ability and incentive to retard the development of the OVD industry and that the Transaction would increase the ability and incentive to do so. OVDs would lose and, in the end, people who want to watch programs.

6. The Role of OVDs in Broadband Competition

193. Comcast has a further incentive to employ these and perhaps other tactics to harm OVDs. As I have shown above, Comcast and Time Warner Cable face little significant competition in the provision of broadband. That is unlikely to change in the near term. Longer term, however, a robust OVD industry could reduce the barriers to entry into the provision of wired broadband for the reasons I discussed in my previous declaration.[160]

194. Wired broadband entrants face many obstacles. One of them involves having to provide programming bundles. Consumers currently want a bundle of broadband and video programming.[161] New entrants face a significant disadvantage. Broadband entrants operate at

[160] Evans Declaration I, ¶ 179.

[161] An FCC working paper found that 39 percent of consumers who switched ISPs cited "Getting a bundle of Internet, TV and phone services from a single company" as the "major reason" for having switched. *See* FCC (2010), "What Drives Consumers to Switch - Or Stick With - Their Broadband Internet Provider," Working Paper, p. 3. A Bernstein Research survey of households in the Google Fiber areas reveals that most people considering Google Fiber are interested in a bundle of pay-TV and broadband. See Bernstein Research, "Google Fiber: What Do Kansas City Residents Say About It?", May 6, 2013, p. 2. Bernstein found that Google's double-play offer was the option most competitive with TWC's corresponding packages. Bernstein also purports that the purpose of the bundled pricing is to reduce churn.

Potential broadband entrants must offer MVPD in addition to broadband to be competitive (The FCC has long recognized that a broadband provider must offer video programming to successfully enter the market. For a recent example, see First Report and Order, Review of the Commission's Program Access Rules and Examination of Programming Tying Arrangements, 25 FCC Rcd. 746, ¶36 (2010) (concluding that "a wireline firm's decision to deploy broadband is linked to its ability to offer video.") (Program Access Order). Municipal fiber providers have also asserted that access to video programming is essential to the success of an ISP. (LUS, Complaint for Violations of Section 628 of the Communications Act and 47 C.F.R. § 76.1001 et seq., p. 3, File

a significant cost advantage compared with much larger rivals in the same markets like Comcast, which can negotiate much lower programming costs.[162] Google, for example, with its size and resources, pointed to the difficulty of assembling a compelling programming bundle as one of the major obstacles in providing fast broadband.[163]

195. A robust OVD industry reduces the cost of broadband entry and enables new broadband providers to enter one market (broadband) rather than two (broadband and video). Potential broadband entrants—from large Internet players such as Google to municipalities that want to start their own systems—could focus on the provision of broadband only. Subscribers would then turn to OVDs to obtain programming in the same way that consumers select their own Internet services and mobile apps today.

196. This OVD competition poses enormous financial risk to Comcast, even if it does not flourish for another decade. Comcast must make substantial long-term investments in broadband. Competition poses a significant risk to these sunk-cost investments. More importantly, Comcast's market value is ultimately based on two related terminating access monopolies: its cable-based MVPD business, which is under direct threat from OVD

No. CSR-8357-P (filed June 8, 2010) (small municipal fiber provider stating that access to video programming is essential to its ability to successfully offer its fiber service).)

[162] Declaration of Gary Biglaiser, August 26, 2014, Exhibit A, p. 28 ("Unfortunately, in the programming market it is well-known that larger MVPDs get much better programming rates than smaller ones. It flies in the face of reality to think that by enlarging, Comcast will gain no additional market power as a purchaser in the programming market."). Frontier Communications, Petition to Deny, August 25, 2014 ("Frontier Petition to Deny"), p. 4 ("[T]he cost of content for video programming remains staggering for new entrants that lack the scale and scope of cable companies like Comcast and Time Warner Cable individually, let alone that of the merged entity."); NTCA-The Rural Broadband Association, Petition to Deny, August 25, 2014 ("NTCA Petition to Deny"), p. 3 (citing NTCA 2013 Broadband/Internet Availability Survey Report (May 2014) http://www.ntca.org/images/stories/Documents/Advocacy/SurveyReports/2013ntcabroadbandsurveyreport.pdf) ("Ninety-nine percent of respondents to a recent NTCA survey stated that access to reasonably priced programming was a barrier to the provision of video programming"); Frontier Petition to Deny, p. 5 ("The underlying programming costs remain one of the largest barriers to entry for new entrants").

[163] Brian Fung, Here's the Single Biggest Thing Holding Google Fiber Back, *Washington Post*, Oct. 6, 2014, http://www.washingtonpost.com/blogs/the-switch/wp/2014/10/06/video-is-holding-google-fiber-back/.

competition as discussed above; and its ISP business, which could be a further casualty of a robust OVD industry that facilitates entry into the provision of broadband in local areas.

197. In conclusion, Comcast would have a significant incentive to invest in slowing or thwarting OVDs even if there was a small chance that the development of a robust OVD industry would put both its MVPD and its ISP business at risk. The cost of engaging in these strategies is small, as discussed above. The benefits, while distant, are potentially huge. Comcast has the ability and incentive to reduce that risk. The Transaction would increase that ability and enhance that incentive.

III. Detailed Response to Dr. Israel

198. This section provides a detailed response to Dr. Israel's claims in his second declaration on five main issues that I have not addressed in detail in the preceding section.[164] I have found that Dr. Israel's claims are not supported by the economic evidence and arguments he presents:

a. *Dr. Israel disputes the evidence that Professor Farrell and I have provided showing that larger ISPs are able to demand higher access fees Dr. Israel argues that the number of interconnection locations is a measure of quality that needs to be taken into account in a comparison of ISP size and access fees. Dr. Israel claims that after including the number of interconnection locations in Professor Farrell's regression analysis, Professor Farrell's finding that {{ }} disappears.*

   Dr. Israel's purported measure of ISP quality is largely a measure of ISP size. Larger ISPs generally tend to have more interconnection locations because they cover a larger geographic footprint. By adding the number of interconnection locations into Professor Farrell's regression analysis, Dr. Israel is in fact adding in a highly correlated measure of size. By doing so, he is creating a classic multicollinearity problem in which {{ }}. His criticism of my empirical evidence on the relationship between Netflix's terminating access prices and the size of the ISPs is wrong for the same reason.

[164] With respect to these issues, Professor Carlton does not make any claims in addition to those made by Dr. Israel, so I restrict my attention to Dr. Israel's claims in this section.

b. *Dr. Israel claims that Comcast's service was significantly harmed due to the degradation episode in an attempt to show that purposeful degradation of peering points is not in its economic interest.*

Dr. Israel, however, provides no evidence on the impact to Comcast and no details from the transcripts of customer service calls to determine whether Comcast, for example, benefited by using these calls as opportunities to sell more expensive broadband packages.[165] By contrast, Netflix has provided transcripts of support calls that show explicitly the distress that Comcast caused Netflix customers that rely on Comcast to watch Netflix.

c. *Dr. Israel cites Comcast's churn rate to argue that consumers switch broadband providers frequently. Dr. Israel calculates Comcast's annual churn rate as {{ }}, exclusive of customers who disconnected because they moved.*

Dr. Israel's calculations include a number of methodological errors. Most critically, he includes involuntary disconnections (such as disconnections for non-payment) in his estimate. Such involuntary churn is not relevant to an assessment of the willingness and ability of customers to switch ISPs.

d. *Dr. Israel cites results from a survey of broadband subscribers prepared for Comcast in connection with this proceeding as support for a number of his claims. For example, he relies on the survey as support for his claim that the vast majority of an ISP's customers would switch away from the ISP if it degraded Internet service significantly.*

There are many serious flaws in the survey design and methodology that render its results unreliable. For example, [[ ]] respondents that stated they had a smartphone with a mobile wireless data plan also stated that they do not have a mobile wireless data plan (such as for use with a smartphone) when asked a separate question. Even leaving aside the flaws in the survey, its results purporting to show that almost all consumers say they would switch in the face of degradation of Internet service by their ISPs are contradicted by empirical evidence on what consumers actually do.

e. *Dr. Israel claims that DSL has grown much more quickly than cable in recent years as support for his claim that DSL is a strong competitor to cable. He reports that the number of DSL subscribers grew at a 26.9 percent annual rate from 2009 to 2013, while the number of cable subscribers grew at a 17.9 percent rate over the same period.*

This finding is based on a sleight of hand. Dr. Israel's claimed DSL growth statistics result from his use of a 3 Mbps threshold. During this time, many DSL subscribers upgraded to speeds in excess of 3 Mbps (although 3 Mbps is still

[165] Israel Declaration II, ¶ 56.

> generally much slower than the speeds for cable subscribers). The claimed growth comes purely from the modest upgrades in DSL speeds. Taking all subscribers regardless of speed, there was an increase of over 11 million cable subscribers from 2009 to 2013, as compared with essentially no change in the number of DSL subscribers.

199. Sections A-E below provide details on Dr. Israel's claims concerning these issues and my discussion of the flaws in his claims.

A. Impact of Transaction on Terminating Access Fees

200. Dr. Israel offers three arguments regarding the impact of the Transaction on access fees. First, he argues that the empirical evidence that Professor Farrell and I have presented documenting that larger ISPs obtain better terms for interconnection is unreliable. Second, he argues that we should focus on Netflix's costs of sending traffic rather than on the access fees themselves. Third, he argues that the Commission's decision in Comcast-NBC Universal provides support for the assumption of a constant split between buyer and seller that is invariant to buyer or seller size in the bargaining model relied on by Dr. Israel. As I discuss in the following subsections, each of these arguments is wrong.

1. Empirical Evidence

201. In my initial declaration and the initial declaration filed by Professor Joseph Farrell, we presented different empirical evidence establishing that larger networks commanded better terms for interconnection fees. Dr. Israel argues that Professor Farrell and I have failed to account for relevant quality differences among networks that, according to Dr. Israel, would account for the better terms received by larger networks.

202. With respect to Dr. Farrell's empirical analysis, Dr. Israel argues that "[c]omparisons between larger ISPs that do offer backbone services—and thus for whom the relevant decision may be between settlement-free interconnection vs. charging for interconnection services—and

smaller ISPs, who generally have to *pay* for transit and at best might hope to get settlement-free terms, are effectively meaningless due to this fundamental difference."[166]

203. Dr. Israel is pointing to the fact that smaller ISPs are in a worse bargaining position because they are more dependent on transit providers. The fact that a larger ISP is less dependent on transit does not mean that it provides higher quality to a CDN or to Netflix in terms of connecting to the ISP's customers. Indeed, one of the reasons why the Transaction will increase access fees is that Time Warner Cable is more dependent on transit providers than Comcast is, so that the merged entity will have greater bargaining power with respect to the Time Warner Cable customers because it will be less dependent on transit than Time Warner Cable currently is today.

204. Dr. Israel also argues that "[g]reater ISP connectivity to the Internet reduces the costs of direct interconnection with the ISP because of the presence of more interconnection options for edge providers and because of the reduced distance between servers."[167] (By "greater connectivity" he is referring to an ISP having more places where transit providers and CDNs can connect.) Larger ISPs often cover greater geographic areas and therefore, not surprisingly, have more interconnection points across all of those areas so as to receive traffic closer to their subscribers. For example, a hypothetical ISP that has customers in Boston and customers in Chicago would likely use interconnection points in both regions. If instead the Boston and Chicago operations were hypothetically owned by two distinct ISPs of the same size in each region as the combined ISP, the Boston ISP would probably not have an interconnection point in Chicago.

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[166] Israel Declaration II, ¶ 153 (emphasis in original, internal citation omitted).

[167] Israel Declaration II, ¶ 154

205. The greater number of connection points of the combined ISP is a function of its geographic scope, which is correlated with size, not of any significantly greater efficiency that the combined ISP provides. Indeed, Mr. Florance has stated that from Netflix's perspective, interconnection consists of straightforward hardware arrangements and that the only "quality" that Netflix considers is whether the ISP can provide sufficient bandwidth to fulfill the needs of Netflix subscribers using that ISP.[168]

206. Dr. Israel's claim that the greater number of interconnection points of larger ISPs is primarily a measure of the higher quality of the access they provide is therefore wrong. Rather, the greater number of interconnection points of larger ISPs is primarily a reflection of ISP size—e.g., the number of geographic footprints it is in. By adding the number of interconnection points into Professor Farrell's regression analysis, Dr. Israel is in fact adding in a highly correlated measure of size. By doing so, he is creating a classic multicollinearity problem in which {{

}}.[169]

207. Dr. Israel offers a similar criticism of the evidence I presented in my initial declaration that {{

}} Dr. Israel argues that my finding is not reliable because I failed to control for the quality of the ISP. As I have explained above, Dr. Israel's purported

[168] Florance Declaration II, ¶¶ 17, 21.

[169] {{

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quality measures are in fact measures of ISP size, not quality. Notably, Dr. Israel, who has access to the agreements signed by Comcast and Time Warner Cable, does not dispute that {{

}}

208. As I discussed above, the number of interconnection locations that an ISP has—which Dr. Israel claims as a quality measure—is not a measure of the quality of the interconnection. Rather, it is correlated with the size of the ISP. If the number of interconnection locations were important, I would expect it to be a significant factor in determining the price of interconnection. {{

}}.[170]

209. Dr. Israel also states that "[he] also understand[s] that other differences across ISPs generate differences in the quality of their interconnection services. Such differences include greater server capacity and more efficient server utilization, which also reduce the costs of interconnection and thus create additional surplus." Dr. Israel appears to be confusing interconnection and CDN services. As Mr. Florance explains, interconnection services only consist of the provision of network ports and cross-connect cable.[171] Netflix does not purchase CDN services from Comcast, only interconnection that provides transport between Comcast's doorstep and the household that has requested Netflix content as part of their contract with Comcast.

[170] Florance Declaration II, ¶ 17.

[171] Florance Declaration II, ¶ 11.

2. Dr. Israel's Flawed Claims Regarding Comparisons to Comcast's Access Fee

210. Dr. Israel criticizes the comparison I presented in my initial declaration showing that larger ISPs have more bargaining power than smaller ISPs with respect to Netflix. As I have discussed, the empirical evidence is clear that {{

}} and that {{

}}

211. Dr. Israel argues that my analysis "does not establish that {{

}}; only that it pays more *to the ISP itself*, with which it connects directly.... The fact that Netflix pays the ISP, rather than some other interconnection provider, does not establish that Netflix pays more in total."[172]

212. As I discussed above, for each of the more than {{ }} ISPs that Netflix interconnects with directly, other than the four largest, Netflix does not pay a terminating access fee. (The more than {{ }} other ISPs that Netflix connects to using a transit provider do not charge for access either.[173]) Netflix does not use a third-party provider (a transit provider or a CDN) to connect to these more than {{ }} ISPs or to Comcast. In sharp contrast Comcast charges a positive access fee of about {{ }} per Mbps, while the other ISPs charge nothing for subscriber access. The only ISPs that Netflix connects to directly that it pays are Comcast, Time Warner Cable, AT&T and Verizon.

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[172] Israel Declaration II, ¶ 166 (emphasis in original).

[173] In these cases, Netflix uses a transit provider, which takes the traffic from the IXP at which Netflix connects to the transit provider to another location at which the transit provider has agreed to interconnect with the ISP. These are typically smaller ISPs that do not have a presence at IXPs so that they cannot connect with Netflix at an IXP. Such an ISP takes traffic at the point at which it connects to the Internet (through its transit provider, which it pays) and does not charge either the transit provider or Netflix for interconnection. The service provided by the transit provider to Netflix to connect to these ISPs is not needed in cases where the ISP is present at an IXP.

213. Dr. Israel also argues that "[a]bsent data to compare the prices Netflix pays to the large ISPs with which it interconnects directly, relative to the prices it pays to transit providers and to the costs it incurs to operate its CDN, Dr. Evans' comparisons say nothing about [1] whether large ISPs capture higher prices than other transit providers, [2] which of these methods is most costly to Netflix, or [3] whether these highly technical distinctions between interconnection methods have any material negative effect on Netflix."[174]

214. Let me take each of Dr. Israel's three points in turn. First, he suggests that the question of "whether large [terminating] ISPs capture higher prices than other transit providers" is relevant. Dr. Israel's suggestion that a large terminating ISP's provision of terminating access is a type of transit is wrong. The typical service provided by a transit provider to Netflix, or any edge provider or CDN, is to transport traffic between different ISPs and/or exchange points—many of which are physically distant from each other. By contrast, the interconnection services provided by large terminating ISPs are merely for access to the ISP's internal network and for providing uncongested paths from the edge of that internal network to the subscribers that have requested content.

215. Netflix's agreement with Comcast covers only the provision of port capacity to interconnect with Comcast's network to provide an uncongested path from the edge of Comcast's network, over the last-mile, to the Comcast subscriber that requested the Netflix content. Netflix's agreement does not provide for transit service, CDN service, or any other service involved in getting content to the edge of Comcast's network.

216. Under the agreement, Netflix must pay, as it did before the agreement, for all of the costs that were previously incurred by a third-party CDN, including:

[174] Israel Declaration II, ¶ 169 (numbered points, [1], [2], [3] added for ease of discussion).

- Transit costs for transporting data across the country to reach interconnection points with Comcast;
- Engineers to develop and maintain Netflix's CDN;
- Hardware; and,
- Fees related to maintaining a presence at an IXP including fees for space, power, and air conditioning.

217. The second question Dr. Israel raises—i.e., "which of these methods is most costly to Netflix"—is also irrelevant. In a merger where firms are supplying an intermediate good that is an input to a final good, as a matter of antitrust practice and sound economics, the focus is on the impact of the merger on the price of that intermediate good.[175] Attempting to discern if the price of the final good has been elevated is unnecessary if, as here, we can directly observe the price being charged for the intermediate good. The relevant issue here is whether the proposed merger will allow Comcast to increase access fees significantly. As I have discussed, the greater bargaining power of larger ISPs in commanding higher access fees, as compared with smaller ISPs that charge nothing for access, indicates this is likely.

218. Given that we can directly observe the price of interest—namely the access fee—it makes no economic sense to compare the total costs of different interconnection methods, which can be complicated given differences in costs across time or across interconnection methods or ISPs for reasons that have nothing to do with the access fee. If we care about the price of an input and can observe it directly, it makes no economic sense to instead attempt to infer differences in the input prices by analyzing output prices, which differ for reasons unrelated to differences in input prices.

[175] United States Department of Justice and Federal Trade Commission (2010), "Horizontal Merger Guidelines," § 6.2 (noting mergers of firms that sell intermediate goods through bilateral bargaining should be analyzed using similar approaches to those used to analyze other differentiated products industries).

219. Nevertheless, for completeness, I now describe how Comcast's terminating access fees increase Netflix's total costs of delivering streaming video to Comcast's customers in comparison to other benchmarks. The relevant benchmarks are situations in which a terminating access fee is not being charged. The following are the ways in which Netflix currently delivers content to subscribers, which do not include access fees except in the case of the four largest ISPs, and the associated costs:

- ISPs with embedded Netflix servers. More than {{ }} ISPs interconnect with Netflix using Open Connect appliances that are "embedded" within the ISP's network. None of these ISPs charge a terminating access fee. In this case, Netflix's costs of serving traffic to a large ISP using this approach are about {{ }} per Mbps.[176] This represents the costs Netflix needs to incur in order to deliver traffic to an ISP within the ISP's network using Open Connect appliances.

- ISPs that connect with Netflix at IXP. More than {{ }} ISPs interconnect with Netflix at an IXP or other public interconnection point. With the exception of the four largest ISPs, none of them charge a terminating access fee. Netflix's costs of serving traffic using this approach to an ISP that is not charging a terminating access fee are about {{ }} per Mbps.[177] This represents the costs Netflix needs to incur in order to deliver traffic to an ISP at an IXP. Netflix's costs of serving traffic to Comcast using this approach is about {{ }} per Mbps. This consists of the same {{ }} per Mbps costs incurred by Netflix to exchange traffic at an IXP as with other ISPs but, in

[176] All the $ per Mbps estimates discussed in this section are based on the 95th percentile traffic methodology that is common in the industry. The {{ }} Mbps estimate consists of an estimated {{ }} per Mbps of hardware costs, {{ }} per Mbps of CDN headcount costs, and {{ }} per Mbps of estimated allocation of general and administrative expenses. The hardware costs are estimated based on the costs of serving traffic to {{ }}, which uses embedded Open Connect appliances The cost per Mbps of cache servers generally decreases as ISP size increases. Netflix's costs for larger ISPs would likely be at or below the cost for {{ }}; Netflix's costs for smaller ISPs would be significantly higher. I report the estimate for {{ }} as that is more comparable to the costs of connecting to Comcast using embedded Open Connect appliances. Because Netflix does not provide CDN services to third parties, it does not incur certain costs that some third-party CDNs would incur, such as sales and marketing expenses. Third-party CDNs would need to cover such costs in their fees and would need in the long run to cover the cost of capital invested. A full comparison between a self-supplied CDN and a third-party CDN would need to account for these types of differences.

[177] This estimate consists of {{ }} per Mbps of IXP costs, {{ }} per Mbps of CDN headcount costs, and {{ }} per Mbps of estimated allocation of general and administrative expenses. Because Netflix does not provide CDN services to third parties, it does not incur certain costs that some third-party CDNs would incur, such as sales and marketing expenses. Third-party CDNs would need to cover such costs in their fees and would need in the long run to cover the cost of capital invested. A full comparison between a self-supplied CDN and a third-party CDN would need to account for these types of differences.

addition, Netflix must pay a {{ }} per Mbps terminating access fee imposed by Comcast.[178]

- ISPs that connect with Netflix using a transit provider. More than {{ }} ISPs interconnect with Netflix using a transit provider.[179] Netflix connects to the transit provider at an IXP and the transit provider takes the traffic to another interconnection point closer to the ISP. The ISPs served using this approach are typically smaller ISPs that do not have a presence at an IXP. Netflix's costs of serving traffic to a small ISP using this approach are about {{ }} per Mbps. This consists of {{ }} per Mbps in costs incurred by Netflix to exchange traffic at an IXP with the transit provider plus an approximate {{ }} per Mbps in fees paid to the transit provider.

220. Another benchmark is the cost to Netflix of using CDNs in the absence of Comcast charging CDNs access fees that increase the CDNs' costs of doing business. It does not make sense to use the cost of using CDNs and/or transit providers at a point in time when those costs are affected by Comcast's attempts to charge terminating access fees and/or degrade its connections, as those costs would be artificially inflated. The most direct CDN benchmark would be Netflix's costs of using {{ }} as a CDN from its contract entered into November 1, 2010, with terms covering the first quarter of 2011 through the fourth quarter of 2013. Shortly after the contract was signed, Comcast attempted to charge {{ }} a terminating access fee for the first time and was successful.[180] A conservative estimate based on that agreement is that CDN costs would be approximately {{ }} per Mbps based on be

[178] The Comcast access fee is calculated based on the methodology discuss above. See, *supra*, n. 113.

[179] For these ISPs, Netflix uses a transit provider, which takes the traffic from the IXP at which Netflix connects to the transit provider to another location at which the transit provider has agreed to interconnect with the ISP. These are typically smaller ISPs that do not have a presence at IXPs so that they cannot connect with Netflix at an IXP. Such an ISP takes traffic at the point at which it connects to the Internet (through its transit provider, which it pays) and does not charge either the transit provider or Netflix for interconnection. The service provided by the transit provider to Netflix to connect to these ISPs is not needed in cases where the ISP is present at an IXP.

[180] Letter from John M. Ryan, Assistant Chief Legal Officer, Level 3 Communications, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket. No. 09-191, Nov. 30, 2010, p. 2. To the extent that any potential concern about Comcast seeking an access fee was a consideration in negotiating a contract, then the comparison is conservative as the rates would have been lower absent such a concern.

the CDN fees charged by {{ }} before {{ }} was forced to pay a terminating access fee to Comcast.[181]

221. Table 5 summarizes these benchmarks and compares them to the costs of serving subscribers at Comcast under the Netflix agreement with Comcast. Under Netflix's agreement with Comcast, Netflix's costs are between: {{ }} per Mbps more than with many other large- and medium-sized ISPs. It is also at least {{ }} per Mbps more than my estimate of what Netflix would pay a third-party CDN such as {{ }} to provide the same services—absent Comcast's intervention in charging {{ }} a terminating access fee.

222. These results reflect that reality that Comcast is charging an ***additional*** fee solely for the purpose of providing an uncongested path for Comcast to transport Netflix content that its subscribers have requested from the edge of the network, where Netflix has delivered that content, to the household who requested it. That additional fee raises Netflix's cost of delivering traffic significantly. As I noted above, the most relevant comparison is between the access fees charged by the different ISPs, in which case it is clear that Comcast is charging a {{ }} per Mbps while all ISPs other than the other three largest ISPs charge zero.

[181] This estimate is based on the agreement Netflix with {{ }} in November 2010. The estimate uses the stated {{ }} per Mbps traffic rate for 4Q 2013 as the current rate, without adjusting for further decreases in rates to the present. This estimate includes estimated storage costs of {{ }} per Mbps based on a {{ }} ratio for Netflix of CDN storage fees to CDN traffic fees in 2013 (last year of significant CDN use at Netflix). This is a conservative lower-bound estimates in that it assumes no further decrease in traffic or storage rates after 4Q 2013 even though the stated rates in the agreement declined by more than 50 percent from the first quarter of 2011 to the fourth quarter of 2013. Because Netflix does not provide CDN services to third parties, it does not incur certain costs that some third-party CDNs would incur, such as sales and marketing expenses. Third-party CDNs would need to cover such costs in their fees and would need in the long run to cover the cost of capital invested. A full comparison between a self-supplied CDN and a third-party CDN would need to account for these types of differences. The comparison to the {{ }} rates is conservative in this regard.

Table 5: Netflix Costs of Delivering Traffic Using Its CDN and a Third-Party CDN

{{

}}

223. Dr. Israel also argues that the Netflix agreement with Comcast is beneficial to Netflix because "the contract includes guaranteed unit cost *reductions* year-over-year."[182] As I have discussed above, there are reasons to believe that Comcast would be able to raise the access fee significantly at the end of the agreement. But, in any event, the declines that Dr. Israel points to are much lower than declines in transit costs, which have declined 33 percent over the last year and an average of 35 percent annually over the last three years.[183] By contrast, the decline in the Comcast rate based on the contracted capacity in each year is only {{

}}. The decline in the rates for usage above the contracted capacity is even lower, at {{

}}.[184] By the last year of the renewal period of the contract, the Comcast fee would be {{ }} based on the contract rates than if the decline had been at the 33 percent annual decline for transit fees.{{

[182] Israel Declaration II, ¶ 174, citing McElearney Declaration, ¶ 43 (emphasis in original).

[183] *See* http://drpeering.net/white-papers/Internet-Transit-Pricing-Historical-And-Projected.php. This is the data source used by Mr. McElearney in his discussion of historical transit prices.

[184] Comcast-Netflix Agreement, February 18, 2014, Service Schedule 1, Sections 1, 5.c, 5.e.

}}

224. The third question Dr. Israel raises—i.e., "whether these highly technical distinctions between interconnection methods have any material negative effect on Netflix"—is also irrelevant.[185] As I have discussed above, whether the price of the intermediate good is a small or large proportion of the cost of the final good is generally not relevant to an inquiry into the existence of market power over the price of that intermediate good or changes in that market power. In fact, Dr. Israel's approach would exempt many mergers from serious scrutiny, since only mergers involving products that constitute a large fraction of the costs for businesses (or a large portion of household spending in the case of consumer goods) would be relevant.

225. ISPs control access into their networks and to their subscribers. As I have discussed, the competitive price for such access is zero. The four largest ISPs have market power and have charged Netflix for access. The relevant issue here is whether the proposed merger will allow Comcast to increase access fees significantly. As I have discussed, the greater bargaining power of larger ISPs in commanding higher access fees indicates that this is likely.

[185] Dr. Israel reports the results of an event study he conducted to "further assess whether the direct interconnection agreements—or the anticipation of the transaction and any associated inferences about future changes to interconnection agreements—has had any negative effect on Netflix or other edge providers." He claimed that the "results provide additional evidence that market participants did not expect the transaction to harm edge providers." *See* Israel Declaration II, ¶¶ 177-179. One basic flaw underlying Dr. Israel's event study is that one would not expect the events to have the effect that Dr. Israel claims to be testing. One event is the publication of rumors of a Comcast-TWC deal and a second event is the announcement of the deal. Dr. Israel uses these events to test whether the deal would be harmful to Netflix or other edge providers. His implicit assumption is that the event study would reveal the extent to which the market believed the merger would harm Netflix. But this presumes that the FCC and the Department of Justice would permit such a deal if there were such harm, which is the very issue that they are assessing. The other two events that Dr. Israel looks at are the announcement of the access fee agreements between Netflix and Comcast and TWC, respectively. Analyzing the financial market reaction to these agreements is only meaningful if they are unexpected. But, to the contrary, it should have been expected that Netflix would need to pay the largest ISPs for access given the ability of these ISPs to restrict access to their large networks. The fact that Netflix was forced to capitulate was not meaningful new information to the financial markets in this respect. Thus, the lack of market reaction to these events that Dr. Israel claims to find in his event study does not have the implications he claims.

3. Commission Decision in Comcast-NBC Universal

226. Dr. Israel argues that "the fact that economic theory makes no systematic prediction on the shape of the surplus functions means that it also makes no general prediction on the directional impact of the merger" on the access fees charged by the merging parties.[186] As I discussed in my initial declaration, Dr. Israel relies on an economic model that assumes that the bargaining power of all sellers is the same with respect to all buyers. It further assumes that the split will be 50/50 regardless of the size of the buyer or seller. As I have discussed, the empirical evidence in this case is that most ISPs, covering a wide range of sizes, charge zero. Only very large ISPs charge positive fees. {{

}}

227. Dr. Israel argues that "the Commission itself employed [the bargaining model relied on by Dr. Israel] in its analysis of Comcast-NBC Universal to assess the effect of the transaction on NBCU's programming prices to Comcast's MVPD rivals. The predictions of that analysis were based on the changes in the outside options of the various parties."[187]

228. In the Comcast-NBC Universal proceeding, one of the questions at issue was the degree to which Comcast's ownership of NBCU programming would give it an incentive to raise the price of NBCU programming to other MVPDs because Comcast would gain some cable subscribers if alternative MVPDs were denied NBCU programming.

229. That transaction did not pose an issue of how changes in buyer or seller size would affect bargaining power. Rather, the issue was the impact of the gain to Comcast as a cable provider from denial of NBCU programming to other MVPDs on Comcast's pricing of NBCU

[186] Israel Declaration I, ¶ 144.

[187] Israel Declaration I, ¶ 145 (internal citations omitted).

content. Given that the relevant question in the Comcast-NBC Universal transaction was the impact of the transaction in changing the surplus from reaching deals with MVPDs, it made sense to consider models that were based on changes in the surplus on the terms of the deals. In this Transaction, the fact that Comcast and Time Warner Cable would be combined does not directly change the surplus from reaching a deal with Netflix—as compared with the Comcast-NBC Universal transaction where the transaction resulted in a new revenue stream for the merged entity's outside option (which reduces the size of the surplus from reaching a deal). Thus, relying on a model that assumes that bargaining power is fixed, regardless of buyer and/or seller size, does not make sense.

230. Moreover, in assessing the Comcast-NBC Universal transaction, the Commission did not endorse an assumption that the split would necessarily be 50/50 between buyer and seller. To the contrary, the Commission explicitly noted that more popular networks would be expected to have more bargaining power than less popular networks—i.e., that the larger networks (in terms of viewership and/or intensity of viewing) had more bargaining power than smaller ones.[188] The Commission cited an empirical study that estimated that NBCU would be expected to have a 53/47 split with telco MVPD providers and a 56/44 split with satellite MVPD providers.[189] The Commission adopted a 50/50 split assumption because these estimates were close to the 50/50 assumption in the theoretical model, and also noted that the

[188] Comcast-NBCU Order, ¶ 40, ("Estimates for six NBCU national cable networks are reported. In order to use these estimates to infer NBCU's bargaining skill parameter in negotiating with various types of MVPDs, we need to account for the fact that national cable networks are almost always sold as a bundle, combining marquee networks and less established networks. To the extent that the content provider obtains carriage of less popular networks rather than a higher price for more popular networks (e.g. USA Network) when negotiating the terms at which an MVPD will accept a bundle of programming, the reported empirical estimates of the bargaining skill of any individual network could be biased. In particular, this dynamic would tend to generate a downward bias for the bargaining skill parameters associated with individual popular networks and an upward bias for the parameters associated with less popular networks.") (internal citation omitted).

[189] Comcast-NBCU Order, ¶ 40

applicants had relied on that assumption.[190] There was therefore no endorsement of a 50/50 assumption in situations where the bargaining split may be expected to deviate either across firms or from the 50/50 assumption. Rather, *there was an explicit recognition that we should expect that larger firms would have greater bargaining power*.

B. Claimed Harm to Comcast's Service from Degradation

231. Dr. Israel argues that his claim that degrading Internet service harms Comcast's business is supported by the real world experience from Comcast's degradation of Netflix streaming.[191] The "real-world experience" he cites is an increase in the number of customer service calls to Comcast. However, he provides no details from the transcripts of these calls to determine whether, for example, customers blamed Comcast or Netflix.[192] As I discuss below, Dr. Israel also cites a survey prepared for Comcast in connection with the review of this Transaction that finds that more than 70 percent of consumers would switch away from their ISPs if the ISP degraded Internet traffic under various scenarios. If such unprecedented switching had taken place, it would not have been hard to document. Dr. Israel provides no such evidence.

232. I have reviewed transcripts of Netflix's customer service chats in connection with degradation of Netflix streaming by Comcast and other large ISPs.[193] {{

[190] Comcast-NBCU Order, ¶ 40

[191] Israel Declaration II, ¶ 56.

[192] Israel Declaration II, ¶ 56.

[193] Transcripts provided by Netflix.

}} Some Netflix subscribers stated they would cancel service:

- {{ }}
- {{ }}
- {{ }}

C. Comcast's Churn Rate

233. Dr. Israel attempts to rely on Comcast's churn rate—the proportion of its customers that are disconnected—to argue that consumers switch broadband providers frequently.[194] Dr. Israel reports an annual churn rate of {{ }} for Comcast, excluding churn from customers who moved.[195] Dr. Israel's analysis of the churn data is fundamentally flawed. He uses imprecise inputs, which exaggerate his estimates. Most importantly, Dr. Israel includes involuntary churn, such as customers who are disconnected by Comcast for non-payment, in

[194] Israel Declaration II, ¶ 94. *See* also Israel Declaration II, ¶ 32. I take the churn rate to be equal to (number of broadband customers who disconnect between month t and t+1)/(number of broadband customers in month t). As I discuss below, disconnections can be voluntary or involuntary on the part of the customer and the relevant churn rate for assessing the ability of customers to switch from Comcast is based only on disconnections that the customer makes voluntarily.

[195] Dr. Israel also reports Comcast's churn rate inclusive of customers who have moved. He argues that that it is appropriate to rely on a switching rate inclusive of customers who move because "[t]o the extent that customers switch ISPs when they move, this means that moves break whatever switching costs exist and give ISPs a chance to compete for moving customers." See Israel Declaration II, n. 104. Comcast does not, however, have a chance to compete for customers who move outside of its footprint, so the existence of such movers does not impose any constraint on Comcast's actions. More generally, churn rates inclusive of customers who disconnected when they moved greatly overstates the likelihood of switching for the vast majority customers who do not move. Moreover, Dr. Israel's estimated churn rate for all customers, including those how moved, is overstated for the same reasons that Dr. Israel's estimated churn rate for non-movers is grossly overstated, as I show below.

his estimated churn rate. Correcting Dr. Israel's errors results in a churn rate excluding movers that is only {{ }} a year, more than {{ }} lower than Dr. Israel's reported estimate of {{ }} a year.

234. Dr. Israel reports an estimate of churn exclusive of consumers who moved of {{ }} percent a year based on the Comcast churn data.[196] This estimate is more than {{ }} as the switching rates from the FCC study I discussed in my first declaration (rate of 11.6 percent) and the Comcast-commissioned survey that Dr. Israel relies on and that I discuss below (about 10 percent).[197] Note that the FCC study included all wired ISPs and therefore included switching from DSL to cable. I would not characterize an estimate of the switching rate from the churn data that is {{ }} as being "in line with" the other estimates, as Dr. Israel does.[198]

235. Moreover, my review of Dr. Israel's churn rate methodology and the underlying data finds that Dr. Israel has made significant errors in his use of the data. Dr. Israel calculates a churn rate among non-movers using the following approach: "Comcast's data shows that the monthly churn rate for broadband customers has been in the {{ }} percent range for several years.... Comcast data indicates that approximately {{ }} of aggregate broadband churn is due to customers moving.... Assuming that the aggregate monthly churn rate is {{ }} percent (midpoint of {{ }} percent), monthly churn excluding

[196] Israel Declaration II, n. 106.

[197] See FCC (2010), "What Drives Consumers to Switch - Or Stick With - Their Broadband Internet Provider," Working Paper, pp. 5-6 and Evans Declaration II, fn. 62; Comcast data produced in FCC Information and Data Request – Exhibit 74.3, p. 5.

[198] Israel Declaration II, ¶ 94.

movers is {{ }} percent (i.e. {{ }}), and therefore the implied churn excluding movers is approximately {{ }} percent annually."[199]

236. The data Dr. Israel relies on shows that for Comcast overall, the monthly churn rate is only between about {{ }} and about {{ }}, rather than between {{ }} and {{ }} as Dr. Israel claims. The average monthly churn rate is only about {{ }} for the twelve months ending in June 2014 (the last month of available data).[200] By starting with a monthly churn rate of {{ }} rather than {{ }}, Dr. Israel has overstated the churn rate by about {{ }}

237. Dr. Israel's calculation to exclude movers is based on his claim that {{ }} of Comcast's churn is due to movers. The document he provided to support this claim showed that movers accounted for {{ }} of Comcast's churn. Just making this adjustment and using the actual monthly churn rate shows that Comcast churn from non-movers was about {{ }} a year rather than the {{ }} Dr. Israel reported.[201]

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[199] Israel Declaration II, ¶ 94 and n. 106.

[200] {{ }} The average monthly churn rate is similar in preceding years, at {{ }} and {{ }} for the twelve month periods ending June 2013 and June 2012 respectively. To the extent that Dr. Israel is including customers who downgrade their broadband service in his calculations, that is inappropriate. For Comcast customers experiencing degraded Netflix streaming, it is unlikely they would downgrade their broadband speeds. If anything, as indicated in the Netflix customer service chats I cited above, it is more likely they would attempt to upgrade their broadband speeds, thereby providing a benefit to Comcast.

[201] Dr. Israel also appears to be calculating the annual churn rate by multiplying his estimated monthly churn rate by 12. The appropriate calculation given a constant monthly churn rate is given by [1 – (1 – monthly rate)^12] rather than [12 × monthly rate]. At the {{ }} rate used by Dr. Israel, the correct figure would be {{ }} rather than the {{ }} he reported. In the calculations I report, I have used the correct approach and have also used the individual monthly churn rates for the twelve months ending in June 2014 (the last month of available data). {{ }}

238. Dr. Israel makes an additional critical mistake by ignoring the fact that, as explicitly reported in the data he uses, only a portion of those consumers that churn do so voluntary. Among non-movers, about {{ }} percent of those leaving Comcast were doing so voluntarily. Churn that is not voluntary is not relevant to an assessment of whether the threat of switching by consumers would limit Comcast's ability to engage in, for example, degradation of OVD video streaming for the substantial majority of customers who do not disconnect from Comcast voluntarily. The data produced by Dr. Israel do not separate churn resulting from non-payment versus other involuntary reasons. A different Comcast document, however, found that about {{ }} of consumers disconnecting were disconnected by Comcast for non-payment of their bills.[202] Such involuntary disconnections do not impose any constraints on Comcast's actions with respect to the vast majority of Comcast subscribers who pay their bills.

239. If we take only the {{ }} percent of non-mover customers that disconnected from Comcast and did so voluntarily, the annual churn rate is only {{ }}, which is over {{ }} lower than Dr. Israel's claim of a {{ }} annual churn rate. On a monthly basis, the voluntary churn is only about {{ }} on average. The Comcast churn rates are lower than the switching rates found by the FCC's study, but it is likely that the rate of consumers switching away from Comcast is lower than across all ISPs, as a significant portion of switching in recent years has been due to consumers switching away from lower speed DSL offerings.

D. Comcast Survey

240. Dr. Israel cites results from a survey of broadband subscribers by Global Strategy Group (GSG) as support for a number of his claims. It appears that this survey was prepared

[202] {{ }}

for Comcast in connection with this proceeding, as opposed to having been prepared in the ordinary course of Comcast's business operations. There are serious flaws in the survey design and methodology that render its results unreliable. Even if I set those flaws aside, there is direct evidence that shows the claimed findings of the survey are wrong. For example, Dr. Israel relies on the survey to claim that Comcast is constrained because it could not degrade Netflix streaming without being subject to a mass exodus of its broadband subscribers. In fact, the evidence is that Comcast did degrade Netflix streaming without any such consequence.

1. Survey Methodology Is Unreliable

241. There are significant reasons to question the reliability of the survey.

242. First, the sample for the survey was provided by an online panel provider. The identity of the panel provider was not disclosed in the materials I have seen. According to the Best Practices of the American Association for Public Opinion Research (AAPOR), "[i]n a bona fide survey, the sample is not selected haphazardly or only from persons who volunteer to participate. It is scientifically chosen so that each person in the population will have a measurable chance of selection.... Virtually all surveys taken seriously by social scientists, policy makers, and the informed media use some form of random or probability sampling, the methods of which are well grounded in statistical theory and the theory of probability."[203]

243. Survey samples taken from online panels are not probability-based. Rather, they are panels of individuals who agree to participate in the panel in return for various inducements. As part of the panel, they are sent surveys for which they fall within the target population of the

[203] American Association for Public Opinion Research, "Best Practices", available at http://www.aapor.org/AAPORKentico/Standards-Ethics/Best-Practices.aspx.

survey. Such panelists are not randomly selected. They have self-selected by being willing to participate in the panel, typically in response to solicitations by the online panel provider.

244. The AAPOR states that:[204]

> When we draw a sample at random—that is, when every member of the target population has a known probability of being selected—we can use the sample to make projective, quantitative estimates about the population. A sample selected at random has known mathematical properties that allow for the computation of sampling error.
>
> Surveys based on self-selected volunteers do not have that sort of known relationship to the target population and are subject to unknown, non-measurable biases. Even if opt-in surveys are based on probability samples drawn from very large pools of volunteers, their results still suffer from unknown biases stemming from the fact that the pool has no knowable relationships with the full target population.

245. Second, according to the AAPOR's Best Practices, someone conducting a survey should "[p]retest questionnaires and procedures to identify problems prior to the survey."[205] It is unclear from the materials provided whether that was done and how it was done. It is not clear, for example, whether a careful assessment of whether respondents understood and accurately replied to the questionnaire was undertaken. I do not have access to the individual responses to undertake a more detailed assessment, but one area of inconsistency in responses to related questions is notable.

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[204] American Association for Public Opinion Research, "Opt-In Surveys and Margin of Error", available at http://www.aapor.org/AAPORKentico/Education-Resources/For-Researchers/Poll-Survey-FAQ/Opt-In-Surveys-and-Margin-of-Error.aspx.

[205] American Association for Public Opinion Research, "Best Practices", available at http://www.aapor.org/AAPORKentico/Standards-Ethics/Best-Practices.aspx ("High quality surveys and polls always provide adequate budget and time for pretesting questionnaire(s) and field procedures. A pretest of the questionnaire and field procedures is the only way of finding out if everything 'works' especially if a survey employs new techniques or a new set of questions. Because it is rarely possible to foresee all the potential misunderstandings or biasing effects of different questions or procedures, it is vital for a well-designed survey operation to include provision for a pretest. All questions should be pretested to ensure that questions are understood by respondents, can be properly administered by interviewers, and do not adversely affect survey cooperation.")

246. Out of the 1012 total respondents, [[ ]] indicated they owned a smartphone.[206] Of these [[ ]] smartphone owners, [[ ]] indicated they had a wireless data plan for the smartphone.[207] A different set of questions in the survey asked respondents to first identify the types of Internet connections they had at home and, if mobile wireless was not named, respondents were asked if they had mobile wireless service. Of the [[ ]] respondents indicating they had a wireless data plan, [[ ]] indicated they had a mobile wireless connection at home.[208] Of the remaining [[ ]], fully [[ ]] indicated that they did not have mobile wireless service.[209] That is, [[ ]] respondents who answered yes to "Do you have a wireless data plan for your smartphone?" answered no when asked:

> "Do you have a wireless or mobile broadband service that allows you to connect to the Internet with a mobile device (this does not include devices that only connect to Wi-Fi)? Examples of wireless or mobile broadband service include an AT&T data plan for your smartphone, iPad or tablet; or a Verizon data plan for your Jetpack mobile hotspot device?"[210]

Anyone answering yes to the first question should answer yes to the second, yet nearly [[ ]] respondents appeared not to understand and/or failed to pay attention to these questions.

247. The reliability of the survey is therefore highly questionable.

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[206] [[ ]]

[207] [[ ]]

[208] [[ ]]

[209] [[ ]]

[210] [[ ]] Comcast data produced in FCC Information and Data Request – Exhibit 74.3, pp. 1, 5.

2. Impact of Comcast Degradation

248. Dr. Israel relies on the GSG survey as support for his claim that customers switching to a different ISP if Comcast degraded the quality of Netflix streaming would act as a significant competitive constraint on Comcast. Before even getting into the flaws in the survey, we know that the claim is wrong. In fact, Comcast did degrade the quality of Netflix streaming, and Comcast customers did not leave Comcast in droves (if they had, I assume Dr. Israel or Comcast would have reported as much).

249. Dr. Israel cites the survey for the claimed finding that "the vast majority [71-80 percent] of broadband users are likely to switch to another ISP, even an ISP *offering slower speeds*, if their current ISP were to take any of the following actions: 'prevent access to favorite websites'; 'slow down Internet speeds for your favorite websites; or 'slow down Internet speeds for Netflix.'"[211]

250. As I have discussed, the reliability of the survey as a whole is highly questionable. There are also significant reasons to question the reliability of the specific question that Dr. Israel relies on here. The hypothetical posed by the question is highly unrealistic. It states as a fact for the respondent that his/her ISP is at fault for the slowdown in Internet access. In reality, there can be extensive disputes between an ISP and an OVD over the assignment of blame for poor video streaming performance, with consumers unlikely to be able to understand the competing arguments. Moreover, the hypothetical also clearly states as a fact that the ISP that offers slower speeds does not take any of these actions, such as slowing down video streaming.[212] In reality, consumers may have little confidence that slow video streaming would

[211] Israel Declaration II, ¶ 90.

[212] Comcast data produced in FCC Information and Data Request – Exhibit 74.3, p. 5.

likely be fixed by switching ISPs, especially when other ISPs may also be engaging in the same practices. In addition, the question is vague as it does not state how much slower the speeds offered by the alternative ISP are.

251. The findings of the GSG survey relied on by Dr. Israel are also at odds with the findings of an October 2013 analysis commissioned in the ordinary course of business by Netflix. That analysis advised Netflix that {{

}}[213] The study noted that attempting to get consumers to switch away from their ISP was unlikely to be successful:

{{

}}[214]

252. Dr. Israel also attempts to use the survey results from a similar question on the survey about switching to "another provider like DSL or Wireless broadband" in reaction to the respondent's ISP degrading Internet access as support of his claim that wireless broadband and DSL are attractive alternatives to cable broadband (used in the standard sense).[215] Again, the question is poorly worded. First, the question includes both DSL and wireless, so that it is unclear which technology it is that consumers are willing to switch to. Second, given the definition of cable broadband as "high-speed internet connection through your phone or cable company," which would appear to include DSL, it is quite possible that consumers would count cable broadband (in the standard sense) to be "like DSL." The question at issue does separate

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[213] {{ }}

[214] {{ }}

[215] Comcast data produced in FCC Information and Data Request – Exhibit 74.3, p. 4 (emphasis in original).

the definitions of cable, fiber, DSL and wireless broadband technologies, but the fact that the definitions differ from those given in a preceding question is in itself enough to question the reliability of the responses to this question.

253. Dr. Israel also attempts to rely on the survey for evidence on the extent of switching by broadband customers. He claims that the survey shows that "one-third of survey respondents switched providers in at least the past two years, and nearly half (49 percent) switched providers within the past four years."[216] Dr. Israel's ignores the fact that 40 percent of respondents stated that they switched because of a move.[217] If we exclude 40 percent of the 33 percent of respondents that switched in the prior two years, we would get roughly 10 percent a year who switched, which is not inconsistent with the 11.6 percent figure I reported in my initial declaration based on an FCC study.[218] They are also {{

}}

3. Mobile

254. Dr. Israel also claims that the survey "documents extensive usage of wireless broadband today, including for 'high-bandwidth' activities such as video."[219] He cites the survey as finding that "approximately 42 percent of survey respondents indicated that they use wireless broadband *at least as much as wired broadband for high bandwidth activities*, and 60 percent

[216] Israel Declaration II, ¶ 93.

[217] Comcast data produced in FCC Information and Data Request – Exhibit 74.3, p. 5.

[218] Evans Declaration I, ¶ 81 and n. 62.

[219] Israel Declaration II, ¶ 88.

or more use wireless broadband at least as much as wired broadband for low-bandwidth activities."[220]

255. As with his reliance on the survey's claimed finding on the impact of degradation by Comcast on switching by broadband subscribers, Dr. Israel does not test the survey's results against real world evidence. In fact, consumers do not currently view Netflix using mobile wireless to any significant extent. As I reported in my original declaration, about {{ }} percent of Netflix hours are viewed over a mobile wireless connection, compared to about {{ }} percent on a wired broadband connection. So even if consumers are using mobile wireless for a range of Internet activities, it is still the case that they find it unsuitable for watching Netflix's long-form video content.

256. In defending the claimed finding in the survey concerning the relative use of mobile wireless versus cable, Dr. Israel argues that "the survey is careful to avoid confusion between mobile broadband, the subject of the question, and Wi-Fi."[221] The only basis he offers for this claim is that the survey has a statement that wireless service does not include Wi-Fi. But there is no evidence to show that respondents to this online survey actually read those clarifications, or that they understood them if they did read them.

257. Another significant source of confusion in the framing of that question is the definition of "cable broadband [I]nternet" as a "high-speed internet connection through your phone or cable company and includes cable Wi-Fi accessible on your mobile device."[222] I assume, based on what I understand the intent of the survey to be, that this definition of "cable" is meant to

[220] Israel Declaration II, ¶ 88 (emphasis in original).

[221] Israel Declaration II, n. 100.

[222] Comcast data produced in FCC Information and Data Request – Exhibit 74.3, p. 2.

encompass services such as basic DSL from telcos, U-verse from AT&T, and FiOS from Verizon. But such a definition is at odds with standard usage and likely to lead to confusion. Whether a Google fiber subscriber would count in this definition is unknown. Using definitions that are different from standard usage, even if the definitions are provided, is likely to lead to confusion among respondents.

258. The particular question at issue is also itself poorly phrased for the use that Dr. Israel makes of it. The question asks "how often" mobile wireless is used compared to cable broadband for "[h]igh-bandwidth activities such as streaming media applications like YouTube, Netflix, Hulu, etc."[223] The fact that YouTube is included and listed first is a source of concern. As I discussed above, the use of mobile wireless is much more common for viewing short-form video content, such as on YouTube, versus long-form video content, such as on Netflix. The fact that consumers may watch a lot of YouTube on mobile wireless is not particularly relevant to whether they would be willing to use mobile wireless rather than cable broadband for viewing Netflix. Moreover, asking "how often" is vague. "Often" could be taken, and is perhaps most reasonably taken, to mean frequency, as in "how many times." Thus, a respondent who watched 2 clips on YouTube that were each 2 minutes long using mobile wireless and 1 two hour movie on Netflix would accurately reply that he or she used mobile wireless more often, even though that would be meaningless to the question of whether Netflix consumers would use mobile wireless to watch Netflix's long-form content.

[223] Comcast data produced in FCC Information and Data Request – Exhibit 74.3, p. 2.

E. DSL and Mobile Wireless

1. DSL Growth

259. Dr. Israel claims that actual data on market growth shows that DSL has been growing faster than cable. As support for his claims, Dr. Israel reports statistics on broadband customers over time in Table 4 of his declaration. To show why his claims are incorrect, I reproduce his Table 4 below (without the columns relating to mobile wireless, which I address separately below) along with an analogous version of that Table including all subscribers, rather than just those meeting the 3 Mbps threshold Dr. Israel used.

Table 6: Wired Broadband Subscribers (in thousands) by Technology, 3 Mbps Threshold and All Subscribers

Month	3 Mbps Threshold				All Broadband Subscribers			
	FTTP	DSL	FTTP+DSL	Cable	FTTP	DSL	FTTP+DSL	Cable
Jun 2009	3,333	5,623	8,956	23,958	3,548	30,848	34,396	41,434
Dec 2009	3,739	6,408	10,147	28,583	3,980	31,212	35,192	42,439
Jun 2010	4,192	6,288	10,480	30,616	4,441	30,950	35,391	43,923
Dec 2010	4,725	7,316	12,041	32,338	4,993	31,637	36,630	45,334
Jun 2011	5,188	8,925	14,113	34,113	5,477	31,770	37,247	46,698
Dec 2011	5,606	10,377	15,983	34,699	5,898	31,478	37,376	48,263
Jun 2012	6,001	12,905	18,906	37,798	6,300	31,312	37,612	49,664
Dec 2012	6,425	13,061	19,486	44,133	6,728	31,111	37,839	51,646
Jun 2013	6,989	16,063	23,052	46,014	7,261	31,009	38,270	52,760
Annual Growth Rate	20.4%	30.7%	26.9%	17.9%	19.6%	0.1%	2.7%	6.2%
Increase in Subscribers (beginning to end)	3,656	10,440	14,096	22,056	3,713	161	3,874	11,326

Source: June 2013 FCC IAS Report, Tables 5 and 7.

260. Dr. Israel points to the 30.7 percent average annual growth rate of DSL as compared to the 17.9 average annual growth rate of cable as support for his claims about the strength of DSL as a broadband technology. What Dr. Israel is focusing on, however, is not true DSL growth but upgrades of DSL consumers to higher speed tiers.[224] Elsewhere, in explaining why

[224] This is true on net for DSL. In addition to DSL subscribers who upgraded during this time period, there will be individual subscribers switching to and from DSL. As I show below, on net DSL has declined since June 2011

he did not look at higher speed thresholds, Dr. Israel concedes that looking at upgrades would fail to present an accurate picture, even though that is exactly what he is doing by using a 3 Mbps threshold.[225]

261. The right side of Table 6 above shows the full picture. We see that DSL has been essentially flat over that period, with an average annual growth in subscribers of only 0.1 percent (and negative 1.2 percent per year over the last two years), while cable subscribers have increased significantly, with a 6.2 percent average annual increase.[226] Given that cable was starting from a higher base, the absolute numbers are even more striking: an increase of over 11 million cable subscribers versus an increase of only 161,000 DSL subscribers.[227]

262. With the fuller picture of broadband subscriber growth from the right side of Table 6, we can see that the faster DSL growth that Dr. Israel points to using a 3 Mbps threshold comes from consumers who are upgrading to higher speed service in recent years. Only about 18 percent of DSL subscribers were above 3 Mbps in June 2009, as compared to 58 percent of cable subscribers. What Dr. Israel claims as DSL growth is really an attempt by DSL to keep up with cable speeds. It is also notable that even if one focuses on the figures using the 3 Mbps

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(and grew only very slowly before then), so that the growth Dr. Israel claims based on a 3 Mbps threshold is, on net, coming from an increase in DSL subscribers that exceed the 3 Mbps threshold over this time period.

[225] Israel Declaration II, n. 62. ("]I]f I were to use a higher speed cutoff, it would largely capture upgrades by some customers rather than overall growth rates, and it would only capture growth rates for the highest speed telco options without answering the question about the overall set of telco options.").

[226] In my initial declaration, I reported certain figures for DSL exclusive of AT&T's U-verse. Dr. Israel claims that my exclusion of U-verse was an error. *See* Israel Declaration II, ¶ 80. The point I was making in my initial declaration was that slower forms of DSL were becoming increasingly less attractive to consumers. Whether one characterizes U-verse as a faster form of DSL or not, it makes no sense to include U-verse when discussing slower forms of DSL. In my analysis, I did not otherwise exclude U-verse. For example, the results I reported in Table 2 of my initial declaration on the lack of alternatives to Comcast and Time Warner Cable, included U-verse along with all other forms of wired broadband.

[227] Dr. Israel also criticizes me for failing to provide a "unified view" of telco broadband providers by discussing DSL separately from fiber, see Israel Declaration II, ¶ 67. The point I was making in my initial declaration was that slow forms of DSL were poor alternatives for consumers who had chosen substantially faster cable broadband offerings. I also note that as shown in Table 6, even if we look at all forms of DSL and fiber combined, cable has grown more in relative and absolute terms in recent years.

threshold, the absolute increases in cable subscribers is more than double that for DSL, about 22 million versus 10 million.

263. And, while DSL subscribers have been upgrading to plans above 3 Mbps, cable subscribers have been moving to yet higher speeds, as shown in Table 7.

Table 7: Wired Broadband Subscribers (in thousands) by Technology, 3 Mbps and 25 Mbps Thresholds

Month	3 Mbps Threshold				25 Mbps Threshold			
	FTTP	DSL	FTTP+DSL	Cable	FTTP	DSL	FTTP+DSL	Cable
Jun 2009	3,333	5,623	8,956	23,958	40	0	40	0
Dec 2009	3,739	6,408	10,147	28,583	83	1	84	200
Jnn 2010	4,192	6,288	10,480	30,616	338	6	344	370
Dec 2010	4,725	7,316	12,041	32,338	607	41	648	547
Jun 2011	5,188	8,925	14,113	34,113	814	74	888	1,526
Dec 2011	5,606	10,377	15,983	34,699	979	84	1,063	5,552
Jun 2012	6,001	12,905	18,906	37,798	1,321	105	1,426	7,037
Dec 2012	6,425	13,061	19,486	44,133	1,831	137	1,968	10,016
Jun 2013	6,989	16,063	23,052	46,014	2,508	168	2,676	19,816
Annual Growth Rate	20.4%	30.7%	26.9%	17.9%	97.7%	411.7%	102.1%	285.1%
Increase in Subscribers (beginning to end)	3,656	10,440	14,096	22,056	2,468	168	2,636	19,816

Sources: Internet Access Services: Status as of June 30, 2009, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (September 2010), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-301294A1.pdf, Table 1; Internet Access Services: Status as of December 31, 2009, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (December 2010), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-303405A1.pdf, Table 12; Internet Access Services: Status as of June 30, 2010, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (March 2011), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-305296A1.pdf, Table 12; Internet Access Services: Status as of December 31, 2010, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (October 2011), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-310261A1.pdf, Table 12; Internet Access Services: Status as of June 30, 2011, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (June 2012), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-314630A1.pdf, Table 12; Internet Access Services: Status as of December 31, 2011, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (June 2012), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-318810A1.pdf, Table 10; ; Internet Access Services: Status as of June 30, 2012, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (May 2013), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-321076A1.pdf, Table 10; Internet Access Services: Status as of December 31, 2012, Federal Communications Commission: Industry Analysis and Technology Division, Wireline Competition Bureau (December 2013), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-324884A1.pdf, Table 10; June 2013 FCC IAS Report, Tables 7 and 10.

264. As with Table 6, the left side of Table 7 reproduces Dr. Israel's Table 4 using his 3 Mbps threshold. The right side shows the change in subscribers over time using a 25 Mbps threshold. The subscriber counts using the 25 Mbps threshold show that a lot of the activity in

cable has been a move to speeds above 25 Mbps. The growth rate and absolute growth for cable above 25 Mbps is much higher for cable than for DSL and/or FTTP. Indeed, the subscriber count as of June 2013, at 19.8 million for cable versus 2.5 million for FTTP and 0.2 million for DSL, shows that the telcos have been marginal competitors above 25 Mbps so far. And, DSL, with only about 168,000 subscribers above 25 Mbps (less than 1 percent of the number of cable subscribers above 25 Mbps), has been essentially non-existent at the 25 Mbps threshold.

265. Dr. Israel focuses only on the statistics shown on the left side of Table 7, which shows upgrades in DSL plans to speeds above 3 Mbps. On a relative, though not absolute basis, the "growth" in DSL was greater than for cable. But that is because most cable subscribers were already above 3 Mbps. Many cable subscribers were upgrading their plans from below 25 Mbps to above 25 Mbps over this time period. In addition, new cable subscribers were joining with plans exceeding 25 Mbps. When we look at statistics using a 25 Mbps threshold, we see much higher "growth" for cable than DSL. And, as we saw above in Table 6, when we look at all cable versus DSL subscribers, cable growth has been much higher than DSL on both an absolute and relative basis, even when U-verse is included in the DSL counts.

2. Mobile Wireless

266. Dr. Israel argues that mobile wireless Internet access is a good alternative for wired Internet access. He argues that the fact that I reported only{{ }} percent of Netflix viewing hours were using mobile wireless is "a backward-looking view of mobile wireless video usage in a world where conditions are changing so rapidly that only a forward-looking view will suffice."[228] This appears to be a concession on Dr. Israel's part that currently mobile wireless

[228] Israel Declaration II, ¶ 82.

is not a good alternative for wired Internet access for Netflix viewing. His argument is that mobile will become a good alternative soon. I show that this claim is not correct.

267. Dr. Israel first argues that "industry analysts recognize that mobile is the number one growth area for Netflix itself: '[M]ost Netflix content is still watched on TV screens, but ... mobile is seeing the biggest growth, in part because of the way phones have been changing.'"[229] This is a highly selective use of the article cited. A more balanced review of the article finds that it fundamentally undermines Dr. Israel's claim that mobile wireless is a good substitute for cable. The article notes that in assessing viewing on mobile devices, "Netflix's designers came upon an unexpected challenge: 87 percent of all mobile sessions last less than ten minutes — but Netflix didn't have any content that was less than ten minutes long. That's why the company decided to experiment with shorter-form content."[230] That demonstrates that consumers do not view mobile wireless as a good alternative for viewing long-form content, which is mainly what Netflix offers and its subscribers are paying for. That is, while viewing of short-form content over mobile wireless might serve as a complement to viewing of long-form content using wired broadband, it is not a good substitute.

268. Second, Dr. Israel cites an article discussing a statement by Hulu claiming that "content on Hulu has jumped from zero percent to 20% viewership using mobile devices."[231] The statement does not distinguish viewing on mobile devices using a mobile wireless connection versus using WiFi that is connected to a wired broadband connection. Moreover, the statement

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[229] Israel Declaration II, ¶ 82, citing Janko Roettgers, "Netflix May Add Short-form Content to Increase Mobile Usage," GIGAOM, September 5, 2014, available at https://gigaom.com/2014/09/05/netflix-short-clips/.

[230] Janko Roettgers, "Netflix May Add Short-form Content to Increase Mobile Usage," GIGAOM, September 5, 2014, available at https://gigaom.com/2014/09/05/netflix-short-clips/. It is unclear whether the discussion relates only to viewing using mobile wireless broadband or also includes viewing on mobile devices connected using WiFi to consumers' wired broadband service at home.

[231] Israel Declaration II, ¶ 82, citing Deborah Yao, "Wireless Operators Getting Serious about Mobile Video," *SNL*, September 10, 2014, available at https://www.snl.com/InteractiveX/ArticleAbstract.aspx?id=29163017.

does not distinguish between viewing on a smartphone versus viewing on a tablet such as an iPad. It appears likely that tablets are included in that statistic given that Hulu includes tablets in its discussion of mobile devices elsewhere.[232] Increases in viewing of online video on tablets over WiFi at home have no relevance to the potential threat of mobile wireless to wired broadband.

269. Third, Dr. Israel claims that "Verizon is poised to launch a new mobile-focused OTT business in 2015."[233] In particular, he cites an article stating that the Verizon offering "would deliver content from major broadcasters and live sporting events to smartphones via a technology called multicasting, which avoids congesting the network because it essentially allows the carrier to broadcast content over a single stream of airwaves that consumers can tune in to."[234] Importantly, the multicasting aspect of Verizon's potential offering—broadcasting the same programming to multiple subscribers—would not work for Netflix's individualized programming model. Moreover, Netflix would need Verizon's permission and cooperation to offer such a product. Whether or not Verizon's potential offering is successful, its success would not demonstrate the feasibility of consumers abandoning their wired broadband connections to rely solely on mobile wireless broadband.

270. And fourth, Dr. Israel cites a report by Ericsson, stating that "[v]ideo is the largest and fastest growing segment of mobile data traffic. It is expected to grow around 13 times by 2019, by which time it is forecasted to account for over 50 percent of all global mobile data

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[232] Karen Nischol, "Free Hulu Clips On The Go!", Hulu Blog, October 23, 2013, available at http://blog.hulu.com/2013/10/23/free-hulu-clips-on-the-go/.

[233] Israel Declaration II, ¶ 82.

[234] Israel Declaration II, ¶ 82, citing Ryan Knutson, "Verizon Eyes Digital Video Service by Mid-2015," *The Wall Street Journal*, September 11, 2014, available at http://online.wsj.com/articles/verizon-ceo-eyes-digital-video-service-by-mid-2015-141046715.

traffic."[235] Dr. Israel is conflating the importance of video to mobile wireless usage with the importance of mobile wireless usage to OVDs such as Netflix. The same report that Dr. Israel references indicated that video already accounted for 40 percent of all global mobile data traffic in 2013. As I have discussed, Netflix viewing over mobile wireless connections is essentially negligible today. That is true at the same time video accounts for 40 percent (or more) of mobile wireless data usage. It is implausible that going from 40 percent in 2013 to 50 percent in 2017 tells us that Netflix viewing over mobile wireless connections will become appreciably more attractive to consumers any time in the near future.

IV. Conclusion

271. Based on the economic analysis presented above, I conclude that this Transaction would cause public harm. It would create a national monopoly bottleneck that would control access to 30 percent of American broadband subscribers. It would enable Comcast to increase the price that OVDs would have to pay to obtain access to Comcast's subscribers significantly, as a result of horizontal unilateral effects, and to maintain its significant market power in the MVPD and broadband markets, as a result of vertical effects.

272. That would be bad enough. But then under the economic theories advanced by Comcast the merged company would be able to acquire the remaining non-overlapping cable ISPs thereby securing a national monopoly bottleneck over {{ }} of American wired broadband households as of today and more than {{ }} in a few years.

[235] Israel Declaration II, ¶ 82, citing "Ericsson Mobility Report: On the Pulse of the Networked Society," *Ericsson*, June 2014, available at http://www.ericsson.com/res/docs/2014/ericsson-mobility-report-june-2014.pdf.

273. I therefore recommend that the FCC block this Transaction and prevent Comcast from continuing on a process that could result in the creation of a massive national bottleneck monopoly standing between edge providers and American consumers of Internet content.

REDACTED—FOR PUBLIC INSPECTION

The foregoing declaration has been prepared using facts of which I have personal knowledge or based upon information provided to me. I declare under penalty of perjury that the foregoing is true and correct to the best of my information, knowledge, and belief.

Executed on December 23, 2014.

David S. Evans
Chairman
Global Economics Group, LLC

CERTIFICATE OF SERVICE

I hereby certify that on December 23, 2014, I caused true and correct copies of the foregoing Reply of Netflix, Inc. to be served by electronic mail upon the following counsel:

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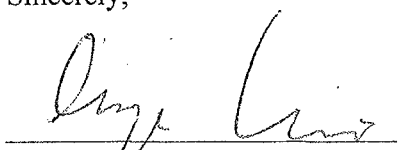

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