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ECONOMIC ANALYSIS OF THE EFFECT OF THE COMCAST-TWC TRANSACTION ON BROADBAND: REPLY TO COMMENTERS

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September 22, 2014

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I. INTRODUCTION AND EXECUTIVE SUMMARY

A. BACKGROUND

1. Comcast Corporation ("Comcast") and Time Warner Cable ("TWC") propose to transfer control of the licenses and authorizations held by TWC and its wholly owned and controlled subsidiaries to Comcast.[1] In addition, Comcast and Charter Communications, Inc. ("Charter") propose a series of divestiture transactions whereby, contingent on approval of the proposed Comcast-TWC transaction, Comcast will divest systems resulting in a net reduction of approximately 3.9 million residential video customers.[2] I refer to these transactions collectively as "the proposed transaction" or just "the transaction."

2. At the request of counsel for Comcast, I have already filed one declaration on this matter.[3] My main conclusion in that declaration was that "[g]iven (i) the lack of any valid competitive concerns and (ii) the substantial consumer benefits, the proposed

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[1] Comcast Corporation and Time Warner Cable Inc., *Description of Transaction, Public Interest Showing, and Related Demonstrations*, April 8, 2014.

[2] Public Interest Statement, *In the Matter of Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Transfer Control of Licenses and Authorizations*, MB Docket No. 14-57, June 5, 2014, *available at* http://apps.fcc.gov/ecfs/document/view?id=7521215151, *site visited* September 17, 2014.

[3] Declaration of Mark A. Israel, "Implications of the Comcast/Time Warner Cable Transaction for Broadband Competition," Attachment to Comcast Corporation and Time Warner Cable Inc., *Description of Transaction, Public Interest Showing, and Related Demonstrations*, April 8, 2014 (hereinafter, *Israel Declaration*). This initial declaration provides my qualifications.

transaction—as it relates to the provision of broadband services in particular—is pro-consumer, pro-competitive, and in the public interest."[4]

3. Based on the analyses presented in my initial declaration and supplemented in this reply declaration, my main conclusion continues to hold: The largely unquestioned consumer benefits from the proposed transaction easily swamp the largely unsupported claims of harms to competition and consumers.

B. ASSIGNMENT

4. For this declaration, counsel for Comcast asked me to review the broadband-related arguments made by economists in the Comments and Petitions to Deny filed in this proceeding, in order to determine whether those arguments provide a basis for amending or reversing the conclusions in my initial declaration.[5] In addition, counsel has asked me to assess whether the economists identify any likely sources of competitive harm other than those examined in my initial declaration. The analysis, presented in this declaration, is based on my review of the Comments and Petitions to Deny, including the

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[4] *Israel Declaration*, ¶ 12.

[5] I focus on arguments related to the provision of broadband data services in the following reports by economists: Declaration of David S. Evans, "Economic Analysis of the Impact of the Comcast/Time Warner Cable Transaction on Internet Access to Online Video Distributors," Attachment to Petition to Deny of Netflix Inc., August 25, 2014 (hereinafter, *Evans Declaration*); Declaration of Joseph Farrell, Attachment to Petition to Deny of Cogent Communications Group, August 25, 2014 (hereinafter, *Farrell Declaration*); Declaration of David Sappington, "The Anticompetitive Effects of the Proposed Merger of Comcast and Time Warner Cable," Attachment to Petition to Deny of DISH Network, August 25, 2014 (hereinafter, *Sappington Declaration*).

economic reports associated with those Comments and Petitions to Deny, review of relevant documents, and discussions with industry personnel, as well as my review of the relevant economic literature, application of relevant economic theory, and analysis of relevant empirical evidence.

5. As in my initial declaration, I focus on the effect of the transaction in the broadband segment. I do not qualify all of my conclusions about competitive effects and benefits from the transaction with the words "broadband' or "broadband-related," but unless otherwise explicitly noted, all statements and conclusions should be taken as referring to effects on broadband.

C. Primary Conclusion

6. M***y primary conclusion remains that the proposed transaction is pro-competitive, pro-consumer, and in the public interest.*** Despite hundreds of pages of argument from economists in this matter—and my own very detailed response in the rest of this report—the key points are actually quite straightforward. **First**, commenters advance no serious arguments to refute the substantial efficiencies and associated consumer benefits from the transaction, as detailed in my initial declaration and the declarations by Drs. Rosston and Topper.[6] Hence, any claimed harms must be weighed

[6] *Israel Declaration*, §§ III-IV; Declaration of Gregory L. Rosston and Michael D. Topper, "An Economic Analysis of the Proposed Comcast – Time Warner Cable Transaction," Attachment to Comcast Corporation and Time Warner Cable Inc., *Description of Transaction, Public Interest Showing, and Related Demonstrations*, April 8, 2014

against these substantial consumer benefits. **Second**, commenters offer no *horizontal* theory of harm to broadband customers and, in particular, no evidence that Comcast and TWC compete with or constrain one another in any market today. **Third**, the *vertical* theory advanced by some commenters—that the transaction would enable Comcast to foreclose OVDs—does not hold together as a matter of economic theory. Comcast lacks the incentive to stifle the complementary OVD industry, which makes best use of the high speed broadband network in which Comcast has invested tens of billions of dollars, and Comcast lacks the ability to thwart the rapidly growing OVD business, which already includes many of the giants of the high technology and entertainment industries. More importantly, this vertical theory is belied by the facts: Comcast has agreed with Netflix to a long-term contract, which imposes minimal incremental costs on Netflix and has not harmed Netflix's market performance. **Fourth**, the remaining "big is bad" argument that the transaction will give Comcast excessive bargaining power is theoretically ambiguous, empirically unsupported, and, in all events, completely swamped by the consumer benefits from the transaction. Perhaps most tellingly, commenters spend dozens of pages alleging that Comcast has substantial market power *today*, and yet the Comcast

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(hereinafter, *Rosston-Topper Declaration I)*, § IV; Declaration of Gregory L. Rosston and Michael D. Topper, "An Economic Analysis of the Proposed Comcast Divestiture Transactions with Charter," Attachment to Comcast Corporation and Time Warner Cable, Inc., *Public Interest Statement*, June 4, 2014 (hereinafter, *Rosston-Topper Declaration II)*, § III.

interconnection charges that lie at the heart of their theories of harm are tiny overall and literally zero for more than 40 "settlement-free" paths into the Comcast network.

D. Executive Summary

7. Although the logic supporting my primary conclusion is straightforward even without wading through the intricacies of interconnection terms or bargaining economics, in this executive summary and the body of the declaration, I explain my findings in more detail. My main points are all presented in the executive summary, including references to the sections/paragraphs in the remainder of the declaration that further develop each point in more detail for those who are interested.

8. *Despite the substantial attention paid by commenters to the combined firm's share of nationwide broadband customers, commenters have not established the existence of a national broadband market in which the change in national broadband share is an indicator of horizontal competitive effects from the transaction, nor any market in which Comcast and TWC place relevant competitive constraints on one another today:*

- *Despite repeated appeals to national share statistics, commenters fail to provide a coherent basis to conclude that there is a national broadband market in which such a share calculation is a relevant indicator of horizontal competitive effects.* The Horizontal Merger Guidelines are clear that product markets are defined to include "a group of substitute products," meaning "products that are reasonably

interchangeable with a product sold by one of the merging firms."[7] Applying this logic to geographic market definition, the Guidelines are clear that the market may be "geographically bounded if geography limits some customers' willingness or ability to substitute to some products, or some suppliers' willingness or ability to serve some customers."[8] In the present case, the market is clearly geographically bounded, as broadband providers cannot serve broadband customers outside the boundaries of their geographically limited footprints. Adding edge providers into the mix does not change this fact; Comcast and TWC each offer broadband platforms to connect edge providers to only those consumers within their distinct footprints, meaning that the Comcast and TWC platforms are not substitutes for the distribution of content to *any consumer*. Even if an edge provider's goal is to achieve national distribution, the Comcast and TWC networks serve different areas and are not substitutes for one another: Rather, relevant substitutes for each include the third-party CDNs and transit providers that sell interconnection services into both networks and mean that an edge provider need not negotiate directly with *either* Comcast or TWC if it chooses not to. Analogies to nationwide markets for cable networks have no substantive effect on this conclusion: At

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7 U.S. Department of Justice and the Federal Trade Commission, "Horizontal Merger Guidelines," August 19, 2010 (hereinafter, *Horizontal Merger Guidelines*), 7-9.

8 *Id.*, 8, 13.

most, such an approach would generate a national market in which there is no diversion between the merging parties and thus no transaction-related effect on the ability of customers to divert to a competitor should their ISP degrade their access to edge providers. Finally, although one could potentially define a national Internet backbone market, including the transport of traffic across Internet backbones and associated interconnection services, no commenter has alleged harm in such a market, with competition in backbone services widely acknowledged to be intense. (See Section II.A, ¶¶ 17-26, for more detail.)

- *Given the lack of relevance of national broadband shares, potential revisions to the minimum speed required to distinguish broadband from non-broadband Internet access have no bearing on analysis of the transaction's effects.* Along with the focus on national broadband shares has come a focus on the minimum speed required for a particular Internet access service to qualify as broadband. Given that the change in national broadband share is not a meaningful indicator of the horizontal competitive effects of the transaction, debates over the definition of broadband—although potentially relevant for transactions that affect competition in local broadband markets and for other important policy issues—are of little relevance to the analysis of the transaction. That said, evidence derived from ordinary course and survey analyses of the products to which marginal customers

would switch if faced with a broadband price increase (the relevant issue when considering market definition) implies that, to define today's local broadband markets, one should use a speed no higher than 10 Mbps, and likely closer to the current 3 Mbps standard.[9] This conclusion follows from the adequacy of slower speeds for many uses, including many video applications, and the fact that the marginal customers who would discipline a price increase would likely consider switching to providers that offer lower speeds. Basing the standard on higher speeds (such as 25 Mbps) would exclude important current competitive constraints. Finally, I note that (i) defining broadband based on a 10 Mbps standard (rather than the FCC's current 3 Mbps used in my initial declaration) has little effect on the national share calculations presented in my initial declaration and (ii) switching to a 25 Mbps standard would imply that TWC has relatively few broadband customers today and thus that the proposed transaction would have little effect on Comcast's current national broadband share. (See Section II.B, ¶¶ 27-35, for more detail.)

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9 The Commission defines the current broadband standard as 4 Mbps download speed and 1 Mbps upload speed. However, in practice, to match the data on broadband customers available from the Commission's Form 477, the Commission actually uses a standard of 3 Mbps download speed and 768 Kbps upload speed. Since those cutoffs define the data used to measure broadband customers under the current definition, I refer to the standard as "3 Mbps" throughout.

- *Comcast and TWC do not constrain each other's actions today and thus the transaction will not relax any competitive constraints.* The heart of a standard argument for horizontal harm from a merger is that, absent the merger, the merging parties would place significant constraints on one another's behavior and thus that, by eliminating this constraint, the merger would make it easier for the merging parties to raise prices or otherwise harm competition. Yet, despite dozens of pages on alleged market power, available substitutes, recent negotiations with edge providers, and related topics, commenters have provided no evidence of any relevant competitive constraint that Comcast or TWC place on one another today. This includes not only a lack of evidence that the firms constrain one another's retail broadband pricing or related strategies, but also a lack of evidence that any competitive constraints from TWC affected Comcast in its recent negotiations with Netflix, Cogent, or other edge providers or their agents (or vice versa). There is simply no direct evidence that any pricing, strategies, or negotiations would have been different absent some constraint imposed by one merging party on one the other. (See Section II.C, ¶¶ 36-37, for more detail.)

9. *Lacking evidence for any **incremental** harm from the transaction, many commenters attempt to divert attention to Comcast's **current** broadband market position, a discussion that primarily serves to highlight the reasons Comcast would not want to harm the broadband marketplace and, otherwise, has little relevance for evaluation of the proposed transaction.* Commenters collectively spend dozens of pages analyzing Comcast's current market position in broadband, arguing that Comcast faces few competitive constraints as a broadband provider today. This entire discussion is of

limited relevance: Proper merger analysis focuses on the incremental effect of the merger on the competitive constraints faced by the parties and, as noted above, the parties do not constrain one another today. That said, what *is* true is that Comcast has spent tens of billions of dollars to develop its (last mile and backbone) broadband network, that as a result it offers very high-quality broadband service with speeds up to 505 Mbps, and that (as explained in my initial declaration), it sees the transaction as a way to extend this high-quality broadband service into additional territories and to expand the footprint over which to deploy future innovations, making more investment in such innovations profitable. The speed enabled by Comcast's broadband network is well suited to—in fact is *only* fully utilized by—online video content, and thus Comcast's broadband investment is deeply complementary to the growth of online video distributors (OVDs); their side-by-side development being a leading example of the virtuous cycle between improving broadband networks and edge provider services. As a result, any strategy to harm online video distributors would involve Comcast degrading the very applications that its broadband network is built to serve and that best enable Comcast to attract broadband customers and generate a return on its broadband investment.

10. *Commenters understate the constraints faced by Comcast, including those that constrain its ability to degrade an edge provider's access to Comcast's last-mile network.*

- *In an attempt to support claims that Comcast can harm competition via "terminating access" market power, many commenters focus attention narrowly on interconnection points through which traffic travels from the broader Internet backbone into last-mile networks, claiming that Comcast has bottleneck control at these points. Such theories ignore the constraints imposed by the competition on*

both sides of these interconnection points, including competition among last-mile networks and especially in the hyper-competitive Internet backbone. Given Comcast's commitment to adhere to Open Internet rules, theories of competitive harm based on discrimination or degradation of traffic inside the Comcast access network (the "last mile") are not tenable. And given the overall competitiveness of the Internet backbone and the merging parties' relatively small role in that ecosystem, theories of competitive harm to the Internet backbone (including transit) are also not tenable. Hence, commenters' theories of harm are reduced to claims about potential changes to agreements regarding interconnection *into* the merging parties' last-mile networks—the terms under which edge providers or, more often, their agents (CDNs, transit providers, etc.) are able to transmit traffic into the parties' last-mile networks. However, interconnection points are not immune from the market forces that prevent competitive harm in the last-mile and backbone networks that sit on either side of them; rather, these market forces—explained in detail in the following bullets—prevent competitive harm via potential transaction-induced changes in interconnection agreements as well. (See Section III.A, ¶¶ 40-43, for more detail.)

- *Commenters largely ignore the range of options open to edge providers to defeat any attempt to degrade their access to ISP last-mile networks.* Due to the competitiveness of backbone services, edge providers—either on their own if they are large enough (and decide to do so) or through CDNs or other agents—can utilize a wide variety of paths into the Comcast network. Hence, no edge provider is forced to negotiate with Comcast or TWC directly. Rather, there are dozens of

third-party CDNs and transit providers who have interconnection agreements with Comcast and TWC—many of them settlement-free agreements under which interconnection is free—with which edge providers can contract to access the Comcast and TWC last-mile networks. Although commenters attempt to dismiss the importance of alternative paths into the Comcast network, in part based on claims about the recent negotiations between Comcast and Netflix, Comcast's Kevin McElearney explains in his declaration that these commenters have their facts wrong, and that there were actually many paths with substantial spare capacity available to Netflix, many of which Netflix simply refused to use. More generally, commenters' claim that Comcast can simply degrade or charge for these interconnection paths ignores the presence of numerous settlement-free paths into the Comcast network and the fact that Comcast would have to compromise significantly its connectivity to the overall Internet to attempt to prevent providers from making use of such paths. (See Section III.B, ¶¶ 44-56, for more detail.)

- *Comcast's broadband customers also have important and growing options, through which they can effectively discipline any attempt by Comcast to degrade edge provider access to its last-mile network.* As an initial matter, note that any reduction in demand for broadband service among Comcast customers would be very costly to Comcast. For example, ordinary-course-of-business customer lifetime value (CLV) calculations show that if a customer were to cancel her broadband service, this would eliminate a very large fraction of that customer's overall lifetime value to Comcast. And should Comcast degrade its customers'

access to edge providers, the customers can and most likely would react in one of many possible ways. One obvious such reaction—entirely ignored by commenters—is that, if faced with diminished broadband service, a customer could downgrade or even cancel broadband service (an option open to all customers in all areas). Indeed, as noted above and stressed by Netflix, a primary incentive to subscribe to higher speed tiers is to watch more online video, meaning that actions to harm online video would reduce demand for Comcast's higher speed broadband tiers. Or Comcast customers could switch broadband providers; commenters significantly understate the strength of competitive alternatives available to Comcast customers. In fact, the competitive threat to Comcast's broadband service, particularly from the full set of options provided by powerful telco competitors, is large and growing. Commenters attempt to downplay this telco competition via a double standard that downplays DSL—which remains highly relevant today—due to claims that its competitive significance is declining, while ignoring the fact that the competitive significance of wireless—while more limited today—is growing rapidly. Together, these options, combined with fiber-to-the-premises (FTTP) options—which AT&T, CenturyLink, and others are committed to expanding, in part as a competitive response to this transaction—form an overall strategy by which the telco providers will remain a highly relevant competitive threat. None of these threats is merely theoretical: Empirical evidence indicates that customers would switch to broadband alternatives in large numbers should Comcast degrade access to edge providers. (See Section III.C, ¶¶ 57-94, for more detail.)

- *Finally, commenters largely ignore the constraints on Comcast due to potential broadband entrants, including Google and certain municipalities, with such entry potentially facilitated by Commission action*. To be clear, I am not claiming that such potential entrants are options for most consumers today. But, in considering whether Comcast could profitably harm edge providers, the role of recent or potential entrants like Google cannot be ignored. Indeed, Dr. Evans acknowledges that Comcast's strategies are affected by the possibility of entry by Google and others. However, he reaches the implausible conclusion that, post-transaction, Comcast could thwart the current and planned efforts by firms like Netflix, Google, Amazon, Apple, Sony to establish OVD services *and* thereby deter broadband entry by Google and others. The more realistic conclusion is that Comcast cannot thwart the OVD efforts of these powerful firms, and that attempts to do so would encourage broadband entry, including by firms like Google that have a vested interest in maintaining competitive broadband markets in support of their enormous edge provider businesses and a proven willingness and ability to enter the broadband business. To the extent that such entry needs any further encouragement, Chairman Wheeler has been quite clear that the Commission intends to provide it, with induced Commission action a further risk Comcast would face should it attempt to harm broadband competition or edge providers. (See Section III.D, ¶¶ 95-99, for more detail.)

11. S*ome commenters advance a theory of OVD foreclosure, which depends on the dual hypotheses (i) that Comcast has an incentive to harm OVDs and (ii) that the increased size of the combined firm would give it the ability to foreclose OVDs. Neither hypothesis holds: Comcast does not have an incentive to foreclose OVDs, and the combined firm would lack the ability to do so*.

- *Given the constraints discussed above, the proposed transaction would not give Comcast the ability to foreclose OVDs.* As above, I note that foreclosure is not a last-mile issue because Comcast's commitment to the Open Internet requirements precludes discriminatory conduct inside the last mile. Thus, my focus is again on the supposed ability to manipulate interconnection arrangements *into* the combined company's last-mile network to achieve OVD foreclosure. Several points each independently refute such ability. First, the discussion above reveals the lack of an effective mechanism to foreclose: Given the ability for OVDs to rely on multiple transit providers or on CDNs that, in turn, can utilize multiple paths, including settlement-free paths, into Comcast's last-mile network, Comcast effectively lacks the ability to limit OVD access to its customers. Any attempt to degrade OVD access to the Comcast network would require substantial disruption to Comcast's overall Internet interconnectivity. Second, the idea that the combined firm could drive enormous edge providers with vested interests in using the OVD business to support core parts of their strategies—including Google, Amazon, Apple, and Sony—out of the OVD business (or significantly degrade their competitive strength) is not credible. And the firm that had received the most attention and is focused primarily on the OVD segment—Netflix—is protected by a multi-year direct interconnection agreement with Comcast. Indeed, for a foreclosure strategy to work, it would need to force out *most or all of these large OVDs*, as a foreclosure strategy that left some OVDs in the market would

not eliminate the OVD sector but rather would primarily serve to strengthen the remaining, non-foreclosed OVDs. Third, even accepting the (incorrect) notion that Comcast actually "controls" its customers, analogies to minimum scale levels that the Commission has used in related contexts and to the size of other content providers or MVPDs reveal that the number of *non*-Comcast/TWC customers is far more than sufficient to sustain a viable OVD. This fact becomes even more obvious when recognizing that OVDs' *global* operations are growing rapidly, and still more obvious when recognizing that (as discussed above), even within the combined firm's footprint, most customers have choices regarding broadband service, with empirical evidence indicating that many would switch ISPs were Comcast to degrade its broadband service. Hence, by the "open field" analysis that the Commission has used in other settings, the combined firm would lack the ability to foreclose OVDs. Finally, no commenter has presented any evidence to support a merger-specific foreclosure claim that the number of customers gained by Comcast via the transaction would make the difference between the ability to foreclose or the lack thereof. (See Section IV.A, ¶¶ 104-115, for more details.)

- *The combined firm will lack the incentive to foreclose OVDs, just as Comcast lacks such incentives today.* Commenters do not argue that the transaction will create a new incentive to foreclose OVDs, rather they claim that the increased size of the combined firm will enhance its ability to foreclose OVDs. Hence, the revealed lack of incentive to foreclose OVDs today should also dictate analysis of post-transaction incentives. Following Netflix's recent negotiations with Comcast and TWC, both merging parties gave Netflix **{{ }}**. None of those facts is

consistent with an incentive to harm OVDs' competitiveness. This should not be surprising; it is explained by fundamental economic logic. OVDs provide services that are highly complementary to Comcast's broadband business, increasing returns from the high-speed broadband network that Comcast has built up through billions of dollars in investments. Moreover, OVDs are significant purchasers of NBCUniversal content, paying hundreds of millions of dollars per year, and thus are complementary to that business as well. Well-established economic theory teaches that strategies to leverage a strong position in one industry (broadband) to foreclose competition in a complementary industry (OVD/video) are rarely profitable, explaining why Comcast lacks the incentive to undertake such a foreclosure strategy pre- or post-transaction. (See Section IV.B, ¶¶ 116-129, for more detail.)

12. *Moving beyond theories regarding foreclosure of OVDs, commenters also advance "big is bad" theories based on increased bargaining power. In particular, commenters argue that, even though the merging parties do not overlap, the increased size created by the merger would increase Comcast's bargaining power vis-à-vis edge providers and their agents (e.g., transit providers and CDNs) and thus enable the combined firm to charge higher prices for interconnection into the Comcast network. However, this theory is not supported by theoretical or empirical economic analysis and is rejected by marketplace realities.*

- *Marketplace realities, including the large number of settlement-free paths into Comcast's network and the extremely small size of interconnection payments to Comcast, contradict theories of harm based on bargaining 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 over edge providers or their agents. Most simply, the existence of over 40 *settlement-free* paths into the Comcast network is inconsistent with the claim that Comcast can impose anti-competitive terms on interconnection. More generally, the amount of money at issue in Comcast's interconnection agreements is **{{ }}**. For example, Netflix's **{{ }}** relative to Netflix's variable operating costs and revenue. Indeed, interconnection payments from edge providers or their agents to Comcast fail even to cover **{{ }}**. (See Section V.A, ¶¶ 132-138, for more detail.)

- *Economic theory does not support the claim that the proposed transaction will increase Comcast's bargaining power.* Dr. Farrell has presented the one economic theory in this case that yields a clear economic prediction about the effect of the transaction on prices charged to edge providers, *and it predicts a price* ***decrease*****.** In discussing the effects of a price increase to OVDs (assuming there would be one), Dr. Farrell presents a model that assumes that OVDs do not price discriminate in the prices they charge to customers with different ISPs, meaning that if one ISP were to raise an OVD's costs (including via higher interconnection payments), that OVD would pass this cost increase through to customers of all ISPs. An implication of this model is that if Comcast or TWC charges more to an OVD today, they effectively impose a tax on each other in the form of higher OVD prices charged to one another's broadband customers. That tax creates an externality on one another, which the combined firm would internalize post-transaction, leading to *lower* prices to edge providers. Aside from

Dr. Farrell's model, the larger body of economic theory establishes no conclusion about the effect of a merger of non-overlapping firms on bargaining power, a point commenters do not dispute. (See Section V.B, ¶¶ 139-150, for more detail.)

- *Empirical evidence rejects the claim that the proposed transaction will increase Comcast's bargaining power*. **First**, any attempt to use an observed relationship between size and prices to establish that greater size creates greater bargaining power must rule out the obvious alternative explanation, that higher quality firms generally are relatively large *and* generally charge relatively high prices. That general economic concept applies to the present context—larger ISPs tend to have higher quality networks and, in particular, to offer a richer, more robust set of interconnection services. **Second,** the analogy to MVPD/content provider negotiations demonstrates the importance of controlling for quality: The greater advertising revenue (and thus greater surplus) that certain MVPDs can generate for content providers more than explains the small observed gaps in affiliate fees across MVPDs. **Third,** once quality is controlled for, the Cogent data presented by Dr. Farrell *actually contradicts the claim that ISP bargaining power due to a greater number of broadband customers leads to higher prices*. In particular, once basic measures of ISP quality are accounted for, an ISP's number of broadband customers is no longer even a statistically significant predictor of interconnection prices, with the ISP quality metrics the relevant determinants of price. **Finally,** the limited details that Dr. Evans provides about Netflix's interconnection prices are meaningless, at most revealing *whom* Netflix pays for interconnection, but lacking sufficient detail to reveal anything about the relevant question, *how much* Netflix pays. (See Section V.C, ¶¶ 151-170, for more detail.)

13. *Even if the structure or magnitude of interconnection prices were to change, as some commenters have predicted, this would not be harmful to consumers or competition.*

- *Direct interconnection agreements between edge providers and ISPs are not harmful to competition, consumers, or edge providers.* The recent direct interconnection agreements between Netflix (and other edge providers) and Comcast and TWC have served to "disintermediate" Cogent and other transit providers, an economically efficient and mutually beneficial outcome in many cases. The Netflix direct interconnection contracts also provide a direct test of whether such direct interconnection agreements are harmful to competition, consumers, or edge providers. In fact, (i) there is no evidence that the contracts led to a change in Netflix's churn, margins, or other such metrics and (ii) the agreements led to no significant change in Netflix's stock market performance, which indicates that the agreements have not harmed Netflix and are not expected to harm its future performance. (See Section VI.A, ¶¶ 172-179, for more detail.)

- *Even if prices to edge providers (or their agents) were to increase further, this would be beneficial to broadband customers and economically efficient.* An ISP's broadband platform is a classic example of a "two-sided market" that facilitates interaction between edge providers and broadband customers, with charges potentially being paid by either side of the market. The economics of two-sided markets provides several reasons why additional charges on the edge provider side of the market would be beneficial to broadband customers and economically

efficient. These reasons include: (i) the "seesaw" principle says that higher prices to edge providers would result in lower prices to broadband customers,[10] which would benefit customers directly and also reduce cross-subsidization of heavy OVD users by light or non-OVD users; (ii) requiring edge providers to pay a greater share of the incremental cost of the traffic generated by their services would incentivize them to make more efficient decisions about how to provide the services; and (iii) greater charges to edge providers could help to solve distortions created by the large and growing heterogeneity between the largest edge providers and much smaller providers. The theoretical two-sided pricing model presented by Dr. Farrell supports many of these conclusions, as do many prior writings by Dr. Evans on two-sided markets. (See Section VI.B, ¶¶ 180-201, for more detail.)

14. *Miscellaneous other arguments advanced by commenters are also without merit*:

- There is no evidence that Comcast and TWC have any plans to compete with one another either in the traditional MVPD or OVD space and thus no basis for a concern about potential competition. To the contrary, the relevant potential competitors are fiber-based broadband providers like Google and municipalities, as well as the growth of wireless broadband providers, all of which have

[10] Throughout the declaration, when I refer to lower prices, this should be taken as a comparison to the "but-for" world absent the transaction, meaning that the lower prices might manifest themselves as a slowed rate of price increase rather than a reduction in the price level. In either case, the key implication is that prices are lower with the transaction than without it.

established plans to expand into the merging parties' territories and thus which place actual constraints on the merging parties' behavior. (See Section VII.A, ¶¶ 203-206, for more detail.)

- There is no basis to conclude that eliminating TWC as one of many competitive benchmarks would lead to higher prices or otherwise harm competition. (See Section VII.B, ¶ 207, for more detail.)

15. *No commenters challenge the consumer benefits from the transaction in any substantive way*. Although some commenters make general assertions that the benefits from the transaction will not come to pass, they offer no substantive refutation of the extensive discussion of broadband benefits in the Israel Declaration, the Rosston/Topper Declarations, and the parties' application. As one striking example, no commenter refutes the significant benefits to business customers, nor the fact that such benefits would lead to network expansion and hardening that would also help residential customers. Nor is there an economic refutation of the fact that investments made by Comcast or TWC are presently "landlocked" by limited footprints, with the geographic expansion due to the transaction thus unlocking value for incremental investments and making more such investments profitable to undertake. As such, there is no refutation of the gains from faster access networks (due to faster rollout of digital service and DOCSIS 3.0/3.1), expanded broadband networks, expanded Wi-Fi networks, or improved home network technology, nor the virtuous cycle that such improvements foster. Any one of these sizable efficiencies would likely be sufficient to overwhelm the small, tenuous claims for adverse competitive effects from the transaction; the combination of consumer benefits surely swamps any alleged harms. (See Section VIII, ¶¶ 208-222, for more detail.)

II. COMMENTERS HAVE NOT ESTABLISHED THE EXISTENCE OF A NATIONAL BROADBAND MARKET NOR THE EXISTENCE OF *ANY* MARKET IN WHICH COMCAST AND TWC CONSTRAIN ONE ANOTHER TODAY

16. Much of the public discussion of the transaction to date has appealed to calculations of the combined firm's share of national broadband subscriptions. (I discuss the details of these calculations in Section II.B.2, below.) Such calculations give complaints about the transaction the patina of traditional horizontal merger analysis in which it is standard practice to consider "the merging parties' market shares in a relevant market, the level of concentration, and the change in concentration caused by the merger."[11] However, as I explain in this section, no commenter has established the existence of a national broadband market in which such market shares would be a relevant indicator of horizontal competitive effects nor, for that matter, any market in which Comcast and TWC compete to any significant degree today. Moreover, no commenter has provided any evidence that Comcast and TWC constrain one another's behavior today. In fact, the contrary conclusion holds: Comcast and TWC do not constrain one another to any significant degree in any well-defined antitrust market today.

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11 *Horizontal Merger Guidelines*, 3.

A. COMMENTERS PROVIDE NO COHERENT BASIS TO DEFINE A NATIONAL BROADBAND MARKET IN WHICH NATIONAL BROADBAND SHARES WOULD BE RELEVANT INDICATORS OF HORIZONTAL COMPETITIVE EFFECTS

17. Several commenters present calculations of national market shares (based on various definitions of what constitutes broadband).[12] However, in presenting such shares, commenters fail to establish the existence of a national broadband market in which such shares would be relevant.

18. The lack of support for a national market in the present case is made clear by considering the Horizontal Merger Guidelines ("Guidelines"). The Guidelines indicate that product market definition is about "customers' ability and willingness to substitute away from one product to another," and that product markets are defined to include "a group of substitute products," meaning "products that are reasonably interchangeable with a product sold by one of the merging firms."[13] The Guidelines are also clear that "the same principles apply" to geographic market definition and that the market may be "geographically bounded if geography limits some customers' willingness or ability to substitute to some products, or some suppliers' willingness or ability to serve some customers."[14]

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12 *Evans Declaration*, ¶ 31 and Table 6; *Farrell Declaration*, ¶ 92 and Figure 5; *Sappington Declaration*, ¶¶ 20, 58 and note 29.

13 *Horizontal Merger Guidelines*, 7-9.

14 *Id.*, 8, 13.

19. In the present case, the market is clearly geographically bounded by individual provider's local service areas. Broadband providers do not make sales to broadband customers outside the boundaries of their geographically limited footprints and thus there is no cross-region substitution.

20. Adding edge providers into the mix does not change this conclusion. The relevant venue for analysis of potential competitive effects on edge providers involves options for interconnection into the Comcast and TWC last-mile networks; the broader venue of Internet backbone service is recognized to be highly competitive,[15] and has not been raised as an area of concern by commenters. With regard to interconnection into last-mile networks, the Comcast and TWC networks reach only customers within their footprints, and their footprints do not overlap. Hence, from the point of view of edge providers, interconnection services into the Comcast and TWC last-mile networks are not substitutes for purposes of reaching *any* consumers.

21. An alternative perspective on market definition may cause some confusion and thus deserves additional comment. One could posit that Comcast and TWC are both buyers of content from edge providers and thus both participate in a national market for content purchases. However, this analogy does not withstand scrutiny. One way to see

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15 *See, e.g.*, Memorandum Opinion and Order and Declaratory Ruling, *In the Matter of Applications filed by Global Crossing Limited and Level 3 Communications, Inc. for Consent to Transfer Control*, IB Docket No. 11-78, September 29, 2011 (hereinafter, *Level 3-Global Crossing Order)*, ¶ 27.

this is to note that, in actuality, ISPs are not generally buyers of services from edge providers, but rather edge providers (or their agents) negotiate to interconnect with ISP networks, and the networks of Comcast and TWC are not substitutes but rather geographically separate, as explained above. However, even if one continues to rely on the analogy of ISPs to buyers of content (like MVPDs buying from cable networks), the same conclusion derives from the fact that content is not a "rival" input in the sense that there are not units of content—like widgets—that are sold to a particular buyer in a market. Rather, once the content is created, it can be accessed by an unlimited number of viewers, and what is sold to MVPDs are rights to show the content. When dealing with MVPDs with separate footprints, those rights cover distinct footprints and thus are not substitutes for one another.

22. Again, the Horizontal Merger Guidelines are on point. They indicate that in defining relevant markets for mergers of buyers, "the Agencies focus on the alternatives available to sellers in the face of a decrease in the price paid by a hypothetical monopsonist."[16] Continuing with the analogy to MVPDs as buyers of content, if Comcast were to reduce the price paid for content (or not take the content at all), selling it to TWC would not be a meaningful "alternative" for a content provider. Presumably the content provider would already have a deal with TWC regarding access to the content for TWC's customers and, more generally, a deal with TWC would not replace the customers lost to

16 *Horizontal Merger Guidelines*, 32-33.

the content provider if no deal with Comcast were reached. Rather, the alternatives for the content provider to reach Comcast's customers would be deals with other MVPDs covering the Comcast footprint, some of which may have national footprints (*e.g.*, DBS providers), others of which may have distinct but overlapping geographic footprints (*e.g.*, telco providers), but none of which would be cable providers with non-overlapping footprints.

23. Indeed the Commission grappled with and resolved a similar issue in the Comcast-NBCUniversal transaction. There the issue was whether NBCUniversal, due to its affiliation with Comcast, would have an incentive to raise prices for content *to those content buyers (e.g., MVPDs) that compete with Comcast*. Although there was great disagreement on many aspects of this question, there was consensus that the relevant measure of competition with Comcast was the diversion rate—the fraction of customers leaving a given MVPD due to higher content prices that would switch to Comcast. As such, there was agreement that the set of MVPDs who competed with Comcast were those that overlapped geographically with Comcast and thus presented a true "alternative" for a content provider to reach the Comcast customers. Hence there was no allegation that non-overlapping cable providers, *including TWC*, would face higher prices from

NBCU—they were not seen as competitors for Comcast, even in a market for purchase of content.[17]

24. Notably, because national cable networks operate on a nationwide basis and some of the MVPDs buying content have national footprints, it may be most convenient to talk about a national market for sale of national cable networks, and this language may be tempting to apply to edge providers.[18] However, even if one were to adopt this language, this would be purely a semantic change with no substantive effect on merger analysis. Instead of defining separate local markets for Comcast and TWC, one would have defined a national market *in which there is no diversion between Comcast and TWC* and thus no competitive interaction between the two firms and thus no transaction-related effect on the ability for customers to divert to competing ISPs. This conclusion is confirmed by the

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17 Memorandum Opinion and Order, *In the Matter of Applications 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 (hereinafter, *Comcast-NBCU Order)*, ¶¶ 40, 42, and Technical Appendix, ¶¶ 13, 47; Department of Justice, Competitive Impact Statement, *US vs. Comcast*, Docket No. 1:11-cv-00106, January 18, 2011, 14, *available at* http://www.justice.gov/atr/cases/f266100/266158.pdf, *site visited* September 12, 2014; William P. Rogerson, "Economic Analysis of the Competitive Harms of the Proposed Comcast-NBCU Transaction," *In the Matter of Applications 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, June 21, 2010, 24-25.

18 *See, e.g.*, *Sappington Declaration*, § III.B.

Comcast-NBCUniversal analysis where a national market for national cable networks was used but where no competitive effects were found on non-overlapping cable providers.[19]

25. Finally, some commenters argue that because certain edge providers "require national distribution" or "enter the market with national distribution in mind," and because "any edge provider that requires national distribution would have to deal with the combined company," there is a market for the "national high-speed broadband distribution of edge provider content."[20] Even if one accepts that some edge providers "require" national distribution—an unsupported assertion—this argument is incoherent. Comcast and TWC provide completely distinct, non-substitutable inputs to an edge provider that seeks national distribution. If an edge provider truly "requires" national distribution and fails to obtain access to the TWC network, the Comcast network is not a substitute. Indeed, if commenters' argument were correct and some edge providers required national distribution *and* needed to work directly with ISPs to obtain it, then both Comcast and TWC would have the alleged power *today*, as failure to reach a deal with *either* of them would prevent national distribution. In fact, however, the same alternatives exist today as will exist post-transaction—the dozens of CDNs and transit

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19 *Comcast-NBCU Order*, Technical Appendix, ¶ 13 (in the context of assessing vertical incentives associated with national broadcast networks).

20 Petition to Deny of Netflix, Inc., *In the Matter of Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Transfer Control of Licenses and Authorizations*, MB Docket No. 14-57, August 25, 2014, § III.A.

providers who offer edge providers the ability to transmit traffic onto the TWC network and thus who provide a substitute to a direct agreement with the merging parties.[21]

26. In short, there is no meaningful national broadband market in which Comcast and TWC constrain one another today. Hence, national market shares lose the value they would have if there were a national market: The Guidelines make clear that it is market definition that "allows the Agencies to identify market participants and measure market shares and market concentration."[22]

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[21] It is true that the transit services offered by Comcast and TWC are among this large set of alternatives for reaching one another's network. But, as discussed throughout this declaration, the Internet backbone is highly competitive, with Comcast and TWC small players in this overall ecosystem and with no commenter alleging harm to Internet backbone services.

[22] *Horizontal Merger Guidelines*, 7. Some commenters have attempted to rely on the AT&T/MediaOne transaction (conditionally approved by the FCC and Antitrust Division of the U.S. Dept. of Justice ("DOJ") in 2000) to support the existence of a national market for broadband. (*See, e.g.*, *Sappington Declaration*, ¶ 21 and note 31). However, that case is not comparable to the present one, as has been noted by careful observers of the debate. (S*ee* Paul de Sa, et al., "Comcast/Time Warner Cable: How Persuasive Are Arguments Against the Merger?" *Bernstein Research*, September 2, 2014.) In the AT&T/MediaOne matter, the merging parties were the two largest providers in a national market for the provision of portals for accessing and interacting with the Internet, and they could compete to be the exclusive portal on unaffiliated cable systems. (*See*, *e.g.*, Competitive Impact Statement, *US vs. AT&T and MediaOne*, US District Court, District of Columbia, 1:00cv00176, May 25, 2000; Memorandum Opinion and Order, *In the Matter of Applications for the Consent to the Transfer of Control of Licenses and Section 214 Authorizations from MediaOne Group, Inc., Transferor, to AT&T Corp., Transferee*, CS Docket No.99-251, June 6, 2000). The fact that providers of exclusive portals to the Internet competed in a national market has no bearing on whether broadband providers with non-overlapping footprints compete in a national market or whether interactions between national edge providers and regional broadband providers give rise to a national broadband market.

B. POTENTIAL REVISIONS TO THE MINIMUM SPEED STANDARD USED TO DEFINE BROADBAND CHANGE NONE OF MY CONCLUSIONS ABOUT THE PROPOSED TRANSACTION

27. Along with the focus on national broadband shares has come a focus by some commenters on the minimum speed required for a particular Internet access service to qualify as broadband.[23] Given that national broadband shares are not a meaningful indicator of horizontal competitive effects of the transaction, debates over the definition of broadband—while potentially relevant for analysis of broadband-related mergers with local market overlap and for other policy issues—are of limited relevance to the analysis of the transaction. No matter which Internet access services are defined as "broadband," there is no market in which Comcast and TWC compete or constrain one another in the provision of such services, and thus the transaction raises none of the standard horizontal merger concerns.

28. Nevertheless, in the remainder of this section, I make two points regarding the minimum speed used to define broadband. First, although it makes sense to set policy goals that continue to strive for faster broadband—and indeed, as explained below, the realization of such faster speeds for more customers is an important goal and benefit of the proposed transaction—standards of market definition point either to the current 3

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[23] For more discussion of this issue, *see* Tom Wheeler, "The Facts and Future of Broadband Competition," prepared remarks at 1776 Headquarters, Washington, DC, September 4, 2014, *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0904/DOC-329161A1.pdf, *site visited* September 11, 2014 (hereinafter, *Wheeler Remarks*).

Mbps standard or, taking a more conservative, forward-looking view, to speeds no higher than 10 Mbps as the appropriate definition of broadband to use when defining markets. And even if I conservatively adopt the 10 Mbps standard, the national broadband share figures presented in the Israel Declaration (based on the FCC's current standard) change at most slightly, meaning the substantive discussion of shares in my initial declaration remains correct. Second, if one were to ignore the evidence presented in this section and insist on a standard of 25 Mbps to define broadband, one implication would be that TWC has few broadband customers today and thus that the transaction would have only a small effect on Comcast's current number of broadband customers.

1. The appropriate speed for defining local broadband markets is at most 10 Mbps, with the current standard a reasonable alternative

29. In recent statements, the Commission has pointed toward speeds of 25 Mbps as a goal for broadband service, based on speeds that may be required in certain high-use cases in which multiple users make simultaneous use of high-bandwidth broadband applications. Although it certainly makes sense for the Commission to continue to encourage faster broadband speeds to support high-use cases, some commenters have advocated using these high-use cases to define the broadband market for analysis of the present transaction.[24] However, while such high-use cases certainly can occur, they do

[24] *Sappington Declaration*, ¶¶ 15-16; *Evans Declaration*, ¶¶ 48-51.

not define markets. To the contrary, the decisions made by the marginal customers who are likely to switch providers or reduce broadband usage, and thereby discipline a theoretical price increase or quality reduction, define the boundaries of (local) broadband markets. As explained in this section, a broadband definition that excludes all broadband services below 25 Mbps would miss important competitive constraints that each of Comcast and TWC faces in its footprint and thus produce an overly narrow market definition. Rather, a speed threshold of no more than 10 Mbps (and perhaps the current 3 Mbps standard) provides a more reasonable definition of broadband for use in defining (local) broadband markets.

30. Perhaps the simplest evidence regarding the effect of excluding broadband service below 25 Mbps comes from the parties' own customers. A sizeable fraction of customers at both companies are currently on service tiers with speeds below 25 Mbps. In particular, according to the December 2013 FCC Form 477 data, **[[ ]]** percent of TWC customers and **[[ ]]** percent of Comcast customers (in combination, 41 percent of the post-transaction customers of the combined firm) are on speed tiers below 25 Mbps even though speeds over 25 Mbps are generally available.[25] Hence, to ignore speeds below 25 Mbps would be to ignore 41 percent of the customers of the combined firm.

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[25] Comcast offers a 105 Mbps downstream tier in all of its markets (*see Israel Declaration*, ¶ 167). TWC offers a 30 Mbps downstream tier in nearly all of its markets (*see*, *e.g.*, TWC document summarizing speed tiers available by geographic area: Speeds Tiers Pricing 2014 Q1.xlsx).

31. When considering substitution by the marginal customers who would discipline price increases or other competitive strategies, other recent commentary from the Commission is on point. In its recent NOI, the Commission defines usage cases that would require a speed of no more than 10 Mbps, and perhaps less.[26] In particular, the FCC estimates that a speed of 4 Mbps would be sufficient for a "light use" broadband household engaged in up to four Internet-related activities, a speed of 7.9 Mbps would be sufficient for a "moderate use" household engaged in up to four Internet-related activities, and a speed of 10 Mbps would be sufficient for a "high use" household engaged in up to four internet-related activities.[27] Thus, even for the "high use" case, customers would be

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26 *See* Tenth Broadband Progress Notice of Inquiry, *In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 14-126, August 5, 2014. In a comment to the Commission, AT&T noted that the Commission's calculations did not take into account common network management practices, such as statistical multiplexing, which would lessen the amount of bandwidth required by several applications running simultaneously. Thus, the 10 Mbps figure is likely an overestimate of throughput needs, even for the high-use case. *See* Comments of AT&T, *In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 14-126, September 4, 2014, 9-10.

27 The four activities for each type of household include: (a) one user watching a standard definition (SD) movie, one user making a high-quality voice call, one user browsing on the web, and syncing of email, alerts, and weather information taking place in the background (low use); (b) one user watching a high definition (HD) movie, one user taking an online education course, one user browsing on the web, and syncing of email, alerts, and weather information taking place in the background (moderate use); (c) one user watching a super high definition (SHD) movie, one user making a HD video call, one user saving files to and from the cloud, and syncing of email, alerts, and weather information taking place in the background (high use).

able to make use of broadband service offering speeds of 10 Mbps, indicating that such options are part of the relevant market. To the extent that "light use" or "moderate use" customers represent the marginal users who would switch following a price or quality change, the appropriate speed threshold for market definition would be even lower.

32. In addition, evidence (presented in detail in Section III.C, below) shows a significant likelihood of customer switching to slower speed services, which means that slower speed services place relevant competitive constraints on Comcast today. As one example, a survey commissioned by Comcast shows that the vast majority of customers would be willing not only to switch but to switch to slower speed service (including DSL or wireless) if their broadband provider were to degrade access to edge providers in a material way. And, notwithstanding Chairman Wheeler's concern about switching costs, substantial switching does occur: Comcast's churn data indicate that over the course of a single year, approximately **{{ }}** of Comcast's broadband customers churn.[28] As explained in more detail in Section III.C.1, below, such switching would be quite costly to Comcast, indicating that the competitive constraint from these slower speed services is relevant to Comcast pricing and other strategies.

[28] As noted below, even conservatively excluding movers from this total, roughly **{{ }}** percent of Comcast broadband customers churn each year.

33. Many industry participants consider broadband download speeds at (or near) 3 Mbps to be sufficient for many of their services today. For example, Netflix's website recommends a download speed of 3 Mbps per stream for playing movies and TV shows in standard definition quality, 5 Mbps per stream for high definition quality, and 25 Mbps *only* for Ultra HD quality.[29] Similarly, Hulu's website recommends a speed of 3 Mbps for high definition videos and 1.5 Mbps for standard definition video, and Amazon Prime's website recommends a speed of 3.5 Mbps for high definition videos and 900 Kbps for standard definition videos.[30]

2. Alternative broadband definitions do not affect my conclusion that changes in national broadband share provide no basis for a finding of horizontal competitive effects from the transaction

34. Given that there is no meaningful national market for broadband, national broadband shares are not indicative of horizontal competitive effects of the transaction in any well-defined market. Nevertheless, even if I compute national shares using a 10 Mbps threshold, they are quite similar to the shares presented in the Israel Declaration based on the 3 Mbps standard. As Table 1 shows, using a 10 Mbps threshold, the share of

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[29] *See* Netflix Internet Connection Speed Recommendations, *available at* https://help.netflix.com/en/node/306, *site visited* September 12, 2014.

[30] *See* Streaming issues with Hulu Plus on your TV, *available at* http://www.hulu.com/help/articles/20196801, *site visited* September 12, 2014; System Requirements for Streaming on Your Computer, *available at* http://www.amazon.com/gp/help/customer/display.html?nodeId=201422810, *site visited* September 12, 2014.

the merged firm (after accounting for the divestitures in the three-way Comcast-TWC-Charter transaction) is 40 percent ignoring mobile broadband competition. If mobile wireless customers are included in the share calculation, the post-transaction share with the proposed divestiture is 22.5 percent.

Table 1: National Broadband Shares Using 10 Mbps Threshold

[[REDACTED**]]**

35. Although I consider a broadband definition based on a downstream speed of 25 Mbps overly narrow and hence inappropriate, it should be noted that TWC currently has fewer than one million broadband customers with speeds at 25 Mbps or higher, whereas Comcast has more than 12 million such customers. Consequently, if broadband is defined as requiring 25 Mbps, the transaction has little effect on Comcast's current share of national broadband customers. Table 2 shows that, under a 25 Mbps definition, without accounting for mobile broadband, Comcast's share increases by only 0.7 percentage points following the transaction; with mobile broadband included Comcast's share increases by only 0.5 percentage points.

Table 2: National Broadband Shares Using a 25 Mbps Threshold

[[REDACTED]]

C. Commenters present no evidence of competitive constraints that Comcast and TWC impose on one another and thus no transaction-induced relaxation of competitive constraints

36. The Horizontal Merger Guidelines focus on mergers that lead to enhancements of market power and substantial lessening of competition. As the Horizontal Merger Guidelines note, "[a] merger enhances market power if it is likely to encourage one or more firms to raise price, reduce output, diminish innovation, or otherwise harm

customers *as a result of diminished competitive constraints or incentives.*"[31] For this reason, evidence that merging parties act as competitive constraints on one another is generally at the heart of merger analysis.

37. Such evidence of competitive constraints is entirely absent from commenters' analysis of the transaction. In particular, commenters have not advanced *any* direct evidence of a competitive constraint imposed by one of the merging parties on the other, or *any* indirect evidence of substitution between the merging parties on any dimension (either acting as sellers or buyers). As such, there is no evidence for the standard horizontal theories of harm, in which constraints imposed by one merging party prevent the other from profitably taking an action unilaterally, or taking an action in coordination with other competitors, with this constraint relaxed due to the transaction. This includes not only the obvious lack of evidence that the firms constrain one another's retail broadband pricing or strategies, but also a lack of evidence that any competitive constraints from TWC affected Comcast in its recent negotiations with Netflix, Cogent, or other edge providers or their agents. There is simply no evidence that any pricing, strategies, or negotiations would have been different absent some constraint imposed by the other merging party.

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[31] *Horizontal Merger Guidelines*, § 1 [emphasis added].

III. THE MERGING PARTIES FACE LARGE AND GROWING COMPETITIVE CONSTRAINTS, INCLUDING ON THEIR ABILITY TO AFFECT EDGE PROVIDER ACCESS TO THEIR LAST-MILE NETWORKS

38. Commenters dedicate dozens of pages to allegations of Comcast's market power, including *substantially overstated* claims about the lack of competitive alternatives available to Comcast broadband customers.[32] Commenters' focus on *current* market power is of limited relevance, particularly absent any showing that the transaction enhances that power. However, because I disagree with commenters' conclusions and because those conclusions also infect their foreclosure and bargaining theories, I refute the conclusions that commenters attempt to draw from Comcast's current broadband market position at some length in this section.

39. Before turning to this refutation, I note that commenters and I do agree on one fact: Comcast has an extremely high-quality broadband network and thus offers very high-quality broadband service to its customers. Comcast has spent tens of billions of dollars to develop its network and now offers broadband speeds up to 505 Mbps. Furthermore, as explained in the Israel Declaration, Comcast sees this transaction as a way to extend its high-quality broadband service into additional territories and to expand

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[32] For example, Dr. Evans concludes that "there are no significant competitive constraints" on Comcast and TWC and "[a]pplicants' subscribers have nowhere else to turn" (*Evans Declaration*, ¶¶ 21, 89). Dr. Sappington states that "most residential customers have little or no meaningful choice among suppliers of high-speed broadband Internet access service." (*Sappington Declaration*, ¶ 37).

its footprint for future investments, thus making more such investments profitable. The speed enabled by this broadband network is well suited to—in fact is *only* fully utilized by—online video content, and thus Comcast's broadband investment is deeply complementary to the emergence and growth of online video distributors (OVDs). This means that any strategy to harm online video distributors would involve Comcast degrading the very applications that its broadband network is built to serve and that best enable Comcast to attract broadband customers and thus generate a return on its broadband investment.

A. THE MERGING PARTIES' ABILITY TO AFFECT EDGE PROVIDER ACCESS TO THEIR LAST-MILE NETWORKS IS CONSTRAINED BY COMPETITION IN THE INTERNET BACKBONE AND AMONG LAST-MILE NETWORKS

40. Commenters dedicate substantial attention to the large number of customers who make use of Comcast's last-mile broadband networks and, from its size as a retail broadband provider, attempt to make the leap to claims about the combined firm's ability to harm edge providers' access to its last-mile network.[33] In this section, I explain why this logical leap does not follow, with further details in Sections III.B through III.D.

41. As an initial matter, note that the commenter theories of harm apply *neither* to last-mile networks nor to transit services on backbone networks through which (among other things) edge provider content is carried to the last-mile networks.

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33 *Evans Declaration*, § III.A; *Farrell Declaration*, § V.B; *Sappington Declaration*, § IV.B and § IV.E.

- The lack of any overlap between Comcast's and TWC's last-mile networks, and Comcast's stated willingness to adhere to Open Internet principles—which prevent selective degradation of particular traffic in the last mile—effectively eliminates any concern about harm in the last mile.

- Although Comcast and TWC participate in the backbone as transit providers, I have seen no allegation that either Comcast or TWC has any market power—or that the transaction would have any anti-competitive effect—in the Internet backbone. To the contrary, as noted, the Commission has previously found that Internet backbone services are highly competitive.[34] No commenter has contested that finding nor argued that this transaction will change that reality.

42. Hence, the possibility of competitive effects from the transaction collapses to the possibility of competitive effects at the "interconnection points" where last-mile and backbone networks intersect. In general, commenters' theories of harm are theories about possible changes to interconnection agreements—the terms under which edge providers, (or more often their CDN or transit provider agents) obtain access into the Comcast and TWC last-mile networks.

43. Much of the remainder of this declaration is explicitly or implicitly about why the transaction creates no harmful effects on interconnection agreements—and more importantly, no harmful effects on the terms under which edge providers can access the

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[34] *Level 3-Global Crossing Order*, ¶ 27.

Comcast or TWC last-mile networks—certainly no effects that come anywhere near the magnitude of benefits from the transaction. At core, the logic follows from a simple idea: Interconnection points are not immune from the competitive forces that prevent competitive harm in the last-mile and backbone networks that sit on either side of them. Most importantly, as explained in Section III.B, the recognized intense competitiveness of *backbone services* places strong constraints on an ISP's ability to manipulate interconnection terms in a way that would harm edge providers, whatever the size of its last-mile network. And, as developed in Section III.C, consumers *do* have important and growing choices between *last-mile networks* and thus have options should an ISP degrade edge provider access to its last-mile network. Finally, as developed in Section III.D, efforts to harm edge providers' access to last-mile networks would likely only hasten the development of new, alternative last-mile networks, sponsored directly by edge providers themselves (*e.g.*, Google), by municipalities, or by Commission action.

B. Constraints arising from the highly competitive internet backbone

1. The wide range of interconnection options means that attempts to degrade interconnection options open to edge providers would be highly disruptive to the combined firm

44. Comcast lacks the ability to degrade edge provider access to its last-mile network to any significant degree. Due to the competitiveness of backbone services, there are many options for an edge provider to obtain access to Comcast's last-mile network. In particular, as detailed in the declarations of Kevin McElearney and Constantine Dovrolis, there are dozens of third-party CDNs and transit providers that have interconnection agreements with Comcast and with which edge providers can contract to access the

Comcast last-mile network.[35] And, importantly, it is the edge provider, not Comcast (or any receiving ISP), that makes all the choices about which of these many paths to use to deliver content.[36]

45. Hence, no edge provider is forced to negotiate with Comcast directly. Rather, edge providers—either on their own if they are large enough (and choose to do so) or through CDNs or other agents—can use any of multiple paths onto the Comcast network.[37] Access through third-party routes is not just a theoretical possibility: I understand that the overwhelming majority of edge providers reach the Comcast last-mile network through indirect connections rather than through direct interconnection with Comcast. And indirect connection is not an option pursued only by small edge providers; for example, Yahoo **{{ }}**.[38]

46. Notably, more than 40 of the third parties offering access to the Comcast last-mile network have settlement-free interconnection agreements with Comcast, meaning that Comcast charges nothing to the provider for interconnection services. The existence of so many settlement-free arrangements belies any claim that Comcast is exercising significant market power via interconnection today.

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35 Declaration of Kevin McElearney, September 19, 2014 (hereinafter, *McElearney Declaration*), ¶ 3; Declaration of Constantine Dovrolis, "The Evolution and Economics of Internet Interconnections," September 21, 2014 (hereinafter, *Dovrolis Declaration*), 24.

36 *McElearney Declaration*, ¶¶ 3, 17; *Dovrolis Declaration*, 5.

37 *Israel Declaration*, § II.B.1.c.

38 Peter Stern, Executive Vice President & Chief Strategy Officer, TWC, September 3, 2014, interview; "September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request," RFI 70, 184.

47. Commenters' claim that Comcast can simply degrade or charge for these paths significantly underplays the import of the large number of settlement-free paths onto the Comcast network. In particular, to support a claim that Comcast could raise interconnection prices across the board, one would have to claim that Comcast would have sufficient power to disrupt its more than 40 settlement-free paths and force positive interconnection payments onto enough of them to disrupt significantly the spare capacity into Comcast's network, of which "there is more than enough…to carry all of Netflix's Comcast-bound traffic."[39] No commenter has presented any evidence that this is possible.

48. To the contrary, given that commenters' discussion focuses on the alleged lack of constraints that Comcast faces *today*, the evidence points in the opposite direction: Comcast has maintained all of these settlement-free paths despite its alleged market power. This Comcast behavior follows from the fact that Comcast depends on these links to maintain connectivity to the broader Internet, not just in the U.S., but globally. Attempting to disrupt them to harm particular edge provider traffic would be extremely disruptive.

49. The upshot of this wide range of paths onto the Comcast network remains what I explained in my initial declaration: To degrade significantly the access of particular edge

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[39] *McElearney Declaration*, ¶ 3.

providers to its last-mile network would require significant disruption to Comcast's own access to the broader Internet, at extremely high cost to Comcast. In particular, as the Israel Declaration explained,[40] the ability of edge providers to pool their traffic with other providers (via the use of transit providers or CDNs) and to make use of multiple paths onto an ISP's network (either on their own or via a CDN) together mean that Comcast would have to degrade its connection to the overall Internet to a significant extent to prevent a particular edge provider from accessing its last-mile network.

2. Contrary to commenters' claims, events during the recent Comcast-Netflix negotiations confirm that Comcast has little ability to harm edge providers' access to its last-mile network

50. Experts for Cogent and Netflix argue that during the recent Comcast-Netflix negotiations, Comcast was able to prevent Netflix from obtaining sufficient capacity to deliver a high-quality experience to Comcast customers.[41] I understand that this is false, with this apparent lack of capacity driven by artificial limitations placed by Netflix on the providers with which it would work. As Kevin McElearney explains in his declaration:[42]

> Netflix appears to have adopted a self-serving strategy of using limited transit providers that never purchase interconnection services from their destination ISP. The result of this self-imposed limitation is that many transit suppliers with available capacity and potentially comparable market pricing, were excluded from Netflix's consideration. This Netflix transit strategy severely limited Netflix's delivery capability and its ability

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40 *Israel Declaration*, § II.B.1(c).

41 *Evans Declaration*, § III.A.2 and § III.A.3; *Farrell Declaration*, § V.C.

42 *McElearney Declaration*, ¶¶ 23-24.

to deliver a high-quality service. No other large content provider that I know of – including several in the same space as Netflix – has adopted the same restrictive delivery requirements. The small handful of providers to which Netflix limited itself simply were not capable, by themselves, of handling delivery of one-third of peak Comcast-bound Internet traffic without arranging for massive capacity augmentations that would have far exceeded normal growth and put those providers outside of their peering policies or not in a position to augment at the speed that Netflix wanted to shift traffic. Had Netflix instead taken advantage of the many other routes into Comcast's network, including the many settlement-free routes on which Comcast had (and has) abundant available capacity, as noted above, it could have delivered its traffic to Comcast's network with high quality and no performance issues.

51. Netflix's experience with other ISPs was similar. For example, Verizon recently stated that Netflix chose to transmit traffic over congested transit paths, even while other paths into its network were uncongested and had substantial available capacity.[43]

52. More generally, Mr. McElearney confirms my understanding that Netflix had access to a wide range of interconnection points into the Comcast network, with the ability to pick and choose from those paths, such that Comcast would have needed largely to shut down its connection to the Internet to degrade Netflix's access significantly:[44]

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[43] *See* "Why is Netflix Buffering? Dispelling the Congestion Myth," *Verizon Policy Blog*, July 10, 2014, *available at* http://publicpolicy.verizon.com/blog/entry/why-is-netflix-buffering-dispelling-the-congestion-myth, *site visited* September 15, 2014. ("While the links chosen by Netflix were congested (congestion occurs when use approaches or reaches 100% capacity during peak usage periods), the links from other transit providers (carrying non-Netflix traffic) to Verizon's network did not experience congestion and were performing fine. The maximum amount of capacity used (or peak utilization) over the links between these other networks and Verizon's network ranged from 10% to 80% (with an average peak utilization of 44%)."

[44] *McElearney Declaration*, ¶¶ 3, 36.

Comcast reaches well over 99 percent of the Internet's networks through more than 40 settlement-free peers and numerous other commercial interconnection agreements, and across our interconnection partners there is more than enough capacity into our network – even enough to carry all of Netflix's Comcast-bound traffic…even in the face of the Netflix-related congestion, Comcast's utilization with its peers during the last 12 months was less than **{{ }}** percent on average during peak times – and those peers do not pay Comcast – which undermines Netflix's suggestion that it sought out all routes where no payment to Comcast was required. Netflix chose routes that it knew were insufficient, and created performance issues for itself and its customers.

3. The array of interconnection options are relevant for all providers and may be especially valuable for small edge providers

53. The wide range of options for getting traffic onto the Comcast network are relevant for all providers; no edge provider is required to negotiate directly with Comcast to access its network. That said, some large edge providers such as Netflix and Google are sufficiently large that they choose to invest in their own CDNs and then to negotiate directly with ISPs for interconnection, rather than pay third-party CDNs or transit providers to provide indirect access.[45] Not surprisingly given that such providers are large, powerful firms in their own right, the terms they have reached with the merging parties have not proven harmful to them, but rather have represented mutually beneficial disintermediation. (See Sections IV.B and VI.A for further discussion.)

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[45] Such "self supply" makes sense when the costs of distributing servers around the backbone, and paying multiple ISPs for direct access to their individual networks, is less (or no more) expensive than paying for third-party CDN services or transit. I understand that direct links also may provide additional control, oversight, and dependable capacity that a larger provider may be willing to pay for.

54. Cases like Netflix and Google are definitely the exception: The vast majority of edge providers are sufficiently small that negotiating direct access with ISPs would be inefficient. Instead, such edge providers, no matter how small, can contract with CDNs such as Akamai and Limelight to deliver content to ISPs' networks (or can use web hosting companies that in turn use CDNs, or can purchase transit from transit providers).[46] The third-party agent arranges direct interconnection with various ISPs, perhaps on its own, or perhaps working with yet another third-party transit provider that has a direct connection with the ISP.

55. By delivering traffic via third parties, small edge providers are effectively able to pool their content with other providers who use a given CDN, web hosting company, or transit provider. Moreover, because edge providers (small or large) can route their traffic over multiple redundant transit and CDN routes, in order to degrade any given edge providers' access to an ISP's network, the ISP would have to degrade a significant amount of the other traffic it receives or sends over these same links, and in the process degrade its interconnectivity with the overall Internet. Hence, small edge providers have a level of protection that distinguishes Internet interconnection arrangements from other contexts, including negotiations for carriage of traditional video offerings.

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46 Such third parties have plenty of capacity to accommodate traffic from small edge providers. For example, MIT CSAIL Information Policy Project recently found that "[f]or smaller providers of content and applications, who would normally reach their customers across the Internet either by using a third-party content delivery platform or by using the paths provided by peering and transit links, the lack of widespread congestion means they have adequate ways to reach their customers." (MIT/CAIDA, "Measuring Internet congestion: A preliminary report," *available at* https://ipp.mit.edu/sites/default/files/documents/Congestion-handout-final.pdf, *site visited* September 22, 2014).

4. Attempts by the merged firm to degrade interconnection into its network in any material way would be extremely costly

56. Recent real world experience illustrates that degradation of edge provider access to the Comcast network—whether inadvertent, intentional, or a temporary side effect of unresolved commercial negotiations—would be harmful to Comcast's business interests. For example, although the recent "event" in which Netflix quality on the Comcast network declined (at least for traffic delivered over certain routes) was fairly short lived and affected multiple ISPs at the same time—thus limiting the impact on customer churn—the Comcast complaint data indicate that customers noticed and reacted negatively to the event, directing complaints to Comcast and, at a minimum, imposing customer service costs on Comcast. In particular, during the brief period in late 2013/early 2014 when Netflix's quality on Comcast network declined (at least for traffic sent over certain routes), Comcast experienced a surge in Netflix-related customer-service calls with customers complaining about Comcast's broadband service. Figure 1 shows that the Netflix-related service calls spiked by approximately **[[ ]]** percent, from **[[ ]]** per month before the onset of the dispute to more than **[[ ]]** per month during the dispute period, which lasted from November 2013 through February 2014. The number of customer calls declined in March and thereafter as Netflix performance improved with the re-routing of its traffic after the resolution of the dispute.

[[ ]]

C. Constraints imposed by customers, making use of the full range of choices regarding broadband service

57. In this section, I explain that even if, despite the analysis above, Comcast attempted and managed to degrade edge provider access significantly, customers would react in a wide range of ways that would impose substantial costs on Comcast, thus further reducing the chance that Comcast could undertake such actions profitably.

1. Any reduction in customers' demand for broadband services would be quite costly to the merging parties

58. Although certain commenters spend substantial time arguing that customers have limited ability to reduce their consumption of Comcast broadband services—a point I refute below—they fail to acknowledge the substantial cost that such reductions in consumption of broadband service would have on Comcast. Customers taking broadband service are extremely valuable to Comcast, both in absolute terms and relative to customers not taking broadband service. Given the high value associated with broadband service, the converse also holds—the loss of a broadband customer is quite costly to Comcast.

59. Ordinary-course-of-business customer lifetime value (CLV) calculations show that the addition of broadband service increases a customer's lifetime value to Comcast **[[ ]]**.[47] Comcast has computed the following CLVs for standalone and bundled products:[48]
{{ }}

60. Notable from this table is the high CLV associated with broadband relative to other products and thus the high cost to Comcast if a customer were to drop broadband service. For example, if a broadband/video double-play customer were to drop broadband service, her CLV would fall from **{{ }}**, thus eliminating more than **{{ }}** percent of her expected lifetime value. No such effect is seen for traditional video: If the double-play customer drops video and thus switches to "data only," this eliminates less than **{{ }}** percent of the double-play CLV (**{{ }}** in double play CLV). A similar pattern holds for

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47 In interpreting these high broadband CLVs, it is important to remember that, as explained in Section II, there is no coherent theory of horizontal harm in broadband competition in this case. If there were such a theory (as in a merger of overlapping broadband providers), then standard "upward pricing pressure" logic might imply that the presence of high broadband CLVs heightens the horizontal concern. In the present case, however, with no coherent theory of horizontal harm, the relevant implication of the high broadband CLVs is that Comcast would be unlikely to find it profitable to harm its profitable broadband business to help its much less profitable video business. Moreover, one also cannot use the broadband CLVs to infer that Comcast has sufficient market power in broadband to foreclose OVD competition. Rather, as explained in Section IV.A, Comcast lacks this ability due to factors including the range of options open to OVDs (including powerful established OVDs like Google, Apple, and Netflix) to access Comcast's network; the large number of non-Comcast/TWC broadband customers outside Comcast's footprint and around the world; and the substantial harm that any attempt to degrade edge provider access would do to demand for Comcast's broadband services.

48 The table is based on slide 17 of Comcast's October 2013 presentation titled "Customer Lifetime Value (CLV)." I understand that this presentation was developed by the Finance Department at Comcast and that the CLV is based on the **[[ ]]**.

single-play customers. Losing a single-play broadband customer leads to an expected reduction in CLV of **{{ }}** loss from losing a single-play video customer. These figures indicate that Comcast suffers substantial losses with each loss of a broadband customer, even if some fraction of those customers chose to replace broadband service with video service.

61. Given that 44 percent of all Comcast broadband customers subscribe to a triple-play package, including video and voice in addition to broadband, the conclusions in this section become even stronger.[49] For any triple-play customers who react to downgraded Comcast broadband service by disconnecting their overall service—as some surely would—Comcast loses **{{ }}** in value, an amount equivalent to the value from more than **{{ }}** standalone video customers (or from more than **{{ }}** customers adding video to what had been a standalone data subscription). Hence, any material risk of loss of triple-play customers would act as a significant deterrent to strategies to downgrade broadband.

2. Customers can substitute away from ISPs along multiple dimensions

62. In evaluating the extent to which customers have the ability to substitute away from Comcast's broadband services, commenters fail to consider all relevant margins of substitution. In particular, commenters focus only on the extent to which Comcast and

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[49] *See* Comcast data produced in FCC Information and Data Request – Exhibit 4.2(e).

TWC customers can substitute to alternative high-speed, wireline ISPs (*i.e.*, one part of the "extensive margin"), ignoring the fact that, if faced with diminished or more expensive broadband service, any Comcast customer in any region could downgrade or even cancel broadband service altogether (*i.e.*, the intensive margin).

(a) Adjusting the Intensity of Usage/Tier of Service (Intensive Margin)

63. Even without switching providers, customers could react to downgraded Comcast broadband service along the intensive margin in a variety of ways, at least two of which would harm Comcast:

- First, if their access to OVDs and other edge providers were degraded, customers might decide they no longer need broadband service from Comcast at all, perhaps relying on mobile service instead, combined with Internet access at work.

- Second, customers could choose to downgrade to a lower tier of Comcast's broadband service (or fail to upgrade to a higher tier). Indeed, both the Commission and industry participants recognize that access to OVD offerings is an important driver of demand for high speed broadband service, so an inability to utilize higher speeds for such access could very well undermine the value of those tiers.[50] Comcast currently offers broadband products that include (among others)

[50] Reed Hastings (Netflix, Inc. CEO), 4Q13 Earnings Call, January 22, 2014. The Commission also recognizes that HD-quality streaming is one of the key edge uses that requires high-speed data networks. (*See* Broadband Speed Guide, *available at* http://www.fcc.gov/guides/broadband-speed-guide, *site visited* September 12, 2014).

the 3 Mbps Economy Plus product ($39.95 per month), the 6 Mbps Performance Starter product ($49.95 per month), and the 150 Mbps Extreme 150 package ($89.99 per month).[51] Comcast indicates that customers who watch video extensively online disproportionately choose higher-speed tiers.[52] Hence, if a reduction in the quality (or increase in the cost) of OVD offerings on the Comcast network were to cause a customer to downgrade broadband service from, for example, Extreme 150 to Economy Plus (which is more than fast enough for most non-video applications), this would cost Comcast $50 per month in revenue—or $1200 over a two-year period. Not surprisingly, then, Netflix CEO Reed Hastings recently explained how Netflix services help cable companies by noting: "I think the more that you own cable companies, you want great broadband services, *you want consumers to take higher and higher priced tiers.*"[53]

64. In sum, then, even those customers who might choose not to switch broadband providers if their service were degraded can (and likely would) react to such degradation by downgrading

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51 *See* http://www.comcast.com/internet-service.html, *site visited* September 12, 2014.

52 John Schanz, Executive Vice President and Chief Network Officer, Comcast Corporation, September 18, 2014, interview.

53 Reed Hastings (Netflix, Inc. CEO), 4Q13 Earnings Call, January 22, 2014 (emphasis added). The Commission also recognizes that HD-quality streaming is one of the key edge uses that requires high-speed data networks. (*See* Broadband Speed Guide, *available at* http://www.fcc.gov/guides/broadband-speed-guide, *site visited* September 12, 2014).

or canceling broadband service, a decision which would be quite costly to Comcast. And importantly, the threat to substitute along the intensive margin in this way is open to *all* Comcast customers, not just those in areas where Comcast faces a particular set of broadband competitors.

(b) Switching to Another Provider (Extensive Margin)

65. Despite overstated assertions that "[f]or all intents and purposes, the Applicants' subscribers have nowhere else to turn,"[54] the evidence presented by commenters is actually quite consistent with the evidence that I presented in the Israel Declaration, showing that most subscribers definitely do have "somewhere else to turn."[55] In particular, Dr. Evans indicates that, on average, Comcast customers have one other *fixed* high-speed (greater than 10 Mbps) broadband option.[56] Similarly, Dr. Farrell acknowledges that most local markets have at least two competitors.[57] Thus, by commenters' own evidence, the majority of Comcast and TWC customers do have at least one alternative that would meet even these commenters' standards for a relevant competitor, a finding consistent with the evidence in my original declaration. In addition,

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54 *Evans Declaration*, ¶ 89.

55 *See Israel Declaration*, ¶ 43 (citing to FCC data showing that "approximately 97 percent of households are located in census tracts in which two or more fixed broadband providers report offering at least 3 Mbps downstream and 768 kbps upstream and approximately 70 percent are located in census tracts in which two or more providers report offering at least 10 Mbps downstream and at least 1.5 Mbps upstream.").

56 *Evans Declaration*, Table 2.

57 *Farrell Declaration*, ¶ 55.

as indicated in the June 2013 FCC Internet Access Report, the inclusion of wireless options—which are becomingly increasingly relevant, with new developments announced nearly every day, as I will explain below—substantially increases the set of options, as 98 percent of US households are located in census tracts that have access to two or more fixed and mobile broadband providers offering speeds of at least 10 Mbps.[58]

66. In Section III.C.4, I present empirical evidence that, faced with a reduction in the quality of broadband service, customers would, in fact, switch to such alternatives—including lower speed, DSL, and wireless options—in large numbers, thus imposing substantial costs on Comcast per the CLV numbers presented above. Before turning to that, I provide some additional details on the set of alternatives and recent developments that continue to strengthen these alternatives.

3. There exists a large and growing set of competitive broadband alternatives

(a) Overview of Telco Options

67. Commenters discuss two of the broadband options offered by telco providers (DSL and wireless) separately, thus creating an incomplete perspective on the full competitive threat imposed by telco providers. Among other things, this one-off evaluation of these telco options leads commenters to a double standard in which they

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58 *See* Figure 5b in FCC's Report titled "Internet Access Services: Status as of June 30, 2013," *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-327829A1.pdf, *site visited* September 20, 2014).

downplay DSL—which is highly relevant today—due to claims that its competitive significance is declining, while ignoring the fact that the competitive significance of FTTP and wireless options—while somewhat more limited today—is growing rapidly. Hence, in this section, I present a more unified view of the competitive strategies and offerings of telco providers. This unified view reveals, unsurprisingly, that firms like AT&T, Verizon, CenturyLink, and others remain powerful broadband competitors and are poised to become even more powerful, in a continuation of the "leapfrogging" that has long characterized broadband competition.[59]

68. Leading the way among the full set of telco options, fiber to the premises ("FTTP") is offered by telcos in a growing set of geographic areas, with some of the growth being tied directly to the need to respond competitively to the proposed transaction.[60] And in areas where FTTP is not presently available, telcos are substantially improving their DSL service. Layered on top of those options, high-speed wireless

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59 FCC Chairman Wheeler recently described this leapfrogging phenomenon as follows: "The path from narrowband, to broadband, to high-speed broadband, was forged by competition. In order to meet the competitive threat of satellite services, cable TV companies upgraded their facilities. When the Internet went mainstream, they found themselves in the enviable position of having greater network capacity than telephone companies. Confronted by such competition, the telcos upgraded to DSL, and in some places deployed all-fiber, or fiber-and-copper networks. Cable companies further responded to this competition by improving their own broadband performance. All this investment was a very good thing." (*Wheeler Remarks*, 3).

60 Thomas Gryta, "AT&T to Build Out Ultrafast Internet in North Carolina," *Wall Street Journal*, April 10, 2014, *available at* http://online.wsj.com/news/articles/SB10001424052702303873604579492103338327532, *site visited* September 15, 2014.

broadband is available nearly ubiquitously. As discussed in the Israel Declaration,[61] the combined set of approaches to providing broadband service makes telco firms highly significant competitors.

69. Actual data on market growth rates belie any claim that, appropriately considered as a whole, telco options are falling behind relative to cable; to the contrary, wired telco options are growing faster than cable, and the telco growth rates are even higher when wireless is included. Table 3 shows broadband customer counts from June 2009 through June 2013 and average annual growth rates for FTTP, DSL, mobile wireless, and cable technologies using the FCC's current definition of broadband (based on speeds of 3 Mbps downstream and 768 Kbps upstream). I rely on the existing broadband definition in order to let the data tell the story—if, for example, telco products are more concentrated in the lower speed ranges, *and* therefore are less popular, telco growth rates should be correspondingly lower.[62] They are not.

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61 *Israel Declaration*, ¶¶ 49-68. I note that data available at the time of the *Israel Declaration* understated the overlap between the Comcast/TWC footprints and the telco footprints. Newly available data indicate greater overlap than reported in ¶¶ 50 and 56 of the *Israel Declaration* (*See* Letter from Comcast, TWC, and Charter to the FCC, June 25, 2014, p. 4, which shows, for example, overlap between the Comcast footprint and AT&T's U-verse footprint of **[[ ]]** percent, and overlap between the TWC footprint and the U-verse footprint of **[[ ]]** percent, compared to overlaps of **[[ ]]** percent and **[[ ]]** percent, respectively, reported in my original declaration.).

62 In addition, if 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.

70. Across both wired options (*i.e.*, FTTP + DSL), the total number of wired telco customers grew at an annual rate of 26.9 percent during this period, and when wireless is included, the total number of telco customers grew at an annual rate of 89.6 percent. *Hence, with or without including wireless options, the telco broadband growth rate is substantially higher than the cable broadband growth rate of only 17.9 percent.*

71. In the following sections, I provide more details on the full set of telco broadband options that are generating this growth.

Table 3: Customer Growth Rates for Connections with Speeds at least 3 Mbps-downstream and 768 Kbps-upstream, June 2009 through June 2013

	Subscriptions					
Month	FTTP	DSL	Mobile Wireless	FTTP + DSL	FTTP + DSL + Wireless	Cable
Jun-2009	3,333,000	5,623,000	224,000	8,956,000	9,180,000	23,958,000
Dec-2009	3,739,000	6,408,000	1,706,000	10,147,000	11,853,000	28,583,000
Jun-2010	4,192,000	6,288,000	4,188,000	10,480,000	14,668,000	30,616,000
Dec-2010	4,725,000	7,316,000	10,416,000	12,041,000	22,457,000	32,338,000
Jun-2011	5,188,000	8,925,000	16,242,000	14,113,000	30,355,000	34,113,000
Dec-2011	5,606,000	10,377,000	30,918,000	15,983,000	46,901,000	34,699,000
Jun-2012	6,001,000	12,905,000	43,025,000	18,906,000	61,931,000	37,798,000
Dec-2012	6,425,000	13,061,000	63,876,000	19,486,000	83,362,000	44,133,000
Jun-2013	6,989,000	16,063,000	93,247,000	23,052,000	116,299,000	46,014,000
Average Annual Growth Rate (June to June)	20.4%	30.7%	584.8%	26.9%	89.6%	17.9%

Sources: FCC Internet Access Reports.

(b) FTTP

72. Commenters all seem to agree that FTTP options pose a significant competitive threat to cable. As such, the recent and planned growth in these options is of particular note. For example, the Israel Declaration noted that AT&T had begun to deploy FTTP (specifically, its GigaPower product with speeds up to 1 Gbps) in certain cities, including

Austin, Texas.[63] In the context of its proposed merger with DirecTV, AT&T stated the following in a submission to the Securities and Exchange Commission (SEC):[64]

> The economics of this transaction will allow the combined company to upgrade 2 million additional locations to high speed broadband with Gigapower FTTP (fiber to the premise) and expand our high speed broadband footprint to an additional 13 million locations . . .

73. Prior to the announcement of its proposed merger with DirecTV, AT&T had already been advancing the deployment of FTTP. In April of this year, in an announcement similar to that of Google Fiber's, AT&T announced plans to expand GigaPower in as many as 100 candidate cities in 21 metropolitan areas.[65] Since then, it has launched service in Austin and Dallas/Ft. Worth and has reached agreements with 11

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63 *Israel Declaration*, ¶ 53.

64 AT&T Inc., Current Report (Form 8-K), Item 8.01 Other Events, June 3, 2014. *See also*, Applications of AT&T Inc. and DIRECTV for Consent to Transfer Control of Licenses and Authorizations, Description of Transaction, Public Interest Showing, and Related Demonstrations, June 11, 2014 ("Specifically, the combined company will commit to provide FTTP wireline broadband service to 2 million more customer locations. In addition, the combined company will commit to deploy fixed wireless local loop ("WLL") technology to bring high-speed broadband to approximately 13 million largely rural customer locations. By using a fixed antenna, this service is designed to perform as well as services with advertised speeds of 15-20 Mbps. This fixed WLL deployment will include areas outside AT&T's wireline footprint and areas within that footprint that currently do not receive the U-verse broadband and video bundle.").

65 Jon Brodkin, "AT&T Copies Google, Names 100 Cities Where It Could Offer Gigabit Fiber," *Ars Technica*, April 21, 2014, *available* at http://arstechnica.com/business/2014/04/att-copies-google-names-100-cities-where-it-could-offer-gigabit-fiber/, *site visited* April 23, 2014.

additional cities in California, Kansas, North Carolina, Tennessee, and Texas.[66] AT&T Chief Executive Randall Stephenson stated that AT&T's work in Austin, along with the proposed Comcast/TWC merger, "has encouraged the company to be 'a little more aggressive and assertive in deploying that technology around the country.'"[67]

74. In addition to AT&T, other providers have launched or are planning to expand their FTTP services. As I discuss in more detail in Section III.D below, Google Fiber and numerous municipalities are expanding their offerings or entering the FTTP broadband space. Among telco providers, Verizon's CEO has just indicated that "he is more open now than before to expanding the company's FiOS broadband Internet service in new markets."[68] Cincinnati Bell has launched "Fioptics Gigabit" in its footprint and explicitly

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66 *See* http://www.att.com/att/gigapowercities/, *site visited* September 19, 2014; Scott Moritz, "AT&T Plots Zippiest Internet Speed in Google's Backyard," *Bloomberg*, August 20, 2014, *available at* http://www.bloomberg.com/news/2014-08-20/at-t-plots-zippiest-internet-speed-in-google-s-backyard.html, *site visited* August 21, 2014; Jeff Baumgartner, "AT&T Adds Overland Park To 'GigaPower' Targets", August 8, 2014, *available at* http://www.multichannel.com/news/technology/att-adds-overland-park-gigapower-targets/382993#sthash.dqo3m6o9.dpuf, *site visited* September 19, 2014.

67 Thomas Gryta, "AT&T to Build Out Ultrafast Internet in North Carolina," *Wall Street Journal*, April 10, 2014, *available at* http://online.wsj.com/news/articles/SB10001424052702303873604579492103338327532, *site visited* September 15, 2014.

68 Ryan Knutson, "Verizon Eyes Digital Video Service by Mid-2015," *Wall Street Journal*, September 11, 2014, *available at* http://online.wsj.com/articles/verizon-ceo-eyes-digital-video-service-by-mid-2015-1410467151, *site visited* September 11, 2014.

compares its top download speeds to those of TWC.[69] And CenturyLink has launched gigabit service to both residential and business customers in ten cities, where it competes with Cox, Mediacom, Bright House, and Comcast, and to just business customers in six additional cities.[70]

(c) DSL

75. For many customers, DSL remains a highly relevant competitor to cable broadband today, one that is likely to continue to remain relevant in the future given advances in DSL technology. As noted in the Israel Declaration, advanced DSL technologies like VDSL, which are based on "fiber-to-the-node" ("FTTN") architecture, offer speeds up to 100 Mbps while non-FTTN DSL technology can deliver speeds up to 45 Mbps, which certainly qualifies as broadband service and is more than sufficient to meet the requirements of many broadband customers.[71] Furthermore, the competitive pressure imposed by DSL is likely to increase over time as telcos continue to make investments in upgrading their DSL footprints.[72] As discussed in detail below, ordinary course business documents as well as customer surveys indicate substantial switching

69 Alan Breznick, "Cincinnati Bell Preps for 1-Gig," *Light Reading*, August 20, 2014, *available at* http://www.lightreading.com/broadband/fttx/cincinnati-bell-preps-for-1-gig-/d/d-id/710411, *site visited* August 21, 2014.

70 Jeff Baumgartner, "CenturyLink Pushes 1-Gig Expansion," *Multichannel News*, August 5, 2014, *available at* http://www.multichannel.com/news/technology/centurylink-pushes-1-gig-expansion/382971, *site visited* August 7, 2014.

71 *Israel Declaration*, ¶ 55.

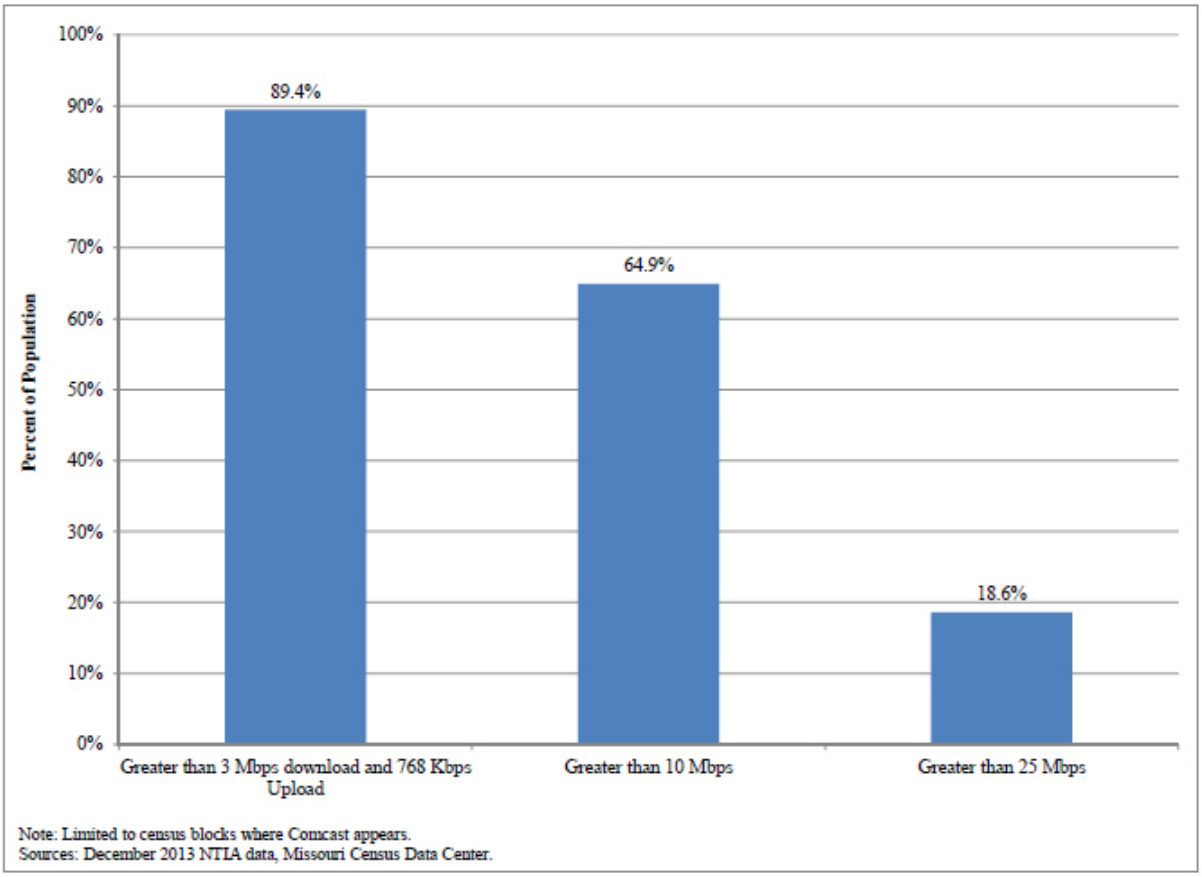
72 *Id.*, ¶¶ 57-59.

from Comcast to DSL, thus confirming that DSL would impose a competitive constraint on Comcast if it were to consider degrading its broadband service.

(1) DSL is a viable alternative

76. DSL easily meets the 10 Mbps threshold in many areas. As is evident in Figure 1, nearly 65 percent of the population has access to a DSL provider offering speeds of 10 Mbps or more, and over 18 percent of the population has access to a DSL provider offering speeds of 25 Mbps or more.

Figure 1: Distribution of Population in Comcast Footprint by DSL Speed



77. In his report, Dr. Evans points to the fact that **{{ }}** occurs on mobile devices today as evidence that wireless service is not an important substitute for wireline options, **{{ }}**. I discuss the limitations of this analysis below (including the fact that it is a backward-

looking analysis at a time when extremely rapid changes in mobile video require a forward-looking perspective). Here, I note that Dr. Evans fails to provide a similar statistic for the current share of Netflix viewing that occurs on DSL connections, a telling omission. Although I do not have the required Netflix data to compute the percentage of Netflix viewing on DSL, it is noteworthy that of the 60 broadband providers included on Netflix's "USA ISP Speed Index," *approximately* 20 provide DSL service.[73] Perhaps even more telling, in Netflix's most recent Speed Test (July 2014), the average speed of many of the DSL providers was greater than the average speed offered by some cable providers, *including TWC*. For example, the average Netflix speeds for Shentel, Lumos, Cincinnati Bell, and Sonic—all DSL providers—were higher than the average speeds for TWC, Brighthouse, and Mediacom.

78. Commenters have also claimed that differences in prices between cable broadband products and DSL suggest that they are in different product markets.[74] However, antitrust economists have long recognized that what matters for product market definition is the degree of substitutability between the products, not differences in their prices.[75] Differences in prices do not necessarily mean that products are not substitutes or are not

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73 Netflix USA ISP Speed Index, *available at* http://ispspeedindex.netflix.com/usa, *site visited* September 5, 2014.

74 *Sappington Declaration*, ¶¶ 18-19.

75 *See*, for example, Gregory J. Werden and Luke M. Froeb (1993), "Correlation, Causality, and All that Jazz: The Inherent Shortcomings of Price Tests for Antitrust Market Delineation," *Review of Industrial Organization*, 9: 329-353.

in the same market. To the contrary, in cases like the present one where one product (DSL) may be of relatively lower quality than some other products, the price differences often serve to make up for the quality gap, making quality-adjusted prices more similar and thus generating more substitution among the products.[76] Hence, the pricing of DSL provides a mechanism for telco providers to make DSL more attractive to customers, further enhancing DSL's role as an important part of telco providers' overall broadband strategy and an important competitive constraint on cable ISPs.

79. Commenters, including Dr. Evans, claim that the lack of DSL growth indicates that DSL is not an important competitive threat.[77] In particular, Dr. Evans argues that the loss of DSL customers between 2011 and 2013 for AT&T (non-U-verse), Verizon (non-FiOS), and other telco providers suggests that DSL is no longer a viable competitor for cable broadband. Although I agree that growth rates can be one indicator of competitive strength, this indicator, when correctly measured, actually points to the overall strength of telco, as shown above. As an example of the misleading nature of Dr. Evans' narrow

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[76] *See*, *e.g.*, Motta (2004) who states that "using price differences as a criterion to define the relevant market is unsound…It might well be, for instance, that the price of product A is twice as much as the price for product B, but that it would be unprofitable to raise the price of A even by a small amount since most of those buying it would switch to B. Markets that exhibit quality differentials are likely to be a case in point. Organic bananas might command a large price premium over bananas grown in plantations that use pesticides…However, a further increase in price of organic bananas (say, because of a merger) is not profitable if there is a sizeable proportion of consumers less keen on organic food who will then switch to non-organic bananas." (Massimo Motta (2004), *Competition Policy: Theory and Practice*, Cambridge University Press, 109-110.)

[77] *Evans Declaration*, ¶¶ 59-61; *Sappington Declaration*, ¶ 18 and note 25.

focus on DSL, he failed even to account for DSL customers who have been upgraded by their telco providers to higher speed technologies. Such customer transitions actually represent overall telco strength, but Dr. Evans ignores that point with his narrow focus on non-U-verse and non-FiOS customers.[78]

80. Even if one chooses to focus on DSL growth by itself (rather than overall telco growth), Dr. Evans' results are incorrect. For example, he excludes U-verse even though U-verse is acknowledged to be an advanced form of DSL.[79] Table 3 shows overall DSL growth rates including all DSL options. As seen in the table, using the current 3 Mbps definition of broadband, *the growth rate in DSL subscribership exceeded the growth rate in cable subscribership* between June 2009 and June 2013. During this time, the average annual subscribership growth rate was 30.7 percent for DSL relative to 17.9 percent for cable. The difference in annual growth rates is even more pronounced under the 10 Mbps downstream definition of broadband: 150.6 percent for DSL, relative to 52.8 percent for cable. In sum, these differences in growth rates suggest that DSL remains a significant competitive threat to cable broadband.

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[78] For example, U-verse subscribership increased from 5.2 million in 2011 to 7.7 million in 2012 and to 10.4 million in 2013, implying growth rates of 47.7 percent and 34.4 percent, respectively.

[79] The FCC Internet Access Reports, for example, consider U-verse a DSL technology and include U-verse's customer figures in the counts of DSL customers.

(2) Empirical evidence indicates substantial substitution from cable to DSL

81. Analysis in the ordinary course of business by Comcast also indicates substantial switching to DSL, meaning that, based on its own analyses, Comcast cannot ignore DSL as a competitive threat. In particular, Comcast conducts quarterly studies on customers who voluntarily disconnect or downgrade their broadband, video, or voice services.[80] **Error! Reference source not found.** below presents results for customers who disconnected their broadband service in early 2011, 2012, 2013, and 2014. The results indicate that a sizeable fraction of disconnects were accounted for by switches to DSL. For example, most recently in Q1 2014, **[[ ]]** percent of the disconnects switched to a DSL provider, and in prior years no less than **[[ ]]** percent of the disconnects switched to a DSL provider. Thus, DSL remains an important destination for broadband customers leaving Comcast, which is also confirmed by the customer survey evidence discussed in Section III.C.4, below.

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80 These studies are based on phone surveys of approximately 2000 households who disconnected services in the prior month.

[[ ]]

(d) Wireless

82. Some commenters also assert that wireless Internet access is not a good alternative for wired Internet access.[81] In support of this view, Table 1 in Dr. Evans' declaration indicates that in May 2014, only **{{ }}** percent of Netflix viewing hours were accounted for by mobile wireless. However, Dr. Evans' argument represents 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. Indeed, 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."[82] Similarly, Netflix's OVD rival Hulu recently called wireless a "really critical" part of its business and also noted that in just three years, "content on Hulu has jumped from zero percent to 20% viewership using mobile

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81 *See, e.g., Farrell Declaration*, ¶¶ 28, 49; *Sappington Declaration*, ¶¶ 14-15; *Evans Declaration*, ¶¶ 45, 47.

82 Janko Roettgers, "Netflix May Add Short-form Content to Increase Mobile Usage," *GIGAOM*, September 5, 2014, *available at* http://gigaom.com/2014/09/05/netflix-short-clips/?utm_medium=social&utm_campaign=socialflow&utm_source=twitter&utm_content=netflix-short-clips_870690, *site visited* September 11, 2014.

devices."[83] As another example, Verizon is poised to launch a new mobile-focused OTT business in 2015:[84]

> Verizon is envisioning a service that would be akin to Netflix . . . but also would likely stream some live channels . . . it 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.

Other industry representatives also recognize the growing importance of video over wireless. For example, Ericsson notes: "[v]ideo is the largest and fastest growing

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83 Deborah Yao, "Wireless Operators Getting Serious about Mobile Video," *SNL*, September 10, 2014, *available at* http://www.snl.com/InteractiveX/article.aspx?CDID=A-29163017-14378&KPLT=4, *site visited* September 11, 2014.

84 Ryan Knutson, "Verizon Eyes Digital Video Service by Mid-2015," *The Wall Street Journal*, September 11, 2014, http://online.wsj.com/articles/verizon-ceo-eyes-digital-video-service-by-mid-2015-1410467151, *site visited* September 11, 2014. For background, *see*, *e.g.*, "September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request," RFI 13.A.2.f., 35 ("For example, in February 2012, Verizon formed a joint venture with the parent company of Redbox to provide over-the-top services. And, earlier this year, Verizon purchased an online video streaming service from Intel that purportedly will enable it to provide a competitive MVPD substitute service over the Internet, including over wireless broadband networks."). *See also*, Verizon Communications at Goldman Sachs Communacopia Conference, edited transcript, September 11, 2014, p. 5 ("So if you look at an over-the-top, I [Lowell McAdam, Chairman and CEO of Verizon] think you could end up with a bundle that will have the major broadcast content providers and we would use our network around multicast to handle that very efficiently. And then you'd have a lot of these sort of custom channels that people can do the video demand, the IPTV much more interactive that you could have on these individual channels . . . So that whole ecosystem . . . is coming together; it has been primed for a while. But as I say, over the last six months to a year, that dialogue is changing dramatically.").

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 traffic."[85]

83. I present more information on the growth of wireless usage below. Before doing so, I note that, in terms of speed, wireless users can already obtain broadband-level performance today. For example, according to NTIA data, the percentage of U.S. population with access to a mobile wireless provider offering broadband speed of *at least 10 Mbps* downstream increased from 7.9 percent in December 2010 to *97.5 percent* in June 2013.[86] Given the widespread availability of wireless networks with broadband-level speed, the main obstacles to increased wireless usage relate to costs and capacity constraints, but these obstacles are diminishing rapidly, as discussed below.

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85 "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, *site visited* September 4, 2014. *See also* "Global Video Index: Q1 2014," *Ooyala*, *available at* http://go.ooyala.com/rs/OOYALA/images/Ooyala-Global-Video-Index-Q1-2014.pdf, *site visited* September 4, 2014.

86 *Israel Declaration*, ¶ 62. National Broadband Map data indicates that 97.5 percent of the U.S. population has access to wireless broadband at speeds greater than 10 Mbps downstream. ("Broadband Statistics Report: Access to Broadband Technology by Speed," July 2014, *available at* http://www.broadbandmap.gov/download/Broadband%20Availability%20in%20Rural%20vs%20Urban%20Areas.pdf, *site visited* September 12, 2014.)

(1) Wireless is growing rapidly in its viability as a broadband alternative

84. As noted in the Israel Declaration, estimates of the degree of substitution from wireline broadband to wireless broadband have been increasing over time.[87] Consistent with these estimates, a recent report on Internet trends notes that mobile usage as a percentage of web usage (defined as the percentage of page views coming from mobile devices) increased from 11 percent in May 2013 to 19 percent in May 2014 in North America.[88]

85. Furthermore, industry research indicates that gains in wireless capacity and reductions in cost will make wireless broadband an increasingly relevant alternative over time.[89] As detailed (with reference to industry sources) in the Israel Declaration, additional spectrum will be released via the upcoming spectrum auctions (*e.g.*, AWS-3 auction and 600 MHz incentive auction), and average spectral efficiency is expected to improve with further LTE deployment and advances in LTE technology. The spectrum auctions and greater LTE deployment and innovation will increase the capacity of

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87 *Israel Declaration*, ¶ 65.

88 Mary Meeker, "Internet Trends 2014 – Code Conference," *KPCB*, May 28, 2014, *available at* http://s3.amazonaws.com/kpcbweb/files/85/Internet_Trends_2014_vFINAL_-_05_28_14-_PDF.pdf?1401286773, *site visited* September 12, 2014, Slide 9.

89 *See, e.g.*, the **[[ ]]** studies discussed in *Israel Declaration*, ¶¶ 64-65.

wireless networks, which will put downward pressure on cost and price per gigabyte.[90] Continuing recent trends of declining prices to consumers, wireless providers' costs are expected to fall roughly **[[ ]]** percent over the next several years which should reduce consumer prices substantially.[91] The increasing threat of wireless broadband is also noted in a recent **[[ ]]**[92]

86. New wireless technologies are further increasing their competitive relevance, particularly for video applications. For example, LTE multicast, based upon evolved Multimedia Broadcast Multicast Service (eMBMS), allows identical content to be sent to many customers at the same time, thus enhancing network efficiency and increasing effective network capacity.[93] As noted in a recent press report, "Verizon Communications CFO Fran Shammo called the advent of Multicast 'the pivotal point that starts to change the way content is delivered over a mobile handset which opens up content into the wireless world.'"[94] AT&T announced in August of this year that it plans to launch LTE multicast some time in 2015, and Verizon Wireless plans to begin seeding its devices with

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90 *Israel Declaration*, ¶ 67.

91 *Id.*, ¶ 67. *See also* **[[ ]]**.

92 **[[ ]]**.

93 For background information concerning LTE multicast, *see, e.g.*, Jeff Baumgartner, "Verizon CFO: LTE Multicast 'Pivotal' To Mobile Video," August 12, 2014, *available at* http://www.multichannel.com/news/technology/verizon-cfo-lte-multicast-pivotal-mobile-video/383137, *site visited* September 11, 2014.

94 Phil Goldstein, "AT&T to Launch LTE Multicast in 2015," *FierceWireless*, August 13, 2014, *available at* http://www.fiercewireless.com/story/att-launch-lte-multicast-2015/2014-08-13, *site visited* August 15, 2014.

technology that can support multicast in the fourth quarter of this year, with plans to launch the service in 2015 as well.[95]

87. Advances in fixed wireless technology provide additional support for expected improvements in wireless capacity and the corresponding downward pressure on wireless network costs and prices. As discussed in the Israel Declaration, fixed wireless is a special type of wireless service that uses radio spectrum (generally licensed to wireless telecommunications providers) to communicate between two fixed points.[96] AT&T recently announced plans to bundle DirecTV with 15 Mbps fixed wireless broadband service by dedicating spectrum to a fixed wireless broadband complement to satellite TV service.[97] In an AT&T SEC filing in June of this year, AT&T discussed fixed wireless as an anticipated benefit of its planned merger with DirecTV:[98]

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95 *Ibid. See also*, Jim Barthold, "Report: Verizon will Deliver Cable TV over 4G LTE," *FierceCable*, August 13, 2014, *available at* http://www.fiercecable.com/story/report-verizon-will-deliver-cable-tv-over-4g-lte/2014-08-13, *site visited* August 15, 2014.

96 *Israel Declaration*, ¶ 63.

97 *See, e.g.*, Daniel Frankel, "AT&T plans to bundle DirecTV video with satellite-delivered wireless broadband for rural customers," *FierceCable*, September 12, 2014, *available at* http://www.fiercecable.com/story/att-plans-bundle-directv-video-satellite-delivered-wireless-broadband-rural/2014-09-12?utm_medium=nl&utm_source=internal, *site visited* September 15, 2014 ("Pending approval of its $49 billion takeover of DirecTV (NASDAQ: DTV), AT&T will bundle the satellite operator's pay-TV service with a wireless-broadband product capable of delivering download speeds of 15 Mbps and above, then deliver the package via a single dish to rural customers starting in 2015.")

98 AT&T Inc., Current Report (Form 8-K), Item 8.01 Other Events, June 3, 2014.

> With the cost synergies and increased revenue from this transaction, AT&T will expand its high speed broadband build to offer a competitive bundle of high speed fixed wireless broadband and satellite video service.

Similarly, Dish Network indicated in August of this year that it will begin a trial of a fixed broadband service with Sprint. According to Dish's CEO, "[o]ne of the great things I love about Sprint is their spectrum is tailor-made, I believe, for many homes to be a substitute for a fixed line to the house for broadband. And we're experimenting both with nTelos and Sprint."[99]

(2) Empirical evidence indicates extensive usage of wireless options for high-bandwidth activities

88. A recent survey commissioned by Comcast documents extensive usage of wireless broadband today, including for "high-bandwidth" activities such as video. In particular, Comcast recently commissioned a survey by Global Strategy Group (GSG) which, among other things, measured current usage of wired and wireless broadband services. Among those with access to wireless broadband, 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 or more use wireless broadband at least as much as

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99 "Dish Network's (DISH) CEO Joseph Clayton on Q2 2014 Results - Earnings Call Transcript," *Seeking Alpha*, August 6, 2014, *available at* http://seekingalpha.com/article/2391475-dish-networks-dish-ceo-joseph-clayton-on-q2-2014-results-earnings-call-transcript?part=single, *site visited* August 7, 2014. I note that there are various fixed wireless options available today, and these offerings may get better in the near future. For example, a recent **[[ ]]** (*See* **[[ ]]**).

wired broadband for low-bandwidth activities.[100] This degree of wireless usage indicates that wireless is a relevant alternative to wireline today for at least some customers, with the degree of substitutability increasing rapidly.

4. Customers would respond to decreased Comcast broadband quality by utilizing these various options, disciplining any attempt to degrade edge provider access

89. Ultimately, the relevant question regarding the availability of competitive broadband providers is whether consumers would switch to such providers in significant numbers in response to any Comcast attempt to degrade access to edge providers or otherwise harm broadband service. If so, this would subject Comcast to the large loss of customer value described above and thus discipline the attempt. Any broadband provider to which a sufficient number of consumers would switch in response to a strategy to harm edge providers is a relevant competitive constraint on Comcast's ability to undertake such a strategy, even if its speed is slower than Comcast's.

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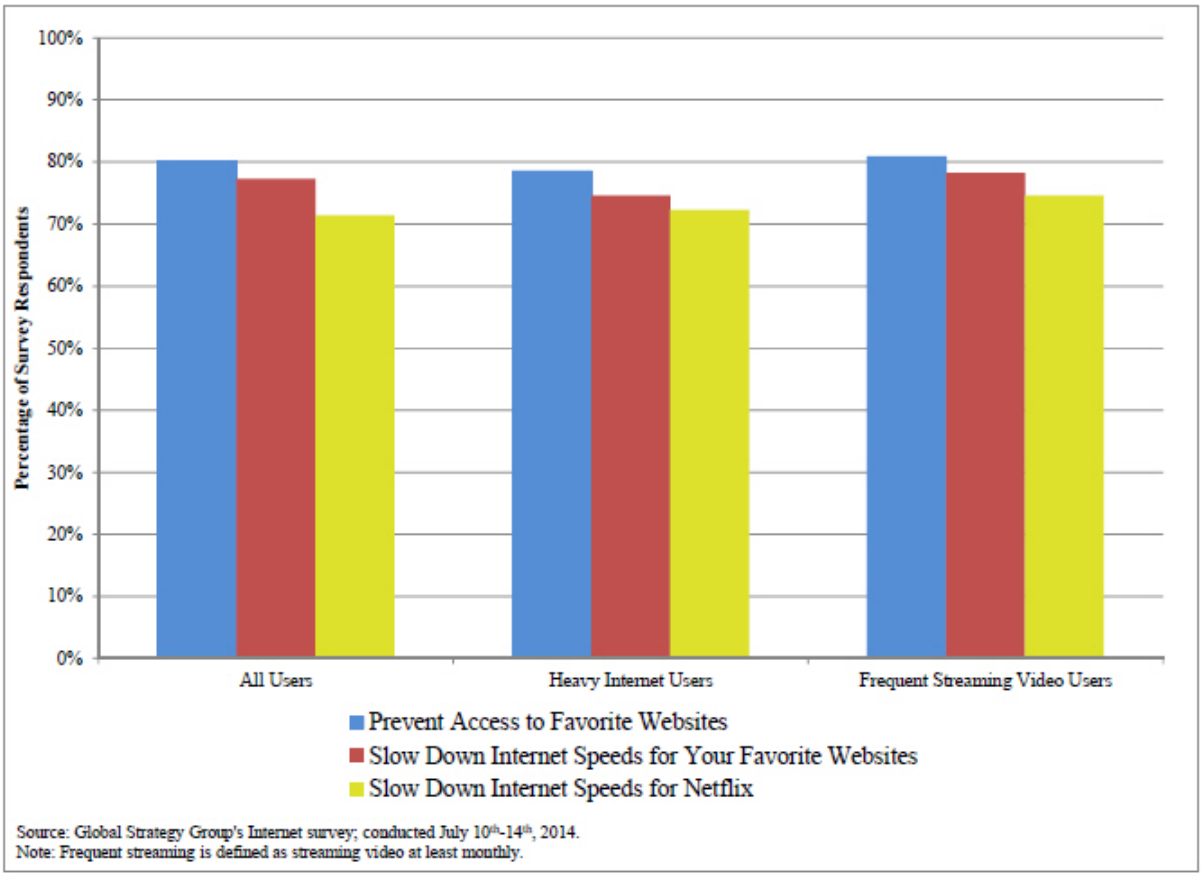
100 *See* Appendix I for a more detailed summary of the survey results. Note that the survey requires that a respondent has previously confirmed having access to wireless broadband, so these results are based on a subset of all respondents (683 of 1,012 or 67 percent of all survey respondents). I understand that the survey is careful to avoid confusion between mobile broadband, the subject of the question, and Wi-Fi. In particular, the text of the wireless usage question in the survey includes the following language: "'Wireless or mobile broadband service' 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."

90. The survey by Global Strategy Group (GSG), discussed above, assesses consumers' willingness to switch broadband providers if access to edge providers were limited—including their willingness to switch to particular types of broadband providers (*e.g.*, DSL or wireless) or, more generally, broadband providers providing slower service. The survey finds that the vast majority 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." Specifically, the percentage of survey respondents likely to switch to an ISP *offering slower speeds* if any of the three actions described above were taken ranges from 71-80 percent for all users; 72-79 percent for heavy Internet users, and 75-81 percent for frequent streaming video users (see Figure 2).[101]

[101] Note that "likely to switch to another ISP" includes "very" and "somewhat" likely to switch responses, and frequent streaming video users are respondents who stream video at least once per month.

Figure 2: Percentage of Survey Respondents Likely to Switch to an ISP Offering Slower Speeds if Their ISP Takes Selected Actions



Source: Global Strategy Group's Internet survey; conducted July 10th-14th, 2014.
Note: Frequent streaming is defined as streaming video at least monthly.

91. The results of the survey are striking: If a customer's broadband provider were to limit access to edge providers, the vast majority of customers would switch to an alternative broadband provider, even one that offers slower speed.[102] Put differently, access to edge providers (which is possible on lower speeds, as discussed above) appears to trump speed as a driver of consumer choice for most consumers. Hence, the

102 *See* Appendix I for a more detailed summary of the survey results.

availability of alternative broadband providers, even those providing slower speeds, places an important competitive constraint on the behavior of Comcast or other broadband providers toward edge providers.

92. The percentage of survey respondents likely to switch to another ISP *like DSL or Wireless Broadband* if any of the three actions listed above ranges from 77-86 percent for all users; 79-85 percent for heavy Internet users, and 81-87 percent for frequent streaming video users. Hence, empirical evidence indicates that DSL and wireless are relevant competitive constraints.

93. Some commenters have also argued that once a consumer chooses a broadband provider, she generally does not change the provider because of switching costs (Chairman Wheeler also referenced switching costs in recent remarks).[103] However, the empirical evidence on customer switching does not bear out this concern. For instance, the GSG survey found that consumers switch broadband providers frequently. As Table 9 in the Appendix shows, 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.[104]

94. Furthermore, Comcast's data shows that the monthly churn rate for broadband customers has been in the **[[ ]]** percent range for several years.[105] This implies that over the course of a single year, approximately **{{ }}** of Comcast's broadband customers churn, which is in line with the results of the GSG survey.[106]

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103 *Evans Declaration*, § II.E; *Sappington Declaration*, ¶ 38 and note 48; *Wheeler Remarks*, 4.

104 The percentages in Table 9 include survey respondents who departed following a move. To 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. Nonetheless, even if I exclude all respondents that moved, I still obtain evidence indicating substantial switching. In particular, results without movers indicate that approximately one-quarter of survey respondents switched providers in at least the past two years, and more than 40 percent switched providers within the past four years.

D. CONSTRAINTS IMPOSED BY POTENTIAL ENTRY OR EXPANSION BY POWERFUL NEW BROADBAND PROVIDERS WITH VESTED INTEREST IN COMPETITIVE BROADBAND MARKETS

95. In evaluating the competitive threats that shape Comcast's strategy, one cannot disregard the important role played by potential entry or expansion by new broadband alternatives. The leading example of such a new entrant is Google Fiber.[107] The Israel

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105 *See* Comcast data produced in FCC Information and Data Request – Exhibit.4.2(e), Exhibit.4.6(a), Exhibit.4.9(a).

106 The churn data from Comcast also includes movers, which, as explained above, is not problematic because moves appear to break any switching costs and give other ISPs an opportunity to compete for customers. Nevertheless, the churn remains high even if I remove the component associated with movers. In particular, Comcast data indicates that approximately **[[ ]]** of aggregate broadband churn is due to customers moving. Hence, I remove movers from the churn data as follows: Assuming that the aggregate monthly churn rate is **[[ ]]** percent (midpoint of **[[ ]]** percent), monthly churn excluding movers is **[[ ]]** percent (*i.e.* **[[ ]]**), and therefore the implied churn excluding movers is approximately **[[ ]]** percent annually.

107 For further discussion of current and expected entry and expansion plans, *see*, *e.g.*, "Telcos Extend Lead in 1 Gbps Race," *SNL Kagan*, September 2, 2014 ("A look at the landscape for the fastest residential HSD offerings from top U.S. providers shows AT&T Inc.'s GigaPower in the lead, Google Inc.'s Google Fiber primed for expansion, and cable slow to enter. Based on a compilation of company announcements, the top telcos combined have targeted almost 40 major metropolitan areas for 1 Gbps services and have deployed the offering in 14 of those areas as of August."). *See also*, Bryan Nichols, "3 Reasons Why Investors Should Avoid Comcast Corporation," *The Motley Fool*, September 8, 2014, *available at* http://www.fool.com/investing/general/2014/09/08/3-reasons-why-investors-should-avoid-comcast-corpo.aspx, *site visited* September 8, 2014. ("In the past, Comcast had one maybe two competitors, often Time Warner Cable included, but now both Google and AT&T are rapidly building faster networks to compete. So, Comcast could lose customers; to avoid that fate, it'll have to lower prices, affecting revenue or margins either way.")

Declaration discussed the launch of Google Fiber, which offers broadband speeds of up to 1 Gbps in both directions.[108] Evidence since that declaration has confirmed Google Fiber's success. In Kansas City, one of the first cities with Google Fiber, survey results indicate Google Fiber's penetration rate has exceeded *50 percent* of homes passed, with substantially higher rates in higher income neighborhoods.[109] Furthermore, customer satisfaction with Google Fiber has been *extremely high*; the median score for "likelihood to recommend Google Fiber" is 10 out of 10 (10 = always recommend it) according to a survey.[110] Given this success, a recent Bernstein research report concludes: "there are material chances that Google could build a network passing 20 or 30 million US homes and small businesses in the US profitably."[111]

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108 *Israel Declaration*, ¶ 51.

109 "Google Fiber: How Well Is It Doing in Kansas City," *Bernstein Research*, May 6, 2014.

110 *Ibid.*

111 "Google Fiber: Scale Matters – How Large Could It Be? How Fast Could It Grow? Introducing Bernstein's BIGR Model," *Bernstein Research*, May 7, 2014.

96. Municipal overbuilds are also potential broadband entrants, and they are supported by the FCC and others. For example, a recent article in *Law360* noted:[112]

> Netflix Inc. is throwing its weight behind the effort to get the Federal Communications Commission to override state laws barring or restricting local municipalities from building their own broadband networks . . . FCC Chairman Tom Wheeler, who has repeatedly said that such laws conflict with his agency's statutory mandate to increase consumer access to broadband, has warned that he might use his authority to preempt them.

97. In addition, in a recent speech Chairman Wheeler could not have been much clearer: "Where greater competition can exist, we will encourage it… where meaningful competition is not available, the Commission will work to create it."[113] One would expect that Comcast heard this message and thus would consider the possibility of Commission action before taking any post-transaction actions to harm broadband competition or edge providers.

98. To be clear, I am not claiming that Google Fiber, municipal broadband offerings, or other such providers are alternatives for a large percentage of Comcast broadband customers today. Although these competitors are relevant in certain markets, their current footprint remains limited. Instead, the threat to Comcast comes from the long-term strategies of these potential entrants or expanders. These entrants are entities with a

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112 Bill Donahue, "Netflix Jumps Into Fight Over City-Run Broadband," *Law360*, September 3, 2014. *See also, e.g.*, Masha Zager, "Number of Community FTTP Networks Reaches 143," *Community Broadband*, August/September 2014, *available at* http://bbcmag.epubxp.com/i/374665, *site visited* September 9, 2014, 10-14.

113 *Wheeler Remarks*, 6.

vested interest in ensuring that broadband remains competitive and that broadband offerings continue to improve—Google to support its various businesses, as perhaps the most prominent edge provider, and municipalities to support local economic growth and attract businesses to the community.[114] As such, if Comcast fails to continue to upgrade its broadband service or degrades the quality of its service by harming edge providers, it would face a heightened risk that these providers would enter or expand to thwart such efforts. Moreover, to the extent that any actions by Comcast were to degrade its broadband service, the evidence presented above indicates that this would cause many customers to wish to switch providers. If those customers do not have good competitive alternatives—as some commenters allege—this would create a source of potential profits

114 *See, e.g.*, Jon Brodkin, "AT&T: Cities Should Never Offer Internet Service Where ISPs Already Do or Might Later," *Ars Technica*, September 2, 2014, *available at* http://arstechnica.com/business/2014/09/att-cities-shouldnt-offer-broadband-where-private-isps-already-do-or-might-later/, *site visited* September 11, 2014 ("Community broadband isn't widespread, but local governments have sometimes built their own networks when service offered by private ISPs was too slow, expensive, or both."); Heather Bellini, Jason Armstrong, Drew Borst, Brian Baytosh, and Dan Pelligrini, "Google Fiber – Build or Bluff," *Goldman Sachs*, June 28, 2013, 1 ("Fiber's vastly greater speeds have the potential to drive more processing to the cloud and accelerate HTML5 adoption . . . These last two moves could serve to cement Google's dominance as a provider of enhanced web-services on both mobile devices and PCs . . . Google is ultimately indifferent to whether it or incumbent broadband providers deliver fiber-optic internet speeds since either case supports the company's vision of an open, services-based web."); Jon Brodkin, "Fed up with Slow and Pricey Internet, Cities Start Demanding Gigabit Fiber," *Ars Technica*, November 22, 2013, http://arstechnica.com/business/2013/11/fed-up-with-slow-and-pricey-internet-cities-start-demanding-gigabit-fiber/, *site visited* March 13, 2014 ("Louisville government officials believe, as many other municipal officials in US cities do, that fiber networks are crucial for attracting and retaining businesses, which increasingly need copious amounts of bandwidth to remain competitive.").

for new entrants, increasing the likelihood that broadband investments would be profitable. The success of existing Google and municipal efforts, even if in only a few markets to date, means these are not threats Comcast can simply ignore.[115]

99. Notably, Dr. Evans supports the view that Comcast will consider medium-/long-term entry threats in assessing its strategy today. In particular, he argues that Comcast may attempt to harm OVDs today in order to deter long-term broadband entry.[116] Dr. Evans and I agree that long-term entry decisions by potential broadband providers influence Comcast's decisions today, but we reach opposite conclusions on the implications. To understand why my version is correct, one simply needs to recognize that Google and/or municipalities would step in to prevent Comcast from impeding broadband competition and OVD development and that firms like Google would take advantage of the ability to steal dissatisfied Comcast customers to enter and expand profitably, a possibility supported by industry observers. To believe Dr. Evans' version, one would have to believe that (i) Comcast has the ability to thwart the development of the OVD industry and (ii) seeing Comcast doing so, Google, municipalities, and others would *reduce* their efforts to enter and expand and choose simply to let this occur. As

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115 Comcast has recognized this threat in its internal documents (*see, e.g.*, **[[ ]]**). Comcast's reaction to the threat has also been documented by third parties (*see, e.g.*, Karl Bode, "Comcast Fights Google Fiber in Provo with New Pricing," *DSLReports.com*, August 15, 2013, *available at* https://secure.dslreports.com/shownews/Comcast-Fights-Google-Fiber-in-Provo-With-New-Pricing-125390, *site visited* September 11, 2014 .

116 *See, e.g.*, *Evans Declaration*, ¶¶ 178-179.

already discussed, point (ii) is implausible. Point (i) may be even more implausible. Comcast would need to prevent the development of successful OVDs by powerful firms like Google, Apple, Amazon, Netflix, Sony, and others.[117] And it would have to do so despite having recently agreed to a long-term interconnection contract with Netflix (thus protecting Netflix from foreclosure), and despite the fact that firms like Google, Apple, Amazon, and Sony all view OVD offerings as a way to support other parts of their core businesses. I discuss Comcast's lacks of incentive and ability to foreclose OVDs in more detail in the next section.

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117 Netflix and Amazon are, of course, already highly successful OVDs (*see, e.g.*, Richard Greenfield, "HBO's Amazon Agreement Illustrates Netflix Is a Competitive Media Brand, Amazon Is Not … for Now," *BTIG Research*, April 24, 2014, *available at* http://www.btigresearch.com/2014/04/24/hbos-amazon-agreement-illustrates-netflix-is-a-competitive-media-brand-amazon-is-not-for-now/, *site visited* September 1, 2014 ("HBO fears Netflix's growing industry power. We suspect HBO wanted to balance Netflix's growing media industry hegemony by helping to bolster their largest direct-to-consumer, SVOD competitor – Amazon."). Sony's ongoing efforts to develop and launch an OVD service are well documented in the public domain (*see, e.g.*, note 127 of this declaration, which indicates that Viacom will be providing "22 channels to Sony's upcoming virtual pay-TV service."). Regarding Apple's OVD plans, it was recently reported that "[f]or several months now, rumors have continually suggested Apple is working on a new television product, which may be an updated set top box with capabilities like support for games and apps and expanded access to television content." (*See* Juli Clover, "New Apple TV Likely Delayed Until 2015 Due to Negotiation Difficulties," July 30, 2014, *available at* http://www.macrumors.com/2014/07/30/apple-tv-launch-delayed/, *site visited* September 11, 2014).

IV. COMMENTERS' FORECLOSURE-BASED THEORIES OF HARM ARE WITHOUT MERIT

100. Some commenters allege that post-transaction, Comcast would intentionally degrade (or deny) OVD access to the combined firm's broadband network (or other assets)[118] in order to weaken OVD competition. For example, Dr. Sappington states that Comcast has an "arsenal of weapons" to "reduce the quality of competing OVD services, as perceived by Comcast's broadband customers."[119] Dr. Evans concludes that "Comcast has the *ability and incentive* to degrade significantly the quality of service that its subscribers obtain from an OVD" and that Comcast's incentives to foreclose OVDs are heightened because, among other reasons, "its subscribers are likely to increase their viewing of Comcast video content if they cannot view content from OVDs."[120]

101. In the economic literature, such a theory is known as "foreclosure." In basic terms, the theory is that a firm may be able to leverage market power in one market (the "primary market") to foreclose competition in a second "adjacent market."[121] In some

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118 I note that, as a general matter, foreclosure could take the form of reducing OVD access to broadband customers or limiting OVD access to NBCUniversal content. Comments mainly focus on the former, but much of the logic described below applies to both and the conclusion is the same: The combined firm would lack both the ability and incentive to foreclose OVDs.

119 *Sappington Declaration*, ¶ 30.

120 *Evans Declaration*, ¶¶ 91, 117 [emphasis added]. *See also, e.g., Farrell Declaration*, ¶¶ 78-86.

121 Patrick Rey and Jean Tirole (2007), "A Primer on Foreclosure," in *Handbook of Industrial Organization*, Volume 3, Mark Armstrong and Robert Porter, eds., Amsterdam: Elsevier (hereinafter, *Rey and Tirole (2007)*).

cases, the foreclosure takes the form of "tying," in which sale of a firm's product in the adjacent market is "tied together" with sale of a product in the primary market, in order to drive competitors out of the adjacent market. The theories advanced in this case are quite similar to tying—if Comcast can prevent OVDs from using its broadband network then Comcast customers would have to use Comcast's various video services (*e.g.*, its traditional linear video services, perhaps combined with non-linear options such as VOD), effectively tying those services to Comcast's broadband and thus, if the effort were successful, leveraging Comcast's position in broadband to drive out OVD competition.

102. For a theory of vertical foreclosure to make sense, the firm engaging in the foreclosure strategy ("the foreclosing firm") must have *both* the ability and the incentive to foreclose the "target."[122] The ability to foreclose generally requires that the foreclosing firm has sufficient scale and market power to drive the target out of business (or prevent it from entering in the first place).[123] The incentive to foreclose requires that the strategy will sufficiently benefit the foreclosing firm in the adjacent market to make up for the loss incurred in the primary market. For example, under commenters' foreclosure theory that

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122 Note that Dr. Evans himself uses this "ability and incentive" formulation in the quotation above.

123 In theory, one could also consider strategies to weaken the competition without driving them out of the market, but if competitors are not driven from the market but rather just weakened, this may simply cause them to become intense price competitors, generally not a good outcome for the firm engaging in foreclosure. *See*, *e.g.*, *Rey and Tirole (2007)*, 2185. In the present case, this could be a particularly bad outcome for Comcast, as weaker OVDs may also reduce their purchases of NBCUniversal content.

the combined firm would restrict OVD access to its customers, one would need to show both that this could significantly weaken OVD competition (ability) and that Comcast's gain from so doing would offset the (likely significant, based on the analysis in Section III.C) reduction in broadband profits (incentive).

103. Although economic theory is clear that a coherent foreclosure theory requires that the combined firm have *both* the ability and the incentive to foreclose OVDs, I show in this section that the combined firm would actually have neither. In particular, available evidence indicates that the transaction would not provide the combined firm with the ability to harm OVD competition to any significant degree, and an analysis of both Comcast's behavior (and thus revealed preferences) and the complementary relationship between the OVD and broadband businesses demonstrates that it does not have the incentive to engage in foreclosure.

A. THE COMBINED FIRM WOULD LACK THE ABILITY TO FORECLOSE OVDS

104. For several reasons, the combined firm would lack the ability to foreclose OVDs. Many of these reasons make use of the evidence presented in Section III on the constraints that edge providers, customers, and emerging broadband alternatives place on Comcast; others are unique to theories of vertical foreclosure.

105. **First** and most basically, as explained above, Comcast lacks the ability to deny OVDs access to its network without enormous disruption to its Internet service. Comcast's commitment to the Open Internet rules (vis-à-vis the last mile) and the competitiveness of the Internet backbone means that any efforts to degrade edge provider access would have to occur at interconnection points between the two. But, as explained in Section III.B, OVDs (and edge providers generally) can rely on one or more transit

providers or CDNs, which pool their traffic with the content from many other edge providers, to deliver their content to Comcast or other ISPs. Hence, to deny (or significantly impair) access to a particular OVD, Comcast would have to deny (or significantly impair) access to all (or at least most) major CDNs and transit links, else the OVD could rely on those alternatives to reach the Comcast network. Denying or significantly impairing access to multiple routes would be a hugely costly step for Comcast, greatly limiting its customers' access to much of the Internet's content. Notably, Netflix's recent disputes with Comcast occurred only after Netflix chose to stop using third-party CDNs and to limit its massive traffic to six transit providers.[124] And, even in this case, Netflix and Comcast eventually agreed to terms for direct interconnection, with Netflix now protected from foreclosure for the next **{{ }}**.[125]

106. **Second** and more generally, the idea that Comcast could foreclose the set of OVDs that already (or will soon) exist is beyond credibility. At this point, the leading OVDs are far from small start-ups that might be driven out of the market; many are extremely large, well-established firms, several with market capitalization that exceeds

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124 Declaration of Ken Florance, Attachment to Petition to Deny of Netflix Inc., August 25, 2014 (hereinafter, *Florance Declaration*), ¶¶ 30-50; *McElearney Declaration*, ¶¶ 23-24 and 36-42.

125 *See* Letter from Kathryn A. Zachem, Comcast Corporation, to Marlene H. Dortch, Secretary, FCC, MB Docket No. 14-57 (Sept. 17, 2014) (enclosed documents on CD-ROM); Letter from Matthew A. Brill, Latham & Watkins, LLP, Counsel to Time Warner Cable Inc., to Marlene H. Dortch, Secretary, FCC, MB Docket No. 14-57 (Sept. 17, 2014) (enclosed documents on CD-ROM).

Comcast's.[126] Examples include Google, Amazon, Sony, Apple, Netflix, and Dish Network.[127] Moreover, as noted above, many of these are firms for which OVD service supports fundamental parts of their business, including search and related services and ad revenue for Google, the overall sales platform and "Prime" service offered by Amazon, hardware sales by Apple, and so on. It is not credible that Comcast could drive these firms out of the market.

107. **Third,** the lack of credibility of a successful foreclosure strategy is heightened by the fact that, in practice, the ability to foreclose OVDs effectively requires the ability to foreclose *all* OVDs. If some combination of the powerful and/or contractually protected OVDs listed above were to survive, any foreclosure efforts by Comcast would at most affect only *additional* OVDs beyond the core set. A primary effect of such partial

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126 Comcast's market capitalization at market close on September 10, 2014, was $147 billion compared to $153 billion for Amazon, $401 billion for Google, and $605 billion for Apple (WolframAlpha, *available at* http://wolframalpha.com, *site visited* September 11, 2014).

127 *See*, *e.g.*, Daniel Frankel, "Viacom to deliver channels to Sony's new OTT service," *FierceCable*, September 10, 2014, *available at* http://www.fiercecable.com/story/viacom-deliver-channels-sonys-new-ott-service/2014-09-10?utm_medium=nl&utm_source=internal, *site visited* September 10, 2014 ("Viacom has struck a deal to provide 22 channels to Sony's upcoming virtual pay-TV service . . . Viacom has agreed to provide live-streaming access to leading channels such as BET, Comedy Central, MTV and Nickelodeon, as well as TV Everywhere authentication and video-on-demand rights. It's the first major announcement relating to Sony's secrecy-shrouded over-the-top service since it was first announced in January . . . In what is shaping up to be a rival OTT pay-TV initiative, Dish Network has secured similar digital rights to Disney and A&E Networks programming for its own upcoming OTT service."). *See also*, *e.g.*, "September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request," RFI 13.A.2., 32-36, which includes a list of potential OVD entrants.

foreclosure would be to benefit the core, existing set of OVDs, who would likely capture many of the customers departing other, foreclosed OVDs. As such, Comcast would bear the costs of a strategy that would largely benefit other OVDs. Such a strategy is unlikely to be profitable.

108. **Fourth**, following the "open field" logic that the Commission has used in other settings,[128] the pool of non-Comcast/TWC broadband customers in the marketplace provides more than sufficient scale for an OVD to succeed even if (counterfactually) that OVD had no access to the combined firm's customers. In particular, even if one considers only domestic customers—obviously an overly narrow view given that OVDs are generally global—and even if one assumes that the combined firm would "control" its customers—an incorrect view given their available alternatives and demonstrated willingness to switch—there are still plenty of *other* broadband customers to support an OVD, making a foreclosure theory implausible.

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128 I note that I am not evaluating or endorsing this logic but rather investigating how it applies to the present setting. *See* Fourth Report & Order and Further Notice of Proposed Rulemaking, *In the Matter of The Commission's Cable Horizontal and Vertical Ownership Limits; Implementation of Section 11 of the Cable Television Consumer Protection and Competition Act of 1992; Implementation of Cable Act Reform Provisions of the Telecommunications Act of 1996; Review of the Commission's Regulations Governing Attribution of Broadcast and Cable/MDS Interests; Review of the Commission's Regulations and Policies Affecting Investment in the Broadcast Industry; Reexamination of the Commission's Cross-Interest Policy*, MM Docket No. 92-264, MM Docket No. 92-264, CS Docket No. 96-85, MM Docket No. 94-150, MM Docket No. 92-51, MM Docket No. 87-154, December 18, 2007, *available at* https://apps.fcc.gov/edocs_public/attachmatch/FCC-07-219A1.pdf, *site visited* September 19, 2014. I also note that the D.C. Circuit reversed this order in *Comcast Corp. v. FCC (2009) (Comcast Corp. v. FCC, 579 F.3d 1, 9 (D.C. Cir. 2009)).*

109. Table 5 provides the numeric support for this conclusion. In particular, the table compares customer levels that have proven themselves to be sufficient for viability in various analogy cases to the number of customers available to an OVD that (counterfactually) did not have access to Comcast and TWC customers. In particular:

- Lacking direct data on the number of customers an OVD needs to succeed, the table considers a wide range of possible benchmarks, including the threshold the Commission has used for required scale in the MVPD context, the number of customers currently served by a range of successful premium channels and MVPDs, and Netflix itself.

- To determine the number of customers available to an OVD, the table relies on the existing 3 Mbps broadband definition. Whatever one's view on the definition of "broadband," Netflix has stated publicly and demonstrated that it can provide video at broadband speeds as low as (or lower than) 3 Mbps, making this the relevant threshold for considering customers available to an OVD.[129]

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[129] *See* Netflix Internet Connection Speed Recommendations, *available at* https://help.netflix.com/en/node/306, *site visited* September 12, 2014. *See also* Michael Nathanson, Robert Fishman, and Andrew Izaguirre, "Netflix: The Law of Large … and Small Numbers," *MoffettNathanson*, February 26, 2014, 3 ("When we first launched on the company, we made the underlying assumption that Netflix's addressable U.S. universe was tied to the underlying U.S. broadband market excluding the homes where broadband is sourced by slower DSL technology. However, in thinking about the addressable universe further (and discussing usage trends with internet-connected device manufacturers), we are revisiting our initial assumption that excluded DSL from these penetration curves. It would appear that the DSL user experience is still acceptable for streaming Netflix at lower speeds and, as such, we need to revise the underlying U.S. addressable market for broadband.")

110. As seen in the table, when counting wireless customers, the benchmark cases are always less than 30 percent and generally less than 20 percent of the "open field" of non-Comcast/TWC broadband customers. Even without counting wireless customers (something that is becoming increasingly hard to justify given OVD focus on this segment, as explained above), the benchmarks are substantially below (generally less than half of) the open field.

Table 5: Providers' Scale Compared to Non-Comcast and TWC Broadband (Residential + Commercial) Customers Nationwide (2012, HSD Speed of 3 Mbps/768 Kbps)

		With Divestiture (Mobile Wireless Included)	With Divestiture (Mobile Wireless Excluded)
Comcast TWC Customers		23,945,701	23,945,701
Non-Comcast Non-TWC Customers		104,526,299	40,650,299
Provider	**Customers**		
FCC Threshold	**19,030,000**	**18.2%**	**46.8%**
Premium Channel: HBO	28,720,000	27.5%	70.7%
Edge Provider: Netflix	25,471,000	24.4%	62.7%
Premium Channel: Showtime	22,329,000	21.4%	54.9%
Premium Channel: Starz	21,229,000	20.3%	52.2%
MVPD: DIRECTV	20,084,000	19.2%	49.4%
MVPD: DISH Network	14,056,000	13.4%	34.6%
Premium Channel: Cinemax	12,730,000	12.2%	31.3%

111. For completeness, Table 6 presents the overly conservative results based on a 10 Mbps threshold. The benchmarks continue to be smaller than the "open field," and in most cases, substantially so.

Table 6: Providers' Scale Compared to Non-Comcast and TWC Broadband (Residential + Commercial) Customers Nationwide (2012, HSD Speed of at Least 10 Mbps Downstream)

		With Divestiture (Mobile Wireless Included)	With Divestiture (Mobile Wireless Excluded)
Comcast TWC Customers		22,159,220	22,159,220
Non-Comcast Non-TWC Customers		37,636,780	28,985,780
Provider	**Customers**		
FCC Threshold	**19,030,000**	**50.6%**	**65.7%**
Premium Channel: HBO	28,720,000	76.3%	99.1%
Edge Provider: Netflix	25,471,000	67.7%	87.9%
Premium Channel: Showtime	22,329,000	59.3%	77.0%
Premium Channel: Starz	21,229,000	56.4%	73.2%
MVPD: DIRECTV	20,084,000	53.4%	69.3%
MVPD: DISH Network	14,056,000	37.3%	48.5%
Premium Channel: Cinemax	12,730,000	33.8%	43.9%

112. In sum, the "open field" is more than sufficient to support an OVD's business without any customers from the combined firm. This conclusion holds even though this analysis has considered only the domestic market. *In fact, the footprints of OVDs such as Netflix, Google, Amazon and others are clearly global, with global markets rapidly becoming as or more important than the US.* For example, Netflix ended the second quarter of 2014 with 13.8 million international subscribers, a 78 percent increase over the second quarter of 2013. That represents 27.6 percent of its total subscribers. This month (September 2014) Netflix is launching in Germany, France, Austria, Switzerland, Belgium, and Luxembourg, markets with more than 60 million broadband households. Executives say the move will "raise our current international addressable market to over

180 million broadband households, or *2x the number of current U.S. broadband households*."[130] Over the longer term, estimates indicate that the "company will have nearly 104 million subscribers globally by 2020."[131] It is implausible to think that a cable provider covering a subset of the US could foreclose an OVD with large and growing global operations.

113. **Fifth,** as documented in Section III.C, it is simply false that Comcast "controls" its customers. As commenters have shown, the typical Comcast customer has at least one broadband alternative, more in some cases, particularly when growing wireless options are included.[132] Furthermore, the vast majority of surveyed broadband customers indicate they would switch providers if their provider attempted to downgrade access to edge providers, even if that meant switching to a lower speed alternative, including DSL or wireless. And roughly **{{ }}** of Comcast's broadband customers do churn every year. As such, it is incorrect to model Comcast as a monopolist that "controls" its customers; the vast majority of such customers have alternatives, and thus the "open field" of customers

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130 Reed Hastings and David Wells, Netflix Letter to Shareholders, July 21, 2014, *available at* http://files.shareholder.com/downloads/NFLX/0x0x769748/9b21df7f-743c-4f0f-94da-9f13e384a3d2/July2014EarningsLetter_7.21.14_final.pdf, *site visited* September 18, 2014 [emphasis added].

131 Daniel Frankel, "Netflix Euro rollout puts it on track to 100M-plus international subs by 2020," *FierceCable*, September 22, 2014, *available at* http://www.fiercecable.com/story/netflix-euro-rollout-puts-it-track-100m-plus-international-subs-2020/2014-09-22?utm_medium=nl&utm_source=internal, *site visited* September 22, 2014.

132 *Evans Declaration*, § II.C and Table 2; *Farrell Declaration*, § III.E.

for an edge provider certainly includes Comcast's own customers, further demonstrating that the combined firm lacks the ability to foreclose OVDs.[133]

114. Dr. Evans' Table 7 appears to be an attempt to refute the above two points, as he uses it to claim that the ability of "very large" ISPs to harm OVDs increases "dramatically" with ISP size.[134] However, notably, Dr. Evans does not claim that the combined firm could actually foreclose Netflix or other OVDs from competing; in fact, he acknowledges that Netflix would still be able to operate even if it did not come to terms with the merged firm.[135] Further, Dr. Evans' analysis in Table 7 is flawed because he ignores the fact that Netflix customers have choices among ISPs, and that if Comcast were no longer an option for obtaining Netflix service, some customers would switch to another ISP. Switching to another ISP would harm Comcast, not Netflix. Table 7 also excludes *all* of Netflix's global operations, a rapidly growing source of revenue and profit for Netflix that Comcast cannot affect, as discussed above.

115. **Finally,** none of the theories presented by commenters has pointed to any transaction-specific evidence of harm. In particular, no one has presented any evidence

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133 I also note that "Comcast does not unilaterally 'downgrade' the capacity of its interconnection links with counterparties and rarely, if ever, decommissions ports." (*See*, *e.g.*, "September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request," RFI 73, 193-194.).

134 *Evans Declaration*, ¶ 140.

135 *Id.*, ¶ 168 and note 123. As noted above in footnote 123, as a matter of economics, a foreclosure strategy that leaves OVDs in the marketplace is unlikely to be profitable, even more so because any reduction in NBCUniversal content purchased by the OVD would be harmful to Comcast.

that the incremental number of customers that Comcast would gain from the transaction (post-divestiture) would make the difference between Comcast having or not having the ability to foreclose customers.

B. THE COMBINED FIRM WOULD LACK THE INCENTIVE TO FORECLOSE OVDS, JUST AS THE MERGING PARTIES LACK THIS INCENTIVE TODAY

116. Not only does the first necessary condition for a foreclosure theory (ability to foreclose) fail, so does the second necessary condition (incentive to foreclose).

1. The merging parties' behavior reveals that they have no incentive to foreclose OVDs

117. When considering whether the combined firm has an incentive to foreclose OVDs, I start by noting that no commenter has advanced a theory that explains why the transaction would create an incentive that does not, by the same logic, exist for Comcast today. That is, any theory under which the video gains would offset the broadband losses and thus support a foreclosure strategy would also apply to Comcast today. Hence, the actions that Comcast has taken on its own, to date, provide the clearest answer to the question of whether Comcast has an incentive to foreclose OVDs, as suggested by some commenters. And, in fact, those actions demonstrate that Comcast does not have such an incentive.

118. As part of regular business operations, Comcast has engaged in negotiations with various edge providers and their agents over interconnection terms—the most publicized

being with Netflix.[136] The outcome of those negotiations indicates that Comcast has not sought to foreclose Netflix. In particular, as explored in more detail in Section V.A, **{{ }}**. In its post-agreement communications with Comcast, Netflix agreed that it was not harmed by the agreement.[137] This behavior is not consistent with Comcast having an incentive to harm Netflix.

119. Two features of the Comcast-Netflix agreement demonstrate Comcast's lack of incentive to harm Netflix's competitiveness most clearly:

- **{{ }}**.
- **{{ }}**.[138] **{{ }}**.

120. Moving beyond just the Netflix agreement, another indicator of the merging parties' lack of intention to harm OVDs comes from **{{ }}**.

121. **{{ }}**: [139]

- **{{ }}**.

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136 Despite commenters' inferences to the contrary *(Evans Declaration*, ¶ 117; *Farrell Declaration*, ¶¶ 10, 13, 130, and 177), it is not surprising (or indicative of any foreclosure incentives) that Comcast did not put additional interconnection capacity in place until these negotiations were completed and thus the terms for payment for such capacity expansions were resolved. To the contrary, this is an entirely standard process: When additional capacity beyond that contemplated in an existing agreement is needed, a commercial negotiation is required, and once terms are reached, capacity can be added. (*See McElearney Declaration*, ¶¶ 18, 32).

137 *See McElearney Declaration*, ¶ 44.

138 Sam Schwartz, Chief Business Development Officer, Comcast Cable, July 22, 2014, interview.

139 The OVDs considered in the sample include **{{ }}**.

- **{{ }}**.

{{ }}

2. Economic theory explains why the merging parties have shown no incentive to foreclose OVDs

122. OVDs are obviously complementary to Comcast's broadband business. As such, Comcast's revealed lack of incentive to foreclose OVDs (pre- or post-transaction) is fully consistent with economic theory. In particular, economic theory is clear that it is generally not profitable to leverage market power in one market to foreclose competition in a closely complementary market, even when competitors produce high-quality and/or low-cost products. As Rey and Tirole explain, firms with market power in a primary market do not want to exclude "low-cost and high-quality varieties" from the adjacent market "since their presence makes its own [primary] product more attractive to consumers."[140]

123. The basic logic against foreclosure of complementary products is straightforward: The strong competitive OVDs add value and thus grow the overall "pie" of profits

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[140] *Rey and Tirole (2007)*, 2182. Note that Dr. Evans himself refers to the possibility of "offsetting factors" that would lessen incentives to foreclose. Presumably he has in mind the harm to broadband profits. Notably the empirical analysis above makes clear that these offsetting factors have eliminated any theoretical incentive to foreclose OVDs. And the theory is also clear. Although Dr. Evans argues vaguely and weakly that because "MVPD and broadband services are not consumed in fixed proportion…the Chicago single-monopoly profit theorem does not necessarily hold," I do not rely on a general reference to that theorem to show there is no incentive to foreclose, but rather demonstrate it for this specific case, including via specific discussion of the import of the negotiation between Comcast and Netflix. (*See Evans Declaration*, ¶ 176 and n. 131.)

available to the OVDs and Comcast collectively, and thus Comcast is better off letting them do so and then profiting from this via its broadband business, rather than attempting to foreclose OVD competition and shrinking the overall pie. The simplest version of this theory applies to the hypothetical case where Comcast would seek to foreclose OVD competition in order to enhance its own OVD business—the theory indicates that this would generally not be profitable, as Comcast would be better off letting the competing OVDs grow the overall pie and profiting through its established broadband service. But the logic also applies to a theory that Comcast would foreclose OVDs to drive customers to its traditional video offering. Indeed, in this case, foreclosure would likely be even worse for Comcast's broadband business (since traditional video does not rely on broadband and thus would not prop up its value as OVDs are removed) while (as shown in the CLV calculations in Section III.C.1), above, it would offer limited profits to make up for this loss.[141]

124. Finally, the fact that Comcast negotiates directly with OVDs (or their agents) completes the point. Bottom line, for those OVDs that grow the overall pie, fundamental economic logic indicates that Comcast and the OVD can always find a "middle ground" that leave them both mutually better off than they would be under a foreclosure

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141 It is also worth noting that such a foreclosure theory would imply that OVDs are in the same market with traditional video. This theory would still involve Comcast harming complementary products (OVDs) in an adjacent market (all video), rather than letting successful OVDs continue to grow and capturing this value via the complementary broadband service.

strategy.[142] And notably this is precisely how Netflix described the outcome of the negotiations in communications with Comcast.[143]

125. To be sure, Comcast may have incentives to develop strong, in-footprint over-the-top video offerings to compete more effectively with OVDs, though it has not entered that market today in any meaningful way. But such competition is fundamentally different from foreclosure—it is good for the broadband business and, should OVDs respond with their own competitive initiatives, that is all the better for broadband. This is much like the case of Google entering the broadband business; Google may well have anticipated the competitive response from other broadband providers but its core edge provider business *benefits* from this competitive response. This logic is what makes Google such a strong competitive threat in broadband. And the same logic applies to Comcast in the OVD business—Comcast has incentives to compete aggressively with OVDs, in part because stimulated responses are good for broadband, unlike any attempts at foreclosure.

126. Dr. Farrell advances the hypothesis that Comcast could have an incentive to hurt complementary OVD offerings if, in so doing, it hurts other competitors (*e.g.*, other ISPs

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142 This logic has been long understood in economics, dating back to Nobel Prize winner Ronald Coase. As summarized by another Nobel Prize winner, George Stigler, "Ronald Coase taught us, what of course we should already have known, that when it is to the benefit of people to reach an agreement, they will seek to reach it." (George J. Stigler (1989), "Two Notes on the Coase Theorem," *The Yale Law Journal*, 99.3: 631-633.)

143 *McElearney Declaration*, ¶ 44.

or MVPDs) more than it hurts itself.[144] Although theoretically possible, such a hypothesis does not apply to the facts of this case: Harming broadband inputs would harm Comcast more than other ISPs or MVPDs, not less. Comcast has spent tens of billions of dollars to develop its high-quality broadband network, which now offers very high-quality broadband service with speeds up to 505 Mbps, with the quality of this broadband network an important source of competitive differentiation that Comcast uses to win customers.[145] The existence of a vibrant OVD sector is complementary to this strategy, as it provides the applications that make best use of Comcast's high-speed broadband network. Moreover, given that, under such a strategy, Comcast would have degraded access to OVDs, it seems far-fetched that angry Comcast broadband customers would then turn to (or increase their use of) Comcast video offerings; rather, it seems more likely that customers would prefer to turn to offerings from other providers. For all these reasons, a strategy to foreclose OVDs by harming their access to the Comcast broadband network would harm Comcast more than the competition. By Dr. Farrell's own logic, this means that Comcast does not have an incentive to foreclose OVDs.

127. Alternatively, one might hypothesize that Comcast would foreclose OVDs in order to benefit itself in some largely independent market (rather than one that is complementary to Comcast's broadband offerings). One possible hypothesis would be

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144 *See, e.g., Farrell Declaration*, ¶ 83.

145 *Israel Declaration*, ¶ 167.

that Comcast wants to foreclose OVDs in order to support expansion of its own OVD (or other video) offerings into new *geographic markets*. However, such a theory does not withstand scrutiny because Comcast has no plans to offer online video offerings outside its footprint Historically, **{{ }}**.[146] Further, Comcast has no plans to extend its geographic footprint by overbuilding another cable operator's territory. Indeed, to my knowledge, no incumbent cable operator has overbuilt another cable operator's territory. As discussed more extensively in Section VII.A, the primary reason that Comcast and other cable companies have not opted to expand into each other's franchise areas is that the fixed costs are too high, causing the return on investment to be either negative or insufficient relative to other strategic options.

128. Alternatively, one could hypothesize that Comcast would have an incentive to foreclose OVDs to protect its NBCUniversal broadcast and cable networks from competition that would reduce their revenues.[147] However, this claim also does not withstand scrutiny. First, OVDs do not threaten NBCUniversal to any significant degree. As Netflix as well as other industry participants and analysts have acknowledged, OVDs such as Netflix compete primarily with premium channels like HBO and Showtime, and not with NBCUniversal, which does not offer such premium channels.[148] Even more

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146 *See, e.g.*, **{{ }}**.

147 *See, e.g., Sappington Declaration*, ¶ 51.

148 *See, e.g.*, Michael Nathanson, Robert Fishman, and Andrew Izaguirre, "2Q Preview: We Interrupt the M&A Show For Earnings," *MoffettNathanson Research*, July 21, 2014, at 1 ("We believe Netflix will, over time, look like HBO in content offerings, margin, pricing strategy, and, one day, subscriber growth."); Reed Hastings, Facebook post, August 6, 2014, *available at* https://www.facebook.com/reed1960/posts/10152414721999584, *site visited* September 1, 2014 ("Minor milestone: last quarter we passed HBO is [*sic*] subscriber revenue ($1.146B vs $1.141B). They still kick our ass in profits and Emmy's, but we are making progress. HBO rocks, and we are honored to be in the same league."); and according to Netflix's chief content officer, the company's goal "is to become HBO faster than HBO can become us." (*See* Bryan Bishop, "Netflix wants at least five new shows a year: 'The Goal is to become HBO faster than HBO can become us," *The Verge*, January 29, 2013, *available at* http://www.theverge.com/2013/1/29/3930560/netflix-wants-at-least-five-new-shows-a-year-the-goal-is-to-become, *site visited* June 5, 2014.)

fundamentally, there are dozens of existing broadcast and cable networks, so the notion that foreclosing OVDs would have a material effect on the profitability of any NBCUniversal network is far-fetched. And finally, this theory ignores the complementarity between OVDs and NBCUniversal content, which arises from the fact that OVDs purchase hundreds of millions of dollars per year in content from Universal studios and NBCUniversal's broadcast and cable networks, and is a source of complementarity that applies to *any* theory under which Comcast would seek to foreclose OVDs.[149]

129. In sum, the features of the broadband marketplace, Comcast's observed behavior, and economic theory all confirm that Comcast lacks both the incentive and the ability to foreclose OVDs.

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[149] In 2013, NBCUniversal earned **{{ }}** in revenues from OVDs. (*See* Comcast data produced in FCC Information and Data Request- Exhibit 19.5(a).)

V. COMMENTERS' CLAIMS THAT INCREASED BARGAINING POWER WILL LEAD TO HIGHER PRICES TO EDGE PROVIDERS OR THEIR AGENTS ARE NOT SUPPORTED BY ECONOMIC THEORY OR EMPIRICAL EVIDENCE

130. The discussion thus far shows that commenters have advanced no coherent horizontal or vertical theory of harm from the transaction, including no coherent theory of OVD foreclosure. Moving beyond these more standard antitrust theories, commenters also advance "big is bad" claims that increasing Comcast's size—even in the absence of any overlap with TWC—would increase its bargaining power *vis-à-vis* edge providers or their agents and thus increase its ability to demand higher payments for interconnection.[150] Such bargaining theories are distinguished from the (already refuted) foreclosure theories addressed in Section IV in that they do not depend on a claim that Comcast seeks to defend its video business, but rather on a claim that Comcast's increased size post-merger will enable it to demand higher interconnection prices. The higher interconnection prices in such a theory need not occur as part of direct interconnection agreements with edge providers; instead they might be charged to edge providers' agents (*e.g.*, CDNs or transit providers who handle edge providers' traffic). But for such higher prices to even potentially form a coherent theory of competitive harm, a necessary (but far from sufficient, as seen below) condition is that they must result in higher prices to edge providers. In contrast, a situation in which an ISP sets up a direct interconnection

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150 *Evans Declaration*, § III.E; *Farrell Declaration*, § VI; *Sappington Declaration*, § IV.E.2.

agreement with an edge provider—which may enable the ISP to secure incremental interconnection revenues, but which, due to the efficiencies from disintermediating a previously-used transit provider (*e.g.*, Cogent), enables the edge provider to secure lower quality-adjusted prices than before the agreement—cannot be the basis of a valid theory of harm.

131. In this section, I explain why marketplace realities, economic theory, and empirical evidence—including that presented by commenters, once properly interpreted—all reject this "big is bad" bargaining theory. Then, in Section VI, I explain why even if some outcomes predicted by commenters—including more direct interconnection deals between Comcast and edge providers or, more generally, higher prices to edge providers or their agents—were to occur, these outcomes would not harm competition or consumers.

A. Marketplace realities contradict theories of harm based on bargaining power

132. Perhaps the most striking feature of commenters' discussion of harms due to bargaining power is that they largely focus on allegations regarding Comcast's *current* size as an ISP and associated market power.[151] Of course, claims about Comcast's current bargaining power cannot establish incremental harms from the proposed combination with TWC. But even more telling, if Comcast has such bargaining power today, then

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151 *Ibid.*

current marketplace outcomes provide a direct test of commenters' theories: Do current marketplace outcomes demonstrate high interconnection prices and limited interconnection options, as one would expect to see if commenters' claims that large size as an ISP parlays into excessive power over edge providers and their agents? The answer is decidedly no.

133. **First**, the fact that there are over 40 *settlement-free* paths into the Comcast network demonstrates that having a large number of broadband customers does not parlay into the ability to charge high prices for interconnection services. Indeed, the existence of that large number of paths substantially restricts Comcast's ability to exercise bargaining power on interconnection terms, even post-merger. In particular, if Comcast were to raise the price for only one or a small number of paths into its network, traffic would naturally flow to other paths. And a claim that Comcast could force higher prices on all paths—even though more than 40 are settlement-free today—would depend on an implausibly large and entirely unproven increase in bargaining power over the entire Internet backbone due to the proposed transaction.

134. **Second**, even where Comcast has entered into paid commercial agreements for direct interconnection, its prices have been very low, generally at or below market prices for transit, which themselves have plummeted over time.[152] Consistent with this fact, payments for direct interconnection make up only a tiny sliver of the costs paid by edge

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[152] *See McElearney Declaration*, ¶ 18; see also Appendix III.

providers and an even smaller percentage of edge providers' revenue (the relevant comparison to assess what effect such charges could possibly have on price, even if fully passed through). Interconnection payments are dwarfed by content costs in particular: As Netflix CFO David Wells recently explained, "I think for Netflix content is our largest cost. It dwarfs all the other costs…."[153] Such a pattern is not consistent with a claim that Comcast controls a critical input (direct interconnection into its last-mile network) without which Netflix cannot compete successfully.

135. Table 8 documents the small size of interconnection payments. It shows the interconnection charges paid to Comcast as a percentage of cost of revenue (or cost of sales) as reported by three large edge providers, **{{ }}**.
{{ }}

136. Even more importantly, the payments for direct interconnection from these edge providers are substantially **{{ }}** their traffic imposes on ISP networks. This comparison is particularly telling because standard theories regarding harm from the alleged exercise of market power involve setting marginal prices over marginal costs, thus inefficiently reducing output. Because Comcast currently charges customers nothing for subscribing

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[153] "Netflix's (NFLX) CEO Reed Hastings on Q2 2014 Results – Earnings Call Transcript," July 21, 2014, *available at* http://seekingalpha.com/article/2327585-netflixs-nflx-ceo-reed-hastings-on-q2-2014-results-earnings-call-transcript, *site visited* September 2, 2014.

to a given edge provider and little if anything for consuming additional data,[154] the marginal revenue associated with an increase in traffic from edge providers comes primarily from the edge provider side of the market. Hence, unless interconnection fees are above marginal cost, then there is no basis to say that such fees are consistent with a standard market power claim of marginal prices greater than marginal costs.

137. The recent Netflix interconnection agreements provide good examples from which to perform compare direct interconnection prices to associated marginal costs. Based on Comcast's estimates of the network costs incurred to serve Netflix traffic, I calculate the marginal costs (per Mbps) associated with Netflix traffic and compare these costs to the direct interconnection fees paid to Comcast by Netflix (also per Mbps).[155] The results show that Netflix's payments to Comcast for direct interconnection are less than **{{ }}** percent of the marginal network costs that the Netflix traffic imposes on Comcast's network. Similarly, TWC indicates that the price that it is charging Netflix for direct interconnection is below the marginal costs of serving Netflix's traffic "by orders of

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154 Although Comcast is experimenting with usage-based pricing in certain markets, the monthly data allowances are high relative to usage and very few customers reach the allowance. For details regarding Comcast's usage-based pricing trials and customer usage relative to the 300 GB/month threshold, *see, e.g.*, "September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request," RFI 59.(iii), 156-161.

155 See Appendix III for the details of this calculation.

magnitude."[156] **{{ }}** for interconnection are not consistent with the standard market power claim that marginal prices are above marginal costs.

138. The fact that Comcast's prices for direct interconnection are below Comcast's marginal costs for the associated traffic holds not just for Netflix, but also for many other edge providers and their agents. Figure 5 plots Comcast's average incremental costs in the 2014-2017 period **{{ }}** against the schedule of direct interconnection prices for six major interconnection customers. In all cases the price is far below the marginal cost.
{{ }}

B. Economic theory does not support the claim that the proposed transaction will increase Comcast's bargaining power

139. Although current marketplace realities refute the argument that Comcast's alleged bargaining power leads to excessively high interconnection prices, commenters still allege that the proposed transaction will lead to a harmful increase in the exercise of bargaining power. Of course, no commenter has provided any transaction-specific evidence explaining why acquiring TWC would be the critical addition that would enable Comcast to exercise such bargaining power over interconnection terms, particularly given that

156 Peter Stern, Executive Vice President & Chief Strategy Officer, TWC, September 3, 2014, interview.

Comcast and TWC do not constrain one another today. To the contrary, economic theory supports no such conclusion (and as I show in Section V.C, empirical evidence rejects it).

1. The one economic theory in this case that yields a clear prediction of the transaction's effects on pricing to edge providers comes from Dr. Farrell and predicts a price <u>decrease</u>

140. In discussing the effects of increased prices for interconnection services to edge providers (assuming there would be increased prices), Dr. Farrell presents a model that assumes that edge providers would not price discriminate in the prices they charge to customers with different ISPs, meaning that if one ISP were to raise an edge provider's interconnection costs, that edge provider would raise prices to the customers of all ISPs.[157] Putting aside whether this model is correct, an implication of its assumption about lack of edge provider price discrimination is that if one of Comcast or TWC charges more to an edge provider, it effectively imposes a tax on the other in the form of higher edge provider prices charged to the other's broadband customers. That tax creates an externality, which the combined firm would internalize post-transaction. In particular, after internalizing the reduced broadband demand that the "tax" imposes on the other firm, the post-transaction firm would have an incentive to *reduce* prices charged to edge

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[157] Dr. Farrell actually presents two versions of his "simple price-theoretic" model. Here, I focus on the second version of Dr. Farrell's model, which Dr. Farrell appears to prefer. *See* discussion in *Farrell Declaration*, ¶¶ 189-192.

providers.[158] Hence, if Dr. Farrell's assumption about edge provider pricing is correct *for even some edge providers*, then he has presented the only theory in this case that makes a clear prediction about the transaction's effect on prices to edge providers: It will decrease them.

141. I note that the internalization effect that drives this result is not apparent in Dr. Farrell's articulation of the model *only* because he effectively assumes it away by assuming that customers react to price changes only by switching firms (the extensive margin), and not by dropping broadband service or downgrading broadband tier (the intensive margin). However, this is not a reasonable assumption. As discussed in Section III.C.2(a), substitution on the intensive margin is likely to be an important phenomenon—if edge provider prices change by a material amount, such that some customers reduce edge provider usage, those customers would surely consider whether they could get by with slower broadband service. Thus, to the extent that higher interconnection fees from Comcast would decrease demand for high-quality TWC broadband products (via their effect on edge provider pricing), Comcast would internalize this effect post-transaction, thus creating an incentive to *lower* interconnection fees post-transaction.[159]

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158 In Dr. Farrell's model, this effect arises because the transaction *reduces* the share of non-firm customers that bear a portion of the price increase, relative to Comcast and TWC standing alone. This creates an incentive for the combined firm to reduce price relative to the stand-alone firms.

159 As an aside, Dr. Farrell concludes that customers benefit from an interconnection price increase in his second model as long as (*i.e.*, as long as the edge provider's pass-through rate is not too much higher than the ISP's). This assumption is likely to hold under any reasonable set of assumptions. For example, if the share () of the combined firm is 40 percent, Dr. Farrell's condition would hold as long as the edge provider's pass-through rate is less than **{{ }}** the ISP's pass-through rate. If one reasonably assumes both pass-through rates are less than one, the edge provider's pass-through rate would have to be less than **{{ }}** for the condition to fail. Pass-through rates below **{{ }}** (implied by a linear demand curve) are not commonly used in practice.

2. Taken as whole, economic theory provides no basis to conclude that the proposed transaction will generate increased bargaining power for Comcast

142. Moving beyond the implications of Dr. Farrell's specific theory, I note that other economic theories provide no basis to conclude that the proposed transaction will lead to increased bargaining power for Comcast. In the Israel Declaration, I demonstrated that "the economic theory of bargaining provides no basis to conclude that the transaction will increase the bargaining power of the combined firm, relative to Comcast and TWC on their own."[160] Neither Dr. Evans nor Dr. Farrell appears to dispute this point.[161]

(a) Economic theory establishes no consistent relationship between size and bargaining power/outcomes

143. As described in the Israel Declaration, the directional impact of a merger of non-overlapping firms on bargaining outcomes depends on technical conditions describing the

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160 *Israel Declaration*, ¶ 89.

161 *Evans Declaration*, note 108 ("It is possible to identify some assumptions under which economic theory would show a different result [from the conclusion that greater size leads to greater bargaining leverage] as Dr. Israel has done."); *Farrell Declaration*, ¶ 148 ("As Dr. Israel suggests, a theoretical literature on the relationship between size and bargaining leverage suggests that the effect of one party's size on its bargaining leverage depends on the shape (concave or convex) of the function that relates value created to the size of the customer base.")

shape (concavity or convexity) of the "surplus functions" for each party in the negotiation.[162] In particular, if the merger involves non-overlapping buyers, it only leads to increased bargaining power if seller surplus functions are concave (exhibit decreasing returns to scale), as in that case each separate buyer is limited by the decreasing returns that the seller receives in working with an additional (marginal) buyer, whereas the merged firm can negotiate over the more valuable (inframarginal) purchases. In contrast, if seller surplus functions are convex (exhibit increasing returns to scale), each separate buyer benefits by negotiating with the seller only over the more valuable marginal sales, whereas the merged firm also bargains over the less valuable inframarginal sales. The same logic holds (with reference to buyer surplus functions) for a merger of sellers.

144. Hence, in situations such as the one arising in the transaction, in which the merging parties do not overlap, 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. Lacking any general relationship, the answer varies from case to case (and perhaps even negotiation to negotiation).

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[162] *Israel Declaration*, ¶ 93.

(b) Dr. Evans' assertion that the transaction will change the split of the surplus is atheoretical and inconsistent with standard economic practice, including the Commission's established practice

145. Traditional bargaining models—including those that give rise to the concavity/convexity results discussed above—assess the impact of a transaction on bargaining outcomes by evaluating how the transaction shifts the outside options of the negotiating parties.[163] By basing inferences on observed changes in outside options, this standard approach permits one to use the economic characteristics of the transaction in question to undertake a fact-based analysis of the likely effects of the transaction on bargaining outcomes. Notably, the Commission itself employed this approach in its analysis of Comcast-NBCUniversal 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.[164] Although there was stark disagreement on the relevant facts and thus predictions, there was no meaningful disagreement on the overall approach.

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163 *See, e.g.*, Tasneem Chipty and Christopher M. Snyder (1999), "The Role of Firm Size in Bilateral Bargaining: A Study of the Cable Television Industry," *The Review of Economics and Statistics*, 81.2: 326-340 (hereinafter, *Chipty and Snyder (1999)*), whose model is based on a Nash bargaining model; Ken Binmore, Ariel Rubinstein, and Asher Wolinsky (1986), "The Nash Bargaining Solution in Economic Modeling," *The RAND Journal of Economics*, 17.2: 176-188. The Commission recognized this same logic in the Comcast-NBCU transaction. *See Comcast-NBCU Order*, Appendix B, ¶ 37.

164 Technical Appendix, *Comcast-NBCU Order*, ¶ 36.

146. As explained above, in the present case, this traditional approach does not support any clear prediction of harm from the transaction. Apparently recognizing this, Dr. Evans turns to an alternative claim that the transaction would change the split of the surplus between ISPs and edge providers.[165] However, as the authors of one paper that raised this possibility note, and as I discussed in the Israel Declaration, claims that a transaction will change the split of the surplus are atheoretical and thus make no clear prediction on the effects of a merger on bargaining outcomes.[166] Put differently, using such an approach only serves to confirm my main conclusion that economic theory provides no general prediction regarding the direction of merger effects from a merger of non-overlapping ISPs.

147. Likely for this reason, neither the Commission nor those opposing the Comcast-NBCUniversal transaction argued for a change in the split of surplus as a basis for harm. Rather, both Dr. Rogerson in his capacity as an expert testifying on behalf of the ACA and the Commission assumed a 50/50 split of the surplus *both pre- and post-merger,*

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165 *Evans Declaration*, ¶ 167.

166 *Israel Declaration*, ¶ 101; Nodir Adilov and Peter J. Alexander (2006), "Horizontal merger: Pivotal buyers and bargaining power," *Economics Letters*, 91: 307-311, 310 (recognizing that "a precise relationship between firm size and bargaining power cannot be determined by theory.")

when evaluating bargaining effects in that transaction, directly contradicting Dr. Evans' proposed approach in this case.[167]

148. Dr. Evans does provide one specific argument about why the transaction could improve the combined firm's outside option relative to Comcast and/or TWC on its own and thus improve Comcast's bargaining position.[168] In particular, he argues that Comcast's size might be positively correlated with its outside option because either (i) "decreased use of OVDs leads to greater consumption of its [NBCUniversal] content"; or (ii) Comcast has made "greater investments than other ISPs in streaming video."[169] With respect to the first claim, as discussed in Section IV.B.2, there is no evidence that OVD content is a particularly close substitute for NBCUniversal's programming networks. Rather, statements by OVDs point to closer competition with premium networks like HBO, which NBCUniversal does not offer. And OVDs are primarily *buyers* of NBCUniversal content, giving Comcast an incentive to favor more OVD competition. With respect to the second claim, Comcast's streaming video is just part of its cable offering and thus does not truly compete with OVD offerings. But, in all events, even if

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167 Technical Appendix, *Comcast-NBCU Order*, ¶40; William P. Rogerson, "Economic Analysis of the Competitive Harms of the Proposed Comcast-NBCU Transaction," *In the Matter of Applications 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, June 21, 2010, 12, 24.

168 *Evans Declaration*, ¶ 172.

169 *Ibid*.

Dr. Evans were correct, this boils down to an efficiencies offense: If Comcast has a superior "streaming video" product than TWC has, TWC's customers will benefit from this service post-transaction. If the scale economies from the transaction lead the combined firm to make further investments to improve this service, this would be a prime example of the scale-based benefits from the transaction. To the extent that such improvements affect Netflix, this would likely occur through the normal competitive process by which Netflix competes for customers, meaning that improvements in the Comcast streaming service would likely induce pro-competitive responses from Neflix and other OVDs. But rather than recognize such direct benefits to consumers, Dr. Evans and Netflix argue that these effects are bad due to alleged second-order effects on the division of surplus in negotiations between Comcast and Netflix.

(c) Dr. Farrell's assertion that ISPs can choose not to bargain jointly is not supported by any evidence and is inconsistent with industry practice

149. Dr. Farrell also offers an alternative view, suggesting that a merger could never decrease a firm's bargaining power because the post-merger firm could choose to bargain separately or jointly depending on which approach is more advantageous.[170] I first note that regardless of the merits of this argument, it does not provide any affirmative theoretical support for a claim that a merger of non-overlapping firms will increase a firm's bargaining power due to greater size. Instead, it only makes the defensive claim

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170 *Farrell Declaration*, § VI.A.2.

that the merger will not *reduce* the merging firm's bargaining power, a possibility I have never advanced affirmatively.

150. Moreover, Dr. Farrell presents no evidence in support of his alternative view, which, in fact, is inconsistent with industry characteristics on multiple dimensions. Dr. Farrell does not present a single situation in which an ISP or MVPD has negotiated about distinct portions of its footprint separately. The failure for ISPs or MVPDs to engage in such bargaining is likely due to specific features of bargaining in this industry, including:

- Each side of a negotiation likely has a different view about whether combined or separate bargaining would be better. Dr. Farrell offers no basis to assert why the ISP would be able to dictate to an edge provider (or its agent) that negotiations will be conducted in separate pieces, rather than the standard practice of a single negotiation.

- Negotiating separately is likely to increase transaction costs for both the ISP and the edge provider relative to negotiating jointly, which is likely a large part of the reason why separate negotiations do not occur in practice.

- Even if the ISP attempted to enforce separate negotiations for distinct parts of its footprint, it is hard to see how the ISP could keep the other parts of the footprint out of the negotiation. In particular, if either party saw a way to gain bargaining leverage through an action that would affect the other party throughout its footprint—not just in the areas technically under negotiation—it seems likely that the party would take that action everywhere, whatever the stated limits to the negotiation. In such instances, it is hard to see how the stated limits to the negotiation could be maintained.

C. Empirical evidence rejects the claim that the proposed transaction will increase Comcast's bargaining power

151. Both Dr. Evans and Dr. Farrell argue that, in the absence of theoretical predictions of the direction of the proposed transaction's effect on bargaining power, one must rely on empirical evidence.[171] I agree, and I consider available empirical evidence in this section. But given the lack of any general theoretical prediction of harm, one should closely scrutinize empirical evidence to see if it can support a prediction of harm that applies to the specific case in question. When subjected to proper scrutiny—including controlling for the effect of ISP quality on observed prices—the empirical evidence in this case supports no such prediction of merger harm due to increased bargaining power; in fact, it contradicts this claim.

1. To be informative, empirical work on the size/bargaining power relationship must control for firm quality

152. To provide a basis to conclude that increased firm size leads to greater bargaining power, empirical evidence would need to rule out alternative explanations, including the well-known relationship between firm size and quality. In any study of the effect of firm size on price, one needs to account for the fact that higher quality firms tend to have higher share *and* higher price. Hence, it is well known that, to be informative, empirical

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171 *Evans Declaration*, ¶ 159; *Farrell Declaration*, § VI.B.

analysis must determine whether an observed size/price relationship actually reflects anti-competitive effects as opposed to the effect of higher quality or other factors.[172]

153. The fact that larger firms tend to be higher quality is not just an abstract possibility; it applies directly to the relevant issues in the present case. Network quality and the quality of interconnection services tend to differ across ISPs of different sizes. Most basically, the smallest ISPs simply do not have backbone facilities, meaning that they generally have to *pay* someone for transit services. Comparisons 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.[173] In effect, the difference in the "quality" of interconnection services offered by these ISPs is so extreme as to render the comparison meaningless.

154. Even among ISPs that do have backbone facilities, I understand there are important differences in network quality and in the quality of interconnection services, with larger ISPs generally offering higher quality. For example:

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172 *See, e.g.*, Peter C. Reiss and Frank A. Wolak (2007), "Structural Econometric Modeling: Rationales and Examples from Industrial Organization," *Handbook of Econometrics*, Vol. 6A, Elsevier B.V., § 7.4.3.

173 *See McElearny Declaration*, ¶ 22; *Dovrolis Declaration*, 13, 25.

- Evidence cited by Dr. Evans, as well as engineers from Netflix and Cogent, indicates that connectivity to the Internet (as measured by the number of paths between the ISP's network and the broader Internet) plays an important role in the negotiations.[174] Greater 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.[175] More interconnection points also lead to more efficient interconnection and greater redundancy.[176] Figure 6 demonstrates that larger ISPs, including Comcast, tend to have more interconnection points than do smaller ISPs.

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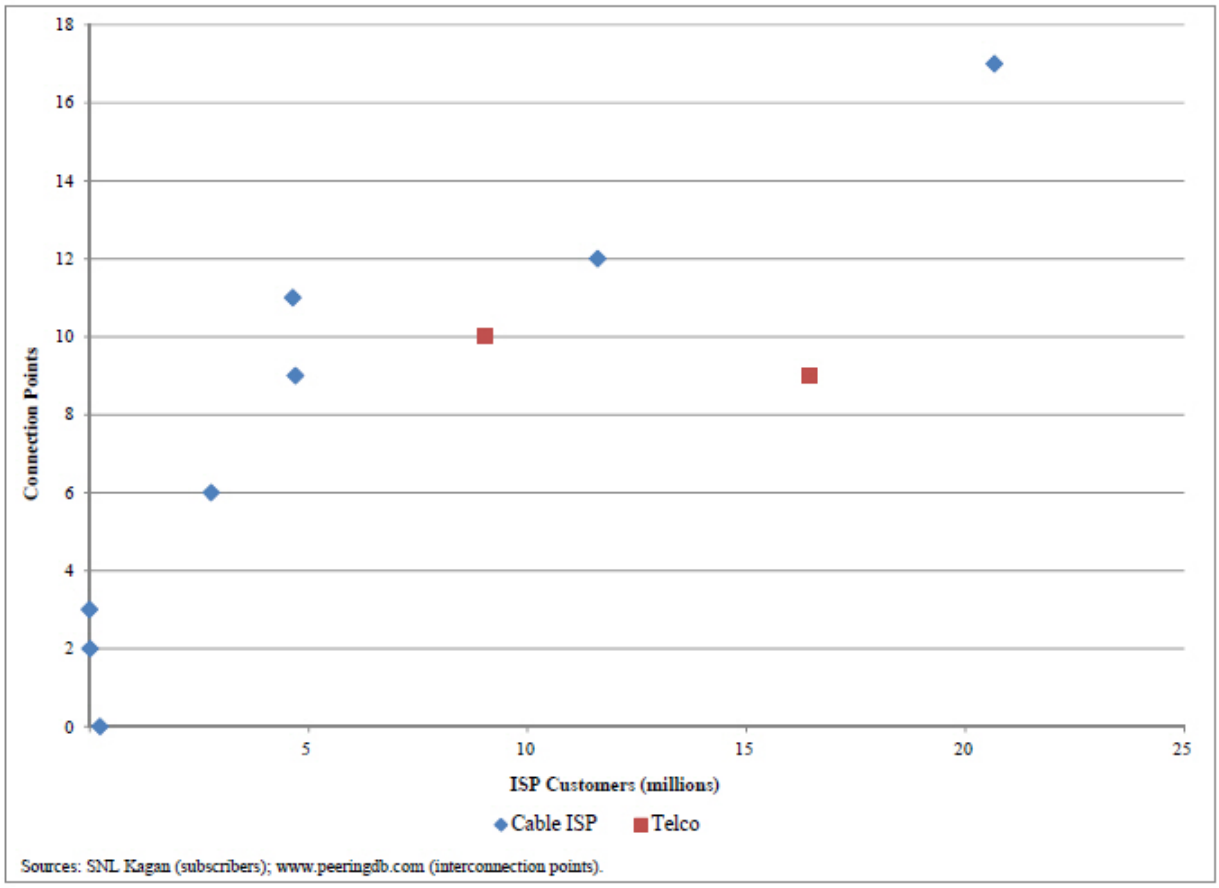
174 *Evans Declaration*, ¶ 147; *Florance Declaration*, ¶ 63; Declaration of Henry (Hank) Kilmer, Attachment to Petition to Deny of Cogent Communications Group, August 25, 2014 (hereinafter, *Kilmer Declaration*), ¶¶ 34, 42-43. *See also*, *McElearney Declaration*, ¶ 5 (investments in backbone "enabled Internet backbone providers and edge providers to more efficiently (and cost-effectively) interconnect to our growing network.")

175 John Schanz, Executive Vice President and Chief Network Officer, Comcast Corporation, September 19, 2014, interview.

176 For example, Comcast requires applicants for settlement-free interconnection to "meet Comcast at a minimum of four mutually agreeable geographically diverse [third-party exchange] points in the U.S." (*McElearney Declaration*, ¶ 7.)

Figure 6: Comparison of ISP Customer Base to Number of Interconnection Points



· I also understand 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.[177] I understand that large ISPs

177 John Schanz, Executive Vice President and Chief Network Officer, Comcast Corporation, September 19, 2014, interview.

in general (and Comcast in particular) tend to offer higher quality along these dimensions as well.[178]

155. The fact that network quality matters to interconnection terms seems beyond reasonable debate. Indeed, in describing the "stringent standard" that Cogent uses to determine which networks warrant settlement-free peering, Cogent engineer Hank Kilmer cites "size, geographic scope, capacity, traffic volume and significance," and also specifically calls out "geographic reach and multiple interconnect points," as relevant factors.[179] Strikingly, however, Cogent's economist, Dr. Farrell, makes no attempt to control for any of these determinants of settlement-free peering when evaluating the prices that different ISPs pay for interconnection with Cogent. As I show below, controlling for these factors eliminates the appearance of any relationship between an ISP's number of customers and interconnection prices.

2. The analogy to MVPD/content provider negotiations demonstrates that quality differences can explain the observed relationship between size and price

156. As an example of the importance of controlling for quality, I consider evidence from negotiations between MVPDs and content providers. Although they take place in a separate industry, with its own unique institutional features, MVPD/content provider

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178 *Ibid*.

179 *Kilmer Declaration*, ¶¶ 14, 16.

negotiations are often used as an analogy for what will happen in ISP/edge provider negotiations as ISPs get bigger.[180] Here, I show that, in fact, to the extent one relies on this analogy, it actually demonstrates that quality (and associated surplus) differences can entirely explain differences in observed bargaining outcomes, with no need to resort to (theoretically ambiguous) claims about bargaining power.

157. The key point in the analogy is to note that, similar to the variation in ISP quality, there are also quality differences across MVPDs that lead to variation in the surplus that different MVPDs generate for content providers. Sources of quality variation across MVPDs include, among other things, differences in the advertising revenue per customer that content providers earn when working with different MVPDs due, for example, to variation across MVPDs in efficacy in monetizing advertising on video-on-demand (VOD) or other non-linear platforms.

158. The differences in quality across MVPDs are easily large enough to explain observed affiliate fee differences across MVPDs (Comcast and TWC in particular). In particular:

- I understand that Comcast's initial assessment was that it expects to generate some modest cost savings on these fees, in part by bringing down the rates on existing TWC contracts to the level of Comcast contracts (as well as by making certain

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[180] *Farrell Declaration*, § VI.B.2.

other adjustments in TWC's programming profile).[181] The cost savings are quite small in total, amounting to only **{{ }}** per year, with the savings phasing in gradually over three years.[182] For my purposes, the key implication of this analysis is that—even assuming that all of the savings are a function of contract price differential, as opposed to tier placement, channel lineups, etc.—the difference in average affiliate fee rates between Comcast and TWC is very small on a per customer per month per network basis. Specifically, TWC has a little more than 11 million video customers currently and each customer has on average access to over 168 video networks.[183] These figures imply a difference between the per-network average affiliate fees of Comcast and TWC of only approximately **{{ }}** per customer per month.[184]

- Given that Comcast and TWC almost surely generate at least somewhat different surplus per customer for content providers, this tiny difference in affiliate fees is

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181 I understand that the actual size of the realized gains will depend on whether the savings are realizable under the contracts, but that does not affect my conclusions regarding the size of the price differences between Comcast and TWC implied by the Comcast analysis.

182 Declaration of Michael J. Angelakis, Attachment to Comcast Corporation and Time Warner Cable Inc., *Description of Transaction, Public Interest Showing, and Related Demonstrations*, April 8, 2014, ¶ 7.

183 "Time Warner Cable Reports 2014 Second-Quarter Results", July 31, 2014, *available at* http://ir.timewarnercable.com/investor-relations/investor-news/financial-release-details/2014/Time-Warner-Cable-Reports-2014-Second-Quarter-Results/default.aspx,

site visited September 14, 2014. TWC's average number of video networks per subscriber estimated using Rovi data.

184 That is, **{{ }}**/[11,011,000 (subs) x 12 (months) x 168 (networks/sub)] ~=**{{ }}** .

not surprising and does not imply differences in bargaining power. For example, NBCUniversal's own analysis indicates that Comcast creates greater surplus for content providers than TWC, in the form of greater advertising revenue, at least in part because of the higher quality of Comcast's VOD platform including its ad-insertion tools. Evidence from analysis performed by NBCUniversal on a group of video networks indicates that, on average, relative to TWC, content providers earn an additional **{{ }}** per customer per month per network in advertisement revenues on Comcast relative to TWC.[185] Hence, this result illustrates that greater surplus generated for content providers by Comcast is easily of a magnitude that can more than explain the very small estimated differences in affiliate fees across the two companies, with no need to turn to differences in bargaining power.[186]

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185 Comcast slide deck analyzing advertisement revenues "Ad Contribution Per Sub by MVPD.pdf." I understand that **{{ }}**. Even if I conservatively assume that the **{{ }}** savings that Comcast is expected to generate from the transaction similarly stems entirely from the top 50 networks, instead of all of the 168 networks, the per sub per month per network fee difference comes out to **{{ }}**, which is still below the **{{ }}** of additional advertisement revenue generated by Comcast.

186 Literature cited by Dr. Farrell does not change this conclusion. (*See Farrell Declaration*, ¶¶165-171). The FCC staff report (Mark M. Bykowsky, Anthony M. Kwasnica and William W. Sharkey (2002), "Buyer Size and Bargaining Power: An Experimental Analysis," *FCC OPP Working Paper No. 35*) presents experimental evidence in which participants are presented with bargaining situations in which the number and share of programming distributors varies. The authors find no effect of size on bargaining power at shares greater than 12 percent.

George S. Ford and John D. Jackson (1997), "Horizontal Concentration and Vertical Integration in the Cable Television Industry," *Review of Industrial Organization* 12.4: 501-518 and Gregory S. Crawford and Ali Yurukoglu (2011), "The Welfare Effects of Bundling in Multichannel Television Markets," *American Economic Review* 102.2: 643-685 only show that prices paid by MVPDs fall with sizes, with no examination of the source of the difference, and thus cannot answer the question posed in this section.

Dr. Farrell's references to the health care literature describe an entirely different industry with different institutional features. As explained above, given that economic theory makes no general prediction on the relationship between size and bargaining power, the answer is highly context-specific, making the hospital industry findings irrelevant to the present case.

3. Once quality is controlled for, Dr. Farrell's conclusions based on Cogent data are reversed

159. Dr. Farrell presents data on interconnection terms between ISPs (including both cable and telco ISPs) and Cogent and concludes on the basis of this evidence that "the largest ISPs have settlement-free peering while smaller consumer ISPs pay Cogent."[187] From this, Dr. Farrell attempts to infer that larger ISPs have greater bargaining power than smaller ISPs.[188] However, Dr. Farrell's empirical results support no such conclusion.

160. Most basically, for many ISPs this result is entirely unsurprising and demonstrates only the fact that, as noted above, many smaller ISPs simply do not have backbone facilities, meaning that they generally *must* pay someone for transit services. No inference of differences in bargaining power can be drawn based on this stark difference in the backbone assets of different ISPs. Among other things, Dr. Farrell's interpretation would suggest that the fact that some large ISPs have built out backbone services, *thus*

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187 *Farrell Declaration*, ¶ 175. *See generally*, *Farrell Declaration*, § VI.B.3 and Appendix B.

188 *Id.*, ¶ 176.

increasing the capacity of the overall Internet, is a bad thing, because he interprets resulting price differences as evidence of bargaining power.

161. More generally, in his analysis of interconnection terms, Dr. Farrell makes no attempt to distinguish between the role of bargaining power associated with a firm's size as a broadband provider and other factors, including the quality of ISPs' interconnection services. For the reasons described above, absent sufficient controls for variation in quality across ISPs, his conclusion that "[t]his pattern seems difficult to reconcile with a view that an ISP's size has no systematic relationship with its bargaining power…"[189] is nothing more than an unsupported assertion.

162. To test whether Dr. Farrell's assertion is correct—or whether, instead, quality differences rather than bargaining power (based on number of broadband customers) explain the observed price differences—I perform a basic regression analysis using the data reported by Dr. Farrell.[190] The results show that, in fact, observed price differences are explained by quality differences across ISPs and that, once such quality differences

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189 *Ibid*.

190 To perform these regressions, I start from the data that Dr. Farrell reports in Appendix B. I drop those ISPs for which SNL Kagan does not report the number of customers. I also drop **{{ }}** from my analysis because the **{{ }}** that Dr. Farrell reports in Appendix B is inconsistent with his statement in paragraph 174 indicating that **{{ }}**. Because Dr. Farrell has not supplied the code used to calculate the average transit prices, I cannot verify its accuracy. **{{ }}**. For these two companies, I include customer counts using data from SNL Kagan, the same data source that Dr. Farrell uses. I include the number of private peering facilities that each ISP has from data reported by www.peeringdb.com.

are controlled for, an ISP's size (measured as its number of broadband customers) has no significant effect on interconnection prices.

163. Table 9 presents the regressions results:

- In Column (1), I simply regress ISP interconnection fees with Cogent (as reported by Dr. Farrell) on the number of ISP customers (in millions). The results indicate that, *without controlling for any other factors*, increasing the number of ISP customers by one million **{{ }}**. This is the relationship to which Dr. Farrell's inference refers.

- However, the regression specification in Column (1) controls for *none* of the differences across ISPs described above. To correct this limitation, I use data reported by www.peeringdb.com to introduce a control for each ISP's number of peering facilities (as described above, the number of peering facilities an ISP has reflects the degree of connectivity the ISP's network has with the broader Internet, an important measure of the quality of an ISP's interconnection services). Where www.peeringdb.com does not report any peering facilities for an ISP, I assume that the absence of any data indicates that the ISP does not have any peering facilities. As described below, I test the sensitivity of the results to alternative assumptions. Of course, an ISP's number of peering locations is likely to be correlated with an ISP's number of customers (see Figure 6), but that is the point of the regression analysis—to sort out whether interconnection prices are driven by the number of broadband customers (the source of the alleged market power that commenters say drive higher interconnection prices) or by measures of interconnection quality.

- Results with the quality control in place are presented in column (2). They demonstrate that, after controlling for quality, the number of broadband customers has no measureable impact on interconnection prices. With the control for quality in place, **{{ }}**.

{{ }}

164. In sum, the Cogent data are more consistent with **{{ }}** based on an ISP's "control" of more broadband customers.[191]

4. Dr. Evans' analysis of Netflix's interconnection payments is uninformative

165. Although he has not produced interconnection terms at the same level of detail as Dr. Farrell, Dr. Evans claims that "[e]xcluding the largest four ISPs, ISPs have not been able to impose terminating access fees on Netflix. Smaller ISPs have been unable to demand and receive payment. They continue to adhere to the zero price equilibrium."[192] For the reasons described below, no coherent theory of harm can be supported based on Dr. Evans' analysis.

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191 I ran several sensitivities on this analysis, all of which confirm my finding that the relationship between ISP size and interconnection fees is no longer statistically significant once one controls for ISP quality. These sensitivities included dropping the observations for which data on the number of connection points are unavailable, treating these same observations as having one (rather than zero) connection point, and including data on **{{ }}**, based on *Farrell Declaration*, ¶¶ 173-174).

192 *Evans Declaration*, ¶ 142.

166. Dr. Evans' claim is effectively meaningless. It does not establish that **{{ }}**; only that it pays more *to the ISP itself*, with which it connects directly. This simply reflects the fact that, as noted above, edge providers have a range of interconnection options, only one of which is direct interconnection with the ISP. The difference Dr. Evans points to is one of form, not substance: The fact that Netflix pays the ISP, rather than some other interconnection provider, does not establish that Netflix pays more in total. Dr. Evans' analysis falls prey to the trap described above; he focuses only on what is charged by an ISP, not on the critical question of whether the edge provider actually pays more as a result.

167. An analogy may clarify the point. If a consumer buys corn directly from a farmer at a farmer's market, he pays more *to the farmer* than if he buys the corn at the grocery store. But this says nothing about how much the consumer pays for the corn in the two cases (or how much the farmer receives), even though those are clearly the relevant economic questions. Analogously, Dr. Evans' statements say nothing about *how much* Netflix pays for interconnection in the various cases, only to *whom* it pays.[193]

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[193] This analogy also highlights another flaw in Dr. Evans' analysis; like Dr. Farrell's analysis, it fails to control for quality. A consumer may happily pay more for corn at a farmer's market if, by eliminating the grocery story middleman, she can get fresher corn. Similarly, I understand that direct interconnection agreements offer benefits like predictability and control, which might explain any increase in price paid by the edge provider, if there were one.

168. Indeed, Netflix's Ken Florance explains that Netflix always pays to interconnect into an ISP's network no matter which of its methods for delivering traffic it uses. In particular, Mr. Florance describes two methods of delivering traffic in addition to direct interconnection.[194] First, with some ISPs (*e.g.*, Cablevision), Netflix might deliver traffic through its own CDN, Open Connect. In this case Netflix "pays for the hardware…, delivery, and maintenance of the appliance," presumably along with the overall costs of running an in-house CDN.[195] Second, for many of the smaller ISPs, as well as Charter and CenturyLink, Netflix "uses transit providers to deliver traffic…."[196] As explained above, this means that Netflix pays a transit provider rather than an ISP directly; it certainly does not mean that Netflix pays less in total.

169. Absent 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 whether large ISPs capture higher prices than other transit providers, which of these methods is most costly to Netflix, or whether these highly technical distinctions between interconnection methods have any material negative effect on Netflix. *Because Dr. Evans has not produced any of his underlying data—including the data on prices and costs that would*

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194 *Florance Declaration*, ¶¶ 14-23.

195 *Id.*, ¶ 16.

196 *Id.*, ¶ 23.

permit an evaluation of Netflix's costs under the different arrangements—his analysis adds no value to the analysis of the proposed transaction. In contrast, the evidence I present in Section VI.A, below, indicates that its agreements for direct interconnection with Comcast and TWC have not harmed Netflix.

170. Finally, Dr. Evans also notes that **{{ }}**[197] However, the fact that Comcast and TWC are known to differ in the quality of their networks and interconnection services renders such a comparison—or any simple comparison of **{{ }}** that does not account for the quality differences—uninformative, as **{{ }}**. The fact that Dr. Evans relies on a **{{ }}** without controlling for quality differences is particularly notable, as Dr. Evans himself recognizes that quality differences are important and that Comcast is ahead of TWC on many important quality metrics.[198]

VI. POTENTIAL CHANGES IN THE MAGNITUDE OR STRUCTURE OF INTERCONNECTION PAYMENTS WOULD NOT BE HARMFUL TO COMPETITION OR CONSUMERS

171. The discussion thus far has established that neither economic theory nor empirical evidence can establish that the transaction will give Comcast greater bargaining power through which it could impose higher prices on edge providers or their agents. Although this should end the inquiry on this topic, in this section I go on to consider whether

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197 *Evans Declaration*, ¶ 146.

198 *Id.*, ¶ 57 and Figure 1. Effectively, Dr. Evans' conclusions, while not based on any formal econometric modeling, suffer from omitted variable bias. The regressions that I present in Section V.C.3 illustrate that such an omission leads to an incorrect conclusion.

possible changes to the structure or magnitude of interconnection payments, which some commenters allege may occur as a result of the transaction, would be harmful.[199] In particular, I assess whether either increased usage of direct interconnection agreements between edge providers and ISPs (thus cutting out the intermediaries), or increased payments from edge providers or their agents to ISPs, would harm competition or consumers. In both cases, I explain why the answer is no.

A. Direct interconnection agreements between edge providers and ISPs are not harmful to competition, consumers, or edge providers

172. Recent trends indicate that, with or without the proposed transaction, there may be increased usage of direct interconnection agreements between edge providers and ISPs—cutting out intermediaries.[200] This trend (whether or not the proposed transaction has any effect on it) is not harmful to competition or consumers, as evidenced by the lack of harm to Netflix from its recent direct interconnection agreements with Comcast and TWC.

1. Direct interconnection agreements between edge providers and ISPs often represent economically efficient disintermediation

173. To put direct payments from edge providers to ISPs in context, it is useful to recognize them for what they are—the disintermediation of intermediaries such as transit providers and CDNs, which otherwise would sit between the edge provider and the ISP,

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199 *Farrell Declaration*, § VI; *Evans Declaration*, § III.F.1; *Sappington Declaration*, ¶ 60 and note 59.

200 *Dovrolis Declaration*, 13-14.

charging one or both of them to connect to the other.[201] Direct interconnection agreements (and associated payments, whichever direction they flow) reflect the fact that when *both* an edge provider and an associated ISP are large enough to have a sufficient Internet backbone presence, they may no longer need such intermediaries. Instead, they may find it mutually beneficial to avoid the cost associated with an intermediary's services (and the associated intermediary profit margins). Such a decision is hardly surprising and not unique to the interconnection context—the economic efficiency of "cutting out the middleman" is well recognized in economics across a wide range of industries. It may not be a good financial result for the intermediary (*e.g.*, Cogent), but it is not a bad outcome for the edge provider (*e.g.*, Netflix) or the ISP (*e.g.*, Comcast), or for competition or consumers.

174. The recent direct interconnection agreements between Netflix and both Comcast and TWC provide examples of such mutually beneficial, economically efficient

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[201] *See* Dan Rayburn, "Here's How the Comcast & Netflix Deal Is Structured, With Data & Numbers," *StreamingMediaBlog.com*, February 27, 2014, *available at* http://blog.streamingmedia.com/2014/02/heres-comcast-netflix-deal-structured-numbers.html, *site visited* September 12, 2014; Dan Rayburn, "Chart Shows Which Content Owners Have Direct Interconnect Deals with ISPs," *StreamingMediaBlog.com*, May 21, 2014, *available at* http://blog.streamingmedia.com/2014/05/chart-shows-which-content-owners-have-direct-interconnect-deals-with-isps.html, *site visited* September 12, 2014; Dan Rayburn, "How Transit Works, What It Costs, & Why It's So Important," *StreamingMediaBlog.com*, February 24, 2014, *available at* http://blog.streamingmedia.com/2014/02/transit-works-costs-important.html, *site visited* September 12, 2014.

disintermediation. The benefits of the agreement to Netflix are clear. As Mr. McElearney explains, "[the Comcast-Netflix agreement] provides Netflix long-term **{{ }}**[202] Indeed, as Mr. McElearney further explains, Netflix appears to recognize the value of such disintermediation.[203] The fact that Netflix benefited from the direct interconnection agreement belies any claim that such agreements and associated payments are anti-competitive or harmful to edge providers or consumers.[204]

175. Direct interconnection agreements (and associated capacity expansions) also free up capacity that the intermediaries can sell to other transit buyers, to the benefit of edge providers and consumers. Again, McElearney explains clearly:[205]

> Today, the Cogent-Comcast interconnection links are uncongested and the parties' traffic flows are back in general balance, with a ratio of less than **{{ }}** over those links, and so now back in compliance with the SFI Policy. This means capacity is again available for many third parties who need to reach Comcast's network through this route.

As a matter of economics, such an increase in available capacity is good for Internet consumers, likely leading to lower transit prices and greater output to make use of the

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202 *McElearney Declaration*, ¶ 43 [emphasis in original].

203 *Id.*, ¶ 44.

204 On this point, it is also worth noting that, to my knowledge, no edge provider other than Netflix has commented in this docket or has come out publicly against the proposed transaction. Certainly firms like Google, Apple, Sony, Amazon, and others have the wherewithal to complain if they felt the transaction would harm their ability to compete.

205 *McElearney Declaration*, ¶ 41.

capacity. But it is also economically harmful to Cogent, perhaps explaining why Cogent is unhappy with the transaction.

2. Recent direct interconnection agreements between edge providers and ISPs have had no material negative impact on edge providers' financial performance

176. Recognizing that the recent agreements with Netflix are only one example, they still provide a useful opportunity to see if direct interconnection deals between edge providers and large ISPs have had a material negative effect on edge providers. In fact, no such effect has been observed, and public statements made by Netflix confirm that the direct interconnection agreements did not have a material impact on its margins.[206] In fact, analyst reports suggest that, if anything, the direct interconnection contracts should enhance Netflix's profitability.[207] Netflix apparently considered the agreement's effects

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206 Netflix CFO David Wells mentioned on the Q2, 2014 earnings call that, "[o]n a short term basis I think there is great assurances in the sense that we've been able to sign these immediate interconnect deals and still able to achieve our margin targets…" Netflix's (NFLX) CEO Reed Hastings on Q2 2014 Results – Earnings Call Transcript," July 21, 2014, *available at* http://seekingalpha.com/article/2327585-netflixs-nflx-ceo-reed-hastings-on-q2-2014-results-earnings-call-transcript, *site visited* September 2, 2014.

207 For example, analyst Dan Rayburn states: "This allows Netflix to spend less on delivery, increase their quality, reduce churn do [*sic*] to streaming issues, and has a direct and positive impact on their bottom line. Show me any company that wouldn't want this, or feel it's an advantage." Dan Rayburn, "Why A Comcast/TWC Merger Is Good For Netflix's Business," *StreamingMediaBlog.com*, April 30, 2014, *available at* http://blog.streamingmedia.com/2014/04/netflix-comcast.html, *site visited* September 2, 2014.

so minor that it did not discuss the agreement in any of its subsequent filings with the SEC, despite being required by law to disclose factors that materially affect earnings.[208]

177. 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, I used standard event study methodology to test the effect of the Comcast/TWC merger rumor, Comcast/TWC merger announcement, and Netflix's direct interconnection agreements with Comcast and TWC on the stock market valuations of Netflix, Google, Amazon, and Apple. In particular, I study whether each company's stock experienced a statistically significant "residual return" (*i.e.*, change in valuation associated with the event net of market and industry effects) on the trading day immediately following the event, and if it did, whether the change in valuation was positive or negative. Based on the results of this analysis, I can infer whether the firm in question was affected directly by the given event and, more generally, whether the market

anticipated that the event would have either a positive or negative effect on the firm in question (or no effect).

178. I evaluated the following four events:

- Effect of rumored transaction between Comcast and TWC (November 23, 2013) on all four edge providers.
- Effect of announcement of Comcast/TWC merger (February 13, 2014) on all four edge providers.
- Effect of announcement of Netflix Interconnection Agreement with Comcast (February 23, 2014) on Netflix.
- Effect of announcement of Netflix Interconnection Agreement with TWC (August 19, 2014) on Netflix.

179. As shown in Table 10, below, the various events were not associated with negative changes (*i.e.*, statistically significant declines in valuation or stock price) for Netflix or any of the other selected edge providers. These results provide additional evidence that market participants did not expect the transaction to harm edge providers. The results also indicate that Netflix's direct interconnection agreements with Comcast and TWC had no measureable direct negative effect on Netflix.[209] As such, these results stand in sharp contrast to any claim that Netflix has been harmed by direct interconnection agreements

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[208] When Netflix announced price increases in the spring of 2014, it mentioned the cost of content but not the cost of interconnection ("A Quick Update On Our Streaming Plans and Prices," *Netflix US & Canada Blog*, May 9, 2014, *available at* http://blog.netflix.com/2014/05/a-quick-update-on-our-streaming-plans.html, *site visited* September 2, 2014; Netflix letter to shareholders, April 21, 2014, 5, *available at* http://files.shareholder.com/downloads/NFLX/3102704504x0x745654/fb5aaae0-b991-4e76-863c-3b859c8dece8/Q114%20Earnings%20Letter%204.21.14%20final.pdf, *site visited* September 2, 2014).

[209] *See* Appendix IV for further details regarding the methodology used in this event study and the statistical results.

with large ISPs such as Comcast and TWC, or that such agreements are generally harmful to edge providers' ability to compete effectively.

Table 10: Results from Stock Market Event Study

		Statistically Significant Residual Return (Direction)?			
	Company	Merger Rumor 11/23/2013 [1]	Merger Announcement 2/13/2014 [2]	NF/CC Interconn. Agmt. 2/23/2014 [3]	NF/TWC Interconn. Agmt. 8/19/2014 [4]
1	Netflix	No (+)	No (-)	No (+)	No (+)
2	Google	No (-)	No (+)	-	-
3	Amazon	No (+)	No (+)	-	-
4	Apple	No (-)	No (-)	-	-

B. FURTHER SHIFTS TOWARD PRICING ON THE EDGE PROVIDER SIDE OF THE MARKET WOULD REPRESENT AN EFFICIENT MOVE TOWARD MARGINAL COST PRICING AND REDUCED CROSS-SUBSIDIZATION

180. As explained in Section V, there is no support for the claim that the transaction will lead to higher payments by edge providers or their agents. In this section, I go on to explain that even if interconnection payments by edge providers or their agents

(collectively, "the edge provider side of the market") were to increase due to the transaction—in contrast to the evidence presented above—this would not be bad for competition or consumers. To the contrary, economic theory and available evidence indicate that any further shifts toward pricing on the edge provider side of the market would in fact be an efficient move toward incremental cost prices and would reduce cross-subsidization on the customer side of the market.

1. ISPs provide two-sided broadband platforms

181. To understand the implications of increased prices to the edge provider side of the market, a bit of economic theory is required. As both Dr. Evans and Dr. Farrell recognize, ISPs run two-sided broadband platforms, which facilitate the interaction of broadband customers and edge providers.[210] Customers derive value from interacting with edge providers. Similarly, edge providers derive value from interacting with customers (some of which may occur by selling to advertisers access to these broadband customers).

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210 *Evans Declaration*, ¶ 38; *Farrell Declaration*, ¶ 1. For general articles describing the economics of two-sided markets, *see* Jean-Charles Rochet and Jean Tirole (2003), "Platform Competition in Two-Sided Markets," *Journal of the European Economic Association*, 1.4: 990-1029; Jean-Charles Rochet and Jean Tirole (2006), "Two-sided markets: a progress report," *The RAND Journal of* Economics, 37.3: 654-667 (hereinafter, *Rochet and Tirole (2006)*); E. Glen Weyl (2010), "A Price Theory of Multi-Sided Platforms," *American Economic Review*, 100.4: 1642-1672 (hereinafter, *Weyl (2010)*); and David S. Evans and Richard Schmalensee (2014), "The Antitrust Analysis of Multi-Sided Platform Businesses," in *The Oxford Handbook on International Antitrust Economics*, Volume 1, Roger Blair and Daniel Sokol, eds., New York: Oxford University Press, forthcoming. (hereinafter, *Evans and Schmalensee (2014)*).

(a) Overview of two-sided platforms

182. A two-sided (or more generally, multi-sided) market has two distinguishing features:[211]

- Cross-group externalities:[212] The value of the platform to one side of the market increases with the amount of participation and/or usage on the other side of the market.

- The price structure, in addition to the price level, matters: The relative prices that the platform charges to each side of the market impact welfare and profits on each side of the market.[213]

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211 *See Rochet and Tirole (2006)* and *Weyl (2010)*.

212 Externalities arise when end-users do not fully internalize the value they produce or the costs they impose on the system. Cross-group externalities (or network effects) arise in many industries, including payment cards, advertising, video gaming, and job matching websites. In the context of the broadband segment, internet access is more valuable to customers the more and higher quality are the available edge provider applications. Similarly, more users with high-quality Internet connections make it more profitable for edge providers to invest in developing content and applications.

213 In order for the price structure to matter (to the welfare and profit on either side of the platform), market participants must not be able to undo the price structure via side payments. If market participants can undo the price structure via side payments, then the price structure is said to be "neutral." This "neutrality exception" does not apply in the present context; among other things, many edge providers have no direct interaction with broadband customers and thus no opportunity for side payments. Dr. Farrell agrees that "[t]his [neutrality] exception almost certainly does not apply to the case for consumer ISPs." (*Farrell Declaration*, ¶ 27.)

(b) Seesaw principle and optimal pricing to each side of the market

183. A core principle of pricing in multi-sided markets is the "seesaw" principle, which Rochet and Tirole describe as follows:[214]

> [A] factor that is conducive to a high price on one side, to the extent that it raises the platform's margin on that side, tends also to call for a low price on the other side as attracting members on that other side becomes more profitable.

In the present context, the implication of the seesaw principle is simple: Higher prices to edge providers or their agents for interconnection imply lower prices to broadband customers. And this result is very general: The seesaw principle is present in nearly all models of two-sided markets, including, as described below, the model introduced by Dr. Farrell.[215] The principle does not depend on any assumption about market structure or the degree of competition. Thus, as both Dr. Evans and Dr. Farrell recognize, in evaluating pricing in two-sided markets, it is critical to evaluate the impact on both sides of the market, *taking into account the fact that higher prices to edge providers or their agents directly imply lower prices to broadband customers and conversely that lower prices to edge providers or their agents directly imply higher prices to broadband customers*.[216]

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214 *Rochet and Tirole (2006)*, 659.

215 *Farrell Declaration*, § VII. For a more complete discussion of his model, *see* Sections V.B.1 and VI.B.3.

216 *Evans Declaration*, ¶¶ 38, 156; *Farrell Declaration*, ¶ 27.

184. The question of the welfare effects of a decision to charge more to edge providers or their agents is an example of a long-standing question in economics, concerning the optimal split of pricing between the two sides of a two-sided market, taking the tradeoff implied by the seesaw principle into account. *As economists including Dr. Evans have long recognized, as a general matter, the answer depends heavily on the market-specific facts, with no presumption that prices should be higher or lower on one side of the market versus the other*.[217] Hence, by Dr. Evans' own logic, there is no general theoretical support for a claim that higher prices on the edge provider side of the market (and thus lower prices on the consumer side of the market) would harm welfare.

185. The fact that there is no general presumption that one side of the market should pay while the other should not also refutes blanket assertions by Netflix that it should not have to pay anything to Comcast for direct interconnection simply because Comcast can charge its broadband customers.[218] This argument simply assumes, without support, that a particular price structure—in which customers pay to use an ISP's broadband platform to interact with edge providers, while edge providers do not pay the ISP for dedicated access to the platform in order to interact with customers—is appropriate, with no economic

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[217] *See Evans and Schmalensee (2014)* (reviewing various models of pricing in two-sided markets that arrive at different optimal pricing rules depending on the modeling assumptions).

[218] Petition to Deny of Netflix, Inc., *In the Matter of Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Transfer Control of Licenses and Authorizations*, MB Docket No. 14-57, August 25, 2014, 66.

support establishing that such a price structure is likely to be socially optimal. As such, there is no economic basis for this position.

2. Features of the two-sided market for broadband services indicate that greater payments on the edge provider side of the market are likely to be efficient

186. Building off both the general principles described above and the economic literature regarding two-sided markets, several specific features of the broadband industry point to the conclusion that, if anything, increased prices charged to the edge providers or their agents are likely to be welfare enhancing (in part because such price increases to edge providers or their agents would tend to *lower* prices to broadband customers, in a socially beneficial way).

(a) The seesaw principle means that payments by edge providers reduce payments by broadband customers and reduce cross-subsidization of OVD users by non-OVD users

187. Under the most common current pricing structures, ISPs do not price differentially to customers depending on the costs they impose on the network (other than any weak correlation between the average usage in a given speed tier and the price of the tier).[219] Hence, all customers (in a given tier) pay a price based on the average usage across all

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[219] As noted above, although Comcast is experimenting with usage-based pricing in certain markets, the monthly data allowances are high relative to usage and very few customers reach the allowance.

users in the tier. An implication of these pricing policies is that non-OVD users (or low-usage customers in general) subsidize OVD users (or high-usage customers in general).

188. Focusing on the case of Netflix in particular, Comcast data indicate that only approximately **{{ }}** percent of Comcast customers use Netflix.[220] Similarly, only approximately **{{ }}** percent of TWC customers use Netflix.[221] And these Netflix users tend to use a disproportionate share of network bandwidth. For example, during peak hours, approximately **{{ }}** percent of Comcast customers are streaming Netflix, and that usage accounts for 35 percent of peak downstream traffic.[222] Thus, because Netflix customers impose relatively large data loads on the network, uniform customer pricing means the majority (non-Netflix users) are subsidizing the minority (Netflix users).

189. Pricing by ISPs to edge providers or their agents can alleviate this cross-subsidization problem. As noted above, an implication of the seesaw principle is that ISP customers will pay less if edge providers or their agents pay more.[223] Edge providers may pass on a portion of any interconnection fee to their own customers, but this pass-through necessarily only goes to customers who use the particular edge provider, and thus such

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220 Barry Tishgart, Vice President, Comcast Wholesale, September 15, 2014, interview.

221 Nielsen Total Communications (TCS) Survey Q2 2014.

222 Barry Tishgart, Vice President, Comcast Wholesale, September 15, 2014, interview.

223 Both Dr. Evans and Dr. Farrell acknowledge that the seesaw principle implies lower broadband pricing given increases in interconnection fees. (*See Evans Declaration*, ¶ 156; *Farrell Declaration*, ¶ 187.)

pricing is targeted at the right customers, limiting cross-subsidization by those who watch little online video.

(b) Increased payments by edge providers would permit marginal prices to move closer to marginal costs, yielding economically efficient reactions by edge providers

190. Prices are the mechanisms by which firms cause buyers to "internalize" the costs their actions create. It is a well-established economic principle that the efficiency of market outcomes requires prices to reflect marginal costs.[224] Given prices that reflect marginal costs, those that interconnect with the platform (customers, edge providers, or both) can then decide how best to optimize their behavior. If prices are below marginal network costs, customers and edge providers will have an incentive to "over-consume" or "over-provide" data.

191. Under current pricing policies, neither customers nor edge providers face prices that fully reflect the marginal network costs that their actions (and interactions) create. Customer pricing is largely on a per customer per month basis and does not vary with usage.[225] Although interconnection fees naturally do have at least some variable

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[224] Dennis W. Carlton and Jeffrey M. Perloff (2004), *Modern Industrial Organization*, 4th Edition, Prentice Hall, at 58, 70. *See also*, *Israel Declaration*, note 105 and Stanley M. Besen and Mark A. Israel (2013), "The evolution of Internet interconnection from hierarchy to "Mesh": Implications for government regulation," *Information Economics and Policy*, 25: 235-245 (hereinafter, *Besen and Israel (2013)*).

[225] As noted above, even where usage-based pricing is in place, the usage level at which additional charges apply is generally set very high, meaning that for most consumers prices do not vary with usage and, in general, the correlation between usage and price is weak.

component, as described in Section V.A, Comcast's interconnection fees are generally substantially below marginal network costs. Given prices that are below marginal costs, increasing incremental prices to edge providers or their agents, in order to move them closer to marginal cost, would be efficient.

192. Notably, charging prices that more closely reflect marginal costs *to edge providers in particular* is likely to be efficient. Edge providers can make investments to react to marginal cost pricing in flexible ways. Because such investments are costly, Netflix has a reduced incentive to undertake such investments (or conversely an increased incentive to over-invest in high-quality video even if it generates limited consumer benefits) if it does not internalize the full costs of its actions, including the costs those actions impose on ISPs' networks. For example, Netflix has a variety of options to optimize its traffic, including investing in caching and compression technologies and establishing flexible pricing policies such as premium charges for consumers who stream video during congested periods.[226] Such options are not just theoretical possibilities. For example, in Canada, Netflix reduced the data requirements associated with streaming video by two-

226 "Optimizing the Netflix Streaming Experience with Data Science," *Netflix Tech Blog*, June 11, 2014, *available at* http://techblog.netflix.com/2014/06/optimizing-netflix-streaming-experience.html, *site visited* September 15, 2014. *See also, Besen and Israel (2013)*.

thirds "with minimal impact to video quality" in response to data allowances used by Canadian ISPs.[227]

(c) The presence of a small set of very large edge providers supports the efficiency of pricing on the edge provider side of the market

193. Finally, economic theory also indicates that, all else equal, it is generally optimal to charge more to the side of the market which: (i) exhibits greater heterogeneity between the largest "inframarginal" users and the smaller "marginal" users,[228] and (ii) derives relatively higher valuation from the interactions facilitated by the two-sided platform.[229] Hence, both the extremely large heterogeneity across edge providers and the large

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227 "Netflix Lowers Data Usage By 2/3 For Members in Canada," *Netflix US & Canada Blog*, March 28, 2011, *available at* http://blog.netflix.com/2011/03/netflix-lowers-data-usage-by-23-for.html, *site visited* September 15, 2014.

228 *See Weyl (2010)*. Weyl shows that a two-sided platform facing heterogeneity in user values has an incentive to cater to the preferences of the marginal user on either side, *causing it to underprice to the side with more heterogeneity* (meaning the side with a bigger gap between the preferences of the marginal and inframarginal users; in the language of economics, the side with a larger Spence distortion). Hence, in such a setting, welfare is generally enhanced if more of the payments can be shifted to the side of the market with greater heterogeneity; here, the edge provider side.

229 *See* Mark M. Bykowsky and William W. Sharkey (2014), "Net Neutrality and Market Power: Economic Welfare with Uniform Quality of Service," *FCC Office of Strategic Planning and Policy Analysis* (hereinafter, *Bykowsky and Sharkey (2014)*). Bykowsky and Sharkey show that the optimal pricing depends on the relative importance, or "willingness-to-pay," of edge providers and consumers for interactions via the ISP's platform. If edge providers have sufficiently high valuations for interacting with customers relative to customers' valuations for interacting with edge providers—as one might expect given the large revenue that some edge providers generate, including from advertisers—and if edge providers' demand is relatively elastic (such that increasing output will not depress their willingness-to-pay too much), then constraining the amount that ISPs can charge edge providers (including for establishing a dedicated access arrangement) tends to diminish welfare.

valuation that at least some edge providers receive from interacting with consumers point toward the efficiency of greater charges to edge providers (or their agents).

194. **First**, as Dr. Evans has noted in his academic writings, there is a huge degree of heterogeneity on the edge provider side of the market, with a few large firms dominating Internet traffic and a "long tail" comprising "thousands of blogs and small websites that provide valuable content."[230] For example, Table 11, based on data from Sandvine, shows that the 10 largest Internet applications account for approximately 76 percent of total peak-period Internet traffic, with Netflix alone accounting for more than one-third of peak-period Internet traffic. Observed trends indicate that such heterogeneity will continue to grow: There has been a huge shift in traffic toward the largest OVDs over the past few years, creating even more heterogeneity on the edge provider side.[231]

195. Large providers such as Netflix and Google are likely to derive substantially more value from interactions via ISPs' platforms than do the millions of small websites in the "tail" of the distribution, which in many cases rely on completely different business

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230 David S. Evans (2011), "Net Neutrality Regulation and the Evolution of the Internet Economy," *CPI Antitrust Chronicle*, 2: 1-9.

231 For instance, Netflix began streaming in 2007 and now accounts for one-third of peak download traffic. *See* Nate Anderson, "Netflix offers streaming movies to subscribers," *Ars Technica*, January 16, 2007, *available at* http://arstechnica.com/uncategorized/2007/01/8627/, *site visited* September 15, 2014; Sandvine, "Global Internet Phenomena Report: 1H 2014," May 15, 2014, Table 2, *available at* https://www.sandvine.com/downloads/general/global-internet-phenomena/2014/1h-2014-global-internet-phenomena-report.pdf, *site visited* September 15, 2014.

models and do not require direct interconnection. *As noted above, economics indicates that, given such heterogeneity, shifting charges toward the edge provider side of the market, including via charges for direct interconnection, is likely to be economically efficient and welfare enhancing.*

Table 11: Top-10 Share of Peak Internet Traffic (Sandvine)

Application	Share
Netflix	34.21%
YouTube	13.19%
HTTP	11.65%
iTunes	3.64%
SSL	3.42%
BitTorrent	3.40%
MPEG	2.85%
Facebook	1.99%
Amazon Video	1.90%
Hulu	1.74%
	76.24%

Source: Sandvine, "Global Internet Phenomena Report," Table 2.

Notes: Peak period usage (1H 2014) - North America, Fixed Access.

196. Moreover, edge providers have pursued a variety of business strategies, a further source of heterogeneity. For example, Table 12 compares the business models of the largest edge providers. Whereas Netflix and HBO derive their revenue almost exclusively from subscription fees, Google (including YouTube) and Facebook derive the vast majority of their revenue from advertising.

Table 12: Sources of Revenue for Large Edge Providers (Revenue in Thousands)

Edge Provider	Subscription Revenue	Percent of Total	Advertising Revenue	Percent of Total	Operating Revenue	Total Revenue
Netflix	$4,374,562	100%	$0	0%	$228,347	$4,374,562
Google/Youtube	$0	0%	$50,578,000	91%	$13,966,000	$55,519,000
Facebook	$886,000	11%	$6,986,000	89%	$2,804,000	$7,872,000
HBO	$4,890,000	100%	$0	0%	$1,791,000	$4,890,000
Hulu	$509,400	51%	$490,600	49%	N/A	$1,000,000

Source: Sec.gov.

197. **Second**, the largest edge providers are likely to derive substantially more value from interactions with customers (including interactions facilitated by direct interconnection) than customers derive from interactions with edge providers. For example, in the case of edge providers like Google, which earn nearly all of their revenue via advertising, prices charged on the customer side of the market cannot incorporate advertisers' willingness to pay for higher quality broadband. In such a setting, economic theory, including models developed by FCC staff economists, indicates that output and welfare will increase with higher fees to edge providers.[232] For example, in an environment where an ISP can only price to customers but not edge providers, it will price based on the willingness to pay of those customers. If the willingness to pay of edge providers is substantially higher than that of customers, pricing only to customers will generally lead to sub-optimal output. In such a case, output would increase if the ISP

[232] *Bykowsky and Sharkey (2014).*

could raise the price to the edge provider side of the market and thus decrease price to customers.[233]

3. The two-sided pricing model presented by Dr. Farrell supports my conclusion that it is efficient to charge edge providers

198. In Section V.B.1, I described a model of two-sided pricing presented by Dr. Farrell.[234] In this section, I explain that Dr. Farrell's model is closely related to other models of two-sided markets and that it supports my conclusion that it is likely to be economically efficient to charge edge providers or their agents.

199. **First**, I note that Dr. Farrell's model reflects the seesaw principle. In all versions of his model, under reasonable parameter assumptions, increasing the price (*t)* to edge providers creates an incentive to reduce the price to customers.[235]

200. **Second**, I note that Dr. Farrell does not reach any conclusions about overall welfare effects arising from increases in interconnection fees. Instead, he concludes that customers and Comcast are likely to gain while edge providers (and possibly customers of other ISPs) may be harmed. But he provides no mechanism to balance these harms and

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233 *Id.*, Figure 4.

234 *See* discussion in *Farrell Declaration*, ¶¶ 189-192

235 This incentive arises for two reasons. First, an increase in is effectively a reduction in the ISP's marginal cost to serve customers (because edge providers cover some of the cost) and, as a matter of economics, the ISP has an incentive to pass a portion of marginal cost reductions on to its consumers in the form of a price decrease. Second, because edge services are a complement to broadband services, an increase in reduces demand for both the edge service and broadband service and creates an additional incentive to lower the broadband price

benefits and thus no conclusion about overall welfare effects. Thus, although it is obvious why Cogent and Netflix might object to increased interconnection fees, *Dr. Farrell provides no evidence to even support a claim that the competitive effects he points to would be harmful (rather than helpful) to consumers and welfare*. This stands in sharp contrast to the largely unchallenged benefits from this transaction, which clearly will benefit consumers and welfare.

201. **Third**, if, as described in Section V.B.1, Dr. Farrell is concerned that interconnection fees impose "taxes" on rival ISPs (assuming edge providers cannot price discriminate),[236] then he should also be concerned about cross-subsidization that benefits one OVD at the expense of another.[237] Yet, such cross-subsidization is what occurs when one OVD, such as Netflix, imposes marginal costs on an ISP that it (or its agents) does not fully pay for. For example, when an OVD sends traffic onto an ISP's network, that action imposes marginal costs on the ISP. If the OVD (or its agents) do not fully pay for those marginal costs, then (absent usage-based pricing that perfectly accounts for those costs, which does not exist today) that raises the ISP's overall marginal costs of service which are then passed on to all of the ISPs' customers. As such, when Netflix argues that broadband customers, not Netflix or its agents, should pay for the costs of delivering its

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236 *Farrell Declaration*, ¶ 192.

237 Dr. Farrell's model implicitly assumes that all of an ISP's customers use the edge provider's service (for example, there is no parameter that scales the increase in edge provider price increase by the fraction of the ISP's customers using the service) and thus does not consider any cross-subsidization within an ISP's customer base.

traffic, they are actually arguing that the users of all other edge providers, including the smallest ones, should pay more to interact with their preferred edge providers in order to subsidize Netflix traffic. Charges to OVDs or their agents that more fully reflect the marginal cost imposed by such traffic reduce such cross-subsidization.

VII. OTHER THEORIES OF COMPETITIVE HARM RAISED BY COMMENTERS ARE WITHOUT MERIT

202. The discussion thus far has refuted all of the core competitive issues raised by commenters with regard to broadband. In this section, I briefly discuss two other claims raised by commenters.

A. A THEORY OF POTENTIAL COMPETITION BETWEEN COMCAST AND TWC IS NOT SUPPORTED BY AVAILABLE EVIDENCE

203. Dr. Farrell finds it "somewhat puzzling" that cable operators have not expanded by entering into other cable companies' historical franchise territories. He also asserts that approval of the transaction would "make permanent the absence of such competitive expansion between Comcast and TWC."[238] Thus, he raises a potential competition theory with regard to the transaction.

204. There is no valid potential competition concern with regard to this transaction. As discussed in Section IV.B.2, neither Comcast nor TWC has plans to overbuild one

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238 *Farrell Declaration*, ¶ 100.

another's current footprints.[239] Indeed, to my knowledge, no incumbent cable operator has ever overbuilt another incumbent cable operator's footprint. Hence, as with all other horizontal aspects of this transaction, Comcast and TWC do not constrain one another today, including via potential competition.

205. The primary reason that incumbent cable operators have not generally overbuilt each other's historical franchise areas is that the fixed costs are too high to be recouped, making the return on an investment either negative or at least not worth it relative to other strategic initiatives. As noted in the Israel Declaration, "[o]verbuilding (*i.e.*, building a network entirely from scratch) in one another's service area would be a significant expense made more difficult to recover by the competitive video and broadband marketplace that already exists."[240] In addition to the cost of materials and labor to build a network entirely from scratch, the expense of obtaining permits, rights-of-way, and so on can be very substantial.[241] Notably, lower fixed cost alternatives to expansion—such

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239 In addition, as discussed above in Section IV.B.2, neither Comcast nor TWC have current or future plans to enter each other's footprints as OVDs.

240 *Israel Declaration*, ¶ 115.

241 *See*, e.g., Federal Communications Commission, "Connecting America: The National Broadband Plan," March 17, 2010, *available at* http://download.broadband.gov/plan/national-broadband-plan.pdf, *site visited* March 28, 2014, at 109: ("The cost of deploying a broadband network depends significantly on the costs that service providers incur to access conduits, ducts, poles and rights-of-way on public and private lands. Collectively, the expense of obtaining permits and leasing pole attachments and rights-of-way can amount to 20% of the cost of fiber optic deployment.")

as expanding distribution of OVD services out of market—have also been considered and rejected, as explained in Section IV.B.2 above.

206. Dr. Farrell is correct that the threat of potential competition can be an important constraint on firms; he is simply incorrect about the relevant source of such potential competition. Contrary to the evidence that Comcast and TWC have no plans to overbuild one another's footprints, there *is* substantial evidence, presented in Section III, above, that Google is planning broadband entry into additional cities; that telco operators including AT&T, CenturyLink, and others are planning to roll out FTTP in more markets; that AT&T, Dish Network/Sprint, and others are planning expanded fixed wireless offerings; that various municipalities are considering investments in municipal fiber networks, and so on. These entities provide the relevant actual and potential competition constraining any ability for the merging parties to slow their broadband investments or degrade the quality of service offered over those networks.

B. The elimination of one competitive benchmark provides no basis to allege competitive harms from the transaction

207. Some commenters assert that Comcast and TWC serve as competitive benchmarks for each other, and that the elimination of this benchmark could increase the likelihood of anticompetitive behavior.[242] Such claims are without basis with regard to the proposed transaction. I am aware of no coherent economic theory or empirical evidence indicating

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242 *Farrell Declaration*, ¶¶ 87-96; *Sappington Declaration*, ¶¶ 70-71.

that more benchmarks lead to lower prices and/or higher quality. Competition between firms selling substitute products benefits consumers because competing firms must make attractive offers to consumers (*e.g.*, lower prices and/or higher quality) in order to attract them away from rival firms. Benchmarking has no such systematic effect on pricing incentives. Moreover, to the extent that competitive benchmarks provide any valuable information to consumers, the transaction results in a negligible decrease in the number of available benchmarks, with multiple cable, telco, and other providers continuing to operate.

VIII. CONSUMER BENEFITS ARISING FROM THE TRANSACTION OVERWHELM SMALL, TENUOUS COMPETITIVE EFFECTS

208. In this section, I begin by providing an overview of commenters' claims about consumer benefits. In short, commenters leave the benefits from the transaction largely untouched, and to the extent they present any analysis of efficiencies, it is without merit. I then summarize the substantial benefits for business customers, residential customers, and edge providers discussed in my initial declaration, which are largely untouched by commenters.[243] At the end of this section, I show that the magnitude of consumer benefits

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[243] I understand that Comcast's analysis indicates that the divestiture transaction will increase the benefits from the Comcast-TWC transaction (*see*, *e.g.*, "September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request," RFI 80(a).2, 225-226.).

arising from even a small subset of the consumer benefits from the transaction easily swamps any alleged harms.

A. Commenters' vague claims about consumer benefits provide no basis to reject the importance and likely realization of these benefits

209. Commenters' analysis of consumer benefits from the transaction, to the extent that there is any analysis at all, is either vague or without merit. Generally, commenters do not address the extensive, specific evidence presented in my original declaration, in the declarations of Drs. Rosston and Topper, and by the merging parties in their application. Dr. Sappington does not address consumer benefits at all. Dr. Evans provides an extremely limited assessment of consumer benefits, acknowledging that he is "not expressing any opinion on the efficiency *[sic]* of the Transaction."[244]

210. Dr. Farrell raises two issues regarding the consumer benefits. First, he states that my "claim that economies of scale are so significant conflicts with . . . [my] assertion that Comcast and TWC face strong competition in the provision of broadband to consumers."[245] He states that, given such competition, "either or both could readily expand their scale and capture any scale efficiencies simply by improving their

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244 *Evans Declaration*, note 12. Dr. Evans' discussion of consumer benefits is limited to one part of a sentence in ¶ 37 (in which he states that he has "found that their substantive claims concerning . . . efficiencies from the merger are not supported by the economic analysis and evidence they present") and a corresponding footnote with selected citations to the economics and business literature.

245 *Farrell Declaration*, ¶ 102.

competitive offerings and thus taking customers from their supposedly many rivals."[246] Hence, he concludes that scale-based efficiencies are generally not merger-specific.[247]

211. Dr. Farrell's criticism is effectively a version of a common criticism of scale-based efficiencies from a merger—that the merging parties should compete to capture the scale benefits, rather than merge. However, in the present case, this argument has two fundamental flaws:

- First, it misses the fact that, unlike most mergers that attract scrutiny, in this transaction *the parties do not compete with one another but rather operate in separate footprints*. Hence, they cannot compete with one another to capture more scale. And any investments they might consider are "landlocked"—no matter how successful they are, they can capture customers only in their own footprint, thus inherently limiting the revenue available and thus potentially turning many high-cost investments into money losers (negative NPV). Given that the parties have decided that footprint expansion is cost-prohibitive, and given the unchallenged fact from the original Israel Declaration that cross-operator partnerships have proven largely unsuccessful in this industry,[248] unlocking the

246 *Ibid*.

247 *Ibid*.

248 *Israel Declaration*, ¶ 128.

profitability of these investments by scaling them to more territories is a transaction-specific benefit.

- Second, the fact that Comcast faces strong competition does not mean it could "readily expand…simply by improving [its] competitive offerings." To the contrary, as a matter of economics, Comcast is making the investments it can justify, and competing as effectively as it can within its footprint today. Nonetheless, as illustrated by recent actions by AT&T, Google, and others, those investments stimulate a competitive reaction that limits how much share can be gained and thus limits the returns on any investment, particularly as long as those share gains are constrained to be within footprint.

212. Second, Dr. Farrell asserts that my claims about scale benefits are belied by Comcast's and TWC's low customer service scores.[249] Despite the fact that I never claimed that Comcast has an advantage relative to other cable companies in customer satisfaction scores, Dr. Farrell devotes substantial attention, including several regression analyses, in an attempt to demonstrate that Comcast does not have such an advantage.[250] Of course, the relevant question is the incremental effect of the transaction, and Dr. Farrell does not even purport to show that Comcast's or TWC's customer satisfaction would be lower than it is today because of the transaction. If Dr. Farrell is arguing that

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249 *Farrell Declaration*, ¶ 103.

250 *Id.*, § IV.E.

the transaction will harm customer service scores, his data do not support this claim: In the surveys Dr. Farrell cites, the performance of Comcast compared to TWC shows no systematic pattern. Comcast is ranked higher than TWC in the *PC Magazine* survey and in the 2014 ACSI survey, the same as TWC in the *Consumer Reports* ranking, and lower than TWC in the JD Power and 2013 ACSI rankings (without taking each survey's margin of error into account).[251]

213. Furthermore, although largely irrelevant for assessing the central question of the incremental effect of the transaction, Dr. Farrell's attempt to demonstrate an inverse relationship between cable company size and consumer satisfaction is highly flawed. Among other shortcomings, Dr. Farrell's regression analysis generally fails to generate statistically significant results (meaning that he generally cannot reject the possibility of no relationship between cable company size and consumer satisfaction). In addition, his analysis focuses on fairly large ISPs, and thus he excludes many smaller ISPs, the inclusion of which might alter his results. Finally, his analysis does not account for potentially confounding variables, such as the possibility that larger ISPs are more likely to be the subject of negative news reports about customer service, as well as differences in service levels and expectations across ISPs.[252]

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251 *Id.*, ¶ 105 and Figure 6.

252 I also note that Comcast has experienced recent improvements in its J.D. Power satisfaction rankings. From 2010 to 2013, Comcast's score in the U.S. Residential Internet Service Provider Satisfaction Study improved by nearly 80 points (averaged across all regions), which was a larger improvement than for any other provider in the survey over that same time period. According to J.D. Power, this study "measures customer satisfaction with high-speed Internet service based on five factors: performance and reliability; cost of service; billing; communication; and customer service." (*See* Press Release, "2013 U.S. Residential Internet Service Provider Satisfaction Study," *J.D. Power and Associates*, September 26, 2013, *available at* http://www.jdpower.com/press-releases/2013-us-residential-internet-service-provider-satisfaction-study, *site visited* September 17, 2014 and Press Release, "2010 U.S. Residential Internet Service Provider Satisfaction Study," *J.D. Power and Associates*, October 28, 2010, *available at* http://businesscenter.jdpower.com/news/pressrelease.aspx?ID=2010167, *site visited* September 17, 2014.).

In addition, in a recent report on Comcast's 2013 fourth quarter performance, industry analyst Craig Moffett observed that Comcast's customer service has "*improved by…lightyears*" (Craig Moffett, Nick Del Deo, and Cathy Yao, "Comcast Q4 2013 Earnings: Boardwalk Empire," *MoffettNathanson*, January 28, 2014 [emphasis added]).

214. Regarding the objective network benefits that I have actually claimed will arise from the transaction—improvements in residential and business network speed and quality, improvements in Wi-Fi networks, improvements in home networking, and so on—such surveys are mostly silent, confounding objective network quality with other subjective metrics and offering no guidance on the transaction's incremental effects. As explained in my initial declaration, objective measures of network quality are an area where Comcast has excelled, and the transaction is designed to bring this quality to the TWC footprint and extend it due to scale economies. For example, as noted in my initial declaration, Comcast has already converted its entire network to all-digital, while TWC has completed the transition in only 17 percent of its footprint, and under current plans expects to reach only 75 percent in 2016.[253] Similarly, Comcast has deployed DOCSIS

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[253] *Israel Declaration*, ¶¶ 173-174. An additional 1.25 million TWC customers will be converted to all-digital in Los Angeles in October of this year.

3.0-capable modems to approximately **[[ ]]** percent of its customers, relative to **[[ ]]** percent for TWC.[254] Looking forward, Comcast is on track to deliver CCAP technology to about **[[ ]]** percent of its footprint by the end of this year and **[[ ]]** percent by 2016, while TWC's plans only contemplate reaching 75 percent of its footprint over the next several years.[255] These improvements are reflected in network speeds available to customers. At present, **[[ ]]** as many Comcast customers are in downstream speed tiers of 25 Mbps or greater as TWC customers.[256] Comcast customers also have access to a greater range of digital amenities than do TWC customers. Comcast had more than 725,000 hotspots operating at the end of 2013, twenty times as many as TWC.[257]

215. The FCC's Measuring Broadband America Report provides additional support for the contention that Comcast ranks highly in terms of network quality. For example, according to the report, Comcast scored the best of all ISPs for download speeds as a percentage of advertised speeds for 1 to 5 Mbps plans and second only to Verizon's fiber-

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254 *Id.*, ¶ 176.

255 *Id.*, ¶ 178.

256 *Id.*, ¶ 168.

257 *Id.*, ¶¶ 192-193. The number of hotspots is growing rapidly, and Comcast expects to reach 8 million hotspots by the end of this year. ("Comcast to Reach Eight Million Xfinity WiFi Hotspots in 2014," *available at* http://corporate.comcast.com/news-information/news-feed/comcast-to-reach-8-million-xfinity-wifi-hotspots-in-2014, *site visited* September 17, 2014).

optic network in the same metric for 25 and 50 Mbps service.[258] Comcast was also tied with Cox for the fastest web page load time of all ISPs on the 1 to 3 Mbps tier and second only to Frontier's fiber for 18 to 25 Mbps service.[259]

B. COMMENTERS FAIL TO ADDRESS SPECIFIC ANALYSES OF EFFICIENCIES ARISING FROM THE TRANSACTION

216. Three main mechanisms drive substantial benefits from the transaction: economies of scale, expanded geographic reach, and sharing of technologies and services. Commenters provide no detailed economic refutation of the comprehensive discussion of these broadband benefits in my initial declaration or the Rosston/Topper declarations. As one notable example, there is no refutation of the significant benefits to business customers. As I described in my initial declaration, the transaction improves the combined firm's ability to serve business customers in at least three ways:[260]

- First, in the case of businesses whose locations span the footprints of multiple cable operators ("super-regional" businesses), the transaction helps to alleviate the coordination problems that currently plague efforts by cable operators to serve those businesses.

- Second, the transaction combines the complementary skills and products of the two companies and facilitates the provision of higher quality business services.

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258 Federal Communications Commission, "2014 Measuring Broadband America: Fixed Broadband Report," 2014, at 28-30, *available at* http://data.fcc.gov/download/measuring-broadband-america/2014/2014-Fixed-Measuring-Broadband-America-Report.pdf, *site visited* September 8, 2014 (hereinafter, *FCC 2014 Broadband Report*).

259 *Id.*, 36 and 38.

260 *Israel Declaration*, ¶¶ 133-160.

- Third, as explained above, the combined firm can spread fixed cost investments over a larger group of current and potential business customers, thereby incentivizing new investment and innovation that benefits those business customers.

217. There is also no refutation of the fact that such business benefits would be a catalyst for network expansion and hardening, which would also benefit residential customers.[261] Commenters also do not refute the fact that investments made by Comcast or TWC are currently "landlocked" by footprint limitations and that the geographic expansion from the transaction therefore unlocks value for incremental investments and makes more of such investments profitable. Thus, there is no denial of the gains regarding faster access networks (owing to quicker rollout of digital service and DOCSIS 3.0/3.1), expanded broadband and Wi-Fi networks, or improved home network technology, nor the virtuous cycle that such improvements catalyze, which also benefits edge providers.

218. My continued investigation has revealed additional sources of consumer benefits that will accrue to TWC customers. As one example, Comcast is ahead of TWC in technology and procedures to enable self-installations for customers who prefer this option, particularly on the broadband side. In particular, I understand that Comcast has made substantial investments to standardize its products on the network and to develop

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261 For a discussion of benefits to residential customers and edge providers, *see Israel Declaration*, ¶¶ 161-201.

the processes that enable customers to activate products remotely.[262] As a result of these investments, a large fraction of Comcast customers now choose to self-install broadband equipment. I understand that approximately **[[ ]]** percent of Comcast's new customer orders chose to self-install their equipment, and the activation success rate among these customers is greater than **[[ ]]** percent. Furthermore, Comcast has increased the rate of self-installs over time, with the rate increasing from **[[ ]]** percent to **[[ ]]** percent in the last four years. Among the benefits of self-installation are:

- Customers have the *option* (but not requirement) to self-install the equipment, thus saving time that would otherwise be spent waiting for a technician.[263]

- When customers choose the self-installation option, Comcast saves the costs associated with installation-related truck rolls.

- Perhaps most importantly, extensive use of self-installation is also the reason why Comcast is able to roll out new technologies quickly and efficiently, as evidenced by the fact that Comcast upgraded its network to all-digital two years ahead of the schedule, with 90 percent of the upgrades implemented through self-installs. Hence, technologies like those enabling more self-installation are a part of the reason why Comcast expects to be able to roll out all digital service, as well as

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262 This paragraph relies on an interview with John Schanz, Executive Vice President and Chief Network Officer, Comcast Corporation, June 25, 2014.

263 *See* http://customer.comcast.com/help-and-support/selfinstall/, *site visited* September 19, 2014.

· DOCSIS 3.0 and 3.1 in the TWC footprint faster than TWC would be able to do on its own.

C. Even a highly conservative quantification of a subset of consumer benefits from the transaction swamps any alleged competitive effects

219. A highly conservative quantification of just a subset of the consumer benefits from the proposed transaction illustrates the substantial value to consumers that that the proposed transaction will generate.

220. As seen in Table 13, as of December 2013, the average broadband speed enjoyed by Comcast customers was **[[ ]]** Mbps versus **[[ ]]** Mbps for TWC customers.[264] Although there may be a number of reasons for this difference, it is likely to be due at least in part to differences in Comcast's and TWC's network infrastructure.[265] With the proposed transaction, Comcast has committed to

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264 I calculate customer-weighted averages using data from FCC Form 477. The data report the following ranges: > 200 kbps and < 768 kbps, >= 768 kbps and < 1.5 Mbps, >= 1.5 Mbps and < 3 Mbps, >= 3 Mbps and < 6 Mbps, >= 6 Mbps and < 10 Mbps, >= 10 Mbps and < 25 Mbps, >= 25 Mbps and < 100 Mbps, >= 100 Mbps. For the purposes of this calculation, I have assumed that each household is at the lower bound of the relevant range. The difference between Comcast and TWC is larger if I assume that customers are at the mid-point of the range.

265 *See Israel Declaration*, § IV.B.3.

Comcast typically automatically upgrades the speed received by customers as the costs of its network decline. (*See*, *e.g.*, Comcast Corp., Press Release, "Xfinity Internet Performance Tier doubles to 50 Mbps. Blast Tier doubles to 105 Mbps and Extreme Tier moves from 105 Mbps to 150 Mbps," July 31, 2014, *available at* http://corporate.comcast.com/news-information/news-feed/comcast-increases-internet-speeds-in-california-kansas-missouri-and-texas, *site visited* September 21, 2014.)

invest hundreds of millions of dollars to improve TWC's network and to realize higher broadband speeds.[266] Comcast and TWC have already made substantial progress in working toward implementation of this commitment.[267]
[[ ]]

221. Even small increases in broadband speeds resulting from these transaction-specific investments will be very valuable to customers.[268] For example, a recent paper by Aviv Nevo and coauthors found that a one Mbps increase in broadband speed is worth as much as $5.86 per sub per month (to customers who place the most value on network speed), with an average of $1.76 and a median of $0.87.[269] Using the median valuation (which is conservative relative to the average), each one Mbps increase in average speed spread

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266 Description of Transaction, Public Interest Showing, and Related Demonstrations, 28. ("Comcast is committed to putting [the efficiencies and synergies of the transaction] to work to forge a faster path to all-digital systems, higher broadband speeds, more advanced video and voice services, a more secure network, better system reliability, and other benefits to consumers, businesses, and the public interest generally.")

267 *See* Comcast and TWC, "Comcast – TWC Merger Integration: Integration Summit II," September 4, 2014, Exhibit 88.3, 49-56.

268 Based on the survey results presented in Section III.C.4 and Appendix I, which demonstrate that the majority of respondents would switch to a slower speed provider if access to edge providers were degraded, it is clear that access to edge providers is worth even more than speed, and that speed becomes less valuable if the broadband uses for which speed is most valuable, such as online video, are degraded or blocked.

269 Aviv Nevo, John L. Turner and Jonathan W. Williams (2013), "Usage-Based Pricing and Demand for Residential Broadband," *Working Paper* (hereinafter, *Nevo et al. (2013)*), 28. Note that, although significant, these values are also consistent with statements above that reasonable speed differences across firms can be overcome with price differences of the magnitude that are seen in practice, enabling slower speed options to be important competitors.

across all TWC customers would be worth approximately $95 million per year to consumers.[270] Given the gap between the Comcast and TWC networks and Comcast's commitment to bring TWC up to Comcast levels, speed increases of several Mbps for TWC customers seem likely, meaning that this source of consumer benefits alone is worth hundreds of millions of dollars.[271] Hence, even small broadband speed gains from the transaction completely overwhelm any theories of harm that commenters have advanced.[272] And this is without even counting any benefits to Comcast customers, all the other benefits to TWC customers, or benefits from the virtuous cycle that start when edge providers develop offerings to take advantage of the increased speeds. Moreover, the comparison of benefits to alleged harms becomes even more one-sided in favor of the

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[270] After divestitures, the former TWC systems remaining with Comcast will constitute 9.1 million broadband customers. Thus, a one Mbps average increase in broadband speed for all customers would be worth *$0.87 per sub per month x 12 months x 9.1 million TWC customers ~= $95* million per year. Because *Nevo et al. (2013)* estimate a complicated non-linear model, the precise calculations would be more complicated—for example depending on the baseline broadband speed for each customer. Nevertheless, I include this estimate as an illustration of the immense benefits that the transaction will yield.

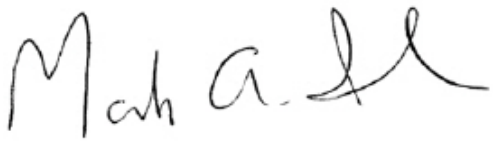
[271] Note that arguments that speed differences are even more important than those listed here, such as some may advance in support of a higher standard for the definition of broadband, would make these consumer benefits even larger.

[272] Note that the full consumer value of these speed increases (without deducting any possible price increase arising from the quality improvements) is the appropriate metric to compare to alleged price increases to edge providers. Economic literature makes clear that upward pricing pressure, changes in marginal cost, and the full value consumers derive from changes in quality all can be weighed directly against one another to determine the directional effect of a merger on consumer welfare. (Robert Willig (2011), "Unilateral Competitive Effects of Mergers: Upward Pricing Pressure, Product Quality, and Other Extensions," *Review of Industrial Organization*, 39:19–38.)

benefits when one recalls that any alleged "harms" via higher prices to edge providers will actually *reduce* prices for broadband customers due to the seesaw principle.

222. In sum, then, the large and mostly unchallenged consumer benefits from the transaction easily swamp any potential competitive harms from the transaction, particularly given that commenters have made no attempt to quantify any such harms and that, as shown throughout this report, such harms are unsupported by theoretical or economic evidence and are likely to be extremely small, if they occur at all.

I, Mark A. Israel, declare under penalty of perjury that the foregoing declaration is true and correct to the best of my knowledge, information, and belief. Executed on September 22, 2014.



Mark A. Israel

APPENDIX I: GLOBAL STRATEGY GROUP'S BROADBAND SURVEY

223. Global Strategy Group (GSG) implemented an online survey of 1,012 adult broadband Internet users from July 10th – 14th of this year. The survey was designed to assess the "likelihood of switching Internet Service Providers if their provider limits Internet speeds, slows down streaming or downloading speeds, or prevents access to certain websites."[273]

224. The primary findings of the survey are as follows:[274]

- A high percentage of broadband users are likely to switch to another Internet service provider (ISP) 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."
    - The percentage of survey respondents likely to switch to another ISP (without qualifying the type of ISP) if any of the three actions listed above were taken by their current ISP ranges from 79-89 percent for all Internet users; from 83-

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[273] Memorandum from Jef Pollock, James Delorey, and Michelle Woodruff, Global Strategy Group to Davis Polk, *re: Broadband Survey*, July 16, 2014.

[274] All figures and tables report weighted results, which are based on GSG's adjustment of the raw data to be representative of the broader adult population of the United States.

90 percent for heavy Internet users, and from 84-91 percent for frequent streaming video users. (See Figure 7.)[275]

- Similar results are obtained when the type of ISP to which respondents would switch is restricted to ISPs with slower speeds or to DSL or wireless providers:
  - The percentage of survey respondents likely to switch to an ISP *offering slower speeds* if any of the three actions were taken ranges from 71-80 percent for all users; from 72-79 percent for heavy Internet users, and from 75-81 percent for frequent streaming video users. (See Figure 8.)
  - The percentage of survey respondents likely to switch to another ISP *using DSL or Wireless broadband technology* if any of the three actions were taken ranges from 77-86 percent for all users; from 79-85 percent for heavy Internet users, and from 81-87 percent for frequent streaming video users (See Figure 9.)

· The survey results also indicate that wireless broadband, in particular, is a relevant and highly-used alternative for many customers:[276]

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275 Note that "likely to switch to another ISP" includes both "very" and "somewhat" likely to switch, and frequent streaming video users are respondents who stream video at least once per month.

276 The survey is careful to avoid confusion between mobile broadband, the subject of the question, and Wi-Fi. To avoid confusion, the text of the wireless usage question in the survey includes the following language: "'Wireless or mobile broadband service' 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

- Note that the survey requires that a respondent has previously confirmed having access to wireless broadband before answering the questions regarding use of wireless broadband as an alternative, so these results are based on a subset of all respondents (specifically, 683 of 1,012 or 67 percent of all survey respondents).

- Among those with access to wireless broadband, approximately 42 percent of survey respondents use wireless broadband at least as much as wired broadband for *high*-bandwidth activities, and 60 percent or more use wireless broadband at least as much as wired broadband for *low*-bandwidth activities.[277] (See Figure 10.)

    - The percentage of survey respondents who use wireless broadband at least as much as wired broadband for *high*-bandwidth activities equals 42 percent for all users; 41 percent for heavy Internet users, and 42 percent for frequent streaming video users.

    - The percentage of survey respondents who use wireless broadband at least as much as wired broadband for *low*-bandwidth activities

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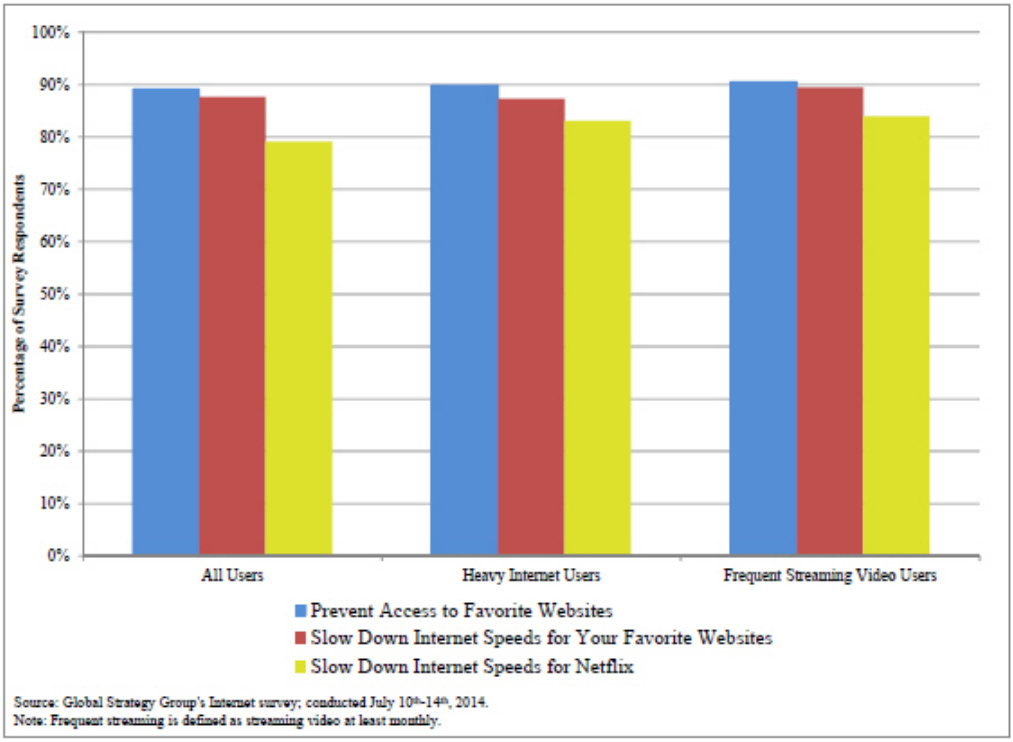
[277] Note that using wireless broadband "at least as much" as wired broadband includes "always," "most of the time," and "equally both" responses regarding usage of wireless relative to wired broadband.

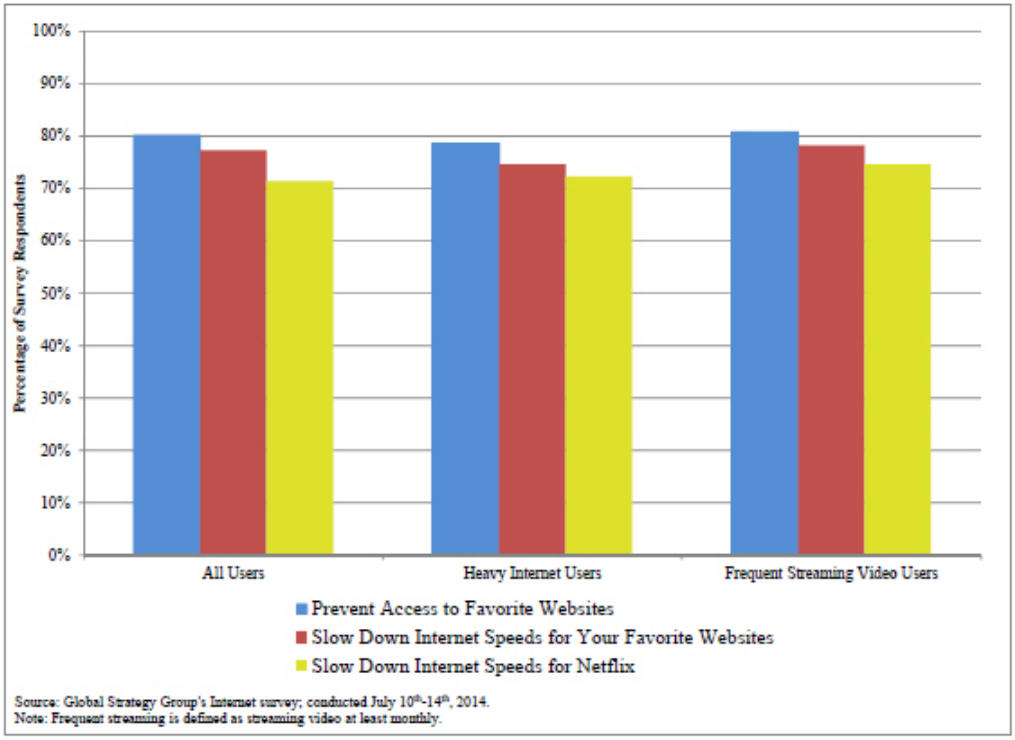
equals 60 percent for all users; 62 percent for heavy Internet users, and 62 percent for frequent streaming video users.

Figure 7: Percentage of Survey Respondents Likely to Switch to Another ISP If Their ISP Takes Selected Actions



Source: Global Strategy Group's Internet survey; conducted July 10th-14th, 2014.
Note: Frequent streaming is defined as streaming video at least monthly.

Figure 8: Percentage of Survey Respondents Likely to Switch to an ISP Offering Slower Speeds If Their ISP Takes Selected Actions



Source: Global Strategy Group's Internet survey, conducted July 10th-14th, 2014.
Note: Frequent streaming is defined as streaming video at least monthly.

Figure 9: Percentage of Survey Respondents Likely to Switch to Another ISP Like DSL or Wireless Broadband If Their ISP Takes Selected Actions

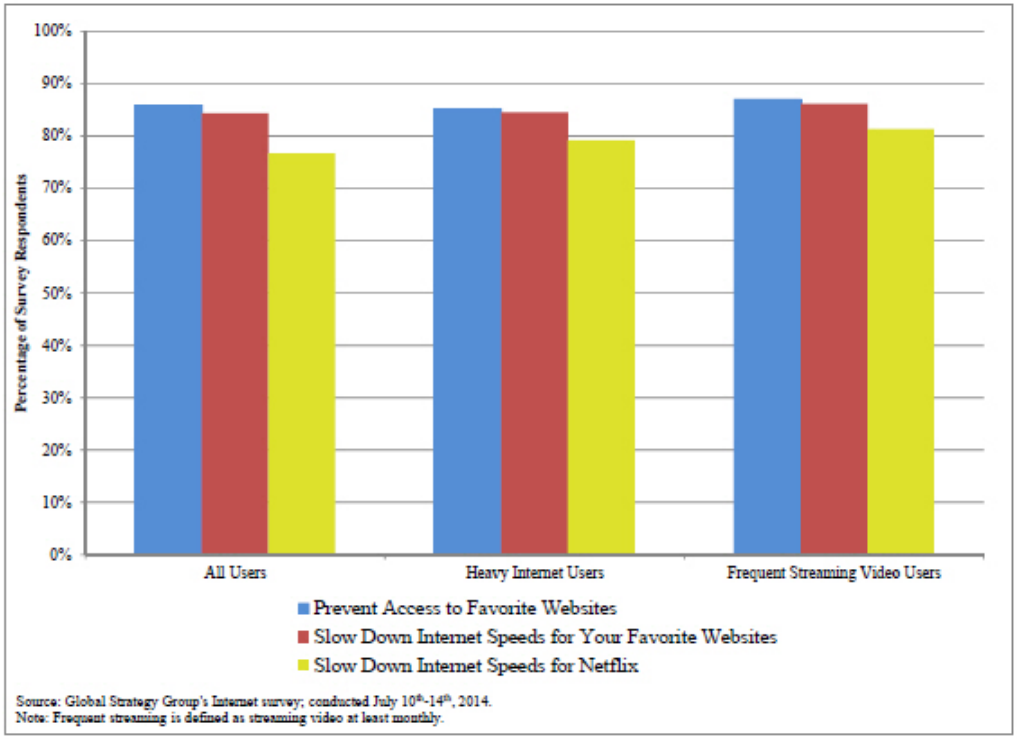
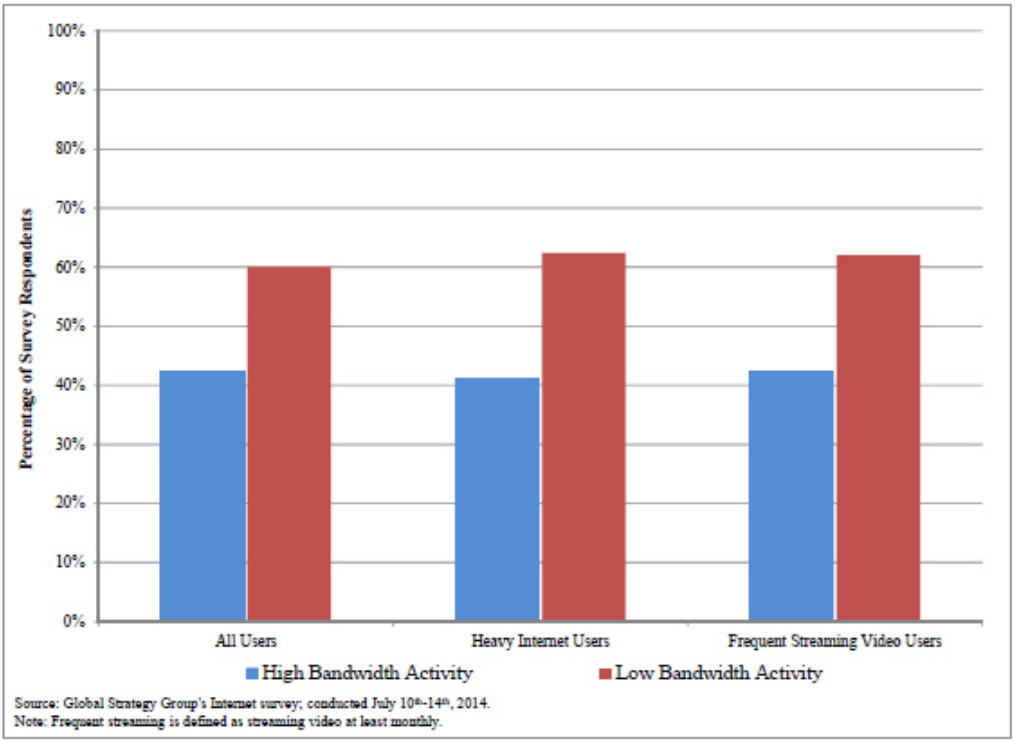


Figure 10: Percentage of Survey Respondents Who Use Wireless Broadband At Least As Much as Wired Broadband, by Activity and Type



225. The survey results also indicate that a large proportion of respondents have recently switched ISPs, including one-third of respondents within the past two years and nearly half (49 percent) within the past 4 years. Table 14 below summarizes these results. Based on these results, a large percentage of all broadband customers are available for capture by new ISPs over relatively short periods of time.

Table 14: Internet Service Provider Switching Trends

Percentage of Survey Respondents Who Have Switched Internet Service Providers:	
In the past 6 months	6.8%
In the past 12 months	17.6%
In the past 2 years	33.1%
In the past 4 years	49.4%

Note: 1,012 total survey respondents. Percentages are based on weighted survey responses.

226. Table 15 through Table 18, below, provide more detailed tabulations of the survey results.

227. According to Table 15:

- The percentage of survey respondents likely to switch to another ISP (without qualifying the type of ISP) if any of the three actions listed above were taken by their current ISP ranges from:
    - 54-76 percent for *light* Internet users
    - 79-91 percent for *medium* Internet users
    - 83-90 percent for *heavy* Internet users
- The percentage of survey respondents likely to switch to another ISP *offering slower speeds* if any of the three actions were taken by their current ISP ranges from:

- 51-69 percent for *light* Internet users
- 74-84 percent for *medium* Internet users
- 72-79 percent for *heavy* Internet users

· The percentage of survey respondents likely to switch to another ISP *like DSL or wireless broadband* if any of the three actions were taken by their current ISP ranges from:

- 59-81 percent for *light* Internet users
- 77-87 percent for *medium* Internet users
- 79-85 percent for *heavy* Internet users

Table 15: Cross-Tabulation of Internet Usage Versus Switching

	Percentage of Respondents Very Likely or Somewhat Likely to Switch to Another ISP If the ISP:		
	Slow down Internet speeds for your favorite websites, so that the webpages load slowly.	Prevent access to your favorite websites.	Slow down Internet speeds for Netflix, so that movies and TV shows stream or download slowly, the video is jumpy and stops in places, or the video has lower-quality resolution.
Light Internet User	76.4%	73.7%	53.8%
Medium Internet User	89.7%	90.9%	79.3%
Heavy Internet User	87.3%	89.8%	83.1%

	Percentage of Respondents Very Likely or Somewhat Likely to Switch to Another ISP That Offers Slower Speeds but Does Not Take Such Action If the ISP:		
	Slow down Internet speeds for your favorite websites, so that the webpages load slowly.	Prevent access to your favorite websites.	Slow down Internet speeds for Netflix, so that movies and TV shows stream or download slowly, the video is jumpy and stops in places, or the video has lower-quality resolution.
Light Internet User	66.2%	68.6%	51.0%
Medium Internet User	81.6%	83.5%	73.7%
Heavy Internet User	74.7%	78.5%	72.3%

	Percentage of Respondents Very Likely or Somewhat Likely to Switch to Another ISP *Like DSL or Wireless Broadband* If the ISP:		
	Slow down Internet speeds for your favorite websites, so that the webpages load slowly.	Prevent access to your favorite websites.	Slow down Internet speeds for Netflix, so that movies and TV shows stream or download slowly, the video is jumpy and stops in places, or the video has lower-quality resolution.
Light Internet User	77.0%	80.5%	59.1%
Medium Internet User	85.4%	87.4%	77.1%
Heavy Internet User	84.5%	85.1%	79.2%

Note: 1,012 total survey respondents. Percentages are based on weighted survey responses.

228. According to Table 16:

- The percentage of survey respondents likely to switch to another ISP (without qualifying the type of ISP) if any of the three actions listed above were taken by their current ISP ranges from:
    - 62-84 percent for users who *stream video rarely or never*
    - 84-91 percent for users who *stream video at least monthly*
- The percentage of survey respondents likely to switch to another ISP *offering slower speeds* if any of the three actions were taken by their current ISP ranges from:
    - 60-78 percent for users who *stream video rarely or never*
    - 75-81 percent for users who *stream video at least monthly*
- The percentage of survey respondents likely to switch to another ISP *like DSL or wireless broadband* if any of the three actions were taken by their current ISP ranges from:
    - 60-82 percent for users who *stream video rarely or never*
    - 81-87 percent for users who *stream video at least monthly*

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Table 16: Cross-Tabulation of Video Usage Versus Switching

	Percentage of Respondents Very Likely or Somewhat Likely to Switch to Another ISP If the ISP:		
	Slow down Internet speeds for your favorite websites, so that the webpages load slowly.	Prevent access to your favorite websites.	Slow down Internet speeds for Netflix, so that movies and TV shows stream or download slowly, the video is jumpy and stops in places, or the video has lower-quality resolution.
Use Streaming Video Rarely or Never	81.2%	84.2%	62.1%
Use Streaming Video At Least Monthly	89.5%	90.6%	83.9%

	Percentage of Respondents Very Likely or Somewhat Likely to Switch to Another ISP That Offers Slower Speeds but Does Not Take Such Action If the ISP:		
	Slow down Internet speeds for your favorite websites, so that the webpages load slowly.	Prevent access to your favorite websites.	Slow down Internet speeds for Netflix, so that movies and TV shows stream or download slowly, the video is jumpy and stops in places, or the video has lower-quality resolution.
Use Streaming Video Rarely or Never	74.0%	77.9%	60.0%
Use Streaming Video At Least Monthly	78.3%	80.8%	74.6%

	Percentage of Respondents Very Likely or Somewhat Likely to Switch to Another ISP *Like DSL or Wireless Broadband* If the ISP:		
	Slow down Internet speeds for your favorite websites, so that the webpages load slowly.	Prevent access to your favorite websites.	Slow down Internet speeds for Netflix, so that movies and TV shows stream or download slowly, the video is jumpy and stops in places, or the video has lower-quality resolution.
Use Streaming Video Rarely or Never	78.2%	81.9%	60.2%
Use Streaming Video At Least Monthly	86.2%	87.0%	81.4%

Note: 1,012 total survey respondents. Percentages are based on weighted survey responses.

229. According to Table 17:

· The percentage of survey respondents who use wireless broadband as least as much as wired broadband for high and low-bandwidth activities ranges from:

  o 46-53 percent for *light* Internet users

  o 43-59 percent for *medium* Internet users

  o 41-62 percent for *heavy* Internet users

Table 17: Cross-Tabulation of Internet Usage versus Wireless Broadband Usage

Percentage of Survey Respondents Who Use Wireless Broadband At Least as Much as Wired Broadband	High Bandwidth Activity	Low Bandwidth Activity
Light Internet User	45.5%	53.4%
Medium Internet User	43.3%	58.5%
Heavy Internet User	41.1%	62.4%

Note: 1,012 total survey respondents. Percentages are based on weighted survey responses.

230. According to Table 18:

· The percentage of survey respondents who use wireless broadband as least as much as wired broadband for high and low-bandwidth activities ranges from:

  o 43-51 percent for users who *stream video rarely or never*

  o 42-62 percent for users who *stream video at least monthly*

Table 18: Cross-Tabulation of Video Usage versus Wireless Broadband Usage

Percentage of Survey Respondents Who Use Wireless Broadband At Least as Much as Wired Broadband	High Bandwidth Activity	Low Bandwidth Activity
Use Streaming Video Rarely or Never	42.9%	50.6%
Use Streaming Video At Least Monthly	42.3%	62.0%

Note: 1,012 total survey respondents. Percentages are based on weighted survey responses.

APPENDIX II: ANALYSIS OF EDGE PROVIDER SCALE

231. This Appendix provides details on the calculations underlying the edge provider scale analysis (summarized in Table 5 and Table 6 in Section IV.A, above). It also includes sources and notes to the tables.

232. I cannot observe directly the minimum scale required for an edge provider to succeed. Instead, I examine the size of one large edge provider (Netflix) and a number of potential "analogy cases" from other industries, including premium movie channels (HBO, Showtime, Starz, and Cinemax), as well as MVPDs (DIRECTV and Dish Network) as examples of video distributors.

233. As a reference point, I also include the minimum viability threshold of 19.03 million subscribers articulated by the FCC in its "Fourth Report & Order and Further Notice of Rulemaking" released on February 11, 2008. The document states the following: [278]

> We also need to decide which characteristics of a network should be taken into account when calculating the survival probability. We use the survival probability for a network that is not vertically integrated and is not a "spin-off" of an existing network. We exclude the effect of vertical integration and "spin-offs" from the calculation in order to account for the additional difficulties faced by independent and unaffiliated programming networks. Thus, we rely on empirical data indicating the number of subscribers needed for a network with the characteristics specified above

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278 Federal Communications Commission, *Fourth Report & Order And Further Notice Of Rulemaking*, February 11, 2008, ¶ 57.

to have a 70 percent probability of survival after five years. These choices lead to a minimum viable scale of 19.03 million subscribers.

234. I do not claim that any of these analogies or reference points is perfect, but I certainly see no basis to believe that an edge provider would need *more* scale than these comparison cases, particularly given the conventional wisdom that the Internet has reduced entry barriers and minimum efficient scale in many businesses.[279]

235. In the tables in Section IV.A, I present the number of customers for the selected comparison cases as a share of the total number of (post divestiture) non-Comcast and non-TWC broadband customers. In this way, I demonstrate that these comparison cases could be replicated (in many cases, more than once over) without any reliance on Comcast-TWC broadband customers (even though there is no reason to believe the transaction would make this necessary).

236. This analysis was performed using information for 2012 due to unavailability of certain data for subsequent years.

237. As a first step, I determined the denominator for the exercise, that is, the number of non-Comcast and non-TWC customers in the marketplace. I estimated this number at the national level using information from the most recent report of the Commission entitled "Internet Access Services: Status as of December 31, 2012," December 2013

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[279] *See*, for example, Federal Communications Commission, "Connecting America: The National Broadband Plan," [March 17, 2010], 266, *available at* http://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf, *site visited* September 17, 2014.

(hereinafter, *FCC IAS Report*), which contains data on the total number of U.S. broadband customers, and from FCC Form 477s for Comcast, TWC, Insight, and Charter which contain data on the number of broadband customers for each firm. I calculated non-Comcast and non-TWC customers for speeds of 3 Mbps downstream /768 kbps upstream (3Mb/768k) and for at least 10mbps downstream (10Mb).

238. The *FCC IAS Report* provides broadband counts for customers with "fixed" broadband service (either wireline or wireless) and "mobile" wireless service. I estimated the relevant figures both excluding and including mobile wireless in the universe of all broadband customers. This resulted in four alternative figures for the denominator; that is, the total number of non-Comcast and non-TWC customers, based on the following cases: (1) 3Mb/768k speed with mobile wireless included, (2) 3Mb/768k speed with mobile wireless excluded, (3) 10Mb speed with mobile wireless included, and (4) 10Mb speed with mobile wireless excluded.

239. When subtracting Comcast and TWC customers from the nationwide broadband counts, I accounted for divestitures reported in an internal Comcast document and scaled them appropriately for HSD customers.[280]

240. The customer numbers for satellite MVPDs and premium movie channels were sourced from SNL Kagan,[281] and Netflix customer figures were derived from its quarterly

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280 Project Tiger_Cheetah Transaction_Updated System List_5 29 143.pptx ("Systems Included in Transaction").

281 Satellite MVPD Subscribers: *SNL Kagan - U.S. DBS Industry Projections* (2012); Premium Movie Channel Subscribers: *SNL Kagan - Broadband Cable Financial Databook 2013 Edition*, December 2013, pg. 21.

financial statements on its website.[282] By dividing these customer numbers (and the FCC's 19.03 minimum scale number) by the number of non-Comcast and non-TWC customers discussed in the previous paragraph, I obtained the shares as reported in the tables in Section IV.A.

Table 19: Providers' Scale Compared to Non-Comcast and TWC Broadband (Residential + Commercial) Customers Nationwide (2012, HSD Speed of 3 Mbps/768 Kbps)

[[REDACTED]]

Table 20: Providers' Scale Compared to Non-Comcast and TWC Broadband (Residential + Commercial) Customers Nationwide (2012, HSD Speed of at Least 10 Mbps Downstream)

[[REDACTED]]

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[282] Quarterly Earnings, Q4 2012 Financial Statement, Netflix, *available at* http://ir.netflix.com/results.cfm, *site visited* August 6, 2014.

APPENDIX III: INCREMENTAL COST ANALYSIS

241. I estimated the incremental costs of additional traffic on Comcast's network based on information provided by Comcast regarding the incremental capital expenditures that it would incur to serve incremental Netflix traffic in the 2014 to 2017 period.[283, 284] I understand that the major elements of incremental capital costs include costs associated with investments in backbone and investment in metro and access components (primarily costs associated with routers, CMTSs, and node splits).

242. Given the existence of an active competitive market for backbone services, I used the market price for backbone to reflect the relevant marginal costs of backbone service, as the backbone market price is essentially the opportunity costs for Comcast of providing transit via its backbone. Unlike the backbone services, there is no spot market for metro and access services and I therefore relied on Comcast's estimate of the incremental costs associated with these services. I very conservatively assumed that the costs associated with operating expenditures (*e.g.*, space rental, power, network maintenance, etc.) are zero. Comcast also provided estimates of its cost of capital and the lifetime of the

283 Amit Garg, Executive Director, Capacity Planning, Comcast Corporation, August 6 and September 22, 2014, interviews.

284 **{{ }}**. (Amit Garg, Executive Director, Capacity Planning, Comcast Corporation, August 6 and September 22, 2014, interviews.)

relevant network capital, which I used to convert capital expenditures to a levelized monthly estimate of costs per Mbps.[285]

243. Table 21 shows that the total monthly incremental cost for serving the Netflix traffic is **{{ }}** in 2014 and decreases to **{{ }}** by 2017 due to the projected decline in the costs for each element of the network. The average monthly interconnection price paid by Netflix to Comcast is **{{ }}** in 2014 (monthly payment of **{{ }}** divided by an allocated data usage of **{{ }}**) and declines to **{{ }}** by 2017. Hence, Netflix's payments to Comcast are no more than **{{ }}** of the incremental costs incurred by Comcast in carrying the additional Netflix traffic in the 2014 to 2017 period.
[[ ]]

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[285] Conclusions are robust to a wide range of values for the lifetime of the capital.

APPENDIX IV: STOCK MARKET EVENT STUDY

244. A stock market event study is a statistical method commonly used in financial economics to estimate the association between releases of information and stock returns, controlling for the effect of market factors on stock returns.[286] The standard approach is to use regression analysis to estimate the historical relation between a company's stock returns and the corresponding returns on a market index (*i.e.*, a one-factor model), perhaps also including an industry-specific index (*i*.e., a two-factor model). The expected return on the event date is calculated based on the parameters from the regression model and the actual performance of the market index (and industry index in a two-factor model) on that date. The expected return is subtracted from the actual return to estimate a residual return (sometimes referred to as an "abnormal return" or "market-adjusted return").

245. In this case, I have estimated two-factor models for Netflix, Amazon, and Apple, and a one-factor model for Google using daily data for the year ending November 21, 2013.[287] For each company, I used the market and industry indices that the company used in their contemporaneous performance comparisons in their 10-K reports to the SEC.[288]

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286 *See, e.g.,* A.Craig MacKinlay (1997), "Event Studies in Economics and Finance," *Journal of Economic Literature*, 35: 13-39 (hereinafter, *MacKinlay (1997)).*

287 Data for the industry index used by Google, the RDG Internet Composite Index, was not available and thus an industry index was not used for the Google event study. The year ending November 21, 2013 was selected for the estimation period because November 21, 2013 was the last trading day prior to the earliest event tested in the event study analysis.

246. When performing event studies, the conventional practice is to test the "null hypothesis" that the residual return is zero against the alternative hypothesis that the residual return is different from zero.[289] If the null hypothesis cannot be rejected at conventional levels of significance, then the residual returns are not considered to be statistically significant (*i.e.* not significantly different from zero). I have implemented this approach. Results—showing no significant residual returns for the OVDs studied—are presented in Table 22 below.

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[288] In instances where the company used multiple market or industry indices, I selected the market and industry index combination that yielded the highest R-squared. However, the market and industry index selection did not affect any substantive conclusions as none of the event studies yielded statistically significant residual returns on any of the dates tested.

[289] John Y. Campbell, Andrew W. Lo and A. Craig MacKinlay (1997), *The Econometrics of Financial Markets*, Princeton University Press, 160-66; *MacKinlay (1997)*, 13-39; G. William Schwert (1981), "Using Financial Data to Measure Effects of Regulation," *The Journal of Law and Economics*, 24: 121-157; Daniel R. Fischel (1982), "Use of Modern Finance Theory in Securities Fraud Cases Involving Actively Traded Securities," *The Business Lawyer*, 38: 1-20, 19.

Table 22: Event Study Results

						Regression Results											
						Intercept		Market		Industry		Returns on 11/22/2013[1]		Returns on 2/13/2014[2]		Returns on 2/24/2014[3]		Returns on 8/20/2014[4]	
				Estimation Period		Parameter		Parameter		Parameter									
#	Company	Market Index[5]	Industry Index[5]	Begin	End	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Residual	t-stat	Residual	t-stat	Residual	t-stat	Residual	t-stat
1	Netflix	NASDAQ Composite Index	S&P North American Technology Internet Index	11/22/12	11/21/13	0.0037	1.66	-3.1483	-6.60	3.6031	10.7	1.97%	0.56	-1.80%	-0.52	0.47%	0.13	0.60%	0.17
2	Google	NASDAQ Composite Index	NA	11/22/12	11/21/13	0.0006	0.85	0.9188	9.72	NA	NA	-0.80%	-0.67	0.19%	0.16	NA	NA	NA	NA
3	Amazon	S&P 500 Index	S&P 500 Retailing Index	11/22/12	11/21/13	0.0000	0.03	-0.5182	-2.74	1.7877	11.5	1.61%	1.34	1.00%	0.84	NA	NA	NA	NA
4	Apple	S&P 500 Index	S&P Computer Hardware Index	11/22/12	11/21/13	-0.0002	-1.11	-0.0753	-3.51	1.0953	123.6	-0.06%	-0.28	-0.07%	-0.30	NA	NA	NA	NA

Sources:
CRSP, Center for Research in Security Prices. Graduate School of Business, The University of Chicago 201406. Used with permission. All rights reserved. www.crsp.uchicago.edu; Bloomberg; FT Interactive; Dow Jones Institutional News; Company SEC filings.

Notes:
1 On 11/22/2013 news reports were published regarding a possible Comcast/TWC transaction. (Bloomberg article published at 9:45AM stating "Comcast seeking advice on anti-trust issues on TWC deal" and Bloomberg article published at 9:51AM stating "Comcast shareholders said encouraging mgmt. to buy TWC."
2 The TWC/Comcast transaction was announced after the market close on 2/12/2014.
3 On 2/23/2014, Comcast and Netflix announced a deal for direct interconnection to Comcast's network. 2/23/14 is a Sunday so returns are on 2/24/14.
4 Netflix announces that it agreed to pay Time Warner Cable for direct internet connections after the market close on 8/19/14.
5 Market and Industry indices are used in the stock performance graph contained in each company's 2013 10-K (Netflix, Amazon, and Apple) or 2013 Annual Report (Google). In cases where the company reported multiple market or industry indices, the regression used the market and industry index combination that yielded the highest R-squared. The data for the industry index used by Google, the RDG Internet Composite Index, was not available so an industry index was not used for the Google event study.

An Economic Analysis of The Proposed Comcast Transactions with TWC and Charter In Response to Comments and Petitions

September 20, 2014

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I. Introduction

A. Assignment

1. On April 8, 2014, we filed a report (the "April Report") analyzing potential benefits and video/advertising competition issues related to the Comcast – Time Warner Cable Inc. ("TWC") transaction (the "TWC transaction").[1] On June 2, 2014, we filed a report (the "June Report") supplementing our analyses to account for an April 25, 2014 agreement between Comcast and Charter Communications ("Charter") on a series of transactions (the "divestiture transactions"), under which Comcast, conditioned on the completion of the proposed TWC transaction, will divest and swap systems serving a net of approximately 3.9 million video customers to Charter and to GreatLand Connections ("GreatLand"), a newly formed, independent, publicly traded company.[2]

2. In this report, we have been asked by counsel for Comcast Corporation ("Comcast") to review and respond to petitions to deny and comments regarding the efficiencies of the proposed Comcast transactions with TWC and Charter, and the impact of the proposed transactions on video and advertising competition.

B. Summary of Opinions

3. Nothing we have reviewed in the petitions to deny and comments changes the conclusions in our April and June Reports. Moreover, we have undertaken additional empirical analysis, some at the request of the Commission and some replicating analyses performed in connection with the Commission's Order in the Comcast-NBCUniversal transaction. The results of those analyses further support our conclusions.

4. The proposed TWC and divestiture transactions will lead to transaction-specific efficiencies that will benefit residential consumers, businesses, and advertisers:

- Economies of scale will justify more fixed-cost investment and lead to more and higher-quality innovations in video, broadband, and advertising. Increasing the size of the company's set of potential customers increases the potential returns on fixed-cost investments. In our previous reports, we provided several examples of transaction-specific benefits and explained why those benefits were unlikely to be attained without the transactions. Some commenters argue that Comcast is already large enough and that such benefits are, therefore, not transaction-specific. We disagree with these commenters' claims, and provide additional transaction-specific examples where increased scale afforded by the transactions will increase investment incentives.

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[1] Declaration of Gregory L. Rosston and Michael D. Topper, "An Economic Analysis of the Proposed Comcast – Time Warner Cable Transaction," April 8, 2014 ("April Report").

[2] Declaration of Gregory L. Rosston and Michael D. Topper, "An Economic Analysis of the Proposed Comcast Divestiture Transactions with Charter," June 2, 2014 ("June Report")

- Expanded geographic reach from the transactions will increase Comcast's ability to serve multi-location and enterprise business customers, and thus increase the competitiveness of business services. Expanded geographic reach will also increase Comcast's incentives to invest in Wi-Fi hotspots and increase the speed and resiliency of Comcast's network, benefitting both residential and business customers. Notably, no commenters presented any credible evidence challenging these benefits.

- Current TWC and Comcast customers and potential customers will benefit from the sharing of technologies across the companies. Some commenters argue that these benefits are not transaction-specific because TWC was planning on upgrading its systems prior to the transaction. However, these upgrades are likely to occur faster and possibly at lower cost with the transactions because of Comcast's specialized knowledge from its own system upgrades. Comcast and TWC have each invested in technology; however, contracting to share technology has not occurred because of transactional frictions. The transactions will allow Comcast to integrate the best technology from each company without the same transactional frictions.

- Customers will benefit from these procompetitive efficiency gains. Some commenters assert, without evidence or economic theory, that such benefits will not be passed through, but it is well known that all firms have incentives to pass through cost reductions and quality improvements in some ways to their customers. In addition, in a dynamic competitive marketplace, competitors will also be forced to increase the attractiveness of their offerings to customers in response to product improvements by Comcast so there will be widespread benefits.

5. The transactions will not cause competitive harm for video or advertising services:

- There is no overlap in the territories served by Comcast, TWC, and Charter, so there will be no reduction in the number of MVPD choices of any consumers. The combined company will continue to compete with two DBS providers in its entire footprint, with telco MVPDs in almost half of its footprint, and with overbuilders and new facilities-based entrants such as Google Fiber in certain areas. Some commenters have made market share and market concentration calculations that assume Comcast and TWC compete with each other, but do not compete with DBS providers. That is simply wrong.

- The transactions will not generate market power in program buying. Some commenters express concern that the transactions would generate monopsony power, but provide no credible evidence to support this assertion. Because the firms do not compete in the distribution of programming, the sale of programming to distributors involves zero marginal cost, and programming is sold to distributors through individualized negotiations, there is no valid economic theory to support the monopsony assertion. Finally, the divestiture transactions bring the national share of MVPD households below 30%, a level even the Commission believed, in a marketplace with fewer competitors and fewer options for the sale of programming than today, would not lead to monopsony concerns.

- The transactions will not increase Comcast's incentives to foreclose or harm unaffiliated content providers to favor NBCUniversal programming. No commenters have provided any viable economic theory or evidence of transaction-specific program carriage concerns. If Comcast were to deny carriage to unaffiliated programming of interest to its customers, it would reduce Comcast's ability to compete with its MVPD rivals and to a lesser extent, with OVDs, and would unlikely benefit its affiliated programming networks due to competition from other unaffiliated programming. Moreover, we have updated the empirical analysis underlying the Commission's conclusion in the NBCUniversal Order that Comcast "may have in the past" favored its own programming for anticompetitive reasons.[3] This updated analysis provides no support for that conclusion now.

- The transactions will not increase Comcast's incentives to foreclose access to or raise prices of programming to rival MVPDs. Commenters have not presented any credible evidence supporting such program access concerns. Those program access strategies would not be profitable for Comcast given the strong competition it faces in the distribution and programming marketplace. Updating the Commission's empirical analysis shows no price effect from vertical integration. In addition, application of the Commission's vertical foreclosure and Nash bargaining models from the Comcast-NBCUniversal Order provides no support for claims that the acquisition of TWC and Charter systems in the current transactions will lead Comcast to use its programming to disadvantage its rivals. Finally, the Commission's program access rules and the Comcast-NBCUniversal conditions remain available if there were any legitimate concerns.

- The transactions will not generate market power in program selling. TWC controls a very small amount of programming. NBCUniversal will continue to have only a modest share of overall programming revenues after the transactions, and will not gain the ability to charge supra-competitive prices for its programming after the transactions. Application of the Commission's empirical model from the Comcast-NBCUniversal Order finds no evidence of price increases due to joint ownership of NBC O&Os and Comcast RSNs in the same area. This result suggests that there is no empirical support for commenters' horizontal program selling power concerns about the current transactions.

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[3] Comcast-NBCUniversal Order, ¶ 117.

- The transactions will not impair competition in national or local advertising. Advertising is a broad market with television, internet, radio, newspapers, direct mail, and others all competing for dollars. The transactions affect only a small part of this broad market and will not cause competitive harms. Concerns raised by certain commenters about Comcast's and TWC's participation in local cable advertising "interconnects" are not transaction-specific, do not appropriately account for the incentives of interconnect managers and participants, and do not account for the fact that local cable advertising competes in a broad market with many other forms of advertising.

II. Transaction-Specific Competitive Benefits and Efficiencies

6. In our previous reports, we described how the TWC and divestiture transactions will lead to transaction-specific competitive benefits and efficiencies through economies of scale at the national and regional levels, expanded geographic reach, and sharing of technologies and services.[4] Nothing in the comments changes these conclusions. We will address comments related to each of these economic mechanisms in turn and also address claims that the efficiencies we have identified would not be passed through to customers. Commenters ignore many of the clearly demonstrated benefits of the transactions and mischaracterize others, leading them to mistakenly conclude that there will not be transaction-specific benefits and that any benefits will not be passed on to customers. We show that business, residential, and advertising customers all stand to benefit from the identified transaction-specific efficiencies.

A. Additional National and Regional Economies of Scale

7. As we described in our April Report, the TWC transaction will allow Comcast to achieve additional economies of scale in its investments and innovation because it will be able to spread the fixed costs of those investments across more potential customers.[5] Among other benefits, increased economies of scale from the transaction should allow Comcast to provide more advanced video services to residential customers, more robust and higher-quality service to business customers, and more valuable dynamic ad insertion possibilities to advertisers.[6] In our June Report, we described how the divestiture transactions will allow Comcast to achieve increased economies of scale at the regional level, which should benefit customers through efficiencies in a variety of areas: network infrastructure and upgrades; operational, marketing and administrative functions; and customer service.[7]

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[4] April Report, ¶¶ 41–161; June Report, ¶¶ 7–19.
[5] April Report, ¶¶ 44–57.
[6] April Report, ¶¶ 85–94, 134–138, 144–147.
[7] June Report, ¶¶ 9–14.

8. Multiple commenters suggest that any claimed benefits due to economies of scale are not transaction-specific, not likely to be realized, or will not lead to benefits to consumers.[8] Commenters' suggestions are vague, unspecific, and do not address the specific transaction-specific efficiencies we discussed in our previous reports. As we described in our April Report, the economies of scale *are* very much transaction-specific because the TWC and divestiture transactions remove some of Comcast's and TWC's geographic limitations on scale and allow Comcast to achieve scale that it could not achieve in its current footprint.[9] The benefits of economies of scale are likely to be realized because they are based on the fundamental economics of the fixed investment costs needed for innovation. These benefits should flow to consumers through improved service, more advanced features, or lower prices that would not occur absent the transactions.

9. Several commenters suggest that Comcast and TWC are already so large that additional economies of scale will be negligible.[10] Commenters' remarks miss the point. While it is true that Comcast and its customers already benefit from Comcast's scale, there are additional economies of scale to be realized from the transactions. In our April Report, we provided examples of investments that Comcast was not able to make or was not able to make as quickly as it would have with a larger scale.[11]

10. AAI suggests that our assertion that Comcast will realize additional efficiencies from a scale larger than its current scale "almost implies an emerging national natural monopoly in wired broadband."[12] We are not suggesting such a natural monopoly, and it does not necessarily follow from the existence of economies of scale in investment at Comcast's current scale. In our April Report, we identified investments for which economies of scale are present at the scale that the transactions will provide. However, this does not necessarily mean that scale economies will always hold at any scale or for any particular investment. Therefore, while having a larger scale increases the incentives for particular investments, it does not necessarily mean there is a natural monopoly in the provision of wired broadband or MVPD services more generally, especially with the competitive success of video and broadband delivery on DBS and telco platforms in addition to overbuilders and wireless providers.

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[8] For example, Joint Petition to Deny of Future of Music Coalition and Writers Guild of America West, Inc. ("WGAW/FMC Comment"); Comments of the American Antitrust Institute ("AAI Comment"); Petition to Deny of Netflix, Inc.; Petition to Deny of COMPTEL ("COMPTEL Comment"); Petition to Deny of Free Press; Petition to Deny of The Greenlining Institute; Statement in Opposition to Comcast's Proposed Acquisition of Time Warner Cable, Senator Al Franken ("Franken Comment"); Cogent Communications Group, Inc.'s Petition to Deny; Declaration of Joseph Farrell, filed on behalf of Cogent Communications Group, Inc. ("Farrell Report"); Joint Petition to Deny of Consumers Union and Common Cause ("Consumers Union/Common Cause Comment"); Petition to Deny of Los Angeles County, et al. ("Los Angeles County, et al. Comment"); Petition to Deny of Consumer Federation of America, et al. ("Consumer Federation of America Comment").

[9] April Report, ¶ 50.

[10] For example, Consumers Union/Common Cause Comment, pp. 38–39; AAI Comment, pp. 24–29; Los Angeles County, et al. Comment, pp. 6–8; Franken Comment, pp. 10–11.

[11] April Report, ¶¶ 87, 90, 93, 136.

[12] AAI Comment, p. 25.

11. Professor Farrell argues that if scale economies were present, Comcast and TWC could realize them by simply expanding within their current footprints.[13] While it is true that Comcast could gain scale by winning more customers within its current footprint (and it continues to aggressively compete for these customers), the transactions allow for additional scale through an expanded footprint and the ability to compete for a larger universe of otherwise unavailable potential customers; such growth cannot be obtained organically within Comcast's existing footprint.[14]

12. Dr. Evans claims that there is no empirical support from Comcast's history or theoretical support for our claim that economies of scale will lead to increased investment.[15] But Dr. Evans has overlooked the evidence in our April Report, in which we showed how Comcast realized economies of scale due to its acquisition of AT&T Broadband and consequently made larger fixed cost investments.[16] Comcast thus produced the benefits that the Commission recognized in its approval of that transaction.[17] In addition, we explained that after Comcast's and TWC's acquisition of Adelphia's cable systems, Comcast and TWC substantially increased investments in those systems to enable them to provide advanced digital services.[18] Here too, Comcast generated the consumer benefits that the Commission anticipated in its Order approving the Adelphia transaction.[19]

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[13] Farrell Report, ¶ 102.

[14] In addition, the competitors that Comcast and TWC face within their current footprints also have large footprints: DirecTV and Dish operate at the national level, AT&T and Verizon have broad geographic reach, and OVDs also have a national (or international) scale.

[15] David S. Evans, "Economic Analysis of the Impact of the Comcast/Time Warner Cable Transaction on Internet Access to Online Video Distributors," 8/25/14, filed on behalf of Netflix, Inc. ("Evans Report"), fn. 12. While Dr. Evans technically states that we have not provided evidence on Comcast "as it has grown over the last decade," the fundamental economics of economies of scale held even prior to the last decade.

[16] April Report, ¶ 69.

[17] In Re Applications for Consent to the Transfer of Control of Licenses from Comcast Corporation and AT&T Corp., Transferors to AT&T Comcast Corp., Transferee, Memorandum Opinion and Order, 17 FCC Rcd. 23246, ¶ 184.

[18] April Report, ¶ 71.

[19] *In re Applications for Consent to the Assignment and/or Transfer of Control of Licenses Adelphia Communications Corporation (and Subsidiaries, Debtors-In-Possession), Assignors, to Time Warner Cable Inc. (Subsidiaries), Assignees, Adelphia Communications Corporation, (and Subsidiaries, Debtors-In-Possession), Assignors and Transferors, to Comcast Corporation (Subsidiaries), Assignees and Transferees*, Memorandum Opinion and Order, 21 FCC Rcd 8203 ¶ 23 (2006) ("Adelphia Order"), ¶ 257.

13. Dr. Evans also ignores support in the economics literature for our claim that economies of scale from the transactions will lead to increased investment. 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.[20] That criticism does not hold.

14. Consider a simple example. Suppose Comcast's scale justified it investing $1 billion to develop its X1 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.[21] 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.

15. Professor Comanor argues the benefits of economies of scale would occur on only 3% of Comcast's total costs (namely the costs devoted to R&D) and therefore represent minor cost savings.[22] Even though R&D may represent only a relatively small portion of Comcast's total costs, that is irrelevant to the impact that economies of scale can have on consumer welfare. The level of R&D spending undertaken by Comcast is determined by weighing the costs of R&D against the benefits from that R&D and customers' willingness to pay for those benefits. And the fact that Comcast also incurs costs in the form of programming expenses and operating expenses has no bearing on the new and improved technologies and services that would be enabled through the increased R&D spending arising from additional economies of scale. After the transactions, the combined firm will have the scale to justify higher R&D spending than would occur absent the transactions.

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[20] Evans Report, fn. 12.

[21] Even a $1 billion investment would be better because former TWC subscribers would get access to the technology and benefits of a $1 billion investment in technology instead of those associated with a smaller $500 million investment.

[22] Testimony of William S. Comanor on the Competitive and Economic Consequences of the Comcast – Time Warner Cable Merger, August 2014, filed on behalf of WGAW/FMC ("Comanor Report"), pp. 22–23.

16. In addition to the examples of the benefits of scale described in our previous reports, another area in which additional economies of scale arising from the transactions may lead to concrete, measurable benefits to customers is in the development of tools to monitor the "health" of Comcast's network.[23] To ensure that it is providing high-quality service, Comcast has invested substantial resources in developing such tools. These include proprietary systems to monitor "node health" (a "node" is a location in Comcast's network where the network transitions from fiber to coax) or "plant performance." Comcast's continual enhancement of these tools over the past decade has been a contributing factor to improvements in network performance, including fewer video quality impairments, faster broadband speeds, and fewer (and shorter) service outages. One indicator of these improvements is that Comcast's technical call volumes and truck roll repairs have decreased steadily each year over the last six years.[24] Investment in network monitoring tools is largely a fixed cost that does not depend on the number of subscribers. Therefore as Comcast gains additional scale from the transactions, it will be able to justify additional fixed cost investments in network monitoring tools.[25] These new network monitoring tools will be a benefit to both business and residential customers through improved network performance and reductions in the marginal cost of serving customers.

17. Comcast internal data on node health and customer churn shows the concrete, quantifiable nature of this benefit to customers. Comcast has found that **[[ ]]**.[26] Early data and analysis from 2014 indicates this is particularly true for business customers, but also holds for residential customers.[27]

18. Another area in which the additional scale from the transactions is likely to yield tangible benefits is in accelerating the deployment, measurement, and uptake of advanced advertising services such as dynamic ad insertion (DAI). As discussed in our previous reports, sharing of Comcast's industry-leading VOD content and delivery platforms will benefit customers in TWC's territory.[28] Moreover, their combination with the additional scale and reach afforded by the transactions has the potential to speed up improved measurement of viewing in ways that could create significant incremental revenue for content providers and, as a result, potentially increase free content for consumers.[29]

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[23] This example is based on interviews that took place after we submitted our previous reports.

[24] These reductions are based on year-over-year comparisons (e.g., Q1 2014 compared to Q1 2013, etc.). Interview with John Schanz (Executive Vice President and Chief Network Officer, Comcast Cable).

[25] Comcast invested in developing a system to evaluate the health of its network. Its "national watchtower" can be used to determine, for example, the location of an impairment in the network to within three feet. Going forward, Comcast plans to develop more advanced tools including spectrum analysis at the premise level, systems for monitoring network health on the customer side of the wireless gateway, and a big data engine that will allow Comcast to use more sophisticated algorithms. Interview with John Schanz (Executive Vice President and Chief Network Officer, Comcast Cable).

[26] Comcast Business Presentation, "Business Service Maintenance Improvement Pilot Overview," 1/9/14.

[27] Interview with John Schanz (Executive Vice President and Chief Network Officer, Comcast Cable).

[28] For example, Comcast represents 55–60% of total national VOD use, even though it represents only about 20% of MVPD subscribers. Interview with Rob Holmes (Vice President of Advanced Advertising Services, Comcast).

[29] Rentrak, State of VOD: Trend Report 2013, Free on Demand, p. 23: "While there has been significant effort to replicate linear C3 ad loads for VOD content, nearly 70% of views do not have full ad loads. Monetizing these views is a major opportunity to increase the value of VOD as an advertising platform, with the potential for multi-billion dollar ad revenues. As with last year, there is still a significant portion of viewing being left on the table by content providers and advertisers."

19. On the VOD platform, **[[ ]]**% of viewing is outside of the traditional window measured by Nielsen on which advertising sales are based.[30] Comcast has been working to improve measurement of viewing outside this window using On Demand Commercial Ratings (ODCR), which it believes would measure an additional **[[ ]]**% of VOD viewing.[31] ODCR has been tested and trialed, and Comcast is waiting for accreditation and auditing. However, Comcast has encountered difficulties gaining industry acceptance of this technology with its current scale and reach.[32]

20. The additional scale and expanded geographic reach provided by the transactions may help accelerate deployment, acceptance, and uptake of these new measurement tools. At present the industry looks at ODCR as a regional, Comcast-only solution.[33] The additional scale and expanded geographic reach enabled by the transactions will make it easier for ODCR to be viewed as a national advertising solution and help get more traction with advertisers, content providers, and other MVPDs.[34] The additional scale and reach will also make it more likely that ad agencies will accept ODCR insertions as something they are willing to pay for and invest in the large scale coordination effort needed.[35]

21. Since even with ODCR, up to **[[ ]]**% of VOD viewing would not be measured, Comcast has also been working with Nielsen to develop a different methodology for DAI based on Nielsen's online campaign tool, which creates a reliable projection of demographic impressions.[36] Comcast is trying to establish this technology as viable, but believes it needs other MVPDs to accept the methodology in order for it to prove a national solution; with a broader presence, Comcast could more readily convince advertisers, and hence other MVPDs, to take a chance on this tool.

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[30] Interview with Rob Holmes (Vice President of Advanced Advertising Services, Comcast).

[31] The basic idea with ODCR is to cut and paste advertisements from the C3 window into older episodes of a given show if being viewed within the C3 window for a current episode. For example, in week 10 of a broadcast season for a show, some consumers will have not seen week 8 and will watch on VOD. With ODCR, if within the C3 window of the week 10 episode, the ads from the week 10 episode would be cut and pasted into the week 8 episode. Interview with Rob Holmes (Vice President of Advanced Advertising Services, Comcast).

[32] Interview with Rob Holmes (Vice President of Advanced Advertising Services, Comcast).

[33] Interview with Rob Holmes (Vice President of Advanced Advertising Services, Comcast).

[34] Interview with Rob Holmes (Vice President of Advanced Advertising Services, Comcast).

[35] Interview with Rob Holmes (Vice President of Advanced Advertising Services, Comcast). See "Comcast Trials Aim to Unlock VOD Ad Dollars, Measure TV Binge Viewing," Multichannel News, 12/2/13.

[36] In the television world, Nielsen projects viewer demographics from a sample panel, and in digital web content, Nielsen has managed to obtain demographic information by working with Facebook. Nielsen takes cookies from the websites someone visits and sends the pool of cookies to Facebook, who provides the demographics for the pool. Nielsen then applies those demographics to the viewed content. Similarly, the VOD solution under development involves trying to generate a projection for each insertion: Comcast provides some data to Nielsen and then Nielsen tries to model the demographic characteristics of who is actually watching

22. If DAI on VOD can be measured so that advertisers pursue it more enthusiastically, content providers and consumers would also benefit. One of the biggest issues faced by content providers is the growing use of DVR viewing, which leads to ad skipping and reduced revenues.[37] DAI in VOD offers an opportunity for content providers to enable the time-shifted viewing that consumers increasingly demand along with better monetization than DVR.[38] To the extent that content providers realize greater revenues from VOD viewing relative to DVR viewing (due to ad-skipping on DVRs), Comcast's large VOD library allows it to provide content providers more ad revenue per subscriber.[39] Content providers are willing to provide more VOD content, e.g., entire seasons of popular shows, to Comcast (and other MVPDs) if they are able to monetize it — and consumers are then often able to enjoy this additional content with no additional charges.[40] The availability of more, free VOD has also proven to be self-reinforcing for content providers' business, as it allows viewers to catch up on previous episodes, and increases the live and total audience size for current shows by helping build momentum as a season progresses.[41]

B. Expanded Geographic Reach Will Increase Comcast's Ability to Serve Residential and Business Customers

23. In our April Report, we described how the transaction will increase Comcast's ability to serve customers whose needs span the existing geographic footprints of Comcast and TWC.

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[37] See "As DVRs Shift TV Habits, Ratings Calculations Follow," The New York Times, 10/6/13.

[38] See "CBS Research Chief: Significant Changes in TV Viewing in Past Two Years," Ooyala.com 12/10/13: "As to VOD, [Dave] Poltrack [Chief Research Officer, CBS] said its 'increasing the average audience for our prime time programming by 4%,' and said VOD is being used to watch television and catch up on favorite shows. Some shows, he said, have recorded more than double the 4% overall bump the network has experienced, like the 9% increase experienced by 'The Good Wife.'" See also "VOD Advertising Business Is Slowly Coming to Life," Broadcasting & Cable, 11/11/13.

[39] NBCUniversal Presentation, "NBC Ad Contribution Per Sub," 11/22/13.

[40] In contrast, with traditional or cloud DVR technology, consumers often pay $10–20 per month for similar capabilities. Interview with Rob Holmes (Vice President of Advanced Advertising Services, Comcast).

[41] See "Comcast Trials Aim to Unlock VOD Ad Dollars, Measure TV Binge Viewing," Multichannel News, 12/2/13.

These customers include (1) businesses with multiple locations that span the Comcast and TWC footprints and (2) residential and business customers who travel throughout the Comcast and TWC footprints and need Wi-Fi access while away from their primary location.

24. As we described in our April Report, by being able to provide business services on its own network in an expanded footprint, Comcast will be a more effective competitor in serving multi-location businesses. This will increase competition for these customers and possibly lead to lower prices and improved service quality. Notably, no commenter addresses the transaction-specific increase in Comcast's ability to provide service to more multi-location businesses and to provide improved enterprise-level service.[42] These benefits of the transaction are cognizable and are recognized by industry analysts.[43] In our April Report we provided specific examples of Comcast contracts for service that could have been provided at lower cost with the expanded geographic reach provided by the transaction.[44]

25. Information obtained since submitting our April Report about Comcast's network investment approval process underscores our conclusions as to the transaction-specific benefits of expanded geographic reach. Comcast undertakes network investment projects within its current footprint if a project satisfies profitability criteria even when individual components of such projects (e.g., network build-out to a particular site) do not meet profitability criteria when examined on a standalone basis. For example:

- A proposed business services investment to serve a customer in **[[ ]]**.[45]

- Comcast approved the network investment required to provide **[[ ]]**.[46]

26. The same logic will spur post-transaction investment that would not take place absent the merger. Today, network investment to serve customers whose locations span the Comcast and TWC footprints does not occur unless the TWC- and Comcast-specific investments each meet profitability criteria. The transaction will relax this constraint: investments that meet profitability criteria on an aggregate basis (i.e., across the combined footprint) may go forward, even if the investment within one party's current footprint does not meet the profitability threshold.

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[42] The City of Los Angeles argues that increased availability of "world class" business services cannot be a transaction-specific benefit because TWC already claims to offer "world class" business services. However, this argument misses the point that the transaction will allow those "world class" business services to be available to more businesses, namely those with locations spanning the Comcast and TWC service areas. Comments of the Office of the Mayor of the City of Los Angeles ("City of Los Angeles Comment"), p. 3.

[43] April Report, ¶¶ 120–133.

[44] April Report, ¶ 127.

[45] Interview with Robert Victor (Senior Vice President, Finance and Operations, Comcast Business).

[46] Interview with Kevin O'Toole (Senior Vice President and General Manager, New Business Solutions, Comcast Business).

27. Finally, new information obtained since submitting our April Report underscores our conclusion that the benefits of geographic reach are transaction specific, and joint sales are not a viable means of realizing the same benefits. We noted in our April Report that Comcast, TWC and other MVPDs have discussed partnering on sales to super-regional businesses that span their footprints, and that Comcast had recently reported closing its first joint contract to serve a super-regional customer. However, the contract in question was not the fruit of a larger collaborative initiative targeting super-regional businesses, but rather a transaction led by Comcast in which TWC and other providers served locations outside Comcast's footprint. We understand that **[[ ]]**. In addition, **[[ ]]**.[47]

28. It should also be noted that Comcast serving more business customers due to the transactions should lead to more network hardening in the nodes that will be serving the additional business customers. For example, when Comcast serves business customers it may lay more fiber or install additional capacity in CRANs to serve these customers. Because business and residential customers use largely the same physical plant, these investments should spill over to benefit residential customers through improved service quality by increasing the capacity of CRANs (allowing, for example, a larger VOD library) and improving "node health" (i.e., reducing service outages or impairments).[48]

29. On the residential side, expanded geographic reach and increased regional clustering from the transactions will increase Comcast's incentive to invest in its Wi-Fi network. These increased incentives arise because Comcast will be able to internalize the benefits of Wi-Fi access to customers across its entire combined service area in a way that the separate cable operators currently do not.

30. Some commenters make reference to the existence of the CableWiFi consortium as a reason to discount claims about the improvements in Comcast's Wi-Fi network due to the transaction.[49] However, these commenters miss the key point that the transactions increase Comcast's incentive to invest in its Wi-Fi network.[50] This increased incentive comes from Comcast internalizing the benefits of the Wi-Fi network to customers in both Comcast's and TWC's current service areas (as well as the service areas being acquired from Charter).[51]

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[47] Interview with Kevin O'Toole (Senior Vice President and General Manager, New Business Solutions, Comcast Business).
[48] April Report, ¶ 63.
[49] Consumers Union/Common Cause Comment, p. 37; City of Los Angeles Comment, p. 3; and Los Angeles County, et al. Comment, p. 16.
[50] April Report, ¶¶ 96–99.
[51] April Report, ¶¶ 96–99.

31. Comcast has already demonstrated a continued commitment to expanding its Wi-Fi network within its footprint. In addition to installing Wi-Fi access points in outdoor locations and in businesses throughout its footprint, it has pioneered the use of in-home "neighborhood" hotspots that allow Comcast customers to access the Wi-Fi network through in-home routers in Comcast customer homes equipped with capable routers. By the end of the year, Comcast plans to have installed over 8 million Wi-Fi hotspots.[52]

32. Comcast's large investment in Wi-Fi access points to date is consistent with it having a strong incentive to invest in a network that will benefit its comparatively large subscriber base. That is, Comcast is able to internalize the benefit that investments in one part of its service area will provide to customers in another part of its service area. For example, when Comcast is considering whether to install an additional Wi-Fi access point in the Philadelphia area, it weighs the cost of doing so against not only the benefit that its customers in the Philadelphia area will realize, but also the benefit that its customers traveling from Washington, DC, Boston, or San Francisco, among others, will realize. The transactions will increase Comcast's incentive to invest in Wi-Fi access points. With the expanded geographic reach afforded by the transactions, Comcast will internalize the benefits to the additional customers in former TWC and Charter areas and therefore will have an even stronger incentive to add Wi-Fi access points. This increased incentive applies to all types of Wi-Fi access points, including in-home neighborhood hotspots.

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[52] Comcast Press Release, "Comcast to Reach Eight Million Xfinity WiFi Hotspots in 2014," 4/30/14, available at http://corporate.comcast.com/news-information/news-feed/comcast-to-reach-8-million-xfinity-wifi-hotspots-in-2014.

33. Finally, Professor Farrell and Senator Franken suggest that Comcast could obtain the benefits of expanded geographic reach by simply expanding its footprint to encompass TWC's service areas without the need for the transactions.[53] As we described in our April Report, Comcast and TWC have not found it profitable to build new cable systems outside their existing geographic footprints or make the major investments necessary to successfully enter as an out-of-footprint OVD.[54] It would be cost prohibitive for Comcast or TWC to build new cable systems throughout each other's geographic footprint, and we have seen no evidence that either firm has considered doing so. And if either firm were to provide OTT services outside its existing footprint, it would face strong competition from large players like Apple, Sony, Dish, and others in providing OTT services. As a result, the geographic expansion suggested by Professor Farrell and Senator Franken is highly unlikely to be a viable strategy for Comcast or TWC.

C. Sharing of Technologies and Services Will Benefit Customers

34. In our April Report, we explained that by combining the Comcast and TWC portfolios of technologies and services, the combined company should be able to provide more services at lower cost than Comcast or TWC could on its own.[55] Each company will bring proprietary technology and specialized knowledge about providing its unique mix of services. For example, the sharing of Comcast's advanced X1 or addressable advertising technology with TWC should speed up deployment of the technology in TWC's territory. Some commenters argue that these benefits are not transaction-specific because (1) TWC has announced plans to upgrade its systems and increase broadband speeds, or (2) in some cases, TWC's offerings appear to be a better value for consumers.[56] In addition, some commenters argue that combining Comcast's and TWC's systems will actually lead to difficulties in integration, which will harm customers.[57]

35. Even though TWC announced plans prior to the transaction (via its "Maxx" initiative) to upgrade systems in certain geographic areas over the next several years, the transaction will allow those upgrades to occur faster and more efficiently because the combined company will be able to leverage Comcast's experience. For example, although TWC announced in January 2014 its plan to transition 75% of its systems to all-digital by 2016, Comcast should be able to use the experience it gained from its own 2009 to 2012 transition to all-digital to transition TWC's systems more rapidly and at lower cost than TWC could on its own. Based on the information Comcast has obtained so far, we understand that Comcast plans to be able to offer all Comcast products and services to TWC customers within 36 months.[58] That will necessitate a transition of all TWC systems to all-digital prior to that time. This will benefit customers, particularly those served by systems TWC was not planning to transition to all-digital via its "Maxx" initiative, through earlier and increased availability of advanced digital services and faster broadband speeds.

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[53] Farrell Report, ¶¶ 97–100; Franken Comment, p. 14.
[54] April Report, ¶ 173.
[55] April Report, ¶¶ 65–68.
[56] For example, WGAW/FMC Comment, pp. 63–65; Consumers Union/Common Cause Comment, pp. 35–38.
[57] For example, Consumers Union/Common Cause Comment, pp. 39–40.
[58] Comcast Response to FCC Request for Information 88.

36. In order to make its transition to all-digital more seamless, Comcast invested in developing a configuration of QAM channels that it believes currently best serves the needs of its customers by utilizing the bandwidth at each of its headends more efficiently.[59] This configuration is a standard by which the QAM channels at Comcast headends are allocated between data and video, among other things. By standardizing its headend configuration, Comcast was able to make self-installation of all-digital set-top boxes relatively seamless for customers. In large part because of this standardization, when Comcast made its transition to all-digital, over 90% of digital upgrades were self-installs.[60] By bringing this standardized configuration to TWC systems, Comcast will be able to use the knowledge it has in this area to make the all-digital transition of TWC systems more efficient. This will benefit customers by giving them access to digital service sooner and perhaps more conveniently by allowing self-installation. The standardization of the channel configuration at Comcast and TWC headends will also make the future deployment of DOCSIS 3.1 (for which chips are currently being designed and deployment should begin in 2016) more rapid than it would be absent standardization.[61]

37. In addition to the benefits from standardizing the channel configuration at its headends, Comcast learned many other "best practices" for the transition to all-digital from its experience going through that transition. A Comcast presentation summarizing these best practices makes clear that Comcast's learning-by-doing spanned multiple areas.[62] These areas include customer messaging, warehouse/inventory management, back-office systems, staffing, and handling of service calls.[63] In transitioning TWC systems to all-digital, Comcast will be able to apply its specialized knowledge about these and other best practices to make the transition faster and more efficiently than TWC could on its own. Consumers in turn will benefit from having access to all-digital systems sooner and with less disruption to their service.

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[59] Interview with John Schanz (Executive Vice President and Chief Network Officer, Comcast Cable).
[60] Interview with John Schanz (Executive Vice President and Chief Network Officer, Comcast Cable).
[61] Interview with John Schanz (Executive Vice President and Chief Network Officer, Comcast Cable).
[62] Comcast Presentation, "All Digital Initiative," July 2013.
[63] Comcast Presentation, "All Digital Initiative," July 2013.

38. WGAW/FMC and Consumers Union/Common Cause argue that sharing technologies and services is not a benefit of the transaction because, in some cases, TWC appears to offer a better value to consumers.[64] In support of that assertion, WGAW/FMC cites one low-cost Internet option that TWC offers that Comcast does not, while Consumers Union/Common Cause cites the ability of TWC customers to access their MVPD service via a Roku device. However, while commenters may be able to find differences in the product portfolios of Comcast and TWC, they have offered no support for the claim that on the whole customers would be better off absent the transaction. It is natural for different companies to offer different products to meet the needs of their different customers. After the transaction, Comcast will seek to meet the needs of its customers, including former TWC customers. To the extent that there are some areas where TWC is able to offer a product at a better value to consumers through superior or more efficient technology than what Comcast has, the combined company will have the option of deploying that technology more broadly, to the benefit of Comcast customers. As we said in our April Report, sharing of technologies works in both directions.[65]

39. Consumers Union/Common Cause also argue that the transaction will lead to integration difficulties, which will actually increase prices to consumers.[66] However, while there are certain to be some costs related to integrating Comcast and TWC systems, if the costs were so high that they would lead to increased prices or lower quality service, Comcast would not choose to make those service changes. After all, Comcast has the option of leaving current TWC technologies in place if they are a more efficient way of meeting customer demand than an alternative Comcast technology. As discussed below, the benefits of efficiency-enhancing changes in technology due to the integration will be passed on in part to customers. Moreover, Comcast's history of integration and investment subsequent to its prior transactions demonstrates the benefits from sharing technologies. For example, Comcast's successful integration and upgrades of AT&T Broadband and Adelphia systems to bring them to the same quality as existing Comcast systems led to increased availability of advanced digital services, as the Commission recognized.[67]

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[64] WGAW/FMC Comment, pp. 64–65; Consumers Union/Common Cause Comment, pp. 36–37.
[65] April Report, ¶ 68.
[66] Consumers Union/Common Cause Comment, pp. 39–40.
[67] Adelphia Order, ¶ 257.

D. Transaction-Specific Efficiencies Will be Passed Through to Customers

40. Some commenters argue that even if Comcast were to realize efficiencies from the transaction, these would not be passed through to customers in the form of lower prices or improved service.[68] They argue either that the efficiencies will come in the form of reduced fixed costs, which would not be passed through, or that due to a lack of competition, Comcast will not have an incentive to pass through cost savings. As we discuss below in Section III.A, it is a straightforward matter of economics to show that cost reductions benefit customers. Even a monopolist, which Comcast is not, would choose to pass through some portion of a cost reduction to customers in the form of lower prices because that would allow the monopolist to sell to some marginal customers for which the monopolist's marginal revenue exceeds the new, lower marginal cost.[69]

41. Regarding the claim that fixed cost savings would not be passed through to customers, it should first be noted that many of the efficiencies we describe should result in reduced *marginal* costs in the near-term. For example, even with a narrow, static view of marginal costs, the geographic clustering of cable systems from the Charter transactions should lead to lower marginal costs for technicians to travel to customers.[70] Moreover, as we described in our April Report, "fixed" cost savings can lead to substantial customer benefits as well:

> [T]he deployment of new technologies depends on a firm's willingness to undertake the fixed costs of research, development, and deployment. As a result, while such costs are 'fixed' when viewed through a static lens, they are incremental costs when viewed through the lens of undertaking or accelerating investment and new product deployment.[71]

42. Therefore, the benefits we described in our previous reports and expand upon here are not merely reductions in Comcast's fixed costs. They are effects of the transaction that will lead to increased investment, which will in turn facilitate and accelerate deployment of new and enhanced services and products. These longer-term benefits, along with reductions in marginal costs that will be passed on to customers, are the ways in which customers will benefit from the efficiencies we have described. Finally, as we discussed in our April Report, the transactions give Comcast the ability to compete for customers in an expanded footprint, but it will need to compete for these customers with a number of rivals that operate on a national scale or with broad geographic reach.[72] Comcast's new and enhanced service offerings will not only benefit its customers directly, but will also likely encourage a competitive response from DBS operators, telcos, and other providers of video, broadband, voice, and advertising services that in turn can lead to new or improved services.

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[68] For example, Consumers Union/Common Cause Comment, pp. 38–39; COMPTEL Comment, p. 9; Franken Comment, pp. 8–11.
[69] See, e.g., Hal Varian, *Microeconomic Analysis*, 3rd Ed., pp. 236–237.
[70] June Report, ¶ 12.
[71] April Report, ¶ 54.
[72] April Report, ¶¶ 80–83.

III. No Video Programming Competitive Concerns

43. We showed in our previous reports that the transactions did not raise competitive concerns about video programming, and that conclusion still holds. Comcast, TWC, and Charter do not overlap in their service territories so the transactions will not affect the competitive choices available to MVPD customers.[73] Therefore, the transactions will not raise any competitive concerns about the distribution of video programming to consumers.

44. The combined company will continue to compete with the two DBS providers in its entire footprint, with telco MVPDs in almost half of its footprint, and also with overbuilders and new facilities-based entrants such as Google Fiber in certain areas within its footprint.[74] Some commenters have made market share and market concentration calculations that assume Comcast and TWC compete with each other, but do not compete with DBS providers.[75] That is simply wrong. DBS providers have been able to compete effectively, increasing their share of MVPD subscribers from 29% to 34% in the past decade alone.[76] Similarly, it does not make sense, as suggested by WGAW/FMC, to ignore OVDs from a competitive analysis of program buying simply because they do not own facilities to distribute content directly to their customers. OVDs are a competitive factor – Netflix, Apple, Google, Amazon, Hulu, Sony, and other online companies are entering or have entered online video provision and are positioning themselves as competitors to MVPDs for at least some services such as VOD. They are also large purchasers of video programming and provide an alternative channel of monetization for content providers.

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[73] Consumer Federation of America argues that combining Comcast and TWC will increase the combined company's ability to "lead, signal and coordinate actions that would diminish competition," especially from OVDs. However, because Comcast and TWC do not compete with one another in distributing video programming to any particular customer, there will be no reduction in the number of competitors serving any customer and no increased possibility of "coordinated effects." Consumer Federation of America Comment, pp. 17–18.

[74] Letter from Comcast, Time Warner Cable, and Charter to Marlene H. Dortch, 6/24/14, p. 4.

[75] Comanor Report, pp. 13–14; Consumer Federation of America Comment, pp. 25–28.

[76] SNL Kagan, "National MVPD subscribers 2005–2013."

For example, as of the end of 2013, Netflix had purchased licenses for $7.25 billion in streaming content.[77] Ignoring the realities of DBS providers and OVDs being part of the open field for content providers in the programming marketplace renders Professor Comanor's and Dr. Cooper's calculations, and WGAW/FMC's speculations, meaningless for understanding any competitive implications of the transactions.

45. In this section, we first address the program buying power and program carriage issues raised by the commenters, and then discuss the program access and program selling power issues raised by the commenters.

A. No Monopsony Program Buying Power Concerns

46. Various commenters have argued that because the TWC and divestiture transactions will increase the number of subscribers served by Comcast, the transactions will give Comcast more program buying power.[78] In our previous reports, we showed that program buying power was not a concern because the TWC and divestiture transactions would not change the demand for or supply of programming, would not give Comcast bottleneck power over the purchase of programming, and would not give Comcast market power from the perspective of bargaining theory. None of these elements is effectively rebutted by any commenter. In addition, size is far from the only determinant of program pricing; there are many other factors that content providers and MVPDs consider in the course of their negotiations.

47. Even if the transactions would allow Comcast to negotiate more favorable terms from content providers, consumers would benefit. Over time, part or all of the savings in Comcast's programming costs, which constitute the largest share of Comcast's marginal cost of serving an MVPD customer, would be passed through to Comcast's customers in the form of slower growth in their subscription fees, or through greater investments in service, expanded program offerings, or other non-price alternatives, relative to what consumers might pay without the transaction, implying an increase in consumer welfare.

48. The theoretical arguments and limited empirical evidence put forward by commenters do not change these conclusions. We respond to the commenters' specific program buying power concerns below. First, we discuss how market facts and economics imply that Comcast will not gain monopsony power from the proposed transactions. Next, we show that there is no evidence that Comcast has exercised monopsony power. We then examine the impacts of the alleged monopsony power on consumers. Our analysis confirms the conclusions in our previous reports that the transactions will not give Comcast monopsony power and even if it did, that would *increase* consumer welfare.

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[77] Netflix, Inc. 2013 Annual Report, p. 28.

[78] For example, WGAW/FMC Comment; Comanor Report; AAI Comment; Consumer Federation of America Comment; Comments of Entravision Communications Corporation ("Entravision Comment"); John Kwoka, "Economic Analysis of the Effects of the Proposed Merger of Comcast and Time Warner Cable on Program Providers Serving the Latino Market," 8/25/14, filed on behalf of Entravision Communications Corporation ("Kwoka Report").

1. Comcast Will Not Gain Monopsony Power from the Proposed Transactions

49. As discussed above and in our previous reports, an MVPD's demand for programming is driven by the need to compete for and retain customers within its footprint. Even within an MVPD's footprint, its demand for programming (including nationally available programming) may vary depending on variations in consumer preferences locally and on the carriage decisions of other MVPDs operating in that local area.[79] Because Comcast and TWC do not compete for MVPD customers, the combination of the two will not change the demand for programming – the combined firm will continue to need programming of the same quality, quantity, and diversity as the separate firms do in each of their local service areas today to satisfy the demands of subscribers and compete with rival MVPDs in the combined service areas. The combination of the two also does not change the supply for programming because there is essentially zero incremental cost for a content provider to sell its programming to both Comcast and TWC relative to selling it to one of the two. Therefore, Comcast and TWC are not competitors in a national market of video programming from either a demand or a supply perspective.

50. Professor Comanor states that even though Comcast and TWC do not compete for customers (in the "output market"), the two may still compete in the program buying market (the "input market"). He argues that "the merger to monopsony may or may not involve monopoly in the output market" and buyers who do not compete with each other directly "can still exploit any market conditions that restrict the number of prospective buyers available to sellers."[80]

51. Professor Comanor's argument is not supported by economics or market facts. According to economic textbook theory, monopsony power stems from a buyer reducing its purchase of an input to drive down the input's price.[81] This textbook scenario requires the input having increasing marginal costs, which leads to an upward sloping supply curve. However, carriage negotiations between MVPDs and content providers do not fit the textbook model. Comcast and TWC do not compete with each other in the distribution of programming, a content provider's sale of programming to both Comcast and TWC involves zero marginal cost, and programming is sold to distributors through individualized negotiations. Therefore, the supply curve for a content provider's sale of programming to Comcast and TWC is essentially flat at zero. In that case, Comcast and TWC cannot reduce programming fees post-transaction by reducing their purchase of programming and moving along the supply curve.

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[79] For example, Comcast continues to carry RFD-TV in Jacksonville, FL, Nashville, TN, and Salt Lake City, UT, but made a decision to stop carrying RFD-TV in Colorado and New Mexico, where it primarily operates in areas with low demand for RFD-TV programming. Letter from David L. Cohen to Rural Media Group, 8/15/14.

[80] Comanor Report, p. 21.

[81] See, e.g., Hal Varian, *Intermediate Microeconomics*, 6th Ed., pp. 464–467.

52. In practice, because Comcast and TWC do not compete with each other in the distribution of programming to consumers, content providers cannot play Comcast and TWC off one another in their negotiations with the two. Consider, for example, a TWC customer in Los Angeles whom a content provider would like to reach. Even prior to the transaction, the content provider could not urge TWC to accept its terms to carry its network in order to serve and retain the customer based on any competitive threat of carriage by Comcast because Comcast could not serve that customer. TWC's programming purchases do not affect the content provider's opportunity cost of selling the same exact programming to Comcast and vice versa. This implies that the combination of Comcast and TWC will not change the content provider's negotiating position.

53. Finally, as explained in our April Report, any deals between MVPDs and content providers must be mutually beneficial. In this transaction, Comcast's larger size raises the stakes for both sides, but there is no clear gain of relative leverage for either side.[82] And because content providers have a large open field in which to sell their programming, Comcast will not gain leverage through any bottleneck power in program buying. In fact, the dramatic increase of programming fees in recent years suggests that content providers have substantial leverage in negotiations with MVPDs (including Comcast).[83] The transactions will not change the balance of negotiating power and will not allow Comcast to exercise monopsony power.

2. No Evidence That Comcast Has Exercised Monopsony Power

54. Commenters claim there is evidence that the largest MVPDs pay less for their programming than small and medium MVPDs. They argue this is an indication of monopsony power.[84] However, the relevant competition question here is not whether small to medium MVPDs generally tend to pay a higher price than large MVPDs, which we do not dispute. Rather, the relevant competition question is whether Comcast will obtain anticompetitive leverage in its programming negotiations after the acquisition of TWC and Charter systems. We have seen no evidence that Comcast's per-subscriber programming costs will be lower as a result of the transactions, and, more importantly, no evidence that, even if Comcast's per-subscriber programming costs were lower, consumers would be harmed rather than benefitting.

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[82] April Report, ¶ 192.
[83] April Report, ¶¶ 193–194.
[84] See, e.g., Biglaiser Report, p. 28, Comanor Report, p. 17 and WGAW/FMC Comment, p. 35.

55. First, some commenters refer to Comcast's preliminary estimated savings of **{{ }}** million in programming costs over three years for the TWC transaction,[85] But even if we were to assume that all of these estimated savings are owing to pricing differentials in Comcast's and TWC's contracts. the savings are small relative to the size of what the combined company's programming budget is likely to be three years after the closing of the transactions.[86]

56. More importantly, these cost savings arise in part because Comcast estimated that some of its *existing* contracts may have somewhat lower prices than TWC contracts; Comcast did not anticipate any *additional* discounts to its own prices in its due diligence analysis for the TWC transaction. (And the difference is small even though Comcast currently has about twice the number of MVPD subscribers as TWC. This is likely because TWC already is a "large" MVPD, and thus its rates are likely to be far more different from those of a small MVPD than from those of a larger MVPD.) In addition, if a content provider gives one MVPD a lower rate, it faces the risk that the MVPD with the lower rate would use the cost advantage to attract subscribers of rival MVPDs with a higher rate. If subscribers of the high-rate MVPD were to switch to the low-rate MVPD, the content provider would collect lower fees. Thus, content providers may have disincentives to give lower rates to Comcast. Of course, any comparisons of per-subscriber fees across MVPDs needs to control for a variety of factors including, for example, differential advertising revenue that the content provider can generate from carriage by different MVPDs.

57. Professor Comanor asserts that Comcast has exercised monopsony power by reducing quantity as predicted by a traditional monopsony model. He measures the "quantity" using the number of channels carried by MVPDs and cites the 2012 and 2013 FCC Video Competition Report to show that Comcast carries a lower number of channels on its "medium-tier" packages than other wireline distributors. He claims that Comcast does so not by reducing the quantity of any particular channel, but instead by reducing the number of channels it takes from a provider.[87]

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[85] Comanor Report, p. 17.

[86] TWC's 2014 programming cost is expected to be around $5.2 billion (TWC 2013 10-K, p. 52) and Comcast's 2014 programming cost is expected to be around $9.8 billion (Comcast 2013 programming cost was $9.1 billion and the annual growth rate of the cost was 7.7% in the last two years; Comcast 2013 10-K, p. 53).. If the combined company's programming costs continue to grow at the 7.7% annual rate, the combined company's programming cost would grow to $18.7 billion in three years (by 2017), of which the estimated **{{ }}** million savings is just **{{ }}**.

[87] Professor Comanor suggests that "one means to exercise monopsony power is to reject the seller's proposed bundles and agree only to pay for a smaller number of channels." Comanor Report, p. 18.

58. Professor Comanor's claim is flawed both conceptually and empirically. Reduction in demand and exercise of market power cannot be shown by simple channel counts because the number of channels carried on a particular tier is not a proper measure of output. Some channels are very valuable whereas others generate little overall surplus, and it would be inappropriate to compare channel counts without adjusting for quality or consumer welfare. Professor Comanor picked arbitrary "medium-tier" packages to compare without any justification for why those particular packages are appropriate, comparable, or relevant for assessing the economic impact and consumer welfare implications of the many other packages offered by MVPDs.

59. Moreover, Professor Comanor's data do not take price of packages into account. According to the 2013 Video Competition Report he cites, the 160-channel package that Comcast offers is priced at $39.99. The prices of other medium-tier packages he uses for comparison of channel counts are much higher: TWC's is $49.99; Cox's is $65.99; Verizon's is $74.99; and AT&T's is $72.00.[88] Even on its own terms, Professor Comanor's interpretation of the data is deeply flawed by not accounting for price.

60. Professor Comanor's data is also out-of-date. He relies on the Commission's 2013 Video Competition Report, which in turn relies on company websites visited on October 30, 2012.

61. Finally, it may be efficient for MVPDs to carry fewer channels. For example, an MVPD may carry fewer channels and devote more of its limited bandwidth to broadband or HD channels. Or an MVPD may decline to carry channels for a variety of legitimate competitive business reasons. For example, Dish does not carry several RSNs, including the YES Network.

62. Despite all of these infirmities in using channel counts as a metric for quantity, applying Professor Comanor's channel count methodology to current data obtained from company websites visited in September 2014 shows that Comcast carries more channels than most major MVPDs. For example, Table III.A.1 provides the advertised channel counts offered by a variety of major MVPDs in September 2014. Comparing "medium-tier" packages (analogous to the method used by Professor Comanor), Comcast currently offers 220+ channels ($39.99) compared to TWC's 200+ channels ($49.99), Cox's 220+ channels ($49.99), DirecTV's 205+ channels ($39.99), Dish's 190+ channels ($54.99), AT&T's 300+ channels ($44.00), and Verizon's 225+ channels ($49.99). Comcast also carries a large number of unaffiliated channels and carries more networks produced by independent content providers (i.e., those outside the top 15 content providers by revenue) than other cable MVPDs.[89] There is no support in the data for a conclusion that Comcast exercises monopsony power by restricting the number of channels.

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[88] FCC 15th Video Competition Report, ¶ 127 (Table 6).
[89] Source: Rovi. See Table III.B.1 below.

Table III.A.1
Advertised Video Packages and Channel Counts
September 2014

MVPD Type	MVPD	Package	Number of Channels	Price
Cable	Comcast	Digital Starter	140+	$29.99
		Digital Preferred	220+	39.99
		Digital Premier	260+	84.99
	Time Warner Cable	Starter TV	20+	19.99
		Standard TV	70+	39.99
		Preferred TV	200+	49.99
	Cox Communications	TV Economy	155+	24.99
		Advanced TV	220+	49.99
		Advanced TV & Contour	220+	61.98
DBS	DirecTV	Select	130+	24.99
		Entertainment	140+	29.99
		Choice	150+	34.99
		Xtra	205+	39.99
		Ultimate	225+	44.99
		Premier	285+	92.99
	Dish Network	Smart Pack	55+	19.99
		America's Top 120	190+	29.99
		America's Top 120 Plus	190+	34.99
		America's Top 200	220+	39.99
		America's Top 250	290+	44.99
		America's "Everything" PAK	320+	89.99
Telco	AT&T U-verse[1]	U-Family TV	140+	29.00
		U200 TV	300+	44.00
		U200 TV Latino	350+	54.00
		U300 TV	390+	59.00
		U450 TV	470+	91.00
	Verizon FiOS	FiOS TV Local	17	10.00
		Select HD	135+	49.99
		Preferred HD	225+	64.99
		Extreme HD	300+	74.99
		Ultimate HD	390+	$89.99

3. Comcast Will Not Gain Monopsony Power Over Hispanic Programming from the Proposed Transactions

63. Entravision and its expert Professor Kwoka express concern that the transactions will harm Hispanic programming.[90] Their arguments about Hispanic programming are similar to the comments about potential horizontal and vertical harms for programming overall that we have addressed in our previous reports and above. The same economic logic and analysis in our earlier discussion show that these concerns about Hispanic programming also do not lead to a cause for concern about anticompetitive behavior.

64. Entravision claims that Comcast will acquire buying power and make it more difficult for other Hispanic programming providers to reach enough subscribers to be successful. In particular, Professor Kwoka claims that Hispanic programming providers may have difficulty reaching a scale of 20 million subscribers if they do not gain carriage on Comcast.[91] There are several problems with this claim.

65. First, Professor Kwoka assumes that reaching 20 million MVPD subscribers is necessary for success of a Hispanic programming network. There is no evidence to support this hypothesis. The minimum viable scale for a network can vary greatly depending on a variety of factors, including its programming concept, delivery strategy, programming costs, revenue sources, and brand recognition. In addition, the 20 million figure is unlikely to apply to Hispanic programming since according to the U.S. Census, there are far fewer than 20 million Hispanic households in the U.S., and only a fraction of those subscribe to MVPD service.[92]

66. In fact, there are other ethnic networks that have succeeded with a limited subscriber base. For example, WAPA-America, which focuses on Caribbean-produced programming, has been a cable network since 2004 and has only an estimated **[[ ]]** million subscribers. CentroAmerica TV, which focuses on Central American programming, has been a cable network since 2004 and is carried by MVPDs to only an estimated **[[ ]]** million subscribers.[93] Other networks with Hispanic-oriented programming and fewer than 20 million U.S. subscribers include Mexico TV, Sorpresa!, LatinoAmerica TV, MEXICANAL, Canal Sur, De Pelicula, and Bandamax.[94]

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[90] Entravision Comment; Kwoka Report.
[91] Kwoka Report, p. 9.
[92] U.S. Census Bureau, 2008–2012 American Community Survey; National Association of Broadcasters, "Broadcast Television and Radio in Hispanic Communities," July 2013.
[93] Source: SNL Kagan, *Economics of Basic Cable Networks 2013*.
[94] Source: SNL Kagan, *Economics of Basic Cable Networks 2013*.

67. Second, even assuming Entravision's hypothesis is correct, an agreement with Comcast is not necessary to reach 20 million MVPD households. As we showed in our April Report, it is easy for a content provider to reach 20 million MVPD households through other MVPDs, including MVPDs that serve all of the top DMAs with high Hispanic populations.[95] In addition, over-the-air (including Entravision broadcast stations) and online distribution would make reaching 20 million households without Comcast relatively easy.

68. Finally, because much Hispanic programming is shown over the air, many of the stations on which this programming is carried have must-carry rights and therefore can demand carriage on Comcast's systems. In addition, such programming is now thought to be valuable enough that many such stations are forgoing must-carry and instead negotiating compensated retransmission consent. There is no evidence that Comcast has the bottleneck power alleged by Professor Kwoka.[96] It is indisputable that Hispanic programming networks can succeed without carriage on Comcast.[97]

4. A Reduction of Comcast's Programming Cost Will Benefit Consumers, Will Not Harm the Quality of Programming, and Will Not Increase the Cost of Other MVPDs

a) Lower Programming Costs Will Benefit Consumers

69. Professor Comanor suggests that a reduction of programming cost from Comcast's exercise of alleged monopsony power would not lower the prices to consumers because "[the monopsonist's] relevant costs for decision marking purposes are marginal costs and these are not lower" and "when the monopsonist has market power in its output market, the reduced input prices translate into higher output prices."[98] Professor Comanor further claims that "any enhanced monopsony power resulting from the proposed merger will likely lead to higher prices for wireline consumers."[99]

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[95] Because there are only about 13.4 million Hispanic households in the U.S., Entravision's claim of 20 million households necessarily includes both Hispanic and non-Hispanic households. Source: U.S. Census Bureau, 2008–2012 American Community Survey. In addition, DirecTV recently announced that it is "building the infrastructure for a Hispanic OTT product," which will provide yet another potential avenue for Hispanic-oriented programming to reach Hispanic households. DirecTV Conference Call at Bank of America Merrill Lynch Media, Communications and Entertainment Conference, 9/16/14, p. 8.

[96] In fact, a sizeable share of Hispanic households are over-the-air only and Comcast could not be a bottleneck for them. See, e.g., National Association of Broadcasters, "Broadcast Television and Radio in Hispanic Communities," July 2013.

[97] The National Hispanic Media Coalition claims that the transaction would "make Comcast the cable provider for up to 90 percent of Latinos nationwide" (Comments of the National Hispanic Media Coalition, p. 2). However, after the transactions, Comcast will not pass 90% of Latino households nationwide, but will only operate in zip codes where about 79% of Hispanic households are located. Moreover, Comcast will be an option, but certainly not the only option for those households. It will need to compete for those customers with other MVPDs, over-the-air viewing, and potentially OVDs.

[98] Comanor Report, p. 20 (quoting Roger D. Blair and Jeffrey L. Harrison, *Monopsony, Antitrust Law and Economics*, Princeton University Press, 1993, pp. 39–42).

[99] Comanor Report, p. 20.

70. In our April Report, we addressed this issue, and the facts and economics have not changed. Programming fees are generally assessed on a per-subscriber basis, and are thus a marginal cost to MVPDs.[100] In addition, as discussed above, the monopsony claim requires a reduction in input quantity (which may in turn affect the output quantity and price) but there is no quantity reduction present here. Without a change in input quantity, basic economics teaches that changes in marginal cost will be passed on in full or in part to consumers, even for a monopolist (which Comcast is not).[101] Economic studies have found changes in programming costs are passed through to MVPD subscribers at a rate of about 50 percent.[102] According to Dr. Shelanski, who recently served as head of the Bureau of Economics at the Federal Trade Commission:

> The case for pass-through of efficiencies is compelling for a firm that faces competition, particularly competition as vigorous as that in the MVPD market. . . . Reductions in the direct costs of procuring programs will result in both a lower cost per-program for subscribers and in an increased number of programs being made available to subscribers. . . . Efficiency gains from the merger may also be passed through to consumers in a less direct way through increased investment in network upgrades and the development and deployment of innovative services.[103]

Thus, over time, part or all of any savings in Comcast's programming costs would be passed through to Comcast's customers.[104]

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[100] Professor Comanor acknowledges this fact: "Prices in this market are traditionally set on a per-subscriber basis, which reflects the buyers' valuation of the programming acquired." Comanor Report, p. 9.

[101] See, e.g., Hal Varian, *Microeconomic Analysis*, 3rd Ed., pp. 236–237.

[102] See George Ford and John Jackson (1997), "Horizontal Concentration and Vertical Integration in the Cable Television Industry," *Review of Industrial Organization*, Vol. 12, No. 4, pp. 501–518 at pp. 513–514. Note that 50% is also the value of the pass-through rate for a monopolist facing linear demand curve. For many models that are commonly used in merger simulations – in which competitors react to one another's price cuts by lowering their own prices and in which demand takes alternative functional forms such as logit or AIDS – pass-through rates are substantially higher than 50%, so this may be a conservative estimate of the actual benefits from eliminating double marginalization.

[103] See Reply to Comments and Petitions to Deny Applications for Consent to Transfer Control of AT&T Corp. and Comcast Corp., In the Matter of Applications for Consent to the Transfer of Control of Licenses, Comcast Corporation and AT&T Corp., Transferors, To AT&T Comcast Corporation, Transferee, MB Docket No. 02-70 (May 21, 2002), App. 4 (Declaration of Howard Shelanski), pp. 21–22.

[104] Any changes in programming costs would occur over time, rather than right away, due to the long term programming contracts that are in place. For example, an increase of 5% per year instead of 10% per year in programming costs would lead to lower cable prices than would otherwise have occurred even though consumers would not actually see nominal rate reductions. These changes might also take 3–5 years to come to fruition given the multi-year nature of programming contracts.

71. In fact, multiple commenters argue that Comcast would pass cost savings on to consumers. For example, ACA states that because Comcast gets the best rates from content providers, it will be able to offer its subscribers the lowest possible prices.[105] ACA casts this as putting ACA members at a competitive disadvantage. However, while lower Comcast subscription prices resulting from lower programming costs would be a concern to those ACA members that compete directly with Comcast for subscribers,[106] those lower consumer prices would be a competitive benefit that would enhance consumer welfare, not an anticompetitive concern. Moreover, basic economics suggests that other MVPDs – particularly the DBS and telco providers who compete directly with Comcast – are likely to react to Comcast's improved service or better pricing with their own service enhancements and/or price competition. The public interest is advanced by promoting competition, not by protecting competitors.

b) Lower Programming Fees Will Not Harm the Quality of Programming

72. Some commenters (e.g., WGAW/FMC and AAI) argue that lower fees from Comcast will reduce investment in programming, stifle innovation in program offerings, and harm consumers.[107] As discussed previously, Comcast does not expect to pay lower programming fees relative to its existing fees, although there is some anticipated moderate reduction in the fees that TWC would otherwise be paying. Of course, Comcast's estimated fee reduction is a small percentage of its overall programming fees, as discussed above.

73. Even that small percentage overstates any potential consequence for programming quality. Content providers rely on multiple revenue streams, including affiliate fees (not only from Comcast, but also from other cable companies that do not overlap with Comcast, competing MVPDs, and OVDs), and advertising revenue. Comcast affiliate fees typically account for less than 30% of the total affiliate fees and much less of the total revenue for content providers. In fact, among the national cable networks tracked by SNL Kagan, advertising revenue comprises on average about **[[ ]]**% of network revenue, with the majority of networks receiving between **[[ ]]**% and **[[ ]]**% from advertising (25th percentile to 75th percentile).[108] As a result, a content provider's decision to reduce quality because of a small reduction in less than about **[[ ]]**% of its revenues would put at risk much more than **[[ ]]**% of the content provider's revenues.

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[105] American Cable Association Comments ("ACA Comment"), pp. 27–28.

[106] Most ACA members operate in geographic footprints that do not overlap with Comcast's geographic footprint.

[107] See, e.g., WGAW/FMC Comment, p. 32; AAI Comment, p. 21.

[108] Source: SNL Kagan. Advertising revenue share is calculated as Net Advertising Revenue divided by Operating Revenue. Average advertising revenue share is calculated as an operating revenue-weighted average.

74. More generally, content providers need to compete with other content providers' programming to attract viewers and therefore carriage by MVPDs. If a content provider reduces the quality of its programming, it will get worse deals and further reductions in fees in future negotiations with all MVPDs and lower advertising revenue. As long as a content provider receives a competitive return, it should be willing to continue supplying the same amount of programming (in terms of quality and quantity) in the long run.

75. Further, Comcast has incentives to pay a competitive rate to ensure the quality of programming as lower quality programming would reduce the attractiveness of Comcast's MVPD service and cause some consumers to drop or downgrade the service they purchase.

c) Lower Programming Costs for Comcast Will Not Increase the Cost to Other MVPDs

76. Some commenters claim that if Comcast gets better prices from content providers, it will in turn cause smaller MVPDs to pay higher prices.[109] However, as explained in our previous reports, there is no evidence that such claims would hold true in the marketplace. In addition, such claims run counter to any rational theory of economics where firms are assumed to maximize profits.

77. As a matter of economics, there is no reason to believe that content providers leave money on the table today, and will only charge small MVPDs higher prices if Comcast pays a lower price. Programming fees are not a zero-sum game with the content provider seeking a fixed, predetermined amount. If content providers could charge higher prices to smaller MVPDs without losing too many sales today to maximize their profit, they would do so regardless of the price charged to Comcast.

78. Most ACA members do not compete with Comcast or TWC. Consider a content provider that sells programming to Comcast, TWC, and an ACA member, each of which serve distinct territories and do not compete with each other for subscribers. The content provider would want to maximize the profits it could get from each of the three buyers. In economic terms, the programming demands of the three buyers are independent. Independent demand and a flat marginal cost for programming, as discussed above, means that the price and quantity from one does not affect the price and quantity of the others. An increase or decrease in the price to Comcast will have no effect on the supply or demand for these ACA members.

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[109] The commenters present no empirical evidence to support this point. Professor Biglaiser claims this is indicated by empirical data but does not present any (Gary Biglaiser, "The Harms of Comcast-TWC-Transaction," 8/25/14, filed on behalf of the American Cable Association ("Biglaiser Report"), p. 29). Mr. Rich Fickle, CEO and President of NCTC, filed a declaration stating that based on his long experience in the industry, if Comcast gets better prices, content providers will charge NCTC higher prices, but does not present any data. Dish also makes this claim in its comments.

79. On the other hand, some ACA members compete with Comcast and/or TWC. In this case, the demands are not necessarily independent. However, if Comcast were to get lower prices, the most logical effect would be for smaller carriers also to get lower, not higher prices. It is perhaps easiest to understand this point by hypothesizing what would happen if content providers all gave Comcast lower prices and then raised the prices to its smaller competitors. In that case, the smaller competitors may be more likely lose customers to Comcast (depending on the magnitude of the differential).[110] But Comcast would pay lower prices than the competitor paid before the price changes, so that the content provider would end up with lower overall revenue as a result of trying to make up the lower Comcast price by raising prices to others. This makes little sense and may be one of the reasons that programming fee differentials appear to be flattening out in today's competitive MVPD marketplace.

80. Professor Biglaiser develops a theory that "when publicly held programming firms address market analysts they often promise to achieve a given rate of return in order to convince the analysts to recommend to their client that they buy the programmer's stock."[111] He claims this story "provides an economic linkage between the prices paid by rival MVPDs and Comcast."[112] However, Professor Biglaiser's story requires that content providers not try to get the best deal in their negotiations with smaller MVPDs unless they get a worse deal from Comcast. Essentially, it requires content providers not to want to exceed Wall Street expectations and not to maximize profits when there is an easy mechanism to do so. Not surprisingly, his story is not backed up with market evidence that content providers behave in this way or that stock analysts accept these "promises."

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[110] According to ACA: "Comcast will be able to offer its subscribers the lowest possible prices, because Comcast receives the most favorable rates from programmers. Competing small MVPDs, who are forced to accept higher rates from programmers, will have to recoup these higher costs by raising prices to their subscribers, putting them at a competitive disadvantage as opposed to Comcast. The small and diverse members of ACA are threatened the most under these circumstances." ACA Comment, pp. 27–28.

[111] Biglaiser Report, p. 29.

[112] Biglaiser Report, p. 30.

81. Overall, neither the theory nor the data provide any support for commenters' claims that the transactions will allow Comcast to exercise increased buyer power, and even less evidence that there would be any harm to consumers.

B. No Vertical Program Carriage Concerns

82. Various parties have argued that because the transactions will increase Comcast's size and footprint, the transactions may increase Comcast's incentive and ability to discriminate against competitors of Comcast's affiliated programming with respect to carriage on Comcast's cable systems.[113] RFD-TV and Tennis Channel also frame their disputes with Comcast in a vertical foreclosure theory to try to explain Comcast's carriage decision with respect to their respective programming.[114]

83. Such vertical program carriage issues were analyzed in our previous reports, where we showed that they are not a concern because of the vigorous competition Comcast faces in the upstream (video programming) and downstream (video distribution) markets.[115] Given this upstream and downstream competition, a discriminatory program carriage strategy against unaffiliated programming would likely be unprofitable – it would likely lead to Comcast's losing cable customers without bringing much benefit to Comcast's affiliated programming. To benefit affiliated programming, Comcast would have to target directly competitive unaffiliated programming (and the benefits of such a strategy are likely elusive given the large number of unaffiliated programming networks).

84. As explained in our April Report, Comcast needs to provide attractive programming because of competition from other distributors. However, programming is not free; additional channels usually increase programming cost, which, as a marginal cost, tends to increase the price of MVPD service. In addition, cable companies (and other MVPDs) face bandwidth constraints. As a result, programming decisions are complex – how much bandwidth should be allocated to video when demand for high-speed data is increasing? Within the bandwidth allocated for video, how much should be used to carry standard-definition channels and how much for HD channels? And then which channels to carry? MVPDs need to have the flexibility to add and drop networks based on the interest of their customers, bandwidth constraints, and other legitimate business considerations.

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[113] See, for example, Comanor Report, WGAW/FMC Comment, and Kwoka Report.
[114] Comments of RFD-TV, pp. 4–10; Comments of The Tennis Channel, Inc., pp. 6–10.
[115] April Report, ¶¶ 203–205.

85. In this section, we show that Comcast carries a large amount of unaffiliated programming, that there are no program carriage concerns for Hispanic programming, and that the Commission's method for showing anticompetitive carriage in the Comcast-NBCUniversal transaction has serious flaws and even then does not provide any evidence of anticompetitive behavior here.

1. Comcast's Carries More Unaffiliated and Independent Programming Than Other Cable MVPDs

86. Given the large number of total channels Comcast carries on its systems, it is hard to believe that foreclosure is a reasonable business strategy. Despite being vertically integrated and allegedly having anticompetitive incentives, the vast majority of the programming carried by Comcast is unaffiliated. In fact, Comcast carries more national cable networks (among those tracked by SNL Kagan) that are unaffiliated with NBCUniversal than any other cable MVPD.[116] Table III.B.1 shows the average number of national cable networks that are unaffiliated with Comcast, among national cable networks tracked by SNL Kagan, carried per headend by cable MVPDs. Comcast's carries an average of 110 unaffiliated networks per headend, followed by Cablevision with 105 per headend. Comcast carries 148 of these 170 unaffiliated networks on at least one headend, which is also the most among cable MVPDs. In addition, Comcast carries more "independent" networks tracked by SNL Kagan per headend than any other cable MVPD, including TWC.[117] The last two columns of Table III.B.1 show carriage of these independent networks. The second-to-last column shows the average number of independent national cable networks, among national cable networks tracked by SNL Kagan, carried per headend by cable MVPDs. Comcast's average of 38 independent networks per headend is the highest, followed by TWC with 33. Comcast carries 64 of these 84 independent networks on at least one headend, as shown in the last column of Table III.B.1, which is also the highest carriage rate among cable MVPDs.[118]

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[116] This analysis focuses on national cable networks tracked by SNL Kagan in order to allow for comparisons across MVPDs that operate in different geographic areas. By focusing on national cable networks, we are able to remove any differences in carriage that may be driven entirely by regional or local networks. We focused further on networks that are tracked by SNL Kagan in order to determine network ownership and carriage. Therefore the network counts in Table III.B.1 do not include all unaffiliated national, regional, or local networks carried by Comcast or other MVPDs.

[117] Source: Rovi. "Independent" networks are defined, per the Commission's Comcast-NBCUniversal Order, Appendix A, as networks that are not majority owned by a content provider that is among the top 15 content providers in revenue. We focus on national cable networks tracked by SNL Kagan in order to determine network ownership and carriage. We note that Comcast carries many more "independent" networks (*In the Matter of Applications of Comcast Corp. and Time Warner Cable Inc. For Consent To Transfer Control of Licenses and Authorizations*, MB Docket No. 14-57, Applications and Public Interest Statement, p. 170), but our analysis only uses the national cable networks tracked by SNL Kagan.

[118] Source: Rovi, SNL Kagan.

[[ ]]

87. We understand that the Commission has received many written comments from viewers (including many from viewers living in territories the combined company will not serve) concerned about the carriage of RFD-TV, a low-rated, niche cable network. In the context of the competitive implications of the proposed transaction, carriage of RFD-TV is not a transaction-specific concern. Any carriage decisions already made by Comcast with respect to RFD-TV are, by definition, not impacted by this transaction. And since Comcast and TWC do not compete for any customers, there will be no difference in the incentives to carry RFD-TV on any particular system.

88. It is very important for MVPDs to carry programming that will attract and retain customers. When there is subscriber demand for programming, including RFD-TV, an MVPD has an incentive to carry that programming. However, as discussed above, both direct costs (affiliate fees) and opportunity costs (from the use of bandwidth) affect the decision to carry a particular channel.

89. We understand, based on Comcast Executive Vice President David L. Cohen's August 15, 2014, letter to Rural Media Group, that Comcast weighed the benefit to its customers of carrying RFD-TV in Colorado and New Mexico against the opportunity cost of foregone Internet speed improvements and carrying other programming. Comcast ultimately decided that providing improved Internet speeds and other programming, particularly high definition programming, to its customers provided more value to its customers.

90. It would be unfortunate if the Commission were to use the pretense of a merger to intervene in a normal business decision simply because a specific content provider is able to generate some publicity and political support. Such an intervention could then cause other content providers to compete on the steps of the Commission rather than to compete by creating and providing programming that would benefit MVPD subscribers.

2. The Transactions Raise No Program Carriage Concerns Related to Hispanic Programming

91. Professor Kwoka and Entravision bring up a vertical program carriage concern about Hispanic programming, similar to the general program carriage concern we have addressed above and in our previous reports. They claim that the transactions will increase Comcast's incentive to discriminate against unaffiliated Hispanic programming to benefit its own Hispanic programming (the cable network mun2, the Telemundo broadcast network, and its Telemundo O&O stations).[119] However, there is very little transaction-specific about these claims related to Entravision.

92. First, Comcast is not acquiring any national Hispanic programming in the transactions, so there will be no additional incentive to foreclose unaffiliated national Hispanic programming due to increasing NBCUniversal's Hispanic programming portfolio. Comcast will be acquiring additional households in certain DMAs with sizable Hispanic populations. However, an anticompetitive program carriage strategy directed at unaffiliated national Hispanic programming would likely not be profitable for Comcast. Comcast has to compete with other MVPDs, over-the-air service, and, to a lesser extent, with OVDs to satisfy the demands of households with a desire for Hispanic programming. If Comcast does not carry attractive Hispanic (or other) programming, consumers may be able to access that programming in other ways, including by switching to other MVPDs, or by canceling their MVPD service and watching over-the-air or online. Thus, competition for subscribers creates the appropriate incentives for Comcast to carry attractive programming.[120] In addition, NBCUniversal programming faces strong competition from a variety of unaffiliated content providers. If Comcast were to deny carriage to a particular Hispanic broadcast or cable network, NBCUniversal programming would continue to compete for viewers, advertising, and programming with a wide variety of other programming. Thus, denying carriage to a particular broadcast or cable network would likely bring little benefit to NBCUniversal programming.

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[119] Kwoka Report, pp. 8–12.

[120] For example, Comcast recently reached an agreement with Univision Communications Inc. for the distribution of Univision Deportes Network, a Spanish-language sports network. Comcast found this network to be attractive enough to its customers to justify the costs associated with carriage. Comcast Press Release, "Comcast and Univision Reach Long-Term Agreement for Distribution of Univision Deportes Network," 9/9/14, available at http://corporate.comcast.com/news-information/news-feed/comcast-and-univision-reach-long-term-agreement-for-distribution-of-univision-deportes-network.

93. Second, although Comcast operates Telemundo O&Os in 17 DMAs, and is acquiring a limited amount of regional Spanish-language programming from TWC,[121] there are no Entravision transaction-specific concerns in any DMAs.[122] None of Entravision's Univision affiliates operates in the four DMAs where Comcast has Telemundo O&O stations and is acquiring a significant number of cable customers: New York, Los Angeles, Dallas, and San Antonio. In addition, there is no evidence that Comcast discriminates against Entravision. Comcast carries all 12 Entravision-operated Univision affiliates in its footprint.[123] Given how widely Comcast carries Entravision stations, it must believe that its customers' demand for Entravision-affiliated stations is strong enough to justify the cost (including the bandwidth) necessary to carry those stations. The transactions do not change that calculus.

94. If Comcast were to foreclose carriage to Entravision's affiliates in the DMAs in which it operates cable systems, it would likely lose MVPD subscribers to other MVPDs who carry Entravision stations and some subscribers would choose to watch Entravision stations over-the-air. As a result, such a strategy would likely be unprofitable for Comcast. As Entravision states in its Annual Report, Univision is the most-watched television network (English- or Spanish-language) among U.S. Hispanic households during primetime.[124] In fact, Entravision claims that Univision and UniMas (the majority of Entravision's stations) represented approximately 67% of the Spanish-language network television primetime audience of adults 18 to 49 as of November 2013.[125] Recently, Univision's primetime average viewership has been twice that of Telemundo's.[126]

95. Professor Kwoka also claims that the "Goolsbee-style" analysis performed by the Commission in the Comcast-NBCUniversal Order is a "compelling" way to determine whether Comcast has favored its affiliated programming in an anticompetitive way.[127] The next section shows that the Goolsbee analysis does not provide the "compelling" support Professor Kwoka relies on for his conclusions.

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[121] Comcast is acquiring three regional networks from TWC that carry major league sports in Spanish, including TWC Deportes (Lakers) and TWC Channel 858 (Clippers and Angels, based on programming feeds from Fox) in Los Angeles, and Canal de Tejas (Mavericks, Spurs and Rangers, based on programming feeds from Fox) in Texas and TWC's local Spanish-language news network (NY1 Noticias) in New York.

[122] We are responding to Entravision's and Professor Kwoka's comments in this paragraph and thus focusing on Entravision's programming; more generally there are no transaction-specific program carriage concerns with any Hispanic programming in any DMAs.

[123] Source: Rovi. Includes the full-power Univision affiliates KLUZ-TV, KCEC-TV, KINT-TV, WVEN-TV, WFDC-TV, WVEA-TV, WUNI-TV, WUVN-TV, KSMS-TV, KVSN-TV, KPMR-TV, WHTX-TV.

[124] Entravision 2013 Annual Report, p. 2.

[125] Entravision 2013 Annual Report, p. 4.

[126] Media Life Magazine, "This week's broadcast ratings," 9/16/14, available at http://www.medialifemagazine.com/this-weeks-broadcast-ratings/.

[127] See Kwoka Report, p.10 (including fn.18). In particular, Professor Kwoka claims that "[e]specially compelling to its determination was the study by Professor Austan Goolsbee that was discussed in detail and applied in that proceeding" and "[a]n important aspect of the Goolsbee study was its methodology for distinguishing efficiency vs. competitive harm as the reason for program selection by vertically integrated companies."

3. The Commission's Goolsbee-Style Regressions Provide No Support For Anticompetitive Program Carriage Concerns

96. We first describe the Goolsbee-style analysis and the conceptual and econometric flaws that render it unreliable for reaching a conclusion about anticompetitive program carriage. We then update the analysis with current data using the same methodology used by the Commission in its Comcast-NBCUniversal Order and show that even this analysis does not provide any evidence that Comcast favors its own programming for anticompetitive reasons, or that the TWC and divestiture transactions will lead to anticompetitive program carriage concerns.

97. In Section E of Appendix B in the Comcast-NBCUniversal Order (hereinafter, "Comcast-NBCUniversal Order, Appendix B"), the Commission performed econometric analyses of program carriage based on a regression model originally proposed by Professor Austan Goolsbee (the "Goolsbee analysis" or "Goolsbee regression").[128] The Commission's implementation of the Goolsbee analysis used channel lineup data to estimate the correlation between Comcast's carriage, relative to other MVPDs, of its affiliated programming on each of its headends and the customer share of "DBS and telco MVPDs" in the DMA containing the headend. Because the Commission's regression specification found a statistically significant negative correlation (i.e., that Comcast was more likely to carry its affiliated programming, relative to other MVPDs, in DMAs with lower DBS and telco customer shares, the Commission concluded that "Comcast may have in the past discriminated in program access and carriage in favor of affiliated networks for anticompetitive reasons."[129] The Goolsbee analysis, however, is ill-suited for assessing Comcast's incentives and ability to engage in anticompetitive program carriage because it has conceptual and econometric flaws (at least as applied by the Commission in this context).

98. The Goolsbee analysis has several conceptual and econometric flaws that render it unreliable for reaching a conclusion about anticompetitive program carriage. One key

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[128] Austan Goolsbee, "Vertical Integration and the Market for Broadcast and Cable Television Programming," research paper commissioned by the Federal Communications Commission, April 2007 ("Goolsbee (2007)").

[129] Comcast-NBCUniversal Order, ¶ 117, and Appendix B, ¶ 70. Although the analysis by the economists retained by the Applicants did not find such a correlation, the Commission did after it made changes to the regression specifications submitted by the Applicants' economists.

conceptual flaw is the interpretation of a *correlation* between Comcast's carriage of some of its affiliated networks and the share of competing MVPDs as an indication of the latter's having a *causal* effect on the former. But the correlation does not necessarily imply causation because other variables could explain why Comcast's carriage of affiliated programming may appear higher in areas where competing MVPDs' market share is lower. For example, in geographic areas that have a strong demand for broadband service and HD channels due to factors not controlled for by the Goolsbee analysis, Comcast might allocate more bandwidth to broadband services and HD channels. As a result, Comcast may be less likely to carry some of its own channels (as well as some unaffiliated channels). At the same time, telco MVPDs may aggressively enter these areas, leading to a higher combined DBS and telco market share. In this example, the Goolsbee analysis would show a negative correlation between Comcast's carriage of its affiliated programming and the share of DBS and telco MVPDs, even though Comcast neither favors its affiliated programming nor discriminates against unaffiliated programming.

99. Compounding these conceptual issues, there are several empirical and econometric flaws with the Commission's implementation of the Goolsbee analysis. First, the empirical specification adopted by the Commission attempts to measure the competition faced by Comcast at each headend using the share of DBS and telco MVPDs across the entire DMA in which a headend is located. In other words, the analysis assumes that Comcast faces the same level of competition at each headend located within a particular DMA. However, the share of DBS and telco MVPD competitors measured at the DMA-wide level does not necessarily reflect the level of competition faced by a particular cable system/headend within that DMA. There are many cable headends in each DMA,[130] and the share of DBS and telco MVPDs (and even the availability of telco MVPD services) can vary considerably across these headends. For example, the Salt Lake City DMA has a relatively high DBS share of **[[ ]]**% (and no telco MVPD presence), but that DMA is geographically very large (encompassing the area from eastern Nevada to southwest Wyoming) and includes areas that are very sparsely populated. However, in the zip codes within the Salt Lake City DMA that are served by Comcast headends, the DBS share is only **[[ ]]**%. The fact that many households in remote areas choose to subscribe to DBS is not necessarily indicative of the level of competition faced by a cable system that operates only in the Salt Lake City metropolitan area.

[130] There are an average of 87 traditional cable company headends in each of the top 50 DMAs, each serving a completely different set of potential subscribers. This count is based on headends appearing in the Rovi data and headends that are missing DMA information are assigned to a DMA based on the zip code(s) that they serve. In Comcast's response to the Commission Information Request, Item 25, we derived the count without filling in the missing DMA information, which yielded a count of 67 (rather than 87).

100. Second, an MVPD's market share is presumably affected by, among other things, the programming carried by the MVPD and its in-market competitors. Thus, the share of DBS and telco MVPDs is affected by Comcast's channel lineup, which means the combined DBS + telco market share is *endogenous*. It is well known in econometrics that using an endogenous variable as a regressor will bias the estimated coefficients.[131] Therefore, regression specifications using the combined DBS + telco market share as a regressor are not reliable.

101. Third, the Goolsbee analysis performed in the Comcast-NBCUniversal transaction used the number of channels to control for the "capacity" of a headend. However, variation in the number of channels at a headend for Comcast, and likely for other MVPDs, may be affected by a variety of factors, including an MVPD's allocation of bandwidth between SD and HD channels (HD channels require more bandwidth) and between linear video channels and other advanced services like VOD and broadband, as well as the availability of local and regional programming at the headend's location.[132] Therefore, the variation in the observed number of channels does not necessarily imply variation in capacity. Incorrectly controlling for capacity may lead to the appearance of a statistically significant correlation between the carriage of affiliated programming and the combined DBS + telco share when in fact none exists.

102. Putting aside the myriad problems with the Goolsbee regression, to respond fully to a Commission request and to address the comment by Professor Kwoka, we have run the Goolsbee regression using current data with a specification analogous to that used by the Commission in the Comcast-NBCUniversal Order, Appendix B.[133] However, Comcast currently has more affiliated programming assets than it did prior to the Comcast-NBCUniversal transaction, so we applied the analysis to several sample network sets. We considered four sets of Comcast-affiliated national cable networks: (1) networks in which Comcast has a controlling interest and management rights and that have carriage rates of 5% to 90% across all MVPDs' headends; (2) all networks in which Comcast has a controlling interest and management rights; (3) Comcast-affiliated networks with between 5% and 90% carriage across all MVPDs' headends; and (4) all Comcast-affiliated networks.[134]

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[131] For example, see Peter Kennedy, *A Guide to Econometrics*, 6th Ed., pp. 139–141.

[132] For example, consider the Comcast headend in Chicago (Area 2&3) and the Comcast headend in Turnersville, NJ. Both of these headends have a raw capacity of **[[ ]]** MHz of bandwidth. However, the Chicago headend has **[[ ]]** channels in its digital lineup while the Turnersville headend has only **[[ ]]** channels in its digital lineup in the Rovi data. This difference is due in part to a difference in the number of broadcast channels carried (the Chicago headend has **[[ ]]** broadcast stations compared to Turnersville's **[[ ]]** and **[[ ]]** low power stations compared to Turnersville's **[[ ]]**), but is also due to a difference in cable channels such as "Windy City TV."

[133] We used data from the Rovi Corporation on channel lineups at every MVPD headend as of May 1, 2014. We estimated a logit model of the probability that a headend carries a Comcast network with the control variables listed in Table III.B.2. We have attempted to mimic the set of control variables identified in footnote 93 of the Comcast-NBCUniversal Order, Appendix B as closely as possible. Robust standard errors are clustered by MVPD.

[134] We consider Comcast-controlled and Comcast-affiliated networks with between 5% and 90% carriage because Goolsbee (2007) suggested that such networks with intermediate levels of carriage would provide the greatest incentives for strategic behavior and he restricted his analysis to networks with between 5% and 90% carriage. In the Comcast-NBCUniversal Order, Appendix B, the Commission followed a similar approach and considered national cable networks in which Comcast had a controlling interest and that were carried on "some but not most cable systems." The Commission excluded E! Entertainment Television from its analysis because it was "carried on nearly all systems." Comcast-NBCUniversal Order, Appendix B, ¶ 68.

103. None of the regression results shows any evidence that Comcast is more likely to carry its own affiliated programming in areas where the combined share of DBS and telco MVPDs is lower (or vice versa). In fact, Table III.B.2 below shows that Comcast is slightly *less* likely to carry its own affiliated programming in areas where the market share of DBS and telco MVPDs is lower, as indicated by the positive coefficient on the interaction term between the Comcast indicator and the DBS + telco share in the DMA. Results are shown for both unweighted and weighted regressions, where each headend is weighted by the population of the zip codes it serves. For both the unweighted and weighted regressions, the coefficient of interest is estimated to be positive in all cases (in the unweighted regression the positive estimate is also statistically significant). This is the opposite of the negative and significant coefficient found by the Commission.

104. In short, even ignoring the significant conceptual flaws in the Goolsbee methodology, updating the data provides no basis to conclude that Comcast favors its own programming for anticompetitive reasons, or that the TWC and divestiture transactions will lead to anticompetitive program carriage concerns. Combined with its conceptual flaws, the Goolsbee methodology provides no empirical support for such conclusions.

[[ ]]

C. No Vertical Program Access Concerns

105. In our previous reports, we showed that the TWC and divestiture transactions raise no vertical program access concerns:

> Comcast will not gain incentives to withhold programming from other video distributors to attempt to benefit its distribution business. After the transaction, Comcast will account for a limited share of customers both nationally and in areas where it will acquire TWC systems. Retransmission consent and license fee revenue from Comcast's broadcast and cable networks have made licensing to other video distributors a productive and important part of the company's business. These facts, along with the strong competition from a broad range of other content providers, mean that denying other video distributors access to Comcast's affiliated programming (or charging above-market rates) could cost Comcast significant revenues while yielding limited benefit to the combined company's cable systems.[135]

In addition, the Commission's regulatory safeguards provide an additional backstop.

106. Various commenters have argued that because the transactions will increase the systems served by Comcast, it will increase Comcast's opportunity to attract subscribers from rival MVPDs if those MVPDs do not have access to Comcast-affiliated programming. This will in turn increase Comcast's opportunity cost of selling programming to rival MVPDs and thus increase Comcast's incentive and ability to withhold NBCUniversal programming from competing distributors or to charge them higher programming prices.[136] In addition, Professor Biglaiser states that because the transactions will lead to efficiency gains and increased programming negotiation leverage for Comcast, they will improve the profit margin of Comcast's cable business and give Comcast further incentive to attract subscribers from rival MVPDs by increasing its programming price to those MVPDs.[137]

107. Using marketplace data and economic theory, we show that these concerns are misplaced and the transactions will not lead to competitive harm. It is important to recall the points we made in our previous reports – the video programming and MVPD markets are competitive, and the transactions will not lead to significant changes in vertical integration between NBCUniversal programming and Comcast distribution. This alone should assuage many of the concerns about competitive problems in program selling.

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[135] April Report, ¶ 26; June Report, ¶¶ 36–49.
[136] See, for example, Biglaiser Report, pp. 5–19; ACA Comment, pp. 15–20; and AAI Comment, pp. 19–20.
[137] Biglaiser Report, pp. 22–23.

108. Commenters point to the Commission's analysis and statements in the Comcast-NBCUniversal Order to justify their program access concerns about the current transactions. In the Comcast-NBCUniversal Order, the Commission analyzed affiliate fees before and after the vertical integration of Fox programming and DirecTV distribution and used the result of that analysis to support its conclusion that the Comcast-NBCUniversal transaction would lead to higher NBCUniversal affiliate fees after the transaction. In this report, we update the Commission's empirical analysis, using data from before and after the Comcast-NBCUniversal transaction, and find no evidence of an affiliate fee increase after the vertical integration of NBCUniversal programming and Comcast distribution. Overall, application of the Commission's methodology to this recent actual vertical integration provides no support for the Commission's conclusion that "… evidence from past vertical transactions supports our conclusion that vertically integrating a video distributor and a national cable programmer leads to higher programming prices to rival MVPDs."[138]

109. In addition, in the Comcast-NBCUniversal Order, the Commission adopted theoretical models to simulate whether it would be profitable for Comcast-NBCUniversal to forego revenues associated with programming in order to attract subscribers from other MVPDs by restricting or raising the cost of the MVPDs' access to NBCUniversal programming. The Commission's analysis included two sets of models: (1) a vertical foreclosure model that theorized how the Comcast-NBCUniversal transaction would affect Comcast's incentives to permanently or temporarily withhold programming from competing MVPDs; and (2) a Nash bargaining model that theorized how the Comcast-NBCUniversal transaction would affect the fees that Comcast would charge rival MVPDs for NBCUniversal programming.[139]

110. We were asked by the Commission to update these vertical foreclosure and bargaining models and apply them to the TWC and divestiture transactions. As we explain in detail below, the Commission's theoretical models have a number of conceptual issues and limitations and thus cannot provide a reliable assessment of the impact of the proposed transactions. Despite these limitations, we have used recent data to calibrate the models to the proposed transactions, and found no evidence to support claims that the transactions would lead to significant price increases as a result of vertical integration. Finally, even if the competitive marketplace, the limited transaction-specific changes in vertical integration, and the clear picture that emerges from updating of the Commission's analyses were not enough, the Commission's regulatory safeguards remain in place.

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[138] Comcast-NBCUniversal Order, Appendix B, ¶ 52.
[139] Comcast-NBCUniversal Order, Appendix B, ¶¶ 36–47.

1. Empirical Analysis Does Not Show Any Anticompetitive Vertical Price Effects from the Comcast-NBCUniversal Transaction

111. Because the Commission's theoretical models regarding foreclosure incentives and price effects of vertical integration require many assumptions and do not capture many of the complexities of real-world bargaining between content providers and MVPDs, the models cannot provide a reliable assessment of the potential impact of the proposed transactions. Therefore, we follow the Commission's approach in the Comcast-NBCUniversal Order to analyze empirically how affiliate fees of NBCUniversal cable networks changed after the Comcast-NBCUniversal transaction.[140] The analysis finds negative and generally statistically insignificant price effects from the vertical integration of NBCUniversal cable networks with Comcast cable systems. We also analyze the retransmission consent fees of NBC O&O stations after the Comcast-NBCUniversal transaction and find that retransmission consent fees of NBC O&O stations remain considerably below the retransmission consent fees of other Big 4 broadcast stations post-transaction. Therefore, real-world prices of NBCUniversal programming do not support the position that the incremental vertical integration that arises in the current transactions will lead to higher NBCUniversal programming prices to rival MVPDs.[141]

a) NBCUniversal Cable Networks

112. In connection with the Comcast-NBCUniversal proceeding, the Commission ran a difference-in-differences regression to estimate the effect of an earlier vertical integration event on the prices of cable networks, comparing the affiliate fees of Fox cable networks to the affiliate fees of non-vertically integrated cable networks before, during, and after the 2004–2008 vertical integration of Fox programming and DirecTV distribution and estimated whether there was a

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[140] Comcast RSNs were already vertically integrated before the Comcast-NBCUniversal transaction and their vertical integration status was not affected by the transaction so the analysis is not applicable to Comcast RSNs.

[141] We understand that the programming prices were negotiated in the backdrop of the Commission's existing program access rules and the Comcast-NBCUniversal conditions. However, the results provide no support for vertical program access concerns since the NBCUniversal transaction. We also note that some commenters claim that the TWC relationship with BHN will increase the degree of vertical integration (see Biglaiser Report, pp. 14–15 and Kwoka Report, p. 14). The analysis in this section is applicable to that relationship as well and shows that such concerns are not problematic either.

significant increase in the prices of Fox networks during the period of integration.[142] It found that "the average monthly price per network for News Corp. programming is expected to be a statistically significant [**REDACTED**] higher than would be the case absent integration" and used that result to support its conclusion that "vertically integrating a video distributor and a national cable programmer leads to higher programming prices to rival MVPDs."[143]

113. There are both conceptual and empirical problems with the Commission's approach. First, programming fees are affected by a wide variety of factors, making it difficult to isolate the effect of vertical integration from those other factors. While a difference-in-difference framework is a well-accepted general methodology for isolating the effect of a particular "event" from other factors, its reliability depends on identifying good controls.[144] In the context of the vertical integration of cable networks, identifying appropriate controls is very difficult due to large variation in networks' content and their value and importance to MVPDs and consumers. Second, analysis of a particular vertical integration event might not be particularly informative for other vertical integration events that differ in various dimensions. For example, Comcast systems that are vertically integrated with NBCUniversal programming will increase from approximately 22% to 29% of MVPD customers after the transactions. This increase in the share of MVPD subscribers involved in vertical integration is very different from the increase in the Comcast-NBCUniversal transaction where the Comcast systems integrated with NBCUniversal programming increased from 0% to 24% of MVPD subscribers. Because of the differences, any effect estimated from the NBCUniversal event may not be applicable to the current transactions.

114. Despite these limitations, we have conducted a difference-in-difference regression analysis, similar to the Commission's analysis, to study the affiliate fees charged by NBCUniversal cable networks before and after the Comcast-NBCUniversal transaction to see if there was a price effect due to the networks becoming part of a vertically integrated company. We use 2008 through 2013 as the sample period of our analysis, with three years of data (2008–2010) before the Comcast-NBCUniversal transaction and three years of data afterwards (2011–2013).

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[142] Comcast-NBCUniversal Order, Appendix B, ¶¶ 48–52.
[143] Comcast-NBCUniversal Order, Appendix B, ¶ 52.
[144] Angrist, J. D.; Pischke, J. S. (2008). Mostly harmless econometrics: An empiricist's companion (pp. 221–247). Princeton University Press.

115. Under the Commission's program access models, a rival MVPD could only be meaningfully impacted by a foreclosure of programming if the programming being withheld is popular and important to the MVPD's subscribers. Small networks that account for a very limited amount of revenues would unlikely raise program access issues. Thus, we focus our analysis on popular NBCUniversal cable networks. Specifically, our treatment group is comprised of six NBCUniversal national cable networks that are in the top 50 national cable networks and were owned by NBCUniversal prior to the Comcast-NBCUniversal transaction ("legacy NBCUniversal cable networks"): Bravo, CNBC, MSNBC, Oxygen, Syfy, and USA.[145]

116. For a difference-in-differences analysis, it is important to find appropriate controls. In the current context, one consideration for selecting appropriate control networks is the popularity (or size) of a network. A popular (and thus widely distributed) network is more important to TV viewers and is more likely to be able to negotiate higher programming fees and possibly larger growth in fees. One way to account for the popularity or size of networks is to use those networks with revenues similar to the treatment NBCUniversal cable networks as controls. Thus, our analysis uses non-vertically integrated top 50 networks as controls.

117. In addition, even cable networks with similar revenues at a point in time may experience significantly different growth paths in affiliate fees over time. Appropriate control networks should have a growth path similar to NBCUniversal cable networks *before* the Comcast-NBCUniversal transaction so that one can assess the specific impact of vertical integration by examining how the affiliate fees of these control networks differ from those of NBCUniversal cable networks after the transaction. As a sensitivity check, we have included specifications that account for the growth of fees before the transaction by limiting the set of control networks to non-vertically integrated top 50 cable networks with average affiliate fee growth rates similar to that of NBCUniversal cable networks *before* the Comcast-NBCUniversal transaction (from 2008 to 2010). Specifically, the pre-event average annual growth rate of the treatment networks was between **[[ ]]**% and **[[ ]]**%. So we have limited the control networks in this sensitivity check to those non-vertically integrated top 50 cable networks with average annual growth rates of **[[ ]]**% to **[[ ]]**% during 2008 to 2010.

118. Following the Commission's approach in the Comcast-NBCUniversal Order, we run difference-in-differences regressions using the growth rate of fees as the dependent variable. We have also run a specification using the natural logarithm of fees as the dependent variable (as we explain in Section III.D below, using the natural logarithm controls for the variation in the scale of fees). Like the Commission, we define the measure of vertical integration as the percentage integrated during the past five years.[146] We also include network fixed effects and per subscriber programming investment of each cable network in the regressions.[147] See Technical Appendix for details of the control selection and regression specification.

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[145] Among the cable networks in which NBCUniversal had full or partial ownership in 2010, besides the six in our sample, NBCUniversal has a minority interest in the Weather Channel but does not negotiate contracts for the network. It also used to have a minority ownership interest in the A&E family of networks but sold it in 2012. The remaining legacy NBCUniversal cable networks were not among the 2013 top 50 cable networks reported by SNL Kagan.
[146] Comcast-NBCUniversal Order, Appendix B, ¶ 51.
[147] Comcast-NBCUniversal Order, Appendix B, ¶ 50.

119. As shown in Table III.C.1 below, in contrast to what the Commission found in the Comcast-NBCUniversal Order, none of the regression specifications finds a statistically significant positive correlation. Instead, the current regressions find a *negative* correlation between the vertical integration variable and the growth rate of affiliate fees or the logarithm of fees.

[[ ]]

120. The results of the analysis do not support the conclusion that vertical integration increased affiliate fees of NBCUniversal cable networks relative to the control networks after the Comcast-NBCUniversal transaction. These results, for a transaction that resulted in a significantly greater increase in vertical integration (Comcast's vertical overlap with respect to NBCUniversal cable networks increased from 0% to 24%) than the current transactions, do not support the position advanced by commenters that the vertical integration between NBCUniversal national cable networks and the cable systems that Comcast will acquire from TWC and Charter (an increase in Comcast's vertical overlap from 22% to 29%) will lead to transaction-specific affiliate fee increases.

b) NBC O&O Stations

121. Next, we analyze the retransmission consent fees of NBC O&O stations after vertical integration with Comcast.[148] There are several considerations to keep in mind when comparing NBC O&Os' retransmission consent fees to those of other Big 4 broadcasters. First, retransmission consent fees for many stations have increased dramatically in the years just before and after the Comcast-NBCUniversal transaction.[149] Because of these dramatic changes, variation in the level and growth of retransmission consent fees over time may have been greatly affected by factors such as the renewal dates of existing contracts, the length of contracts signed, and other networks included in the negotiations, making it difficult to identify appropriate controls for a regression analysis.

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[148] The Commission did not analyze the impact of vertical integration on Fox O&O retransmission consent fees in the Comcast-NBCUniversal Order, Appendix B.

[149] SNL Kagan, "Average Retrans Per-Sub Fees Up 45.6% YOY for TV Station Owners."

122. As a result, even stations that may be expected to have similar retransmission consent fees could differ greatly in the fees that they receive at a particular point in time. For example, SNL Kagan reports that NBC O&O stations charged a **[[ ]]** retransmission consent fee in 2010 while all other Big 4 O&Os and broadcast station groups with Big 4 network affiliates charged **[[ ]]** retransmission consent fees. Therefore, it would not be surprising if NBC O&O stations' fees would **[[ ]]** than other O&O and Big 4 network affiliate fees regardless of vertical integration.[150] Similarly, given the rapidly changing marketplace during this period, it would not be surprising if some of the station group owners with lower retransmission consent fees were able to raise their fees more rapidly than those station group owners already charging higher fees.

123. Due to the lack of data to account for the factors above, it would be inappropriate to run a difference-in-difference regression for NBC O&O stations as we did for NBCUniversal cable networks above. Based on the limited data we have, we compare the average level of retransmission consent fees for NBC O&O stations, other Big 4 O&O stations, and broadcast station groups carrying Big 4 affiliate stations.[151]

124. As shown in Table III.C.2 below, the average retransmission consent fee of NBC O&Os in 2013 (**[[ ]]**) remained considerably lower than those of other Big 4 O&O stations and broadcasters of Big 4 affiliate stations, including Fox O&O stations (**[[ ]]**), CBS O&O stations (**[[ ]]**) and ABC O&O stations (**[[ ]]**), as well as seven of the nine broadcast groups tracked by the SNL Kagan report.

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[150] According to Steve Burke, the CEO of NBCUniversal, "We will, as contracts come up, get those revenues the same way as CBS, ABC and Fox have. There may be a little bit of a lag, because our contracts may come up at a later date than some of the other broadcasters, but we have gone from essentially zero a couple of years ago to $200 million this year. I see no reason why we won't draft behind the other broadcasters and get paid in a similar fashion to the way they get paid in the future." Mike Farrell, "Burke: NBC Retrans Revenue to Reach $200M in 2013," *Multichannel News*, 9/11/13, available at http://www.multichannel.com/cable-operators/burke-nbc-retrans-revenue-reach-200m-2013/145410.

[151] SNL Kagan, "Average Retrans Per-Sub Fees Up 45.6% YOY for TV Station Owners." The average retransmission fee of each group of O&O stations is calculated as the group's 2013 retransmission fees divided by the number of subscribers of the O&O stations (SNL Kagan, "Broadcast TV Network O&O Station Retrans Revenue Projections 2012–2018").

[[ ]]

125. The retransmission consent fee estimates above suggest that, following the Comcast-NBCUniversal transaction, NBC O&O retransmission **[[ ]]** even though NBC O&Os were vertically overlapped with Comcast distribution to a substantial degree in seven DMAs. This evidence does not support a conclusion that the additional vertical overlap resulting from the current transactions will lead to transaction-specific retransmission consent fee increases.[152]

126. In sum, empirical analysis of the pricing of NBCUniversal cable networks and NBC O&O stations finds no evidence of any price increase due to the vertical integration from the Comcast-NBCUniversal transaction. The empirical methodology that the Commission relied upon for assessing the effect of vertical integration in the Comcast-NBCUniversal transaction suggests that such concerns are not present in the current transactions.

2. The Commission's Vertical Foreclosure Model Provides No Support for Any Anticompetitive Conclusions

127. In addition to its empirical analysis of vertical price effects, the Commission adopted two theoretical models to assess the effect of vertical integration on Comcast's incentives in negotiation with MVPDs. In Section A of its Comcast-NBCUniversal Order, Appendix B, the Commission analyzed Comcast's incentives to permanently or temporarily withdraw signals of NBC O&O stations from DBS and telco MVPDs. The Commission's analysis consisted of three steps.

- First, the analysis assumed that, if an MVPD loses access to NBC O&O programming, the MVPD will lose subscribers at a certain rate ("departure rate"), and the departing subscribers will switch to Comcast at a certain rate ("diversion rate"). Under the Commission's theory, the higher the departure rate, the more likely that Comcast's gain of MVPD profit will exceed its loss of programming profit if it withholds programming from the MVPD, controlling for the diversion rate, Comcast's MVPD profit, NBCUniversal programming profit (from advertising revenues and retransmission fees), and other parameters. Thus, the Commission's analysis used a *theoretical* foreclosure model to estimate a critical departure rate above which Comcast would have an incentive to foreclose other MVPDs.

- Second, the Commission estimated the actual subscriber departure rate that might occur following a hypothetical temporary loss of NBC O&O programming. The estimation was based on data from the 2008–2009 Fisher-Dish dispute in which programming from Fisher's ABC, CBS, and Fox affiliates in seven DMAs was withheld from Dish during a six-month retransmission consent dispute.

- Third, the Commission compared the theoretical critical departure rate to the estimated actual departure rate. Because the Commission's preferred calibration of the temporary foreclosure model produced a theoretical critical departure rate less than the actual departure rate the Commission estimated from the Fisher-Dish dispute, the Commission concluded that Comcast would likely profit from temporarily withholding NBC O&O programming from rival MVPDs after the Comcast-NBCUniversal transaction.

128. The theoretical model underlying the Commission's permanent and temporary foreclosure analysis has a number of conceptual issues and limitations that undermine the reliability of its results. First, the theoretical model does not capture many important features of real-world negotiations between content providers and MVPDs. The model focuses on trade-offs between short-term programming profits and MVPD profits but ignores how withholding programming from rival MVPDs could harm Comcast/NBCUniversal in the long run. For example, withholding programming from MVPDs could jeopardize the programming's popularity among consumers and give other MVPDs more incentives to purchase competing programming, both of which could harm Comcast's programming revenues (including both license fees and advertising sales) over time but are not accounted for by the model. Foreclosure may also harm the reputation of NBCUniversal and give producers of shows and other programming more incentives to work with other broadcast or cable networks, or OVDs, instead of with NBCUniversal. In addition, the model does not account for the Commission's program access rules or the additional program access conditions adopted in the Comcast-NBCUniversal Order, both of which provide further assurance against any program access concerns about vertical foreclosure and pricing effects.

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[152] The additional vertical overlap of NBC O&Os and Comcast distribution arising in the current transactions is considerably less than the vertical overlap that arose in the Comcast-NBCUniversal transaction. Specifically, after the Comcast-NBCUniversal transaction, DMAs with vertical overlap between NBC O&Os and Comcast systems include Chicago (**[[ ]]**%), Hartford-New Haven (**[[ ]]**%), Miami (**[[ ]]**%), New York (**[[ ]]**%), Philadelphia (**[[ ]]**%), San Francisco-Oakland-San Jose (**[[ ]]**%), and Washington DC (**[[ ]]**%). The current transactions will increase Comcast's vertical overlap with NBC O&Os in five DMAs, including Dallas-Ft.Worth (from no overlap to **[[ ]]**%), Los Angeles (from no overlap to **[[ ]]**%), San Diego (from no overlap to **[[ ]]**%)), Hartford-New Haven (from **[[ ]]**% to **[[ ]]**%) and New York (from **[[ ]]**% to **[[ ]]**%)).

129. Second, the model relies on a series of assumptions about factors such as the rate at which consumers who leave a rival MVPD may switch to Comcast. For example, the model assumes that the percentage of departing consumers who switch to Comcast (the "diversion rate") is proportional to Comcast's and other MVPDs' shares, and does not take into account that certain programming may be available from non-MVPD outlets. In addition, the model relies on assumptions about the rates at which customers who switch would return to their original MVPD after the foreclosed programming is restored. However, there is little empirical evidence to support these assumptions.

130. Third, the model requires estimates of the actual departure rate that would occur after programming of interest (which was NBC O&O programming in the Commission's analysis) was withheld from an MVPD. We are aware of no situations where NBC O&O programming has been withheld. Thus, estimating a departure rate applicable to NBC O&O programming requires looking at other retransmission disputes where other programming was withheld and controlling for differences in the programming and MVPDs involved, differences in the characteristics and preferences of customers of different MVPDs, differences in the competitive environment and the specific markets at issue, and differences in other factors that influence subscriber departure rates.[153] Because it is difficult to control for all of these differences, estimates of subscriber departure rates from a particular event when programming was withheld may not provide a reliable benchmark to assess the likelihood of Comcast foreclosure of different programming to a different MVPD in a different time period.

131. Furthermore, because the video programming marketplace has been evolving rapidly in recent years, older events such as the 2008–2009 Fisher-Dish event and the 2004 News Corp.-Hughes merger that the Commission relied upon in the Comcast-NBCUniversal transaction likely do not provide reliable information about MVPD subscriber behavior in 2015 and beyond, the time period relevant for assessing the competitive effects of the current transactions. For example, access to programming online provides an additional viewing option for consumers and may reduce departure rates even if the MVPD does not carry certain NBCUniversal programming.

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[153] As just one example, DirecTV is the exclusive provider of NFL Sunday Ticket, which is highly valued by certain of its subscribers. At the same time, Dish may have more price sensitive subscribers as it markets more low-cost options. Thus, information derived from an event where programming was withheld from Dish may not be particularly informative about what would happen if similar programming were withheld from DirecTV.

132. The Commission requests that critical departure rates be calculated for NBCUniversal cable networks and Comcast and TWC RSNs, as well as for NBC O&Os. In addition to the difficulties outlined above, the lack of proper benchmarks to compare with the theoretical critical departure rates is a serious limitation for applying the Commission's foreclosure analysis to NBCUniversal cable networks and Comcast and TWC RSNs. For NBCUniversal cable networks, there have been no recent blackout events that cover all the programming at issue. Moreover, the wide variation in content available on different cable networks makes it very difficult to identify blackout events for other cable network programming that is sufficiently comparable to NBCUniversal's cable network programming to make it a reasonable benchmark.

133. For Comcast and TWC RSNs, while there are MVPDs not carrying particular RSNs for short or long periods of time, such events may not provide reliable evidence for use as a benchmark for assessing departure rates after a hypothetical foreclosure of the RSNs at issue. The importance of an RSN to a particular MVPD's subscribers may vary greatly depending on factors such as the popularity of the team(s) carried by the RSN, how well the team(s) is doing at a particular point in the season, whether a carriage interruption occurs during the season or the off-season, other sports (and general) programming available to consumers, and the alternative ways for TV viewers to access programming related to the team(s), such as through local broadcast stations, through national sports networks like ESPN, through the Internet (e.g., MLB.com, NHL.com and NBA.com), or through radio. It is difficult to estimate actual departure rates applicable to the RSNs at issue because controlling for all of these factors across areas and over time leads to large margins of error, not to mention the need to extrapolate beyond the scope of the data.

134. Finally, the Commission's theoretical foreclosure model does not take into account the transaction-related efficiency gains that could benefit consumers and their impact on incentives. Therefore, the model does not provide a full picture of the impact of the proposed transactions.

135. Despite these significant limitations, we have applied the Commission's foreclosure model to NBC O&O stations, NBCUniversal cable networks, and Comcast and TWC RSNs. We have also compared the computed theoretical critical departure rates to the limited information available regarding actual departure rates when programming was withheld. Our analysis of recent retransmission consent disputes shows that estimates of actual departure rates are small and generally far below the theoretical critical departure rates, which means there is no evidence to support arguments that the proposed transactions raise any program access foreclosure concerns.

a) Foreclosure Analysis for NBC O&O Stations

136. As explained in our April and June reports, five of the ten NBC O&O stations (Chicago, Miami, Philadelphia, San Francisco, and Washington DC) will not be affected by the transactions because Comcast will acquire no or very few cable systems in the stations' footprints.[154] As a result, the proposed transactions will have zero or close to zero incremental effect on the critical departure rates for these five NBC O&O stations.

137. Comcast will acquire TWC or Charter systems serving a non-trivial number of subscribers in five DMAs where there is an NBC O&O station: Dallas, Hartford-New Haven, Los Angeles, New York, and San Diego. For the New York and Hartford-New Haven DMAs where Comcast is currently present, we compute pre-transaction and post-transaction critical departure rates, with the difference between the pre- and post-transaction rates being the transaction-specific effect on critical departure rates. Because Comcast currently has no cable systems in Dallas, Los Angeles, and San Diego, we calculate only the post-transaction critical departure rates for the NBC O&O stations in those three DMAs to estimate the effect of the transactions.

138. Although we have calculated critical departure rates individually for each NBC O&O as requested by the Commission, we understand that **[[ ]]**. Therefore, we have applied the Commission's foreclosure analysis to an additional scenario: **[[ ]]**.

139. In the Comcast-NBCUniversal transaction, the Commission calculated critical departure rates for the temporary foreclosure of DirecTV, Dish, AT&T, and Verizon separately and for the permanent foreclosure of these MVPDs combined. We have done the same here. In addition, we have also run the permanent foreclosure model for each MVPD separately because anticompetitively foreclosing all these MVPDs permanently is highly unlikely in reality as it would be very costly and damaging to NBCUniversal programming and would attract considerable regulatory attention. We have also performed the Commission's foreclosure analysis for RCN because RCN raised vertical program access concerns in its comments about the current transactions.

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[154] April Report, ¶ 218; June Report, ¶ 37.

140. We present results of the permanent foreclosure analysis for two scenarios: (1) foreclosure of DirecTV, Dish, AT&T, Verizon, and RCN separately; and (2) foreclosure of all five rival MVPDs at the same time. For the temporary foreclosure analysis, we present the results for the foreclosure of each rival MVPD separately. For both the permanent and temporary foreclosure analyses, we calculate theoretical critical departure rates for each NBC O&O station affected by the transactions and for all NBC O&Os as a group. Similar to the Commission's approach in the NBCUniversal Order, we use MVPDs' share of subscribers in each DMA to calculate the diversion ratios. We also adopt similar assumptions to the Commission regarding over-the-air watching, online video viewing, the nonlinearity of advertising revenues, and other parameters. See Technical Appendix for further details of the critical departure rate calculation.

141. Below, we show the calculated theoretical critical departure rates and the estimates of actual departure rates, and then compare the two sets of rates.

(1) Critical Departure Rates Based on the Commission's Permanent and Temporary Foreclosure Models

142. Table III.C.3 shows the calculated critical departure rates for permanent foreclosure of the five NBC O&O stations at issue. For individual NBC O&O stations in DMA where Comcast is present both pre- and post-transaction, the change in the critical departure rate is around **{{ }}**% for the Hartford-New Haven NBC O&O and is in the range of approximately **{{ }}**% to **{{ }}**% for the New York NBC O&O. For each of the five NBC O&Os, the post-transaction critical departure rate is **{{ }}** – **{{ }}**% for the foreclosure of rival MVPDs combined and generally in the range of **{{ }}**% to **{{ }}**% for the foreclosure of a single rival MVPD. To put this in context, a critical departure rate of 30%, for example, implies that 30% or more of an MVPD's subscribers would need to leave that MVPD in response to the withholding of NBC O&O programming in order for such withholding of NBC O&O programming to be profitable in theory for Comcast. These critical departure rates show that the actual departure rate in a permanent foreclosure event would have to be very high for the theoretical model to imply that Comcast would have an incentive to foreclose MVPDs.

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143. For the temporary foreclosure analysis, we calculate critical departure rates for a one-month foreclosure event rather than for a six-month event as the Commission did in the Comcast-NBCUniversal Order. This is because the length of the foreclosure event is determined by the length of the actual event(s) used to estimate the actual departure rates under the Commission's approach. Because of rapid changes in the video marketplace in recent years, the 2008–2009 Fisher-Dish event (which lasted six months) that the Commission relied upon last time may not provide a reliable benchmark for departure rates in 2015 and beyond. Thus, we use two more recent events to estimate the departure rate, a 2013 retransmission consent dispute between Media General and Dish that lasted 46 days and a 2013 retransmission consent dispute between CBS and TWC that lasted 32 days. Since these more recent blackout events lasted one month or so, we use a one-month event window.

144. Table III.C.4 shows the critical departure rate calculated for temporary foreclosure of the five NBC O&O stations at issue. The results show that, for NBC O&O stations in DMAs where Comcast is present both pre- and post-transaction, the change in the critical departure rate ranges from **{{ }}**% to **{{ }}**% for the Hartford-New Haven NBC O&O and from **{{ }}**% to **{{ }}**% for the New York NBC O&O. For the five NBC O&Os, the level of post-transaction critical departure rate ranges from around **{{ }}**% to **{{ }}**%. As we show below, these critical departure rates **{{ }}** estimates of actual departure rates, implying that there are no temporary foreclosure issues.

{{ }}

145. As discussed above, we understand that current practice is that **[[ ]]**. Table III.C.5 shows the critical departure rate calculated for permanent and temporary foreclosure of all NBC O&O stations in the footprint of Dish, DirecTV, AT&T, Verizon, and RCN. For individual MVPDs, the transaction-related change ranges from **{{ }}**% to **{{ }}**% for the permanent foreclosure model and from **{{ }}**% to **{{ }}**% for the temporary foreclosure model. The level of post-transaction critical departure rates range from **{{ }}**% to **{{ }}**% for permanent foreclosure and **{{ }}**% to **{{ }}**% for temporary foreclosure. For permanent foreclosure of all MVPDs combined, the change in critical departure rate is around **{{ }}**% and the post-transaction critical departure rate is **{{ }}**%.

{{ }}

146. As explained above, these theoretical critical departure rates derived from the Commission's foreclosure models should be compared to actual departure rates estimated from comparable actual blackout events to accurately determine whether Comcast would have an incentive to withhold NBC O&O programming. We estimate the actual departure rates in the next section.

(2) Actual Departure Rates

147. In the Comcast-NBCUniversal transaction, the Commission used an actual departure rate estimated based on the 2008–2009 Fisher-Dish dispute and compared that rate to the theoretical critical departure rates derived from the Commission's foreclosure models. The departure rate estimate for the Fisher-Dish dispute is confidential and not available to us. Moreover, as we discussed above, the 2008–2009 Fisher-Dish event may not provide a reliable benchmark for departure rates in 2015 and beyond. In addition, we are aware of no situations where NBC O&O programming has been withheld. Thus, we use two more recent events involving Big 4 affiliate stations and other Big 4 O&O stations to estimate the actual departure rate for a temporary foreclosure of NBC O&O stations: the 2013 retransmission consent dispute between Media General and Dish and the 2013 retransmission consent dispute between CBS and TWC.

148. Among the retransmission blackout episodes since 2012 (tracked by SNL Kagan), the dispute between Media General and Dish (which lasted 46 days from October 1, 2013 to November 16, 2013) is the only one that involved a major rival MVPD of Comcast (i.e., DirecTV, Dish, AT&T, or Verizon), affected more than five DMAs (including some top 50 DMAs), and lasted longer than 30 days. The dispute affected all 17 Big 4 broadcast stations owned by Media General in 17 markets, including eight NBC affiliate stations. See Technical Appendix for details of the selection of blackout events for our analysis.

149. We first examine Dish's subscriber growth rate in the DMAs where it lost access to Media General's broadcast stations (the "treatment DMAs") and in a set of "control DMAs" where Dish did not lose access to Big 4 network affiliate programming. In the Comcast-NBCUniversal Order, Appendix B, the Commission stated that it identified control DMAs by matching unaffected DMAs to the treatment DMAs. However, the criteria used for the matching were confidential and not available to us. For the current analysis, we select control DMAs that are similar to the treatment DMAs in size and/or in geographic location, but in which Dish did not lose access to Big 4 broadcast stations (see Technical Appendix for details).

150. Table III.C.6 below compares Dish's subscriber growth rates inside Media General's footprint (where Dish lost access to Media General's broadcast stations) to comparable DMAs outside Media General's footprint (where Dish did not lose access to programming) before, during and after the programming dispute. The comparison finds that there was **[[ ]]** in the difference between Dish's subscriber growth rate in the treatment DMAs and that in the control DMAs during the dispute. Specifically, the difference between Dish's subscriber growth rate in the treatment DMA and that in the control DMAs **[[ ]]** during the dispute (4Q2013) relative to the quarter before the dispute (3Q2013), from **[[ ]]**% to **[[ ]]**%, and continued to **[[ ]]** after the dispute ended (to **[[ ]]**% in 1Q2004). The results are similar if the affected DMAs are limited to those in which Media General operates an NBC station (to test whether there is some NBC effect that differs from the other Big 4 networks). Again, the difference in subscriber growth rates between the treatment and control DMAs **[[ ]]** during the dispute relative to the quarter before the dispute (from **[[ ]]**% to **[[ ]]**%) and continued to **[[ ]]** after the dispute ended (to **[[ ]]**% in 1Q2004). Overall, a simple comparison of subscriber growth rates finds no evidence that the dispute had any adverse effect on Dish's subscriber growth in the affected DMAs.

[[ ]]

151. Next, to estimate the departure rate in the Media General-Dish event, we follow the Commission's approach in analyzing the 2008–2009 Fisher-Dish event in the Comcast-NBCUniversal Order. Specifically, we run a regression of natural logarithm of Dish subscribers on quarterly and DMA fixed effects and an interaction term between a dummy for affected DMAs and the dummy for the quarter of the blackout (4Q2013). The regression uses one year of quarterly data, from 2Q2013 through 1Q2014. According to the Commission's approach, the coefficient for the interaction term represent the percentage change of Dish subscribers in affected DMAs relative to control DMAs as a result of the blackout.

152. Table III.C.7 below shows the regression results. None of the specifications finds a statistically significant effect during the blackout period. Because we only have quarterly subscriber data for the event and the blackout happened in the first half of 4Q2013, it is conceivable that the quarterly subscriber count captured the net effect of subscribers leaving Dish as the result of the blackout and those departing subscribers returning to Dish during the second half of 4Q2013, after the blackout ended. Therefore, the evidence is inconclusive as to whether there is a significant actual departure rate associated with this event. However, to the extent that the net effect of the blackout event was **[[ ]]** by the end of 4Q2013, it implies that the temporary foreclosure of the Media General network affiliates had no lasting effect on Dish subscribers beyond two months.

[[ ]]

153. We also consider evidence on departure rates from TWC during its August 2013 dispute with CBS that led to a 32-day blackout (from August 2 through September 2, 2013) of the CBS O&O stations in six DMAs (Boston, Dallas-Ft. Worth, Denver, Los Angeles, New York, and Pittsburgh). CBS also blocked all TWC's broadband subscribers' access to CBS.com during the dispute. Around the same time, TWC also had a retransmission consent dispute with Journal Broadcasting that lasted from July 25, 2013 to September 20, 2013 and resulted in blackout of CBS affiliate stations in four DMAs (Green Bay, Wisconsin; Milwaukee, Wisconsin; Omaha, Nebraska; and Palm Spring, California).

154. Despite the significant publicity surrounding the CBS-TWC dispute, its relevance for assessing vertical foreclosure incentives in the current transaction is limited since Comcast does not have even a theoretical anticompetitive incentive to withhold NBC O&O programming from cable MVPDs such as TWC with which it does not compete. In addition, the departure rate from a cable company like TWC in areas including Manhattan may be very different than departure rates from other MVPDs in other areas. This is because TWC is a cable company, while the estimated departure rate of interest would be for DBS companies, telcos, or overbuilders whose subscribers may have different characteristics. In addition, market conditions faced by TWC systems in the areas affected by the dispute may also differ from the areas to which the estimate would be applied. Thus, departure rates from TWC during the CBS-TWC programming dispute may not be informative regarding Comcast's vertical incentives with respect to its rival MVPDs. Despite these limitations, we use this event as an additional estimate of actual departure rates after the withholding of a single Big 4 network.

155. We follow the same steps as we did with the Media General-Dish blackout. Using data on monthly TWC video subscriber counts by DMA, we first compare the changes in subscriber counts in DMAs affected by the blackout and control DMAs.[155] Like the analysis of the Media

[155] Unlike in the Media General-Dish dispute where we needed to rely on Kagan data for video subscriber counts, we rely on confidential TWC data on monthly subscribers.

General-Dish event above, our control DMAs include DMAs that are similar to the affected DMAs in size and/or in geographic location, but in which TWC did not lose access to CBS broadcast stations. Because the DMAs affected in the CBS-TWC event were mostly large DMAs such as New York and Los Angeles, our control DMAs include all Top 50 DMAs in which TWC has a significant presence. For each affected DMA, we also include the two unaffected TWC DMAs closest in size in the Census region of the affected DMA. The control DMAs exclude the four DMAs that were affected by the Journal Broadcasting-TWC dispute. See Technical Appendix for details of the selection of control DMAs for the CBS-TWC event.

156. Table III.C.8 below shows 12 months of subscriber growth rates in the affected and control DMAs, from February 2013, the first month for which we can calculate the growth rate, through January 2014. **{{ }}**. In August 2013, the month of the CBS-TWC dispute, there was a **{{ }}** in the difference in subscriber growth rates between the affected and control DMAs (from **{{ }}**% in July to **{{ }}**% in August). The difference **{{ }}**% in September, possibly due to a lag in the effect of the blackout. As the blackout ended in early September, the trend in the difference between affected and control DMAs **{{ }}**% in October and November before **{{ }}**% in December. The simple comparison of subscriber growth rates suggests that the blackout's effect was likely primarily in September of 2013, with probably some small effect in August of 2013.

{{ }}

157. Next, to estimate the departure rate in the CBS-TWC event, we again follow the Commission's approach in analyzing the Fisher-Dish event. Specifically, we run a regression of the natural logarithm of subscribers on monthly and DMA fixed effects and interaction terms between a dummy for affected DMAs and dummy variables for August and September of 2013 (the period impacted by the blackout). Under the Commission's approach, the coefficients of the interaction terms estimate the percentage change of TWC subscribers in affected DMAs relative to control DMAs as a result of the blackout. The regression uses one year of monthly data, from February 2013 through January 2014. To give DMAs where TWC has more subscribers more weight, we use the subscriber count in January 2013 as the weights. We also show the results of regressions without the weights.

158. Table III.C.9 shows the regression results. The unweighted regression finds no statistically significant blackout effect **{{ }}**. The weighted regression does not find a statistically significant effect in August, but finds a statistically significant effect in September 2013 – the coefficient estimate for the interaction between September and affected DMAs is **{{ }}**, implying that the subscriber loss rate in the affected DMAs was about **{{ }}** than that in the control DMAs during the window of the CBS blackout.

{{ }}

159. Overall, our analysis finds no conclusive evidence for a statistically significant actual departure rate for the Media General-Dish programming dispute, but finds a statistically significant estimated actual departure rate (**{{ }}**%, with a standard error of **{{ }}**%) in September 2013 for the CBS-TWC programming dispute. As we explained earlier, because, among other things, TWC does not compete with Comcast, the CBS-TWC result may not provide a reliable benchmark departure rate for MVPDs that do compete with Comcast. Nonetheless, we assume that the actual departure rate for NBC O&O stations would be **{{ }}**%, the same as the rate estimated from the CBS-TWC event.

(3) Compare Theoretical Critical Departure Rates to Actual Departure Rates

160. The estimated actual one-month temporary departure rate of **{{ }}**% for NBC O&O stations is **{{ }}** than all theoretical one-month temporary foreclosure critical departure rates calculated above (in Tables III.C.3, III.C.4 and III.C.5). Therefore, the Commission's theoretical foreclosure model does not suggest any temporary foreclosure concerns for NBC O&O stations.

b) Foreclosure Analysis for NBCUniversal National Cable Networks

161. Next, we apply the Commission's foreclosure model to NBCUniversal national cable networks. Comcast currently has a controlling interest and management right in 17 nationally distributed cable networks including Bravo, Chiller, Cloo (formerly Sleuth), CNBC, CNBC World, E!, Esquire Network (formerly Style), G4, Golf Channel, MSNBC, mun2, NBC Sports Network (formerly Versus), Oxygen Network, Sprout, SyFy, Universal HD, and USA. These networks constitute the set of national cable networks examined in our foreclosure analysis. While Comcast (and TWC) has some interest (or attributable interest) in a few other national networks such as NHL Network and MLB Network, it is our understanding that Comcast does not negotiate the contracts for those networks and is not in a position to withhold the networks from rival MVPDs. Therefore, we do not include these networks in our foreclosure analysis.

162. Similar to our application of the Commission's foreclosure model to NBC O&O stations, we apply the Commission's model to compute critical departure rates for theoretical permanent and temporary foreclosures of DirecTV, Dish, AT&T, Verizon, and RCN separately. For permanent foreclosure, we have also modeled the extremely unlikely scenario of the five MVPDs being foreclosed at the same time. For the temporary foreclosure analysis, we use a one-month event window for the same reasons noted above.

(1) Critical Departure Rates Based on the Commission's Permanent and Temporary Foreclosure Models

163. Table III.C.10 shows the critical departure rate estimates for permanent and temporary foreclosure of the bundle of NBCUniversal national cable networks. For permanent foreclosure, the theoretical critical departure rates **{{ }}** by an amount ranging from **{{ }}**% to **{{ }}**%, but level of post-transaction theoretical critical departure rates are **{{ }}**, ranging from **{{ }}**% to **{{ }}**%. For temporary foreclosures, the change in the rates is between **{{ }}**% and **{{ }}**%, with the level of post-transaction theoretical critical departure rates ranging from **{{ }}**% to **{{ }}**%.
{{ }}

(2) Actual Departure Rates

164. In the Comcast-NBCUniversal transaction, the Commission did not use an actual blackout event to estimate an actual departure rate due to the withholding of NBCUniversal cable networks. Instead, the Commission inferred a departure rate by applying a theoretical model proposed by DirecTV's expert Professor Kevin Murphy based on assumptions about the bargaining between NBCUniversal and MVPDs, and observed affiliate fees for NBCUniversal networks. Professor Murphy's model was based on confidential data not available to us. The merging parties' experts Professor Michael Katz and Dr. Mark Israel assumed that the actual departure rate due to the withholding of NBCUniversal cable networks would be half (1/2) of the departure rate for withholding of NBC O&O stations. Professor Rogerson has suggested that the departure rate due to foreclosure of NBCUniversal cable networks "would be at least comparable in size to the departure for an individual Big 4 broadcast network."

165. The Commission's discussion in the Comcast-NBCUniversal Order, Appendix B appeared to suggest that the Commission believed NBC O&O stations were more important to consumers than NBCUniversal cable networks. Specifically, in the Commission's analysis of the transaction's vertical price effect, it assumed that NBC O&O stations would receive 2/3 of the surplus from a carriage agreement with MVPDs while NBCUniversal cable networks would receive 1/2 of the deal surplus, the same as MVPDs. While the Commission described this parameter as a measure of relative bargaining skills of negotiating parties, it acknowledged that the parameter reflected the popularity of the programming involved in the negotiation. If so, the difference in the Commission's assumed parameter values for NBCUniversal cable networks and NBC O&Os presumably reflects the difference in the popularity and importance of the programming.

166. Because the actual departure rate is determined in large part by the programming's popularity and importance to consumers, the Commission's assumptions suggests that the actual departure rate for NBCUniversal cable networks is likely lower than that for NBC O&O stations. If the ratio of the Commission's assumed shares of deal surplus that would be received by the two sets of programming reflects the relative importance of the programming and the ratio of departure rates related to the programming, the NBCUniversal cable networks would have a departure rate **{{ }}** that of the NBC O&O stations. In that case, a rough estimate of the actual departure rate for NBCUniversal cable networks would be **{{ }}** as our estimated actual departure rate for NBC O&O stations is **{{ }}**%.

(3) Compare Theoretical Critical Departure Rates to Actual Departure Rates

167. The assumed actual one-month temporary departure rate of **{{ }}**% for NBCUniversal cable networks is **{{ }}** than all theoretical one-month temporary foreclosure critical departure rates computed above (in Table III.C.10). Therefore, the Commission's theoretical model does not suggest any concern that Comcast will have any incentive to temporarily foreclose its rivals' access to NBCUniversal cable networks

c) Foreclosure Analysis for Comcast and TWC RSNs

168. Comcast owns interests in nine RSNs that carry major league professional sports. Of these nine Comcast RSNs, CSN New England (carrying the Boston Celtics) is the only RSN for which Comcast's share of subscribers will have a material increase after the transactions. Thus, we apply the Commission's foreclosure model to CSN New England. As explained in our previous reports, six of the other RSNs (CSN Chicago, CSN Houston, CSN California, CSN Philadelphia, CSN Mid-Atlantic, and CSN Bay Area) will see zero or minimal change in Comcast's share of subscribers within the core footprint of the RSNs. A seventh RSN, CSN Northwest, is not carried by any of the four major rival MVPDs, so there is not a foreclosure issue. For the eighth RSN, SportsNet New York, Comcast will remain a minority owner after it acquires TWC's interest in the RSN, so it will not gain any ability to withhold SportsNet New York from other MVPDs. Since there is no transaction-specific vertical integration for these other RSNs, we do not apply the Commission's foreclosure model to them.

169. Among the TWC RSNs in which Comcast will have a controlling interest after the TWC transaction, only TWC SportsNet in Los Angeles carries major professional sports (the Lakers) in English. Comcast currently does not have cable systems in Los Angeles, and there is already vertical overlap between TWC SportsNet and TWC's Los Angeles cable systems, so the TWC transaction does not raise any transaction-specific vertical issues for TWC SportsNet. However, Comcast will acquire some Charter cable systems in the core footprint of TWC SportsNet. As a result, the theoretical critical departure rates for TWC SportsNet would change post-transaction. Thus, we apply the Commission's foreclosure model to TWC SportsNet.

170. As part of the transactions, Comcast will take over distribution and operational services for SportsNet LA in Los Angeles, which carries the Dodgers. However, the RSN is currently not carried by any of the major rival MVPDs so there is no transaction-specific foreclosure issue. Therefore, we do not apply the Commission's foreclosure model to SportsNet LA.

(1) Critical Departure Rates Based on the Commission's Permanent and Temporary Foreclosure Models

171. Table III.C.11 shows theoretical critical departure rates for permanent and temporary foreclosure for CSN New England and TWC SportsNet. We consider the scenarios where each rival MVPD individually experiences permanent or temporary foreclosure and the unlikely scenario where all five rival MVPDs are permanently foreclosed at the same time.
{{ }}

(2) Actual Departure Rates

172. In the Comcast-NBCUniversal Order, the Commission did not compute critical departure rates or estimate actual departure rates for RSNs. As we noted earlier, the potential departure rate from an MVPD that loses access to an RSN may vary greatly across different MVPDs and RSNs due to multiple factors. As a result, it is very difficult to find reliable benchmarks for the departure rate from CSN New England and TWC SportsNet. Without a reliable benchmark from empirical data, we assume, for the purposes of this analysis, that each RSN has the same departure rate as the NBCUniversal cable networks. Thus, our calculations assume that the RSNs have a departure rate of **{{ }}**% (with a standard error of **{{ }}**%).

(3) Compare Theoretical Critical Departure Rates to Actual Departure Rates

173. The estimated actual temporary departure rate of **{{ }}**% is **{{ }}** than all the post-transaction critical departure rates for temporary foreclosure computed above (in Table III.C.11). Thus, the Commission's theoretical foreclosure model does not provide support for any transaction-specific foreclosure concerns for CSN New England and TWC SportsNet.

(3) Compare Theoretical Critical Departure Rates to Actual Departure Rates

174. In Section B of the Comcast-NBCUniversal Order, Appendix B, the Commission adopted a Nash bargaining model for analyzing the potential price effect of vertical integration between Comcast's MVPD service and NBCUniversal's programming assets. The model assumed that vertical integration would increase Comcast's opportunity cost for selling programming to rival MVPDs and, therefore, increase Comcast's incentive and ability to charge rival MVPDs higher programming prices.

175. The magnitude of the price increase predicted by the model depends on several factors, including the bargaining skill of Comcast relative to the rival MVPD (μ); the rate at which the rival MVPD's subscribers would leave the MVPD if it lost access to Comcast's programming (the "departure rate" d); the share of those departing subscribers who would switch to Comcast (the "diversion ratio" α); and the MVPD profit that Comcast would earn from an additional subscriber (π). Specifically, the predicted price increase was calculated using the following formula:

$$\Delta P = (1 - \mu) \times d \times (\alpha_{post} - \alpha_{pre}) \times \pi$$

In the formula above, αpre and αpost represent the diversion ratios before and after the proposed transactions.

176. The theoretical model underlying the Commission's vertical price effect analysis shares the conceptual issues and limitations of the Commission's foreclosure models. For example, the vertical price effect model does not capture many important features of real-world negotiations between content providers and MVPDs. The model relies on a series of assumptions that have limited empirical support, including assumptions about factors such as the rate at which consumers who leave a rival MVPD may switch to Comcast and the likely departure rate if NBCUniversal programming is not accessible to an MVPD. The model also does not take into account the transaction-related efficiencies and other gains that could benefit consumers. See a more detailed discussion of these issues in Section A.1 above. Moreover, by design, the model predicts a price increase for all increases in MVPD share by a vertically integrated MVPD, regardless of the programming involved, the viewing options available to consumers, or the size of the share increase. Because of these limitations, the Commission's theoretical model does not provide a reliable benchmark for assessing the price effect of vertical integration in the current transactions.

177. Despite these limitations of the Commission's model, we have updated the model and applied it to Comcast-NBCUniversal programming affected by the proposed transactions. As explained in Section A.1 above, a number of NBC O&O stations and RSNs are either not affected or minimally affected by the current transactions, so the theoretical Nash bargaining model would predict a zero or minimal price effect from the proposed transactions. Thus, we have computed the theoretical price effect predicted by the Commission's Nash bargaining model for the following Comcast and TWC programming where there is a material change in the extent of vertical integration: (1) five NBC O&O stations (Dallas, Hartford-New Haven, Los Angeles, New York, and San Diego); (2) the national cable networks in which Comcast has a controlling interest, and (3) CSN New England (Celtics) and TWC SportsNet (Lakers) in Los Angeles. Also, as in Section A.1, we calculated results for DirecTV, Dish, AT&T, Verizon, and RCN separately.

178. In the calculation of the theoretical price effect, one needs to make an assumption about the departure rate at which a rival MVPD's subscribers would leave the MVPD if it lost access to Comcast's programming. Based on the recent Media General-Dish and CBS-TWC disputes, which involved blackouts of Big 4 broadcast stations, we use an estimate of the actual departure rate for a one-month temporary foreclosure of **{{ }}**% for NBC O&O stations. Based on the Commission's assumption in the NBCUniversal Order, we assume an actual departure rate of **{{ }}**% for the set of NBCUniversal cable networks, and for each of the two RSNs affected by the transactions, CSN New England and TWC SportsNet. See Section III.C.2 above for additional details.

179. Table III.C.12 and Table III.C.13 below show the theoretical price increases calculated using the Commission's vertical price effect model. All calculated price increases account for a small or moderate percentage of what the MVPDs currently pay. In the Commission's Adelphia Order, the Commission found that a vertical price effect would not be a concern if the price increase were less than 5% of the current price. Table III.C.12 and Table III.C.13 show that there is no theoretical price effect **{{ }}** the Commission's 5% criterion, with all but one of the calculated price increases **{{ }}** the criterion.

{{ }}

180. As discussed above, the Commission's vertical price effect model has many significant limitations and relies upon a large number of assumptions for the values of parameters in the model, many of which are based on no or very little market evidence. Therefore, the vertical price effects resulting from the Commission's model and the large number of assumptions and parameters underlying the model cannot provide any reliable assessment of the impact of the proposed transactions. Even ignoring the conceptual problems and lack of market evidence for other parameters, the departure rate estimate also has a considerable margin of error that should be considered if the estimate is used to calculate theoretical price increases and to assess whether those calculated increases raise any concerns. As a result, the Commission's vertical price effect model, even with no consideration of procompetitive efficiencies, provides no basis for the conclusion that the proposed transactions are likely to result in retransmission consent or affiliate fee increases to rival MVPDs.

4. Commenters Proposed Extensions to the Commission's Foreclosure and Vertical Price Effect Models Do Not Raise Program Access Concerns

181. Commenters propose a number of theoretical extensions to the Commission's foreclosure and vertical price effect models. As we demonstrate in this section, these proposed extensions, which are not accompanied by any empirical analysis, do not raise program access concerns for the current transactions. For example, Professor Biglaiser suggests that merger-related efficiency gains and lower programming fees will increase the profit margin of Comcast's MVPD service ([Missing Graphic Reference] in the equation in Section C.3 above), which in turn would increase NBCUniversal's incentives or ability to raise programming fees to rival MVPDs.[156] Professor Biglaiser and other commenters have presented no evidence that the transactions will increase Comcast's negotiation leverage and allow it to pay lower programming fees. But, even if that were the case, Professor Biglaiser's theory ignores the benefits to consumers associated with Comcast being more efficient or paying lower programming fees. If the transactions improve Comcast's efficiency and reduce its per-subscriber costs, Comcast will be able to provide consumers with better products in the form of higher quality, faster speed, or slower increases in price, among others. Being able to compete more efficiently is good for consumers and strongly in the public interest.

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[156] Biglaiser Report, pp. 22–23.

182. Moreover, Professor Biglaiser has presented no evidence that his theorized fee increase would be significant relative to the consumer welfare benefits identified above. In fact, because Comcast faces strong competition from other distributors in the markets in which it competes, any increase in its profit margin would be limited. And with a limited increase in its margin, even the Commission's Nash bargaining model, which theorizes that the vertical price effect equals the change in price margin multiplied by the departure rate ([Missing Graphic Reference]), diversion ratio ([Missing Graphic Reference], and relative bargaining skill [Missing Graphic Reference], would imply very little vertical price effect based on the parameter values we estimated from empirical data above. Even this small theoretical price increase is not supported by any real-world evidence – as we have shown above, analysis of empirical data finds no evidence of any significant price effect from vertical integration.

183. In addition to claiming that the transactions may increase Comcast's wholesale affiliate fees to rival MVPDs, Professor Biglaiser also suggests that the transactions will give Comcast incentives to increase the retail price of its own MVPD service.[157] He suggests that, because vertical integration allows Comcast to internalize the cost of NBCUniversal programming, there is an opportunity cost associated with having a subscriber with Comcast (which as an integrated firm effectively pays a zero affiliate fee) instead of with another MVPD that pays a programming fee to NBCUniversal. He further explains that, if an increase in Comcast's MVPD subscription price leads some Comcast subscribers to switch to other MVPDs, Comcast can recoup some of the losses through the affiliate fees that the other MVPDs pay. He suggests that this is an effect not considered by the Commission in the Comcast-NBCUniversal transaction.[158]

184. To analyze any transaction-specific effects on retail pricing, one needs to compare Comcast's (or TWC's) MVPD price before and after the proposed transaction. Professor Biglaiser's theory does not do that – it only looks at Comcast's profit after the transaction.[159] As a result, the theory fails to take in account that vertical integration between distribution and programming will internalize the cost of programming for Comcast (i.e., eliminate the double marginalization between Comcast or TWC and NBCUniversal). This internalization of programming cost will allow Comcast to pass more benefits on to consumers in the form of better product quality, more product offering or slower growth in its MVPD price, which offsets the upward pricing pressure theorized by Professor Biglaiser.

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[157] Biglaiser Report, pp. 19–22.

[158] Biglaiser Report, p. 22. Professor Biglaiser states that this harm occurred and has existed since the NBCUniversal merger, but provides no evidence to support this statement.

[159] See, for example, Biglaiser Report, p. 20.

185. In addition, contrary to Professor Biglaiser's claim, the Commission's Comcast-NBCUniversal Order did consider the upward pricing pressure he theorized. Consistent with our discussion above, the Commission's analysis considered both "the opportunity cost associated with rival subscribers switching to Comcast" (which underlies the upward pricing pressure theorized by Professor Biglaiser) *and* the elimination of double marginalization between Comcast and NBCUniversal, and concluded that "Comcast's subscribers may benefit from the elimination of double marginalization."[160] The same conclusion applies to the current transactions – the downward pricing pressure from the elimination of double marginalization between TWC and Comcast-NBCUniversal may well more than offset the upward pricing pressure.

186. Finally, Professor Biglaiser and ACA argue that because NBCUniversal negotiates a single master agreement with NCTC (which represents ACA members), if NBCUniversal has incentives to charge any NCTC member more, it will charge a higher price to all NCTC members covered by the agreement. However, the change in overlap between NCTC and the combined company is very limited (only 2%).[161] Thus, any effect, which the analysis does not support, would be small. If the current NCTC price were optimal, then it does not make economic sense for Comcast to increase the price to the entire membership just to harm a small share of NCTC members. In addition, any price change would be *de minimus* even according to this argument. For example, if the transaction caused the profit-maximizing price for 2% of the membership to increase by $0.25, then the overall price increase would be $0.005.

187. Overall, our analysis in this section confirms the conclusions from our April and June Reports that there should be no program access concerns for the proposed transactions. First, Comcast-NBCUniversal faces substantial competition in the video programming and MVPD markets in which it competes, and that substantial competition protects consumers. Second, the Commission's empirical framework for assessing the impact of vertical integration on affiliate and retransmission consent fees does not show any harmful price effect after the 2011 vertical integration of NBCUniversal and Comcast. Third, the theoretical models the Commission relied upon for its program access conclusions in the Comcast-NBCUniversal Order do not support any anticompetitive program access concerns. Fourth, commenters proposed extensions to the Commission's theoretical foreclosure and vertical price effect models do not raise program access concerns for the current transactions. Finally, the Commission's program access rules and NBCUniversal Order conditions remain in place to provide additional assurance against any potential program access concerns.

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[160] Comcast-NBCUniversal Order, Appendix B, ¶¶ 56–64. The Commission concluded that while there may be benefits, the magnitude of the benefits may be smaller than what the Applicants claim. However, this does not change the conclusion that the benefits are positive.

[161] Biglaiser Report, pp. 17, 19 (Table 1). The change in overlap is slightly higher if Brighthouse is included.

D. No Horizontal Program Selling Concerns from the Transactions

188. As discussed in our April and June Reports, Comcast will gain a very limited amount of programming from TWC and Charter, and after the transactions Comcast will continue to have a limited share in video programming and to face strong competition from unaffiliated content providers at both the national and regional level.[162] As a result, the transactions do not raise horizontal program selling concerns.

189. Professor Biglaiser suggests that the TWC transaction will lead to horizontal program selling concerns because Comcast could raise programming prices to other MVPDs by combining TWC's RSNs in Los Angeles and New York with the NBC O&Os in those DMAs.[163] He proposes a theoretical model with two networks in which if an MVPD carries both networks, the total value of the two networks is less than the sum of each network's value to the MVPD if the MVPD just carries that network but not the other network. In his model, MVPDs would incur a lower program cost if the two networks are owned by two content providers as opposed to by one content provider, even if the two networks are not close substitutes. This model is not supported by any data to show that the assumptions are valid or that the effects would be meaningful.

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[162] April Report, ¶¶ 212–213; June Report, ¶ 35. Contrary to the concern raised by Dr. Cooper (Consumer Federation of America Comment, pp. 32–33), the transactions do not materially change the concentration of regional programming as we discussed in our April Report, ¶ 213.
[163] Biglaiser Report, pp. 25–27; ACA Comment, pp. 21–23.

1. Market Facts and Economics Do Not Support Commenters' Concerns

190. Professor Biglaiser suggests that Comcast would acquire TWC RSNs in both Los Angeles and New York, but that is not correct – Comcast already is a minority owner of SportsNet New York today and will continue to be a minority owner even after acquiring TWC's minority stake in SportsNet New York. Therefore, Comcast will not acquire control of SportsNet New York.

191. In Los Angeles, TWC currently owns TWC SportsNet (which carries the Lakers) and the distribution rights for (but no ownership interest in) SportsNet LA (which carries the Dodgers). Neither RSN has a footprint that overlaps with a Comcast RSN. We have shown above that Comcast's acquisition of TWC SportsNet and the distribution rights for SportsNet LA do not raise vertical program access competitive concerns. As we demonstrate in this section, the transactions do not raise horizontal program selling concerns in Los Angeles (or elsewhere).[164]

192. Mergers generally raise horizontal pricing concerns when the goods produced by the merging firms are close substitutes.[165] Because programming on the NBC O&O station in Los Angeles O&O and programming on TWC SportsNet and SportsNet LA mostly serve different demands (general entertainment versus regional sports), they are not close substitutes. The NBC O&O and TWC-affiliated RSNs face many other closer programming competitors, including a large number of other national and regional broadcast and cable networks with general entertainment and sports programming. Dish does not carry TWC SportsNet (Lakers), which means that a major MVPD can be successful in the Los Angeles DMA even without the RSN.[166]

193. Moreover, as noted, we understand that **[[ ]]** and may or may not involve the negotiations for any Comcast RSNs carried by the MVPD. For example, according to Professor Biglaiser, negotiations for NBC O&Os and those for Comcast RSNs are separate for NCTC members.[167] To the extent that carriage negotiations for NBC O&Os and for TWC RSNs are negotiated separately and at different times, it would be difficult to extract increased fees from MVPDs for the carriage of the two. Additionally, the Comcast-NBCUniversal Order provides a commercial arbitration remedy stipulating that an MVPD can seek standalone arbitration for a Comcast-owned RSN programming or broadcast stations.[168]

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[164] The same analysis shows there will be no horizontal program selling concern in New York either even ignoring Comcast's lack of control of SportsNet New York.

[165] See, e.g., U.S. Department of Justice and the Federal Trade Commission, Horizontal Merger Guidelines, p. 20: "Unilateral price effects are greater, the more the buyers of products sold by one merging firm consider products sold by the other merging firm to be their next choice."

[166] We note that there has been concern about the lack of carriage of SportsNet LA (Dodgers) by MVPDs other than TWC. While this may be a concern to regulators, it is not a transaction-specific concern.

[167] According to Professor Biglaiser, "NCTC currently has a master agreement with Comcast for its national cable programming and for its ten NBC O&O stations. … NCTC does not have, and has never had, an agreement for Comcast's RSN programming. For this programming, an NCTC member must negotiate with Comcast directly for RSN programming owned by Comcast." (Biglaiser Report, p. 31.)

[168] Professor Biglaiser also argues that the combination of NBC O&O stations and TWC RSNs in New York and Los Angles will increase the rate at which an MVPD's subscribers will leave the MVPD if it does not carry Comcast's programming in those areas (Biglaiser Report, p. 24). However, this is not an issue in practice to the extent the negotiations regarding NBC O&Os and Comcast RSNs are separate. Moreover, an MVPD that shares these concerns can pursue arbitration, as noted above, and thus need not face the alleged subscriber loss.

194. As a result, the combination of an NBC O&O and TWC-affiliated RSNs will not give Comcast market power or the ability to increase its fees anticompetitively.[169] In fact, in the next section we show that the Commission's empirical framework for estimating horizontal pricing effects in the Comcast-NBCUniversal Order does not show any price increases due to the joint ownership of NBC O&Os and RSNs after the Comcast-NBCUniversal transaction.

195. Moreover, even if one assumes that Comcast could bundle the NBC O&O station and TWC RSN in Los Angeles, Professor Biglaiser's theoretical example for a price effect is not applicable. While his model does not explicitly rely on programming channels being close substitutes, implicitly it relies strongly on assumptions that the stations have a particular relationship in value to an MVPD, which in turn relies on assumptions about the presence or lack of competitive alternatives. In particular, his model essentially assumes the value of networks is concave in the number of networks, i.e., the second network in a two-network bundle will generate less incremental value than the value each network can generate individually. There is no evidence that this assumption is consistent with reality. Since O&Os and RSNs offer different programming (one with general entertainment and the other with regional sports), the value that each can generate may not be affected by whether or not the two are bundled. In addition, Professor Biglaiser's model would apply to the ownership of any two programming channels, but he presents no evidence that owning multiple channels leads to higher prices when all other factors are considered. One reason is that the programming market is competitive so that implementing such a strategy would not work well.

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[169] Similar analysis applies to areas where there is a Telemundo O&O station and a TWC affiliated Spanish-language RSN that carries major league sports, including Los Angeles (with a Telemundo O&O, TWC Deportes, and TWC Channel 858) and Dallas and San Antonio in Texas (with a Telemundo O&O and TWC's Canal de Tejas).

2. Empirical Analysis of RSN – O&O Overlap Does Not Show Any Anticompetitive Price Effects

196. Commenters have not presented any empirical evidence that the acquisition of TWC's ownership or distribution rights for RSNs in Los Angeles (or New York) will increase Comcast's programming price in those areas. Professor Biglaiser refers to the Commission's finding that "two separately owned, same market broadcasters who coordinate their retransmission consent negotiations can extract higher prices than when broadcasters negotiate separately."[170] However, the coordinated negotiation by two broadcasters in the same market is not at issue in this transaction, and there is no reason to expect that evidence developed in that proceeding regarding the joint negotiation of retransmission consent fees by Big 4 broadcast stations in the same DMA is relevant to the very different programming, market environment, and negotiation dynamics regarding RSNs.

197. In the Comcast-NBCUniversal Order, the Commission considered the question of whether joint ownership of NBC O&Os and Comcast RSNs in the same DMA would lead to programming price increases for Comcast RSNs relative to the pre-merger situation in which NBC O&Os and Comcast RSNs were under separate ownership. The Commission examined that issue by estimating a regression using data from the News Corp.–Hughes transaction involving joint ownership by News Corp. of Fox O&Os and Fox RSNs in the same DMA.[171]

198. The Commission's approach assumed that results based on joint Fox ownership of RSNs and O&Os could be used to predict the impact of the Comcast-NBCUniversal transaction. It found that there was a positive correlation between the increase of Fox RSNs' prices and the time that the RSNs and Fox O&O station were under the same ownership over the previous five years. The Commission interpreted the result as evidence that joint ownership of RSNs and O&O stations in the same area increased the RSNs' price and assumed that the same result would apply to joint ownership of Comcast RSNs and NBC O&O stations in an area.

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[170] Biglaiser Report, p. 25, referring to the Commission's Amendment of the Commission's Rules Related to Retransmission Consent, Report and Order and Further Notice of Proposed Rulemaking, MB Docket 10-71.
[171] Comcast-NBCUniversal Order, Appendix B, ¶¶ 53–55.

199. The Commission's assumptions (and approach) were potentially problematic as a predictor of what would happen after the Comcast-NBCUniversal transaction, as it ignored differences in the programming involved, the parties involved, and market condition differences between the Fox situation and the Comcast-NBCUniversal situation. Ignoring these limitations, which also apply to the current transactions, we apply the same difference-in-differences regression framework to examine the pricing of Comcast RSNs before and after the Comcast-NBCUniversal transaction. We use 2008 through 2013 as the sample period of our analysis, with three years of data (2008–2010) before the Comcast-NBCUniversal transaction and three years of data afterwards (2011–2013).

200. The relevant empirical question is whether Comcast RSNs' affiliate fees in areas with an NBC O&O station ("treatment RSNs") increased more relative to the market trend after the Comcast-NBCUniversal transaction than before the transaction. The treatment RSNs are the six Comcast RSNs that overlapped with an NBC O&O after the Comcast-NBCUniversal transaction.[172] Appropriate control RSNs should be similar except for not overlapping with an O&O under the same ownership. We are able to identify nine control RSNs (i.e., RSNs without an O&O station under the same ownership during the relevant time period) for which SNL Kagan data are available. See Technical Appendix for the full list of RSNs the selection of control RSNs.

201. An important consideration in using this set of control RSNs is that most of the treatment RSNs (except for CSN California and SportsNet New York) had both higher programming investments and higher affiliate fees in 2010 (prior to the Comcast-NBCUniversal transaction) than many of the control RSNs. The simple average of programming investments for the six Comcast RSNs was $**[[ ]]** and the average program investments for the nine control RSNs was $**[[ ]]**. The simple average affiliate fee for the six Comcast RSNs was $**[[ ]]** and the average affiliate fee for the nine control RSNs was $**[[ ]]**.

[172] For purposes of this analysis only, we categorize SportsNet New York as a Comcast RSN because several commenters are of the (incorrect) view that even a minority owner of an RSN could somehow gain negotiation leverage from the RSN.

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202. Given the difference in costs and fees, a simple comparison of fees over time without controlling for the scale of fees may yield a misleading result. For example, if the treatment Comcast RSN prices increased by 5% or $0.12 while the control RSN prices also increased by 5% or $0.10, a naïve comparison of the absolute dollar change in fees before and after the Comcast-NBCUniversal transaction would conclude that Comcast RSNs had a larger post-transaction increase in fees than the control RSNs, even though the change is the same in percentage terms.

203. There are two straightforward ways to account for such scale differences: using the percentage change in fees as the dependent variable (the approach adopted by the Commission in the Comcast-NBCUniversal Order) or using the logarithm of fees as the dependent variable.[173] We have run the analysis both ways.

204. Following the Commission's approach, we include a variable for joint ownership of an O&O and RSN as measured by percentage of years overlapped in previous five years. We also follow the Commission's approach and include each RSN's monthly per subscriber programming investment along with RSN fixed effects and year fixed effects.[174] Similar to the sensitivity check in our analysis of vertical price effects, we have also included specifications where we limit the set of control RSNs to those with a pre-transaction growth rate similar to those of the treatment RSNs (in the range of 6% to 15% in this case). See Technical Appendix for details of the selection of controls and regression specifications.

205. Table III.D.2 shows the results of the regressions. Neither specification shows any support for the conclusion that overlap between Comcast RSNs and NBC O&O ownership led to increased RSN fees after the Comcast-NBCUniversal transaction. In Table III.D.2 below, none of the coefficient estimates on "% Overlap in 5 Years" are statistically significant, which means there is no evidence that the horizontal overlap between Comcast RSNs and NBC O&Os is correlated with a higher growth rate of RSN fees after the Comcast-NBCUniversal transaction. Therefore, the Commission's approach to estimate horizontal price effects does not support the conclusion that there is a horizontal program selling power concern in the current transaction from Comcast's acquisition of TWC ownership or distribution rights for RSNs in Los Angeles.

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[173] In contrast, in a difference-in-differences regression using the level of fees as the dependent variable, an RSN fixed effect would only capture the difference in the average level of fees, not the difference in the amount of fee growth due to the different starting points.

[174] The Commission states that the investment controls for possible changes in programming quality over time. Comcast-NBCUniversal Order, Appendix B, ¶ 50.

IV. No Video Advertising Competitive Concerns

206. Various commenters have alleged that the transactions will reduce advertising competition. As we showed in our April Report, advertising is a very broad and competitive market with cable comprising only a small part. Commenters concerned about the transactions' impact on advertising implicitly define unrealistically narrow markets with no justification or analysis and mischaracterize the workings of the advertising market. A proper competition analysis shows that the transactions (1) do not reduce advertising competition; (2) do not reduce competition in cable advertising representation services; and (3) do not reduce competition in advanced advertising technology and services.

A. Overview of the Advertising Marketplace

207. Television comprises part of the overall advertising market.[175] Television advertising can be broken down into three basic categories: (1) cable and broadcast network adverting ("network advertising"); (2) local broadcast advertising; and (3) local cable advertising.

208. Network advertising is sold by national broadcast networks (ABC, CBS, NBC, etc.) and national cable networks, like ESPN, CNN, and USA. It is sold on a national basis. Networks compete with each other to sell advertising, since each offers an alternative path to reach the same (or many of the same) consumers, and also compete with other forms of advertising such as online, print, direct mail, and radio. Advertisers place their ads on a given network based upon their assessment of how effectively that network delivers access to the targeted audience.

209. Local broadcast advertising is sold by local broadcast affiliates of national broadcast networks – like the local ABC or NBC affiliate – as well as by independent local broadcasters in a given market. It is typically sold across the region where the broadcast affiliate is distributed – sometimes referred to as a DMA. Like national networks, local broadcasters compete directly to sell advertising, since each offers an alternative path to reach the same consumers, and also compete against other forms of advertising.

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[175] April Report, ¶¶ 236–246.

210. Finally, local cable advertising is sold by MVPDs.[176] In their affiliation agreements with cable networks, MVPDs typically are allocated two minutes per hour of advertising inventory. They sell this inventory on a local basis. In contrast to the networks and local television broadcasters, MVPDs do not typically compete with each other in the sale of local cable advertising because they do not offer alternative paths to reach the same consumers. Instead, each MVPD serves separate subscribers. If an advertiser wants to reach TWC subscribers, purchasing advertising on Cablevision is typically not an effective substitute. Instead, advertising on different MVPD systems is often complementary since different MVPDs offer access to different consumers and combining purchases may assist advertisers in reaching their target audience.

211. Because MVPD advertising is often complementary, MVPDs have agreed in many DMAs to form procompetitive "interconnects" where they pool their inventory. The interconnects permit MVPDs to compete more effectively with other outlets for local advertising, like broadcast television, which sell advertising inventory on a DMA-level with far greater coverage than any individual MVPD. This structure benefits advertisers who can go to one outlet (the interconnect) to purchase DMA-level advertising if they choose. Otherwise, advertisers would have to purchase advertising from each and every MVPD in a DMA to make a purchase of similar scope from cable companies trying to compete with local broadcasters.

212. Interconnects are generally managed by the largest MVPD in a particular market, which negotiates with advertisers that want access to the pooled inventory. In addition, individual MVPDs can and do sell advertising directly to advertisers. The managing MVPD generally distributes the interconnect revenue back to the participating MVPDs on a pro rata basis according to the amount of inventory and number of subscribers contributed to the interconnect (less a management fee). Management of an interconnect generally requires significant investments in personnel, research, technology, and sales/marketing.

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[176] In addition, a small amount of advertising is sold by local and regional cable channels.

213. MVPDs also formed NCC Media to simplify and facilitate the buying process across multiple interconnects in different DMAs for larger scale national and regional advertisers. NCC Media serves as a representative for its affiliate MVPDs (including all major cable, DBS, and telco providers and many smaller ones as well) in the sale of local advertising availabilities to national and regional advertisers. While NCC Media negotiates on their behalf, the represented MVPDs (which sometimes serve as managers of interconnects) set their own rate cards for the advertising inventory NCC Media sells. Comcast owns **[[ ]]**%, Cox owns **[[ ]]**%, TWC owns **[[ ]]**%, and Bright House owns **[[ ]]**% of NCC Media.[177] NCC Media has its own management team with 450 employees across 17 offices nationwide.[178] In addition to purchases through NCC Media, some national and regional advertisers buy local cable advertising from interconnects and directly from individual MVPDs to reach viewers in certain local markets.

B. No Competitive Concerns for Advertisers

214. As we detailed in our previous reports, the proposed transactions do not raise any competitive concerns for national, regional, or local advertisers. The transactions do not change the competitive landscape for national advertising since there will be no change in the ownership of any national broadcast or cable network. And as we explain in this section, the transactions do not raise competitive concerns for advertisers who rely on local cable as one of their advertising options.

1. No Competitive Concerns for Local Cable Advertisers

215. Commenters Viamedia, ACA, NBC Television Affiliates, and Viamedia customers CenturyLink and RCN claim that the transactions will harm local cable advertising competition.[179] Viamedia, for example, claims that the transaction "…provides Comcast with the unchecked ability to exercise its market power" and will "put an end to competition in…the Spot Cable Advertising market…"[180] CenturyLink claims that "…access to Comcast/TWC will often be a 'must have' for advertisers, which will give the combined entity greater incentive and ability to increase their market share…"[181] These claims are flawed for a number of reasons.

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[177] September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request, Response 46(a).

[178] See http://nccmedia.com/about/.

[179] See Comments in Support of Conditions, Mark Lieberman, President and Chief Executive Officer, Viamedia Inc., 8/25/14, ("Viamedia Comment"), pp. 3–4, 11–12; Comments of CenturyLink, Inc., 8/25/14 ("CenturyLink Comment"), pp. 21–22, 26; RCN Telecom Services, LLC, Grande Communications Networks, LLC and Choice Cable TV of Puerto Rico Petition to Deny Applications or Condition Consent, 8/25/14 ("RCN Comment"), pp. 27–28; Comments of the American Cable Association, 8/25/14 ("ACA Comment"), pp. 30–31; Comments of the NBC Television Affiliates, 8/25/14 ("NBC Affiliates Comment"), pp. 5–6.

[180] Viamedia Comment, p. 4.

[181] CenturyLink Comment, p. 26.

216. First, the cable MVPDs in a DMA, including Comcast, TWC, and Charter, operate in distinct footprints and do not serve or compete for the same households. For this reason, advertisers do not view them as competitive alternatives, but instead view them as complements. Indeed, even otherwise competitive MVPDs (such as DBS and telco MVPDs) are complements to cable MVPDs because they do not offer alternative means for an advertiser to reach a given MVPD household. Accordingly, there is no basis to conclude that the proposed transactions will eliminate or harm competition in any fashion.

217. This conclusion is supported by the fact that MVPDs typically pool their advertising inventory (through interconnects) and sell it on a coordinated basis. They have pooled advertising to serve advertisers more efficiently and attempt to offer a stronger competitive alternative to local broadcasters and other forms of local advertising. Because MVPDs do not compete for advertisers to the same households and already pool their advertising inventory by contract to serve advertisers' needs, a merger or other combination of these MVPDs will not have any adverse effect on local advertising competition.

218. Second, these commenters ignore the fact that local cable advertising prices are disciplined by robust competition with other local advertising media. The appropriate relevant market is a broad local advertising market comprised of advertising on local broadcast stations, local cable television, and a range of other media and advertising platforms, including online video advertising, other online advertising, radio, print, outdoor, and direct mail.[182] For example, online advertising is a significant competitive threat for automotive, political, and pharmaceutical advertising.[183] According to SNL Kagan, local cable advertising accounts for approximately 7% of total local advertising spending and 21% of local television advertising spending.[184] Thus there is no economic support for CenturyLink's claim that Comcast/TWC will be a "must have" for advertisers. In summary, given that the parties do not compete in the provision of local advertising services and the robust competition that local cable advertising faces from other local advertising providers, there is no concern about reduction of competition for local cable advertising.

219. In addition, there are no competition concerns in the small handful of DMAs with an NBC O&O broadcast station where Comcast will be acquiring TWC or Charter subscribers. The Commission (and DOJ) analyzed this exact issue (the overlap of local cable advertising with O&O advertising) in the Comcast-NBCUniversal transaction and concluded that "the proposed transaction is unlikely to harm competition in advertising."[185] While both compete in the same broad local advertising market, each has closer substitutes. For example, NBC O&O stations compete more closely with the affiliates of the other major broadcast networks and with independent broadcasters for advertising dollars.[186] As we discussed in our April Report, the NBC O&Os in the four DMAs where Comcast is acquiring cable systems from TWC face competition from at least six other local broadcasters, and the NBC O&O share of local broadcasting advertising revenue varies from **[[ ]]**% to **[[ ]]**%.[187]

2. No Competitive Concerns for Local Cable Advertisers in New York City

220. A few commenters claim that because Comcast and TWC are members of competing interconnects in the New York City DMA today, the transaction will reduce competition and raise local cable advertising prices in New York.[188] These claims are without merit. As we discussed above, the combination of Comcast and TWC advertising operations will not increase advertising prices in the New York DMA for several reasons: Comcast and TWC do not reach the same households, local cable comprises a small share of the New York local advertising market, and local cable advertising prices in New York are disciplined primarily by the competitive local advertising marketplace in New York, not by illusory competition between the two cable interconnects. Commenters present no theory or evidence that the two companies compete.

221. The New York DMA is unique in being the only top 50 DMA with two interconnects, a Cablevision-managed interconnect in which Comcast participates, and a TWC-managed interconnect in which Verizon, DirecTV, and Dish participate. There is no overlap in membership in the two interconnects, so an advertiser that wishes to reach all MVPD households in the DMA must negotiate with both interconnects. In all of the other top 50 DMAs in the country, there is a single cable advertising interconnect.[189]

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[182] April Report, ¶¶ 236–246.
[183] Interview with Hank Oster (Senior Vice President and General Manager, Comcast Spotlight).
[184] See SNL Kagan "US Advertising Market Overview 2003–2022."
[185] Comcast-NBCUniversal Order, ¶ 152.
[186] See Complaint, United States Department of Justice Antitrust Division v. Gannett Co., Inc, Belo Corp., and Sander Media LLC, December 16, 2013. See also Complaint, U.S. v. Raycom Media, Inc., August 28, 2008.
[187] April Report, ¶ 245.
[188] See Viamedia Comment, pp. 1–3; CenturyLink Comment, p. 21; RCN Comment, p. 27–28; ACA Comment, p. 30.
[189] See http://www.tvb.org/media/file/TVB_Local-Cable-Reach-Guide.pdf.

222. If, as commenters imply will occur, the transaction results in a single interconnect in the New York DMA, this would create efficiencies by allowing advertisers wishing to target the entire New York DMA or various slices of it to do so with a single coordinated transaction.

223. RCN's claim that "[p]rices for advertisers could be increased because advertisers' ability to leverage independent Interconnects against the Interconnects controlled by the combined entity will be severely depleted"[190] does not reflect the realities of the advertising marketplace. Interconnects provide efficient mechanisms for advertisers to reach all or specific sets of households in a DMA. Interconnects do not compete with each other as a means for advertisers to reach any specific household.[191] An advertiser seeking to reach all customers in a Cablevision interconnect market, for example, cannot threaten to go to the TWC interconnect because it services different customers. In summary, there is no support for commenters' claim that the transaction will reduce local cable advertising competition in the New York City DMA.

3. No Reduced Supply of Local Advertising or Bundling Concerns

224. Additionally, Viamedia raises concerns that Comcast's "domination" of the local cable advertising market will cause it (through NCC) to "allocate more advertising time for the national and regional advertisers because of the higher margins those transactions provide for Comcast."[192] According to Viamedia, this reallocation will result in reduced supply of local cable advertising to local advertisers and increased prices.[193]

225. However, Viamedia offers no support for its claims and they are incorrect. We are not aware of any basis for Viamedia's claims that the margins for national and regional advertisers are higher and this would be surprising if true since it is our understanding that prices for local cable advertising are generally higher than regional cable advertising, which in turn are generally higher than prices for national cable advertising.[194] In fact, Comcast Spotlight has a greater emphasis on local business and more focus on local zones than TWC does.[195] Therefore, rather than reducing the supply of local advertising, the transaction may *increase* supply. Additionally, Viamedia's concern is not transaction-specific. Comcast already has a majority stake in NCC, and Comcast and TWC would have already allocated more local ad availabilities to NCC for its inventory if this were more attractive. Finally, as a matter of economics, if advertising supply were moved to where it was of higher value, it would be a social benefit and more efficient use of scarce resources.

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[190] RCN Comment, p. 27

[191] We note that a number of advertisers filed in support of the transactions.

[192] Viamedia Comment, p. 11.

[193] Viamedia Comment, pp. 11–12.

[194] Interview with Hank Oster (Senior Vice President and General Manager, Comcast Spotlight).

[195] Interview with Hank Oster (Senior Vice President and General Manager, Comcast Spotlight).

226. Viamedia also raises a concern that "Comcast could bundle across interconnects,"[196] but offers no explanation of what such "bundling" would look like, how it would occur, who would be harmed, and how. If anything, bundling across interconnects is more likely to be pro-competitive, as it could reduce rates for national or regional advertisers who purchase cable advertising across multiple DMAs.

C. No Transaction-Specific Competitive Concerns for Cable Advertising Representation Services

227. Some commenters, including Viamedia, CenturyLink, RCN, and ACA have raised concerns about the transaction's impact on cable advertising representation services,[197] including local and regional representation, and national representation by NCC. Specifically, commenters claim the transaction will harm Comcast and TWC competitors, such as Viamedia, in providing representation services as well as harming smaller MVPDs that may wish to use independent representation services.[198]

228. These commenters claim that Comcast has excluded independent cable advertising representation firms such as Viamedia and competing MVPDs such as RCN from participation in cable advertising interconnects and that Comcast's "control" of additional interconnects and larger ownership stake in NCC after the transactions will give Comcast leverage to restrict its competitors' access to the interconnects and NCC and squeeze out independent representation firms.[199] Commenters also claim that Comcast will have increased leverage to force MVPDs to use Comcast Spotlight representation services as a condition to access the interconnects and NCC and discriminate against competing MVPDs with higher rates for interconnect and NCC representation services.[200] Finally, CenturyLink claims the transaction would give Comcast the incentive and ability to steer national advertisers to interconnects controlled by Comcast and away from DMAs with a higher proportion of MVPDs who do not participate in the interconnect.[201] These claims do not demonstrate that the transactions will lead to any harms to competition.

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[196] Viamedia Comment, p. 11.
[197] Viamedia describes representation services as including "…fully functioning turn-key sales, spot insertion, encoding, validation, IT, traffic and billing, and collection." Viamedia Comment, p. 8.
[198] See Viamedia Comment, pp. 8–14; CenturyLink Comment, pp. 21–28; RCN Comment, pp. 26–28; ACA Comment, pp. 30–31.
[199] See Viamedia Comment, pp. 9–14; CenturyLink Comment, pp. 24–27; RCN Comment, pp. 26–28; ACA Comment, p. 30.
[200] See Viamedia Comment, pp. 12–14; CenturyLink Comment, pp. 26–28; RCN Comment, pp. 27–28; ACA Comment, pp. 30–31.
[201] CenturyLink Comment, pp. 27–28.

1. Existing Industry Structure and Practices Are Unrelated to these Transactions

229. Most of these issues raised about cable advertising representation services are not specific to these transactions. The industry practices and concerns these commenters raise, such as the practical difficulties faced by independent representation companies, are issues that exist today.

230. Nearly all DMAs have a single advertising interconnect,[202] almost all interconnects currently are managed by the largest cable MVPD in the DMA,[203] and interconnect participants almost always use the representation services provided by the managing MVPD.

231. Economic efficiencies, rather than market power, have driven interconnects to include both technical integration and advertising sales components – it is not efficient for most MVPDs to field an independent local advertising sales force in DMAs where they have a small amount of the overall local advertising pie. While Viamedia tries to draw a stark distinction between the technical integration component of the interconnect and the representation (sales, billing, and insertion) component, it acknowledges that "…[a]n interconnect is both a joint sales and technical integration entity comprised of the MVPDs that offer service in a given market…" and that "…[t]he Interconnect is managed, and therefore controlled, by the dominant MVPD in the DMA."[204] Therefore, the idea that MVPDs can or should be precluded from offering representation services for the interconnects they manage would be inefficient. In addition, it would create perverse investment incentives if MVPDs who have invested in the technology and personnel to run and represent an interconnect were required to open the interconnect to competing representation firms that have not made similar investments. Finally, Comcast at least, and to our knowledge all interconnects, welcome all MVPDs of any size – **{{ }}**.[205]

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[202] Of the 210 DMAs, 196 have a single interconnect, 7 have two interconnects, and 7 have no interconnects. See http://www.tvb.org/media/file/TVB_Local-Cable-Reach-Guide.pdf.

[203] The largest cable MVPD manages an interconnect in all of the top 50 DMAs. In all DMAs with at least one interconnect, the largest cable MVPD manages an interconnect in approximately 90% of cases.

[204] Viamedia Comment, pp. 2–3.

[205] Interview with Hank Oster (Senior Vice President and General Manager, Comcast Spotlight).

232. Additionally, cable interconnects face formidable competition from other outlets available for advertisers. Commenters have provided no evidence that the current organization of regional cable advertising interconnects has reduced advertising competition and, more importantly, that the transactions would reduce local advertising competition.

2. The Transactions Result in Little or No Change to Operation of Interconnects in Most DMAs

233. Commenters point to a variety of statistics, some misleading, to illustrate Comcast's dominance and control of the "national Spot Cable Advertising market"[206] following the transactions. For example, several commenters note that Comcast will "control" 18 of the top 25 interconnects.[207] Commenters then assert that "control" of a larger number of interconnects nationally will lead to a variety of competitive harms in cable advertising representation services, including exclusionary conduct, tying, price discrimination, and steering. There is no theoretical or empirical support for any conclusion of competitive harm from the transactions.

234. First, there is no "national spot cable advertising market." Spot cable advertising is a form of *local advertising*, and different interconnects generally do not compete. This is because advertising in one DMA is generally not a substitute for advertising in another DMA. For an advertiser (say an association of car dealerships) desiring to reach customers in a given DMA (say Boston), it is not a substitute to purchase advertising in another DMA (say Los Angeles). Instead, such an advertiser would consider other alternatives in the *targeted* DMA, such as local cable advertising from the specific MVPDs, local broadcast advertising, radio advertising, and online advertising. These alternatives would be closer substitutes than cable advertising in a *different* DMA. Therefore, the scope of Comcast's interconnect management nationally is irrelevant and the transaction's impact on cable advertising representation services should be evaluated in *each individual DMA.*

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[206] Viamedia Comment, p. 3.
[207] Viamedia Comment, p. 9; ACA Comment, p. 30; RCN Comment, p. 26.

235. Second, in nearly all DMAs (other than New York City) where Comcast would gain "control" of the interconnect as a result of the transaction, the change simply consists of Comcast managing the interconnect instead of TWC, which will make little practical difference.[208] A simple change in management from one MVPD to another does not remove a competitor in either advertising sales or representation services from the DMA, and results in little or no change in industry structure or dynamics. As explained, and contrary to Viamedia's claims, Comcast and TWC (and other MVPDs) generally do not "compete in the Spot Cable Advertising Representation business against each other"[209] in a given DMA and there is no support for Viamedia's claim that "[t]he consolidation would result in one less Spot Cable Advertising Representation firm in many U.S. markets."[210]

3. Comcast Provides Interconnect Access to All MVPDs and Has Expanded Access for Competing MVPDs

236. Commenters' theories regarding Comcast's future exclusionary behavior and tying practices towards competing MVPDs are contradicted by the widespread participation (including competing MVPDs) in Comcast Spotlight-run interconnects today. With respect to competing MVPDs, **[[ ]]**.[211] If Comcast had an incentive to foreclose interconnect access to competing MVPDs, one would expect to see limited participation today. Contrary to commenters' claims, Comcast has generally accepted every MVPD into interconnects.[212]

237. In addition, **[[ ]]**.[213] Therefore, there is no basis for commenters' concerns about the transactions' impact on interconnect access for smaller MVPDs. This may reflect the fact that Spotlight has made investments and developed technologies that reduce the minimum viable scale for interconnect participation.[214]

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[208] Interview with Hank Oster (Senior Vice President and General Manager, Comcast Spotlight).
[209] Viamedia Comment, p. 3.
[210] Viamedia Comment, p. 3.
[211] Based on subscriber data from SNL Kagan and Comcast data on interconnect participation, and weighted by the number of telco and DBS subscribers in each DMA. See SNL Kagan ("Subs by all MVPD by DMA Q2 2014.xlsx"); September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request, Exhibit 47.1.
[212] See Testimony of David L. Cohen (Comcast Executive Vice President), Oversight Hearing on Competition in the Video and Broadband Markets: The Proposed Merger of Comcast and Time Warner Cable: Hearing Before the H. Subcomm. on Regulatory Reform, Commercial and Antitrust Law, Questions for the Record, Response 11, at 18 (5/8/14): "Comcast will continue its policy of admitting all MVPDs to any interconnects that it manages."
[213] Based on subscriber data from SNL Kagan and Comcast and TWC data on interconnect participation. See SNL Kagan ("Subs by all MVPD by DMA Q2 2014.xlsx"); September 11, 2014 Responses of Comcast Corporation to the Commission's Information and Data Request, Exhibit 47.1; TWC's Response to FCC Information Request No. 45.
[214] Interview with Hank Oster (Senior Vice President and General Manager, Comcast Spotlight).

238. **[[ ]]** commenters' speculation that Comcast will attempt to exclude competing MVPDs and overbuilders from the interconnects it manages would be counter to Comcast's incentives to include all MVPDs in interconnects. An interconnect is valuable to advertisers because it provides access to substantially all MVPD households in a given DMA. Therefore, excluding certain MVPDs from participation is likely to reduce the value of the interconnect and hinder its ability to compete with other forms of local advertising.[215]

4. No Basis for a Claim about Discriminatory Representation Rates

239. Viamedia claims that "…smaller MVPDs rely on robust competition among Spot Cable Advertising Representation firms to keep the revenue share costs in check…" and that "smaller MVPDs, small business advertisers, and consumers would face the threat of higher costs and fewer choices."[216] CenturyLink warns that the transactions "…could also give the combined entity the scale and ability to offer short-term discounts that could threaten the viability of independent [representation] firms" and would allow "…it to raise the rates it charges for representation of its competitors."[217]

240. Since the transactions do not impact competition in cable advertising representation services, these concerns are not transaction-specific. Viamedia does not present any theory or empirical evidence as to why the proposed transaction would harm competition among representation firms. Similarly, CenturyLink presents no evidence that Comcast has ever engaged in predatory pricing in cable advertising representation services or discriminatory pricing of representation services for its MVPD competitors.

5. No Competitive Concerns with NCC Media

241. The transactions raise no competition issues with respect to NCC Media. As commenters note, Comcast already owns a majority of NCC Media. In addition, we have seen no evidence that TWC has ever adopted a different approach to the operations of NCC Media than Comcast. Thus, there is no basis for a transaction-specific issue relating to NCC Media as a result of Comcast's acquisition of TWC's minority interest in NCC Media.

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[215] In particular, a high concentration in overbuild areas with more affluent customers makes a competing MVPD valuable to advertisers and to Comcast as an interconnect operator.
[216] Viamedia Comment, p. 4.
[217] CenturyLink Comment, pp. 26–27.

242. In addition, there is no evidence that Comcast has ever used its controlling ownership interest in NCC Media to disadvantage competitive MVPDs. To the contrary, today NCC Media's affiliates include a host of MVPDs that compete with Comcast and TWC, including DirecTV, Dish, Frontier, RCN, FiOS, AT&T U-verse, WOW!, and others.[218]

243. In addition, Viamedia is a member of NCC Media and Comcast has never threatened Viamedia's access to NCC Media. To the contrary, Viamedia's CEO recently wrote to Comcast to give his thanks for its support in the NCC extension (even though this decision was made independently by NCC's management).[219]

6. No Basis for CenturyLink's Steering Claims

244. CenturyLink claims that Comcast would be able to use its "control" of NCC to "steer advertisers looking to buy a significant portion of the country to DMAs where Comcast controls the interconnect" and away from those DMAs where "the advertiser would …have to buy from smaller cable operators who are not represented in the particular interconnect."[220]

245. We have seen no evidence that Comcast has used its control of NCC or its current interconnects to engage in the types of steering conduct that CenturyLink predicts. In addition, CenturyLink does not specify how Comcast would "steer" advertisers to purchase advertising in DMAs other than those they wished to buy. As noted above, local advertisers that want to purchase advertising in a particular DMA have many options for doing so, and do not view advertising in different DMAs as substitutes. Finally, CenturyLink's steering theory is not transaction-specific. There is no support for the assertion that adding TWC's ownership interest to Comcast's would lead to a different approach to the operation of NCC Media, and no support for a theory that common operation of a larger number of local interconnects will change the incentive or ability to "steer" advertisers.

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[218] See http://nccmedia.com/about/owners-affiliates/.
[219] See Reply Comments of Comcast Corporation and Time Warner Cable Inc., State of New York Public Service Commission Case 14-M-0183 (8/25/14) at 72 n. 205.
[220] CenturyLink Comment, pp. 27–28.

D. No Basis for Claim that Transaction Will Stifle Advanced Advertising Services Development

246. Finally, Viamedia and the NBC Affiliates raise concerns about the transactions' impact on advanced advertising services. Viamedia claims that "the combined entity will dominate future advertising markets," "…effectively control the deployment of emerging advertising technology for broadcast television, cable television, and online video," and "…allow Comcast to define the terms under which new cable advertising technology is introduced to the market – likely on terms that only benefit Comcast."[221] The NBC Affiliates claim that "Comcast's extensive advertising interests could put it in a position to affect competition in emerging markets for advanced advertising technologies and platforms" and that "Comcast could have the incentive and ability to use its market power as a distributor to impair the ability of broadcasters and others from participating in this market."[222]

247. First, these claims are highly speculative and not supported by any empirical evidence that Comcast has attempted to or could dictate advanced advertising technologies for the cable advertising sector. The landscape for advanced advertising technologies is dynamic and rapidly changing, with the involvement of major industry players such as Google and Apple. In such an environment, there is no basis for commenters' claims that Comcast will be able to limit the ability of others to enter and compete in video advertising markets, including broadcasters. In addition, the robustly competitive advertising marketplace makes it implausible that Comcast could control or dictate anything. New cable advertising technologies will only be successful if they can offer value to advertisers and consumers beyond other offerings in the broad, competitive advertising marketplace.

248. Second, far from being an anticompetitive harm, the increased scale, reach, and sharing of technologies from these transactions is likely to accelerate the deployment, measurement, and uptake of advanced advertising services that will compete with the many other forms of advertising available to prospective advertisers. As we have detailed previously and expand on in Section II.A, with so many MVPDs across the country, coordination is a major hurdle for the cable advertising industry to overcome, and the transactions will help with that coordination. To date, the only area in which cable companies have successfully collaborated on an advanced advertising technology is with dynamic ad insertion, and more is still needed in that area with respect to better measurement. Industry efforts towards addressable advertising and interactive advertising have been largely unsuccessful. The sharing of Comcast's addressable advertising technology with TWC, along with the additional scale and reach for better targeting will make Comcast a stronger competitor for the advanced, targeted advertising offered by online advertising providers.

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[221] Viamedia Comment, pp. 4, 14.
[222] NBC Affiliates Comment, pp. 5–6.

249. In addition, Comcast has incentives to work with other MVPDs on advanced advertising technologies and does not have incentives to limit their ability to offer or compete for these services. Similar to the formation of interconnects, the pooling of availabilities across MVPDs, particularly with addressable advertising or interactive advertising capabilities benefits both advertisers (with one-stop-shopping) and MVPDs. In sum, there is no support for commenters' claims that the transactions will harm the development of or competition in advanced advertising technologies.

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TECHNICAL APPENDIX

I. Empirical Analysis of the Price Effect of Vertical Integration of NBCUniversal Cable Networks and Comcast's MVPD Service after the Comcast-NBCUniversal Transaction

1. This section provides additional details regarding our analysis of the vertical price effect of the Comcast-NBCUniversal transaction (as described in Section III.C.1 of the Reply Report). Our analysis follows the Commission's approach in the Comcast-NBCUniversal Order.[1]

A. Treatment and Control Networks

2. The treatment networks include the six NBCUniversal legacy networks (Bravo, CNBC, MSNBC, Oxygen, Syfy, and USA) that are in SNL Kagan's Top 50 national cable networks in 2013 (ranked by total revenues, including both affiliate revenue and net advertising revenue).[2]

3. To determine a set of appropriate control networks, we start by considering all the Top 50 national cable networks excluding the six legacy NBCUniversal cable networks. We then exclude from the set: (1) three premium network entries (HBO/Cinemax, Showtime/TMC/Flix, Starz/Encore) because premium networks are not comparable to NBCUniversal's basic cable networks due to their higher pricing and more restricted targeted audience; (2) three networks that were repackaged or re-launched during the sample period of 2008 – 2013[3] (Speed, currently FOX Sports 1; Toon Disney, currently Disney XD; and Discovery Health Channel, currently Oprah Winfrey Network) because the change of programming may affect the networks' affiliate fees in ways that do not represent market trends; (3) one network (the MLB Network) for which SNL Kagan does not have an affiliate fee for one year during the sample period; and (4) 14 cable networks that were vertically integrated with MVPDs at some point during the 2008-2013 sample period,[4] so that we are not comparing the treatment networks to other networks that were also vertically integrated. After these exclusions, the remaining 23 national cable networks are used as non-vertically integrated controls. Table A-1 shows SNL Kagan's list of Top 50 national cable networks in 2013 and whether a network is included as a treatment or control network or excluded from the sample.

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[1] Comcast-NBCUniversal Order, Appendix B, ¶¶ 48 – 52.
[2] SNL Kagan, "Basic Cable Networks by Affiliate Revenue" and "Basic Cable Networks by Net Advertising Revenue."
[3] The sample period covers three years before and three years after the Comcast-NBCUniversal transaction.
[4] A network is classified as vertically integrated with an MVPD in a year if the MVPD or the parent company of the MVPD has a 50% or greater ownership interest in the network in the year.

Table A-1. Top 50 National Cable Networks in 2013

Network Name	2013 Rank [1]	Category	Premium	Repackaged	Missing Affiliate Fees	Vertically Integrated Between 2004 and 2013
ESPN	1	Control				
HBO / Cinemax	2	Exclude	Yes			
TNT	3	Exclude				Yes
USA	4	Treatment				Yes
FOX News	5	Exclude				Yes
Nickelodeon/Nick At Nite	6	Control				
TBS	7	Exclude				Yes
Showtime / TMC / Flix	8	Exclude	Yes			
Disney Channel	9	Control				
MTV	10	Control				
Starz / Encore	11	Exclude	Yes			
FX Network	12	Exclude				Yes
NFL Network	13	Control				
ESPN2	14	Control				
CNN	15	Exclude				Yes
DiscoveryChannel	16	Control				
Lifetime Television	17	Control				
HGTV	18	Control				
A&E	19	Control				
Food Network	20	Control				
History	21	Control				
Cartoon Network	22	Exclude				Yes
AMC	23	Exclude				Yes
Syfy	24	Treatment				Yes
ABC FamilyChannel	25	Control				
Comedy Central	26	Control				
Spike TV	27	Control				
Bravo	28	Treatment				Yes
BET	29	Control				
CNBC	30	Treatment				Yes
VH1	31	Control				
TLC	32	Control				
MSNBC	33	Treatment				Yes
FOX Sports 1	34	Exclude		Yes		
E!	35	Exclude				Yes
Golf Channel	36	Exclude				Yes
TV Land	37	Control				
National Geographic Channel	38	Exclude				Yes
truTV	39	Exclude				Yes
NBCSN	40	Exclude				Yes
Hallmark Channel	41	Control				
The Weather Channel	42	Control				
Travel Channel	43	Exclude				Yes
Animal Planet	44	Control				
Investigation Discovery	45	Control				
Disney XD	46	Exclude		Yes		
FOX College Sports	47	Exclude				Yes
OWN: Oprah WinfreyNetwork	48	Exclude		Yes		
MLB Network	49	Exclude			Yes	
Oxygen Network	50	Treatment				Yes

Source: SNL Kagan

Note: [1] National cable networks are ranked by total revenue in 2013, defined as the sum of affiliate revenue and net advertising revenue.

B. Regression Specifications

4. Following the Commission's approach,[5] we regress the year-on-year growth rate of affiliate fees on:

- Percentage of years under vertical integration during the previous five years (including the current year), which is the variable of primary interest.[6] A positive and statistically significant coefficient is interpreted as indicating a positive correlation between affiliate fees and the event of vertical integration.

[5] Comcast-NBCUniversal Order, Appendix B, ¶ 51.

- Growth rate of the three-year moving average of monthly programming investment of the 36-month window covering the previous three years (including the current year).

- A spline in the age of the network with knot points at the quintiles.

- Network and year fixed effects.

5. We cluster the standard errors of the estimates by the "top owner" to account for the fact that networks are usually sold as a bundle.[7]

6. In addition to a specification using the growth rate of fees as the dependent variable, we run an alternative specification where we use the natural logarithm of affiliate fees as the dependent variable. In this alternative specification, we replace the growth rate of the three-year moving average of programming investment with the natural logarithm of the three-year moving average of programming investment.

7. We also run the growth rate and natural logarithm specifications using a subset of control networks that had average pre-transaction growth rates of affiliate fees similar to those of the treatment networks. We compute the average annual growth rate of affiliate fees in the pre-transaction period of 2008 to 2010 for each of the six treatment networks. Pre-transaction, the six treatment networks had average annual growth rates between **[[ ]]**% and **[[ ]]**%, so we choose control networks with pre-transaction average annual growth rates between **[[ ]]**% and **[[ ]]**%. This criterion excluded 5 of the 23 control networks, leaving 18 networks in this subset of control networks.[8]

II. Empirical Analysis of the Price Effect of Horizontal Integration of Comcast RSNs and NBC O&Os in the Same Area after the Comcast-NBCUniversal Transaction

8. This section provides additional details regarding our analysis of the price effect of horizontal integration of Comcast RSNs and NBC O&Os in the same area after the Comcast-

[6] The Commission used this variable because it was "unable to observe the date when the pre-transaction contracts were renegotiated following the merger. Since contracts can span multiple years, we would expect that the change in programming fees would increase with the time since vertical integration occurred." Comcast-NBCUniversal Order, Appendix B, ¶ 51.
[7] Comcast-NBCUniversal Order, Appendix B, ¶ 51. The top owner of the network is identified as the owner with the highest ownership interest in the network. If there is a tie between two owners, we identify the top two owners. For example, Walt Disney and Hearst each owned 50% of Bio Network in 2013. We classify Walt Disney and Hearst as the top owners of the network.
[8] The networks excluded are ABC family channel, Disney channel, HGTV, Hallmark channel, and Food network.

NBCUniversal transaction (as described in Section III.D.2 of the Reply Report). Our analysis follows the Commission's approach in Section C of the Comcast NBCUniversal Order, Appendix B.[9]

A. Treatment and Control RSNs

9. There are 42 RSNs for which SNL Kagan tracks affiliate fees since 2008.[10] These 42 RSNs each carry at least one NBA, MLB, or NHL team in the U.S.[11] The treatment RSNs include the six Comcast-affiliated RSNs whose footprints overlap with DMAs served by NBC O&Os (CSN Philadelphia, CSN Mid-Atlantic, SportsNet New York,[12] CSN Bay Area, CSN California, and CSN Chicago).

10. To select a group of appropriate control RSNs, we exclude from the remaining 36 RSNs: (1) 17 Fox RSNs due to their joint ownership with a Fox O&O station for at least some time from 2008-2013; (2) five RSNs that were launched after 2010 and thus have no data from the pre-period; (3) two RSNs that experienced a significant change of programming during the sample period; (4) two RSNs that have gone off-air; and (5) Comcast SportsNet Northwest because it only had Comcast as its main carrier during most of the sample period. After these exclusions, the remaining nine RSNs are used as non-horizontally integrated control RSNs.

11. Table A-2 below shows the RSNs included and excluded from the sample and the reasons for exclusion, along with the NBA, MLB, and NHL teams carried by the RSNs in 2014.

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[9] Comcast-NBCUniversal Order, Appendix B, ¶¶ 53 – 55.
[10] SNL Kagan, "RSN Networks by Affiliate Revenue per Avg Sub per Mo".
[11] Together, these 42 RSNs carry all the U.S.-based NBA, MLB, and NHL teams, except for the Kansas City Royals, New Orleans Pelicans, and Oklahoma Thunder. The Kansas City Royals are carried by Fox Sports Kansas, the New Orleans Pelicans by Fox Sports New Orleans, and the Oklahoma Thunder by Fox Sports Oklahoma, none of which is tracked in the SNL Kagan report.
[12] Comcast has a minority, non-controlling ownership interest in SportsNet New York.

Table A-2. Regional Sports Networks (RSNs) Included in and Excluded from the Sample

	RSN	NBA Teams	MLB Teams	NHL Teams	Category
Treatment					
	Comcast SportsNet Philadelphia	Philadelphia 76ers	Philadelphia Phillies	Philadelphia Flyers	Treatment
	Comcast SportsNet Mid-Atlantic	Washington Wizards		Washington Capitals	Treatment
	SportsNet New York		New York Mets		Treatment
	Comcast SportsNet Bay Area	Golden State Warriors	San Francisco Giants		Treatment
	Comcast SportsNet California	Sacramento Kings	Oakland Athletics	San Jose Sharks	Treatment
	Comcast SportsNet Chicago	Chicago Bulls	Chicago Cubs	Chicago Blackhawks	Treatment
			Chicago White Sox		Treatment
Control					
	Comcast SportsNet New England	Boston Celtics			Control
	Altitude Sports and Entertainment	Denver Nuggets		Colorado Avalanche	Control
	MSG Plus			New Jersey Devils	Control
				New York Islanders	Control
	Madison Square Garden Network [1]	New York Knicks		New York Rangers	Control
				Buffalo Sabres	Control
	Mid-Atlantic Sports Network		Baltimore Orioles		Control
			Washington Nationals		Control
	Root Sports Pittsburgh		Pittsburgh Pirates	Pittsburgh Penguins	Control
	New England Sports Network		Boston Red Sox	Boston Bruins	Control
	Root Sports Northwest		Seattle Mariners		Control
	SportsTime Ohio		Cleveland Indians		Control
Excluded					
	FOX Sports Arizona	Phoenix Suns	Arizona Diamondbacks	Phoenix Coyotes	Excluded
	FOX Sports Carolinas	Charlotte Hornets		Carolina Hurricanes	Excluded
	FOX Sports Detroit	Detroit Pistons	Detroit Tigers	Detroit Red Wings	Excluded
	FOX Sports Ohio	Cleveland Cavaliers	Cincinnati Reds	Columbus Blue Jackets	Excluded
	FOX Sports Southwest	Dallas Mavericks	Texas Rangers	Dallas Stars	Excluded
		San Antonio Spurs			Excluded
	FOX Sports Tennessee	Memphis Grizzlies		Nashville Predators	Excluded
	FOX Sports West [2]		Los Angeles Angels	Los Angeles Kings	Excluded
Overlap with O&O Stations under the same Ownership	Prime Ticket [3]	Los Angeles Clippers		Anaheim Ducks	Excluded
	SportSouth [4]	Atlanta Hawks	Atlanta Braves		Excluded
	FOX Sports Wisconsin	Milwaukee Bucks	Milwaukee Brewers		Excluded
	Sun Sports	Miami Heat	Tampa Bay Rays	Tampa Bay Lightning	Excluded
		Orlando Magic			Excluded
	FOX Sports Midwest	Indiana Pacers	St. Louis Cardinals	St. Louis Blues	Excluded
	FOX Sports Florida	Orlando Magic	Miami Marlins	Florida Panthers	Excluded
	FOX Sports North	Minnesota Timberwolves	Minnesota Twins	Minnesota Wild	Excluded
	FOX Sports South	Atlanta Hawks	Atlanta Braves		Excluded
	Root Sports Rocky Mountain	Utah Jazz	Colorado Rockies		Excluded
	YES Network	Brooklyn Nets	New York Yankees		Excluded
	Longhorn Network				
	Comcast SportsNet Houston	Houston Rockets	Houston Astros		Excluded
Launched after 2010	Time Warner Cable SportsNet/Deportes	Los Angeles Lakers			Excluded
	FOX Sports San Diego [5]		San Diego Padres		Excluded
	SportsNet LA		Los Angeles Dodgers		Excluded
Change in Programming	Cox Sports Television	(New Orleans Hornets prior to 2012-2013 season)			Excluded
	Channel 4 San Diego		(San Diego Padres prior to 2012)		Excluded
Off the Air	Royals Sports Television Network				Excluded
	Comcast/Charter Sports Southeast				Excluded
With little sales to MVPDs other than Comcast	Comcast SportsNet Northwest	Portland Trail Blazers			Excluded

Source: RSN websites

Notes: [1] Madison Square Garden Network also broadcasts some games for the New Jersey Devils and New York Islanders.
[2] FOX Sports West also broadcasts some games for the Anaheim Ducks.
[3] Prime Ticket also broadcasts some games for the Los Angeles Kings.
[4] SportSouth also broadcasts some games for the Memphis Grizzlies and Charlotte Hornets.
[5] FOX Sports San Diego also broadcasts some games for the Los Angeles Clippers, Anaheim Ducks, and Los Angeles Kings.

12. As shown in Table A-3 below, our sample of treatment and control networks covers 8 NBA teams, 12 MLB teams, and 11 NHL teams.

Table A-3. RSN Sample
Carriage of Major League Teams

Category	NBA	MLB	NHL
Treatment	5	6	4
Control	3	6	7
In Sample	**8**	**12**	**11**
Excluded	19	16	12
Not Tracked by SNL Kagan [1][2][3]	3	2	7

Note: [1] NBA: Oklahoma City Thunder (carried by Fox Sports Oklahoma), Toronto Raptors (carried by a Canadian network), New Orleans Pelicans (carried by Fox Sports New Orleans).
[2] MLB: Kansas City Royals (carried by Fox Sports Kansas) and Toronto Blue Jays (carried by a Canadian network).
[3] NHL: Seven teams carried by Canadian networks.

B. Regression Specifications

13. Following the Commission's approach,[13] we regress the year-on-year growth rate of affiliate fees from the previous year on:

- Percentage of years under horizontal overlap during the previous five years (including the current year), which is the variable of primary interest.[14] A positive and statistically significant coefficient is interpreted as indicating a positive correlation between affiliate fees and the event of horizontal overlap.
- Growth rate of the three-year moving average of monthly programming investment of the 36-month window covering the previous three years (including the current year).
- A spline in the age of the network with knot points at the quintiles.
- Network and year fixed effects.
- We cluster the standard errors of the estimates by RSN.[15]

[13] Comcast-NBCUniversal Order, Appendix B, ¶¶ 51, 54.
[14] The Commission stated that this variable was used because it was "unable to observe the date when the pre-transaction contracts were renegotiated following the merger. Since contracts can span multiple years, we would expect that the change in programming fees would increase with the time since vertical integration occurred." Comcast-NBCUniversal Order, Appendix B, ¶¶ 51, 54.
[15] Comcast-NBCUniversal Order, Appendix B, ¶54.

14. We also run an alternative specification where we use the natural logarithm of the affiliate fee as the dependent variable. In this alternative specification, we replace the growth rate of the three-year moving average of the programming investment with the natural logarithm of three-year moving average of the programming investment.

15. In addition, we also run the two specifications using a subset of control RSNs that had an average pre-transaction affiliate fee growth rate similar to those of the treatment RSNs. We compute the average annual growth rate of affiliate fees in the pre-transaction period of 2008 to 2010 for each of the six treatment RSNs. Pre-transaction, the six treatment RSNs had average annual growth rates ranging between **[[ ]]**% and **[[ ]]**%, so we choose control RSNs with pre-transaction average annual growth rates between **[[ ]]**% and **[[ ]]**%. This criterion excluded 5 of the 9 control RSNs, leaving 4 RSNs in this subset of control networks.[16]

III. Permanent and Temporary Foreclosure Analysis Using the Commission's Approach in the Comcast-NBCUniversal Order

A. Illustration of Theoretical Critical Departure Rate Calculations

16. In this section, we illustrate the calculation of theoretical critical departure rates for permanent and temporary foreclosures using the Commission's approach in the Comcast-NBCUniversal Order. Section C below lists mathematical formulas of the calculations for all scenarios.

1. NBC O&Os

a) Permanent foreclosure

17. Consider a permanent foreclosure of the NBC O&O station in DMA *m* to four rival MVPDs (e.g., Dish, DirecTV, AT&T and Verizon) combined.[17] The cost of a permanent foreclosure includes lost retransmission fees and lost advertising revenues (local and national). The former is associated with the rival MVPDs' subscribers who do not leave the MVPDs. The latter is associated with the rival MVPDs' subscribers who do not leave the MVPDs and do not watch NBC programming over-the-air. In addition, we adopt the Commission's assumption that the

[16] The excluded RSNs are Mid-Atlantic Sports Network, New England Sports Network, Root Sports Pittsburgh, MSG Plus, and Comcast SportsNet New England.
[17] A similar formula applies to five MVPDs including RCN.

foreclosure-related decrease in viewership will also reduce Comcast's national and local advertising revenue per viewer.[18] The total cost of foreclosure is given by the following formula:

$$\sum_{i=1}^{4} retrans_i \times (1-d) \times subs_{i,m} + \left(ad_{national} + ad_{local_m}\right) \times (1-a-d) \times \sum_{i=1}^{4} subs_{i,m}$$

$$+ad_{national} \times b \times (1-a-d) \times \frac{\sum_{i-1}^{4} sub\,s_{i,m}}{sub\,s_{national}} \times [a \times \sum_{i=1}^{4} subs_{i,m} + (subs_{national} -$$

$$\sum_{i=1}^{4} subs_{i,m})] + ad_{local_m} \times b \times (1-a-d) \times \frac{\sum_{i-1}^{4} sub\,s_{i,m}}{sub\,s_m} \times [a \times \sum_{i=1}^{4} subs_{i,m} + (subs_m -$$

$$\sum_{i=1}^{4} subs_{i,m})]$$

18. In this formula, *d* is the proportion of foreclosed MVPD's subscribers who switch to other MVPDs; *a* is the proportion of subscribers who will stay with the foreclosed MVPDs but switch to watch the NBC programming over-the-air.[19] We use 33% for *a*, the same rate the Commission used in the Comcast-NBCUniversal transaction and the News Corp-Hughes transaction.[20] We also assume that a 1% decline in viewership results in a 0.39% (*b*) reduction in the advertising price per viewer.[21]

19. For retransmission fees, we use the fee each MVPD pays Comcast in 2014. For local advertising revenues, we use the 2014 advertising revenue per subscriber of the relevant NBC O&O station estimated by SNL Kagan. For national advertising revenues, we use 2014 national advertising revenues per subscriber of the NBC Network estimated by SNL Kagan.

20. Under the Commission's theoretical foreclosure model, the gain from foreclosing a rival MVPD is the additional profit Comcast will earn from subscribers who switch from the rival MVPDs to Comcast due to the loss of NBC O&O programming, which is:

$$\alpha_{MVPDs,m} \times d \times \pi_m \times \sum_{i=1}^{4} subs_{i,m}$$

[18] FCC Appendix B, ¶ 20. For ease of calculation, we assume that the reduction in national and local advertising revenue per subscriber does not apply to foreclosed subscribers who switch to other MVPDs.
[19] Comcast-NBCUniversal Order, Appendix B, ¶ 23.
[20] Comcast-NBCUniversal Order, Appendix B, ¶ 23. News Corp Hughes Order, Appendix D, ¶ 6.
[21] Comcast-NBCUniversal Order, Appendix B, ¶ 20.

21. In this formula, [Missing Graphic Reference] is the diversion ratio from the foreclosed MVPD to Comcast, i.e., among the subscribers who would leave the MVPD, the share that would switch to Comcast. Following the Commission's approach in the Comcast-NBCUniversal Order, we calculate proportional diversion ratios in each DMA based on 2Q2014 subscriber shares estimated by SNL Kagan.[22] For profit [Missing Graphic Reference] in market *m*, we use the monthly average profit per video subscriber calculated from the 2014 Comcast regional "profit and loss" statements.[23] See Section I.B below for details of the calculation of the profits per video subscriber.

22. Equating the theoretical cost and benefit of the foreclosure, the critical departure rate *d* for permanent foreclosure is given by the following formula:

$$d_{permanent} = \frac{\sum_{i=1}^{4}\left[retrans_i + \left(\widetilde{ad_m} + \widetilde{ad_m}\right) \times (1-a)\right] \times subs_{i,m}}{\sum_{i=1}^{4}\left(retrans_i + \widetilde{ad_m} + \widetilde{ad_m} + \alpha_{MVPDs,m} \times \pi_m\right) \times subs_{i,m}}$$

23. In the formula,

$$\widetilde{ad_m} = \left[ad_{national} \times \left(1 - b \times (1-a) \times \frac{\sum_{i=1}^{4} subs_{i,m}}{subs_{national}}\right) + ad_{local_m} \times \left(1 - b \times (1-a) \times \frac{\sum_{i=1}^{4} subs_{i,m}}{subs_m}\right)\right]$$

and

$$\overline{ad_m} = ad_{national} \times b + ad_{local_m} \times b$$

b) Temporary foreclosure

24. The calculation of theoretical critical departure rates for a one-month temporary foreclosure of the NBC O&O station in DMA *m* to a rival MVPD *i* is similar to that for a permanent foreclosure but with a few modifications. First, we adopt the Commission's assumption that a temporary foreclosure will not lead to any reduction in the advertising revenue per viewer ([Missing Graphic Reference].[24] The cost of a temporary foreclosure is the lost retransmission fee and local

[11] Comcast-NBCUniversal Order, Appendix B, ¶ 13.
[23] Comcast-NBCUniversal Order, Appendix B, ¶ 22.
[24] Comcast-NBCUniversal Order, Appendix B, ¶ 20.

and national advertising revenue during the foreclosure, which is

$$Cost = retrans_i \times (1-d) \times subs_{i,m} + \left(ad_{national} + ad_{local,m}\right) \times (1-a-d) \times subs_{i,m}$$

25. Second, unlike in a permanent foreclosure where subscribers are assumed to permanently switch from the foreclosed MVPD, in a temporary foreclosure subscribers are assumed to switch back to the foreclosed MVPD gradually after the programming is restored. Since the subscribers who switch from the foreclosed MVPD have shown a higher tendency to switch MVPDs depending on the MVPD's carriage of programming, they are also more likely to switch back (or "churn back") to their original MVPD when the programming is restored on the MVPD. We estimate two "churn-back" rates based on Comcast's churn data, one rate for those who are more likely to switch ("movers") and one rate for those who are more likely to stay ("stayers"). Following the Commission's approach, we assume that during the month immediately after the programming is restored, the switchers would churn back to the foreclosed MVPD at a rate about twice the estimated churn rate for movers.[25] Using Comcast's churn data, we estimate the churn rate of the movers to be **{{ }}**%, which implies that the first-month churn back rate is about **{{ }}**% (≈ 2 × **{{ }}**%) according to the Commission's assumption. For the second month onward, we also follow the Commission's approach and assume the churn back rate is the same as the average customer churn rates in Comcast's subscriber data.[26]

26. Third, Comcast incurs a net acquisition cost including sales and marketing, installation and overhead costs at the time a subscriber switches to Comcast. In addition, the profit for a new subscriber during the first year may be lower due to promotions that reduce revenue. Therefore, we calculate three average profits for subscribers at three different points in their tenure with Comcast. The first average profit is for new subscribers who have switched to Comcast for less than a month, which takes into account the net acquisition cost. The second average profit is for new subscribers who have been with Comcast for more than one month and up to one year, which takes into account promotional offers. The third average profit is for subscribers who have been with Comcast for at least one year. See Section I.B below for the details of calculation of Comcast profits.

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[25] Comcast-NBCUniversal Order, Appendix B ¶ 24. This assumption was originally proposed by Comcast's experts in the Comcast-NBCUniversal transaction (Israel-Katz February 2010 Report, ¶¶ 41, 43) and was adopted by the Commission.
[26] Comcast-NBCUniversal Order, Appendix B ¶ 24. **{{ }}**.

27. Overall, the theoretical gain from a temporary foreclosure is given by:

$$\alpha_{i,m} \times d \times subs_{i,m}$$
$$\times \left[\left(\pi_{1,m} - Acqcost \right) + \pi_{1,m} \right.$$
$$\times \left((1-c_1) \times \frac{1}{1+r}^{1} + (1-c_1)(1-c_2) \times \frac{1}{1+r}^{2} + (1-c_1)(1-c_2)^2 \right.$$
$$\left. \times \frac{1}{1+r}^{3} + \cdots + (1-c_1)(1-c_2)^{10} \times \frac{1}{1+r}^{11} \right) + \pi_{2,m}$$
$$\times \left((1-c_1)(1-c_2)^{11} \times \frac{1}{1+r}^{12} + (1-c_1)(1-c_2)^{11}(1-c_3) \times \frac{1}{1+r}^{13} + \cdots \right.$$
$$+ \ (1-c_1)(1-c_2)^{11}(1-c_3)^{12} \frac{1}{1+r}^{24}$$
$$\left. \left. + (1-c_1)(1-c_2)^{11}(1-c_3)^{12}(1-c_4) \times \frac{1}{1+r}^{25} \ldots \right) \right]$$

28. In this formula, $\alpha_{i,m}$, the diversion ratio, represents the proportion of subscribers departing foreclosed MVPD *i* that would switch to Comcast. We compute the proportional diversion ratios using 2Q2014 subscriber shares. To account for the fact that DBS subscribers are more likely to switch to other DBS providers than to Comcast, the Commission used a diversion ratio from DBS to Comcast at an undisclosed rate implied by the proportional diversion ratio.[27] Since the Commission's rate is redacted, we assume the diversion rate for DBS MVPDs to be 1/2 of the rate implied by the proportional diversion ratio and the diversion rate for telco MVPDs to be the same as proportional diversion ratio.

29. We assume subscribers churn back to the foreclosed MVPD at a rate of c_1 during the first month after the programming is restored, at c_2 during the second month up to one year, at c_3 during the second year, and at c_4 after the second year. We assume that *r*, the annual discount

[27] Comcast-NBCUniversal Order, Appendix B, ¶¶ 13-16.

rate, is 10%. The monthly profit of a new subscriber in DMA *m* is [Missing Graphic Reference] during the first month, [Missing Graphic Reference] during the second month up to one year, and [Missing Graphic Reference] after the second year.

30. With the assumptions above, we derive the critical departure rate that would equate the cost and benefit of a temporary foreclosure.

$$d_{temporary} = \frac{retrans_i + (ad_{national} + ad_{local,m}) \times (1-a)}{retrans_i + \alpha_{i,m} \times (\pi_{1,m} - Acqcost) + \alpha_{i,m} \times \pi_{1,m} \times \tilde{c} + \alpha_{i,m} \times \pi_{2,m} \times \hat{c} + (ad_{national} + ad_{local_m})}$$

31. In this formula,

$$\hat{c} = \left(\frac{1-c_2}{1+r}\right)^{12}\left(\frac{1-c_1}{1-c_2}\right) + \sum_{t=13}^{24}\left(\frac{1-c_3}{1+r}\right)^{t}\frac{(1-c_1)(1-c_2)^{11}}{(1-c_3)^{12}} + \left(\frac{1-c_4}{1+r}\right)^{25}\frac{(1-c_1)(1-c_2)^{11}(1-c_3)^{12}}{(1-c_4)^{24}} \times \frac{1+r}{c_4+r}$$

and

$$\tilde{c} = \sum_{t=2}^{11}\left(\frac{1-c_2}{1+r}\right)^{t}\left(\frac{1-c_1}{1-c_2}\right) + \frac{1-c_1}{1+r}$$

2. NBCUniversal Cable Networks

32. The Commission's permanent and temporary foreclosure model for NBCUniversal national cable networks is similar to that for NBC O&Os with a few modifications. First, Comcast loses affiliate fees instead of retransmission consent fees. Second, the advertising revenue Comcast loses in a foreclosure is national cable network advertising.

33. We calculate affiliate fees and advertising revenue per subscriber per month for the set of NBCUniversal cable networks at issue based on Comcast's data on affiliate fee revenue, advertising revenue and cable network subscribers for the first half of 2014. Diversion ratios are calculated using 2Q2014 subscribers estimated by SNL Kagan.

3. RSNs

34. The permanent and temporary foreclosure model for an RSN is also similar to that for NBC O&Os with a few modifications. First, the advertising revenue Comcast loses in a foreclosure involving RSNs is regional advertising. Second, the diversion ratio is calculated based on the shares of RSN subscribers. For example, Dish does not carry TWC SportsNet, so

the model assumes that if a subscriber leaves DirecTV due to foreclosure of TWC SportsNet, she would not switch to Dish.[28]

35. As explained in the main text, we calculate critical departure rates for two RSNs: CSN New England and TWC SportsNet. For CSN New England, we calculate affiliate fees, advertising revenue per subscriber per month, and diversion ratios using Comcast data for the first half of 2014.[29]

36. For TWC SportsNet, we obtain the affiliate fees from TWC and calculate the advertising revenue per subscriber per month from SNL Kagan estimates. Diversion ratios are calculated based on subscriber counts from SNL Kagan in Los Angeles, the home DMA of the LA Lakers.[30]

B. Model Inputs

1. Comcast's Monthly Profit from an Additional Residential Video Subscriber

37. To estimate the monthly profit Comcast would earn from an additional residential video subscriber, we first identify revenue and cost items for video service from Comcast's "2014 budgeted Profit and Loss (P&L) Statements," (hereinafter "Comcast P&L Statements"), which were provided to us for Comcast's 16 business regions.[31]

38. Revenues from an additional residential video subscriber include recurring video revenue (including monthly video subscription revenues and video equipment rentals) and Pay-Per-View revenue on the Comcast P&L statements.

$$Video\ Revenue = Recurring\ Video\ Revenue + Pay\ Per\ View\ Revenue$$

39. **{{ }}**. Since these expenses include expenses for both residential and commercial subscribers, we adjust these expenses by the share of residential video subscribers in total video

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[28] We note that this assumption is problematic. Suppose a consumer chooses among Comcast, DirecTV, Dish and AT&T based on the value of each MVPD to her. Dish does not carry the RSN programming while the other three MVPDs do. Suppose the value ranking of the four MVPDs is DirecTV, Dish, AT&T, and Comcast, from the highest to lowest, so the subscriber chooses DirecTV. Assume that if DirecTV loses the RSN programming, its value to the subscriber declines to just below the value of Dish and the value ranking changes to Dish, DirecTV, AT&T and Comcast. In that case, the subscriber will choose Dish even though it does not carry the RSN programming while AT&T and Comcast do. While we do not have the data to estimate such an effect, this example shows that if the diversion ratio calculation excludes an MVPD not carrying the programming at issue, it may overstate the diversion ratio to Comcast and overstate Comcast's incentive for permanent or temporary foreclosure.

[29] Comcast Exhibit 8.2 (b), Comcast Exhibit 8.6 (a-c).

[30] We exclude Dish's subscribers as Dish does not carry TWC SportsNet.

[31] These regions include Beltway Region, Big South Region, California Region, Chicago Region, Florida Region, Freedom Region, Greater Boston Region, Heartland Region, Houston Region, Keystone Region, Mile High Region, Mountain Region, Portland Region, Seattle Region, Twin Cities Region, and Western New England Region.

subscribers, which is estimated to be **{{ }}**%.[32]

{{REDACTED**}}**

40. Second, **{{ }}**.[33] Because a subscriber will typically return equipment if his or her service is discontinued, we **{{ }}**.[34] That is:

$$Amortized\ Capital\ Expense = \frac{capital\ expense\ for\ video\ sub}{\sum_{t=0}^{119}\left(\frac{1}{1+r}\right)^{t}}$$

41. With the video expenses identified above, we subtract recurring video expenses from video revenue, divide the difference by the number of residential video subscribers and 12 months, and then subtract the amortized capital expense to calculate profit per video subscriber per month in a given region.

$$Profit\ per\ video\ sub\ per\ month = \frac{Recurring\ Video\ Revenue - Recurring\ Video\ expenses}{residential\ video\ subscribers \times 12} - Amortized\ Capital\ Expense$$

42. Third, Comcast incurs a net acquisition cost at the time a subscriber switches to Comcast, **{{ }}**.[35] Note that even if the foreclosure drives a subscriber to leave her current MVPD, Comcast still needs to incur the cost to compete with other MVPDs to attract the subscriber. For sales and marketing expense associated with a new video subscriber, we use the **{{ }}**.[36] We subtract the installation revenue from the installation and overhead costs to calculate the net installation costs and **{{ }}**.[37]

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[32] Comcast Exhibit 4.7 (e).
[33] Comcast, "Customer Lifetime Value", October 2013, p. 22.
[34] Comcast, "Customer Lifetime Value", October 2013, pp. 22-23. **{{ }}**.
[35] Comcast, "Customer Lifetime Value", October 2013, p. 22.
[36] Comcast's Response to the DOJ 2nd Request, Exhibit 4.13(a).
[37] Comcast, "Customer Lifetime Value", October 2013, p. 22.

$$\begin{aligned} &Net\ acquisition\ cost\ per\ video\ sub \\ &= regional\ cost\ per\ connect + national\ marketing\ expense \\ &+ \frac{installation\ cost + overhead - installation\ revenue}{3} \end{aligned}$$

43. In addition, as described above, the profit for a new subscriber during the first year is usually lower due to promotional offers. Therefore, we calculate separately an average profit for a new subscriber during the first month that takes into account the net acquisition cost, an average profit for a new subscriber after the first month up to one year that takes into account promotional offers, and an average profit for a subscriber with at least one year of tenure.

$$\begin{aligned} &Video\ Profit\ per\ sub_{first\ year} \\ &= Video\ Revenue\ per\ sub * \%\ of\ First\ year\ ARPU^{38} \\ &- Video\ Expense\ per\ sub \end{aligned}$$

$$\begin{aligned} &Video\ Profit\ per\ sub_{second\ year\ and\ beyond} = \\ &= Video\ Revenue\ per\ sub * \%\ of\ Second\ year\ and\ beyond\ ARPU^{39} \\ &- Video\ Expense\ per\ sub \end{aligned}$$

$$\begin{aligned} &Video\ Profit\ per\ sub_{first\ month} \\ &= Video\ Profit\ per\ sub_{first\ year} - Net\ acquisition\ cost\ per\ video\ sub \end{aligned}$$

2. Other Inputs

44. The values of various other parameters used in the calculations are listed below:

- § Share of over-the-air watching: a = **{{ }}**
- § Percentage reduction in advertising revenue per sub due to loss of one percent viewership: b = **{{ }}**
- § Churn back rates after programming is restored:

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38 Comcast, "Customer Lifetime Value", October 2013, p. 6. We estimate first year ARPU by averaging 0-6 months and 7-12 months monthly recurring charge (MRC) and second-year-beyond ARPU by averaging 1-2 years, 2-3 years, 3-5 years, and >5 years MRC.

$$\%\ of\ First\ year\ ARPU = \frac{First\ year\ ARPU}{First\ year\ ARPU * \%\ of\ 1st\ year\ subs + Second\ year\ and\ beyond\ ARPU * \%\ of\ subs\ with\ tenure\ longer\ than\ 2\ years}$$

39

$$\%\ of\ Second\ year\ and\ beyond\ ARPU = \frac{Second\ year\ and\ beyond\ ARPU}{First\ year\ ARPU * \%\ of\ 1st\ year\ subs + Second\ year\ ARPU * \%\ of\ subs\ with\ tenure\ longer\ than\ 2\ years}$$

- Month 1: c_1 = **{{ }}**%
- Month 2 – Month 12: c_2 = **{{ }}**%
- Month 13 – Month 24: c_3 = **{{ }}**%
- Month 25 onwards: c_4 = **{{ }}**%

§ Monthly discount rate: r = **{{ }}**%

3. Estimation of Actual Departure Rates Using Data from Programming Disputes

a) Selection of programming disputes

45. In order to estimate the actual departure in a hypothetical foreclosure of NBC O&O programming, we examine retransmission consent blackouts between a broadcaster or O&O carrying Big 4 networks and one of the four major non-cable MVPDs (Dish, DirecTV, AT&T, or Verizon). As explained in the main text, due to rapid changes in the video programming marketplace, we focus on recent retransmission blackouts since 2012 tracked by SNL Kagan.[38] To make sure that the dispute lasted long enough to have an effect and we have enough data to estimate the effect, we also limit the disputes to those affecting more than 5 DMAs (including some Top 50 DMAs) and lasting more than 30 days.

46. Based on the criteria above, the programming dispute between Media General and Dish (which lasted 46 days from October 1, 2013 to November 16, 2013) is the only one that involved a major rival MVPD of Comcast in more than five affected DMAs (including some Top 50 DMAs) and lasted longer than 30 days.[39] To supplement the Media General-Dish dispute, we also used SNL Kagan data to identify retransmission consent blackouts between a broadcaster or O&O carrying Big 4 networks and a cable MVPD since 2012. The dispute between CBS and TWC (which lasted 32 days from August 2, 2013 to September 2, 2013) is the only one that lasted more than 30 days and affected more than five DMAs.

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[40] SNL Kagan, Publicized Retrans Blackouts 2000-2014 YTD.

[41] There was also a dispute between Bonten Media and Dish that led to a blackout in 6 small DMAs with big 4 stations for 36 days from December 8, 2013 to January 12, 2014 where the affected DMAs ranged in size ranging from 97 to 198 in 2013-2014 Nielsen size ranking ("Nielsen, Local Television Market Universe Estimate"). In comparison, the DMAs involved in the Media General-Dish dispute are bigger, with a Nielsen size ranking ranging from 14 to 167, and the DMAs at issue in this transaction (those with NBC O&Os) have a Nielsen size ranking ranging from 1 to 30. Due to the small size of the DMAs involved in the Bonten dispute, it is not relevant for estimating actual departure rates applicable to foreclosure of NBC O&O programming.

b) Selection of control DMAs for the analysis of the Media General – Dish programming dispute

47. The dispute between Media General and Dish affected 17 big 4 broadcast stations in 17 DMAs. To select control DMAs similar in size and/or geographic location to the affected DMAs, we first limit the set of potential control DMAs to unaffected DMAs in the same census regions of each affected DMA and then select the two DMAs closest to the affected DMA in 2013-2014 Nielsen ranking of DMAs by number of TV households.[40] Table A-4 below shows the affected DMAs and the control DMAs.

Table A-4. Media General-Dish Dispute Affected DMAs and Control DMAs

Affected DMAS	Control	
Augusta, GA-Aiken, SC	Montgomery-Selma	Lafayette, LA
Birmingham (Anniston and Tuscaloosa), AL	Norfolk-Portsmth-Newpt Nws	Greensboro-H.Point-W.Salem
Charleston, SC	Chattanooga	Waco-Temple-Bryan
Columbus, GA (Opelika, AL)	Corpus Christi	Amarillo
Columbus, OH	Kansas City	Milwaukee
Greenville-New Bern-Washington, NC	Ft. Smith-Fay-Sprngdl-Rgrs	Tallahassee-Thomasville
Greenville-Spartanburg, SC-Asheville, NC-Anderson, SC	San Antonio	West Palm Beach-Ft. Pierce
Hattiesburg-Laurel, MS	Abilene-Sweetwater	Clarksburg-Weston
Jackson, MS	Shreveport	Harlingen-Wslco-Brnsvl-McA
Mobile, AL-Pensacola (Ft. Walton Beach), FL	Tulsa	Knoxville
Myrtle Beach-Florence, SC	Tyler-Longview(Lfkn&Ncgd)	Macon
Providence, RI-New Bedford, MA	Buffalo	Wilkes Barre-Scranton-Hztn
Raleigh-Durham (Fayetteville), NC	Charlotte	Baltimore
Roanoke-Lynchburg, VA	Lexington	Charleston-Huntington
Savannah, GA	Huntsville-Decatur (Flor)	Paducah-Cape Girard-Harsbg
Tampa-St. Petersburg (Sarasota), FL	Miami-Ft. Lauderdale	Orlando-Daytona Bch-Melbrn
Tri-Cities, TN-VA	El Paso (Las Cruces)	Baton Rouge

Source: Nielsen (2013), US Census

Note: Control is defined as an unaffected DMA in the same census region as the affected DMA with the closest Nielsen ranking.

c) Selection of control DMAs for the analysis of the CBS – TWC programming dispute

48. The dispute between CBS and TWC affected six CBS O&O stations in Boston, Dallas-Ft. Worth, Denver, Los Angeles, New York, and Pittsburgh. Because most of these DMAs are very large, our set of control DMAs includes all unaffected DMAs among the top 50 DMAs in the

[42] Nielsen, Local Television Market Universe Estimate (Estimates as of January 1, 2014 and used throughout the 2013-2014 television season).

nation if TWC has a significant presence in the DMAs.[41] In addition, like in our analysis of the Media General-Dish dispute, we select two control DMAs in the footprint of TWC for each affected DMA based on census region and 2013-2014 Nielsen ranking of DMAs by TV households. Table A-5 below lists the control DMAs selected for the CBS-TWC dispute.

Table A-5. CBS-TWC Dispute
Control DMAs

Albany-Schenectady-Troy, NY	Honolulu, HI	Rochester, NY
Austin, TX	Houston, TX	San Antonio, TX
Buffalo, NY	Kansas City, MO	San Diego, CA
Charlotte, NC	Louisville, KY	Spokane, WA
Cincinnati, OH	Norfolk-Portsmouth-Newport News, VA	Syracuse, NY
Cleveland-Akron (Canton), OH	Portland-Auburn, ME	Wilkes Barre-Scranton-Hazleton, PA
Columbus, OH	Raleigh-Durham (Fayetteville), NC	Yuma, AZ-El Centro, CA
Greensboro-High Point-Winston Salem, NC		

C. List of Formulas

49. This section shows the mathematical formulas for deriving the critical departure rates under the Commission's permanent and temporary foreclosure models. The notations in the formulas are listed at the end of the section.

A. Permanently withholding signal of the NBC O&O station in market *m* from MVPD *i*

$$d_{permanent} = \frac{retrans_i + \left(\widetilde{ad_m} + \widetilde{ad_m}\right) \times (1-a)}{\alpha_{i,m} \times \pi_m + retrans_i + \widetilde{ad_m} + \widetilde{ad_m}}$$

$$where\ \widetilde{ad_m} = ad_{national} \times \left(1 - b \times (1-a) \times \frac{sub\,s_{i,m}}{sub\,s_{national}}\right) + ad_{local_m} \times \left(1 - b \times (1-a) \times \frac{sub\,s_{i,m}}{sub\,s_m}\right)$$

[43] We exclude DMAs where TWC's presence is less than 1,000, as well as four DMAs affected by a dispute between Journal Broadcasting and TWC (Green Bay, Wisconsin; Milwaukee, Wisconsin; Omaha, Nebraska; and Palm Springs, California).

B. Permanently withholding signal of all NBC O&O stations in the footprint of MVPD *i*

$$d_{permanent} = \frac{\sum_{m=1}^{10}\left[retrans_i + \left(\widetilde{ad_m} + \widetilde{ad_m}\right) \times (1-a)\right] \times subs_{i,m}}{\sum_{m=1}^{10}\left\{\left(\alpha_{i,m} \times \pi_m + retrans_i + \widetilde{ad_m} + \widetilde{ad_m}\right) \times subs_{i,m}\right\}}$$

$$where\ \widetilde{ad_m} = ad_{national} \times \left(1 - b \times (1-a) \times \frac{\sum_{m=1}^{10} sub\, s_{i,m}}{sub\, s_{national}}\right) + ad_{local_m} \times \left(1 - b \times (1-a) \times \frac{sub\, s_{i,m}}{sub\, s_m}\right)$$

C. Permanently withholding signal of the NBC O&O station in market *m* from four major MVPDs.

$$d_{permanent} = \frac{\sum_{i=1}^{4}\left[retrans_i + \left(\widetilde{ad_m} + \widetilde{ad_m}\right) \times (1-a)\right] \times subs_{i,m}}{\sum_{i=1}^{4}\left(retrans_i + \widetilde{ad_m} + \widetilde{ad_m} + \alpha_{MVPDs,m} \times \pi_m\right) \times subs_{i,m}}$$

$$where\ \widetilde{ad_m} = \left[ad_{national} \times \left(1 - b \times (1-a) \times \frac{\sum_{i-1}^{4} sub\, s_{i,m}}{sub\, s_{national}}\right) + ad_{local_m} \times \left(1 - b \times (1-a) \times \frac{\sum_{i-1}^{4} sub\, s_{i,m}}{sub\, s_m}\right)\right]$$

D. Permanently withholding signal of all NBC O&O stations in the footprint of each of the four major MVPDs

$$d_{permanent} = \frac{\sum_{i=1}^{4}\sum_{m=1}^{10}\left[retrans_i + \left(\widetilde{ad_m} + \widetilde{ad_m}\right) \times (1-a)\right] \times subs_{i,m}}{\sum_{i=1}^{4}\sum_{m=1}^{10}\left(retrans_i + \widetilde{ad_m} + \widetilde{ad_m} + \alpha_{MVPDs,m} \times \pi_m\right) \times subs_{i,m}}$$

$$where\ \widetilde{ad_m} = ad_{national} \times \left(1 - b \times (1-a) \times \frac{\sum_{i-1}^{4}\sum_{m-1}^{10} sub\, s_{i,m}}{sub\, s_{national}}\right) + ad_{local_m} \times \left(1 - b \times (1-a) \times \frac{\sum_{i-1}^{4} sub\, s_{i,m}}{sub\, s_m}\right)$$

E. **Temporarily withholding signal of the NBC O&O station in market *m* from MVPD *i* for one month**

$$d_{temporary} = \frac{retrans_i + \left(ad_{national} + ad_{local_m}\right) \times (1-a)}{retrans_i + \alpha_{i,m} \times \pi_{1,m} \times \tilde{c} + \alpha_{i,m} \times (\pi_{1,m} - Acq) + \alpha_{i,m} \times \pi_{2,m} \times \hat{c} + \left(ad_{national} + ad_{local_m}\right)}$$

F. **Temporarily withholding signal of all NBC O&O stations in the footprint of MVPD *i* for one month**

$$d_{temporary} = \frac{\sum_{m=1}^{10}\{[retrans_i + (ad_{national} + ad_{local_m}) \times (1-a)] \times subs_{i,m}\}}{\sum_{m=1}^{10}\begin{bmatrix} retrans_i + \alpha_m \times \pi_{1,m} \times \tilde{c} + \alpha_m \times (\pi_{1,m} - Acqcost) \\ + \alpha_m \times \pi_{2,m} \times \hat{c} + (ad_{national} + ad_{local_m}) \end{bmatrix} \times subs_{i,m}}$$

G. Permanently withholding signal of NBCUniversal national cable networks in the footprint of MVPD *i*

$$d_{permanent} = \frac{fee_i + \widetilde{ad}}{\alpha_i \times \pi_{national} + fee_i + \widetilde{ad}}$$

$$where\ \widetilde{ad} = ad \times \left(1 + b - b \times \frac{sub\,s_i}{sub\,s_{national}}\right)$$

H. Permanently withholding signal of NBCUniversal national cable networks in the footprint of each of the four major MVPDs

$$d_{permanent} = \frac{\sum_{i=1}^{4}[fee_i + \widetilde{ad}] \times subs_i}{\sum_{i=1}^{4}\{(fee_i + \widetilde{ad} + \alpha_{MVPDs} \times \pi_{national}) \times subs_i\}}$$

$$where\ \widetilde{ad} = ad \times \left(1 + b - b \times \frac{\sum_{i=1}^{4} sub\,s_i}{sub\,s_{national}}\right)$$

I. Temporarily withholding signal of NBCUniversal national cable networks in the footprint of MVPD *i* for one month

$$d_{temporary} = \frac{fee_i + ad}{fee_i + \alpha_i \times \pi_1 \times \tilde{c} + \alpha_i \times (\pi_1 - Acqcost) + \alpha_i \times \pi_2 \times \hat{c} + ad}$$

J. Permanently withholding signal of a Comcast RSN from MVPD *i* in market *m*

$$d_{permanent} = \frac{fee_i + \widetilde{ad_m}}{\alpha_{i,m} \times \pi_m + fee_i + \widetilde{ad_m}}$$

$$where\ \widetilde{ad_m} = ad \times \left(1 + b - b \times \frac{sub\,s_{i,m}}{sub\,s_m}\right)$$

K. Permanently withholding signal of a Comcast RSN from four major MVPDs in market *m*

$$d_{permanent} = \frac{\sum_{i=1}^{4}[fee_i + \widetilde{ad_m}] \times sub\,s_{i,m}}{\sum_{i=1}^{4}\{(fee_i + \widetilde{ad_m} + \alpha_{MVPDs,m} \times \pi_m) \times subs_{i,m}\}}$$

$$where\ \widetilde{ad_m} = ad \times \left(1 + b - b \times \frac{\sum_{i-1}^{4} sub\,s_{i,m}}{sub\,s_m}\right)$$

L. Temporarily withholding signal of a Comcast RSN from MVPD *i* in market *m* for one month

$$d_{temporary} = \frac{fee_i + ad}{fee_i + \alpha_{i,m} \times \pi_{1,m} \times \tilde{c} + \alpha_{i,m} \times (\pi_{1,m} - Acqcost) + \alpha_{i,m} \times \pi_{2,m} \times \hat{c} + ad}$$

Notation:

a: Proportion of foreclosed MVPD who will switch to watch NBC programming over the air.

$Acqcost$: One-time net acquisition cost incurred when Comcast acquires a new subscriber.

$ad_{local,m}$: Advertising revenue per sub per month of the NBC O&O in market m.

$ad_{national}$: Advertising revenue per sub per month of the NBC network.

$\widetilde{ad_m} = ad_{national} \times b + ad_{local_m} \times b$

α_i: Diversion ratio from foreclosed MVPD i to Comcast in the footprint of MVPD i nationally. $\alpha_{i,m}$: Diversion ratio from foreclosed MVPD i to Comcast in market m.

$\alpha_{MVPDs,m}$: Diversion ratio from foreclosed MVPDs to Comcast in market m.

α_{MVPDs}: Diversion ratio from foreclosed MVPDs to Comcast nationally.

b: Percentage reduction in average advertising revenue per sub given 1% of decrease in local or national viewership.

c_1: Churn rate during the first month after the programming is restored.

c_2: Churn rate between the second and the 12th month after the programming is restored.

c_3: Churn rate between the 13th and the 24th month after the programming is restored.

c_4: Churn rate beyond 25th month after the programming is restored.

$$\hat{c} = \left(\frac{1-c_2}{1+r}\right)^{12}\left(\frac{1-c_1}{1-c_2}\right) + \sum_{t=13}^{24}\left(\frac{1-c_3}{1+r}\right)^{t}\frac{(1-c_1)(1-c_2)^{11}}{(1-c_3)^{12}} + \left(\frac{1-c_4}{1+r}\right)^{25}\frac{(1-c_1)(1-c_2)^{11}(1-c_3)^{12}}{(1-c_4)^{24}} \times \frac{1+r}{c_4+r}$$

$$\tilde{c} = \sum_{t=2}^{11}\left(\frac{1-c_2}{1+r}\right)^{t}\left(\frac{1-c_1}{1-c_2}\right) + \frac{1-c_1}{1+r}$$

d: Departure rate.

fee_i: Affiliate fee per sub per month MVPD i pays to Comcast for RSNs or bundle of cable networks.

π: Comcast's profit per sub per month nationally.

π_m: Comcast's profit per sub per month in market m.

π_1: Comcast's profit per sub per month of a first-year subscriber nationally.

$\pi_{1,m}$: Comcast's profit per sub per month of a first-year subscriber in market m.

π_2: Comcast's profit per sub per month of a subscriber with at least one year of tenure nationally.

$\pi_{2,m}$: Comcast's profit per sub per month of a subscriber with at least one year of tenure in market m.

$retrans_i$: Retransmission fee per sub per month MVPD i pays to Comcast for NBC O&Os.

$subs_i$: Subscribers of MVPD i nationally.

$\pi_{national}$: Comcast's profit per sub per month nationally.

$subs_{i,m}$: Subscribers of MVPD i in market m.

$subs_m$: Subscribers in market m.

$subs_{national}$: Subscribers of MVPD services in the US.

REDACTED – PUBLIC INSPECTION

DECLARATION OF DENNIS W. CARLTON

September 22, 2014

I. Introduction

1. My name is Dennis W. Carlton. I am the David McDaniel Keller Professor of Economics at the Booth School of Business of The University of Chicago. I have served on the faculties of the Law School and the Department of Economics at The University of Chicago and the Department of Economics at the Massachusetts Institute of Technology. In addition to my academic experience, I served as Deputy Assistant Attorney General for Economic Analysis, Antitrust Division, U.S. Department of Justice from October 2006 through January 2008. I also served as a Commissioner of the Antitrust Modernization Commission, created by Congress to evaluate U.S. antitrust laws. I also am a Senior Managing Director of Compass Lexecon, a consulting firm that specializes in the application of economics to legal and regulatory issues and for which I served as President (of Lexecon) for several years. I have provided expert testimony before various U.S., state and federal courts, the U.S. Congress, a variety of state and federal regulatory agencies and foreign tribunals. My curriculum vitae is attached as Exhibit 1 to this report.

2. I have been asked by counsel for Comcast Corporation ("Comcast") to focus on the economic analyses related to the provision of broadband services. I have reviewed the declaration of Dr. Israel on broadband services as well as the declarations by the economists who criticize his analyses ("Commenters").[1] I have also reviewed Dr. Israel's reply declaration, which provides a detailed rebuttal to many of the criticisms of Commenters as they pertain to his analysis of the broadband segment.[2]

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[1] Declaration of Mark A. Israel, "Implications of the Comcast/Time Warner Cable Transaction for Broadband Competition," Attachment to Comcast Corporation and Time Warner Cable Inc., *Description of Transaction, Public Interest Showing, and Related Demonstrations*, April 8, 2014 (hereinafter, *Israel Declaration I*); Declaration of David S. Evans, "Economic Analysis of the Impact of the Comcast/Time Warner Cable Transaction on Internet Access to Online Video Distributors," Attachment to Petition to Deny of Netflix, Inc., August 25, 2014 (hereinafter, *Evans Declaration*); Declaration of Joseph Farrell, Attachment to Petition to Deny of Cogent Communications Group, Inc., August 25, 2014 (hereinafter, *Farrell Declaration*); Declaration of David Sappington, "The Anticompetitive Effects of the Proposed Merger of Comcast and Time Warner Cable," Attachment to Petition to Deny of DISH Network Corporation, August 25, 2014 (hereinafter, *Sappington Declaration*).

3. In a transaction as large as this one, with effects on so many parties, it is not surprising that hundreds of pages of analyses have been submitted challenging Dr. Israel's conclusion that the proposed transaction is in the public interest.[3] My purpose here is not to analyze the detailed criticisms of Dr. Israel's analysis, a task that I leave to him, nor to verify any claimed facts. Rather, my purpose is to highlight what I consider to be the key economic issues based on the submissions by the economists, assuming that the evidence they present is correct. To focus on the key issues in this case, I intentionally abstract from many details that are covered at length in Dr. Israel's declarations. With a matter involving as many details as this one, my goal is to make sure that details do not obscure the big picture, which, as I will explain, seems clear. In my view, none of the details I ignore are likely to change my central conclusions. If Commenters believe otherwise, I welcome their views and the opportunity to react to them.

4. Based on my reading of the economic analyses, my key conclusions are the following:

   · The proposed transaction promises large consumer benefits from improvement in broadband quality.

   · The proposed transaction creates no additional market power over consumers of broadband.

   · Commenters focus primarily on two concerns that they claim will generate significant harm to competition arising from the proposed transaction. The first concern involves vertical foreclosure (or harm to a rival) – in which the merged entity will harm online video distributors (OVDs) such as Netflix in order to promote its own competing video services. The second concern is that, by

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2 Declaration of Mark A. Israel, "Economic Analysis of the Effect of the Comcast-TWC Transaction on Broadband: Reply to Commenters," September 22, 2014 (hereinafter, *Israel Declaration II*).

3 *Israel Declaration I*, ¶ 12.

becoming larger, the merged entity will be able to negotiate better terms from edge providers, thereby harming them. Given the structure of the industry, economic theory is ambiguous as to whether these concerns are valid, highlighting the need for empirical evidence. Importantly, the evidence cited by commenters in fact supports exactly the reverse of their conclusion – namely the evidence they cite in fact shows that the magnitude of any harm, even if real, is likely to be tiny.

The overall conclusion that emerges is that the benefits of the proposed transaction are large relative to the key harms that Commenters have identified. Thus, the proposed transaction is in the public interest. Below, I briefly discuss each of these points in more detail.

II. Efficiencies

5. The proposed transaction promises large consumer benefits from the improvement in broadband quality.[4] None of the economists who criticize Dr. Israel factor such consumer benefits into their evaluation of whether the transaction is in the public interest. Yet obviously, such benefits, if sufficiently large, can provide a justification for proceeding with the transaction even if there were harms to competition. If one ignores these benefits, then it is not surprising that one could conclude that there is no reason to risk incurring competitive harms even if the risk – or those harms themselves – may be small. However, doing so would be inappropriate. That is especially the case here, where the unrebutted consumer benefits from the proposed transaction are particularly large.

6. Dr. Israel and others identify three categories of efficiencies arising from the transaction:

- Efficiencies arising from increased scale;[5]
- Efficiencies arising from increased geographic scope;[6] and

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4 See, e.g., *Israel Declaration I*, § IV and *Israel Declaration II*, § VIII.

5 *Israel Declaration I*, § III.A.

6 *Israel Declaration I*, § III.C.

- Efficiencies arising from a combination of complementary skills and products.[7]

Based on these incentives and the evidence, Dr. Israel and others identify specific ways in which the proposed transaction would improve wired, Wi-Fi, and home networks, including via higher broadband speeds.[8] Such improvements in broadband networks are a central component of the Commission's public policy objectives.[9] Recent economic research has demonstrated that improvements in broadband network performance are tremendously valuable to consumers.[10] For example, Dr. Israel demonstrates that even a one Mbps increase in speed for TWC customers would generate nearly $100 million in annual consumer benefits, and that such increases in speed are well within the range of benefits expected from the proposed transaction.[11]

7. Dr. Israel also shows how these significant efficiency gains will bring more competition and more reliable services to business customers, especially those with multiple offices throughout the combined company's region.[12] The Commission should welcome the strengthening of competition in this sector. None of the commenters challenge, or even address, this benefit.

8. Indeed, as a general matter, Commenters have not refuted, or even addressed, any of the specific efficiencies that Drs. Israel and others have identified beyond vague statements that such efficiency claims are "speculative."[13] These unrefuted efficiencies must be taken into account in order to reach sound conclusions about the net impact of the

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7 *Israel Declaration I*, § IV.A.2.

8 *Israel Declaration I*, § IV.B.3.

9 See, e.g., "The Facts and Future of Broadband Competition," Prepared Remarks of FCC Chairman Tom Wheeler, 1776 Headquarters, Washington, DC, September 4, 2014.

10 *Israel Declaration II*, § VIII.C.

11 *Israel Declaration II*, § VIII.C.

12 *Israel Declaration I*, § IV.A.

13 See, e.g., *Evans Declaration*, n. 12; *Sappington Declaration*, ¶ 91. See also *Israel Declaration II*, § VIII.A (demonstrating why Dr. Farrell's claims about customer service scores do not refute the specific efficiencies that Dr. Israel and others identify).

proposed transaction on consumer welfare.[14] Any sensible policy decision must consider the magnitude of these potential efficiencies.

III. No horizontal overlap in the provision of broadband services to consumers

9. The transaction creates no additional market power over consumers of broadband. Commenters seem not to (and cannot) dispute this point. Because the market areas of Comcast and Time Warner do not overlap, the proposed transaction raises none of the traditional horizontal concerns from mergers in which competitors merge and gain greater pricing power over consumers who are faced with elimination of one of their sources of supply.[15] Even though this point seems undisputed, Commenters spend many pages establishing that Comcast or Time Warner may currently have market power over their consumers.[16] That may or may not be so for some consumers. But such claims have nothing to do with an evaluation of how the proposed transaction alters the available sources of supply to consumers, a central question in any merger analysis. The answer to

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14 See U.S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines*, August 19, 2010 (hereinafter, *Horizontal Merger Guidelines*), § 10.

15 *Israel Declaration I*, § II.A.

While both Comcast and TWC may compete in the market for "transit" or "backbone" services that deliver traffic to their broadband access networks that provide broadband services to consumers (such services to consumers are in a separate market from transit or backbone services), so do multiple other providers; no Commenter suggests that the elimination of TWC would have anything but a minimal impact on the competitiveness of this separate market. (See *Israel Declaration I*, § II.A.3.(c).)

16 See, e.g., *Evans Declaration*, § II; *Farrell Declaration*, § III.

Some Commenters assert that Comcast and TWC currently have a terminating access monopoly, a term borrowed from telecom regulation. Even if that claim were true, for the same reasons discussed above, this claim has no bearing on the transaction since whatever market power for terminating access to an individual consumer exists pre-merger does not change post-merger because the geographic markets of Comcast and TWC for providing broadband access to consumers do not overlap. Moreover, Commenters use Comcast's agreement with Netflix to illustrate the existence of this market power. Yet, as I discuss later, the facts of the Netflix transactions **{{ }}**. (*Israel Declaration II*, § V.A and Appendix III; see also *Israel Declaration II*, § III for a discussion of the institutional features that constrain Comcast.)

that question is that the proposed transaction does not alter the supply alternatives to consumers of broadband.

IV. Commenters' concerns about significant antitrust harms do not follow unambiguously from economic theory and are contradicted by the evidence

10. Lacking any plausible claim that the proposed transaction will increase market power over (and thus prices to) broadband customers, some Commenters instead focus on two theories of antitrust harm that they claim could be significant. The first involves the possibility that the merged firm will use its market position to harm a rival such as Netflix in order to benefit itself by increasing sales of its own video products. The second concern is that by becoming larger the merged entity will have greater bargaining power and will be able to negotiate better prices when it deals with third parties, thereby harming those third parties. Given the structure of the industry, economic theory is ambiguous as to whether these concerns are valid, highlighting the need for empirical evidence.[17] Importantly, Commenters "prove" empirically the validity of their concerns by referencing the recent agreement between Netflix and Comcast.[18] But that transaction reveals that Commenters' concerns about significant harms are unjustified based on the empirical facts.

A. Ambiguous theoretical basis for concerns

11. The theoretical literature on vertical foreclosure demonstrates that a key condition for such theories to operate would be that Comcast would benefit from harming an edge provider primarily when, by doing so, it would acquire market power over consumers with whom it does not currently deal or have market power over. I have written several articles on this topic and take seriously the concern about such potential vertical harms.[19] For example, if by harming Netflix (and all other OVDs), Comcast could acquire additional market power to sell its competing video products to consumers who reside outside of Comcast's territory then, in such a situation, Comcast could theoretically have an incentive to harm Netflix (or other OVDs).[20] But, if such a gain of new market power cannot occur given current marketplace or other constraints, then even if Comcast were to destroy Netflix (and all other OVDs), Comcast will not benefit: it would not obtain access to any customers over whom it does not already have "market power" according to Commenters and, therefore, gain no additional power to harm consumers above what it already had absent the foreclosure.[21] Therefore, its incentive to harm Netflix is eliminated.[22] (Indeed, as I describe below, in situations where Comcast and an edge provider are in competition for customers, Comcast has an incentive to reach a mutually beneficial vertical arrangement with the edge provider rather than attempt to harm it.) As I understand the facts, Comcast has no plans to market its video services outside of its current footprint (absent the transaction) or the combined footprint (post-merger) and thus has no incentive to engage in the behavior contemplated by Commenters to extend any of its assumed market power to consumers over whom it does not already, or will not in the future, have market power.[23]

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17 Dr. Evans appears to agree with me that, when theory is ambiguous, facts are crucial. (See, e.g., *Evans Declaration*, n. 108.)

18 See, e.g., *Evans Declaration*, § III.E.2; *Farrell Declaration*, ¶ 177.

19 See, e.g., Dennis W. Carlton and Michael Waldman (2002), "The strategic use of tying to preserve and create market power in evolving industries," *RAND Journal of Economics*, 33(2): 194-220.

20 If the foreclosure concern arises post-merger, then the relevant "Comcast territory" is the merged firm's territory.

21 To see this, consider an example. Suppose a consumer who pays $5 to Comcast for video on demand (VOD) services considers switching to Netflix instead of consuming those VOD services (a form of "cord-shaving"). In such an instance, Comcast could charge Netflix $5 for the switch if Comcast is the monopoly supplier to Netflix, as Commenters allege, and therefore has no incentive to destroy Netflix to prevent the switch.

22 See, e.g., Dennis W. Carlton and Ken Heyer (2008), "Assessing Single-Firm Conduct," *Competition Policy International*, 4(2):285-305. It is true that absent the key condition discussed in the text, models of vertical foreclosure (or harm to rivals) can still be built that preserve the incentive to harm rivals under a variety of special circumstances. The results of such models are fragile in the sense that small changes in assumptions completely reverse the results. That is why empirical evidence on harm to rivals is needed, since the theory is ambiguous. I discuss below the empirical evidence that Commenters cite and show it is lacking.

23 *Israel Declaration II*, §§ IV.B.2 and VII.A.

12. More generally, the literature on vertical harms often relies on assumptions about the impossibility of writing flexible contracts. When such assumptions are relaxed, the rationale for the vertical harm disappears. The logic explaining why firms do not find it in their interest to harm rivals when contract terms are freely negotiable is that if, for example, a powerful firm (e.g., Comcast) that produces products *A* (e.g., broadband distribution services) and *B* (e.g., video services) – where *A* and *B* are complements – attempts to harm a rival (e.g., Netflix) who produces product *B*, it will lose sales of product *A* by making the complementary product *B* less valuable. As Rey and Tirole (2007) note, a firm with market power over product *A*, as commenters suppose, "has no interest in excluding low-cost and high-quality varieties from the market since their presence makes its own product more attractive to consumers."[24] Thus, the Internet service provider (ISP) and the edge provider have an incentive to negotiate terms that split the surplus that their interaction generates in a way that makes both better off. When ISPs and OVDs negotiate directly and flexibly, such flexibility removes any pricing-related constraints that might otherwise inhibit the ability to negotiate a mutually beneficial outcome.[25]

13. Regarding the theory underlying Commenters' claim that the merged entity will be able to negotiate better terms because of its increased size, there seems to be no dispute among Commenters and Dr. Israel that the predictions provided by economic theory of the merger's effect on the outcome of a negotiation are ambiguous.[26] Instead, Commenters attempt to support their assertions with empirical evidence, which, as I describe in the next section, is very limited and does not support their conclusions.

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[24] Patrick Rey and Jean Tirole (2007), "A Primer on Foreclosure," in *Handbook of Industrial Organization*, Volume 3, Mark Armstrong and Robert H. Porter, ed, Amsterdam: Elsevier at 2182.

[25] Non-linear pricing terms are common in interconnection agreements. For example, Comcast's agreement with **{{ }}**. (See Letter from Kathryn A. Zachem, Comcast Corporation, to Marlene H. Dortch, Secretary, FCC, MB Docket No. 14-57 (Sept. 17, 2014) (enclosed documents on CD-ROM).)

[26] *Evans Declaration*, n. 108; *Farrell Declaration*, ¶ 148. Indeed, Dr. Farrell's model – the only formal economic model presented in this proceeding – demonstrates that consumers typically benefit from increases in interconnection fees. (See *Israel Declaration II*, § V.B.1. See also *Israel Declaration II*, § VI for further discussion of the reasons why increases in interconnection fees are likely to benefit, rather than harm, consumers.)

B. Empirical evidence shows that the harms identified by commenters are tiny, if they exist at all

14. Commenters rely on the recent negotiations between Comcast and Netflix to illustrate the validity of their concerns about the harms they raise. For example, Dr. Evans argues that the outcome of the Netflix deal shows that, by supposedly foreclosing Netflix, Comcast succeeded in obtaining sizable interconnection fees.[27] Similarly, Dr. Evans uses the Netflix example to show that the interconnection fee that Netflix pays Comcast, the largest ISP, is greater than the zero fee that Netflix pays many smaller ISPs.[28, 29] Regardless of one's views about the facts of the supposed "foreclosure," or about requiring an edge provider like Netflix, which seeks special arrangements for the very large demands it places on the network, to pay for a portion of the costs that its traffic imposes on Comcast's network, the amount that Netflix pays Comcast is **{{ }}** and, indeed analysts expect the agreement to enhance Netflix's profitability relative to its previous arrangements for interconnecting with Comcast.[30] **{{ }}**.[31] As Netflix itself has said publicly, the payments it makes to Comcast have no material effect on its margins.[32] Such amounts are inconsistent with claims that Comcast is exercising substantial bargaining power over edge providers or trying to harm their business prospects.[33] Rather than showing the significant harm that Comcast can inflict, this evidence shows exactly the reverse. Even the "powerful" Comcast has not caused Netflix any material harm.

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27 *Evans Declaration*, § III.B.

28 *Evans Declaration*, § III.E.2.

See also *Farrell Declaration*, § VI.B.3. Professor Farrell presents an analysis, based on Cogent data, that he claims shows that the merged entity will acquire significant bargaining power. Dr. Israel discusses why that analysis is flawed. (See *Israel Declaration II*, § V.C.3.)

29 Dr. Israel discusses the reasons why Dr. Evans' inferences from the empirical evidence are incorrect, including that Netflix does in fact incur costs to interconnect with *all* ISPs. (*Israel Declaration II*, § V.C.4.)

30 See *Israel Declaration II*, §§ V.A and VI.B.2.(b) for a discussion of Comcast's incremental network costs. See *Israel Declaration II*, § VI.A.2, for a discussion of the impact of direct interconnection agreements on edge providers' financial performance.

31 See *Israel Declaration II*, § V.A.

15. There is another important point that follows from the agreement between Netflix and Comcast. That negotiation led to an **{{ }}** contract during which time Netflix is protected from the alleged power of Comcast to harm it through foreclosure or **{{ }}**. That is, whatever harm Commenters are worried about no longer applies to Netflix, which has guaranteed interconnection terms with Comcast for approximately the next **{{ }}**. Furthermore, the long-term agreement with Netflix means that should the merged entity attempt to harm a different rival of the merged firm (and a rival of Netflix), then the gain to the merged entity is reduced from what it would have been absent the Netflix contract, to the extent that the merged firm's profits are lower as a result of Netflix's presence. Hence, the incentive to preserve its profits – which drives models of vertical harm – is diminished by Netflix's presence (which is guaranteed by contract). In other words, the long-term agreement with the largest OVD substantially reduces any incentives to harm *other* OVDs, because now the benefits of doing so must be shared with Netflix.

V. Conclusion

16. The evidence presented in this proceeding supports the conclusion that the large benefits from the proposed transaction outweigh whatever potential harms may exist.

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[32] Thomson Reuters StreetEvents Edited Transcript, "NFLX – Q2 2014 Netflix Inc Earnings Call," July 21, 2014 ("Well on a short-term basis, I think there's great assurances in the sense that we've been able to sign these immediate interconnect deals, and *still able to achieve our margin targets, and our guidance implies those costs are embedded*." [emphasis added])

[33] See also *Israel Declaration II*, § VI.A.2 (presenting a stock market event study demonstrating that "market participants did not expect the transaction to harm edge providers.")

I, Dennis W. Carlton, declare under penalty of perjury that the foregoing declaration is true and correct to the best of my knowledge, information, and belief.

Executed on September 22, 2014.

/s/ Dennis W. Carlton

Dennis W. Carlton

EXHIBIT 1

REDACTED – PUBLIC INSPECTION

DECLARATION OF KEVIN MCELEARNEY

1. My name is Kevin McElearney. I am Senior Vice President, Network Engineering for Comcast Cable, a position I have held since March 2011. Before that, I was Vice President, National Network Engineering for Comcast Cable. I am responsible for managing Comcast's converged, fiber-rich network, which offers video, voice, and data services.

2. I joined Comcast in 2004 with the principal focus of establishing a technologically advanced and fully upgradeable nationwide backbone network over which Comcast could deliver new and enhanced services to its commercial and residential customers. Over time, we created a multi-terabit, converged backbone, which became the first 40 Gbps and now Nx100Gbps backbone in the world. My team's accomplishments also included several technology firsts, including the first live network traffic trials at 40 Gbps, then 100 Gbps, and most recently one Terabit.

3. The purpose of this declaration is to describe Comcast's Internet traffic exchange practices, and to respond to certain assertions in declarations submitted by Ken Florance of Netflix and Hank Kilmer of Cogent. At the outset, I want to highlight a few key points:

- Comcast is a responsible participant in the Internet ecosystem. We respect and abide by Internet norms; we honor our contracts; and we have many long-standing and successful business relationships with our peering and transit partners.

- We have invested billions of dollars in our access, metro, and backbone networks, and these continuous investments have helped to create more capacity, establish more connections, increase options, and lower unit prices. As a result of these investments, we have a rich array of mutually beneficial on-net and off-net interconnection arrangements with numerous CDNs, edge providers, and other partners.

- Internet traffic exchange has worked extremely well throughout the history of the Internet. The FCC consciously – and rightly – chose to leave this marketplace unregulated, and that judgment has been validated by the way in which the marketplace has produced tens of thousands of agreements, with a minimum of disputes, even as traffic volumes have grown exponentially and new business models have developed. Given that capacity has scaled up to meet exponential growth in traffic and transit prices have declined over 99 percent over the past 15 years, it is simply not credible to claim that there is a market failure that requires government intervention.

- Edge providers have more options for delivering their traffic to end-users than ever before. And it is they (and their transit or CDN provider(s)) that dictate the path their traffic will travel to reach our network. Any edge provider that wants to deliver traffic to our customers can hand its traffic off to numerous other partners, and need never deal directly with us. There is no "bottleneck" issue with respect to last-mile delivery. Comcast reaches well over 99 percent of the Internet's networks through more than 40 settlement-free peers and numerous other commercial interconnection agreements, and across our interconnection partners there is more than enough capacity into our network – even enough to carry all of Netflix's Comcast-bound traffic – which is available at reasonable, market-based prices. Edge providers with sufficient traffic and their own CDN can arrange direct connections that result in additional savings.

- Traffic exchange disputes arise only rarely, and generally only when a backbone provider or (more recently) an edge provider has sought to create a problem as a means of exerting leverage over an ISP.

- Netflix has not been honest about what it did to alter traffic destined for Comcast and several other large ISPs in 2010-2013. During that period, it arranged for sudden shifts in the routing of massive volumes of its traffic (one-third of peak traffic bound to Comcast), first to Akamai, then to Limelight, then to Level 3 and Tata and Cogent. In each case, Netflix attempted to force-deliver much more traffic into Comcast's network than these providers' agreements had forecasted and provisioned with Comcast. In so doing – most notably, in the case of Cogent – Netflix effectively degraded its own customers' experience (and that of other businesses relying on these same providers) in an effort to increase its bargaining leverage against Comcast (and other ISPs). In short, the congestion problems were not caused by changes within Comcast's network but by the traffic delivery decisions of Netflix, which had other many transit options available that would have avoided congestion and consumer disruption.

- Comcast at all times dealt responsibly and in good faith with Akamai, Limelight, Level 3, Tata, and Cogent – and with Netflix as well when it sought to connect directly to our network. We ultimately reached a mutually agreeable direct interconnection agreement with Netflix in February of this year. At that time, Netflix's CEO wrote to Comcast executives and said: "We found middle ground on our issues that worked well for both of us for the long term, and works great for consumers." Comcast, of course, wholeheartedly shared that view and still does. Comcast is fully complying with that agreement and looks forward to a successful partnership with Netflix for years to come.

Background on Comcast's Interconnection Practices

4. Comcast has a wide variety of interconnection arrangements with other networks and services on the Internet, which can be categorized as follows: (1) settlement-free peering, (2) off-net transit, and (3) on-net transit (i.e., paid peering), including metro interconnect (an emerging regional offering, which involves a direct interconnection to Comcast's metro networks in specific markets). Settlement-free peering involves the mutual exchange of network value without payment pursuant to the terms of each party's peering policy. Off-net transit service provides access to Comcast's entire network and the full Internet. On-net transit (i.e., paid peering) provides access to Comcast's entire network and all our commercial, residential, and content customers, but does not include off-network access; metro interconnect provides reach into specific Comcast markets only. Off-net transit and on-net transit involve some payment to Comcast at market-driven competitive prices.

5. When Comcast first began interconnecting with other networks over two decades ago, nearly all of our arrangements involved purchasing transit services from major providers to reach the other networks that comprised the "public Internet." Over the past decade, we made a multi-billion dollar investment to build our own backbone, which has enabled Internet backbone providers and edge providers to more efficiently (and cost-effectively) interconnect to our growing network – and allows third parties to use *our* network for transit to other parts of the Internet. As part of this evolution of our network, we developed a broader range of interconnect relationships to include over 40 settlement-free interconnections, as well as dozens of commercial arrangements with content delivery networks ("CDNs"), edge providers, and transit relationships with thousands of other businesses. All of these relationships are critical to our participation in the Internet and to providing our customers the services they demand.

6. Comcast's Settlement-Free Interconnection ("SFI") Policy, which is consistent with industry standards used by other ISPs, including AT&T, Verizon, Sprint, CenturyLink, international ISPs, and many others, is publicly available at www.comcast.com/peering. The criteria in the SFI Policy include certain operational requirements intended to ensure that providing settlement-free interconnection is mutually beneficial for Comcast and the potential partner. This is consistent with industry norms in Internet network interconnection, where parties seeking settlement-free interconnection have traditionally been expected to demonstrate that they can provide a roughly commensurate level of mutual network value to one another.

7. For example, Comcast's SFI Policy requires that an applicant "operate a US-wide IP backbone whose links are primarily 10 Gbps or greater," in order to ensure that the applicant provides roughly equivalent network routing availability for the level of traffic exchanged to Comcast as Comcast provides in return. And, in order to allow for efficient interconnection across Comcast's network, an applicant must be prepared to "meet Comcast at a minimum of four mutually agreeable geographically diverse [third-party exchange] points in the U.S." Another requirement is that "traffic to/from the Comcast network . . . must amount to at least 20 Gbps average in the dominant direction," because it would not be cost-effective for Comcast to dedicate facilities and invest time and resources for a network with a lesser infrastructure.[1] Similarly, the SFI Policy requires that "the network cost burden for carrying traffic between networks shall be similar to justify SFI." The relative network investment to carry traffic in both directions across interconnection links is one factor that affects whether the interconnection arrangement offers mutual network value to both parties. In that regard, the policy requires that the applicant must "maintain a traffic scale between its network and Comcast that enables a general balance of inbound versus outbound traffic." We regularly monitor the traffic balance with our respective peers, and, in Comcast's experience, a persistent ratio of **{{ }}** or more over a prolonged period of time is generally understood to be an indication that a settlement-free relationship is no longer in balance.[2]

[1] Comcast has **{{ }}**.

[2] Settlement-free peering applicants also must "have a professionally managed 24x7 NOC [(network operations center)] and agree to repair or otherwise remedy any problems within a reasonable timeframe," since Comcast will rely on the applicant's network routes for incoming and outgoing traffic, and needs assurance that the applicant will be able to quickly address maintenance issues.

8. The roughly 40-plus entities with which Comcast has established settlement-free peering arrangements are overwhelmingly international or domestic ISPs.[3] In addition, this group includes providers that serve enterprises, edge providers, web and content hosting companies, and other networks. Similar to Comcast, some of these entities also operate their own CDNs, though most do not. All of these settlement-free peers have invested, to a greater or lesser extent, in the backbone, metro, access, and exchange facilities that enable the essential interconnectivity of the Internet, and in facilities to serve their customers. Smaller ISPs, website hosting companies, content providers, and other non-network based Internet players – that may not have contributed to the Internet networks through direct investment in end-to-end facilities that other providers can utilize – instead contribute directly or indirectly by buying paid transit, content delivery, or other interconnection arrangements. CDNs on the other hand, have contributed to the overall Internet ecosystem by aggregating and distributing web and other services closer to ISP networks, lowering the overall burden on parts of the Internet infrastructure. This contribution is typically reflected in a CDN receiving significantly lower transit prices from an ISP than a web server located in a single facility.

[3] An exception in this category of settlement-free partners are providers of Root DNS services, such as ISC (Internet Systems Consortium), *see* http://www.isc.org/f-root/, that are a critical part of the Internet infrastructure but do not run backbone or access services.

9. It is important to stress that settlement-free peering is a two-way street. In other words, Comcast is often the *requesting* party for such arrangements, not simply the "grantor" of such arrangements. In fact, we have been denied settlement-free peering by some networks that don't believe we conform to their peering policies. When that has occurred, we have not sought regulatory relief or tried to execute any punitive tactics to force the hand of other networks; we have either addressed their policy concerns, or simply relied on commercial transit arrangements to reach them. In other words, in evaluating a proposed interconnection arrangement, *both* parties typically evaluate whether it would comply with each of their respective settlement-free peering policies, and both must conclude that it does. Settlement-free peering agreements are subject to regular review for continued compliance with each contracting party's policies and are not a permanent entitlement.

10. Comcast has a general balance of network investment with its settlement-free peers, i.e., the traffic burden from the peer is in general balance with the traffic burden Comcast imposes on that peer. In fact, the number of settlement-free peers to which Comcast sends more traffic than it receives is roughly equivalent to the number of peers from which Comcast receives more traffic than it sends. While this may seem surprising to those who prefer to characterize Comcast as strictly a consumer "eyeball" or "terminating access" network, the reality is that Comcast serves as a transit provider to many businesses, CDNs, small ISPs, content providers, and other entities that send large amounts of traffic off-net, destined for other providers' networks.

Capacity Arrangements

11. Internet traffic is constantly growing. To handle the expanding volume, arrangements must be made from time to time to add capacity to existing interconnection links. As explained in greater detail below, Comcast's policy for adding capacity with settlement-free partners is different from Comcast's policy for adding capacity for its customers that purchase transit services. But a threshold point applies to both: Comcast does not possess the power to act unilaterally in either situation.

12. Settlement-free peering arrangements are inherently two-way. As a result, one party cannot augment the interconnection arrangement on its own; rather, both parties must add new ports when an interconnection link must be augmented, which generally involves joint planning and discussion. Further, in any given settlement-free interconnection arrangement, Comcast may be the party experiencing traffic growth, thus making Comcast the party *requesting* an augmentation rather than "granting" it.

13. Likewise, paid arrangements are not augmented at the whim of the ISP; the customer determines when it wants additional capacity to meet its needs. Different customers may be satisfied with different levels of utilization of their interconnection ports. The decision to increase capacity has many facets, including where and when to add capacity, and the ability of the transit provider to deliver the locations at the time-frames requested.[4]

Settlement-Free Partners

14. Internet traffic is constantly growing, and Comcast and its interconnection partners strive to account for this growth proactively. Comcast's SFI Policy requires that applicants "must agree to participate in joint capacity reviews at pre-set intervals and work towards timely augments as identified." Comcast and its settlement-free peers hold these reviews approximately every six weeks, and also have ad-hoc communications between reviews, to discuss operational and infrastructure needs. These discussions include capacity requests and ongoing assessments of each party's compliance with the other's peering policy, as well as discussions about additional technology needs or geographic locations. Comcast's business practice is to maintain a healthy interconnection relationship with each of its partners and manage traffic growth as anticipated by both parties. And while different partners have different policies and practices, Comcast's goal is to have no more than **{{ }}** percent utilization of available capacity in any settlement-free interconnection arrangement to provide sufficient headroom for spikes in traffic, unexpected events, and normal growth.

[4] Although Comcast has historically had several interconnection relationships in which Comcast has *paid* for transit as the "customer," **{{ }}**. Comcast would have to *request* an augmentation if Comcast decided it needed more capacity **{{ }}**. In the main, **{{ }}**. **{{ }}**.

15. When one of the two parties projects (or experiences) growth that would require additional capacity and communicates that to the other party, the other party evaluates the request to determine whether the addition of capacity would be consistent with its peering policy. As noted above, the requesting party might be Comcast or might be the peer. Of course, in some cases, both parties may project relatively equivalent growth, which makes augmentation straightforward. Upon receiving a straightforward request for augmentation (either because the request is mutual or because it is compliant with the SFI Policy), Comcast will promptly begin the process of provisioning the requested capacity. This process entails evaluating whether the additional capacity is readily available at the relevant exchange points (i.e., whether there are available ports, line cards, capacity on the relevant router, and optical capacity to carry the traffic onto Comcast's backbone network and nationally to the associated metro network). If the requested capacity is readily available, Comcast generally can provision it within as little as a week. If the requested capacity is not readily available, Comcast will begin the process of network design, capital orders, deployment, and turn-up in order to make the new capacity available as soon as practicable. In some cases, the required changes are minor, but, in others, Comcast may need to install new network infrastructure or arrange for more space and power (though this is less common given Comcast's efforts to deploy spare capacity in these facilities). Overall, the process of provisioning additional capacity when none is available often takes approximately six to eight weeks, depending on the work required.

16. It is important to note that a settlement-free agreement is not a permanent entitlement and both parties review compliance of the relationship on a regular basis. On rare occasions, a substantial change in a peer's business practices may cause the peer to exceed the bounds of the pre-agreed to settlement-free policy. Historically, peering disputes have come about because of such a dramatic alteration of the balance of mutual network value.

17. Relatedly, where these situations involve sudden and unexpected shifts of massive amounts of traffic across the parties' interconnects, demand for that capacity will quite quickly exceed the prearranged supply – resulting in congestion.[5] While ISPs can determine the utilization percentage of an interconnection point's capacity, they generally cannot determine in real time the extent to which the path selection of a content provider is negatively impacting its services. The content provider alone makes the routing decision and is in full control of any resulting consequences for user experience. Receiving ISPs do not choose the path(s) over which content enters their network.

18. If a peer accepts this unanticipated level of traffic destined for Comcast's network, beyond what the SFI Policy contemplates, Comcast will invite the company to engage in discussions concerning an out-of-policy commercial arrangement for additional capacity (i.e., above and beyond the capacity covered by the existing SFI arrangement).[6] The commercial terms are typically straightforward and **{{ }}**. The prices are market-based, and are constrained by the transit pricing offered by third parties. As shown below, transit pricing has steeply decreased over time (note the logarithmic scale on the y-axis).

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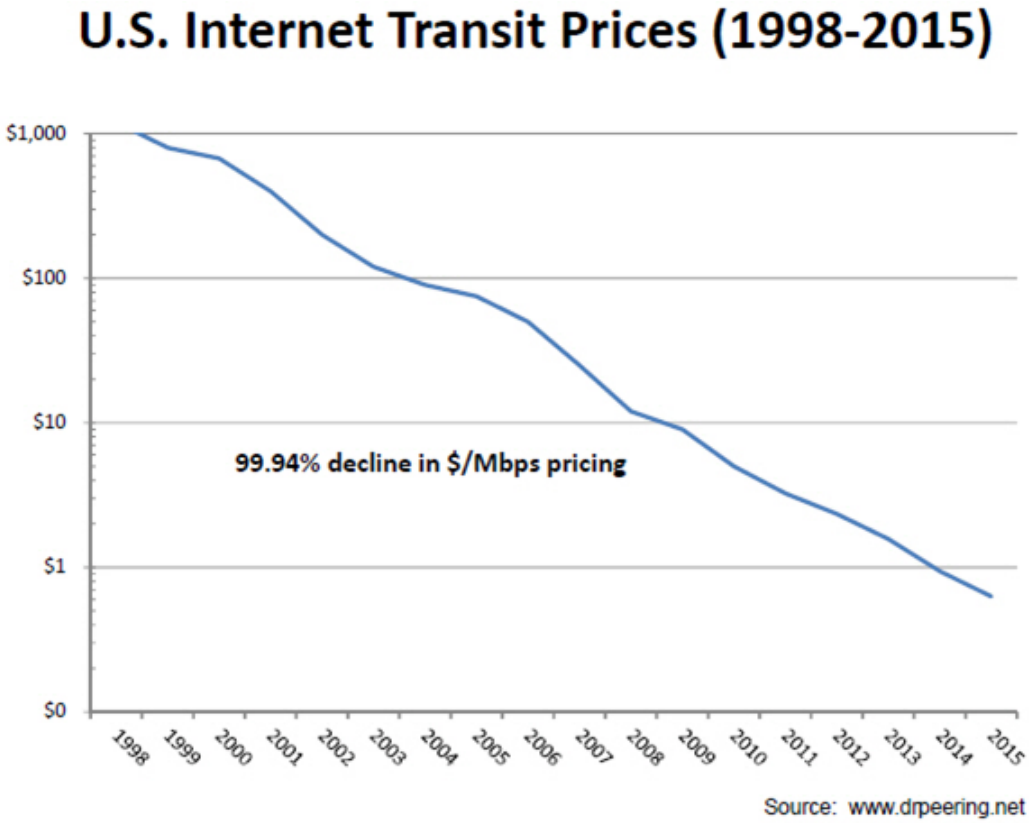
[5] The reverse is also theoretically possible, resulting in stranded facilities and capacity.

[6] In the interim, because Comcast typically has longstanding, productive relationships with its peers, Comcast may provide a complimentary augmentation of the interconnection to help alleviate the congestion.



19. Alternatively, the peer could choose to "groom" the amount of traffic it sends over its interconnection arrangement with Comcast, and use – or encourage its customers to use – one of the many other routes third parties offer into Comcast's network for the overflow. Thanks to the joint efforts of Comcast and its interconnection partners to plan for traffic growth, the capacity of Comcast's interconnection points is almost always more than sufficient to accommodate the volume of traffic exchanged. In fact, over the past two years, the ports that Comcast uses to interconnect with its settlement-free peers have been, on average, less than **{{ }}** percent utilized during peak times, as shown in the chart below.

{{ }}

Transit and On-Net Partners

20. When companies purchase off-net or on-net transit services from Comcast, they enter into contracts that specify the capacity that must be made available, the locations at which traffic will be exchanged, and other conventional terms and conditions of an interconnection arrangement. As a general matter, these contracts provide that the parties may request that Comcast add capacity, and (subject to the terms of the contracts) Comcast must do so in the manner described above. It is the customer's decision whether or not to have Comcast add capacity. In our history, we have never rejected an order, and we have a strong track record of providing ample capacity. Our standard installation intervals are often much shorter than those available from most other networks.

Response to Ken Florance's Allegations

21. All of the foregoing is necessary background for responding to Ken Florance's general depiction of the traffic exchange marketplace and his specific claims about issues that he claims Netflix encountered in delivering its traffic to Comcast. At the outset, I note that many of Mr. Florance's statements portray as fact certain characterizations that are matters of opinion or are just plain wrong. I note also that many of his specific claims regarding Comcast are unsupported hearsay – pertaining to matters as to which his knowledge is at best second-hand, and which have apparently been either misreported to him or misconstrued by him.

22. Mr. Florance chooses to characterize ISPs such as Comcast and TWC as "terminating access networks." (Florance Decl. ¶ 3) This is a loaded term, imported from common carrier regulation, that is properly applied only to components of the public switched telephone network – which has a dramatically different structure, history, economics, and regulatory regime than Internet services do. Mr. Florance also overlooks the fact that some residential ISPs only operate regionally with metro and last-mile networks, while others have substantial national and international infrastructures as well as commercial and residential services. According to Mr. Florance's logic, both supposedly serve as so-called "terminating access networks." But the reality is that their situations differ markedly because the former are dependent on transit providers, while the latter are not.[7]

23. Mr. Florance suggests that Netflix had a choice of only six "transit providers" (Florance Decl. ¶ 5) – but he omits dozens of other transit options with adequate capacity to reach Comcast's network. Netflix appears to have adopted a self-serving strategy of using limited transit providers that never purchase interconnection services from their destination ISP. The result of this self-imposed limitation is that many transit suppliers with available capacity and potentially comparable market pricing were excluded from Netflix's consideration.

24. This Netflix transit strategy severely limited Netflix's delivery capability and its ability to deliver a high-quality service. No other large content provider that I know of – including several in the same space as Netflix – has adopted the same restrictive delivery requirements. The small handful of providers to which Netflix limited itself simply were not capable, by themselves, of handling delivery of one-third of peak Comcast-bound Internet traffic without arranging for massive capacity augmentations that would have far exceeded normal growth and put those providers outside of their peering policies or not in a position to augment at the speed that Netflix wanted to shift traffic. Had Netflix instead taken advantage of the many other routes into Comcast's network, including the many settlement-free routes on which Comcast had (and has) abundant available capacity, as noted above, it could have delivered its traffic to Comcast's network with high quality and no performance issues.

[7] I note that Netflix's economic expert, Dr. David Evans, implicitly acknowledges the importance of an ISP's presence in the backbone space (i.e., rather than the size of its so-called "terminating access network") when he observes that "CenturyLink . . . has substantially more bargaining leverage than does Charter [in interconnection negotiations with Netflix], even though they have roughly similar numbers of subscribers." (Evans Decl. ¶ 147).

25. Mr. Florance suggests (Florance Decl. ¶ 6) that ISPs like Comcast have only two choices: they can pay entities like Cogent for interconnection, or they can peer on a settlement-free basis where the other partner agrees it makes sense. But this view is seriously flawed and outdated. ISPs that have invested in large metro networks and Internet backbone facilities today no longer rely on paid transit to any significant degree, and in fact offer their *own* commercial transit services, charging third parties, just like the traditional Tier 1 providers did for years. And that is not the result of any "terminating access" monopoly, but instead of the massively increased interconnectedness of the Internet, which allows many more parties to compete in the transit market. Mr. Florance's logic would also compel Comcast not only to accept traffic for free from any edge 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.

26. Mr. Florance claims that Netflix's goal is to send traffic in the most efficient manner possible (Florance Decl. ¶ 27). But Mr. Florance does not address *incentives* for efficiency, which come into play where senders of traffic bear some responsibility for the costs of delivery. It was the cost of transit that led to the development of CDNs 15 years ago and more backbone investment, as various providers sought to send their traffic more efficiently. Of course, if Comcast were required to accept traffic for free from any edge provider or network operator on the Internet, without regard to volume, that would remove normal incentives for those who send large amounts traffic to do so efficiently. Not only would that increase the risk of abusive sending practices, stranded facilities, and constant congestion episodes, but it also would unfairly impose the sending party's costs on *all* of Comcast's customers, rather than those who actually receive and benefit from the relevant traffic (i.e., Netflix's and Comcast's shared customers).

27. It is emphatically *not* the case that Comcast over the period 2008-2014 "succeeded in departing from the previous business norm" under which ISPs either paid for transit or "received such traffic without payment." (Florance Decl. ¶ 26) Just as Netflix's business has evolved since 2007, so has Comcast's. But, unlike Netflix, Comcast has followed established norms as its backbone facilities and infrastructure have become more robust and as Internet traffic has exploded (peak Internet demand in Comcast's network is growing over 40 percent per year). Comcast's investments in infrastructure not only have helped to provide new capacity for the Internet ecosystem, but have provided new options for edge providers and increased competition that contributed to continued reductions in the cost of transit services.

28. Circa 2004-2005, Comcast used AT&T for backbone services. At no time did edge providers or CDNs ever get costless delivery to Comcast's network; they just paid another transit provider instead. Comcast decided to build a network comparable to AT&T's, since Comcast already accounted for more than half of AT&T's Internet traffic at the time. Once Comcast had invested sufficiently, and had significant value to offer, it began selling Internet traffic services (or trading value via settlement-free relationships), just as AT&T had done previously (and still does). Having built a large backbone network, Comcast acted like every other backbone provider. We have not "depart[ed] from" any "previous business norm" (Florance Decl. ¶ 26); the relevant norm is, and has always been, mutual exchange of value (in one form or another) among settlement-free peers, and payment for transport in the absence of that. This is invisible to most edge providers, because it is handled by the transit provider or CDN they use to deliver their traffic, but it is not novel.

29. It is certainly true, as Mr. Florance suggests (Florance Decl. ¶ 28), that much of the behavior in the Internet community is infused with a respect for traditions established in the early days of the Internet and a commitment to the overall health of the Internet ecosystem. That "do no harm" ethos is reflected in many of the elements of *The Art of Peering: The Peering Playbook* – a compendium of interconnection knowledge from hundreds of the people most involved in architecting and managing Internet traffic exchange.[8] And as a major member of the Internet, it would be fair to expect that Netflix would be true to that ethos in establishing its CDN and peering relationships. Yet, in my opinion, Netflix has been more focused on another part of the *Playbook*, which explains a variety of "tactics that Peering Coordinators have used to obtain peering where they otherwise might not have been able to obtain peering," and these maneuvers "vary from the mundane to the clever, from merely deceptive to manipulative and unethical."[9]

30. Netflix's sole concern is to deliver the most traffic possible to Comcast's network, with the least cost to Netflix. To try to achieve its economic goals, Netflix has actively employed some of the most harmful tactics described in the *Playbook*. These harmful tactics include, most notably, the Traffic Manipulation, Aggressive Traffic Buildup, and Bluff tactics designed to create consumer disruption that the receiving ISP can resolve only by caving to Netflix's (or its chosen transit provider's) demands.

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[8] http://drpeering.net/white-papers/Art-Of-Peering-The-Peering-Playbook.html.

[9] *Id*.

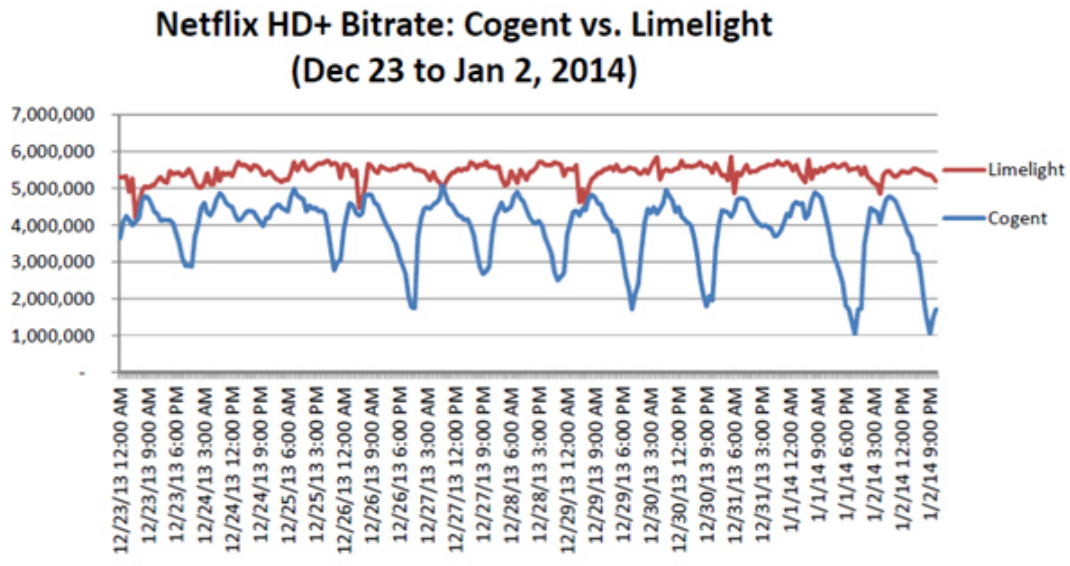
Response to Claims About Congestion Problems

31. In the following paragraphs, I respond directly to certain allegations made by Mr. Florance.

32. It is false that Comcast began a practice in 2009 to 2010 to allow its ports with certain settlement-free transit networks and CDNs to congest. (Florance Decl. ¶¶ 28-29) Instead, in 2009-2010, Netflix began sending huge, unprecedented amounts of traffic over Level 3's transit links into Comcast's network, which had not been provisioned to handle that amount of traffic. From day one of this dispute, Comcast offered to augment the relevant links (and, in fact, made initial augmentations immediately that were soon overcome by even more traffic). But the augmentations would have provided capacity above and beyond the amount required or contemplated under the settlement-free arrangement under which the existing interconnection arrangement had been established – and thus had to be arranged on a commercial basis, which Level 3 at first refused to consider. While this issue was resolved with no performance issues when it involved Level 3, with whom Comcast has since established a positive **{{ }}**, this was not the case when, several years later, Netflix switched its allegiance to Cogent, causing the exact same scenario. In that case, Netflix and Cogent continued to send the traffic at issue, knowing full well it would cause performance issues – a *Playbook* tactic designed to "persuade" Comcast to cave and provide more capacity on a settlement-free peering basis. I address below various specific allegations Mr. Florance makes that misrepresent all parts of this series of events.

33. First, Mr. Florance claims that, "Not long after Akamai took on Netflix traffic [in 2009], Comcast used a number of different tactics against Akamai, including de-peering and congestion." (Florance Decl. ¶ 32) None of this is true. First, Akamai has been a partner of Comcast's since 2008, prior to any arrangement Netflix apparently made with Akamai. Second, our relationship with Akamai has been a good and solid one: we have never de-peered Akamai or threatened to do so, nor have we ever limited capacity to Akamai; and we have consistently provisioned its requested capacity pursuant to our agreement. Contrary to Mr. Florance's speculation, Comcast did not impose a "new terminating fee" on Akamai in 2009; **{{ }}**.

34. Mr. Florance's claims about our dealings with Limelight (Florance Decl. ¶¶ 33-35) are also incorrect. I am aware of no basis for his assertion that Comcast demanded that Limelight interconnect directly with Comcast rather than continuing its reliance on Global Crossing (later acquired by Level 3) as its upstream transit provider; Comcast at all times honored its agreement with Global Crossing and would have readily added capacity in accordance with the policies described above. Limelight and Comcast did enter into a **{{ }}**, and capacity was added to that arrangement whenever Limelight requested it. In fact, even when Netflix began moving most of its traffic to Cogent and other transit routes in late 2013, Netflix continued to use Limelight to deliver some of its traffic to Comcast, and that traffic was not affected by congestion or other quality issues, as shown in the chart below. (The same was true of Akamai and Level 3.) In short, Mr. Florance's attempt to show that Comcast took aggressive steps that somehow undermined Netflix's relationships with its CDN partners has no basis in reality.



35. As just noted, Mr. Florance also misrepresents our dealings with Level 3. (Florance Decl. ¶¶ 36-38) Comcast and Level 3 had a settlement-free arrangement for several years prior to November 2010, when Level 3 signed on as Netflix's CDN. At that time, Level 3 **{{ }}**. But Level 3's new arrangement with Netflix substantially increased the amount of traffic Level 3 delivered to Comcast's network. Instead of ordering additional capacity, as **{{ }}**, Level 3 instead demanded additional settlement-free peering capacity by an amount that would have exceeded the **{{ }}**. Then, as now, Comcast had a transaction review pending before the Commission, and arguments were made that Comcast should be forced to provide the requested capacity on a settlement-free basis (above and beyond some additional free capacity Comcast had provided already as a show of good will) – notwithstanding that Level 3 itself had taken the same position as Comcast in its own previous peering dispute with Cogent. Instead, Comcast invited Level 3 to explore an additional commercial on-net transit arrangement, and offered to consider various iterations that would serve both parties' interests. Ultimately Comcast and Level 3 reached a mutually beneficial arrangement, and Comcast has honored – and continues to honor – all of its contractual obligations to Level 3 (and vice versa).

36. Mr. Florance states that Netflix then determined to transition to its own CDN and relied on transit providers to reach those ISPs, like Comcast, that did not accept Netflix's "offer" that Comcast connect with Netflix on a settlement-free basis. He then suggests (Florance Decl. ¶ 48), incorrectly, that Netflix had a choice of only six transit providers. The reality is that, throughout the period in which Netflix used some or all of these six routes, *there remained abundant available capacity into Comcast's network on scores of other routes.* Indeed, Netflix and Mr. Florance concede that AT&T (the only ISP mentioned by Mr. Florance) could have delivered Netflix's traffic to Comcast (Florance Decl. ¶ 49). But there were also other large transit routes and dozens of other settlement-free peers and CDNs that Netflix could have used to send its traffic to Comcast's network. As noted, even in the face of the Netflix-related congestion, Comcast's utilization with its peers during the last 12 months was less than **{{ }}** percent on average during peak times – and those peers do not pay Comcast – which undermines Netflix's suggestion that it sought out all routes where no payment to Comcast was required. Netflix chose routes that it knew were insufficient, and created performance issues for itself and its customers.

37. By its own account, Netflix sent traffic to Comcast over only three of Comcast's more than 40 settlement-free peers: Cogent, Level 3, and Tata. Netflix has been saying (but not in the Florance declaration) that it was using five of the six "top" transit providers according to Renesys Market Intelligence data, but Renesys data measures the Internet routing table, not capacity or performance.[10] Also, three of the five transit ISPs that Netflix was using are primarily international, leaving only two U.S.-based major transit providers to carry the lion's share of Netflix's massive traffic load. Out of more than 40 available paths with capacity to Comcast, Netflix intentionally attempted to funnel all of its traffic to a small number of connections not designed to handle this massive amount of traffic. Netflix, in its sole discretion, moved this traffic and could do so again at any time – creating new congestion on the Internet. In contrast, CDNs that adhere to Internet norms of managing capacity across available paths would measure any capacity issues and move traffic appropriately (and often quite rapidly) to avoid customer impact. In fact, prior to Netflix in-sourcing its CDN, Limelight, Level 3, and Akamai were managing this delivery and providing Netflix customers with a good video experience.

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[10] *See* http://www.renesys.com/2014/01/bakers-dozen-2013-edition/. In other words, Renesys measures how many individual networks are behind each ISP, so a provider with many small transit customers could be reflected as "larger" by Renesys than one with far more capacity and connectivity to Netflix's end customers.

38. During these events, Comcast observed that the utilization rates of its interconnection points with Cogent, Level 3, and Tata suddenly soared to 100 percent at peak times, far beyond normal Internet growth expectations. Discussions with these partners (as well as customer complaints) made clear that there was a congestion issue. **{{ }}**. Thus, with sufficient notice, Comcast could and would have supplied the capacity necessary to avoid congestion on its routes with **{{ }}**. However, the Netflix traffic was moved to that route very quickly, before capacity had been deployed, and immediately caused short-term congestion issues and customer impact.

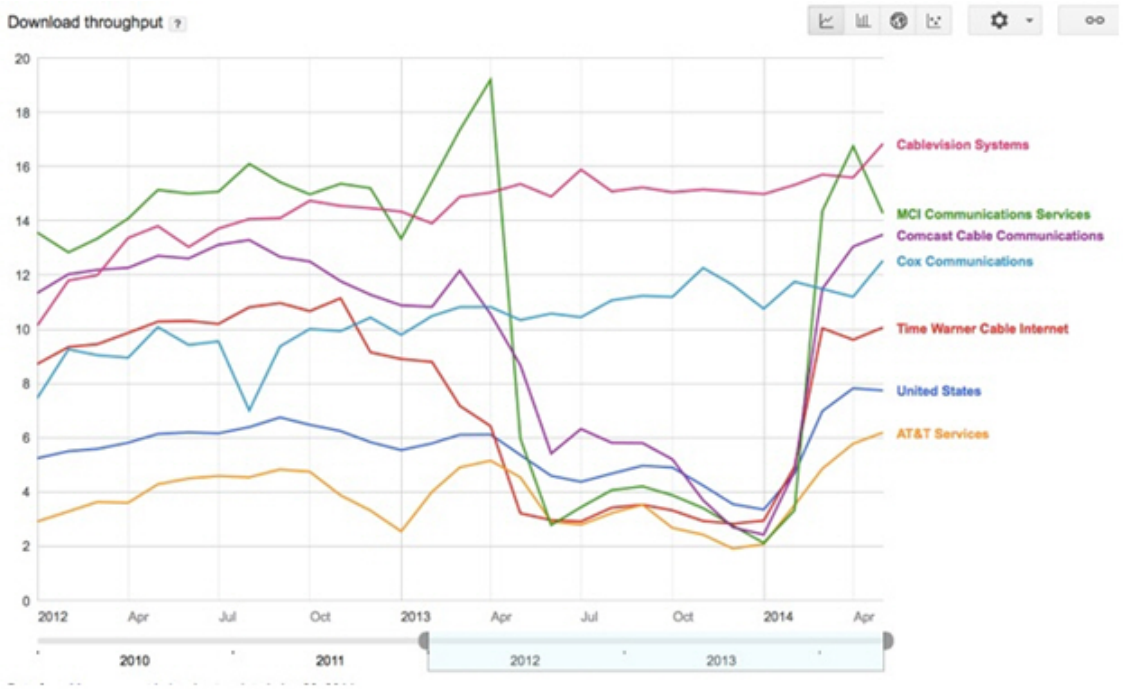
39. As noted above, **{{ }}**. Netflix elected to send its traffic to Tata, through NTT, TeliaSonera, and XO, for Tata to deliver to Comcast. My understanding is that **{{ }}**. **{{ }}**. In effect, Netflix used Tata as a pawn in Netflix's effort to press Comcast on settlement-free interconnection – again, not the conduct of a responsible member of the Internet ecosystem. Notwithstanding this unfortunate episode, Comcast and Tata's traffic exchange arrangements continue to be mutually beneficial, and our negotiations are amicable and productive. **{{ }}**.

40. Netflix's actions created the most pronounced and prolonged problem with Cogent, which had been a long-term settlement-free peer of Comcast and remains so today. During Comcast and Cogent's scheduled joint capacity review at the end of 2012, Cogent informed Comcast that it did not foresee needing any additional capacity for the coming year. In the fall of 2013, however, Cogent requested that substantial additional capacity be added immediately to its interconnection links to accommodate a massive and unexpected spike in traffic. Comcast offered to do so pursuant to a commercial arrangement, since the additional traffic would have put the company's relationship in violation of our SFI Policy,[11] but Cogent refused to have any discussions with Comcast other than repeated demands for "free" interconnection.

41. Over the next few months, Cogent's traffic into Comcast's network grew by nearly *500 percent*, overwhelming Cogent's existing spare capacity and then overwhelming 50G of additional interconnection ports that Comcast supplied to Cogent on a complimentary basis in the hopes of relieving some pressure and showing good faith to encourage a solution. The resulting congestion not only affected Netflix traffic, but also disrupted other customers of Comcast and Cogent. Comcast repeatedly asked Cogent to meet and enter into discussions to resolve the situation, but they were not willing to meet to discuss any kind of commercial arrangement. The problem thus remained unresolved until – after Netflix proposed and entered into a direct relationship with Comcast – Netflix reduced the volume of traffic that it transmitted to Comcast through Cogent. Today, the Cogent-Comcast interconnection links are uncongested and the parties' traffic flows are back in general balance, with a ratio of less than **{{ }}** over those links, and so now back in compliance with the SFI Policy. This means capacity is again available for many third parties who need to reach Comcast's network through this route.

[11] Note that it was not just the traffic flow that became decidedly one-sided. While the receiving party (Comcast) bore the growing burden of transporting more and more traffic over its facilities, the sending party (Cogent) did nothing more than pick up traffic at a third-party collocation site from Netflix's collocated server and transfer such traffic to a Comcast server in the same exact facility, essentially carrying the traffic a few hundred feet or less.

42. Netflix's use of Cogent was not unique to Comcast; multiple ISPs were also negatively impacted by Netflix's decision to use Cogent far beyond its capabilities. Google's Measurement Lab (M-Lab) infrastructure, which uses Cogent for some of its measurement servers, is an Internet research project with servers measuring various ISPs' performance. During the time at issue here, M-Lab measured a clear performance decline across several ISPs that had not agreed to Netflix's demand for settlement-free peering and was accordingly subjected to Netflix's various *Playbook* tactics. As shown below:



The Direct Connection Agreement

43. While these congestion events were occurring in 2013, Netflix and Comcast had discussions about establishing a direct connection relationship. The parties discussed a number of technical and economic issues about how such an arrangement might be structured, but negotiations foundered on Netflix's insistence that the relationship cost Netflix nothing. But, in January 2014, before Comcast's transaction with Time Warner Cable was announced, Netflix agreed in principle to a commercial direct connection relationship. In February, Comcast and Netflix entered into a mutually-agreeable, long-term contract. That agreement addressed one of the chief concerns Mr. Florance identifies – "unpredictable price increases by Comcast." (Florance Decl. ¶ 39) In fact, it provides Netflix long-term **{{ }}**. And the contract includes **{{ }}**.

44. After the agreement was reached, and implementation was underway, Netflix's CEO Reed Hastings wrote to Comcast executives and said: "We found middle ground on our issues that worked well for both of us for the long term, and works great for consumers." He also noted that the Comcast team's technical agility "is like nothing we've ever seen anywhere in the world" and predicted that "the great performance will be the major story over the coming months." Later, Netflix conceded in an email to Comcast executives that "you [Comcast] made paid peering affordable for us."

45. Of course, Netflix soon decided that it wanted to tell another story publicly. Just three weeks after signing the agreement, Netflix began portraying its agreement with Comcast as something it was forced into against its will and contrary to its interests. Notably, this was after Comcast and Time Warner Cable had announced their transaction. And it thus came as no surprise when, in April, Mr. Hastings wrote to Comcast executives to urge Comcast to accept settlement-free interconnection for residential networks without regard to traffic volumes as a merger condition – and stated that, in the absence of such a statement, Netflix and other Internet companies would "have to protest the merger to increase the odds of winning the condition."

Response to Hank Kilmer's Allegations

46. I now turn to Hank Kilmer's declaration, much of which has already been addressed above. In particular, I have already refuted Mr. Kilmer's highly misleading description of congestion problems that Cogent created in 2013, but a few additional points warrant further explanation.

47. Mr. Kilmer asserts that whether a network has (or should be entitled to) settlement-free peering with Tier 1 networks depends on whether it is itself a Tier 1 network. (Kilmer Decl. ¶ 14) His implication is that, since Comcast is technically not a Tier 1 provider, Comcast should be *paying* for transit, rather than peering with anyone on a settlement-free basis. By this definition, once the Tier 1 "club" is established everyone must pay Tier 1s, no new ISP can ever become a Tier 1, and a Tier 1 network's status is forever, no matter how its business changes. While Mr. Kilmer may wish this to be true, it is not. As noted, over the last decade, backbone interconnect players have changed and the market has become increasingly competitive and dynamic. Comcast and other new entrants in the backbone market have invested *billions of dollars* in fiber backbone facilities while some older Tier 1s have consolidated or disappeared. The Internet is not a static world, and as businesses, networks, and services have evolved, so have the underlying interconnection arrangements. As explained in paragraph 5 above, as companies like Comcast built out backbone networks, direct settlement-free peering became more widespread among a variety of players, and non-Tier 1 providers began competing to provide paid transit. This created choice and competition – with the unsettling result, for Cogent, that it can no longer charge all other players for transit. But the fact that an edge provider, small ISP, or CDN now has the choice of reaching an arrangement with Comcast, directly, rather than paying *more* to Cogent to reach Comcast, has clearly been an unmitigated positive for the Internet at large.

48. Mr. Kilmer acknowledges that Cogent has been de-peered by five Tier 1 carriers since 2003. (Kilmer Decl. ¶ 15) It bears emphasis that this accounts for almost half of all major de-peering occurrences across the globe since the turn of the century.[12] Although Mr. Kilmer raises these incidents to try to show that such disputes should be resolved by a resumption of settlement-free peering (which of course is ultimately what has now happened between Comcast and Cogent), he does *not* focus on the more compelling issue: that Cogent's repeated abuse of its interconnection capacity with other providers has caused it to be involved in a disproportionate share of the Internet's fairly limited de-peering situations.

[12] *See generally* http://en.wikipedia.org/wiki/Peering#Depeering.

49. Mr. Kilmer devotes several paragraphs to an argument that "Comcast's 'balanced traffic ratio' requirement makes no sense." (Kilmer Decl. ¶¶ 55-60) First, he points out that cable broadband providers' last-mile networks are asymmetrical, and that home users want to download more than they transmit (Kilmer Decl. ¶ 55) and asserts that "a Tier 1 backbone provider will always deliver more traffic to a cable ISP than the cable ISP will transmit to a Tier 1 provider." (Kilmer Decl. ¶ 59) To the contrary, Comcast tends to send roughly the same amount of traffic off-net, to its settlement-free peers, as it receives collectively from them. As noted, our relationship with Cogent is highly balanced today. In fact, Comcast *sends* more traffic to some of its peers than it receives. Mr. Kilmer overlooks that Comcast is not simply an eyeball network, anymore than Cogent is simply a transit provider: Comcast provides transit to many networks, businesses, and content providers, and Cogent serves "eyeballs" like universities and businesses and networks that consume traffic. As shown in the graph below, we send net traffic *outbound* through roughly the same number of settlement-free peers as those through which we receive net *inbound* traffic.

{{Table Redacted**}}**

50. Mr. Kilmer next suggests that interconnection responsibilities (and costs) should all be borne by Comcast, because any traffic that is delivered to Comcast's network is traffic that Comcast's customers have requested. (Kilmer Decl. ¶ 58) But of course, even if this were completely true, Comcast had sufficient interconnection arrangements in place to handle all of Netflix's traffic and all other traffic incoming to its network. Furthermore, it certainly is not Comcast's "responsibility" to ensure that there is always and immediately sufficient capacity to handle a third of the Internet's traffic via any route Netflix chooses to use at any instant. To do so would require hugely excessive spare capacity on every route and create serially stranded facilities. The bottom line is, whether or not Comcast's customers request the traffic, it is Netflix that decides which route to use to send it to Comcast's network, and Netflix's responsibility to deliver what its customers are requesting with sufficient quality.

51. Comcast did not "deliberately fail to augment port capacity." (Kilmer Decl. ¶ 61) Comcast repeatedly offered to enter into discussions with Cogent about augmenting the capacity – and in the meantime, as I explained above, even augmented ports for Cogent for free.

52. Cogent could have solved its problems at any time, without paying Comcast a dime. It is not uncommon for a transit ISP to work with its large customers to manage their traffic so as to avoid causing congestion or peering problems (e.g., by using a variety of other transit options). Comcast has addressed similar situations with its large volume transit customers, and in my experience, they have always been very cooperative. Large-volume customers are (or should be) very aware that they have the power to create congestion, which can result in "denial of service" situations with their traffic, and normally such customers act very responsibly to avoid these issues. Congestion can be easily corrected in real time by edge providers if the traffic is properly managed, forecasted, and distributed among the various routes available to the customer, rather than insisting that all of it stay on any particular provider's route. Equally important, transit providers like Cogent should avoid selling more capacity than they have in any given time period.

53. Cogent's refusal to engage in this expected Internet "hygiene" is hardly unusual conduct for Cogent, as Mr. Kilmer's discussion of Cogent's de-peering history, mentioned above, illustrates: Cogent has a long history of overselling its routes and then refusing to address the resulting crisis. As Verizon noted during a similar dispute with Cogent in 2013:

Cogent is not compliant with one of the basic and long-standing requirements for most settlement-free peering arrangements: that traffic between the providers be *roughly in balance*. When the traffic loads are not symmetric, the provider with the heavier load typically pays the other for transit. * * * This is [simply] a bandwidth provider that is unhappy that they are out of balance and will have to make alternative arrangements for capacity enhancements, just like any other interconnecting ISP.[13]

[13] *See* http://publicpolicy.verizon.com/blog/entry/unbalanced-peering-and-the-real-story-behind-the-verizon-cogent-dispute (emphasis added).

And the same problem arose between Cogent and Level 3 in 2005, leading to Cogent being de-peered by Level 3. As Level 3 said:

We determined that the agreement that we had with Cogent was not equitable to Level 3. There are a number of factors that determine whether a peering relationship is mutually beneficial. For example, Cogent was sending far more traffic to the Level 3 network than Level 3 was sending to Cogent's network. It is important to keep in mind that traffic received by Level 3 in a peering relationship must be moved across Level 3's network at considerable expense. Simply put, this means that, without paying, Cogent was using far more of Level 3's network, far more of the time, than the reverse. Following our review, we decided that it was *unfair for us to be subsidizing Cogent's business*.[14]

54. Finally, I want to answer Mr. Kilmer's claim that Cogent offered to bear the cost of all of Comcast's expenses in upgrading its connections with Cogent. (Kilmer Decl. ¶ 68) Importantly, the costs of upgrading the ports themselves are relatively minor compared to the costs of carrying huge amounts of traffic on an ongoing basis. In any event, Cogent only made this offer in late March 2014, a month *after* Netflix and Comcast had announced (February 23) that they had reached a direct interconnection agreement and weeks after Netflix had moved its Comcast-bound traffic off Cogent's network.

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[14] *See* http://www.prnewswire.com/news-releases/level-3-issues-statement-concerning-internet-peering-and-cogent-communications-55014572.html (emphasis added).

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The Evolution and Economics of Internet Interconnections

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About the Author

Dr. Constantine Dovrolis is a Professor at the School of Computer Science of the Georgia Institute of Technology. He received his Ph.D. degree from the University of Wisconsin-Madison. His research focuses on the evolution of the Internet, the economics of Internet interconnections, network measurement methods, and cross-disciplinary applications of network science.

Dr. Dovrolis has been an editor for the *IEEE/ACM Transactions on Networking* and the ACM Communications Review (CCR). He served as the Program co-Chair for the PAM'05, IMC'07, CoNEXT'11, and as the General Chair for HotNets'07. He received the National Science Foundation CAREER Award in 2003.

His most relevant prior work to this report includes publications in:

a) The evolution of the Internet at the Autonomous System level from 1998 to 2010 [1], exploring the transformation of the latter from a hierarchical to a horizontally-dense ("flat") structure [2];

b) The economics of Internet interconnections, and of peering in particular [3, 4, 5]; and

c) The development of network measurement tools to evaluate network performance and to detect traffic discrimination in the Internet [6, 7, 8].

His previous research has been funded by the National Science Foundation, Google, and Cisco.

Dr. Dovrolis is a Steering Committee member of the Measurement Lab (M-Lab), a consortium of research, industry, and public interest partners dedicated to providing an ecosystem for the open, verifiable measurement of global network performance.

About this Report

The author was asked by counsel for Comcast Corporation, based on his expertise in the evolution and economics of Internet interconnection, to offer an objective and neutral overview of the techno-economic structure of Internet interconnections and their evolution during the last 20 years.

The author was also asked to offer his assessment of whether certain claims by Cogent (see Declaration of Mr. H. Kilmer) and Netflix (see Declaration of Mr. K. Florance) submitted on the record in this proceeding are accurate, whether these claims justify regulatory intervention in Internet interconnection arrangements, and whether such intervention would benefit the Internet ecosystem as a whole. These three points are discussed in the last three sections of the report.

The opinions expressed in this report are solely of the author and do not necessarily reflect the opinions of Comcast (or any other Internet firm), Georgia Tech, M-Lab, or any sponsors of the author's research.

Executive Summary

I have examined the declarations submitted in this proceeding, In the Matter of Applications of Comcast Corporation, Time Warner Cable Inc., Charter Communications, Inc., and SpinCo for Consent To Transfer Control of Licenses and Authorizations, MB Docket No. 14-57, by Mr. Ken Florance on behalf of Netflix, Inc. and Mr. Henry Kilmer on behalf of Cogent Communications Group. In my opinion, they misrepresent many aspects of the Internet ecosystem – its history, its recent evolution, its direction – and the technical and economic factors that characterize it today. In particular, the mechanisms of traffic routing and capacity provisioning, what options are available, and which parties are most able to influence the quality of routed traffic, are not reported accurately or clearly. I provide this report to correct the misconceptions or misstatements that I have observed. Although I begin with a background on the Internet backbone's structure and evolution, I then comment in particular on the following key points:

- The traditional lines between various Internet firms – enterprise networks, content providers, transit providers, content delivery networks, and access networks – have blurred and many of today's networks have multiple roles and provide multiple services. The arrangements under which these networks have interconnected have evolved as well. ***Today, it makes no sense to decide who should pay whom, or who should peer with whom, based on a historical classification of each firm's Internet role. Instead, each interconnection should be evaluated independently based on the costs and benefits it introduces to each party.***

- Over the past decade, the backbone has become very competitive, there is abundant connectivity at all layers and among all types of providers, and access providers have many interconnection relationships in which they do not pay for transit. Where providers like Cogent used to dominate the transit market and charge providers such as Comcast for transit, today Comcast and Cogent are more or less in the same business – both serve end-users of various sizes, both provide transit, and if the two peer for free, it is because doing so helps both their businesses. ***Thus, Cogent's focus on the "Tier-1 vs. Tier-2" classification is an anachronism with no particular relevance to the current environment or ongoing policy debates.***

- Settlement-free peering is reasonable when the arrangement is of roughly equal benefit to both parties, taking into account both value and costs. The "traffic-ratio" metric is a commonly used proxy to evaluate if a peering link is of roughly the same value for both parties, but it is not the only one and more sophisticated cost-benefit analyses can be used that consider the costs on the receiving network as well as the economic benefits that the transferred flows will generate for each party. ***If one of the parties benefits much more from the interconnection than the other, or imposes far more cost on the other, it is reasonable to consider a paid-peering relationship.***

- Direct interconnection arrangements between content providers and access providers are beneficial to the content provider because the latter ensures capacity and may even reduce the transport costs for the traffic flow (by removing a middleman transit provider). At the same time, the direct arrangement will impose costs on the access network. ***These costs include not only the costs of the dedicated interconnection arrangement, but also the costs of accommodating the incremental traffic flow all the way from the interconnection point to the end-user*** – costs that may increase over time if the sending content provider takes advantage of the direct interconnection to send traffic with less compression or higher resolution, for example.

- ***Paid-peering payments are very different from "termination access fees," although that is the talismanic terminology that Netflix and Cogent have used.*** Access providers cannot demand direct interconnection arrangements (or payments) from the various content providers, CDNs, and other networks that send them traffic. Those providers always have the option of sending their traffic to an access provider by using the various indirect transit providers that provide the core interconnectivity of the Internet; no access provider can fulfill its role reliably and efficiently without being densely interconnected with several transit providers. Access providers simply offer the option of direct interconnection (through paid-peering) as an alternative to the sender's purchase of transit services. Paid-peering may also be offered as a way for a settlement-free peer to send traffic that exceeds the limitations of the parties' settlement-free peering arrangement in terms of traffic exchange constraints.

- Although Netflix and Cogent suggest that Comcast forced Netflix into direct interconnection by causing congestion on its routes with Cogent, it is important to remember that it is ***the networks that send traffic over the Internet (including content providers) that control how to route that traffic***. Thus, a content provider can choose which routes to use, whether to split its traffic over several different routes, and whether to send it directly to another network (via a direct interconnection arrangement if it has one) or over the many indirect routes available into access providers' networks. These routing decisions can be made in real-time and they can be adjusted on a minute-by-minute basis depending on the measured performance of each interconnection, cost considerations, and the usage constraints of each interconnection. ***In contrast, the receiving network cannot control the routing of the traffic it receives. It cannot stop a content provider from pushing all its traffic over one interconnection link rather than spreading it among several, or from using up all available capacity on a particular link the moment it becomes available, creating serious congestion issues.***

In addition, I conclude that if content providers, or transit providers carrying content providers' traffic, could demand free direct interconnection with access networks, as Netflix and Cogent seek through regulation, there would be several negative impacts on consumers and the Internet in general.

- ***First, forcing networks to provide free direct interconnection to any requesting provider would place significant and unfair financial burdens on consumers.***

  - Ø End-users (i.e., access providers' customers) would have to pay the dedicated transport costs of a particular content provider's traffic, whether or not they even subscribe to that content provider, which may be significant when larger providers, like Netflix, are at issue. Meanwhile, the content provider (i.e., Netflix) would not only get subsidized transport to an access network, but also subscription or advertising revenues that it earns because it has access to that network.

  - Ø Eliminating all paid-peering would place all financial burden for the growth of the Internet exclusively on end-users – a situation that has never before prevailed in the Internet ecosystem. End-users would have to pay not only for Internet access but also for investments in the network core, something that has traditionally been defrayed by contributions from content providers, CDNs, and other "large" Internet players.

- ***Second, there is no way or reason to differentiate between content providers (and their partners) and other network providers in setting such a rule; and in any event content providers can simultaneously be transit providers and CDNs themselves.*** There is no basis to differentiate among so-called "terminating access networks" (i.e., all access providers) and transit providers like Cogent, because those categories are equally fluid – transit providers like Cogent provide access to the Internet for their customers. And why would it be deemed acceptable for a transit provider to collect compensation from small access networks and content providers, and send traffic between the two, but wrong for those same small access providers and content providers to pay for direct paid-peering interconnection, eliminating the "middle man" (i.e., the transit provider) from the path? If all networks have the right to seek direct interconnection to every other network, and all can do so for free, this essentially would eliminate the transit market, among other collateral effects, and further exacerbate the problems just described about supporting the Internet's backbone going forward.

- ***Third, paid-peering (and transit) arrangements create incentives for efficiency – these arrangements provide senders of Internet traffic reasons to invest in compression technologies and other ways to reduce their traffic loads.*** When everything is "free" to the sender, those incentives disappear, so bandwidth demands will increase rapidly – with the access networks presumably tasked with the endless job of maintaining sufficient bandwidth for all possible needs. This will simply increase the strain on the Internet and on the consumers who use it.

In short, regulatory intervention to prohibit access providers from collecting payments for direct interconnection arrangements with content providers or their intermediaries is not only unnecessary, but would also be unfair to end-users and harmful to the evolution of the Internet ecosystem.

Finally, with respect to certain claims made by Mr. Florance and Mr. Kilmer, I explain why their premise that access providers' paid-peering arrangements are the same as "terminating access fees" is false. I demonstrate that the purported benefits to access providers of participating in "Open Connect" may not be a benefit at all to certain providers; that the proposition that Comcast should not be charging for interconnection is anachronistic and unjustified; that the claim that Comcast caused congestion on the interconnection links between it and Cogent is implausible and ignores the reality that Netflix controls how its traffic is routed and that Cogent continued to route Netflix's traffic over congested links; and that the assertion that whether a network paid for or was paid for interconnection has always been based on whether the network was a member of the historic "Tier-1 club," rather than whether the network provided a mutual exchange of value, is fiction.

1 The Internet Ecosystem

We usually think of the Internet as a communication network. It is much more than that, however. The Internet is a dynamic and self-organized *"network of networks"*. The networks that participate and form the Internet can belong to an individual or family, a small business, a global enterprise, an ISP, a content provider, etc. Each of these networks operates independently, has its own objectives, and operates under its own constraints. Their common goal, however, is that they want to form a *connected inter-network* in which every individual network can reach every other network. From this point of view, we can also think of the Internet as a techno-economic ecosystem in which various "species" interact through different types of relations (antagonistic or symbiotic) to meet their diverse objectives.

The larger individual networks often follow an administrative process in which they are registered as *"Autonomous Systems"* or ASes, so that they can have their own provider-independent addresses, and to have more than one direct interconnection with other ASes. Individual users or smaller businesses, on the other hand, are typically connected to the Internet through another AS (e.g., their residential ISP or the AS they work for). Today, the Internet consists of about 50,000 ASes [9].

The set of these ASes is constantly changing as new firms and organizations connect to the Internet, while others merge or shut down. The interconnections between these ASes are also highly dynamic because they are determined by economic, performance or strategic objectives, while the "ecosystem's landscape" is constantly in a state of flux. It should be emphasized that these interconnections are not just some cables that connect the networking gear of different companies; *an interconnection between two ASes represents a business agreement, and as such it is formed only when it is beneficial for both parties.* It is amazing (but certainly not a coincidence) that, despite this distributed and heterogeneous decision-making process that is executed in parallel by about 50,000 players, the Internet has always remained connected (with only few disruptions that are discussed later in this report).

1.1 The "Species" of the Internet Ecosystem

Autonomous Systems are often classified based on their main functional role or business objective. I summarize this classification next (emphasizing, at the outset, that many ASes which at one time fit neatly into a single one of the categories below today play multiple roles in the ecosystem).

1.1.1 Traditional AS Classification

- **Enterprise Networks:**
  Most registered ASes fall in this category. They are typically corporations or organizations that want to connect to the Internet with their own, provider-independent addresses. For instance, a major university, a federal organization, or a manufacturing company with multiple sites would be classified as an enterprise network.

- **Access Providers:**
  These are firms that sell *Internet access* to residential and business customers (mostly through broadband technologies such as DSL or DOCSIS, but possibly also through fiber optics or wireless connections). Historically, firms such as Comcast and Verizon would be classified as access providers.

- **Content Providers:**
  These are firms that generate Internet content, such as online video, news, e-commerce, online social networking, or Web search results. The revenues of these firms are generated mostly through user subscriptions, advertisements, and online sales. For example, Netflix, Google, Facebook, and Amazon would be classified as content providers.

- **Transit Providers:**
  These are firms that operate geographically large and high-capacity backbone networks. Historically, transit providers were paid by all other types of ASes to transfer data over large distances. Firms such as Cogent, NTT, and Level3 would be classified as transit providers. From the start, many transit providers also were access providers at least to business networks.

- **Content Distribution Networks (CDNs):**
  These are firms that replicate Internet content in their distributed storage infrastructure ("caches"), serving download requests from locations (typically third party IXPs, explained below, where they have deployed caches) that are close to end-users. The customers of CDNs are typically content providers. For instance, firms such as Akamai and Limelight are CDNs.

- **Internet Exchange Points (IXPs):**
  These companies operate well-connected facilities ("Internet hotels"), mostly at major urban centers, in which different ASes can be present and interconnect with each other (if they choose to do so). They are paid by the ASes that use these facilities [10]. For instance, Equinix and NetIX are IXP providers.

1.1.2 Versatile, Multi-Role ASes

This traditional classification system can be misleading today. As discussed more in Section 2, the Internet ecosystem has gone through a major transformation during the last ten years. The largest ASes (at least in terms of generated or transferred traffic) try to be more independent and versatile, playing multiple roles at the same time. For instance, the major content providers (e.g., Netflix, Amazon) have developed their own CDNs and some have even begun supporting third-party services on those "private" CDNs; in some cases (e.g., Google), content providers operate their own international backbone networks. Some transit providers (e.g., Level3) have also diversified their role by offering CDN services to content providers and others. Certain access providers (e.g., Comcast) also have deployed large, high-capacity backbone networks so that they now provide transit service to other networks, CDNs, etc.; additionally, they do not need to rely on the services of other transit providers as much or at all. And of course, content is not only generated by content providers, but also from all Internet users, and consequently, from all ASes.

This diversification of the business roles and functions of ASes has major implications, as will be discussed later, for the economics of Internet interconnections. We can no longer determine who should pay whom based on the single business function that has been historically associated with each AS. By the same token, old classifications no longer have much relevance, including for example the "Tier-1" classification discussed below. *Today, every interconnection must be evaluated independently by the interconnecting parties to determine what its terms should be, examining the costs and benefits that that interconnection brings to each party* [11,12].

A point about terminology: in the rest of this report, when I refer to an AS based on the traditional classification (e.g., "a transit provider"), I mean that it acts in this role at that specific instance, not that this is the only role of that AS.

1.2 Interconnections Between Autonomous Systems

An interconnection between two ASes can be of different types. These types control both the traffic that can be exchanged and the economics of the interconnection (who pays whom and for what purpose) [13]. In the following, I review the major types of AS interconnections:

- **(Global) Transit:**
  This is an asymmetric relation in which one AS is the "customer" and the other is the "provider." The provider offers the customer routes that can reach any network in the Internet, and it "advertises" the addresses of the customer to the rest of the Internet. The customer pays the provider for the traffic it sends to and receives from the Internet.[1]

[1] Typically, the customer pays based on usage, billed at the 95th percentile of the five minute average traffic load. Also, the customer typically pays only for the most heavily used direction of the transit link. This means that a customer may pay based on the traffic *into* its network from third party senders.

- **Settlement-Free Peering (SF-peering):**
  This is a symmetric relation ("peer to peer"). The two peering ASes agree to exchange traffic that is destined to them or their customers[2] for "free", based on the mutual exchange of transport value each AS obtains from the other. Thus, SF-peering interconnections are established when there are roughly equal costs and benefits for both parties. For instance, two ASes may want to establish a SF-peering interconnection to reduce the fees they would otherwise pay to their transit providers. ASes typically establish criteria specifying the conditions under which they will establish SF-peering links with other ASes; these are often publicly posted. Traditionally, a rough balance of traffic has been deemed a necessary element for many SF-peering relationships, as well as roughly equivalent network facilities and sufficient traffic to merit dedication of one or more 10Gbps links [13]. In some instances, where one network provides unique network routing value (e.g., transport to another country), that can provide value that would make up for a less balanced traffic flow and thus justify an SF-peering arrangement.

- **Paid Peering (Paid-peering):**
  This type of interconnection (sometimes also referred to as "on-net transit") can be thought of as an intermediate solution between the previous two types (namely, transit and SF-peering relations). Similar to transit links, a paid-peering interconnection is asymmetric: one party is the customer and the other is the provider; typically, the former sends far more traffic than the provider sends back (if any) and/or has much less to offer in terms of mutual "transport" or "network" value. Similar to SF-peering relations, the only traffic that can be exchanged is traffic flowing between the two ASes or their customers. A paid-peering interconnection may be chosen to provide a redundant route alternative to an indirect transit route into the network – something large CDNs may do to ensure that they have several options for quality routing. A paid-peering arrangement may also make sense when a party has a large amount of traffic destined for the receiving network, and direct interconnection would be less expensive and/or more predictable and reliable than relying on an indirect transit provider to reach that network. Paid-peering arrangements are commercially negotiated and may be very simple contracts or agreements that are reached as part of larger, multi-faceted arrangements.

- **Other kinds of interconnections:**
  As the Internet has evolved, the level of sophistication in the available interconnection types has been increasing to meet more specialized needs and cost structures. For instance, a *Partial-Transit* relation provides transit service but for only a subset of the global routes or ASes. A *Backup* interconnection is used only when a primary interconnection has failed or is congested. ISPs also are experimenting with interconnections beyond the regional IXPs described above; they are testing models that would provide interconnection deeper into their networks, which might make sense and save money for content providers or CDNs with enough traffic to make this worthwhile. I believe that in the future we will see more advanced interconnection types in which different routes may cost more or less depending on their distance, capacity, or number of intermediate ASes. Such innovations can improve Internet performance because they create economic incentives to offer better routing and more well managed networks with more available capacity.

[2] For this purpose, "customers" include not just retail customers but transit/paid-peering customers; traffic can be sent to any of these entities, but *not* to the provider's other SF peers.

2 The Evolution of the Internet Ecosystem

Since the commercialization of the Internet core in the mid-90s, the Internet has gone through a gradual but major transformation during the last 20 years. Specifically, it has evolved from a highly hierarchical structure to a more "flat", horizontally-dense structure [2,14]. Roughly speaking, we can separate this 20-year period in two phases: the hierarchical era (mid-90s to mid-00s) and the "flat" era (mid-00s to present).

2.1 The Hierarchical Internet (Mid-90s to Mid-00s)

Originally, there were only a few transit providers that had the resources and "know-how" to operate geographically large IP-based backbone networks. At the top of the hierarchy, there was a set of ten to fifteen *Tier-1* providers. These were large, national (U.S.) and global ASes that would establish peering links with all other Tier-1 ASes and, therefore, they did not need to have a transit provider because they could reach every network in the Internet through their customers or through other Tier-1 providers. This fully interconnected mesh of Tier-1 providers is referred to as the *"Tier-1 club"* or the "*Tier-1 clique."*

Lower in the hierarchy, there were many *Tier-2* transit providers, which were customers of one or more Tier-1 providers. Tier-2 providers often had a regional footprint. Access and content providers would often be customers of both Tier-1 and Tier-2 providers, placing them at Tier-3. At the Tier 3 level of the hierarchy, we would find most enterprise networks.

Because of the previous hierarchy, most Internet traffic would need to go through three to six ASes before it could reach its destination. Those long inter-ASes paths often caused delays and congestion. Additionally, it was quite hard to identify the ASes, or the ASes' interconnection, that were responsible for any observed performance problems.

Most traffic would ultimately need to flow through one or two Tier-1 providers, generating large revenues for them. When a Tier-1 provider routed traffic directly from one customer to another customer, it would often be paid twice for the same traffic (i.e., on both ends of the transmission).

Tier-1 providers have often been involved in bilateral disputes (the so-called "Tier-1 peering disputes").[3] A common reason behind these disputes is that one or more of their SF-peering interconnections were very imbalanced in terms of traffic. Most of these disputes were resolved, but only after causing significant pain to the customers of the involved Tier-1 providers. It is worth noting that at least some of those disputes were eventually resolved through the establishment of paid-peering links, even though the details of those agreements were never publicly disclosed.

2.2 The Flat Internet (Mid-00s to Present)

In the last decade or so, the structure of the Internet has changed. The establishment of many peering links across ASes of the same or different role has transformed the Internet from a hierarchical to a "flat," horizontally-dense structure. Today, most traffic can be routed from its source to its destination through only a couple of ASes, because many more ASes are directly connected, regardless of their supposed "Tier," using any and all of the interconnection types described above. [14]

This transformation has been caused by mostly the following developments:

a) Many networks, including large access and content providers, invested in the development of their own backbone networks, reducing the volume of traffic they have to route through transit providers, and bringing their networks directly into contact with the interconnection points of other networks.

b) The establishment of IXPs at major urban centers made it much easier and cheaper to interconnect directly with many other ASes. After the initial cost of setting up a connection at the premises of an IXP, an AS can connect directly (through "public" or "private" interconnections) with many other ASes that are also present at that IXP. Again, this reduces the volume of traffic that needs to be routed through transit providers, and helps increase interconnectivity.

c) The penetration of CDNs around the Internet, closer to the end-users in the relevant region of the country, reduced significantly the amount of traffic that needs long-distance transit. It is common today, at least in the United States, that an Internet user will download most traffic from servers that are located at the nearest IXP (the major U.S. IXPs are located in New York City, the Washington, DC area, Atlanta, Miami, Chicago, Dallas, the Bay area, and Seattle), although at times CDNs make real-time routing decisions based more on load-balancing or economic calculations than distance to a requesting user.

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[3] Some of the more recent Tier-1 peering disputes: Cogent with AOL in Dec 2002, Cogent with Level3 in Oct 2005, Cogent with Telia in Mar2008, and Cogent with Sprint-Nextel in Oct 2008. Even more Tier-1 peering disputes took place in the 90s, when the commercial Internet was still at its early steps and there were several more contesters (UUNET, Global Crossing, PSINet, Savvis, etc.).

d) A small number of content providers (Netflix, Google, Facebook, Amazon, etc.) generate a large (and increasing) percentage of the total amount of Internet traffic.[4] These content providers have started using CDNs (sometimes their own CDNs) and/or their own backbone networks to bring traffic closer to end-users and interconnect directly with at least larger ISPs: generally to avoid or reduce their transit fees.

In this new, flat Internet, the terms "Tier-1/2/3 provider" are often misleading. For instance, a historically Tier-2 provider may engage in SF-peering with a historically Tier-1 provider, and may sell transit service competing with Tier-1 providers.

The transformational developments described above also had a major effect on the price of Internet transit. As noted, more providers invested in their own fiber backbones, so they no longer bought as much transit service, which forced transit prices down. The development of CDNs – first conceived of as a way of *reducing* transit fees, further drove down demand for transit. And, access providers with new large backbone facilities also began offering their *own* competitive transit services to third parties, thus producing even more downward pressure on transit pricing. To stay competitive in the flat Internet, transit providers had to drop their monthly transit prices, over time, from over $1000 per Mbps in 1998 to less than $1 per Mbps today, and pricing continues to drop [13]. It is worth noting that *streaming a high-definition movie through a transit provider today costs less than a penny*; indeed, the over-the-top streaming video business came about largely because network investment and commercial forces made the transport of content so inexpensive.

3 Good (and Bad) Network Interconnections

Whether an interconnection arrangement will provide high quality and efficient transport depends primarily on two factors: routing and available capacity. The routing component determines the sequence of links, and thus the sequence of ASes, that a traffic flow will go through. The capacity component determines whether the corresponding links are heavily loaded, and thus whether they can transfer the traffic with negligible queuing delay and/or packet loss.

[4] In 2009, 30% of the total Internet traffic was generated by 30 ASes [14]; today, just a single content provider, Netflix, generates more than 30% of the peak traffic in the United States.

3.1 The Routing Component

The flow of traffic in the Internet does not follow simple optimization objectives, such as "choose the route with the minimum number of hops." At the inter-domain level (i.e., between different ASes), routing decisions are based on local policies set by each AS.

In the outgoing direction (the "egress paths"), an AS can control how to route its traffic. Specifically, it can choose which neighboring ASes it will route the traffic through and at which locations it will pass the traffic to that (or those) ASes. For example, if Netflix is a transit customer of Cogent and a paid-peering customer of Comcast, Netflix may choose to route its traffic to Comcast through the paid-peering interconnection or through Cogent, or it may even split its traffic between these two interconnections. These routing decisions can be made in real-time and they can be adjusted on a minute-by-minute basis depending on the measured performance of each interconnection, cost considerations, as well as the usage constraints of each interconnection.

In the opposite direction however (the "ingress paths"), it is not possible for an AS to control the routing of the traffic it receives.[5] For example, a receiving AS cannot dictate (other than by contract) where it receives traffic from a sending party: this is the so-called "*hot potato routing*" practice, in which a sending AS will drop off traffic as close to its source as possible, leaving the receiving network with the cost of transporting it all the way across the backbone – notwithstanding that the parties have a second interconnection point far closer to the destination of the traffic. Similarly, a receiving AS cannot stop the sending AS from pushing all its traffic over one interconnection link rather than spreading it among several, from using up all available capacity on a particular link the moment it becomes available, or from sending *too much* traffic over an interconnection link, potentially creating serious congestion issues. All of these decisions are in the hands of the sending AS, and the receiving AS can only react to them.

3.2 The Capacity Component

Together with routing policies, the performance of an interconnection also depends on the capacity of the corresponding links. Typically, if the utilization of a link during peak-usage time periods is more than 70%, the link can experience congestion episodes in which traffic is delayed or even dropped.[6]

In a transit or paid-peering interconnection, the customer generally dictates the number of peering links, their location, and the required capacity of each link. In SF-peering interconnections, on the other hand, the two parties decide all these aspects of the agreement together. They typically also agree on how they will deal with long-term growth and sudden spikes. For instance, they may decide that they will review the utilization level at each peering link every three months, that the sending AS will *not* be using "hot potato routing", and/or that the receiving AS will be informed well in advance about any major changes in expected traffic volumes. SF-peering interconnections can be terminated when the sending AS violates this "peering etiquette," though issues generally are worked out cooperatively given the parties' joint interest in resolution.

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[5] BGP MEDs or AS-Path prepending are crude and typically ineffective mechanisms to control ingress routes [15].

[6] That is not to say that links cannot be run "hotter." Higher levels of utilization (even as high as 90-100%) may be acceptable when traffic is very smooth (i.e., not bursty, of almost constant rate), as long as the link is closely monitored.

A naïve way to think about the cost of a bilateral AS interconnection is that it is only the cost of the corresponding router ports that need to be directly connected. Depending on the capacity of these ports and the number of physical locations at which the interconnection is taking place, this cost may be from two to three hundred dollars to a few tens of thousands of dollars, which seems like a relatively low cost given the size of major providers.

The reality, however, is that the real costs of an interconnection are much higher. Suppose that X and Y are two ASes that interconnect at ten locations with 40Gbps SF-peering links. But say that X starts flooding these links to the point that the links are running at 100% utilization, potentially also dropping some traffic. To handle the incoming traffic flow, Y may need to upgrade its capacity not only at the corresponding routers, but also throughout all network paths through which it exchanges traffic with X – all the way through the last mile, where capacity is most expensive. And if X directs this traffic to many different paths of Y at different times, the latter will need to upgrade its interconnection and transport capacity at multiple locations throughout its network. Such an upgrade may require Y to purchase more and/or faster routers, increase the capacity or density of its links, to modify its internal traffic engineering and network management provisions – and more. In other words, capacity upgrades are *not* simply the acquisition of an additional port, nor are they a purely local operation; they cause cascade effects that require network-wide planning and optimization.

In summary, the interconnection between two ASes is not simply the agreement to share a link and two router ports. Instead, *it is an agreement to share the entire infrastructure of each AS.* This is an important point that should be considered when we estimate the cost of a substantial capacity upgrade in a peering interconnection – particularly when it is being driven primarily by one party's needs.

3.3 Who is Blamed When an Interconnection Performs Poorly?

It is quite hard for Internet users (and sometimes even for network operators) to identify the exact location of congestion that may be affecting their quality of experience, especially when the end-to-end path traverses more than one or two ASes. For example, a Comcast customer that experiences many "re-buffering events" while watching a Netflix movie would not know whether the problem is at her home network, within Comcast's network, at the Netflix origin servers, at the CDNs that Netflix uses, at an intermediate transit provider, or at an interconnection between any of these ASes. This creates the potential for "finger-pointing" between the involved ASes, and can make it harder and slower to address the root cause of congestion. For example, there may be congestion within *both* the receiving network (Comcast in this hypothetical) and the transit network or the CDN, but Comcast would have no way of knowing reliably that other segments of the end-to-end network path are also congested. Thus, the receiving network could undertake substantial investment to upgrade its network and/or its interconnection with the transit provider, only to find out eventually that the end-to-end performance problems experienced by its subscribers persist.

Additionally, based on my observations in the marketplace, Internet users typically complain to their access provider (Comcast in my example) when they experience the effects of poor interconnection, probably because that is the only network provider they directly interact with (and pay). As a result, the risk of poor network performance is mostly borne by access providers like Comcast. For instance, it is my understanding that congestion episodes have caused a flood of calls to the technical support centers of access providers. Additionally, frustrated customers may switch to another access provider when they experience congestion, independent of the actual location of the congested links. Under this pressure, the access provider may be compelled to make upgrades to its interconnections even when the congestion is caused by other ASes' conduct and even when these upgrades do not make economic sense.

4 The Economics of Internet Interconnections

4.1 Who Should Pay Whom?

In traditional telephony, it was typically the caller that was charged for a call, not the called party. In most telephone markets, this rigid pattern was enforced by a regulatory authority. In the case of Internet traffic, if AS X sends traffic to AS Y over an interconnection arrangement, who should pay for the costs of the traversed network infrastructure? In contrast to telephony, in the case of the Internet this question has been answered by the participants themselves, through voluntary commercial agreements.

This debate usually does not focus on global transit interconnections/services, presumably because in that case it is clear that the customer needs the provider's infrastructure to transfer the traffic to *another* party's network. This has not provoked the same policy considerations to date.[7]

[7] Of course, as noted above, some transit providers are also access providers, and thus some of the traffic they carry remains "on-net" (i.e., it does not leave the transit provider's AS) even when they sell global transit. This raises the question, *why is paid-peering viewed as controversial while transit service is considered "business as usual"?*

But there has been much debate in the past few years about who should pay (or whether there should be payment) in the case of peering interconnections, i.e., whether such arrangements should be settlement-free or paid-peering. There is a fallacy in this dichotomy, however, because SF-peering is not truly "free." If a peering interconnection is somewhat equally beneficial for X and Y, and if the two ASes can split the costs, one reasonable approach is that neither party pays the other. This is exactly the rationale behind SF-peering links; the two ASes agree that a direct interconnection would be (almost) equally beneficial for both of them and so they do not pay each other. On the other hand, if one of the two ASes benefits much more from the interconnection than the other, or imposes far more cost on the other, it is reasonable (and has traditionally been the case) to consider a paid-peering relationship. Thus, in determining what is equitable for various peering arrangements, we need to *consider the relative value of the interconnection for each of the two involved parties and the cost each would bear absent the agreement*. But how can we estimate the relative value of an interconnection between two ASes?

4.2 The Economic Value of a Traffic Flow

For most Internet applications today, the economic value of a particular traffic flow is paid to the source of the traffic, not the destination. For instance, in the case of video, which constitutes more than 60% of the Internet traffic today, Internet users pay an online video provider to watch movies, or they watch them for free but the video provider generates revenue from advertisements those users see. Or, in the case of e-commerce sites, users pay those sites (the source of the traffic) through their purchases and, typically, viewing advertisements. Or, when users use a search engine or an online social network, they also look at advertisements that create revenue for the sources of that traffic. There are certainly exceptions (e.g., some peer-to-peer applications), but for the majority of Internet traffic today, it is a fact that the economic value of a traffic flow is exploited significantly by the sender. Additionally, establishing a direct interconnection arrangement to support that traffic flow is beneficial to the sender, since it ensures capacity and may even reduce the transport costs for the traffic flow (by removing a middleman transit provider), thus *increasing* the value of the traffic flow for the sender. At the same time, the direct arrangement will impose costs on the receiving AS including the costs of accommodating the incremental traffic flow over its network, and, over time, it may generate more costs – for example, if the sending AS takes advantage of the direct interconnection to send traffic with less compression.

Consequently, if a peering arrangement is mostly used to transfer traffic from AS X to AS Y, X surely receives a meaningful economic utility from this arrangement. Note that X may receive another utility from this arrangement – it may obtain a lower cost than it would have to pay to send the same traffic to Y through transit provider Z (as noted, cutting out the cost of a middleman). Additionally, having a direct interconnection makes it easier for X to monitor the performance of its traffic, and to ensure sufficient and non-shared capacity (potentially on a long-term basis), which is another benefit. These points should be taken into account when considering whether this interconnection will be SF-peering or paid-peering, and in the latter case, in determining an appropriate and fair price.

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[1] Of course, as noted above, some transit providers are also access providers, and thus some of the traffic they carry remains "on-net" (i.e., it does not leave the transit provider's AS) even when they sell global transit. This raises the question, *why is paid-peering viewed as controversial while transit service is considered "business as usual"?*

4.3 Traffic Ratios and Cost-Benefit Analysis

The "traffic-ratio" metric is a commonly used proxy to evaluate if a peering link is of roughly the same value for both parties. For a link between X and Y, the *"traffic-ratio < q"* constraint states that the average traffic load in either direction should be less than q times the average traffic load in the opposite direction. Typical values of the parameter q are between 2 to 5. If this constraint is violated, and especially when that happens often and/or by a large extent,[8] one of the two parties is likely to perceive that the economic value of this direct interconnection is (very) unequally distributed between the two parties and to insist either that the traffic balance is restored or that the nature of the relationship is revised.

It is often claimed, especially by content providers and CDNs, that the traffic-ratio constraint does not apply in the case of modern Internet traffic because the latter is highly asymmetric (the traffic flows mostly from content providers and CDNs towards access providers and enterprise networks). As a preliminary matter, I note that there are many stable SF-peering agreements among large transit/access networks today, which implies that the traffic-ratio constraint is not violated at those interconnections. While this is not the case for the interconnections of content providers or CDNs, such ASes were historically viewed as customers of network services, and thus they have always been expected to pay a transit or access provider for transferring their traffic.

In any event, the traffic-ratio metric is certainly only one, admittedly simplistic, mechanism to evaluate the mutual value of an SF-peering interconnection between two ASes. More sophisticated cost-benefit analysis can be used by each party, considering the actual costs of delivering the traffic not only through the corresponding peering ports but on an end-to-end basis, as well as the economic benefits that the transferred flows will generate for each party. If AS X would benefit much more from a direct interconnection with AS Y, while at the same time imposing additional costs on AS Y, it is reasonable to expect that Y will request a paid-peering relation with X in which the payment from the latter will amortize the costs associated with the arrangement and the corresponding economic value between the two parties. Importantly, if their respective valuations differ widely, and as a result they are not able to agree, then each AS has alternative ways to obtain the connectivity it needs.

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[8] A heavily unbalanced traffic flow may impose costs on the receiving network far beyond what it had to expend to support the outgoing traffic for which *it* needed the interconnection arrangement.

4.4 The Role of Paid-Peering Agreements in the Evolution of the Internet

Such negotiations can lead to the establishment of stable and fair paid-peering direct interconnections that would not be possible under the parameters of SF-peering. These arrangements thus increase the interconnectedness of the Internet. Additionally, paid-peering interconnections typically result in lower costs and shorter network paths compared to transit interconnections.

Economists often think about the Internet as *a two-sided market*: one side of the market has end-users (or "customers"), the other side has content providers, and in between there is an Internet "platform" that allows the two sides to communicate [19,20,21,22]. A key question in the economic theory of two-sided markets is how to allocate the price that each side of the market should pay to the platform. Even though that research does not provide a clear-cut answer (the optimal price allocation depends on the specific setup of each model and on its parameters), it approaches the problem from the right perspective: *if there is a cost associated with transferring content to end-users, and if content providers generate substantial value from these transfers, then some fraction of the platform's costs should be paid by the content providers or by their transport agents*. This is another way to understand the rationale behind paid-peering interconnections.

As the Internet evolves, I expect to increasingly see sophisticated interconnection agreements that provide more flexibility, better economics, and more stable network performance to the involved parties. For instance, AS X may want to pay AS Y only for selected routes and to condition pay depending on the performance level of those routes. Or, two ASes may agree to be SF-peers for some types of traffic but paid-peers for all other traffic. The network locations for peering interconnection may move closer to the network edge, at least for larger senders of traffic. At the same time, Internet firms are using more advanced tools for traffic measurement and performance monitoring, allowing them to examine in a real-time manner whether the performance conditions of an interconnection agreement are violated. These are indications of a healthy competitive marketplace, and we can expect that they will increase the overall efficiency, robustness and performance of the Internet ecosystem.

5 Paid-Peering and Network Neutrality

The debate about Internet peering (namely whether access providers should be permitted to establish paid-peering interconnections with other ASes) has recently been presented to the public as a debate about the "neutrality" of the Internet. This has created confusion and several misunderstandings. The public is led to believe that peering disputes mean that they will not be able to access certain sites or services unless the content provider pays their ISP some "terminating access fees." Another hyperbolic concern is that certain types of traffic, say Netflix or Skype, will be subject to deliberate degradation of service and congestion by ISPs that offer similar services.

5.1 What Does Network Neutrality Mean?

The FCC has focused its net neutrality rules on the last mile, where a receiving network may be in the position to undertake the types of improper conduct that have been the focus of the net neutrality rules – blocking or degrading an individual edge provider's traffic. No provider should engage in such conduct, nor should any provider demand compensation for *not* engaging in this conduct.

Even beyond the strict confines of the net neutrality legal regime, I take the view that providers should not be discriminating against individual content provider's traffic at *any* point in the network. With the exception of malicious/unlawful traffic, every intermediate provider at *any* point along the route should do its best to deliver all traffic at its highest possible performance, subject to the constraints imposed by the available routes and network capacity, and subject to the interconnection terms that the intermediate ASes have agreed on. In so stating, I am not proposing an expansion of regulation – just describing a behavioral norm that I believe is widely respected throughout the ecosystem.

Consistent with my views, I and several other Internet researchers, have designed measurement tools that can detect such traffic discrimination in the Internet [6,7,8,16,17,18]. These tools are publicly available at M-Lab and they are used by thousands of Internet users every day. It should be noted that such *traffic discrimination events occur very rarely, especially in the United States, and when they do occur, they result in major negative publicity for the corresponding ISP.*

My understanding is that many major providers today have provisions in their SF-peering agreements that specifically prohibit the receiving network from even inspecting traffic across the parties' interconnections for reasons unrelated to operational or legal reasons.

5.2 Are Peering Disputes Related to Net Neutrality-Type Concerns?

Traffic discrimination practices are clearly *not relevant* to the recent paid-peering disputes. The former involve the intentional service degradation of a selected portion of Internet traffic. Peering disputes, on the other hand, represent market-based, content-agnostic disagreements about the price of providing dedicated capacity from one network to another. It is not ultimately about *access* to the receiving network, since the sender retains other access options (i.e., through transit providers). It is also not about performance, since those other routing options can also provide high quality access. It is simply about the price of dedicated direct interconnections versus interconnections that traverse shared, indirect paths. Such disagreements are common in any market and they are resolved through economic analysis, bargaining, and compromise.

6 The Risk of Regulatory Intervention

Cogent and Netflix request regulatory intervention to prohibit Comcast (and, in other proceedings, other ASes that traditionally have been labeled as “access providers”) from collecting payment for direct peering with content providers or their intermediary ASes. I believe that such regulatory interventions would not only be unnecessary but will harm the evolution of the Internet ecosystem. I explain my position next.

First, paid-peering payments are very different from “termination access fees,” although that is the “talismanic” terminology that these parties tend to use. Notably, Comcast does not demand the payment of such fees from the various ASes that send it traffic. It simply offers the option of direct interconnection (through paid-peering) as an alternative to the sender’s purchase of transit services. Paid-peering may also be offered as a way for a SF-peer to send traffic that exceeds the limitations of the parties’ SF-peering arrangement in terms of traffic constraints.

A second issue is *the economic incentives that will result from such regulation*. If a content provider or CDN could demand SF-peering with any access provider (and practically all ASes can be viewed as access providers, as discussed in Section 2), content providers and CDNs would not have the incentive to optimize their traffic operations (e.g., compressing traffic prior to delivery, or storing many profiles of each DASH video stream). Rather, they could simply shift their costs to network operators and expect that the next-hop AS (the access provider) would bear the burden of figuring out *some way* to keep increasing its capacity to accommodate all received traffic and avoid congestion.

Similarly, nothing would preclude the content provider or CDN from making erratic routing decisions, moving traffic from point to point (or, if the rule applied to transit providers like Cogent as well, from transit route to transit route), forcing the access provider to repeatedly build capacity at various points, or maintain huge amounts of spare capacity across the Internet with all its partners, bearing the cost of repeatedly stranded facilities or idle equipment and capacity.

A third issue is *the implementation of such regulation*. Paid-peering interconnections are not used only by content providers or CDNs (or their transit providers), but by other networks, such as smaller access providers that may arrange direct access to a particular network. Why would a regulator control the interconnections between some ASes but not between others? Would CDNs get free access while smaller ASes had to pay? Why would it be deemed acceptable for a transit provider to collect compensation from small access networks *and* content providers, and send traffic between the two, but wrong for that same content provider to pay for a direct paid-peering interconnection, eliminating the “middle man” (i.e., transit provider) from the path? Again, there is no clear and major difference today between large access and transit providers. They are not fundamentally different in terms of their network infrastructure and function.

A fourth issue relates to *the viability and evolution of the Internet ecosystem and the network core*. If content providers can *demand* SF-peering interconnections with access providers, then any AS should also be allowed to demand SF-peering with any other AS. The reason is that any AS can claim to be a content provider (they all generate some traffic) and any AS can be described as an "access provider" (they all consume some traffic). There are many potential, and unforeseen consequences of this type of rule. The first victim of such regulation might well be the traditional transit providers, because their customers (or potential customers) could demand SF-peering interconnections with access providers instead of purchasing transit; their business models would dissolve if all direct interconnection were cost-free. Further, and critically, as I explain below, interfering with the efficient operation of the Internet interconnection marketplace and shifting the bulk of the costs to end-users is likely to disrupt the massive flow of new investment necessary to ensure a robust backbone and ever-expanding Internet facilities. This raises serious concerns about the Internet's evolution.

A final remark about *the necessity of regulation*: Internet peering disputes are not new. As mentioned in Section 2 (*see also* Footnote 3), peering disputes between Tier-1 providers have occurred from time to time. Those disputes were always quickly resolved by network operators, often through negotiation and mutual compromises, without ever requiring regulatory intervention. The current disputes are not fundamentally different so as to warrant dramatically different action by regulatory bodies. Plus, the price of transit has dropped by 99%, which strongly suggests that there is no market failure here.

7 Looking Forward: Who Will Pay for the Continuing Growth of the Internet?

Even though the Internet has always been full of surprises, there are two observations that we can reliably expect to remain true in the future. First, the Internet will continue to grow in terms of number of users, new applications, and volume of traffic exchanged. In the last few years, the annual traffic growth rate is about 35%-55%, depending on when, where, and how it is measured [23]. This means that, in the absence of any capacity upgrades, networks today will need to be able to carry twice the amount of traffic currently carried in about 18-28 months from now. Clearly, if major capital expenditures in networking capacity cannot be sustained, it will only take a few months for the existing infrastructure to get severely congested.

The second observation is that whenever there is an increase in the access capacity of Internet users, a new wave of applications is quickly invented that manages to use that capacity. For instance, soon after DSL and cable broadband access became widely available, the first peer-to-peer file sharing applications were developed, and it did not take much time to saturate those early broadband links. When the access capacities increased to more than 2-4 Mbps – and when CDNs exploded and providers' investments in backbone facilities shrunk the cost of transit – online video began to flourish, now encompassing high-definition video streaming products such as Netflix. I expect that as the broadband access capacities begin to increase to about 100Mbps (downstream), we will see in the next few years a new wave of applications that will quickly utilize that capacity.

This relentless traffic growth and the associated evolution of Internet applications will require a persistent and substantial capital investment in Internet infrastructure. In particular, it is the last mile of the network, i.e., the access links that connect millions of households to the Internet, that will require the largest capital expenditures in the next decade or so. The obvious question is: *who is going to pay for this major overhaul of the Internet access infrastructure?*

If we eliminate the option of paid-peering interconnections through regulatory intervention, we are effectively placing all financial burden for the growth of the Internet exclusively on end-users (access providers' customers) – a situation that has never before prevailed in the Internet ecosystem. End-users will have to pay not only for Internet access but also for investments in the network core, something that has been traditionally been defrayed by contributions from edge providers, CDNs, and other "large" Internet players. Additionally, end-users will have to pay the dedicated transport costs of a particular content provider's traffic, whether or not they even subscribe to that content provider – which may be significant when larger providers, like Netflix, are at issue. Meanwhile, the content provider (i.e., Netflix) would not only get subsidized transport, but subscription or advertising revenues that it earns *because* it has access to that access network. Not only is this inconsistent with how the Internet has evolved and grown, it may also be insufficient for the continuing growth of the Internet. *Given that edge providers benefit from this communication platform, as do their transport agents, and some of them are among the most profitable companies today, shouldn't they also financially contribute to the Internet's growth and evolution?*

8 Comments on Certain Claims by Netflix and Cogent

8.1 Comments on the Declaration of Mr. K. Florance (Netflix)

- In §2 of Mr. Florance's declaration, he claims that Comcast uses its market power to "*impose a terminating access fee on Netflix and others.*"
    - As I discuss above, this misrepresents how Internet interconnectivity works. A terminating access fee is a mandatory fee that must be paid to the access provider so that the corresponding traffic can reach its destination. But there are other routes content providers like Netflix could use to reach Comcast (and since this dispute is fairly recent, apparently *did* use for many years) without paying Comcast any fee.

- Moreover, if Mr. Florance were correct that this was a terminating access fee, you would expect *every terminating access provider to try to extract such a fee from Netflix*. Yet, as he notes in his declaration, Netflix has reached hundreds of agreements with terminating access networks for settlement-free transfer of traffic. The likely reason for this disparity between business arrangements with Netflix is that these (typically smaller) networks saw value in exchanging traffic directly with Netflix on a settlement-free basis rather than pay the transit costs of receiving Netflix's traffic from a third-party transit provider. But other, larger networks that have built their own backbones, like Comcast, and that do not incur the transit costs to send and receive Netflix traffic, likely do not realize the same benefits of settlement-free direct connections with Netflix, so Netflix's tactics to impose transit costs on them are less susceptible to success.

- In §18, Mr. Florance asserts that Netflix can install the Open Connect appliances as deep into Comcast's network as the latter would like, and that this would provide several benefits to Comcast and its customers, which Comcast should have accepted.

- Deeper network connections may in fact benefit access providers by reducing the load on their backbones (or, for access providers without their own backbone facilities, this could reduce their transit costs). But that does not mean that the relationship inherently qualifies for SF peering. As discussed in Section 3 of this report, the relative value and costs of a peering interconnection should be evaluated based on the costs *and benefits* it provides to each party. Notably, Comcast would continue to bear the cost of dedicated space and power, and would continue to bear the cost of building capacity as Netflix's traffic expands. While the price in this arrangement might be lower than the price for interconnection at an IXP, there is no reason to assume it would be zero.

- In §26, Mr. Florance claims that *"Comcast succeeded in departing from the previous business norm under which the terminating access network paid for the delivery of traffic to its network, or received such traffic without payment."*

- This view of the "business norm" is outdated. As discussed in Section 2 of this report, large access networks today often have their own nation-wide backbone, and so they may need the services of a transit provider for only a small fraction of their traffic. For this reason, as noted above, smaller access providers have a much greater incentive than larger ones to establish SF-peering links with content providers and CDNs (so that they decrease their transit costs).

- In §29, Mr. Florance alleges that *"Comcast began a practice in 2009 to 2010 in which it allowed its ports with certain settlement-free transit networks and CDNs to congest"*.

- This is at best misleading. As discussed in Section 3 of this report, based on my observations of this market, the cost of bad performance is paid mostly by access providers. It would be unwise for Comcast to deliberately cause congestion to its own customers. At the same time, capacity upgrades or new links cannot be set up overnight and they are costly. If the traffic ratio constraints of Comcast's SF-peering interconnections were persistently violated, it would have been reasonable for Comcast to seek to restore its peer's compliance with the terms of those agreements. This is common practice. Why should we think about this as "normal business practice" *only* when transit providers do it?

- In §41, Mr. Florance claims that *"Comcast began to allow Cogent's routes into Comcast to congest."*
  - As discussed in Section 3, an AS cannot control the ingress path of the traffic it receives. If there was congestion at the links between Cogent and Comcast, it was not necessarily Comcast's fault. While I know only the details the involved parties have revealed, in my view, responsible network providers work hard to avoid congesting their links not only by building capacity but through regular capacity planning meetings with their peers and through traffic grooming (i.e., rerouting or encouraging a customer to reroute) traffic off congested links. It seems to me that Cogent could have addressed this situation far more cooperatively than it reportedly did, and with less harm to the Quality of Experience of its own and of Comcast's customers. Similarly, Netflix has not satisfactorily explained why it did not route the traffic to Comcast through other, non-congested routes, especially when its decision not to use other, non-congested routes reportedly hurt *its* paying customers and was simply poor Internet "hygiene" that is not expected of such large players in this ecosystem.

- In §46, Mr. Florance claims that *"adding port capacity costs less than $10,000 -- a cost which is typically amortized over three to five years by the access network."*
  - This figure is accurate if we only consider the cost of peering to be equivalent to buying a few ports. As discussed in Section 3 of this report, however, capacity upgrades are not a localized operation. A significant increase in the capacity of an interconnection may require simultaneous capacity upgrades in several other links and routers. Otherwise, the bottleneck is just moved from the interconnection links elsewhere in the same network.

8.2 Comments on the Declaration of Mr. H. Kilmer (Cogent)

- In §26, Mr. Kilmer contends that *"Comcast and TWC, although not Tier 1 networks, have been able to obtain settlement-free peering from certain Tier 1 providers, including Cogent, because of their market power arising from their control of access to the consumers who use them for broadband Internet service."*
  - It is hard for me to see how any network could be *forced* into a SF-peering interconnection (without government intervention). Another way to interpret the relation between Cogent and Comcast is that – assuming Comcast was not interested in *purchasing* transit from Cogent once it had its own backbone capabilities – *Cogent actually preferred* SF-peering interconnection with Comcast, compared to having no direct connection with Comcast at all. This allows Cogent to then attract transit customers who want short paths to Comcast's subscribers.

- In §43, Mr., Kilmer claims that Comcast and TWC *"are not Tier 1 ISPs. They do not provide the infrastructure and support for the Internet that Tier 1 providers do"*.

- As discussed in Section 2 of this report, the historical distinction between Tier-1 and Tier-2 (or access providers) is of little practical consequence today. Should we evaluate the value an AS brings to a relationship based on whether it happened to be a member of a particular "club" established more than a decade ago? Or does it make more sense to evaluate a provider based on its investment in its transmission links, the total traffic it carries, the number of people that it serves directly, and similar factors? The marketplace has been gravitating toward the latter approach, and interconnection arrangements today turn on these types of factors, not outdated Tier rules.
- It is certainly hard to quantify the "*support for the Internet*" that any Internet firm offers, though it seems to me unfair and unjustified to allege that Comcast has not provided "support for the Internet". We should not ignore that most peering disputes during the last 15 years, sometimes causing reachability disruptions to millions of users, involved Cogent (see Footnote 3).

- In §55-§60, Mr. Kilmer argues that *"Comcast's 'Balanced Traffic Ratio' Requirement Makes No Sense."*

- First, it is important to note that a "traffic ratio constraint" is used by many ASes, not just Comcast. In fact, the existence of a traffic ratio clause is the norm in SF-peering policies, as Cogent is well aware given its past peering disputes over the same issue.
- Second, Mr. Kilmer criticizes the use of traffic ratio constraints, but without offering an answer to the obvious question: how will two ASes determine if an SF-peering interconnection is (roughly) equally valuable for both parties such that they should share the costs? To be clear, traffic ratio considerations are not an end of themselves, but rather a proxy that has been used by many networks for several years to determine mutual value.

- In §68, Mr. Kilmer claims that *"the cost of upgrading all of the connections between Comcast and Cogent (…) would have been approximately $120,000."* And it is further stated that *"in March of 2014 Cogent offered to pay for Comcast's expenses in upgrading the connections with Cogent. Comcast refused."*

- As was also discussed in my response to Mr. Florance's declaration, these cost estimates refer only to the cost of the ports between Cogent and Comcast – they do not capture the other required interconnection costs or the capacity upgrades that will certainly be required more deeply into Comcast's network. ***An interconnection is not just a "shared link"; it is a "shared network."***
- Further, what would happen if Cogent kept increasing the volume of traffic it sends to Comcast? Cogent's revenues would increase the more (Netflix or other) traffic it sends to Comcast, while Comcast's costs would increase as it carries these larger and larger traffic loads. And since Comcast would presumably be required to maintain whatever amount of capacity Cogent required to keep the direct interconnection between the two providers uncongested, neither Cogent nor Cogent's customers would have any reason to send traffic in an efficient manner, meaning Comcast's costs would increase all across its network on an ongoing basis. In a marketplace where direct connections have always been formed and maintained only when they were deemed to be mutually beneficial, why should Cogent enjoy growing benefits while Comcast is saddled with growing costs?

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Exhibit 6
COMCAST'S LEADING TRACK RECORD ON DIVERSITY AND COMMUNITY INVOLVEMENT AND CITIZENSHIP

I. Diversity

Comcast is strongly committed to diversity and inclusion. Comcast believes that promoting diversity and inclusion enhances efficiency, innovation, and competition, and provides additional value to customers, while contributing to the creation of jobs and building wealth within diverse communities. Comcast is recognized nationally for its comprehensive commitment to promoting diversity and has received over 100 awards in the past three years for its leadership in this area from a wide array of organizations.[1] Comcast's progress and accomplishments in this important area are detailed in a recently-released Comcast-NBCUniversal Diversity and Inclusion Progress Report,[2] and include the following:

- Corporate Governance. One-third of the members of Comcast's Board of Directors reflect diversity, including representation of people of color and women. Comcast and NBCUniversal each have an executive Internal Diversity Council to provide oversight and guidance on development and implementation of diversity and inclusion strategies across the company. The company has also established an external Joint Diversity Council ("JDC") to advise on diversity and inclusion efforts. The JDC consists of four, nine-member Diversity Advisory Councils representing the interests of African Americans, Asian Americans, Hispanics, and Women. There are also At Large Members representing Native Americans, people with disabilities, veterans, and the lesbian/gay/bisexual/transgender ("LGBT") community. The JDC participates in formal meetings attended by Comcast and NBCUniversal executive leadership, and regularly interacts with the company's Internal Diversity Councils and corporate-level Diversity and Inclusion Groups to share information and consult about ideas for achieving diversity and inclusion goals.

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[1] *See also* Comcast-TWC Public Interest Statement at 111; *see also* Exhibit 7 (updated version of the list of "Select Comcast-NBCUniversal Diversity Awards (2010-2014)" that was included as Exhibit 11 to the Public Interest Statement).

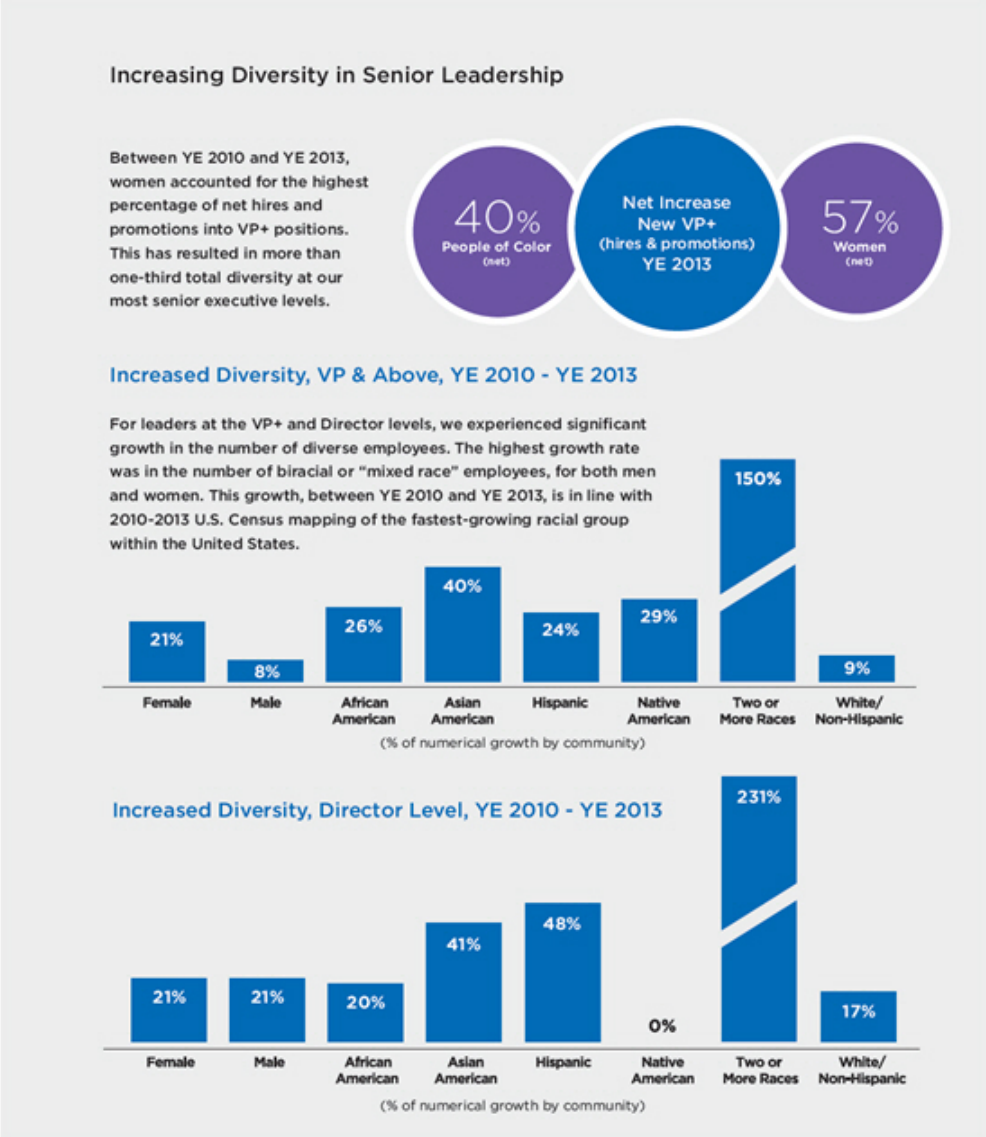
[2] Comcast Corp., *Comcast-NBCUniversal Diversity and Inclusion Progress Report*, at 3 (June 2, 2013), http://corporate.comcast.com/images/Comcast_Diversity_Report_060214.pdf ("Our Master Strategic Plan for Diversity and Inclusion is our comprehensive road map for achieving optimal diversity and inclusion across our organization. On the very first page of that plan, we assert: 'At Comcast and NBCUniversal, our goal is to be the model company for diversity and inclusion.'").

Comcast's Internal Diversity Councils were recently selected for the 2014 "Top 25 List" of the Association of Diversity Councils (a practice group of the diversity and inclusion training firm PRISM International, Inc.), marking the sixth consecutive year the company has received this recognition (rankings will be announced in October 2014).

· Workforce Diversity. At the heart of Comcast's workforce culture, is a tangible and visible commitment to diversity and inclusion. At year-end 2013, the company's total workforce was 59 percent diverse. And this commitment and progress is evident at every level of the company – from entry level, to mid-management, to directors, to the VP level. For example, at year-end 2013, the company's workforce was more than 50 percent diverse at the director level and 46 percent diverse at the VP+ level, and every level of the company saw an increase in people of color.

One of Comcast's proudest achievements to date is the increase in women leaders across the company. As of year-end 2013, women accounted for about 40 percent of all directors and 36 percent of all executives at the VP+ level. In addition, women accounted for 44 percent of all promotions and 35 percent of all new hires at the VP+ level in 2013 alone. Between year-end 2010 and year-end 2013, women accounted for the highest percentage of net hires and promotions into VP+ positions with 57%, while people of color accounted for 40%. This has resulted in a workforce that is 46% diverse at our most senior executive levels.

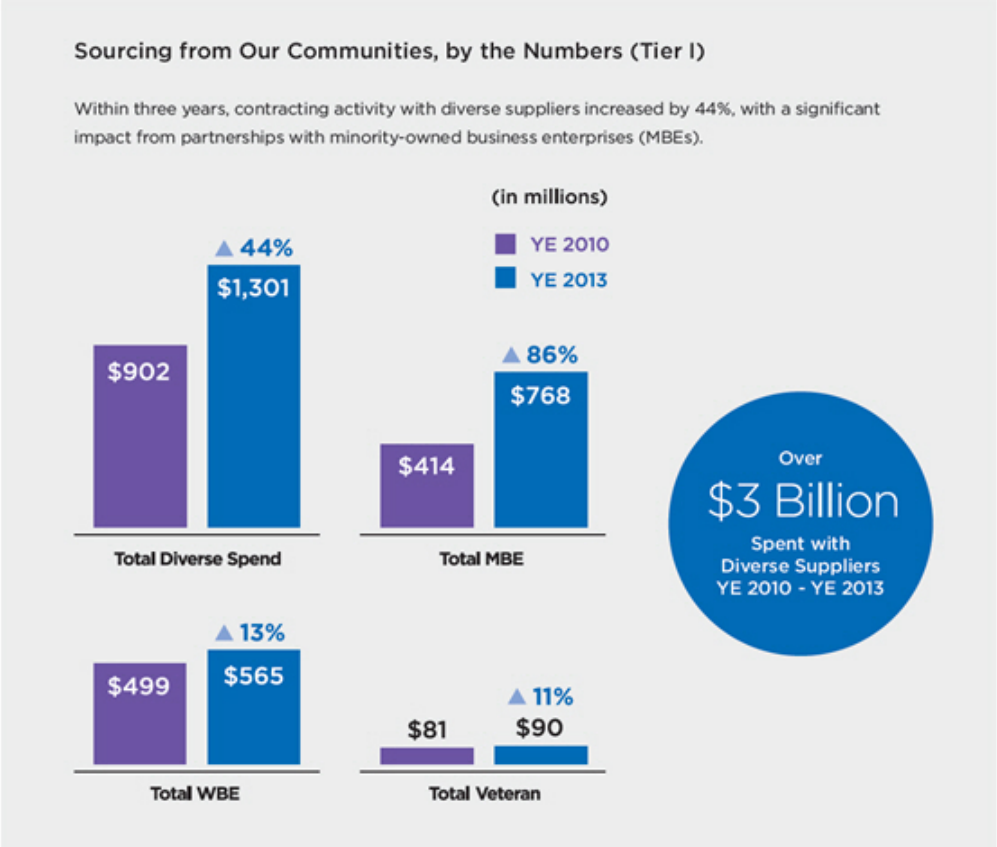
This commitment to workforce diversity also extends to employees in front of the camera and behind the camera. For example, the NBC Owned Television Stations division – which owns and operates WNBC in New York – has one of the highest percentages of on-air news and primetime ethnic diversity across NBCUniversal's programming units, with 47 percent diversity in front of the camera and 35 percent behind the camera. At local NBC owned stations, between year-end 2010 and year-end 2013, the number of ethnically diverse anchors and reporters grew at nearly three times the rate of white anchors and reporters. The owned stations' longstanding leadership in promoting diversity in front of and behind the camera has been validated by peer surveys, including the National Association of Black Journalists' census of diversity among television newsroom managers, which in 2012 concluded that NBC-owned stations' "total diversity percentage is the best of all companies in the report," including the percentages reported by the ABC, CBS, and Fox owned television stations.[3]



[3] *See* 2012 NABJ Diversity Census: An Examination of Television Newsroom Management, www.nabj.org/resource/resmgr/onrmore.2012_nabj_diversity_.pdf.

Comcast has also long recognized that veterans bring exceptional strengths to its business. The company is proud to actively recruit prospective employees with military backgrounds and provide an array of networking and professional development resources to help them succeed. Comcast deepened this commitment in 2012 by becoming a corporate sponsor of "Hiring Our Heroes," a U.S. Chamber of Commerce Foundation campaign that helps veterans and military spouses find meaningful employment. By August 2014, the company had successfully hired more than 3,000 veterans into its Comcast and NBCUniversal workforce, far outpacing both the company's original goal to hire 1,000 veterans, and its expanded goal to hire 2,000, by 2015.

· Supplier Diversity. Comcast also embraces diversity within the supply chain, which enhances efficiency, innovation, and competition, provides additional value to customers, and contributes to job creation and wealth building within diverse communities across the country. Supplier diversity includes Comcast's primary (Tier I) suppliers and subcontractor (Tier II) vendors. Over the course of three years, Comcast has spent almost $3.2 billion with diverse Tier I vendors. Since Comcast's launch of its Tier II program in 2012, prime suppliers have reported over $325 million in diverse Tier II subcontracting.



Other supplier diversity initiatives include: (i) partnering with diverse chambers of commerce and business organizations at the national and regional level; (ii) attending more than 200 supplier diversity events in the last four years, including supplier fairs, conferences, capacity-building events, and business opportunity fairs, panels, and awards ceremonies; and (iii) pursuing diversity objectives in its purchase of professional services, including banking and advertising services. For example, in April 2011, Comcast added The Williams Capital Group, L.P. (Williams Capital), a minority-owned bank, as one of its four placement agencies in its commercial paper program. Since 2011, Williams Capital has issued $2.75 billion in commercial paper for Comcast. Likewise, it works with diverse firms for advertising, public relations, marketing, and media services, including Burrell Communications, Baru, Grupo Gallegos, Liquid Soul Media, Bark, TD Wang, and Lopez Negrete.

Comcast's supplier diversity program has been recognized by DiversityBusiness.com, *Black EOE Journal*; *Hispanic Network Magazine*; *Professional Women's Magazine*; the National Veteran-Owned Business Association (NaVOBA); Black Enterprise Magazine; the U.S. Hispanic Chamber of Commerce, and *U.S. Veterans Magazine*, among others. With this transaction, the combined company will be able to further expand the opportunities for, and the business revenues of, Tier I and Tier II vendors, including additional diverse vendors in many new local markets.

· Programming Diversity. Comcast provides its customers with access to a variety of programming choices and options that speak directly to their entertainment or educational interests. Comcast has consistently expanded minority-focused programming, increasing the amount, quality, and diversity of national and local programming for its customers across its platforms, including its VOD and online platforms.

By June 2014, Comcast carried more than 100 networks tailored to ethnic minority and women audiences. Over the last three years, Comcast has significantly expanded carriage of many of these networks, including the following:

- Expanded distribution of The Africa Channel in Detroit, Chicago, and Washington, D.C. markets; also launched in Northern Santa Barbara County, Savannah, Charleston, and South Florida markets, growing the network's audience by more than 2 million homes.

- Expanded carriage of TV One, a channel focused on African-American programming, making it available to over 600,000 additional subscribers in the Chicago and Miami markets.

- Expanded carriage of Mnet, a South Korean based music television channel, to more than 4 million additional Comcast subscribers in the San Francisco, Chicago, Sacramento, Boston, Washington, D.C., and Philadelphia DMAs.

- Expanded distribution of seven Hispanic programming services (Azteca America, Galavisión, HITN, LATV, nuvoTV (formerly SíTV), Telefutura, and Univision) by more than 14 million subscribers, exceeding by more than 40 percent Comcast's commitment to expand carriage of three Hispanic networks by more than 14 million subscribers.

- Launched MYX TV, a channel made for and by Asian-Americans, in Seattle and western Washington, increasing the network's audience by over 2.4 million Comcast subscribers.

– Launched the Asian-American oriented network Crossings TV in over 3.5 million homes.

Comcast is proud to be the nation's largest provider of Hispanic and multicultural television packages, with a distribution platform that delivers more than 60 Hispanic networks in both Spanish and English. In 2012, Comcast enhanced its suite of video products and services developed exclusively to serve Latino customers by adding 10 new popular Hispanic channels and doubling Latino On Demand content on TV and online. It also created the XFINITY Latino Entertainment Channel, which provides programming highlights and allows customers to directly access and discover On Demand content through an interactive menu. In 2013, Comcast launched XFINITY Freeview Latino, the biggest Hispanic On Demand event ever, now giving customers a two-week all-access pass to discover and view more than 2,500 hours of the best Latino entertainment available in the United States, totaling over 3,500 programs on XFINITY On Demand. And Telemundo Media leads the industry in the production and distribution of high-quality Spanish-language original content across its multiplatform portfolio to U.S. Hispanics and audiences around the world.[1]

In 2011, Comcast announced its plans to distribute eight new minority-owned and/or operated independent networks on its cable systems, four of which would be controlled or operated by African Americans and four of which would be controlled or operated by Latinos. Two of those networks launched in 2012, and two launched in 2013:

ASPiRE – Comcast joined with sports legend and entrepreneur Earvin "Magic" Johnson and Up TV (formerly the Gospel Music Channel) to launch ASPiRE in 2012. Since its launch, ASPiRE has been offered on Comcast's digital basic tier and continues to deliver enlightening, entertaining, and positive programming to African American families with a diverse slate including movies, documentaries, short films, music, comedy, visual and performing arts, and faith and inspirational programs. The channel is now available to approximately 9 million Comcast subscribers in 16 markets.

REVOLT – REVOLT TV, the new 24-hour music, pop culture, and social media interactive network developed by Sean "Diddy" Combs, launched in October of 2013 in select cities nationwide on Comcast's XFINITY TV. REVOLT TV is a multi-genre, multiplatform music network that delivers music news in real time and the best in music programming. The channel is now available to approximately 8.5 million Comcast subscribers in 25 markets.

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[4] Telemundo's primary platforms include the Telemundo Network and mun2. Telemundo Network is a Spanish-language television network featuring original productions, theatrical motion pictures, news, and sporting events. It reaches U.S. Hispanic viewers in 210 markets through 17 owned stations and its broadcast and cable affiliates. And mun2 is the preeminent voice for young Hispanics in the United States, reaching TV households nationwide on digital and analog cable and satellite. Since 2011, Telemundo has increased its total primetime viewers by 86 percent, becoming the fastest-growing broadcast network, regardless of language.

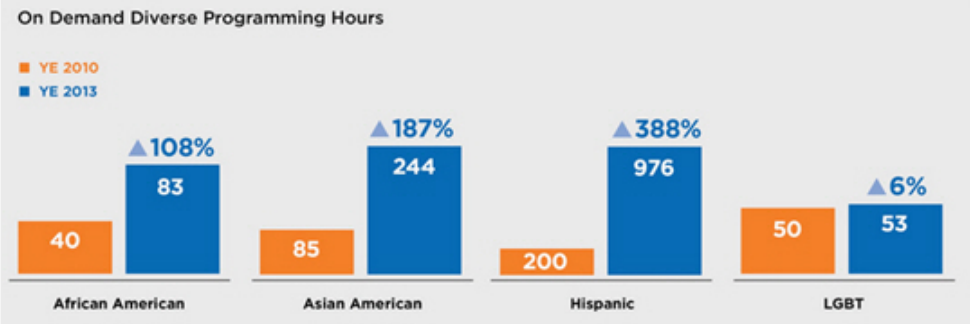
BabyFirst Americas – Launched in 2012, BabyFirst Americas is a Latino-focused English-language channel proposed by Spanish-language television veteran Constantino “Said” Schwarz, designed for children and their parents and emphasizing the importance of early development of verbal, math, and motor skills. The channel is now available to nearly 9 million Comcast subscribers in 19 markets.

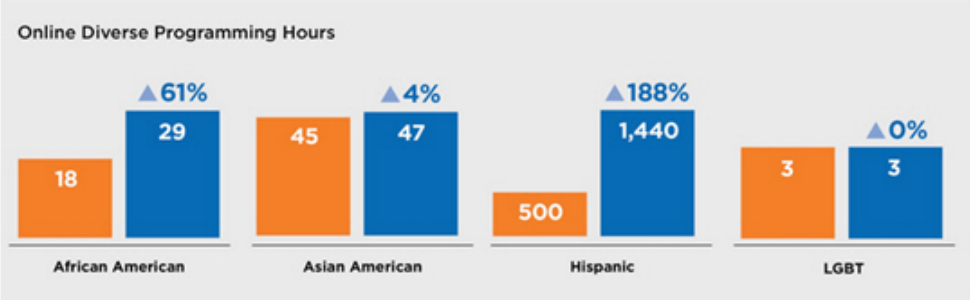
El Rey – El Rey, which launched in December of 2013, is designed to be an action-packed general entertainment channel in English for Hispanic and general audiences that includes a mix of reality, scripted, and animated series, movies, documentaries, news, music, comedy, and sports programming. The channel is now available to approximately 8.3 million Comcast subscribers in 19 markets.

And Comcast will be adding five more independent channels in the coming years, including four more with African American or Latino ownership or management.

Comcast also launched a family of award-winning microsites specific to diverse communities, which offer customers access to special programming for African American, Asian-Pacific American, LGBT, and Hispanic audiences. Each microsite brings together culturally relevant entertainment from a variety of sources in a central, easy-to-navigate location. In 2013 alone, the sites achieved more than 3 million visitors. Moreover, Comcast offers special multicultural programming collections that inform and entertain, in both the On Demand and Online platforms. These collections include: Black History Month and Black Music Month, Asian-Pacific American Heritage Month, LGBT Pride Month, Hispanic Heritage Month, Disability Awareness Month, Veterans Day, and Native American Heritage Month. Each special collection supplements Comcast’s permanent On Demand and Online offerings, providing customers with access to hundreds of additional diverse content hours and choices throughout the year.

As the charts below illustrate, the last three years have seen tremendous growth in Comcast's On Demand and Online offerings of content designed for African American, Asian American, and Hispanic communities.



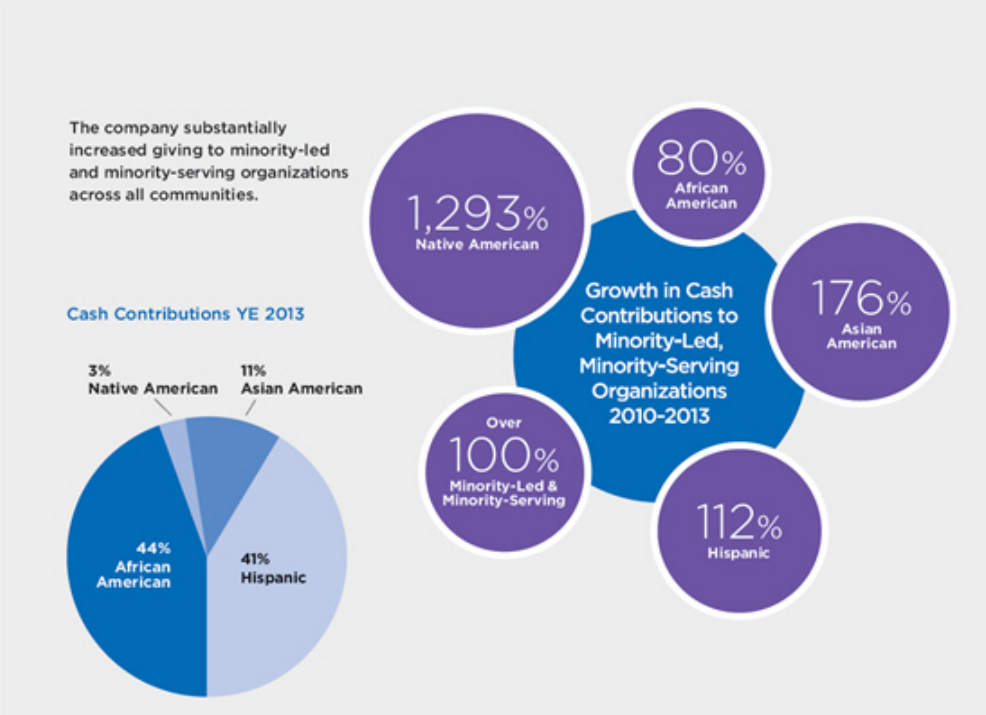


For these and other efforts, Comcast was recently honored with the 2014 Multicultural TV Front Runner Award, recognizing the company's commitment and leadership in supporting multicultural communities. The National Hispanic Media Coalition ("NHMC") also honored Comcast for its Outstanding Diversity Practices during NHMC's 17th Annual Impact Awards Gala in February 2014. In 2012, Comcast Cable was the first-ever recipient of Broadcasting & Cable and Multichannel News' award for Leadership in Hispanic Television. And in 2013, Comcast and Telemundo won many first-place awards for their programming at The National Association for Multi-ethnicity in Communications' 2013 Excellence in Multicultural Marketing Awards ("EMMAs"). These awards recognize original, multi-platform television programming that depicts the lives, spirit, and contributions of people of color and best reflects the diversity of the global viewing audience. Comcast's multicultural microsites were honored as well, with six first-place awards at the 2013 EMMAs.

- Philanthropic and Community Investment. Comcast and NBCUniversal empower communities by investing in local organizations, developing programs and partnerships, and mobilizing resources to connect people and inspire positive and substantive change. In 2010, Comcast established a three-year goal to increase cash contributions to organizations led by and serving minority groups by 10 percent year-over-year for each of the three years. The company significantly exceeded this 10 percent annual goal. In 2013 alone, Comcast and NBCUniversal contributed a combined $415 million in cash and in-kind services to charitable organizations nationwide. The company's cash giving to minority-led and minority-serving organizations in 2013 was *106 percent greater* than 2010 levels.

Comcast and NBCUniversal have been recognized for community investment-related achievements by many organizations, including the following:

- United Way Worldwide recognized Comcast Corporation with two 2013 Summit Awards for volunteer and philanthropic engagement.
- The Congressional Black Caucus Foundation, Inc. recognizes Comcast as a Distinguished Corporation for its tremendous work in promoting digital literacy.
- Comcast and the City of Chicago were awarded the U.S. Conference of Mayors Outstanding Award for Public/Private Partnerships for the collaborative efforts to close the Digital Divide via Comcast's *Internet Essentials* program.



II. Active Community Involvement and Citizenship

Like diversity, community involvement and corporate responsibility and citizenship are Comcast hallmarks.[5] The company, through extensive employee volunteer activities, the Comcast Foundation, partnerships with local organizations and groups, and its signature programs like *Internet Essentials*, establishes deep roots in and works to help the towns and neighborhoods it serves. Comcast looks forward to bringing more of these opportunities and relationships to all the acquired systems covered by the Transaction. Comcast's community initiatives include:

- Comcast Cares Day. Comcast Cares Day is Comcast and NBCUniversal's signature celebration of service and the largest single-day corporate volunteer effort in the nation. When we first started in 2001, nearly 6,000 Comcasters volunteered at 108 projects in the Greater Philadelphia area. Last year, more than 85,000 volunteers participated in over 750 project sites, contributing their time and energy to clean up parks, makeover schools, and landscape playgrounds. In 2014, a record 95,000 Comcast and NBCUniversal volunteers contributed 570,000 hours to improve more than 820 parks, schools, beaches, senior centers, and other vital community sites around the world.[6]

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[5] *See* Exhibit 8 – Selected Comcast-NBCUniversal Community Investment Awards, 2010-2014.

[6] Comcast Community Service, http://corporate.comcast.com/our-values/community-investment/community-service#accordion-0 (last visited Aug. 24, 2014).

- Comcast Leaders and Achievers® Scholarship Program. Now in its 13th year, the Comcast Leaders and Achievers® Scholarship Program, funded through the Comcast Foundation, recognizes high school seniors for their community service, academic achievement, and leadership skills. Comcast has awarded more than $21.6 million in scholarships to about 21,000 students through this program since 2011.

- Comcast Digital Connectors. The Comcast Digital Connectors program trains youth from primarily diverse, low-income backgrounds in Internet and computer skills. Teens meet weekly after school, have the option to earn a Cisco IT Essentials certification of completion, and receive a complimentary laptop upon graduation from the program. The program also has a community service component, as participants volunteer at senior centers, churches, local schools, and other community organizations. Since the program began, more than 2,000 Digital Connectors have participated, volunteering more than 100,000 hours to bridge the Digital Divide in their communities. Based on a survey conducted by an independent research firm, program participants scored higher than the school district average in English and Math, and more than 54 percent of those surveyed agreed or strongly agreed that they have gotten better grades since starting Comcast Digital Connectors. The majority of participants surveyed responded that they agree or strongly agree that doing well in school is more important to them than before starting Comcast Digital Connectors (64 percent), or it has made them feel that going to college is important to their future (61 percent). And 66 percent of those surveyed agreed or strongly agreed that Comcast Digital Connectors will help them achieve their future goals. Of alumni from the program years 2010-2011 and 2011-2012 program, 51 percent are in high school, 19 percent have graduated from high school and are working, and 30 percent are in college.[3]

- Big Brothers Big Sisters, Boys & Girls Clubs. Comcast runs the nation's largest workplace mentoring program in partnership with Big Brothers Big Sisters of America ("BBBS"). "Beyond School Walls" is a one-on-one youth mentoring program through which children from local schools meet with an employee volunteer mentor every other week during the school year. The program introduces children to jobs at an early age, helping them understand what it means to work for a corporation and the educational requirements needed to achieve professional success. In 2013, Comcast celebrated its fifth anniversary of Beyond School Walls with a total of 305 matches in 13 cities, including its newest site in Chicago. All of Comcast's current school assignments are located in diverse communities. And compared to national BBBS metrics, Comcast's matches on the whole are more diverse (77% non-white vs. 69% non-white); serve more male "Littles" (52% vs. 44%); and have a higher 12-month retention rate than the national BBBS average (66% vs. 44%). These metrics exemplify the high quality of the matches made in the program.

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7 *See* Rockman et al, *Comcast Digital Connectors: 2012-2013* (July 17, 2014), http://bit.ly/DigitalConnectorsPresentation.

Comcast has supported local Boys & Girls Clubs for more than a decade, providing more than $88 million in cash and in-kind contributions. In 2010, Comcast took its support to the next level to sponsor Club Tech, a program incorporating digital literacy into local Clubs' curriculum, providing children and teens with technology training to equip them with the skills needed to succeed in the 21st century. Through its support of Club Tech and other programs, Comcast supports half the nation's Boys & Girls Clubs serving nearly 900,000 young people annually.

- United Way. Through an annual employee giving campaign, company employees pledged nearly $6.4 million to United Way during the 2013 campaign. Combined with matching Comcast Foundation grants, the campaign will provide almost $8 million next year to local United Ways and affiliate organizations across the country, and more than $50 million in total historic support to United Way. Comcast is ranked 41st among all companies in America for its United Way campaign.

Exhibit 7
SELECTED COMCAST-NBCUNIVERSAL
DIVERSITY & INCLUSION AWARDS
2010-2014

Overall/Multiple Focus Areas

§ In 2014, for the second consecutive year, Comcast-NBCUniversal was named among ***DiversityInc*** magazine's prestigious ***Top 50 Companies for Diversity*** list, moving up to 44th from 49th in 2013. The "Top 50" includes companies from a wide range of industries that *DiversityInc* recognizes for "using diversity management to attract and retain a global, multicultural workforce and gain market share." Companies participate in the annual survey assessing four areas of diversity management:

- CEO Commitment: accountability for results, communications, visibility
- Human Capital: management, professional development, and promotions
- Corporate and Organizational Communications: mentoring, employee resource groups, philanthropy, consistency/effectiveness of diversity-management initiatives
- Supplier Diversity: spend with certified minority-owned and women-owned companies, as well as spend with companies owned by people with disabilities, veterans, and members of the LGBT community

Comcast was recognized as one of ***DiversityInc's 25 Noteworthy Companies*** for the three consecutive prior years.

§ Comcast and NBCUniversal were named among the ***2014 LATINO 100*** by ***Latino Magazine***, which recognizes companies providing the most opportunities for Latinos.

§ For the second consecutive year in 2014, ***U.S. Veterans Magazine*** (USVM) named Comcast-NBCUniversal among its ***Best of the Best*** lists for "Top Veteran-Friendly Companies" and "Top Supplier Diversity Programs."

§ For the second year in a row in 2014, ***Hispanic Network Magazine*** named Comcast-NBCUniversal among its ***Best of the Best*** in "Top Diversity Employers" and "Top Supplier Diversity Programs."

§ The ***Urban League of Southern Connecticut*** awarded NBCUniversal its ***Corporate Diversity Award*** in June 2014.

§ The readers of ***Diversity/Careers in Engineering & Information Technology*** recognized Comcast-NBCUniversal as a ***2014 Best Diversity Company***.

- The ***National Association for Multi-ethnicity in Communications (NAMIC)*** honored Comcast and NBCUniversal with its ***2013 Industry Diversity Champion Award***, which is given to a company demonstrating an exemplary effort to address diversity and inclusion among its workforce and within the communities it serves. The ***Industry Diversity Champion Award*** was presented during the National Cable Telecommunications Association (NCTA)'s annual Cable Show held in June 2013 in Washington, D.C.

- In November 2013, Comcast and NBCUniversal were both designated a ***2013 Top Company for People of Color by NAMIC***, based on the findings of NAMIC/WICT's (Women in Cable Telecommunications) Cable Telecommunications Workforce Diversity Survey.

- ***OCA - Asian Pacific American Advocates***, a national membership driven organization dedicated to advancing the social, political, and economic well-being of Asian Pacific Americans (APAs), awarded Comcast-NBCUniversal its ***2013 Outstanding Corporate Partner Award*** during the National Asian Pacific American Corporate Achievement Awards in November 2013. The distinction recognizes Comcast-NBCUniversal for its demonstrated commitment to diversity and to partnering with OCA on community investment efforts.

- ***Black EOE Journal*** (BEOEJ) named Comcast among its ***2013 Best of the Best*** lists for "Top Diversity Employers" and "Top Supplier Diversity Programs." In determining the Best of the Best companies, the BEOEJ polled hundreds of Fortune 1000 companies for its 2013 Best of the Best evaluations. BEOEJ is a leading African American career and business magazine. Its annual review is an evaluation of the nation's employers, initiatives, government agencies, and educational institutions.

- ***Hispanic Network Magazine*** named Comcast and NBCUniversal among its ***2013 Best of the Best*** lists for "Top Diversity Employers" and "Top Supplier Diversity Programs" for 2013.

- ***U.S. Veterans Magazine*** (USVM) named Comcast-NBCUniversal among its ***2013 Best of the Best*** lists for "Top Veteran-Friendly Companies" and "Top Supplier Diversity Programs."

- ***Professional Woman's Magazine*** recognized Comcast-NBCUniversal among its ***2013 Best of the Best*** lists for "Top Diversity Employers for Women" and "Top Supplier Diversity Programs for Women."

- In March 2013, ***Calvert Investments***, a mutual fund firm that invests in companies that engage in sustainable and responsible practices, released its ranking of diversity among companies in the S&P 100. Using an in-depth methodology, Calvert examines diversity policies, programs, and performance metrics that these companies employ. This year, ***Comcast scored 90 points out 100 for its record on including women, minorities, and LGBTs***. Among other initiatives, Calvert highlighted Comcast's diversity recruiting events, new Office of Corporate Diversity and Inclusion, and restructured Internal Diversity Council.

§ Comcast Corporation was honored with the ***New York Urban League's (NYUL) 2013 "Champions of Diversity" Award***, presented at the 10th Anniversary Champions of Diversity (COD) Awards Breakfast in February 2013. The COD Awards Breakfast recognizes companies that understand the need for diversity in the job market, embracing diversity to its fullest potential, and understanding that, to be successful in today's competitive market, diversity must be reflected in every aspect of the workplace. Corporate leadership, employment policy, supplier relations, and corporate giving are fundamental tenets of NYUL's philosophy. In listing Comcast-NBCUniversal among its COD honorees, the NYUL recognized that the company's "top-down commitment to diversity is evident through its leadership, hiring, supplier relations and philanthropic activities."

§ ***Black Enterprise*** magazine selected Comcast as one of its 40 Best Companies for Diversity in 2012. *Black Enterprise* compiles its 40 Best Companies for Diversity list using a survey measuring diversity among employee base, senior management, board of directors, and procurement.

§ Comcast-NBCUniversal ranked No. 5 among ***HispanicBusiness.com's 2014 Best Companies for Diversity***. Each year, *Hispanic Business* magazine analyzes top corporation's efforts on diversity in recruitment and retention, governance, supplier development, and philanthropy.

– 2014 marks Comcast's 10th consecutive year on *Hispanic Business*'s Top 60 list, moving up to No. 5 (Comcast was also No. 9 in 2013 and 2012, No. 37 in 2011, and No. 38 in 2010).

§ For the second year in a row, Comcast was named among ***Asian Enterprise Magazine's Fortune 500's Best Companies for Asian Americans and Pacific Islanders***, recognizing Comcast's "invaluable contribution to the Asian American and Pacific Islander community." (August 2012)

Governance

§ Comcast and NBCUniversal's Diversity Councils are ranked among the ***2014 Top 25 Diversity Councils by the Association of Diversity Councils*** (a practice group of the diversity and inclusion training firm PRISM International, Inc.). Exact rankings will be announced in October 2014.

– 2014 is the sixth consecutive year that Comcast has made the *Top 25* list.

- In 2009, Comcast was ranked No. 12; in 2010, Comcast was ranked No. 13; in 2011, Comcast was No. 8; in 2012, Comcast and NBCUniversal's Diversity Councils were ranked No. 5. In 2013, Comcast and NBCUniversal's Diversity Councils were ranked No. 3.

§ Comcast received a score of 85 on the Hispanic Association of Corporate Responsibility's (HACR) 2013 ***Corporate Inclusion Index*** (CII). The HACR CII, a component of HACR's Corporate Accountability Strategy, takes a comprehensive measurement of Hispanic inclusion at *Fortune 100* and HACR corporate member companies by focusing on HACR's four pillars of corporate social responsibility and market reciprocity: Employment, Procurement, Philanthropy, and Governance.

- Comcast earned a score of 75 on the 2012 CII, 60 points on the 2011 CII, and 50 points on HACR's 2010 CII.

§ In May 2012, the ***Equality Forum*** honored NBCUniversal with its ***International Business Leadership Award***.

§ Comcast received a ***Corporate Impact Award*** at the California Asian & Pacific Islander Policy Summit, *iADVOCATE*, in April 2012.

§ At the ***National League of Cities***' (NLC) Congress of Cities and Exposition in 2012, Comcast officials accepted awards of appreciation from Asian Pacific American Municipal Officials (APAMO), Women in Municipal Government (WIMG), National Black Caucus of Local Elected Officials (NBC-LEO), Hispanic Elected Local Officials (HELO) and the Gay Lesbian Bisexual Transgender Officials (GLBTO).

Workforce

All Communities

§ ***Equal Opportunity*** magazine ranked Comcast 22nd in among its 2014 ***Top 50 Employers***. Readers of *Equal Opportunity* select the top companies in the country for which they would most prefer to work or believe would provide a positive working environment for members of minority groups.

§ In March 2014, ***The Legal Intelligencer*** named Comcast's legal team among Pennsylvania's Best In-House Legal Departments of the Year for, among other things, its commitment to diversity.

§ The Legal Department of Comcast Cable Communications was selected to receive the ***Minority Corporate Counsel Association's 2013 Employer of Choice Award for the Mid-Atlantic Region***. Comcast was selected from legal department applicants of corporations across the Mid-Atlantic for demonstrating a commitment to diversity and creating and maintaining an inclusive workplace.

- Comcast was named one of the ***2012 Best Adoption-Friendly Workplaces*** by the Dave Thomas Foundation for Adoption. The list recognizes the top 100 companies with the best adoption benefits available to their employees. Comcast tied for No. 3 with Verizon Communications in the Communications and Telecommunications category.

- Comcast placed No. 9 out of 50 among ***Diversity MBA Magazine's "Top 50 Companies for Diverse Managers to Work."*** (April 2010)

African-American

- Comcast received the ***National Association of Black Accountants' (NABA) 2012 Workforce Diversity Award***.

- Comcast received the ***"Outstanding Achievement in Workforce Initiatives"*** honor from the ***Philadelphia Association of Black Accountants*** in 2012.

- Comcast was recognized as the ***2011 National Black MBA Association, Inc.'s Corporate Partner of the Year.***

- NBCUniversal won the ***2010 National Association of Black Journalists Best Practices Award***, given annually to a news organization for extraordinary coverage of issues of great importance to the black community and for efforts in increasing diversity among newsroom staff and management.

Asian-American

- Comcast received the ***Asian American Justice Center's 2011 Bridge Builder Award***. (October 2011)

- Craig Robinson, NBCUniversal's Chief Diversity Officer, was honored by the ***Japanese American Citizens League (JACL)*** in September 2012 with its ***Salute to Champions Award***. Comcast received the JACL's Salute to Champions Award in September 2011.

- ***Hmong American Partnership*** featured Comcast as its ***"Partner of the Month."*** (August 2011)

- Comcast Cable received the ***APIsCAN Corporate Vision and Leadership Award from the Asian Pacific Islanders California Action Network***. (July 2011)

Hispanic

- § As mentioned above, for the second consecutive year in 2014, Comcast and NBCUniversal were named among *Latino Magazine's* ***LATINO 100***.

- § In its Fall 2013 issue, ***Latino Magazine*** recognized Comcast among the ***LatinoSTEM10*** as a top 15 company actively encouraging Latinos to enter STEM (science, technology, engineering and mathematics) careers.

- § Comcast Corporation was ranked No. 3 among the ***2013 LATINA Style 50 Report***, the seventh consecutive year that Comcast was selected for the list.

  - – Comcast was selected as the ***Company of the Year (No. 1)*** for the ***2012 LATINA Style 50 Best Companies for Latinas to Work***.

  - – Comcast ranked No. 45 on LATINA Style's 2011 list. In 2010, Comcast ranked No. 46.

Women

- § ***Women in Cable Telecommunications*** (WICT) ranked Comcast (and Cox Communications) first among Best Operators for Women in Cable; and NBCUniversal ranked first among Best Programmers for Women in Cable in ***WICT PAR's 2013 Best Companies for Women in Cable Telecommunications*** survey, the first time one company won both awards the same year.

- § Comcast was named ***Regional Corporation of the Year*** by the ***Women's Business Enterprise Council of PA-DE-sNJ***. (May 2010)

Veterans

- § In November 2013, ***G.I. Jobs*** and ***Military Spouse*** magazines ranked Comcast-NBCUniversal No. 76 among the ***Top 100 Military Friendly Employers for 2014***. Companies compete for this elite title through a data-driven survey, with criteria scoring key programs and policies such as the strength of company military recruiting initiatives, percentage of new hires with prior military service, and retention efforts.

- § Due to an unprecedented number of participants in its annual survey, *G.I. Jobs*, for the first time, awarded a new ***Military Friendly Employers®*** designation in 2012, recognizing employers that offer tremendous benefits for military personnel but fall outside of *G.I. Jobs'* Top 100 list. Comcast was named among this elite group of *Military Friendly Employers*® in *G.I. Jobs* magazine's January 2013 issue, having qualified for this designation based on our survey score, which meets *G.I. Jobs'* stringent criteria and exceeds an established baseline.

- Comcast was listed among *G.I. Jobs'* 2011 Top 100 Military Friendly Employers (at No. 87); Comcast also ranked No. 87 on the 2010 *G.I. Jobs'* Top 100 list.

§ Comcast-NBCUniversal was named one of ***U.S. Veterans Magazine's* "2012 Best of the Best: Top 100 Companies Recruiting Veterans."**

§ In November 2012, ***the U.S. Chamber of Commerce*** and its National Chamber Foundation announced Comcast and NBCUniversal among its ***2nd Annual Lee Anderson Hiring Our Heroes Award Winners***, honoring employers that have gone above and beyond to honor the sacrifices made by our nation's military families. Specifically, Comcast and NBCUniversal received the *Lee Anderson Veteran and Military Spouse Employment Award*, which recognizes Comcast and NBCUniversal's proven dedication in addressing the challenges faced by veterans, transitioning service members, and military families in their search for meaningful employment.

LGBT

§ For the second year in a row, Comcast-NBCUniversal earned a 100% score on the ***Human Rights Campaign***'s (HRC) 2014 Corporate Equality Index (CEI), and was recognized among ***HRC's "Best Places to Work"*** list. HRC's CEI rates large U.S. employers and their policies and procedures pertinent to LGBT employees.

- Comcast scored 80 points out of 100 on HRC's 2012 CEI, 95 out of 100 on HRC's 2011 CEI, and 90 out of 100 on HRC's 2010 CEI.

§ For the second year in a row in 2012, NBCUniversal was selected as one of ***Work Life Matters magazine's Top Companies for LGBT Equality***, honoring the trailblazing company's work for LGBT equality, both within and outside the company. (June 2011 and November 2012)

People with Disabilities

§ Comcast was listed No. 27 among ***Careers & the disABLED Magazine's Readers' Choice Top 50 Employers for 2014***. The Readers' Choice Awards include public and private sector employers for which the publication's readers would most like to work or that they believe would provide a progressive environment for people with disabilities.

- Comcast ranked No. 9 on the 2013 list and No. 41 on the 2012 list.

§ Universal Orlando won a ***2012 Exceptional Employer Award from the State of Florida's Agency for Persons with Disabilities***. Lighthouse Central Florida nominated Universal Orlando for its work with them on providing employment opportunities for persons with disabilities.

§ NBCUniversal won the ***Disability Rights Legal Center's Corporate Diversity Award***. (November 2011)

Procurement

§ The ***National Veteran-Owned Business Association*** (NaBOVA) named Comcast and NBCUniversal among its 2014 *10 Best U.S. Corporations for Veteran-Owned Businesses*. Comcast and NBCUniversal had previously won the award in 2012.

§ ***DiversityBusiness.com*** ranked Comcast-NBCUniversal No. 27 among its ***Top 50 Organizations for Multicultural Business Opportunities*** (Div50) for 2014. The *Div50* award recognizes commitment to diversity throughout the nation's multicultural business community and commitment to growing this economic sector. The award is based on factors such as volume, consistency, and quality of business initiatives a company grants to multicultural suppliers. 2014 marked the company's ninth consecutive year on the list.

§ Comcast is ranked 12th among the 2014 ***HispanicBusiness.com Top 25 Supplier Diversity Companies*** list.

§ In August 2014, the ***National Association for Multi-ethnicity in Communications (NAMIC)*** announced the winners of its 2014 ***Excellence in Multi-cultural Marketing Awards (EMMAs)***, garnering 13 top awards across Case Studies/Campaigns and Marketing Tactics. The EMMAs recognize excellence in marketing designed to culturally diverse audiences and customers among African American, Asian, Hispanic, LGBT, and other market segments. Comcast also earned an additional six 2014 EMMA Awards for international marketing efforts.

- In 2013, Comcast garnered five first place wins to lead the Cable Distributors division. Additionally, Telemundo Media, including mun2, garnered three first place wins, and International Media Distribution earned two first place awards. Comcast's EMMA wins for 2012 totaled 13.

- Comcast, in collaboration with GRM Marketing, won first place in the Tactics Category for Experimental Marketing of NAMIC's 2011 ***Excellence in Multicultural Marketing*** Awards (EMMAs) for La Academia de Comcast. (October 2011)

§ In December 2013, the ***PA-NJ-DE Minority Supplier Development Council (MSDC)*** recognized Comcast as ***National Corporation of the Year*** based on the company's supplier diversity policies, contracting activity, MBE development, leadership, and engagement. The PA-NJ-DE MSDC is one of 37 regional councils of the National Minority Supplier Development Council, which certifies minority-owned businesses and creates access to opportunities for them.

§ In September 2013, Comcast-NBCUniversal was honored among ***United States Hispanic Chamber of Commerce***'s (USHCC)'s ***Million Dollar Club*** ($100M-$250M category), which recognizes corporations and procurement executives who actively demonstrate an unwavering commitment to Hispanic Business Enterprises (HBEs) through their work with Hispanic suppliers.

§ Comcast was named one the ***Best Companies for Asian American and Pacific Islanders*** in 2012 by ***Asian Enterprise*** magazine, which recognized Comcast's "unwavering and continued commitment to the small business community" and "invaluable contribution to the Asian American and Pacific Islander community."

§ The ***Rocky Mountain Minority Supplier Development Council*** named Comcast its ***Corporate Partner of the Year*** in July 2012.

§ Comcast was ranked No. 1 among the ***Top 50 Green Fleets*** in 2012 by ***Fleet Central Magazine***, thanks in part to Comcast's effective outsourcing relationship with Burt Fleet. Burt Fleet, an MSDC-certified supplier, has provided in excess of 20,000 vehicles to Comcast across our service footprint, making Comcast the 4th largest fleet in the U.S., and aiding Comcast's commitment to lowering our carbon footprint by purchasing flex-fuel and hybrid vehicles.

§ NBCUniversal was named ***2012 Corporation of the Year*** by the ***Greater Los Angeles African American Chamber of Commerce*** (GLAAACC), for its contribution and support of the African American business community.

§ Comcast was recognized as the ***National Black Chamber of Commerce's Corporate Partner of the Year*** for its achievements with diverse suppliers. (August 2011)

§ The ***Hispanic Chamber of Commerce*** in Philadelphia recognized Comcast as the 2010 "***Corporate Advocate of the Year***."

Programming

§ The ***National Hispanic Media Coalition*** (NHMC) honored Comcast for its Outstanding Diversity Practices during NHMC's ***17th Annual Impact Awards Gala*** in February 2014. The Impact Awards Gala celebrates the artistic achievement of American Latino artists shows work is so creative and outstanding that it must be recognized. NHMC also honors those individuals or entities whose achievements have greatly benefited the welfare of the Latino community in front of and behind the camera.

§ Comcast-NBCUniversal was awarded the ***2014 Multicultural TV Front Runner Award*** for the company's commitment and efforts to support multicultural communities -- in particular, for noteworthy efforts like *His Dream, Our Stories*, the interactive and comprehensive multimedia package we unveiled to honor the 50th anniversary of the March on Washington for Jobs and Freedom.

§ The ***GLAAD Media Awards*** recognize and honor media for their fair, accurate, and inclusive representations of the lesbian, gay, bisexual and transgender community and the issues that affect their lives. They also fund GLAAD's work to amplify stories from the LGBT community that build support for equality. In 2014, sixteen Comcast-NBCUniversal productions were nominated for the ***25th Annual GLAAD Media Awards***, which recognize and honor media for their fair, accurate, and inclusive representations of the LGBT community and the issues that affect their lives.

- *Dallas Buyers Club* (Focus Features) – Outstanding Film
- "There's the Door" *Necessary Roughness* (USA Network) – Outstanding Individual Episode
- *Days of Our Lives* (NBC) – Outstanding Daily Drama
- "Gay Rights at Work" *MSNBC Live* (MSNBC) – Outstanding TV Journalism Segment
- "Pride & Prejudice" Melissa Harris-Perry (MSNBC) – Outstanding TV Journalism Segment
- "Scouts Dishonor" *The Last Word with Lawrence O'Donnell* (MSNBC) – Outstanding TV Journalism Segment
- "Wild Blue Yonder: Scott Hines" *The Rachel Maddow Show* (MSNBC) – Outstanding TV Journalism Segment
- "Entregando a mi nieta" *Caso Cerrado* (Telemundo) – Outstanding Daytime Talk Show Episode [Spanish Language]
- "Exclusivas Declaraciones" *Al Rojo Vivo* (Telemundo) – Outstanding Daytime Talk Show Episode [Spanish Language]
- "Matrimonios del mismo sexo: Entrevista con Daniel Zavala y Yohandel Ruiz" *Un Nuevo Día* (Telemundo) – Outstanding Daytime Talk Show Episode [Spanish Language]
- "Decisión Histórica" *Noticiero Telemundo* (Telemundo) – Outstanding TV Journalism Segment [Spanish Language]
- "Hasta que la corte nos una" *Noticias Telemundo 51* (WSCV-51 [Miami, Fla.]) – Outstanding Local TV Journalism [Spanish Language]

- "Natalia: rompiendo barreras" *Noticiero Telemundo Arizona* (KTAZ-39 [Phoenix, Ariz.]) – Outstanding Local TV Journalism [Spanish Language]

- "Reportaje Especial: Derechos Homosexuales" N*oticiero Telemundo Washington* (WZDC-25 [Washington, D.C.]) – Outstanding Local TV Journalism [Spanish Language]

- *Brooklyn Nine-Nine* (Universal Television) – Outstanding Comedy Series category

- "Fred Rosser" *The Ellen DeGeneres Show* (syndicated/airs on NBC's 10 Owned Stations) – Outstanding Talk Show Episode

§ In May 2014, the ***National Academy of Television Arts and Sciences*** awarded Telemundo two ***Sports Emmys***, the most of any Spanish-language broadcast network. Telemundo also received more nominations and awards than any other Hispanic broadcast network at the 35th Annual Sports Emmy® Awards, the first time specific categories for Spanish-language television were included. The World Cup classifying match between Mexico and Costa Rica on "Rumbo al Mundial" in October 2013 was recognized as "Outstanding Live Sports Coverage in Spanish" and the network's acclaimed sportscaster Andrés Cantor was honored as "Outstanding On-Air Sports Personality in Spanish."

§ In July 2013, ***NAMIC*** announced winners of its ***19th Annual Vision Awards***. Presented in partnership with **NAMIC - Southern California**, the awards recognize original, multi-platform television programming that depicts the lives, spirit, and contributions of people of color and best reflects the diversity of the global viewing audience. 2013 winners include:

- Comedy: *The Rickey Smiley Show* (TV One)

- Digital Media – Long Form: *Black and Latino* (mun2)

- Digital Media – Short Form: *The Secret of Chancla* (mun2)

- Reality (Unscripted): *Tia and Tamera* (Style Network)

- Reality (Social Series): *Save My Son* (TV One)

§ Eighteen NBCUniversal productions were nominated for the ***24th Annual GLAAD Media Awards* (2013)**, including *Smash* (Outstanding Drama Series), *The New Normal* (Outstanding Comedy Series), *Titulares Telemundo*'s interview with openly gay boxer Orlando Cruz, and *Days of Our Lives* (Outstanding Daily Drama).

§ According to the ***National Association of Black Journalists***' 2012 Diversity Census, NBC again led the industry with 27% newsroom management diversity, up from the prior year's 24%.

§ Comcast Cable was the first-ever recipient of ***Broadcasting & Cable and Multichannel News' new award for Leadership in Hispanic Television***. (October 2012)

§ MSNBC was announced as the recipient for the ***DANDI Award in the Media*** category at the first annual DANDI Awards Ceremony held in July 2012. The Diversity and Inclusion Awards, better known as the DANDI Awards, was founded in 2012 to recognize exemplary commitment and focus on diversity and inclusion. The mission of the DANDIs is to celebrate the contributions of any individual, group or organization that is truly making a difference toward creating a more diverse and inclusive world. MSNBC prepared a video that was presented during the awards ceremony, featuring Phil Griffin and emphasizing the network's commitment to diversity.

§ The ***American Association of People with Disabilities*** honored NBCUniversal's USA Network with its Image Award at the annual ***AAPD Leadership Awards*** Gala in March 2012. USA was acknowledged for *Characters Unite*, which has helped promote equal rights and opportunities for people with disabilities. *Characters Unite* is USA Network's public service campaign to address the social injustices and cultural divides still prevalent in our society. Inspired by USA's iconic *Characters Welcome* brand and, with the support of leading national nonprofit organizations, the ongoing initiative is dedicated to supporting activities and messaging that combat hate and discrimination while promoting understanding and acceptance — on-air, online, and in communities around the country.

§ Comcast and NBCUniversal were recognized at the ***23rd Annual GLAAD Media Awards*** in 2012. Among other mentions:

- Neil Meron and Craig Zadan, producers of *Smash*, were honored with the ***Vito Russo Award***, which is presented annually to openly LGBT media professionals who have made a significant difference in promoting equality;

- FOCUS Features' *Pariah* was honored as Outstanding Film–Limited Release;

- Telemundo's "Lesbianas celebran 10 años" Caso Cerrado was honored as Outstanding Daytime Talk Show Episode;

- GLAAD's Acting President took a special moment in his remarks to thank Comcast for sharing GLAAD's anti-bullying public service announcements with Comcast's nearly 23 million video customers;

- Tina Fey and Rachel Maddow were featured in GLAAD's video clip recognizing media personalities who were committed to the positive representation and inclusion of LGBT community members and issues in the media.

§ In February 2012, the ***National Latino Media Council*** (NLMC) released its 2011 Network Diversity report card, awarding NBC an overall B+ grade (an improvement over 2010's B grade). NBC earned an A+ for "Actors: On-Air Primetime Reality Shows," the highest score in any category for any network. NBC also earned an A in the "Entertainment Creative Executives" category, as well as the "Network Commitment to Diversity Initiatives and Submission of Data" category. The NLMC noted that there have been "tangible and incremental" results since NBC's 2000 MOU was signed.

§ In December 2011, NBCUniversal received an overall grade of B from the ***Asian Pacific American Media Coalition***, the highest grade ever given by the group.

- In December 2011, the ***Asian Pacific American Media Coalition*** (APAMC) issued its annual report card. Overall, NBC, with a B (up from a B- in 2010), ranked highest in this year's APAMC report cards, which marks the 10th anniversary of judging the inclusion of APAs in eight categories: actors, unscripted show participants, writers/producers, directors, development, procurement, executives, and network initiatives. No other network has ever received this high a grade from the coalition. Out of 12 report cards since 2000, NBC has received the highest overall grade 8 times (5 of them ties with other networks). NBC has also received the highest grade for actors, development deals, and writers/producers, and tied for top honors in procurement, executives, and diversity initiatives. Guy Aoki, Co-Chair of the APAMC, stated, "last season, NBC had 13 regulars of Asian Pacific descent (boosted by five regulars on *Outsourced*). This was the highest number any network has been able to achieve in the 11 years the Coalition has released report cards. Accordingly, we have issued our highest grade in the actors category ever, a B+. NBC is the only network to receive this high a grade, which they also received in 2004."

§ NBCUniversal was named to the ***WICT*** Foundation/PAR Initiative ***Best Programmers for Women in Telecommunications*** in 2011**.**

§ NBCUniversal won several categories at the 22nd Annual GLAAD Media Awards (2011), including ***Outstanding Individual Episode*** for the "Klaus & Greta" episode of *30 Rock*. MSNBC's *The Last Word with Lawrence O'Donnell* won for Outstanding TV Journalism Segment for its "Fort Worth Speech" segment. (April 2011)

§ In April 2011, MSNBC President Phil Griffin was honored by the ***National Action Network*** as a recipient of its 13th annual ***Keepers of the Dream Award***.

§ In July 2011, NBC's *Parenthood* was selected to receive the ***American Federation of Television and Radio Artists***, AFL-CIO's (AFTRA) 2011 American Scene Award in the Television Dramatic Program category for its diversity of age and ethnicity, as well as groundbreaking storylines that accurately and honestly depict the intricacies of relationships. In addition, NBCUniversal's *The Voice* was selected as recipient of AFTRA's 2011 American Scene Award in the Talent competition.

Exhibit 8
SELECTED COMCAST-NBCUNIVERSAL
COMMUNITY INVESTMENT AWARDS
2010-2014

§ In 2014, Comcast and NBCUniversal received the ***Innovative Program Award*** for *Internet Essentials* at the 2014 T. Howard Foundation Diversity Awards Dinner.

§ In March 2014, the ***Denver Indian Center*** presented its Excellence in Corporate Partnership Award to Comcast-NBCUniversal for the company's outstanding work with American Indian communities in Colorado and across the United States. Comcast Denver was recognized separately as Local Partner of the Year.

§ Comcast-NBCUniversal received a ***Distinguished Corporation Award*** from the ***Congressional Black Caucus Foundation, Inc. (CBCF)*** for its work in promoting digital literacy. This award honors corporations that have demonstrated a commitment to cultivating minority and civic engagement, public discourse on African American history, or the preservation of important historic artifacts through philanthropic or programmatic support. The award was presented at CBCF's Avoice Heritage Celebration on February 2014.

§ In December 2013, Comcast was recognized among ***The Civic 50***, an initiative to identify the 50 most community-minded companies in the nation. Additionally, Comcast was recognized as No. 3 – Best in Communications industry. Launched in 2012, *The Civic 50* is an initiative to survey and rank S&P 500 corporations on how they engage with the communities they serve and institutionalize these practices in their corporate culture. Specifically, *The Civic 50* recognizes companies seeking to best use their time, talent, and resources to improve the quality of life in the communities where they do business.

§ During its 2013 Corporate Philanthropy Summit, the *Philadelphia Business Journal* presented Comcast with the ***Top Community Impact Award*** and the ***Top In-Kind Donor Award*** in the extra-large company category. Comcast was also ranked as the fifth-largest corporate charitable giver in the Philadelphia region.

§ In September 2013, the ***Marin County Chamber of Commerce*** awarded Comcast its ***Spirit of Marin Award*** for its efforts in the *Internet Essentials* program.

§ In September 2013, the ***Foundation for Florida Virtual Schools*** awarded Comcast its ***Bridging the Gap Award*** for demonstrating a resourceful approach to education by connecting communities through innovation and technology.

§ In June 2013, WICT honored Comcast as an exceptional operator that champions community and public service programs in support of women's initiatives through the *Internet Essentials* program.

§ In May 2013, the ***Gay, Lesbian & Straight Education Network (GLSEN)*** honored USA Network's *Characters Unite* campaign with its ***Inspiration Award*** during GLSEN's Respect Awards in New York City.

§ During the ***United Way Spirit of America® and Summit Awards*** program in April 2013 in Indianapolis, the United Way recognized Comcast Corporation with awards for ***Philanthropic Engagement and Volunteer Engagement***. The Spirit of America and Summit Awards program, celebrating its 26th year, is United Way's highest national honor for corporations, recognizing United Way Global Corporate Leaders with the most comprehensive commitments to strengthening communities.

§ In January 2013, the ***United States Conference of Mayors*** recognized Comcast and the City of Chicago as the ***Outstanding Public/Private Partnership*** for the *Internet Essentials* program.

§ In 2013, Comcast received a Beacon Award® from the Association of Cable Communicators for its *Internet Essentials* Ambassadors Program.

§ In June 2012, Comcast was honored with the ***Communications Pillar Award at the United Way's Annual Community Celebration***. The award recognizes a company that strategically raises visibility and awareness through outstanding communication to employees about the impact United Way makes in the Chicagoland community. Among other mentions:

  – Comcast's Angie Wells received the Outstanding Volunteer of the Year Award, which recognizes a United Way volunteer whose work has gone above and beyond the defined requirements and resulted in groundbreaking achievements towards the advancement of United Way's LIVE UNITED 2020 vision.

  – Comcast was also recognized for giving 110% year-over-year with our Comcast United Way employee campaign.

§ Comcast received a ***Platinum PR Award*** in 2011 for Comcast Cares Day.

§ Comcast Cable Communications was honored with a ***2011 Visionary Award presented by United Spinal***.

Important Information For Investors And Shareholders

This communication does not constitute an offer to sell or the solicitation of an offer to buy any securities or a solicitation of any vote or approval. In connection with the proposed transaction between Comcast Corporation ("Comcast") and Time Warner Cable Inc. ("Time Warner Cable"), Comcast has filed with the Securities and Exchange Commission ("SEC") a registration statement on Form S-4, including Amendments No. 1, 2, 3, 4, 5 and 6 thereto, containing a joint proxy statement of Comcast and Time Warner Cable that also constitutes a prospectus of Comcast. The registration statement was declared effective by the SEC on September 5, 2014, and Comcast and Time Warner Cable commenced mailing the definitive joint proxy statement/prospectus to shareholders of Comcast and Time Warner Cable on or about September 9, 2014. INVESTORS AND SECURITY HOLDERS OF COMCAST AND TIME WARNER CABLE ARE URGED TO READ THE DEFINITIVE JOINT PROXY STATEMENT/PROSPECTUS AND OTHER DOCUMENTS FILED OR THAT WILL BE FILED WITH THE SEC CAREFULLY AND IN THEIR ENTIRETY BECAUSE THEY CONTAIN OR WILL CONTAIN IMPORTANT INFORMATION. Investors and security holders may obtain free copies of the registration statement and the definitive joint proxy statement/prospectus and other documents filed with the SEC by Comcast or Time Warner Cable through the website maintained by the SEC at http://www.sec.gov. Copies of the documents filed with the SEC by Comcast are available free of charge on Comcast's website at http://cmcsa.com or by contacting Comcast's Investor Relations Department at 866-281-2100. Copies of the documents filed with the SEC by Time Warner Cable are available free of charge on Time Warner Cable's website at http://ir.timewarnercable.com or by contacting Time Warner Cable's Investor Relations Department at 877-446-3689.

In addition, in connection with the proposed transaction between Comcast and Charter Communications, Inc. ("Charter"), Charter will file with the SEC a registration statement on Form S-4 that will include a proxy statement of Charter that also constitutes a prospectus of Charter, and a definitive proxy statement/prospectus will be mailed to shareholders of Charter. INVESTORS AND SECURITY HOLDERS OF COMCAST AND CHARTER ARE URGED TO READ THE PROXY STATEMENT/PROSPECTUS AND OTHER DOCUMENTS THAT WILL BE FILED WITH THE SEC CAREFULLY AND IN THEIR ENTIRETY BECAUSE THEY WILL CONTAIN IMPORTANT INFORMATION. Investors and security holders will be able to obtain free copies of the registration statement and the proxy statement/prospectus (when available) and other documents filed with the SEC by Comcast or Charter through the website maintained by the SEC at http://www.sec.gov. Copies of the documents filed with the SEC by Comcast are available free of charge on Comcast's website at http://cmcsa.com or by contacting Comcast's Investor Relations Department at 866-281-2100. Copies of the documents filed with the SEC by Charter will be available free of charge on Charter's website at charter.com, in the "Investor and News Center" near the bottom of the page, or by contacting Charter's Investor Relations Department at 203-905-7955.

Shareholders of Comcast and Time Warner Cable are not being asked to vote on the proposed transaction between Comcast and Charter, and the proposed transaction between Comcast and Time Warner Cable is not contingent upon the proposed transaction between Comcast and Charter.

Comcast, Time Warner Cable, Charter and their respective directors and certain of their respective executive officers may be considered participants in the solicitation of proxies in connection with the proposed transaction between Comcast and Time Warner Cable, and Comcast, Charter and their respective directors and certain of their respective executive officers may be considered participants in the solicitation of proxies in connection with the proposed transaction between Comcast and Charter. Information about the directors and executive officers of Time Warner Cable is set forth in its Annual Report on Form 10-K for the year ended December 31, 2013, which was filed with the SEC on February 18, 2014, its proxy statement for its 2014 annual meeting of stockholders, which was filed with the SEC on April 29, 2014, and its Current Report on Form 8-K, which was filed with the SEC on June 13, 2014. Information about the directors and executive officers of Comcast is set forth in its Annual Report on Form 10-K for the year ended December 31, 2013, which was filed with the SEC on February 12, 2014, its proxy statement for its 2014 annual meeting of stockholders, which was filed with the SEC on April 11, 2014, and its Current Report on Form 8-K, which was filed with the SEC on July 1, 2014. Information about the directors and executive officers of Charter is set forth in its Annual Report on Form 10-K for the year ended December 31, 2013, which was filed with the SEC on February 21, 2014, its proxy statement for its 2014 annual meeting of stockholders, which was filed with the SEC on March 27, 2014, and its Current Report on Form 8-K, which was filed with the SEC on May 9, 2014. These documents can be obtained free of charge from the sources indicated above. Additional information regarding the participants in the proxy solicitations and a description of their direct and indirect interests, by security holdings or otherwise, are contained in the definitive joint proxy statement/prospectus of Comcast and Time Warner Cable filed with the SEC and other relevant materials to be filed with the SEC when they become available, and will also be contained in the preliminary proxy statement/prospectus of Charter when it becomes available.

Cautionary Statement Regarding Forward-Looking Statements

Certain statements in this communication regarding the proposed acquisition of Time Warner Cable by Comcast and the proposed transaction between Comcast and Charter, including any statements regarding the expected timetable for completing the transactions, benefits and synergies of the transactions, future opportunities for the respective companies and products, and any other statements regarding Comcast's, Time Warner Cable's and Charter's future expectations, beliefs, plans, objectives, financial conditions, assumptions or future events or performance that are not historical facts are "forward-looking" statements made within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements are often, but not always, made through the use of words or phrases such as "may", "believe," "anticipate," "could", "should," "intend," "plan," "will," "expect(s)," "estimate(s)," "project(s)," "forecast(s)", "positioned," "strategy," "outlook" and similar expressions. All such forward-looking statements involve estimates and assumptions that are subject to risks, uncertainties and other factors that could cause actual results to differ materially from the results expressed in the statements. Among the key factors that could cause actual results to differ materially from those projected in the forward-looking statements are the following: the timing to consummate the proposed transactions; the risk that a condition to closing either of the proposed transactions may not be satisfied; the risk that a regulatory approval that may be required for either of the proposed transactions is not obtained or is obtained subject to conditions that are not anticipated; the parties' ability to achieve the synergies and value creation contemplated by the proposed transactions; the parties' ability to promptly, efficiently and effectively integrate acquired operations into their own operations; and the diversion of management time on transaction-related issues. Additional information concerning these and other factors can be found in Comcast's, Time Warner Cable's and Charter's respective filings with the SEC, including Comcast's, Time Warner Cable's and Charter's most recent Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K. Comcast, Time Warner Cable and Charter assume no obligation to update any forward-looking statements. Readers are cautioned not to place undue reliance on these forward-looking statements that speak only as of the date hereof.