

# WILLKIE FARR & GALLAGHER LLP

MICHAEL H. HAMMER  
202 303 1110  
mhammer@willkie.com

1875 K Street, NW  
Washington, DC 20006-1238  
Tel: 202 303 1000  
Fax: 202 303 2000

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## VIA HAND DELIVERY

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

Federal Communications Commission  
Office of the Secretary

**Re:** *In the Matter of Applications of Comcast Corporation, General Electric Company and NBC Universal, Inc. for Consent to Assign Licenses or Transfer Control of Licensees*, MB Docket No. 10-56

**REDACTED – FOR PUBLIC INSPECTION**

Dear Ms. Dortch:

The attached filing, authored by Drs. Mark Israel and Michael L. Katz, addresses certain arguments made by Dr. William Rogerson in the Commission's economist workshop<sup>1</sup> regarding the calculation of savings from the reduction or elimination of double marginalization. As Drs. Israel and Katz demonstrate in the attached, when Dr. Rogerson's framework is properly applied, it supports the conclusion that the amount of savings resulting from the reduction or elimination of double marginalization as a result of the proposed transaction is significant. In short, the attached analysis confirms the substantiality of a key benefit of the proposed transaction.

Specifically, in their July 20, 2010, report, Drs. Israel and Katz explained that a full analysis of vertical pricing effects from the proposed Comcast/NBC Universal transaction must account for the efficiencies associated with vertical integration, including those arising from the reduction or elimination of double marginalization.<sup>2</sup> In the workshop, Dr. Rogerson raised certain questions about the proper calculation of the reduction in double marginalization.<sup>3</sup> Dr. Rogerson's framework, however, omits two critical factors – tier switching and advertising revenues – that, when properly incorporated, show that the double marginalization savings under

<sup>1</sup> See Letter from William D. Freedman, Associate Chief, Media Bureau, to Marlene H. Dortch, Secretary, FCC, MB Docket No. 10-56 (Aug. 30, 2010) (summarizing economist workshops)

<sup>2</sup> Mark Israel and Michael L. Katz, Economic Analysis of the Proposed Comcast-NBCU-GE Transaction, MB Docket No. 10-56, ¶ 61 (July 21, 2010).

<sup>3</sup> Professor Rogerson made similar arguments in an earlier report. See William P. Rogerson, A Further Economic Analysis of the Proposed Comcast-NBCU Transaction, MB Docket No. 10-56, at 11 (Aug. 19, 2010).

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his framework are very similar (or even larger) than the savings estimated in Drs. Israel and Katz's earlier report.

Pursuant to the Protective Order<sup>4</sup> and Second Protective Order<sup>5</sup> in the above-referenced proceeding, Comcast Corporation hereby submits two copies of the redacted version of the filing. The Confidential and Highly Confidential versions of this filing are being filed simultaneously under separate cover.

Comcast will make the Confidential and Highly Confidential versions of this filing and the associated backup materials available pursuant to the terms of the Protective Orders. Parties interested in securing access to the Confidential or Highly Confidential versions of this filing should contact Brien Bell, Willkie Farr & Gallagher LLP, 1875 K Street NW, Washington, DC 20006, (202) 303-1164, bbell@willkie.com.

Please do not hesitate to contact me with any questions.

Sincerely yours,



Michael H. Hammer  
*Counsel for Comcast Corporation*

Enclosures

cc: Vanessa Lemmé

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<sup>4</sup> *Applications of Comcast Corporation, General Electric Company, and NBC Universal Inc. for Consent to Assign Licenses or Transfer Control of Licensees*, Protective Order, MB Docket No. 10-56, DA 10-370 (MB Mar. 4, 2010).

<sup>5</sup> *Applications of Comcast Corporation, General Electric Company, and NBC Universal Inc. for Consent to Assign Licenses or Transfer Control of Licensees*, Second Protective Order, MB Docket No. 10-56, DA 10-371 (MB Mar. 4, 2010).

## Response to Professor Rogerson’s Comments on Double Marginalization

Mark Israel and Michael L. Katz

October 25, 2010

### I. OVERVIEW

In our July 20, 2010 report, we noted that a full analysis of vertical pricing effects from the proposed Comcast-NBCU-GE transaction must account for the efficiencies associated with vertical integration, including those arising from the elimination or mitigation of double marginalization.<sup>1</sup> We quantified the size of double marginalization effects based on the fact that Comcast currently pays NBCU approximately {{ }} per subscriber, per month for programming.<sup>2</sup> In particular, we noted that, in the case in which Comcast obtains 100 percent of NBCU (or, equivalently, Comcast acts to maximize combined Comcast-NBCU profits, which is the case Professor Rogerson has considered and the case on which we focus throughout this memorandum), Comcast’s effective per-subscriber, per-month cost for NBCU programming falls by {{ }} because Comcast internalizes the associated revenue.

In the economist workshop convened by the Commission, Professor Rogerson explained that, although he agrees that double marginalization effects should be incorporated in an analysis of the pricing effects from the transaction, he disagrees with our quantification, believing that the

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<sup>1</sup> Mark Israel and Michael L. Katz, Economic Analysis of the Proposed Comcast-NBCU-GE Transaction, *In the Matter of Applications of Comcast Corporation, General Electric Company and NBC Universal, Inc. for Consent to Assign Licenses or Transfer Control of Licensees*, MB Docket No. 10-56, July 20, 2010 (hereinafter, *Israel/Katz Reply Declaration*), ¶ 61.

<sup>2</sup> In our July 20, 2010 report, we conservatively included only {{ }}. In this response, we account for per-subscriber payments on all NBCU cable networks currently carried by Comcast.

double marginalization effects from the transaction would be much smaller than {{ }} per-subscriber per-month.<sup>3</sup> This position is based on the general framework for measuring double marginalization effects from the transaction that Professor Rogerson laid out in his August 19, 2010 report.<sup>4</sup> A key insight from Professor Rogerson’s framework is that double marginalization effects arise because, post-transaction, Comcast will internalize NBCU’s profit from greater subscribership to its networks. This creates an incentive for Comcast to attract additional subscribers to those networks, including through reductions in the price Comcast charges for its services.<sup>5</sup>

Under Professor Rogerson’s framework, it is clear that (as we established in our July 20, 2010 report) Comcast will no longer treat the payments it makes to NBCU for NBCU programming as costs (because it internalizes the associated NBCU revenue). However, Professor Rogerson’s framework also identifies an additional effect: for any consumers who were subscribing to the NBCU networks at other MVPDs, but then switch to Comcast following a post-transaction price reduction, Comcast will internalize the “opportunity cost” of lost payments from the other MVPD to NBCU. Professor Rogerson asserts that the vast majority of consumers who would begin subscribing to NBCU networks due to Comcast’s price cuts would

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<sup>3</sup> Professor Rogerson also raised this issue in a prior report. William P. Rogerson, “A Further Economic Analysis of the Proposed Comcast-NBCU Transaction,” August 19, 2010 (hereinafter, *Rogerson Reply Report*) at 11.

<sup>4</sup> *Rogerson Reply Report* at 54 – 59.

<sup>5</sup> Here, and throughout this memorandum, prices changes are defined as the differences in price levels with and without the proposed Comcast\NBCU\GE transaction. For example, if MVPDs’ subscription fees would rise with or without the transaction, but would rise by less with the transaction than without, then we refer to the difference as a price reduction. This use of the but-for world as a benchmark provides an appropriate measure of the impact of the proposed transaction on consumer welfare.

be consumers who were already subscribing to the NBCU networks at other MVPDs, thus reducing double marginalization savings to near zero.

We agree with Professor Rogerson's theoretical framework for measuring double marginalization effects and, specifically, that the opportunity costs should be included. However, in implementing this framework, Professor Rogerson omits two critical factors that, when properly incorporated, imply the size of double marginalization savings under Professor Rogerson's framework is actually similar to (or even larger than) the estimate we used in our July 20, 2010 report. In particular, Professor Rogerson fails to account for: (i) consumers who currently subscribe to MVPD service tiers that do *not* include one or more of the NBCU networks but would switch to Comcast service tiers that do include those networks, and (ii) NBCU advertising revenues associated with new viewers. The first omission is significant because such tier-switching behavior by consumers would generate incremental revenues for NBCU with no offsetting opportunity cost. The second omission is significant because Comcast would internalize these advertising gains post transaction. The next two sections quantify the effects of each omission, in turn.

## **II. PROFESSOR ROGERSON'S FAILURE TO ACCOUNT FOR TIER SWITCHING**

Professor Rogerson assumes that the only incremental subscribers to NBCU networks that Comcast can possibly attract with price reductions (and thus the only consumers who generate double marginalization savings with no offsetting opportunity cost) are those who

currently do not subscribe to any MVPD.<sup>6</sup> However, current MVPD subscribers who switch from a tier that does not have one or more NBCU networks to a Comcast tier that does have those networks generate no opportunity cost and thus would contribute to the double marginalization savings that Comcast internalizes. Therefore, for Professor Rogerson’s assumption to be correct, it would have to be the case that *all* subscribers to Comcast or other MVPDs subscribe to *all* the NBCU networks.

An examination of the facts clearly demonstrates that Professor Rogerson’s implicit assumption is incorrect. In fact, the NBCU cable networks are not generally found on the lowest, “limited basic tier” at cable operators (or, for example, on low-end “family” packages at the DBS providers), but rather are on “expanded basic” or other higher tiers. As seen in Table 1 (based on internal Comcast and NBCU data provided with our backup materials), the fraction of Comcast and DBS/telco subscribers who do not subscribe to one or more of the NBCU networks is substantial:<sup>7</sup>

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<sup>6</sup> *Rogerson Reply Report* at 9.

<sup>7</sup> In all discussions and analysis, we define non-Comcast MVPDs to include only DirecTV, DISH network, AT&T, and Verizon, as these are the main MVPDs that overlap with Comcast in its footprint.

**Table 1: NBCU Subscribership by MVPD**

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By incorporating MVPD subscribers who do not currently subscribe to particular NBCU networks—and who thus generate double marginalization savings with no offsetting opportunity cost—we can correctly implement Professor Rogerson’s framework. Correctly applied, this framework accounts for the fact that, because it would internalize NBCU profits post transaction, Comcast would have an incentive to lower the price for access to NBCU networks currently at the expanded-basic level and above in order to attract additional subscribers to those networks.

In contrast to Professor Rogerson’s implementation, the correct implementation incorporates four types of consumers who may react to such price reductions by switching tiers or MVPDs:

- *Group 1:* Those consumers who previously had no MVPD subscription but now join Comcast (denote the number in this group by  $g_1$ ).
- *Group 2:* Those Comcast subscribers who previously did not have access to the NBCU networks but now switch to a Comcast tier with the networks (denote the number in this group by  $g_2$ ).
- *Group 3:* Those consumers who had subscribed to non-Comcast MVPDs and did not have access to the NBCU networks but now switch to a Comcast tier offering the networks (denote the number in this group by  $g_3$ ).
- *Group 4:* Those consumers who had access to the NBCU networks through subscriptions to non-Comcast MVPDs but now switch to a Comcast tier offering the networks (denote the number in this group by  $g_4$ ).

As Professor Rogerson correctly pointed out, consumers in Group 4 do not generate double marginalization savings. However, consumers in Group 1, Group 2, and Group 3 *do*.

A key parameter in Professor Rogerson’s framework is  $1 - \theta$ , the fraction of those switching in response to the Comcast price cut who generate marginal cost savings. In terms of the notation defined above, the correct value is

$$1 - \theta = \frac{g_1 + g_2 + g_3}{g_1 + g_2 + g_3 + g_4}$$

Professor Rogerson ignores the existence of consumers who switch from an MVPD tier that does not include one or more NBCU networks to Comcast tiers that do. That is, he assumes that there are no Comcast subscribers who move from tiers without one or more NBCU networks

to tiers that do have those networks (*i.e.*, that  $g_2 = 0$ ) and that there are no consumers who would switch from subscribing to rival MVPD tiers without one or more NBCU networks to Comcast tiers that do have those networks (*i.e.*, that  $g_3 = 0$ ). Hence, Professor Rogerson estimates  $1 - \theta$  as

$$1 - \theta = \frac{g_1}{g_1 + g_4},$$

which substantially understates the true value of  $1 - \theta$  when  $g_2$  and  $g_3$  are significant.

Computing the appropriate value of  $1 - \theta$  requires quantifying  $g_1$ ,  $g_2$ ,  $g_3$ , and  $g_4$ , for each NBCU network individually. We proceed in two steps. First, we measure the size of the underlying population from which each of these groups of switchers is drawn. Second, we multiply this population size times the fraction of each population expected to switch in response to a Comcast price reduction.

These underlying populations corresponding to  $g_1$  through  $g_4$  are defined as follows:

- For Group 1, the population comprises those television households with no MVPD subscription (denote the size of this population as  $h_1$ ).
- For Group 2, the population comprises Comcast subscribers who do not subscribe to the network in question (denote the size of this population as  $h_2$ ).
- For Group 3, the population comprises subscribers to DBS or telco MVPDs who do not subscribe to the network in question (denote the size of this population as  $h_3$ ).
- For Group 4, the population comprises subscribers to DBS or telco MVPDs who do subscribe to the network in question (denote the size of this population as  $h_4$ ).

Table 2 reports the size of each of these populations for each NBCU network expressed as a percentage of all television households within Comcast’s footprint. The table also presents the overall percentage of television households in Comcast’s footprint that do *not* have access to each NBCU network (*i.e.*,  $h1 + h2 + h3$ ). As can be seen in the table, a sizable fraction of all television household lack access to each NBCU cable network, creating the possibility of large double marginalization effects from the transaction.

**Table 2: TV Households with and without NBCU Networks**

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Of course, the population sizes ( $h1$  through  $h4$ ) are unlikely to equal to the number of switchers ( $g1$  through  $g4$ ). In order to determine the number of switchers, we next evaluate what percentage of each population would be induced to switch to a Comcast tier (expanded basic or higher) by a post-transaction Comcast price reduction.

We begin by considering what fraction of those Comcast subscribers who do not currently have access to the NBCU network in question would switch tiers and obtain access to that network following a post-transaction price reduction in Comcast’s higher tiers. Denote this fraction as  $\alpha$ , meaning that:

$$\alpha = \frac{g^2}{h^2} .$$

Next, consider the rates at which households currently subscribing to rival MVPDs and not subscribing to the NBCU networks would switch to Comcast. There are strong reasons to believe that these switching rates will be significantly lower than  $\alpha$ . First, Comcast’s current subscribers can more easily learn about and react to post-transaction price changes than could subscribers to rival MVPD services. In other words, Comcast subscribers face particularly low costs of searching and switching among Comcast tiers of service. Second, by the logic of Professor Rogerson’s framework, double marginalization savings create an incentive for Comcast to find ways to attract subscribers who are truly new to the NBCU networks (as opposed to those who subscribed to the NBCU networks at another MVPD). Given that Comcast has full information on the current programming choices of its own subscribers and can easily market to them, an obvious way to grow NBCU subscribership is to focus marketing efforts on those current Comcast subscribers who do not at present subscribe to tiers offering the

NBCU networks.<sup>8</sup> Moreover, by Professor Rogerson’s logic, Comcast has a limited incentive to advertise its price reduction to subscribers at other MVPDs because, among such subscribers, only those who do not currently subscribe to one or more NBCU networks generate double marginalization savings. All of these factors suggest that  $\alpha$  will be large relative to the rate of switching for the other populations.

In principle, the rates at which households currently subscribing to rival MVPDs would switch to Comcast could vary depending on whether the households currently have access to the NBCU networks in question. However, we are unaware of any convincing argument that the variation should be in one direction or the other. Hence, we assume that

$$\frac{g_3}{h_3} = \frac{g_4}{h_4} .$$

We denote the extent to which the switching rate from other MVPDs to Comcast is below the switching rate by subscribers within Comcast by  $s$ . Formally,

$$s = \frac{g_3/h_3}{g_2/h_2} = \frac{g_4/h_4}{g_2/h_2} .$$

In order to quantify  $s$ , we use that information provided by Comcast on a recent (August – September, 2010) promotion in which the *same* offering was made to both Comcast

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<sup>8</sup> [[  
 ]] (Suzanne  
 McFadden, Vice President, Marketing & Strategy, Comcast Cable, October 18, 2010, interview).

subscribers and subscribers to other MVPDs.<sup>9</sup> In particular, [[

]]

Alternatively, as a more conservative estimate (*i.e.*, one yielding a lower estimate of the double marginalization benefits), another Comcast analysis indicates that, over their lifetime with Comcast, consumers are, on average, [[

]]. Although we consider [[ ]] to be the more appropriate estimate (because it is based on response to an actual price promotion), we consider scenarios with both [[ ]] in our calculations below.

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<sup>9</sup> [[

]] (Suzanne McFadden, Vice President, Marketing & Strategy, Comcast Cable, October 18, 2010, interview).

<sup>10</sup> Underlying data on responses to the offering are included with our backup materials. As seen in the backup spreadsheet, [[

]] (Suzanne McFadden, Vice President, Marketing & Strategy, Comcast Cable, October 18, 2010, interview).

<sup>11</sup> In particular, a Comcast analysis from 2009, included with the backup materials, shows [[

]]

Finally, switching to Comcast among those households who currently have no MVPD subscription ( $g1$ ) is also likely to be lower than tier-switching by Comcast subscribers. We denote the extent to which the switching rate from no-MVPD-service to Comcast is below the switching rate by subscribers within Comcast by  $t$ . Formally,

$$t = \frac{g1}{h1} / \frac{g2}{h2} .$$

We consider scenarios with  $t$  equal to  $[[ \quad ]]$ . The assumption that  $t = 0$  is the most conservative one possible (*i.e.*, the assumption that minimizes the projected double marginalization savings) as it completely ignores switching by those households with no MVPD service, who generate double marginalization savings with no offsetting opportunity cost. There almost certainly are some consumers who do not at present subscribe to MVPD service but are at the margin of doing so.<sup>12</sup> Nevertheless, we include this scenario to be conservative.

In terms of the notation above,

$$1 - \theta = \frac{g1 + g2 + g3}{g1 + g2 + g3 + g4} = \frac{t \times h1 + h2 + s \times h3}{t \times h1 + h2 + s \times (h3 + h4)} .$$

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<sup>12</sup>

[[

]] (Suzanne McFadden, Vice President, Marketing

& Strategy, Comcast Cable, October 18, 2010, interview).

Comcast document 04-COM-00000159 notes that {{

}} meaning that

the assumption that  $t = 0$  is conservative.

This expression demonstrates that the size of  $1 - \theta$  depends on the size of the four populations and the extent to which switching is lower among subscribers to other MVPDs and those not subscribing to an MVPD than among Comcast subscribers. Table 3 uses the population sizes from Table 2 to compute  $1 - \theta$  in the four scenarios defined by the combinations of {{

}}

**Table 3: Values of  $1 - \theta$  Under Different Scenarios**

{{

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### **III. PROFESSOR ROGERSON'S OMISSION OF NBCU ADVERTISING REVENUES**

A second omission in Professor Rogerson's implementation of his framework is the failure to account for the fact that Comcast's internalization of NBCU advertising revenues further heightens Comcast's post-transaction incentives to lower prices. Specifically, Professor Rogerson correctly notes that double marginalization effects arise because Comcast internalizes

the benefits to NBCU of new NBCU subscribers. But he fails to note that this implies that Comcast internalizes the NBCU advertising revenues generated by new subscribers to NBCU networks. More formally, Professor Rogerson's term for NBCU's upstream profits, (A.8), should include not only the affiliate fees per subscriber ( $w$ ) but also the NBCU network's advertising revenue per subscriber ( $a$ ).<sup>13</sup> Working through his math with this correction implies that the effect on prices of eliminating double marginalization is equivalent to a Comcast cost reduction equal to  $(1 - \theta) \times (w + a)$ .

Table 4 reports the value of  $(w + a)$  for each of the NBCU cable networks.

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<sup>13</sup> *Rogerson Reply Report* at 57.

**Table 4: NBCU Network Affiliate Fees and Ad Revenues**

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**IV. PROJECTED DOUBLE MARGINALIZATION BENEFITS**

We can use the information described in the two previous sections to project the double marginalization savings of the proposed transaction and the resulting benefits to consumers.

Table 5 combines the network-specific values of  $(1 - \theta)$  for each of the scenarios (from Table 3) with the network-specific values of  $w + a$  (from Table 4) to compute implied double marginalization savings in each scenario. As seen in the table, the combined double marginalization savings range from {{ }} per-subscriber per-month, with an average across the scenarios of {{ }}, which is larger than the {{ }} that we use in our July 20, 2010 report.

**Table 5: Double Marginalization Effects**

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In the *Israel/Katz Reply Declaration*, we argued that, because the subscriber-weighted average of the Comcast double marginalization savings and the potential affiliate fee increases for other MVPDs (as predicted by a modified version of the models advanced by Professors Murphy and Rogerson) is negative, the proposed transaction would enhance consumer welfare.<sup>14</sup> The fact that the double marginalization savings computed above are as large or larger than those in our July 20, 2010 report implies that this conclusion continues to hold under Professor Rogerson’s double marginalization framework.

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<sup>14</sup> *Israel/Katz Reply Declaration*, ¶ 75.

To verify this conclusion, we also conducted a differentiated products, Bertrand-Nash simulation to solve for the combined effects of Comcast cost savings (from elimination of double marginalization) and potential affiliate fee increases for other MVPDs on the prices paid by consumers for MVPD services. To do so, we began by modeling the equilibrium pricing outcome of competition between a cable MVPD, a telco MVPD, DirecTV, and DISH network in each of the each of the seven “overlap DMAs” with both an O&O NBCU station and a Comcast cable system (Chicago, Hartford, Miami, New York, Philadelphia, San Francisco, and Washington DC).<sup>15</sup> We then simulated the effects of the transaction by implementing the Comcast double marginalization reduction (using a value of {{        }}, the average of the scenarios presented in Table 5) as of January 1, 2011 (assuming that this is when the transaction

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<sup>15</sup> All simulation code and results are included in our backup materials. In each DMA, we model separately competition inside and outside of Comcast’s footprint. In one version of the simulation, we use a PC AIDS model with two nests, one for the cable and telco provider and one for the DBS providers, with the nesting parameter set so that the cable-DBS cross-elasticity is {{        }}. We calibrate this model based on observed shares for each MVPD, Comcast average video prices (applied to all MVPDs), and Comcast’s profit margin. In another version of the simulation, we use a linear demand model with pre-transaction elasticities set equal to those in the PC AIDS model.

closes) and implementing the predicted affiliate fee increases for each of the other MVPDs when their current carriage contracts with NBCU expire.<sup>16</sup>

To determine the effect of the transaction on consumer welfare, we compare the discounted sum of weighted average prices paid by MVPD consumers with and without the transaction, using a 5% annual discount rate. In order to put bounds on the consumer welfare effects, we compute the post-transaction weighted average price (and thus the price change) in two ways. To compute a lower bound on the consumer welfare effects given a set of cost changes, we use pre-transaction MVPD shares as weights for the weighted average post-transaction price. The resulting estimate is a lower bound because it does not account for consumers' ability to switch MVPDs following price changes. To compute an upper bound on the consumer welfare effects given a set of cost changes, we use post-transaction MVPD shares as weights. This estimate is an upper bound because it counts the full value of lower prices achieved by switching MVPDs as a welfare benefit.

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<sup>16</sup> Fee increases are implemented in {{  
 }}. Low-end and high-end predicted fee increases are computed as in ¶¶ 64-74 of the *Israel/Katz Reply Report* with two modifications. First, we assume that diversion from DBS to telco is {{  
 }} based on the average of the estimates for DirecTV customers who switch due to dissatisfaction with programming, as presented in Professor Murphy's August 19, 2010 report (Kevin M. Murphy, "Response of Professor Kevin M. Murphy to Reply Report of Mark Israel and Michael L. Katz," August 19, 2010, ¶ 27-34). Second, we assume that the departure rate induced by withholding content from a telco MVPD is {{  
 }} times the departure rate induced by withholding content from a DBS provider (for which we use the same figures in the *Israel/Katz Reply Report*, ¶ 72). We base this {{  
 }} factor on the fact that at least three-fourths of telco MVPD subs have triple- or quad-play packages (AT&T 2Q 2010 Investor Briefing, p. 8, available at [http://www.att.com/Investor/Financial/Earning\\_Info/docs/2Q\\_10\\_IB\\_FINAL.pdf](http://www.att.com/Investor/Financial/Earning_Info/docs/2Q_10_IB_FINAL.pdf), site visited October 22, 2010); the assumption that at least three-fourths of DBS subscribers have single-play (video only) packages; and the fact that Comcast data (provided with our backup material) shows {{  
 }}.

The results of this simulation are clear. Across the various specifications (low-end and high-end predicted fee increases, PC AIDS or linear demand model, pre-transaction or post-transaction shares used to compute weighed average post-transaction prices), the subscriber-weighted average price change (across the seven overlap DMAs) due to the transaction is between -0.22% and -0.44%.<sup>17</sup>

In summary, when one appropriately accounts for the full set of pricing effects from the transaction, including double marginalization savings, one finds that the transaction *reduces* average prices paid for MVPD services and, thus, *increases* consumer welfare.

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<sup>17</sup> Note that our estimate of Comcast double marginalization savings of {{ }} (averaging across the four scenarios) aggregates the total savings across all NBCU cable networks, even though not all Comcast subscribers subscribe to all the networks. As an alternative, lower-bound measure of double marginalization savings (and consumer welfare effects of the transaction), we compute double marginalization savings by weighting the savings for each network by the current number of Comcast subscribers receiving that network. This yields an average double marginalization savings figure of {{ }} (averaging across the four scenarios). This is clearly a lower bound because it does not account for Comcast subscribers who will switch to the network following a post-transaction price decrease and it does not account for the fact that some of the vertical price increases (under Professor Rogerson's or Professor Murphy's models of vertical price effects) will also be on networks that not all subscribers receive. Nevertheless, even using this lower bound, we find that the transaction will yield an average change in prices paid by MVPD consumers of between -0.01% and -0.19%, thus increasing consumer welfare.