45. The steps I took for calculating this probability for each operator followed closely those that I took in calculating the same probability for Comcast as described in detail in paragraphs 50-53 in my previous declaration. In what follows, I only briefly cover steps that were identical to those used in the Comcast analysis and focus my description on those few cases where the steps were different.

46. The key inputs for the calculation of the probability a news neighborhood would be located randomly on a headend for each operator are, for each of their headends, M_h, the number of news channels carried on that headend, and N_h, the total number of channels on that headend that were not broadcast, HD, On Demand, or Public, Educational, or Government ("PEG") channels. For news channels, I count all the starred channel groups in Appendix B of my previous declaration. For convenience, in the paragraphs that immediately follow, I will call a headend's total channels less broadcast, HD, On Demand, or PEG channels simply "total channels."

47. For Cox, 72 of its total headends carry BTV. The average number of news channels on these headends is 11.21, and the average number of total channels is 151.03. For Charter, 228 of its headends in top-35 DMAs carry BTV. The average number of news channels on these headends is 10.05, and the average number of total channels is 129.94. For Cablevision, 44 of its headends in top-35 DMAs carry BTV. The average number of news channels on these headends is 10.07, and the average number of total channels is 215.89.

48. For each operator, I estimate the probability there would be a news neighborhood of 4-in-5 if the M_h channels were randomly distributed among the N_h channels using a numerical simulation with 10,000 draws per headend. For Cox, I found the average probability a news neighborhood would occur at random across its headends, as described above, to be 1.0%. For Charter, I found the average probability a news neighborhood would occur at random across its

headends to be 0.9%. For Cablevision, I found the average probability a news neighborhood would occur at random across its headends to be 0.2%.

49. Based on these average probabilities, I also calculated the probability that news neighborhoods would occur by chance on at least as many headends that carry BTV in the top-35 DMAs for each operator (all DMAs for Cox). For example, based on the average probability of 1.0% that a single Cox headend would have a news neighborhood, the probability that at least 36 of Cox's 72 headends that carry BTV would have a news neighborhood (as is the case in the data) is on the order of 10 to the negative 57th power (i.e. a decimal point followed by 56 zeros and then a "1"). Similarly, based on the average probability of 0.9% that a single Charter headend would have a news neighborhood, the probability that at least 93 of the 146 headends that carry BTV in top-35 DMAs would have a news neighborhood is on the order of 10 to the negative 173rd power. Finally, based on the average probability of 0.2% that a single Cablevision headend would have a news neighborhood, the probability that at least 43 of 44 headends would have a news neighborhood is on the order of 10 to the negative 114th power. All these probabilities are far too low to be considered a product of chance.

50. As requested by counsel for Bloomberg, I also analyzed the carriage of sports channels by Comcast and other major cable operators. In particular, I explored the incidence and size of 4-in-5 sports neighborhoods below channel 100 on their channel lineups following the same procedures already described for news channels.

51. The structure of this analysis followed closely the structure of my analysis for news channels. I began with the same merged TMS channel lineup data from May 4, 2011 that I used in my analysis of news channels. I then defined the set of sports channels that were to be the focus of

my analysis based on their TMS channel name, patterns of industry categorization (e.g. DirecTV's list of sports channels), and my previous research experience.

52. I identified 136 sports channels belonging to one of four broad categories: (1) ESPN family channels (of which there were 5); (2) sports conference and/or league channels (of which there were 18); (3) regional sports networks (RSNs) (of which there were 90); (4) and other sports networks (of which there were 23). This list is included below as Attachment C to this declaration.

53. I also identified High-Definition (HD) feeds of these same channels (of which there were many), Spanish-language sports networks (e.g., ESPN Deportes, Fox Deportes), and general-interest networks that have some sports content (e.g., TBS, TNT, USA). I chose not to include the first two groups for the same reasons I did not include similar types of networks in my analysis of news channels. HD channels largely replicate the content of standard-definition feeds, and Spanish-language channels are typically considered to be "multicultural" channels, regardless of their specific video content. I chose not to include general-interest networks that have some sports content as I concluded that, because the majority of their programming does not consist of sports, these networks would more likely be perceived by consumers as the former "type" of network than the latter.

54. I again resolved to keep a single channel lineup per headend (as described in paragraphs 17-20 of my previous declaration) and eliminated any remaining instances of multiple channels being offered in the same channel position (as described in paragraphs 21-25 of my previous declaration).

55. In resolving issues of multiple channels in a single channel position, I used an automated decision rule similar to that described above for news channels carried by non-Comcast

cable operators, albeit here I used it for all cable operators, including Comcast. If there was only one sports channel among any duplicated channels, I kept it. If there were 2 or more sports channels among the duplicates, I kept the sports channel whose name came first in alphabetical order. This procedure resolved all the duplicates for each of the cable operators.

56. I then defined sports neighborhoods in exactly the same manner as news neighborhoods in my previous declaration, paragraphs 26-39. In essence, I defined a sports neighborhood to be all groups of channels that, based on their relative channel position in a Comcast headend's channel lineup, included (1) at least four contiguous sports channels or (2) at least four sports channels in a group of five channel positions.

57. Focusing on headends in the top 35 DMAs that carry BTV, the results show similar patterns for sports neighborhoods as for news neighborhoods. 367 of Comcast's 485 headends (75.7%) that are in a top-35 DMA and carry BTV offer a sports neighborhood below channel 100. The average number of sports channels in these neighborhoods on these 367 headends is 5.06, with 153 (41.7%) of these sports neighborhoods offering 4 sports channels, 102 (27.8%) offering five, and the balance (112) offering six or more.

58. 32 of Cablevision's 44 headends (72.7%) that are in a top-35 DMA and carry BTV offer a sports neighborhood below channel 100. The average number of sports channels in these neighborhoods on these headends is exactly 4.00 (as all such neighborhoods contain exactly four sports channels).

59. 118 of Time Warner's 226 headends (52.2%) that are in a top-35 DMA and carry BTV offer a sports neighborhood below channel 100.[8] The average number of sports channels in these neighborhoods on these headends is 4.48, with 77 (65.3%) of the neighborhoods offering 4 sports channels, 25 (21.2%) offering five, and the balance (16) offering exactly six.

60. 88 of Charter's 146 headends (60.3%) that are in a top-35 DMA and carry BTV offer a sports neighborhood below channel 100. The average number of sports channels in these neighborhoods on these headends is 6.16, with 45 (51.1%) of the neighborhoods offering between four and six sports channels, 37 (42.1%) offering seven, and the balance (6) offering eight or more.

61. Counsel for Bloomberg also asked me to analyze the extent to which channels carried on Comcast headends are carried in multiple channel positions and, if so, whether they are carried above channel position 100, below channel position 100, or both.

62. To do so, I began with the final dataset that I used to analyze the incidence of news neighborhoods on Comcast's channel lineups. As described in my previous declaration at paragraph 25, this consisted of 346,740 channel positions across 1,014 Comcast headends.

63. I then counted the number of unique networks carried on those headends and divided them into (1) those that are only carried once (which I call "singleton" networks) and (2)

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[8] The number of headends that are in a top-35 DMA and carry BTV differs slightly for Time Warner in this analysis of sports neighborhoods (there are 226) compared to the analysis of news neighborhoods described in paragraph 43 (where there are 228). This discrepancy is due to the process by which I ensured a single channel per channel position in each analysis. In the analysis of news neighborhoods, this process ensured no loss of news channels across channel positions. In the analysis of sports neighborhoods, this process ensured no loss of sports channels across channel positions, but made no guarantees regarding news channels. As a consequence, in the analysis of sports neighborhoods, several instances of BTV were dropped where they were carried on the same channel position with another channel. This resulted in the reduced number of headends that are in top-35 DMAs and carry BTV. No such issue arose with the other cable operators.

those that are carried in multiple channel positions (which I call "multiple" networks).[9] Across the 1,014 Comcast headends, the average number of unique networks carried was 322.9, of which 305.4 (or 94.6%) were singleton networks and 17.5 were multiple networks. These averages correspond to 327,454 total networks, 309,696 singleton networks, and 17,758 multiple networks, respectively, across the 1,014 Comcast headends.

64. Among multiple networks (*i.e.*, those networks that were carried more than once on a given headend), the average network was carried 2.09 times per headend, with 90.4% of the cases being that a network was carried exactly twice per headend.

65. Multiple networks occupied 37,044 channel positions in the 2011 data. Of these, 5,718 (or 15.4%) were below channel position 100, and the balance were at or above channel position 100.

66. Of the 17,758 networks that were offered in multiple channel positions across all Comcast's headends, 4,783 (26.9% of this subsample or 1.5% of the total networks across all headends) had at least one channel position below channel 100 and at least one channel position at or above channel 100.

67. Across all networks, the two networks which most commonly occupied multiple channel positions, at least one of which was above and at least one of which was below channel position 100, are both affiliated with Comcast: ShopNBC (with 203 instances across the 1,014 headends) and Style (with 161 instances).

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[9] Note that a "network" distinguishes between a channel's standard-definition and high-definition feeds. So if a headend carries both CNN and CNN HD, each in a single channel position, then that would count as two singleton networks for the purpose of the analysis to follow.

68. Counsel for Bloomberg also asked me to analyze how often Comcast excludes the C-SPAN family of channels in news neighborhoods that also exclude BTV on headends in top 35 DMAs that carry BTV.

69. In my previous declaration, I found that, of the 369 headends in top-35 DMAs that carry BTV and that have a news neighborhood below channel 100 that does not include BTV, 99.7% (368) include HLN in a news neighborhood that excludes BTV, 98.9% (365) include CNBC, 97.3% (359) include CNN, 93.5% (345) include Fox News, and 61.8% (228) include MSNBC.[10]

70. Extending this line of analysis to the C-SPAN family of channels shows that, of these same news neighborhoods, 28.2% (104) include C-SPAN, 10.6% (39) include C-SPAN2, and 0.3% (1) includes C-SPAN3. Indeed, channels in the C-SPAN family are much more likely to be carried outside these news neighborhoods: this is true for 262 of the 366 headends (71.6%) that carry C-SPAN, for 324 of the 363 headends (89.3%) that carry C-SPAN-2, and for 337 of the 338 headends (99.7%) that carry C-SPAN3.

71. Counsel for Bloomberg also asked me to analyze the extent to which Comcast has changed their channel lineups over time. In particular, I compared Comcast's channel lineups as of June 16, 2010 with its channel lineups as of May 4, 2011 and evaluated the extent to which each of the networks carried on Comcast changed channel positions in this period.

72. This analysis was conducted in three steps. First, I determined Comcast's channel lineups as of May 4, 2011. Second, I determined Comcast's channel lineups as of June 16, 2010.

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[10] Note that these results include the 1 additional headend which should have been included in the analysis in my previous declaration but was not due to a coding error. As such, the results reported here as representing the conclusions from my previous analysis differ slightly from the numbers actually presented in that declaration. See footnote 3 for more details.

Third, I merged these two datasets together and compared the lineups over time. I described the specific steps I took to determine Comcast's channel lineups as of the May 4, 2011 data in my previous declaration in paragraphs 10-49. I describe the other two steps below.

73. To determine Comcast's channel lineups as of June 16, 2010, Bloomberg again licensed channel lineup data from TMS. TMS does not keep historical channel lineup data, but Bloomberg had previously licensed the June 16, 2010 data for use in its comments opposing the Comcast-NBC Universal merger. Bloomberg again licensed it for use in the current proceeding and provided me with access to it so that I could conduct my analysis.

74. The steps required to construct Comcast's 2010 channel lineups were similar to those required to construct its 2011 channel lineups. The data provided by TMS came in the form of two relational databases. The first ("lineups") database reported information at the level of the headend id-device-channel position.[11] A headend is a facility operated by a cable system that, among other things, receives television programming (usually by satellite), organizes that programming into channel lineups, and distributes those lineups to devices (usually) attached to customers' televisions according to the type of service they have purchased from the system. As in my previous declaration, I will refer to a headend id as a headend in the balance of this declaration.

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[11] This database was called [redacted]

75. The 2010 "lineup" database also reported information about the zip codes served by each headend, the [redacted] for the DMA encompassing those zip codes, and the MSOthat owned the headend.[12]

76. The 2010 "lineup" database was only available in an XML format that was incompatible with Stata's "xmluse" command. In order to compare it with the 2011 data, I had it converted into 14 smaller comma-delimited data files and read these into Stata.

77. There were a number of differences between the 2010 and 2011 TMS "lineup" datasets in both the fields included in the data and the names used to identify those fields. Anticipating the desire to later link them together, I resolved to reconcile these differences when reading in the raw 2010 data.

78. The difference in field names across years was usually easy to reconcile by simple inspection. [redacted] In case of doubt, more substantial differences could usually be reconciled by examining a subset of headends that were present in both years and inspecting the names of the fields in each year that presented the identical information. [redacted]

79. Missing fields were more challenging to recover. The only meaningful data missing from the 2010 data that was present in the 2011 data were the name and rank (within the 210 DMAs in the United States) of each headend's DMA. [redacted]

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[12] [redacted]

[redacted] As such, I determined the DMA name and rank for each headend in the 2010 data by attributing to it the DMA name and rank for the 2011 [redacted] that matched that 2010 headend's [redacted]. When I later merged the 2010 and 2011 data, I confirmed that the DMA rank associated with each headend that was present in both years was the same.

80. The second relational database ("stations") reported information at the level of each television station offered on any headend in the TMS data.[13] It reported, among other things, the channel name for that station.

81. I merged these two databases by their common field [redacted]. The result was 394,778 headend-device-channel positions across 1,059 Comcast headends.

82. After reconciling the aforementioned differences in reading in the raw 2010 data, the subsequent steps followed closely those that I took in obtaining channel lineups for the 2011 data, which were described in detail in paragraphs 10-49 in my previous declaration. In what follows, I only briefly cover the steps where they are identical to those followed in the 2011 data and focus my description on those few cases where the steps are different.

83. I next defined the set of possible news, business news, and public affairs channels that were to be the focus of my analysis. This followed the steps described in my previous declaration in paragraphs 14-16.

84. As in the 2011 data, there were again many instances of multiple channels being offered on a single channel position due to headends providing different channel lineups according

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[13] This database was called [redacted]

to the device households were using to receive the programming. Indeed, there were 2,006 lineups being distributed over the 1,059 headends in the 2010 data.

85. As for the 2011 data, for simplicity I decided to keep one channel lineup per headend. I followed the same rule as there: I kept the Digital (non-rebuild) lineup if one was offered and the Analog lineup if one was not. The result was 887 Digital (non-rebuild) lineups and 172 Analog lineups.

86. As for the 2011 data, this procedure resolved many but not all of the instances of multiple channels being offered on a single channel position; there remained 2,354 (of 331,612, or 0.7%) channel positions in which there were more than one listed channel within the same lineup.

87. As for the 2011 data, I resolved these first by dropping duplicate channels if they shared the same channel name (resolving 228 of the 2,354 duplicate channel positions) and ignoring differences in names if none of the affected channels were a news channel (resolving 1,985 of the duplicate channel positions). After these steps, only 141 (of 331,612, or 0.04%) channel positions continued to have multiple different channels where at least one of which was a news channel.

88. Unlike for the 2011 data, I did not resolve these by hand. Instead, I constructed an automated system to determine which channel to keep. If there was only one news channel among the duplicated channels, I kept it. This resolved 132 of the 141 cases. If there were 2 or more news channels among the duplicates, I investigated the type of news channel it was. If only one was a news channel among the 5 most widely distributed news channels (CNBC, CNN, Fox News, HLN, or MSNBC), I kept it. If there were either none or two or more such channels, I kept the news channel whose name comes first in alphabetical order. This resolved the final 9 cases.

89. I next defined news neighborhoods following the steps described in paragraphs 26-39 of my previous declaration and calculated all of the same objects that were the subject of my analysis of the 2011 data (*e.g.*, the incidence of news neighborhoods, whether they carried BTV, whether they carried other news channels, etc.) as described in paragraphs 40-49 of my previous declaration. All of these steps resulted in the final 2010 Comcast lineup dataset to which I compared the 2011 Comcast lineups. I describe how I merged these two datasets in what follows.

90. I began by loading each of the 2010 and 2011 lineup datasets and keeping the variables most relevant to my subsequent analysis, notably information about each headend (first community and zip code served, DMA name and rank, whether it had a news neighborhood anywhere in the lineup and whether it had one below channel 100) and that headend's lineup (each channel name and position, both absolute and relative, whether it was a news channel, and whether it was in a news neighborhood).

91. I then used the Stata "join" command to merge these datasets by their headend and station number. That is to say, each incidence of a station number within each headend in 2010 was matched to the same station number and headend in 2011. If a station was never repeated on a headend, this would be the same thing as merging each of the two datasets. "Joining" them instead forms all pairwise combinations of station numbers within a headend across years. For example, the Comcast headend in [redacted] carried [redacted] on channel [redacted] in 2010 and carried it on both channel [redacted] and channel [redacted] in 2011. In the "joined" data, there were two observations: the single observation in 2010 merged with *each* of the observations in 2011. In my analysis below, I will focus on the first instance of each channel carried by Comcast in each of its lineups.

92. As described above, there are 331,612 channel positions across 1,059 headends in the 2010 data. As described in paragraph 25 of my previous declaration, there were 346,740 channel positions across 1,014 headends in the 2011 data.

93. There were 404,419 headend-channels in the joined 2010-2011 data, of which 23,478 were present only in the 2010 data, 37,366 were only present in the 2011 data, and 343,575 were present in both years of data.

94. The presence of data in one but not both years arose due to headends being present in one year but not the other, as well as headends being present in both years that contained station numbers that were present in one year but not the other. I discuss each in turn.

95. There were 1,001 Comcast headends that were present in both years. This means that 58 of the 1,059 2010 headends were not present in the 2011 data and 13 of the 1,014 2011 headends were not present in the 2010 data. These are likely due to ongoing processes within Comcast to retire older headends and introduce new ones.

96. I focus the balance of my analysis on the 1,001 Comcast headends that were present in both years. I do this largely for computational reasons. Because the headend identifiers for these headends match between the TMS data in 2010 and 2011, I have great confidence that my analysis is correctly measuring the changes in channel lineups facing the households served by these headends.

97. Unfortunately, this also means that my analysis is capturing an incomplete picture of the full extent of channel changes facing Comcast subscribers. Comcast subscribers being served in 2010 by a headend that was subsequently retired are no doubt being served by another Comcast headend in 2011. Unless the channel lineups on the retired and replacement headend were identical, such subscribers necessarily faced some channel lineup changes. Similarly, Comcast subscribers

being served in 2011 by a new headend were no doubt previously being served by another Comcast headend in 2010. They, too, were likely to have experienced lineup changes.

98. I would prefer to include channel changes due to the retirement of old and the introduction of new headends in my analysis. Unfortunately, it is difficult to track down these changes. Without proprietary subscriber information, I could only do it by linking the zip codes served by old/new headends to the zip codes served by existing headends. Even then, there is the potential for overlap of zip codes.

99. I therefore focus my analysis only on those Comcast headends that are present in both years of the data. I reiterate, however, that this is likely to underestimate the extent of channel changes experienced by Comcast subscribers between 2010 and 2011.

100. In conducting my analysis of channel changes on Comcast systems between 2010 and 2011, I decided to focus only on the first instance of the network in each channel lineup. I did this largely because the networks that were carried in multiple channel positions often (1) were multiplexed versions of high-definition movie channels (e.g. HBO HD, Showtime HD, Cinemax HD), (2) provided multiplexed or overflow content for sports networks (e.g. Big Ten Network Overflow, NFL Network, NBA TV), or (3) provided on-demand content (e.g. Searchlight On Demand, Movies on Demand, HD on Demand). As households are likely to be less sensitive to changes in channel positions for these kinds of networks (or the second instance of any network) than for the first instance of a network, I chose to focus on the latter.[14]

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[14] The first instance of each of the multiplexed/overflow/on demand networks will of course remain as part of the analysis along with the first instance of all other networks. It is just the duplicate networks in higher channel positions that will not count.

101. As a result of this decision, a network's channel position in my analysis corresponds to the channel position of its first instance in a channel lineup, counting from below. Thus for the earlier example of [redacted] in [redacted], I consider its (first) channel position to be [redacted] in 2010 (as that is its first and only channel position in that year) and [redacted] in 2011 (as that is its first channel position in that year). In what follows, I will usually refer only to a network's channel position – that should be understood to be the network's "first" such channel position.

102. For the 1,001 Comcast headends present in both years of the data, an average of 329.2 channels are carried in a Comcast channel lineup. Of these, 290.8 (or 88.3%) are present in both years, 5.8 (or 1.8%) are present in 2010 only, and 32.6 (or 9.9%) are present in 2011 only.[15] Across all 1,001 headends, this represents 291,089 headend-channels present in both years, 5,850 headend-channels present in 2010 only, and 32,599 headend-channels present in 2011 only. As was the case for headends, it is not surprising that Comcast has dropped some channels from the average headend between 2010 and 2011 and added even more.

103. For the 594 headends present in both years of the data in the top 35 DMAs, an average of 356.0 channels are carried in a Comcast channel lineup. Of these channels, 314.6 (or 88.4%) are present in both years, 6.3 (or 1.8%) are present in 2010 only, and 35.2 (or 9.9%) are present in 2011 only.[16]

104. I next evaluated whether a channel present in 2010 had changed positions. I decided one had done so if three conditions held: (1) the station was carried on the headend in both years

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[15] Of the channels present in both years, an average of 270.6 of the 290.8 (93.1%) appear only once on a channel lineup.

[16] Of the channels present in both years in top-35 DMAs, an average of 292.4 of the 314.7 (92.9%) appear only once on a channel lineup.

of the data; (2) it was the first instance of that channel in the 2010 channel lineup; and (3) the channel number in 2010 did not match the channel number in 2011.

105. The first condition prevented counting channels that disappeared between 2010 and 2011 as changes in that channel's channel position. The second was discussed earlier; see paragraphs 100 and 101 above. The third captured the essence of a channel changing position.

106. Comcast has argued that it is burdensome for the company and its customers to change a network's channel position. Despite this, 10,625 channels changed their (first) channel position between June 2010 and May 2011, an average of 10.6 channels per headend. This was 3.7% of the 291,089 first channel positions across these headends. In the top 35 DMAs, 6,806 channels (of 186,876 channel positions, or 3.6%) changed position, an average of 11.5 channels per headend.

107. Comcast has argued that it is particularly burdensome to change channels for networks in relatively low channel positions (between channel 1 and 99).[17] Despite this, channels that were below 100 in 2010 have moved at only a slightly lower rate than that observed for all channels.

108. Among all 1,001 Comcast headends present in both years of the data, an average of 65.2 channels were carried below channel position 100. Of these, 62.6 (or 96.0%) were present in both years of the data. Across these headends, 1,752 channels changed position between June 2010 and May 2011, an average of 1.8 channels per headend. This was 2.8% of the 62,276 first channel positions across these headends.

109. Similar patterns emerge among headends in the top 35 DMAs. There were an average of 67.7 channels carried below channel position 100 in top 35 DMAs, of which 64.9 (or

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[17] *See, e.g.*, Comcast Answer at ¶ 82.

95.9%) are present in both years of the data. Within these DMAs, 930 channels (of 38,349, or 2.4%) changed positions, an average of 1.6 channels per headend.

110. The identities of the networks that changed first channel position between 2010 and 2011 covered the spectrum of channels offered by Comcast. The network that most frequently changed first channel position was C-SPAN2, which did so on 138 of 1,001 headends. C-SPAN2 was also the leader in changes among channels who were below position 100 in 2010, with 130 changes of their first channel position, followed by QVC (113 changes), History (91), C-SPAN (58), Home Shopping Network (57), and Country Music Television (38). Sometimes Comcast changed the first channel position of very popular networks (among those below 100 in 2010), including TBS (27), Cartoon Network (26), USA (23), Comedy Central (20), AMC (19), Bravo (19), FX (16), Discovery (11), and even ESPN (10). Additionally, there were many instances where Comcast either moved its affiliated channels from channel positions above 100 to channel positions below 100 or added a feed for such channels below channel position 100. For example, this occurred 77 times with respect to ShopNBC and 10 times with respect to G4.

111. All the results above document the frequency and magnitude of changes in the *first* channel position a channel holds on a channel lineup. In particular, if Comcast decided to carry a second feed of a given channel between 2010 and 2011 and this second feed is on a lower channel position than the original, this gets counted in the results above as a (first) channel position change.

112. I also explored the frequency and magnitude of "pure channel moves". By a pure channel move (or pure move), I mean that subset of channel changes for which the channels are only carried on the lineup in one channel position in each year. For convenience, I call these channels singleton channels.

113. Two examples from the [redacted] headend introduced above clarify the difference between a channel that changes its first position and one that "purely moves". The case of [redacted] introduced above is an example of a channel that changed its first position; in 2010 its first (and only) channel position was [redacted] and in 2011 its first (of two) channel positions was [redacted].[18] [redacted], on the other hand, is an example of a pure move; in 2010 its first (and only) channel position was [redacted] and in 2011 its first (and only) channel position was [redacted].

114. Of the 10,625 channels that changed their first channel position across all 1,001 Comcast headends present in both years of the data, 6,909 were pure moves. As a channel can only be carried on a headend in one channel position in each year in order to qualify as a pure move, there are fewer channel positions in the merged data that are candidates. Indeed, there are 270,917 first channel positions among channels that are only carried once per headend in both years (compared with 291,089 first channel positions among all channels present in both years). Thus 2.6% of Comcast's singleton channels moved between 2010 and 2011, with an average of 6.9 channels per headend.

115. Similar patterns arise for headends in Top 35 DMAs and for channels carried below channel 100 in 2010. Among all channels in top 35 DMAs, 4,422 of 173,699 possible singleton channels (2.5%) moved between 2010 and 2011, with an average of 7.4 singleton channels moving per headend. Among channels that were below channel position 100 on Comcast's lineups in 2010, 1,098 of 56,827 (1.9%) singleton channels moved between 2010 and 2011, with an average of 1.1 singleton channels moving per headend. Among singleton channels below 100 in 2010 on

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[18] Similarly, on the [redacted] headend in the [redacted], MSNBC's first (and only) channel position in 2010 was [redacted] and in 2011 its first (of two) channel positions was [redacted].

Comcast's headends in top 35 DMAs, 515 of 35,290 (1.5%) moved, with an average of 0.9 moving per headend.

FOR PUBLIC INSPECTION

Dated: August 30, 2011

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Attachment A

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Professional Experience

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Professor of Economics, September 2008-present

Director of Research, September 2009-present
Courses taught: *Graduate:* Empirical Industrial Organization (MSc/PhD), Empirical Methods. *Undergraduate:* Introductory Econometrics (time series, limited dependent variables, panel data), Undergraduate Business Strategy.

Centre for Economic Policy Research (CEPR)

Research Fellow, Industrial Organization Programme, February 2011-present

Federal Communications Commission (FCC)

Chief Economist, September 2007 - August 2008

Reported to the then-FCC Chairman, Kevin Martin. Primary responsibilities were to advise the Chairman and his staff regarding the economic issues facing the Commission, to formulate and implement desired policies, to communicate and discuss these policies with senior Commission staff, and to assist as needed the 40+ staff economists. Main workstreams focused on the cable and satellite industries, including bundling and tying in wholesale and retail cable and satellite television markets and the economic analysis of XM/Sirius satellite radio merger. Also consulted on spectrum auction design, net neutrality, access pricing, ownership rules, and various international policy issues. Previous to joining the Commission, wrote a sponsored study analyzing media ownership and its impact in television markets.

University of Arizona, Department of Economics

Associate Professor of Economics, September 2008-August 2009 (on leave)

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Courses taught: *Graduate:* Empirical Industrial Organization (2nd-year PhD), Business Strategy (MBA) *Undergraduate:* Introductory Econometrics (cross-section).

Duke University, Department of Economics

Assistant Professor of Economics, September 1997-August 2002

Courses taught: *Graduate:* Empirical Industrial Organization (2nd-year PhD), Graduate Econometrics (1st-year PhD), *Undergraduate:* Introductory Econometrics (cross-section), Introductory Microeconomics, The Economics and Statistics of Sports.

Other Academic Appointments

Visiting Professor, European School of Management and Technology, Berlin, Summer 2007.

Visiting Professor, Fuqua School of Business, Duke University, 2000-2001

Consulting Experience (Country)

Evaluating switching costs in fixed voice telephony markets (UK), 2010-11 – Designed and executed reports for Office of Communication (Ofcom) evaluating the impact of automatically renewable contracts (ARCs) introduced by British Telecommunications (BT) in the UK fixed voice telephony market. Ofcom subsequently challenged the practice (March, 2011).

Evaluating competitive harms, Comcast-NBCU (US), 2010, consulting expert – Worked closely with lead expert to design and execute economic and econometric analyses in support of Bloomberg (Television) L.P.s opposition to Comcast-NBCU merger. Analysis included business news market definition and quantifying the potential harms of the merger, including those related to "neighborhooding" of television channels and refusal to carry (foreclosure). Report submitted to media regulator (FCC). FCC conditions required merged firm not to favor their content in general, with specific provisions for the neighborhooding of news (including business news) channels.

Analysis of advertising market regulations (UK), 2009-10, consulting expert – Advised project team on analysis of demand for advertising for the purpose of evaluating changes in regulation of advertising minutes on public-service broadcasters in the United Kingdom. Designed econometric model and supervised implementation and description of results. Report submitted to media regulator (Ofcom).

Distribution of cable copyright royalties (US), 2009-10, testifying expert – Submitted rebuttal testimony to copyright royalty judges regarding relative market value of programming provided on the distant broadcast signals carried by U.S. cable systems. Testified before judge panel.

Blockbuster/Hollywood Video (US), 2005, consulting expert – Supported BatesWhite team to establish liability for FTC challenge of proposed merger.

Echostar/DirecTV (US), 2002-03, consulting expert – Supported analysis by AES Consulting (now Compass) of liability for proposed merger. Helped design econometric model of pay-television

demand and participated in conference calls with opposing lawyers and experts.

Advisory roles (US):
AMD/Intel, 2009; DRAM Litigation, 2009; German media market, 2007; AT&T/BellSouth, 2006; Auto-finance merger, 2005; Death-care industry merger, 2005; Vitamins price-fixing litigation, 1999-2001

Bates White LLC, Academic Affiliate, 2005-present

Publications

"The Welfare Effects of Bundling in Multi-channel Television Markets," (with Ali Yurukoglu), University of Warwick, April 2011, forthcoming, *American Economic Review.*

"Cable Regulation in the Satellite Era," Chapter 5 in Rose, N., ed, "Economic Regulation and Its Reform: What Have We Learned?", forthcoming, University of Chicago Press.

"Economics at the FCC: 2007-2008," (with Evan Kwerel and Jonathan Levy), *Review of Industrial Organization*, v33n3 (November 2008), 187-210.

"The Discriminatory Incentives to Bundle: The Case of Cable Television," *Quantitative Marketing and Economics*, v6n1 (March 2008), 41-78.
- Winner, 2009 Dick Wittink Prize for the best paper published in the *QME*

"Bidding Asymmetries in Multi-Unit Auctions: Implications of Bid Function Equilibria in the British Spot Market for Electricity, (with Joseph Crespo and Helen Tauchen), *International Journal of Industrial Organization*, v25n6 (December 2007), 1233-1268.

"Bundling, Product Choice, and Efficiency: Should Cable Television Networks Be Offered A La Carte?," (with Joseph Cullen), *Information Economics and Policy*, v19n3-4 (October 2007), 379-404.

"Monopoly Quality Degradation and Regulation in Cable Television," (with Matthew Shum), *Journal of Law and Economics*, v50n1 (February 2007), 181-209.

"Uncertainty and Learning in Pharmaceutical Demand," (with Matthew Shum), *Econometrica*, v73n4 (July 2005), 1137-1174.

"Recent Advances in Structural Econometric Modeling: Dynamics, Product Positioning, and Entry," (with J.-P. Dube, K. Sudhir, A. Ching, M. Draganska, J. Fox, W. Hartmann, G. Hitsch, B. Viard, M. Villas-Boas, and N. Vilcassim), *Marketing Letters*, v16n2 (July 2005).

"The Impact of the 1992 Cable Act on Household Demand and Welfare," *RAND Journal of Economics*, v31n3 (Autumn 2000), 422-449.

Reports

"Empirical analysis of BT's automatically renewable contracts," (with ESMT Competition Analysis, Commissioned Research Study for the Office of Communications), August 2010. Also Supplementary Report, February 2011.

"Television Station Ownership Structure and the Quantity and Quality of TV Programming," (Commissioned Research Study for the Federal Communications Commission), July 2007.

Work in Progress

Working Papers

"The Empirical Consequences of Advertising Content in the Hungarian Mobile Phone Market," (with Jozsef Molnar), University of Arizona, March, 2008.

"Estimating Price Elasticities in Differentiated Product Demand Models with Endogenous Characteristics," (with Dan Ackerberg), mimeo, University of Arizona, March 2007.

"The Welfare Effects of Endogenous Quality Choice: The Case of Cable Television," (with Matthew Shum), mimeo, University of Arizona, March, 2006

"A Virtual Stakes Approach to Measuring Competition in Product Markets," (with R. Michael Black, Shihua Lu, and Hal White), mimeo, University of Arizona, May 2004.

Work In Progress

"Robust Instrumental Variables," (with Dan Ackerberg), mimeo, UCLA, March 2007.

"An Empirical Analysis of Manufacturer-Retailer Interaction: What Determines Wholesale Prices?" (with Zsolt Macskasi), May 2006.

"Storability, Competition, and Sales: Do Firms Cut Prices to Steal Demand from Rivals or Themselves?," (with James J. Anton), April 2005.

"A Dynamic Model of Quality Competition in Subscription Television Markets," (with Alex Shcherbakov), March 2007.

"The Impact of Ratings and Word-of-Mouth on DVD Rentals: An Analysis of the Netflix Data," (with Ivan Maryanchyk), February 2007.

Grants

"Endogenous Product Characteristics in Empirical Industrial Organization," Economic and Social Research Council, £140,000 (~$220,000), 2010-2012.

"The Empirical Consequences of Advertising Content" (with Jozsef Molnar), Hungarian