



**News Corporation's Partial Acquisition of DIRECTV:  
Economic Analysis of Vertical Foreclosure Claims**

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## I. Summary and Findings

1. We have examined the comments filed regarding the proposed partial acquisition of Hughes and its Direct Broadcast Satellite subsidiary, DIRECTV, by News Corporation (“NC”) and have carried out an economic analysis of the likely effects of this transaction on competition and consumers. Because this transaction involves no significant horizontal overlap, there is no horizontal issue. The transaction combines firms with substantial assets at the programming and distribution levels, so it is appropriate to inquire into the likely economic effects of partial vertical integration.
2. Our basic conclusion is that the proposed transaction will not harm competition at either the programming or the distribution level. To the contrary, we believe that it is likely that the proposed transaction will benefit consumers. The proposed transaction offers the prospect of strengthening DIRECTV, in part due to the efficiencies that are expected to flow from it.<sup>1</sup> A stronger DIRECTV would be better able to compete even more aggressively against cable operators in multi-channel video programming distribution (“MVPD”) markets in many geographic areas. In this sense, the proposed transaction would clearly be pro-competitive.
3. The Commission has expressed concern about vertical foreclosure in the MVPD market, and its program access rules are motivated by such a concern. However, any such concerns should be far greater with respect to cable television operators, who have much larger market shares in areas in which they compete than either DBS

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<sup>1</sup> An economic analysis of the efficiencies associated with this transaction is provided in the Lexecon Report.

operator. Today, DIRECTV faces strong competition from both cable operators and EchoStar. It is clear that DIRECTV does not approach the dominant position of the cable operator in any particular area. Nothing about the proposed transaction will alter that essential fact. More generally, as shown below, the proposed transaction will not harm competition in any well-defined relevant market at the distribution level or the programming level.

4. Commenters have suggested that the transaction will harm competition in the MVPD market by giving NC the incentive to withhold critical Fox Entertainment Group programming (“Fox programming”) from DIRECTV’s MVPD rivals. This programming includes both cable programming and Fox’s Owned and Operated broadcast television stations (“O&Os”). Commenters also have suggested that NC would raise the price it charges for Fox programming, either uniformly or in a discriminatory way.
  
5. These claims do not stand up to rigorous economic analysis because such a foreclosure strategy would prove unprofitable for NC. In particular, withholding Fox programming from DIRECTV’s rivals, or raising the price of such programming would cause NC to lose more money on its programming assets (due to the reduced number of subscribers to its programming) than it could gain through Fox’s 34% share of DIRECTV’s profits.<sup>2</sup> In our competitive analysis, we assume (as do

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<sup>2</sup> Several commenters have suggested that NC could increase its share of DIRECTV to above 34%. It is our understanding that such additional ownership may not trigger further regulatory review until the ownership reaches 50%. Therefore, in addition to analyzing the current transaction, we also examine the likely effects if the ownership of DIRECTV by NC were greater than 34%. The results are similar even if NC’s profit share would approach 50% share of the DIRECTV profits. Those results are summarized below in Section III.C

Professor Rogerson and others) that in the absence of partial vertical integration, program suppliers and MVPDs cannot make contracts that anticompetitively foreclose their competitors. We also assume that the legal fiduciary obligations of the Hughes Board of Directors and the Board's audit committee of outside Directors would prevent NC from profiting at the expense of the other Hughes shareholders.

6. NC has agreed to abide by the Commission's program access rules and has offered further undertakings that would prohibit such vertical foreclosure of Fox programming against rival MVPDs. But even if those undertakings and commitments could be evaded, such a strategy would still prove unprofitable, given the structure of the MVPD market and NC's partial ownership of DIRECTV. DIRECTV has only a 13% share of the national MVPD market, making foreclosure far more costly in terms of foregone programming revenues than if DIRECTV had a share closer to cable's national average share of 78%. In addition, Fox will have only a 34% partial ownership interest in DIRECTV, which also reduces the profitability of foreclosure. Given these facts, DIRECTV would need to dramatically (and implausibly) increase its market share (or subscription fee) for a foreclosure strategy to be profitable.
7. Second, the transaction will tend to reduce the "double markup" in the sale of Fox programming to DIRECTV.<sup>3</sup> This factor substantially lessens the likelihood that NC would raise its prices to DIRECTV's rivals, even assuming that the program access

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<sup>3</sup> Elimination of double markup is a classic efficiency rationale of vertical mergers first identified by Cournot (1838) and then formalized by Spengler (1950). See Augustin Cournot, *Researches into the Mathematical Principles of the Theory of Wealth*, (N.T. Bacon Trans.), New York: Macmillan (1927, original work published 1838); Joseph Spengler, *Vertical Integration and Antitrust Policy*, 58 J. Pol. Econ. 347 (1950). For a modern treatment of this topic, see Jean Tirole, *The Theory of Industrial Organization* 174, MIT Press (1993).

rules and undertakings would fail to constrain Fox's pricing. While our overall analysis requires an adding up and balancing of several incentive effects, the reduction of the double markup alone creates incentives for programming prices to be lower than they otherwise would be. (Note: When we refer to lower prices, we also encompass the outcomes in which product quality is higher at constant prices or that quality rises by more than price. In addition, we mean lower than the prices would have been otherwise, not lower than they were at an earlier date.)

8. Third, with respect to sports programming (the cable programming that seems to raise the most vertical foreclosure concerns among commenters), the empirical evidence is inconsistent with the claim that DIRECTV would be able to achieve a sufficient increase in market share to make a foreclosure strategy profitable. For example, DIRECTV had a *de facto* exclusive on the YES sports network in the franchise areas served by Cablevision in the New York region in 2002, but this exclusive did not produce nearly the level of market share gains that would be necessary to sustain a profitable vertical foreclosure strategy. In addition, the profitability of such a foreclosure strategy is inconsistent with the prices currently being charged by Fox for regional sports programming.
9. Fourth, Fox must regularly renegotiate to obtain its own rights from the original owners of the sport rights. Therefore, even if the foreclosure strategy using sports programming somehow were initially successful in allowing DIRECTV to increase its profits, this success would be short-lived. This is because the sports entities, not Fox, ultimately control the sports programming. When the television rights contracts

with sports teams come up for renewal, the teams would inevitably demand a large share of any supra-competitive profits. The anticipation of this need to share the profits would limit NC's upside gain from the foreclosure strategy, which would greatly reduce its willingness to attempt the strategy to begin with -- even assuming away all the legal and economic reasons why it would not be profitable in the first place. In addition, the excluded MVPDs may bid for the sports rights themselves.

10. Finally, the fact that the Commission has been concerned with cable ownership of programming and cable exclusivity does not weaken our analysis. The likelihood of profitable foreclosure strategies by vertically integrated cable companies is far higher than it would be from Fox's partial ownership interest in DIRECTV. DIRECTV has a much lower MVPD market share and Fox will only have a 34% ownership interest in DIRECTV. Our finding, demonstrated below, that foreclosure by NC would not be profitable depends upon the facts surrounding NC and DIRECTV and this transaction. It is fully consistent with the Commission's stated concerns that vertically integrated cable companies might, in contrast, find such a strategy to be profitable.

11. We have also analyzed cable retransmission rights for Fox's O&Os in a similar manner and reached similar conclusions. For many of the reasons provided above, foreclosure using the Fox O&O stations also would be unprofitable. We find no likely anticompetitive effects flowing from NC's partial acquisition of DIRECTV. Similar to the other programming considered, NC is bound by the Commission's good faith requirements for retransmission consent negotiations, but even if those

rules were to be ignored, it appears highly unlikely that withholding the signals of the O&O stations from rival MVPDs would be a profitable strategy for NC. The advertising revenues and other valuable consideration lost from any attempt to foreclose cable and EchoStar from the O&O stations would be too great to hope to recoup through the partial ownership of the profits of DIRECTV.

12. The remainder of this report provides our reasoning in support of these various propositions, along with empirical evidence relevant to our analysis. In Section II, we discuss the pro- and anti-competitive effects that can generally arise in vertical transactions involving content and distribution. In Section III, we evaluate the claims that after the transaction NC would have the incentive to withhold Fox programming from DIRECTV’s MVPD competitors. We find that this foreclosure likely would not be profitable, whether it involves Fox’s regional sports programming networks (“RSNs”) or the Fox O&Os, the two main types of programming that commenters have asserted would be used to implement such a strategy. In Section IV, we evaluate the claim that NC would have an incentive to raise the price of Fox programming, in either a uniform or discriminatory way. We explain the role of partial elimination of the double markup caused by this transaction on Fox’s pricing incentives and how omission of this factor in the analysis of the commenters distorts the conclusions they reach. We also relate the unprofitability of withholding programming to Fox’s incentives to raise prices. Finally, in Section V we evaluate the alternative anticompetitive theory that NC will deny carriage on DIRECTV to programming that competes against Fox programming in order to give Fox programming the power to raise its prices.

## II. Economic Evaluation of Partial Vertical Integration

13. Two product markets are relevant for the analysis of this transaction: the market for program services to MVPDs and the provision of MVPD services to retail consumers. The proposed transaction creates no significant direct horizontal overlap at the MVPD distribution level.<sup>4</sup> Nor does the transaction create any significant overlap in programming. While NC, through Fox, owns various video program services, including the Fox News Channel, FX, the Fox Movie Channel, various regional Fox Sports Networks, and a number of local television stations, DIRECTV owns no program services beyond a 5% passive ownership in the Hallmark Channel.
14. The proposed transaction is, therefore, fundamentally vertical in nature, combining the various cable networks owned by NC (through Fox) with DIRECTV, a distributor of video programming. Importantly, however, it is not a complete vertical merger. It involves Fox obtaining a 34% partial ownership stake in DIRECTV.<sup>5</sup> This is an important fact for analyzing possible foreclosure of Fox programming to DIRECTV's MVPD rivals, because it means that Fox will reap only 34% of the economic benefits of any increased profitability of DIRECTV.
15. NC initially will have a number of directors on the Hughes Board of Directors, and Chase Carey will be the CEO, so NC will have significant operational influence over DIRECTV. However, the other shareholders will have a significant role in governance. The Hughes Board has a fiduciary obligation to the other shareholders

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<sup>4</sup> Note that Liberty, a NC shareholder, owns a cable company in Puerto Rico, which we do not examine in this paper. We understand that NC has no ownership interest in this Puerto Rican system.

under corporate and securities law. In fact, the Hughes Board will have an audit committee consisting only of outside directors and this committee will have the ability to review and approve any transactions between DIRECTV and an affiliated company like Fox. These institutions are designed to ensure that DIRECTV will not enter into transactions that are against DIRECTV's own interests. The presence of these safeguards reduces the likelihood of anticompetitive effects resulting from this transaction.

16. In this section, we set out the economic framework for analyzing vertical mergers and vertical foreclosure. We then present data on MVPD market shares that will be relevant to our analysis of the vertical foreclosure claims made by commenters.

**A. Economics of Vertical Transactions Involving Content and Distribution**

17. A full analysis of the competitive effects of any vertical transaction involving content and distribution must encompass analysis of both potential pro-competitive and anti-competitive effects. Looking at only one side in isolation may result in a misleading conclusion.

18. One potential pro-competitive effect from vertical integration, apart from any synergies specific to a particular transaction, is the elimination of the double markup. A double markup arises whenever there is a margin between price and marginal cost at both vertical levels in the pre-merger world.<sup>6</sup> Of course, in intellectual property markets (such as programming), this double markup is common even if there are a

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<sup>5</sup> NC will have an 82% ownership interest in the Fox Entertainment Group, the entity which holds the programming interests and will hold the interest in DIRECTV.

significant number of competitors. This is because the creation and production of intellectual property involves high fixed costs and low (or even zero) marginal costs of production and distribution, and a markup over marginal costs is needed to earn even a competitive return on investment. We understand that generally the per-subscriber price exceeds marginal cost in the programming and distribution markets. A price in excess of marginal cost also can occur when there is imperfect competition or market power in both markets. However, the divergence between price and marginal cost does not imply the presence of supra-competitive profits or harm from a vertical merger. In theory, a double markup could be avoided altogether through contracts that involve lump-sum payments and zero per-unit fees. However, lump-sum pricing often is deterred by the fact that it is not efficient for the purchaser to bear the entire risk of output variations and per-unit prices (here, per-subscriber fees) serve as a “metering” (*i.e.*, risk-sharing) device. In this market, the provisions of the program access rules that bar discriminatory pricing also could be a significant constraint on lump sum pricing.

19. Elimination of the double markup occurs when the upstream division of an integrated firm reduces the price that it charges its downstream affiliate and thus reduces one of the two markups in the vertical chain. A vertical merger creates the incentive to eliminate the double markup because profits are higher (and downstream prices lower) if downstream prices reflect the true marginal cost of content rather than a price for content in excess of marginal cost. For the current transaction, this effect

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<sup>6</sup> As we use the term, “markup” refers to the gap between price and incremental cost.

takes the form of an incentive of Fox to lower the prices it charges to DIRECTV for its programming. Were Fox to reduce its content prices to DIRECTV, this also would create an incentive for DIRECTV to improve the quality of its service offerings or lower its subscription price in the light of its lower costs. The commenters have completely omitted this pro-competitive vertical effect from their analysis.

20. Elimination of the double markup also creates some incentive, *ceteris paribus*, for the upstream division of an integrated firm (in this case, Fox) to reduce the prices that it charges downstream rivals (in this case, other MVPDs), relative to what it would have charged otherwise, or to improve the quality of its service offerings. This is because if the downstream affiliate (in this case, DIRECTV) were to reduce its retail subscription price or to improve its quality, the downstream rivals in turn would reduce their input demand. This fact in turn often would make it more profitable for the upstream division of the integrated firm to charge them a lower input price (or, perhaps, provide a higher quality at the same price). This factor thus creates downward pricing pressure. In properly evaluating the competitive effects of a vertical transaction, the downward pricing pressure flowing from this incentive must be taken into account along with any incentives to raise the input prices charged to rivals. We discuss this issue in more detail below.<sup>7</sup>

21. Vertical mergers, however, can also lead to anticompetitive incentives and potentially can have anticompetitive effects. An integrated firm may have the incentive to raise the price of the input it sells or withhold that input from rivals. Commenters assert

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<sup>7</sup> We discuss this issue in Section IV and Appendix B.

that this effect would occur in this transaction, either taking the form of Fox withholding programming content from DIRECTV's MVPD competitors or the form of Fox charging higher prices for its programming to those competitors. The profitability of these two scenarios is closely related and we analyze them both. However, the foreclosure itself is only half the story. In a full competitive analysis, foreclosure is only considered anticompetitive if it leads to harmful effects in the MVPD market, that is, higher prices and reduced output. Analysis of these potential anticompetitive effects must also take into account the potential pro-competitive incentives and downward price pressure associated with the elimination of a double markup and other efficiencies, as well as any regulatory constraints on price discrimination. The commenters have not provided such a complete analysis.

22. Professor Rogerson claims that NC might attempt a foreclosure strategy. In setting out his analysis, Professor Rogerson cites the economics and antitrust literature to explain why a “vertically integrated supplier *will generally* have an incentive to raise rivals’ costs either by raising the price of the inputs it sells or withdrawing them altogether.”<sup>8</sup> In making these allegations, Professor Rogerson refers to a number of articles, including several written by one of us (Salop). In our view, Professor Rogerson does not accurately state the ultimate policy conclusions of these articles. The thrust of Professor Salop’s articles is that exclusionary conduct *can* be anticompetitive *under certain conditions* and that antitrust enforcers should not

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<sup>8</sup> See Report of William P. Rogerson, *An Economic Analysis of the Competitive Effects of the Takeover of DIRECTV by News Corp.* (attached to *Comments of Advance/Newhouse Communications, Cable One, Cox communications, and Insight Communications*, MB Docket No. 03-124, (filed June 16, 2003) (“Joint Cable Comments”)) at 22 (*emphasis added*) and 22 n. 45 (citing articles) (“Rogerson”).

assume away the potential for such anticompetitive effects. Those articles make the point, as we have above, that vertically integrated firms have anticompetitive incentives under certain conditions.

23. However, Professor Salop’s articles do not conclude that anticompetitive exclusion is *inevitable* in vertical mergers, or that vertically integrated suppliers will *generally or invariably* be able to profitably foreclose rivals, or allow the firm to raise prices and increase profits in the downstream market as a result. Professor Salop’s articles also do not conclude that all attempts at exclusionary conduct will necessarily harm consumers or competition. The incentives to foreclose and the anticompetitive harm from foreclosure must be proved. The potential for benefits from vertical integration and exclusivity also must be reckoned into a full competitive analysis.

24. For example, in the *Evaluating Vertical Mergers*<sup>9</sup> article cited by Professor Rogerson,<sup>10</sup> Professors Riordan and Salop state, “vertical mergers can lead to anti-competitive effects under certain circumstances.”<sup>11</sup> That article sets out a four-step analysis “intended to evaluate the likelihood and magnitude of harm to competition, absent efficiency benefits. . . . This analysis then is combined with the evaluation of efficiency benefits in order to gauge the likely net competitive impact of the proposed vertical merger.”<sup>12</sup> This is not a theory of *per se* illegality.<sup>13</sup>

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<sup>9</sup> Michael H. Riordan and Steven C. Salop, *Evaluating Vertical Mergers: A Post-Chicago Approach*, 63 Antitrust L.J. 513 (1995) (“*Evaluating Vertical Mergers*”).

<sup>10</sup> Rogerson at note 2.

<sup>11</sup> *Evaluating Vertical Mergers* at 515.

<sup>12</sup> *Id.* at 530.

25. Professors Riordan and Salop make the specific point that the analysis “may demonstrate that competition among downstream firms may remain vigorous so that prices do not rise relative to the relevant competitive benchmark.”<sup>14</sup> They conclude that theirs is a “stringent standard that will permit most vertical mergers. Moreover, once the likely efficiency benefits from a particular vertical merger are evaluated, even fewer vertical mergers will be found to have an adverse net effect on competition.”<sup>15</sup> According to their article, “It should not be assumed that competitive harms dominate efficiency benefits, or vice versa.”<sup>16</sup> Regarding input foreclosure, Professors Riordan and Salop conclude, “it is insufficient to demonstrate merely that input prices will rise. The significant likelihood of output price increases also must be shown.”<sup>17</sup> In our analysis below, we show that NC is unlikely to have the incentive to foreclose or to raise either input or output prices.

26. Professor Rogerson does not conduct a full analysis of the overall impact of NC’s investment in DIRECTV on incentives necessary to determine the net competitive effect. First, his analysis states the potential for the transaction to harm competition but his analysis does not demonstrate the likelihood of such an effect. In particular,

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<sup>13</sup> In fact, the theory of Riordan and Salop suggests a *rule of reason* approach similar to that adopted by the Department of Justice. As explained by former Deputy Assistant Attorney General Steven Sunshine, “In both [horizontal and vertical mergers], antitrust analysis requires an assessment of the proposed transaction’s likely effects through a weighing of expected efficiency gains against potential harms from any lessening of competition.” See Steven C. Sunshine, *Vertical Merger Enforcement Policy*, Address before the American Bar Association, Spring 1995. <http://www.usdoj.gov/atr/public/speeches/2215.htm>.

<sup>14</sup> *Evaluating Vertical Mergers*, at 531. The authors go on to say, “The proper competitive benchmark would be the price that would occur but for the vertical merger.” *Id.* at note 43.

<sup>15</sup> *Id.*

<sup>16</sup> *Id.* at 547.

<sup>17</sup> *Id.* at 550.

Professor Rogerson does not show that NC would have the incentive to deny access to its programming or raise its prices, once all the factors that affect incentives are taken into account.

27. Second, Professor Rogerson completely overlooks the potential for this transaction to create efficiencies. This omission alone renders his analysis seriously incomplete, because efficiencies can reduce or eliminate the incentives that may otherwise exist to raise rivals' input costs or raise prices in the output market. In particular, Professor Rogerson does not discuss the fact that this transaction will create incentives to reduce the double markup of Fox programs supplied to DIRECTV. As discussed above, this effect provides pro-competitive incentives regarding both product quality and input and output prices. This incentive may more than offset any incentive to raise rivals' costs. For this reason, it must be taken into account in a full analysis of competitive effects. Professor Rogerson fails to do this. Nor does Professor Rogerson discuss the other potential benefits from this partial vertical integration.

28. In this paper, we carry out a more complete economic analysis of the incentives for NC to engage in anticompetitive foreclosure. In conducting our analysis, we take into account the impact of the reduction in the double markup on incentives and prices. We also take into account DIRECTV's small market share, cable's large market share, and the fact that NC is acquiring only a partial ownership interest in DIRECTV. We also examine relevant empirical evidence and other potential pro-competitive rationales for exclusivity. Based on this more thorough analysis, we conclude that anticompetitive exclusion and consumer harm are unlikely.

## B. DIRECTV Faces Significant Competition in MVPD Markets

29. The Commission has concluded that cable companies remain dominant in the MVPD market,<sup>18</sup> and it has expressed concern about vertical foreclosure in the MVPD market by cable companies. Indeed, the program access rules are motivated by the concern that without these rules vertically integrated cable companies could enhance their dominance.<sup>19</sup> However, any such concern should be much greater with respect to cable television operators than DBS operators like DIRECTV. DIRECTV is clearly a challenger in MVPD markets, in marked contrast to cable companies. We believe that distinction is very important. Whatever concerns the Commission has about vertical integration between *cable operators* and programming, such concerns should be greatly muted or non-existent in the case of a programmer gaining a 34% partial ownership interest in a relatively small MVPD such as DIRECTV. DIRECTV has a much lower market share in those local areas in which it competes than do the cable operators.<sup>20</sup>

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<sup>18</sup> For example, the FCC recently concluded: “Overall, although competitive alternatives continue to develop, cable television still is the dominant technology for the delivery of video programming to consumers in the MVPD marketplace.” *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, Ninth Annual Report, 17 FCC Rcd. 26901 at ¶ 4 (2002). Similarly, the FCC found, “Controlling 78 percent of all MVPD subscribers, cable operators continue to decisively dominate the market for the distribution of programming.” *Implementation of the Cable Television Consumer Protection and Competition Act of 1992 – Sunset of Exclusive Contract Prohibition*, 17 FCC Rcd. 12124 at ¶ 65 (2002) (“*Exclusivity Sunset Order*”).

<sup>19</sup> The FCC concluded: “We find, however, that the concern on which Congress based the program access provisions – that in the absence of regulation, vertically integrated programmers have the ability and incentive to favor affiliated cable operators over nonaffiliated cable operators and programming distributors using other technologies such that competition and diversity in the distribution of video programming would not be preserved and protected—persists in the current marketplace.” *Exclusivity Sunset Order* at ¶ 65.

<sup>20</sup> For example, the FCC found that “cable operators dominate the market for the distribution of video programming serving 78 percent of all MVPD subscribers. This suggests that the costs of withholding programming from non-cable MVPDs (i.e., the revenues foregone by not selling the programming to non-cable MVPDs) remain relatively low.” *Exclusivity Sunset Order* at ¶ 53.

30. In particular, it would be far more plausible for a large cable operator to use vertical foreclosure of regionally-targeted programming services (like RSNs) to raise or maintain MVPD prices and profits and harm competition than for DIRECTV to use vertical foreclosure to achieve those ends. First, if an MVPD were able to raise its subscription price (or maintain a higher price) by purchasing exclusive content in its service area, it would get that higher price on its entire base of subscribers. Because DIRECTV has a much smaller subscriber base in any particular cable operator's service area, it would not be able to benefit as much as would a cable operator. Second, because DIRECTV's rivals have a much larger local subscriber base, a DIRECTV-affiliated programmer engaging in foreclosure would sacrifice much more programming revenue than would a cable-affiliated programmer. These points are demonstrated in our numerical analysis below. Third, DIRECTV faces limits on its ability to increase its market share at the expense of cable operators. Not all customers have the ability to switch to DBS. Many are unable to "see" the southern sky because they are blocked by trees or other obstacles. Others have line of sight problems because they live in an apartment building and do not have a south-facing balcony on which to place their satellite dish. Other potential customers may highly desire local programming that they cannot receive on DIRECTV. Still others may have multiple television receivers and are unwilling to pay the resulting higher cost of DIRECTV.

31. At the distribution level, we believe it is clear that DIRECTV cannot and will not obtain a dominant position in MVPD markets with or without the proposed transaction. Even if the critics of the proposed transaction are right and NC can

somehow use Fox programming to help DIRECTV gain a few share points from cable, it is obvious that DIRECTV will remain a distant second to cable in regions served by cable for the foreseeable future. A vertical transaction that allows one company to grow from, say, 10% to 15% of the market is unlikely to cause harm to competition. And we have seen nothing to indicate that this transaction would enable NC to prevent EchoStar from continuing to compete effectively against DIRECTV in areas not served by cable operators. In short, we see no basis for predicting that there will be harm to competition in MVPD markets as a result of the proposed transaction, even if one credits the assertions of various critics that certain rival distributors might be harmed by DIRECTV gaining some market share.

32. On a national basis, as shown in Table 1, DIRECTV has approximately 13% of MVPD subscribers, a smaller share than Comcast and Time Warner.

**Table 1**  
**National Subscriber Shares of Major MVPDs**

	Number of Subscribers (000)	Share of Subscribers
Comcast	23,845	26%
Time Warner	13,168	14%
DIRECTV	11,420	13%
EchoStar	8,400	9%
Charter	7,188	8%
Cox	6,350	7%
All Others	20,805	23%
<b>Total</b>	<b>91,176</b>	<b>100%</b>

*Source: March 2003 Nielsen Focus Report and March 2003 SkyREPORT.*

33. In addition to these national numbers, DIRECTV has a much lower share than the cable companies with which it competes in particular local areas where competition occurs. Table 2 presents the number of DIRECTV subscribers (excluding National Rural Telephone Cooperative (“NRTC”) subscribers) in regions served by each of the major MSOs and in all other cabled regions combined.<sup>21</sup> Table 2 shows that in cabled regions DIRECTV has approximately 10 percent of subscribers on average.

<sup>21</sup> As discussed below, NRTC independently markets DIRECTV service. NRTC subscribers are included in the DIRECTV subscriber numbers in Table 1. Lacking data, we estimate EchoStar subscribers by MSO-served regions using the information in Table 3 that EchoStar has 91 percent as many subscribers nationwide as DIRECTV (again, excluding NRTC subscribers).

**Table 2: MVPD Subscribers in Cabled Areas**

	Subscribers			
	DIRECTV	EchoStar* (est)	MSO	Total
Time Warner				
Charter				
Adelphia				
Comcast				
Cox				
Cablevision				
Mediacom				
All Other Cabled Areas				
<b>Total</b>				<b>88,434,928</b>

	Subscriber Shares			
	DIRECTV	EchoStar* (est)	MSO	Total
Time Warner				100%
Charter				100%
Adelphia				100%
Comcast				100%
Cox				100%
Cablevision				100%
Mediacom				100%
All Other Cabled Areas				100%
<b>Total</b>				<b>100%</b>

*Notes:*

NRTC subscribers are excluded.

\* The number of EchoStar subscribers is estimated as 91 percent of DIRECTV subscribers, consistent with relative subscriber shares nationally, as reflected in Table 3.

*Sources:*

Nielsen Focus Report, March 2003.

DIRECTV, Voluntary Active Viewer Disconnects by DMA and MSO, June 2002.

34. We next examine a slightly different breakdown, namely the shares of subscribers to DIRECTV, NRTC, Cable and EchoStar in each state. Table 3 reports MVPD subscriber shares for each state and nationally. In Table 3 we have included the NRTC subscribers in the total for DIRECTV. NRTC has the ability to price independently of DIRECTV. NRTC also determines the level of marketing in the areas it serves.

**Table 3: MVPD Subscriber Shares by State**

	DIRECTV	NRTC	Total DIRECTV and NRTC	EchoStar* (est)	Cable	Total
UNITED STATES	11%	2%	13%	10%	77%	100%
ALABAMA						100%
ALASKA						100%
ARIZONA						100%
ARKANSAS						100%
CALIFORNIA						100%
COLORADO						100%
CONNECTICUT						100%
DELAWARE						100%
DISTRICT OF COLUMBIA						100%
FLORIDA						100%
GEORGIA						100%
HAWAII						100%
IDAHO						100%
ILLINOIS						100%
INDIANA						100%
IOWA						100%
KANSAS						100%
KENTUCKY						100%
LOUISIANA						100%
MAINE						100%
MARYLAND						100%
MASSACHUSETTS						100%
MICHIGAN						100%
MINNESOTA						100%
MISSISSIPPI						100%
MISSOURI						100%
MONTANA						100%
NEBRASKA						100%
NEVADA						100%
NEW HAMPSHIRE						100%
NEW JERSEY						100%
NEW MEXICO						100%
NEW YORK						100%
NORTH CAROLINA						100%
NORTH DAKOTA						100%

**Table 3: MVPD Subscriber Shares by State (continued)**

	DIRECTV	NRTC	Total DIRECTV and NRTC	EchoStar* (est)	Cable	Total
OHIO						100%
OKLAHOMA						100%
OREGON						100%
PENNSYLVANIA						100%
RHODE ISLAND						100%
SOUTH CAROLINA						100%
SOUTH DAKOTA						100%
TENNESSEE						100%
TEXAS						100%
UTAH						100%
VERMONT						100%
VIRGINIA						100%
WASHINGTON						100%
WEST VIRGINIA						100%
WISCONSIN						100%
WYOMING						100%

*Notes:* \*The number of EchoStar subscribers is estimated at the state level as Total DTH subscribers less the sum of C-Band, DIRECTV, and NRTC subscribers. The national share for EchoStar is not an estimate but is its actual share.  
The number of C-Band subscribers (which is not shown in the Table) is estimated at the state level by assuming that the ratio of C-Band and DIRECTV subscribers is the same as the ratio for the entire United States.

*Sources:* DIRECTV Active Residential Customers by State, June 09, 2003.  
SKYTRENDS, Skymap April 1, 2003.  
SkyREPORT, Satellite TV Subscriber Counts, March 2002-2003.

35. As shown in Table 3, DIRECTV's share (including NRTC subscribers) is 13 percent nationally, with a maximum state-wide share of 22 percent and a minimum (in the lower 48 states) of 6 percent.<sup>22</sup> EchoStar's numbers are similar, with a national share of 10 percent, a maximum state-wide of 24 percent and a minimum of 2 percent. In contrast, cable is much larger than either DBS provider, with a national share of 77 percent, ranging across all states from 60 percent to 96 percent.<sup>23</sup> Clearly, at the state level, cable operators, not DIRECTV, are the largest providers of MVPD services.

36. We are aware, of course, that there are some areas within states that do not have cable service. In those regions, DIRECTV still faces significant competition from EchoStar. In its evaluation of the EchoStar/DIRECTV merger, the FCC concluded: "the record is replete with evidence that EchoStar and DIRECTV do indeed compete vigorously with each other and that this competition effectively constrains prices."<sup>24</sup> Moreover, many of the areas where cable is absent are NRTC regions where DIRECTV lacks marketing control and earns a much lower margin on subscribers.

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<sup>22</sup> Because of satellite coverage, DIRECTV's subscription rates in Hawaii and Alaska are even lower.

<sup>23</sup> The two states with the lowest cable penetration, Idaho and Utah, are the two states in which EchoStar has its largest share.

<sup>24</sup> *Application of EchoStar Communications Corporation, General Motors Corporation, and Hughes Electronics Corporation*, 17 FCC Rcd. 20559 at ¶ 163 (2002).

### III. Denying Fox Programming to DIRECTV's MVPD Competitors Would Not Be Profitable

37. Several commenters have claimed that the proposed transaction might give Fox the incentive to foreclose DIRECTV's competitors from certain Fox programming.<sup>25</sup> For example, in his report, Professor Rogerson states: "News Corp. could also harm its rivals by pursuing exclusionary or cost-raising strategies with respect to this [regional sports] programming."<sup>26</sup>
38. Under this theory, the acquisition would lead Fox either to withhold certain Fox programs from DIRECTV's rivals or to raise its programming prices to those rivals (and possibly also to DIRECTV). Either of these tactics would sacrifice program revenues and profits at Fox.<sup>27</sup> For the vertical foreclosure strategy advanced by Professor Rogerson and others to succeed, however, this sacrifice of program profits would have to be more than offset by higher profits at the distribution level. Unless this condition is met, such a strategy would be unprofitable for NC, and thus unlikely to be followed. The critics simply assume that foreclosure would be profitable for NC because DIRECTV would increase its profits by increasing its volume or prices, and Fox would obtain its 34% share of these higher profits. However, any proper

<sup>25</sup> See Joint Cable Comments at 30-32; *Comments of American Cable Association*, MB Docket No. 03-124, (filed June 16, 2003) ("ACA Comments") at 9-11; *Comments of Cablevision Systems Corp.*, MB Docket No. 03-124, (filed June 16, 2003) at 8; *Petition to Deny and Comments in Opposition to Transfer of Control of EchoStar Satellite Corporation*, MB Docket No. 03-124, (filed June 16, 2003) ("EchoStar Petition") at 13; *Petition of the National Rural Telecommunications Cooperative to Designate Application for Hearing*, MB Docket No. 03-124, (filed June 16, 2003) ("NRTC Petition") at 13-14.

<sup>26</sup> Rogerson at 12-13.

<sup>27</sup> The costliness of these tactics is perhaps most obvious for total withholding. But, as discussed in more detail below, Fox's current program prices must be more profitable to Fox than would be higher prices, in the light of the fact that Fox has chosen these prices to maximize its pre-acquisition profits.

analysis of the likelihood of such vertical foreclosure must involve a balancing of these gains and losses to NC. Unfortunately, none of the commenters actually undertook the necessary calculations to perform this balancing. We do.

39. The enforceable voluntary program access commitments agreed to by the Parties would, of course, preclude Fox from withholding its cable programming from DIRECTV's rivals. The purpose of this section is to show that even if this were not the case, it would not be economically rational for the Parties to act in such a manner.
40. In this section, we show that the strategy of denying Fox programming to cable operators and EchoStar as a means of driving subscribers to DIRECTV would not be profitable for NC.<sup>28</sup> Put simply, this vertical foreclosure theory does not hold up to empirical testing in the case at hand. One reason that withholding Fox programming would not be profitable is that Fox is only acquiring a 34% partial ownership interest in DIRECTV. As a result, Fox would bear the entire upstream cost of such a strategy, but it would capture only about a third of any additional profits earned downstream by DIRECTV.<sup>29</sup> Another reason is DIRECTV's relatively small share of MVPD subscribers, which would have to increase dramatically to make the hypothesized foreclosure strategy profitable. Such increases are not plausible in the light of the empirical evidence.

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<sup>28</sup> In the following section, we examine the strategy of raising the price of Fox programming to DIRECTV's competitors rather than directly withholding the Fox programming from them. The results of this section are an input into that analysis.

<sup>29</sup> We estimate these profits as DIRECTV's current margin for its customers, which overstates the benefits to Fox when a new subscriber is in an NRTC region, in which case the margin earned is much lower.

41. The fact that these foreclosure strategies are unprofitable for NC and DIRECTV does not mean that exclusive arrangements between content providers and video distributors would never occur or are necessarily anti-competitive when they do occur. To the contrary, exclusivity is common in video programming; typically, only one broadcast network carries each program. Exclusivity can have pro-competitive as well as anti-competitive effects. In particular, exclusivity can facilitate efficient risk-taking and promotion by the distributor, and non-exclusivity can lead to free riding among competing networks. Exclusivity also is a way to create a marketing “buzz,” that helps to identify and promote the network, even if the particular exclusive arrangement is not profitable evaluated in isolation. Exclusivity does not imply anticompetitive effects or foreclosure. Indeed, one network may have an exclusive on program X, another might obtain an exclusive on program Y and competition between the networks would remain strong. Those same benefits may apply to MVPD exclusives. Second, even in the absence of proven efficiency benefits, exclusives may not cause competitive harm. Anticompetitive harm involves the favored MVPD gaining the power to raise or maintain a supra-competitive subscription price, not simply a modest gain in subscribers from rivals.

42. These same considerations would apply to MVPD exclusives.<sup>30</sup> For example, DIRECTV has had a longstanding and well-publicized exclusive agreement with the

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<sup>30</sup> We understand that there are a number of exclusive agreements between EchoStar and various cable programming channels. These include the Al Jazeera, Al Zikr, ART Global, ART Movies, ART Music, De Pelicula, De Pelicula Clasico, Dubai Satellite, FOL TV, LBC, Nile Drama, Polsat 2, Telehits, TV Azteca, Zee Gold, Zee TV, Sun TV, PTV, and The Israeli Network. In addition to the NFL exclusive, DIRECTV has exclusives with Chinese Movie Channel, Jade East and Jade West, and Jeweworld SuperChannel.

NFL. DIRECTV offers these games as a premium service, NFL Sunday Ticket. Subscribers receive all out-of-market NFL games every Sunday during the regular season, for a total of 14 games each week. This exclusive programming certainly contributed to marketing buzz for DIRECTV. DIRECTV CEO Eddy Hartenstein has said that since 1995, the NFL Sunday Ticket has become “our flagship service; it is the package that more than any other is the differentiator for us against cable and everyone else.”<sup>31</sup> This exclusive agreement also has led to DIRECTV undertaking additional investments. In particular, under the new agreement, DIRECTV has the ability to offer NFL Sunday Ticket subscribers exclusive enhanced technical innovations (e.g., HDTV game telecasts, viewer-selected cameras and replays, and other features). DIRECTV has also agreed to offer a new NFL Channel, a year-round service devoted entirely to football. Nor has this exclusivity had anticompetitive effects. The exclusivity has not driven EchoStar or cable out of business. Indeed, despite this exclusivity, DIRECTV’s MVPD share remains at 13%, far behind the share of the local cable operators it competes with in various areas.

43. In this section, we examine and quantify foreclosure issues in connection with the programming that commenters most often asserted would be used to implement such a strategy. We first analyze Fox’s post-acquisition incentives to withhold sports programming from other MVPDs. We then analyze Fox’s incentives to withhold retransmission consent for Fox’s O&Os. We analyze the related point of NC’s

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<sup>31</sup> David Lieberman, *DirectTV Keeps NFL Games in \$2B Deal*, USA Today (Online), December 11, 2002.

incentives to raise the prices of Fox programming and retransmission consent in Section IV below, using the results from the current section.

**A. Withholding Sports Programming**

44. Several commenters have suggested that Fox would use its sports programming to disadvantage DIRECTV's rivals.<sup>32</sup>

45. Note that in addition to the sports programming, Fox owns a number of national programming channels, such as Fox News Channel, FX, and Fox Movie Channel. Each of these channels has many competitors offering similar programming. For example, the Fox News Channel faces competition from CNN, MSNBC, and other news program services; FX has similar programming to USA and TNT, among other services. It is hard to believe that denial of any (or all) of Fox's national channels to DIRECTV's rivals would cause a significant loss of subscribers by the excluded MVPDs or permit DIRECTV to raise its subscription price. Put differently, the Fox Cable Networks are clearly not an essential input for an MVPD to be successful. We now turn to the analysis of potential foreclosure in sports programming.

*1. Unprofitability of Foreclosure*

46. Suppose that Fox were to withhold sports programming from cable and EchoStar. The immediate and certain effect of these competitors not carrying the Fox programming would be sharply to reduce the programming revenues earned by Fox. The revenue reduction includes both the affiliate fees charged by Fox to the MVPD as

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<sup>32</sup> See Rogerson at page 12; Joint Cable Comments at 35-36; EchoStar Petition at 22; NRTC Petition at paragraph 28.

well as the advertising revenues earned by Fox.<sup>33</sup> In the light of the fact that DIRECTV only has about a 13% share of MVPD subscribers, these lost revenues would be borne on roughly 87% of Fox's subscriber base. Those losses would be very substantial. This loss in programming revenue could only be worth sustaining if there were a sufficiently large gain in profits at DIRECTV. The required gains in DIRECTV profits are magnified by the fact that Fox bears 100% of the reduced programming profits but obtains only 34% of any higher DIRECTV profits. As we now demonstrate, the required gains in DIRECTV profits would be so dramatic as to be implausible.

47. We can quantify the gains on DIRECTV necessary to make profitable a strategy of withholding Fox's regional sports networks from cable and EchoStar in two simple yet informative ways.<sup>34</sup> First, we can ask by how much DIRECTV's share of the MVPD market would need to increase (holding its price constant) in order to compensate Fox for program revenue losses. Alternatively, we can ask by how much DIRECTV would need to increase its price or per-subscriber revenue (holding its subscriber base constant) to make sufficient additional MVPD profits to compensate for the lost programming profits. Either way, we find it implausible that such a large gain in profits at DIRECTV would be possible.

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<sup>33</sup> We assume that advertising revenue is proportional to the number of subscribers. This likely understates the revenue reduction because the loss of a large number of subscribers when the programming no longer appears on cable likely would reduce the per subscriber advertising rate that could be charged.

<sup>34</sup> For a similar methodology applied to different market conditions, see David S. Sibley and Dennis L. Weisman, *The Competitive Incentives of Vertically Integrated Local Exchange Carriers: An Economic and Policy Analysis*, *Journal of Policy Analysis and Management* 17 (1998), 74-93.

48. Our numerical analysis indicates that the foreclosure strategy would only be profitable for NC if DIRECTV would, as a result of the foreclosure activity, increase its market share in the combined Fox RSN footprint area, from 13% up to 30%, holding prices constant. Alternatively, to make foreclosure profitable, DIRECTV would need to be able to increase its price charged so that its average revenue collected per subscriber in the combined Fox RSN footprint would increase by about 49% (i.e., about \$ , from roughly \$ to \$ ) without losing any subscribers.<sup>35</sup>

49. We do not find it plausible that so many MVPD subscribers view regional sports as so critical as to make these gains from exclusivity likely or even possible. Nor do we think that DIRECTV could raise prices by so much without losing substantial subscribers. Indeed, if the regional sports networks were so valuable, why would Fox be charging MVPDs only \$ per subscriber (on average) for them now?<sup>36</sup> This foreclosure theory would require that Fox be dramatically undervaluing today the very assets that, it is asserted, will allow it to gain a significant economic advantage tomorrow. Again, this seems highly implausible.

50. We derived the 30% market share figure as follows. Fox earns an average revenue of \$ per subscriber (from affiliate fees plus advertising revenues) for its regional

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<sup>35</sup> Note that this required price increase is assumed to be targeted solely in the region in which the particular RSN is offered. DIRECTV would have no ability to set a higher price outside the combined Fox RSN footprint area as it would enjoy no new programming advantage there. Of course, if DIRECTV foreclosed rivals in a narrow region and then solely raised prices in that region, it certainly would be detected by the competitors and the Commission, which would lead to a potential enforcement action.

sports networks.<sup>37</sup> For this example, we assume that Fox's costs do not vary with the number of subscribers over the relevant range of output, so incremental revenue falls to the bottom line as increased contribution to cover fixed costs and generate a return on investment. The combined market share of cable and EchoStar is approximately 87% of the MVPD market.<sup>38</sup> Finally, we assume that DIRECTV's constant margin on its subscribers is approximately \$ .<sup>39</sup> If Fox were to deny cable and EchoStar access to one of its RSNs, Fox would immediately lose \$ in programming revenue for each cable and EchoStar customer of this RSN. For every new subscriber gained by DIRECTV, Fox would gain back this \$ in programming plus 34% of the DIRECTV \$ distribution margin. So, Fox would find it profitable to withhold this programming from its MVPD competitors if and only if  $\$ \times 87\% \leq S^* \times \{(\$ \times 34\%) + \$ \}$ , where  $S^*$  is the increase in DIRECTV's share of the MVPD market in which this RSN is carried and 87% represents the total share of the MVPD market originally held by DIRECTV's MVPD competitors. Solving this inequality for  $S^*$ , we find that withholding a regional sports network would only be profitable if DIRECTV were able to increase

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<sup>36</sup> This average affiliate fee is calculated by taking the average of all affiliate fees for all the Fox RSNs, weighted by the number of subscribers to each of these RSNs at each MVPD. For any particular RSN for any particular MVPD, the actual affiliate fee paid likely will be slightly different.

<sup>37</sup> To the extent that smaller MVPDs without volume discounts pay higher prices and generate higher margins on average, our analysis would tend to understate the programming profit losses incurred by Fox as a result of losing their subscribers. Therefore, we would tend to underestimate the extent of subscriber movement (to DIRECTV) necessary for foreclosure to be profitable for NC.

<sup>38</sup> We also will use this average MVPD share as the share of competing MVPDs of the foreclosed programming. For any particular programming channel, the share will vary a bit, but the general conclusions remain the same.

<sup>39</sup> This margin takes the average revenue per customer (\$ ) and subtracts from it the average variable costs incurred in serving this customer. These variable costs are assumed to include the amortized

its share of the MVPD market within the combined Fox RSN footprint by 17 share points, from the current 13% up to 30%, that is, well more than doubling. This is obviously a huge and implausible increase. If this were done on a national level (i.e., if Fox had an RSN in every part of the U.S.), it would make DIRECTV the largest MVPD in the U.S. In fact, not all areas of the country are served by Fox RSNs.

51. We used a similar methodology to derive the \$            per-subscriber revenue increase that DIRECTV would have to achieve to make foreclosure profitable at current subscriber levels. Using these same data, consider the price increase that DIRECTV would have to be able to achieve to counteract the loss of Fox programming revenues earned from other MVPDs. Here, the loss in profits on programming is the same \$             $\times 87\%$  and the gain is  $P^* \times 13\% \times 34\%$  where  $P^*$  is the increase in the DIRECTV price (or revenues per subscriber), holding market share constant. Solving for  $P^*$ , DIRECTV would have to be able to increase its price so that revenue per subscriber would increase by over \$            per subscriber, from \$            to roughly \$            , *without losing any subscribers*, in order to compensate for Fox's programming revenue reductions. Again, this level of price increase without any subscriber losses is huge and implausible.

52. Moreover, the above calculations do not take account of a number of real-world factors that make it even less likely that a foreclosure strategy would be profitable for NC. The cable companies and EchoStar would undoubtedly respond to the

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variable cost of acquiring the customer. These figures are for DIRECTV customers. For the NRTC customers, DIRECTV's margin is much lower—less than \$            per subscriber.

foreclosure, perhaps by adding other high quality programming, by increasing their promotional efforts, or by reducing their prices (because their variable costs have fallen and the quality of their offering has, by assumption, fallen). While some of these responses – such as obtaining replacement programming or increasing promotional activities – would involve variable costs for these MVPD competitors, they still would make the foreclosure strategy less profitable for NC because they would reduce the movement of customers to DIRECTV.

53. Even accepting the assertion that sports programming is important to many viewers, it is not plausible that exclusive rights to Fox’s regional sports networks could lead to either the quantity increase (13% to 30% for DIRECTV’s share of the local MVPD market) or the per-subscriber revenue increase (\$ per month to \$ per month) required to make this foreclosure strategy profitable for NC. The empirical evidence also supports the conclusion that these large movements are unlikely.

*2. Subscriber Effects From Exclusive Sports Programming*

54. There have been a handful of real-world examples that can be used to evaluate the likely magnitude of subscriber shifts associated with exclusive sports programming. As these examples make clear, although sports programming exclusivity has affected subscriber levels to some extent, it has not caused anywhere near the amount of shifting required for the foreclosure strategy to be profitable for the merged entity. In situations where MVPDs have not carried a particular RSN, they nonetheless have still been able to compete effectively, even if they were somewhat affected. Most importantly for our analysis, the absence of the RSN has not led to the massive

subscriber or price movements that would be required for the foreclosure strategies advanced by commenters to be profitable for NC.

55. For example, in the case of the YES Network, we have direct evidence of the effect of DIRECTV gaining a sports network exclusive. At the start of the 2002 baseball season, the YES Network was created for carrying a number of the Yankees games.<sup>40</sup> Given the price that YES was charging per subscriber, and its insistence on carriage on the basic tier, only DIRECTV, Time Warner, and Comcast carried the service. Neither EchoStar nor Cablevision elected to offer this programming to their customers.<sup>41</sup> By the start of the 2003 baseball season, Cablevision started carrying this programming, albeit on a separate tier. Thus, for one year, DIRECTV had a *de facto* exclusive for the YES Network in the Cablevision franchise areas.

56. This episode is the type of “natural experiment” suggested by Professor Rogerson.<sup>42</sup> He points to DIRECTV’s increased subscriber growth during the period of the dispute. During this period of *de facto* exclusivity, DIRECTV offered the YES Network as part of its main package.<sup>43</sup> DIRECTV did not change its prices in the New York region. Despite this exclusive and the lack of any price increase, neither EchoStar nor Cablevision failed. In fact, DIRECTV did not achieve anything close to

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<sup>40</sup> Other programming on this channel includes a number of New Jersey Nets games.

<sup>41</sup> This outcome appears to have been the result of a bargaining impasse and breakdown in 2002, rather than a formal sale of an exclusive to DIRECTV, so the YES experience does not suggest that sports exclusives maximize joint profits. Nonetheless, this episode is highly informative for the purpose of measuring the effect of sports exclusives on MVPD markets shares.

<sup>42</sup> Rogerson at 15.

<sup>43</sup> During the 2002 baseball season, DIRECTV actively marketed itself as the only MVPD that had carriage of all of the Yankee games in the Cablevision areas.

the dramatic market share gains that, as discussed above, would be required to make withholding of Fox regional sports networks profitable.

57. Professor Rogerson apparently would not dispute this empirical evidence. This YES episode is the only one of his “natural experiments” in which he provides lost subscriber numbers. In fact, Professor Rogerson quotes a newspaper article and states that Cablevision lost “at least 30,000 subscribers to DIRECTV” as a result of the YES exclusive.<sup>44</sup> This figure is in doubt, and even if accurate does not support Professor Rogerson’s contention that foreclosure is likely to occur. First, Professor Rogerson’s other newspaper source gives a lower number. It cites to analysts who say that Cablevision’s loss was even lower, between 10,000 and 30,000 subscribers.<sup>45</sup> Indeed, this other article also stated, “Cablevision describes the actual number of defectors as minimal.” Second, whatever the subjective characterization, those 30,000 subscribers amount to about 1% or less of cable subscribers in the Cablevision franchise areas. This subscriber shift over a year certainly would not be nearly large enough to make a sports exclusive strategy by Fox profitable.<sup>46</sup>

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<sup>44</sup> Rogerson at 16, text and note 34 (citing Staci D. Kramer, *It’s Spring, and Hope Again Springs Eternal*, *Cable World*, March 17, 2003, at p. 11).

<sup>45</sup> Richard Sandomir, *YES, Cablevision War Has a Winner: DIRECTV*, *The New York Times*, April 25, 2002 at D2 (cited in Rogerson, note 33).

<sup>46</sup> We also examined DIRECTV subscriber growth as an additional check. In January 2002, DIRECTV had \_\_\_\_\_ subscribers in the Cablevision areas, which is less than \_\_\_\_\_ % of the MVPD market. By December 2002, DIRECTV had \_\_\_\_\_ subscribers in these areas, or less than \_\_\_\_\_ % of the MVPD market. Even assuming that *all* of these subscriber gains were caused by the YES exclusivity (which is unlikely), DIRECTV was able to gain approximately \_\_\_\_\_ percentage points in share. This is higher than the numbers cited by Professor Rogerson, but it is still far below the 17% share point gain estimated earlier as necessary to make foreclosure profitable. Of course, even this \_\_\_\_\_ percentage point gain is a likely overstatement of the share gain from the exclusive, because DIRECTV experienced secular subscriber growth across the entire country, and thus some of those gains in New York likely would be unrelated to the YES Network programming.

58. Another episode mentioned by Professor Rogerson involves a situation in Minnesota where Time Warner and Fox Sports Net North were unable to reach an agreement on the affiliate fee.<sup>47</sup> When this impasse was reached, Time Warner stopped offering Fox Sports Net North to its subscribers. It is our understanding that Time Warner did not carry this RSN from January 1, 2003 until March 13, 2003. In January 2003, Time Warner had \_\_\_\_\_ subscribers in these regions while by March these subscribers had fallen to \_\_\_\_\_ (for a loss of \_\_\_\_\_ subscribers).<sup>48</sup> Over the same time period, DIRECTV went from \_\_\_\_\_ subscribers in the entire Fox Sports Net North area in January to \_\_\_\_\_ subscribers in March (or a gain of \_\_\_\_\_ subscribers).<sup>49</sup> Clearly this small number of new subscribers to DIRECTV, even if they all subscribed as a result of Time Warner no longer carrying the RSN, is much smaller than the number needed to make foreclosure profitable for NC.<sup>50</sup>

59. Comcast's exclusivity in Philadelphia provides another (albeit somewhat less direct) example. In Philadelphia, Comcast has refused to supply the RSN it owns to either DIRECTV or EchoStar. DIRECTV has correctly pointed out that it likely would be able to attract more subscribers if it had access to the regional sports network in

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<sup>47</sup> Rogerson at page 15.

<sup>48</sup> Internal NC estimates.

<sup>49</sup> These DIRECTV subscriber numbers includes subscribers that are located in areas other than Time Warner franchise areas. Therefore, those subscriber gains clearly were not caused by the sports programming.

<sup>50</sup> Another episode cited by Professor Rogerson involves a situation in Los Angeles involving Time Warner. The article cited by Professor Rogerson says that Time Warner dropped FSN West in response to a one-cent per month fee increase. It is hard to believe that Time Warner would have been willing to drop this RSN rather than pay the extra penny, if it anticipated that it would lose even a fraction of the subscribers that DIRECTV would need to gain for a NC foreclosure strategy to be profitable. Rogerson at note 31, citing Linda Haugsted and R. Thomas Umstead, *Subtracting Sports: Licensing Hassles Lead to Cable Drops*, Multichannel News, July 2, 2001, at 1.

Philadelphia.<sup>51</sup> But it is obvious that the harm from this foreclosure has not forced either DIRECTV or EchoStar to exit this market, where both in fact continue to grow.

60. This situation in Philadelphia also is different from the case of a DIRECTV exclusive. In Philadelphia, it is the large cable operator that is withholding the programming, not a smaller challenger. (Moreover, Comcast also was the team owner, as we discuss below.) A dominant cable operator with a larger subscriber base would have a far greater incentive to obtain an exclusive on a regionally-targeted service than would DIRECTV, *ceteris paribus*, and it is more likely that a successful foreclosure strategy would help maintain a dominant position and high prices. In particular, it would be far more plausible for a dominant cable operator with its large share of local MVPD subscribers to attempt to use vertical foreclosure of a regionally-targeted program service to increase its profits, and increase prices or gain market share than for DIRECTV to attempt to use vertical foreclosure to achieve similar results. If a cable operator were able to raise its subscription price (or maintain a higher price) by purchasing exclusive content, it would get that higher price on its much larger base of subscribers in the region. Thus, this type of regionally-targeted foreclosure is far more likely to be profitable for dominant cable operators than for smaller competitors like DIRECTV.

61. In addition to the greater foreclosure concern because of the larger share of the cable operator relative to its competitors, there would also be a greater concern if the MVPD and program service are both wholly owned by a single entity, in contrast to

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<sup>51</sup> See Reply Comments of DirecTV, Inc. *In the Matter of Implementation of the Cable Television Consumer Protection and Competition Act of 1992*, CS Docket No. 01-290.

Fox's 34% partial ownership interest in DIRECTV. Using our profitability analysis methodology, we can show why foreclosure of sports networks would be much more profitable for a fully vertically integrated cable company.

62. For example, suppose that a RSN were 100% owned by a cable company that had a 78% share of the MVPD market. Withholding the RSN from DIRECTV and EchoStar would be profitable as long as the cable company would be able to increase its share by only 1.6 share points, from 78% up to about 80%.<sup>52</sup> This share increase is obviously much more plausible than the 17 share points required to make such a strategy profitable for Fox as the 34% owner of DIRECTV. Thus, our conclusion that Fox's partial ownership interest in DIRECTV is not a concern is perfectly consistent with the view that profitable foreclosure of rival MVPD's access to programming by a cable company owner of the programming is a more significant possibility. These conclusions reflect the common view in antitrust that exclusive contracts are far more likely to harm competition when employed by dominant firms than when employed by firms with modest market shares that lack the ability profitably to gain power over price and harm competition as a result of the conduct.

63. The critical subscriber share gain just cited is derived in the same way as it was for the hypothetical DIRECTV Fox RSN exclusive, adjusted for the difference in market share of rivals (87% vs. 22%) and ownership interest (34% vs. 100%). Assuming that the profit margin on the sports network is \$      per subscriber, and also assuming that cable's margin on its subscribers is \$      , it would be profitable for the vertically

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<sup>52</sup> This gain amounts to a loss to the DBS competitors of about 7% of their DBS subscribers.

integrated cable company to withhold this programming from DIRECTV and EchoStar if  $\$ \quad \times 22\% \leq S^* \times \{(\$ \quad \times 100\%) + \$ \quad \}$ , where  $S^*$  is the increase in the cable company's share of MVPD subscribers and 22% is the total non-cable share (i.e., DIRECTV and EchoStar) of the MVPD subscribers. Solving this inequality for  $S^*$ , we find that withholding a regional sports network would be profitable if the cable owner were able to increase its share of the MVPD subscribers by 1.6 share points, from 78% to 79.6%. This gain comes at the expense of other MVPDs, that is, DIRECTV and EchoStar together would fall from a share of 22% down to 20.4%, a loss of about 7% of their subscriber base.

### 3. Other Evidence

64. There also are other indicators of the inability of sports programming to shift so many consumers.
65. First, if the lack of Fox RSN programming on an MVPD would result in the shift of so many consumers away from that MVPD, Fox should already be able to charge much greater affiliate fees than it in fact obtains. The fact that affiliate fees charged to MVPDs are not higher (these fees are currently \$  $\quad$  per subscriber per month on average as noted above) is strong evidence that the requisite power to move subscribers among MVPDs does not exist.
66. Second, the Fox RSNs face competition from other sports programming such as sports shown on broadcast and other cable program services, ESPN, and specialized sports program services such as the Golf Channel and Outdoor Life Network, as well as other general entertainment cable program services. Each of these programming

outlets provides some competition to the Fox sports programming. No one has shown that these other program services would raise their prices in response to a Fox RSN exclusive.

67. Finally, cutting off rival MVPDs from RSNs to benefit DIRECTV would create future problems for Fox in its dealings with the sports teams that ultimately control the sports programming, thus constraining or eliminating any foreclosure incentive. In the highly unlikely event that a foreclosure strategy using sports programming would divert enough subscribers to DIRECTV to be profitable in the immediate term, its benefits to NC likely would be short-lived. As the contracts with sports teams come up for renewal, those teams would demand a large share of any supra-competitive profits. They also would want compensation for any harm to their popularity or loss of ancillary revenues they perceive from the more limited distribution. The anticipation of this need to share the profits would limit NC's upside gain from the foreclosure strategy and, thus, reduce its willingness to attempt the strategy to begin with. Moreover, the foreclosed MVPDs also might bid for the sports rights. Indeed, even in they fail in the bidding for these sports rights, this intensified bidding competition would increase Fox's costs of acquiring the rights, thereby reducing the profitability of the foreclosure strategy. Significantly, in the Philadelphia market, Comcast also owns the two primary sports teams being carried by the RSN, and thus can internalize these additional factors.

### B. Withholding Fox Owned and Operated Television Stations Signals

68. A number of commenters have suggested that the ability of DIRECTV's rivals to compete effectively could likewise be harmed by NC's refusal to allow Fox O&Os to be carried on rival MVPDs and that this could lead to anticompetitive effects. For example, in its comments on the merger, EchoStar states: "One of the most immediate and direct means of leveraging News Corp.'s new DBS asset to its own benefit, at the expense of consumers, will be potentially through the retransmission consent process."<sup>53</sup>
69. Unlike these commenters, we have performed calculations to determine whether such a strategy would be profitable for NC. We find that a foreclosure strategy likely would not be profitable.
70. Our financial analysis of withholding O&Os from rival MVPDs is similar to the analysis discussed above for the Fox RSNs. The key difference is that Fox's programming revenue losses mainly involve foregone advertising revenues from subscribers that retain their EchoStar or cable subscriptions but do not receive the O&O signal over-the-air. In 2002, for example, the Fox broadcast network earned \$     in advertising revenue per television household per month. The Fox O&O stations earned an additional \$     per television household per month in their broadcast areas. In addition to revenue from advertisers, Fox also sometimes receives consideration from MVPDs in exchange for carriage of its O&O stations, typically in the form of an agreement to carry other cable programming services owned by Fox.

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<sup>53</sup> EchoStar Petition at 12-13. *See also* Rogerson at 6; Joint Cable Comments at 8; Cablevision Comments at 15-17.

If Fox withholds retransmission consent for its O&Os, in addition to a loss of advertising revenue, it may also sacrifice the value of this other consideration, as the MVPD may be entitled to drop the relevant cable programming service. In the profitability analysis for O&O foreclosure, however, we omit the consideration received from the MVPD in our evaluation of the program revenue sacrificed by foreclosure because it is difficult to set a precise value there. This approach somewhat underestimates Fox’s “cost” of foreclosure and, therefore, overestimates the profitability of foreclosure.

71. Using the same basic methodology as earlier, but ignoring any consideration for carriage, and assuming that the subscribers of these MVPDs do not receive the Fox O&O over-the-air when the O&O is no longer carried by EchoStar and cable, then Fox would find it profitable to withhold carriage of the O&O from EchoStar and cable only if DIRECTV could expect to gain an additional 40% of MVPD subscribers in the O&O areas, more than quadrupling DIRECTV’s share from about 13% to 53% in the area.<sup>54</sup>

72. Alternatively, to make foreclosure profitable with a constant number of subscribers, DIRECTV would need to be able to increase its price charged so that the average revenue collected per subscriber in the Fox O&O areas would increase by about 175% (i.e., from roughly \$ to \$ ) without losing any subscribers.<sup>55</sup> A revenue increase of this magnitude without any subscriber losses is huge and implausible.

<sup>54</sup> The relevant equation is  $87\% \times \$ + \$ \leq S^* \times \$ \times 34\% + \$ + \$$ , or  $S^* \geq 40\%$ .

<sup>55</sup> The relevant equation is  $87\% \times \$ + \$ \leq P^* \times 13\% \times 34\%$ , or  $P^* \geq \$$ .

Moreover, as mentioned with respect to subscriber losses, this result does not take into account the impact of losing the other consideration gained from the MVPD.

73. In many areas, even if Fox withheld the O&O signal, it would remain available over-the-air to the subscribers of other MVPDs. For this reason, those subscribers might remain with their current preferred MVPD and use an A/B switch to access over-the-air broadcasts. This option would have two effects on profitability that go in opposite directions. On the one hand, it would reduce the number of subscribers likely to switch to DIRECTV, thereby reducing the profitability of the foreclosure strategy. On the other hand, it would permit Fox to continue to earn advertising revenue from the subscribers that do not switch MVPDs, but still receive the O&O over-the-air. Suppose that one-third of the rival MVPDs' subscribers who do not switch still receive the O&O signal over-the-air. This assumption would reduce the number of new DIRECTV subscribers required for profitability, but DIRECTV still would need to increase its MVPD share by 31 share points, from 13% to 44%.<sup>56</sup> This is clearly an implausibly large required subscriber gain. The rival MVPD's would have to suffer this large loss of subscribers in response to the unavailability of a single network's O&O. This very substantial loss also does not appear plausible.

74. If one-third of the subscribers on the rival MVPDs would receive the O&O signal over the air when it is no longer available through their preferred MVPD, DIRECTV would need to increase its revenues by \$ \_\_\_\_\_ per subscriber (a 117% increase in

<sup>56</sup> The relevant equation would become  $87\% \times (\$ \text{ } + \$ \text{ }) \leq S^* \times (\$ \text{ } \times 34\% + \$ \text{ } + \$ \text{ }) + (87\% - S^*) \times 33\% \times (\$ \text{ } + \$ \text{ })$ , or  $S^* \geq 31\%$ .

revenue) without losing any subscribers.<sup>57</sup> Such a revenue increase without any subscriber loss is implausible.

75. Professor Rogerson refers to situations where local station retransmission consents were withdrawn during negotiations. He states that “the evidence suggests that significant number of customers leave the MVPD that can no longer offer the local stations. . . .” He refers to a newspaper article that says that satellite providers “profit[ed] from the disruption in service.”<sup>58</sup> However, he does not provide any evidence of substantial subscriber shifts that would support a claim that this foreclosure would be profitable to NC. Professor Rogerson refers to a DIRECTV report that its overall subscriber levels have increased by 20 percent since offering local broadcast channels.<sup>59</sup> This 20 percent increase, which is less than 3 share points of the MVPD market, is far less than the required subscriber shift for profitability. It is our understanding that this subscriber growth is only in those locations where the local channels are offered. But, more importantly, this impact involved access to *all* the local channels, not just one.

76. The foregoing also does not take into account another important cost of withholding Fox broadcast programming. Broadcast networks earn a premium in sales of network and national spot advertising because of their ability to offer nationwide reach.<sup>60</sup> If

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<sup>57</sup> When one-third of the customers on the rival MVPDs use their A/B switch to receive the Fox O&O station signal, the relevant equation becomes  $(100\% - 33\%) \times 87\% \times \{ \$ \quad + \$ \quad \} \leq P^* \times 13\% \times 34\%$ , or  $P^* \geq \$$ .

<sup>58</sup> Rogerson at 10-11.

<sup>59</sup> *Id.* at 12.

<sup>60</sup> The FCC has recognized that audience fragmentation has made the delivery of a mass audience more difficult and “media that can still produce mass audiences have become more valuable.” The

Fox were to withhold its programming from EchoStar and cable, this premium would be reduced on all advertising sales.

77. The Fox O&Os compete against a number of other local broadcast stations and other cable programming. The commenters also have not shown that these competitors would respond to a denial of access by Fox O&Os by raising their prices.<sup>61</sup>

### C. Denying Fox Programming to Small Cable Companies

78. Professor Rogerson and other commenters raise a foreclosure concern with respect to small and medium-sized cable companies.<sup>62</sup> They suggest that it would be profitable to withhold programming, particularly Fox O&Os, from these cable companies. The expressed fear is that these cable companies then would exit the market, permitting DIRECTV to increase its market share and retail subscription fees.

79. As noted already, this behavior would be precluded by the Parties' voluntary commitments and the Commission's rules. However, even if these constraints were assumed away, we are highly skeptical of the notion that these cable companies would cease to exist due to a lack of Fox O&Os, certainly in the absence of a more detailed economic analysis than is provided by Professor Rogerson. These cable companies apparently retain substantial market shares in their respective franchise areas, and have made substantial sunk capital costs in their cable plant. While they

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Commission observed that "...broadcast networks have achieved substantial gains in revenues in recent years despite their loss of audience relative to years past." FCC, *Amendment of Section 73.658(g) of the Commission's Rules – The Dual Network Rule*, MM Docket No. 00-108, ¶ 20 (2001).

<sup>61</sup> As a result, it might be harder for DIRECTV to profitably raise its subscription price or increase its market share

<sup>62</sup> Rogerson at 4, 23, and 26; ACA Comments at 8-16; Joint Cable Comments at 30-34.

may be losing share to DBS, we see no reason why their market shares should plunge dramatically, or why they would be forced to exit in response to no longer carrying Fox programming.

80. As already discussed, such a dramatic reduction in market share would be required to make foreclosure profitable. Using the national cable shares to proxy the share of the small cable companies, we previously explained that DIRECTV would need to increase its share by 31 to 40 share points (holding price constant) or increase its per-subscriber revenue by 117% to 175% (holding its subscribers constant) in order to make foreclosure of O&Os profitable, where the range depends on whether a significant fraction of subscribers of the foreclosed MVPDs use A/B switches to access the O&O over-the-air. These increases are not plausible.

81. Even if a small cable company were to have a significantly lower market share in its franchise area, the required increases would be implausible. For example, suppose that the small cable company had an MVPD market share of 55%, whereas DIRECTV had a share of 27% and EchoStar had a market share of 18%. Suppose that DIRECTV foreclosed these MVPD rivals from access to its O&Os. In that situation, DIRECTV would need to increase its market share by 26-33 share points (at constant prices) to make this foreclosure profitable, depending on the assumption about A/B switches discussed above. This is a DIRECTV percentage share increase in the range of 97-124%. The required price increases would involve per-subscriber revenue increases of 47-71%, holding the number of DIRECTV subscribers constant.

82. The required increases also would be implausible if DIRECTV were to foreclose only the small cable operators from its O&Os, while continuing to provide EchoStar with this content. In this case, DIRECTV would need to increase its market share by 16-19 share points (at constant prices) to make this foreclosure profitable, depending on the assumption about A/B switches discussed above. This is a DIRECTV percentage share increase in the range of 59-71%. The cable operator's loss in market share would be in the 27-32 share point range.<sup>63</sup> The required price increases would involve per-subscriber revenue increases in the range of 36-53%, holding DIRECTV subscribers constant.

83. If some of the DIRECTV subscribers are NRTC customers, then a programming foreclosure strategy would be even more unprofitable. In these areas, instead of the normal \$ margin that DIRECTV earns on each subscriber, DIRECTV earns less than \$ per NRTC subscriber. Therefore, Fox, which would own 34% of DIRECTV, only would earn less than \$ for each additional NRTC subscriber, making foreclosure even less profitable than indicated above in our calculations. In addition, to the extent that Fox is currently earning higher margins on Fox programming from small and medium-sized cable companies than from larger cable companies, then foreclosure would be even more costly to Fox and thus more unprofitable than our calculations above would indicate.

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<sup>63</sup> Where there is foreclosure solely of the cable operator, we assume that DIRECTV and EchoStar gain subscribers in proportion to their market shares, so that DIRECTV would gain about 60% of the subscribers that leave the cable operator. This means that the cable operator's loss in market share is 1.67 times DIRECTV's gain in market share, because EchoStar also would pick up subscribers.

**D. Impact on Foreclosure Incentives of a 50% Ownership Share of DIRECTV**

84. We understand that under the Commission rules, NC would be able to increase Fox's share of DIRECTV up to just below 50% without further review and approval. We have recalculated the numerical analysis presented earlier to take into account that higher profit share. The relevant figures are summarized in Tables 4 through 7.
85. As indicated in these Tables, if Fox's profit share in DIRECTV were 50% instead of 34%, it would not have to acquire as many subscribers from its rivals (and they would not have to lose as many subscribers) for the foreclosure strategy to be profitable. Likewise, the required per-subscriber revenue (price) increase would be somewhat lower. However, the required DIRECTV subscriber increases (and rival MVPD decreases) would remain implausibly large, as would the required DIRECTV per-subscriber revenue increases.
86. As already discussed, such price or share increases from foreclosure are inconsistent with the evidence, including the evidence of subscriber movements in response to lack of access to sports programming. Although we do not have similar natural experiments for the O&Os, it seems highly unlikely that such large subscriber movements would occur. Therefore, even if NC's share of DIRECTV were to be increase to just under 50%, it is not likely that NC would have an incentive to foreclose MVPD rivals from Fox programming.

**Table 4: Required Changes for Profitability  
Fox RSN Foreclosure**

Foreclosure Scenario	Fox Ownership Interest	
	34%	50%

**Paragraph 50**

**DIRECTV Subscriber Increase:**

Share Points	17	12
Percentage of Initial Subscribers	128%	93%

**Paragraph 51**

**DIRECTV Revenue (per sub) Increase:**

Monthly Subscriber Cost	\$	\$
Percentage Increase	49%	33%

**Table 5: Required Changes for Profitability  
Fox O&O Foreclosure**

Foreclosure Scenario	Fox Ownership Interest	
	34%	50%

**Paragraph 71**

**DIRECTV Subscriber Increase:**

Share Points	40	32
Percentage of Initial Subscribers	306%	244%

**Paragraph 72**

**DIRECTV Revenue (per sub) Increase:**

Monthly Subscriber Cost	\$	\$
Percentage Increase	175%	119%

**With A/B Switch  
Paragraph 73**

**DIRECTV Subscriber Increase:**

Share Points	31	24
Percentage of Initial Subscribers	241%	185%

**With A/B Switch  
Paragraph 74**

**DIRECTV Revenue (per sub) Increase:**

Monthly Subscriber Cost	\$	\$
Percentage Increase	117%	80%

**Table 6:  
Required Changes for Profitability:  
Fox O&O Foreclosure in Small Cable  
Operator Area (Paragraph 81)**

Foreclosure Scenario	Fox Ownership Interest	
	34%	50%
<b>DIRECTV Subscriber Increase:</b>		
Share Points	33	27
Percentage of Initial Subscribers	124%	98%
<i>Corresponding Small Cable Operator Subscriber Loss:</i>		
Share Points	25	20
Percentage of Initial Subscribers	46%	36%
<b>DIRECTV Revenue (per sub) Increase:</b>		
Monthly Subscriber Cost	\$	\$
Percentage Increase	71%	48%
<b><u>With A/B Switch</u></b>		
<b>DIRECTV Subscriber Increase:</b>		
Share Points	26	20
Percentage of Initial Subscribers	97%	75%
<i>Corresponding Small Cable Operator Subscriber Loss:</i>		
Share Points	20	15
Percentage of Initial Subscribers	36%	28%
<b><u>With A/B Switch</u></b>		
<b>DIRECTV Revenue (per sub) Increase:</b>		
Monthly Subscriber Cost	\$	\$
Percentage Increase	47%	32%

**Table 7:  
Required Changes for Profitability:  
Fox O&O Foreclosure Solely of Small  
Cable Operator (Paragraph 82)**

<b>Foreclosure Scenario</b>	<b>Fox Ownership Interest</b>	
	<b>34%</b>	<b>50%</b>
<b>DIRECTV Subscriber Increase:</b>		
Share Points	19	16
Percentage of Initial Subscribers	71%	60%
<i>Corresponding Small Cable Operator Subscriber Loss:</i>		
Share Points	32	27
Percentage of Initial Subscribers	58%	49%
<b>DIRECTV Revenue (per sub) Increase:</b>		
Monthly Subscriber Cost	\$	\$
Percentage Increase	53%	36%
<b><u>With A/B Switch</u></b>		
<b>DIRECTV Subscriber Increase:</b>		
Share Points	16	13
Percentage of Initial Subscribers	59%	48%
<i>Corresponding Small Cable Operator Subscriber Loss:</i>		
Share Points	27	21
Percentage of Initial Subscribers	48%	39%
<b><u>With A/B Switch</u></b>		
<b>DIRECTV Revenue (per sub) Increase:</b>		
Monthly Subscriber Cost	\$	\$
Percentage Increase	36%	24%

#### IV. The Transaction Will Not Lead to Anticompetitive Price Increases for Fox Programming

87. Some commenters have asserted that the proposed transaction will give NC the incentive to simply raise the price of Fox programming as a means of raising the costs of DIRECTV's rivals.<sup>64</sup> These price increases might be discriminatory or uniform. For example, after criticizing NC's non-discrimination conditions, Professor Rogerson suggests that the conditions would place "very little constraint" on NC's prices to smaller cable companies. He then goes on to say, "the proposed condition only requires that NC charge the *same* prices to all MVPDs. NC could comply fully with the condition and still charge high prices to its rivals simply by charging equally high prices to DIRECTV."<sup>65</sup> In this section, we explain the flaws in the claim that such price increases would occur and harm consumer welfare.

88. We have already discussed why a foreclosure strategy of denying rivals' access to certain Fox programming likely would be unprofitable. We now discuss why a foreclosure strategy of raising the prices of this programming similarly would be unprofitable. These different foreclosure strategies are closely related, of course. One way to deny access is to set a prohibitively high programming price, so high that the MVPD chooses to forgo the programming altogether. In addition, both types of

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<sup>64</sup> Rogerson at 22; EchoStar Petition at 22-24; American Cable Association Comments at 17-19. If the prices were raised so high that the rival MVPDs do not carry the Fox programming, the outcome is conceptually equivalent to the withholding case studied in the previous section. Indeed, withholding is economically equivalent to raising prices to rival MVPDs so high that no rival MVPD would pay those prices.

<sup>65</sup> Rogerson at 5 (emphasis in original).

foreclosure strategies reduce profits at the program supply level.<sup>66</sup> This profit loss must be compared to the magnitude of increase in profit at the MVPD level. Thus, the fact that the denial of access is unprofitable makes it more likely that programming price increases also would reduce profits. In our discussion, we also focus on the partial elimination of the double markup. That factor is important because it reduces the incentive to raise prices; indeed, on its own, it gives a programmer like Fox an incentive to lower its programming prices and a MVPD like DIRECTV an incentive to lower its subscription prices. Thus, the evidence does not support the claim it likely would be profitable for Fox to attempt discriminatory price increases against DIRECTV's rivals.

89. In this section, we first examine the incentives for NC *uniformly* to raise the price at which it offers its programming to all MVPDs, including DIRECTV.<sup>67</sup> This uniform price increase scenario is particularly relevant because price discrimination against rival MVPDs would violate both the Commission's program access and retransmission consent rules and the undertakings that NC has agreed to adopt. We demonstrate here that the proposed transaction would in fact create just the opposite incentive -- to *lower*, not raise, the uniform price Fox would charge to MVPDs for its

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<sup>66</sup> The main difference in the two strategies is that some of the programming may continue to be purchased when prices are raised only moderately. That is, when a programmer raises its price, it faces a risk that the MVPD will drop the programming, but dropping the programming altogether is not a certainty. This makes the details of the analysis somewhat more complex. However, even if the programming price increases are not prohibitive, they still would lead to rival MVPDs on average purchasing less of the programming, thereby reducing the programmer's program profits. This must be true because, after all, if the programming profits would have increased at a higher price, the programmer would have chosen the higher price absent the vertical integration.

<sup>67</sup> To the extent that there are initial price differences among MVPDs, we analyze identical price increases for each. We refer to this as "uniform" price increases.

programming when it cannot price discriminate. The key reasons for this incentive are the combination of partial elimination of the double markup and the assumption that Fox and DIRECTV each attempts to maximize its own profits.

90. We then examine the incentives for discriminatory price increases targeted at DIRECTV's rivals. This foreclosure strategy assumes that the Commission would fail to impose the proposed conditions or that the parties somehow could evade the Commission's order. The commenters such as Professor Rogerson have not demonstrated that NC would have the incentive to raise Fox or DIRECTV prices. They have just asserted that there would be an incentive for such a price increase. But the likelihood of a price increase in this scenario cannot properly be assumed, but instead must be analyzed and proved. In this regard, the significant unprofitability of the denial of access discussed earlier, and the partial elimination of the double markup, together point away from a finding of likely price increases. The commenters also fail to show that Fox's closest programming competitors would raise their prices in response to a Fox price increase. Thus, one cannot conclude that the proposed transaction would lead to higher prices for Fox programming, or higher MVPD prices and lower consumer welfare.

#### **A. Uniform Programming Prices**

91. The Commission's program access and retransmission consent rules, along with the undertakings that NC has agreed to enter into, are a constraint on Fox's ability to price discriminate. NC has stated its willingness to make the Fox programming available to all MVPDs on non-discriminatory prices, terms and conditions. NC has

also stated its willingness to agree to conditions that would preclude exclusive agreements for any of its existing or future (national or regional) programming services. NC has also stated its willingness to preclude DIRECTV from discriminating against unaffiliated program services. NC has further stated its willingness to consent to rules prohibiting it from unduly or improperly influencing affiliated programming entities, including Liberty Media.

92. A number of commenters nevertheless suggest that these constraints will not prevent NC from imposing a *uniform* increase in the price charged for Fox programming. For example, Gene Kimmelman has testified:

While News Corp./Fox agrees to make its programming available on non-discriminatory terms and conditions, there is absolutely nothing that would prevent News Corp./Fox from raising the price that it charges itself on its satellite system, in return for increased revenues from the other 70 million cable households.<sup>68</sup>

This relatively short quote contains several basic errors in economic reasoning.

93. First, the presumption in the quote that all cable operators would simply accept and pay higher fees for Fox programming is clearly inconsistent with the fact that Fox's fees today already maximize the profits that Fox can earn on its programming. Fox must believe today, in the pre-acquisition world, that raising its affiliate fees would run the risk of losing carriage on some cable systems; or it would have raised its fees already. The proposed transaction would not make an increase in affiliate fees more likely. It would not lower the elasticity of demand facing Fox programming. In short, the Fox fees today already capture whatever edge Fox programming can give to

one distributor over another (given the program access rules preventing discrimination). NC's investment in DIRECTV cannot magically enhance the price that Fox can get for its programming from any distributor -- cable, DIRECTV, or EchoStar.

94. Second, contrary to Mr. Kimmelman's statement, there is no basis for the assumption that "there is absolutely nothing that would prevent NC/Fox from raising the price it charges itself." For one thing, the quotation is mistaken because the proposed transaction only involves NC taking a *partial* ownership interest in DIRECTV, so fees charged by Fox to DIRECTV clearly are not payments from NC to "itself." In addition, because Fox would own only 34% of DIRECTV, DIRECTV would not have the incentive simply to pay inflated prices to Fox for its programming. DIRECTV's majority shareholders have no incentive to stand by idly and permit DIRECTV to take actions contrary to their interests, that is, actions that lower DIRECTV's own profits. In fact, Hughes will have an audit committee consisting of outside directors with the ability to review and disapprove potentially overpriced programming agreements between DIRECTV and Fox. Because of this, after the transaction, Fox would find that charging higher fees to DIRECTV would risk loss of carriage, just as it would in the pre-acquisition world.

95. Third, and most important, Mr. Kimmelman's assumption that Fox would have the incentive to set inflated fees for its programming to DIRECTV after this transaction is simply wrong. His claim is directly contrary to the implications of reducing the

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<sup>68</sup> Testimony of Gene Kimmelman before the Senate Commerce, Science, and Transportation Committee, *Cable Television and the Dangers of Deregulation*, May 6, 2003, at 5.

double markup discussed earlier. Assuming that prices must be non-discriminatory, as a result of the program access rules and undertakings, NC's partial ownership interest in DIRECTV in fact gives NC an incentive to uniformly *lower* the prices charged by Fox to DIRECTV and other MVPDs, not raise them. We next explain why.

- ***Fox's Profits:*** Economic theory assumes that, prior to its investment in DIRECTV, Fox's current programming prices have been chosen to maximize profits for Fox. Fox is a profit-maximizing firm and there is no reason to think that it would not be setting its programming prices to maximize its profits. That means that setting higher uniform affiliate fees would predictably lead to enough subscriber losses to be unprofitable. This fact that a uniform price increase would reduce Fox's programming profits does not change when NC adds an investment in DIRECTV.
- ***DIRECTV's profits:*** A uniform price increase by Fox would increase the costs of all the MVPDs, including DIRECTV. That cost increase would tend to reduce the profits of all MVPDs, including DIRECTV.

96. These two observations make a powerful point. After the acquisition, there would be *two* reasons why raising the Fox affiliate fees would cause NC to lose money, relative to maintaining prices at the pre-acquisition level, *ceteris paribus*. First, Fox would lose money on its programming (Fox's pre-transaction price having already maximized its programming profits). Second, DIRECTV would lose money from the higher fees. Once NC has a partial ownership interest in DIRECTV, it would take

that latter profit reduction into account in its decision making. Thus, NC certainly would *not* want to raise the price of Fox programs to all MVPDs after acquiring an interest in DIRECTV.

97. Instead, this investment would give NC a distinct incentive to *lower* the price of Fox programming, relative to what it would have charged otherwise. Although the lower programming fees would reduce Fox's profits somewhat, those lower fees would raise DIRECTV's profits. Given the facts here, lower programming fees would boost DIRECTV's profits even if DIRECTV's rivals also would receive the same lower fees.

98. Thus, the claims of Mr. Kimmelman and the commenters are incorrect. Assuming that Fox programming prices to all MVPDs must rise or fall together, the transaction would not create an incentive for Fox to raise its programming prices uniformly. To the contrary, it would create an incentive for Fox to *lower* its programming prices uniformly.

99. This analysis involves general economic principles and does not depend on particular assumptions about exact subscriber movements. Therefore, it is not necessary to carry out the type of numerical analysis presented earlier with respect to denial of access to Fox programming. However, we do provide an illustrative arithmetic example of this analysis in Appendix A.

100. The commenters appear to be assuming that higher uniform Fox fees would shift subscribers on balance towards DIRECTV. However, by their very nature, uniform increases in the price of content used equally by all distributors would not generally

give any one distributor a competitive advantage, and thus would not tend to cause significant shifts among those distributors. There is no reason why DIRECTV would benefit at the expense of cable and EchoStar from a uniform increase in the price of Fox programming.

101. It also might be argued that DIRECTV would not have the incentive to raise its subscription fee along with its MVPD rivals in response to the hypothesized increase in Fox programming fees. However, this claim is inconsistent with the assumption that DIRECTV would continue to maximize its own profits rather than NC's profits. We understand that forcing DIRECTV instead to serve NC's broader interests would violate the Hughes Directors' fiduciary obligation towards the other shareholders and expose the company and its Directors to legal action.

102. Thus, in the presence of binding program access rules, NC's voluntary undertakings and corporate and securities laws, the proposed transaction would not lead to incentives to raise prices uniformly. Instead, NC would have the incentive to reduce price, relative to what it would charge absent the transaction, or improve the level of service, all to the benefit of consumers.

**B. Discriminatory Price Increases**

103. Several commenters have suggested that the transaction might lead to targeted price increases of Fox programming.<sup>69</sup> (These claimed discriminatory price increases in principle might involve Fox abusing the O&O retransmission process or might

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<sup>69</sup> See, e.g., Joint Cable Comments at 31-32; ACA Comments at 12-13 (retransmission consent), 17-18 (satellite-delivered programming).

entail Fox evading the program access rules.) However, there are major shortcomings in the commenters' arguments that make them unusable as a policy prescription. The commenters' arguments alleging an incentive to raise the cost of the programming to rival MVPDs have only been made at a general level, and have not been supported with substantial evidence. Moreover, as discussed next, the evidence (both facts and economic theory) does not support their claims.

104. First, we have already discussed in detail how denying access to Fox programming would be unprofitable to NC. This factor casts considerable doubt on the claim of anticompetitive effects. In the real world, discriminatory price increases would be risky because the MVPD whose price has been increased might just decide to drop the service, which would have the same effect as denying the MVPD access to that programming. The fact that denial of access would not be plausible because it would be highly unprofitable also makes it less likely that discriminatory price increases would be attempted.

105. Second, we have already discussed in detail how this acquisition would reduce the double markup. We also have explained in detail how this factor would tend to produce an incentive to lower prices uniformly. A similar analysis applies to discriminatory price increases. Partial elimination of the double markup would give NC the incentive to reduce Fox's programming prices charged to DIRECTV. Once that price-lowering incentive effect is taken into account, it can offset an incentive to raise prices to DIRECTV's rivals. In short, this analysis implies that there are incentive effects running in opposite directions. One effect, driven by the rivals'

reduced demand for Fox programming resulting from the fact that DIRECTV would have lower costs, pushes towards lower programming prices (*ceteris paribus*). The other effect, driven by the benefits of handicapping competitors, pushes towards higher programming prices (*ceteris paribus*). Because these effects run in opposite directions, it is not possible to conclude simply on the basis of theory that the net effect would be to raise programming prices. Yet, in effect, this is what the commenters do.

106. In Appendix B, we present a relatively simple linear model that shows how these two countervailing incentives interact.<sup>70</sup> It is noteworthy that in this simple model, the net effect of these incentives would be to *lower* the price of the input charged to the rival firms and reduce the price of output charged to consumers. Therefore, the results of this model do not support the commenters' view that programming prices would tend to rise and that consumers would be harmed. If anything, the results would support a view that prices would tend to fall. As discussed earlier, this could involve a lower price or higher quality than would have occurred otherwise.

107. Third, we have already discussed the fact the Fox RSNs face competition from sports shown on broadcast and cable channels, other sports channels, and other general entertainment cable programming. Fox's O&Os also face competition from other local broadcast stations and cable networks. The commenters have not shown that those competitors also would respond with similar discriminatory price increases,

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<sup>70</sup> We do not provide numerical analysis for this foreclosure scenario as we did for the case of denial of access to Fox programming. This is because the numerical analysis cannot easily illustrate the complexity of the interaction of these incentives in the presence of partial elimination of double markup or other efficiency benefits.

following a discriminatory price increase by Fox. This factor also reduces the likelihood that Fox would attempt to raise prices to DIRECTV's competitors.

108. Thus, based on this analysis, the commenters provide no basis for concluding that NC would have the incentive to foreclose with the alleged price discrimination strategy, even if the constraints from the program access and retransmission consent rules and proposed undertakings were limited. As illustrated by the example in Appendix B, one cannot conclude that this partial ownership interest is more likely than not to harm consumer welfare or efficiency.

**V. The Transaction Will Not Lead to Anticompetitive Foreclosure of Rival Program Services**

109. The other vertical exclusion claim that has been raised is the anticompetitive denial of distribution by DIRECTV to rival cable networks that compete directly against programming owned and controlled by Fox.<sup>71</sup> According to this theory, DIRECTV would deny carriage to programming that competes directly against the Fox programming. This would reduce profits at DIRECTV (which we presume has been making its carriage decisions to maximize its own profits). However, under this theory, such denial of carriage would become profitable for NC and DIRECTV together after the proposed transaction and would lead to a reduction in competition at the programming level, to the detriment of consumers.

110. We do not find it plausible that carriage on DIRECTV is essential for programming to compete against Fox programming. Nor does this transaction

significantly raise entry barriers into programming markets, however one reasonably defines the precise programming markets in which Fox programming competes.

Even if one believed that certain Fox programming were dominant or had significant market power today, we have seen no serious argument as to why that power would be enhanced or entrenched by the proposed transaction, given DIRECTV's modest share of MVPD subscribers. It is also important to note that in addition to the economic incentives, the Parties' voluntary commitments and the Commission rules.

111. This vertical foreclosure theory rests on the assumptions that (a) NC can somehow force DIRECTV to act against its own interests by refusing to carry programming that it would otherwise choose on the merits, and that (b) such strategic denial of carriage by DIRECTV would greatly weaken Fox's programming rivals and force them to exit the market or significantly reduce the quality of their programming. Neither of these assumptions seems likely to be valid empirically.

112. First and foremost, as shown in Table 1 above, DIRECTV accounts for only a modest share of total MVPD subscribers, roughly 13% nationally. As a result, even if DIRECTV were to deny access to a rival program service, the rival program service would still be able to reach the lion's share of MVPD subscribers nationally. With only 13% of subscribers nationally, carriage on DIRECTV is unlikely to be essential for the viability of video programming.<sup>72</sup> It is not plausible that lack of carriage on a

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<sup>71</sup> See, e.g., NRTC Petition at 13-14; EchoStar Petition at 39-40; *Comments of the National Association of Broadcasters*, MB Docket No. 03-124, (filed June 16, 2003) ("NAB Comments") at 20-21.

<sup>72</sup> See *Implementation of Section 11(c) of the Cable Television Consumer Protection Act of 1992*, Third Report and Order, 17 FCC Rcd. 19098, 19119, ¶ 52 (1999) (concluding that new video programmer has reasonable chance of success if it can reach 40% of subscribers in MVPD market).

single MVPD the size of DIRECTV would be sufficient to drive a rival program service to exit the market.

113. Second, it is not clear how such a strategy could result in the creation or enhancement of dominance or market power for Fox programming. In some cases, such as Fox News Channel (FNC), rival programming is very strong (CNN and others) and the prospect of FNC gaining monopoly power by denying CNN access to DIRECTV subscribers is not plausible. DIRECTV also would be unwilling to stop carrying popular channels like ESPN and TNT to benefit Fox programming.

114. DIRECTV's current channel lineup is the one it believes maximizes its profits. Thus, by denying carriage of these programs, DIRECTV's profits as a distributor would be reduced. Hughes' independent directors would be violating their fiduciary duties by consenting to a policy that distorts DIRECTV's channel lineup in order to generate more profits for Fox programming. Such a course of action would not be in the interest of the other Hughes' shareholders. Moreover, lacking the ability to drive rival programmers from the market or significantly weaken them by refusing carriage on DIRECTV, this strategy would not be profitable for NC and DIRECTV together. In other words, NC and DIRECTV together also do not have the *incentive* to discriminate against rival cable networks/programming in terms of DIRECTV carriage, so such discrimination is highly unlikely to occur after the proposed transaction.

115. Finally, even if DIRECTV were to deny carriage to a program service that competes with some Fox programming service, that fact alone does not prove an

anticompetitive effect in the program service market. An anticompetitive effect could only arise if the competing Fox program service gains the power to raise or maintain a supra-competitive price. Moreover, one cannot infer anticompetitive purpose or effect solely from the failure to carry a program service that competes with Fox programming. There are a variety of other reasons why DIRECTV might not carry a particular service, including channel constraints, a perception that the service might not be popular with viewers, the desire for a certain menu of program types, or an inability to reach an agreement on price.

## **VI. Conclusions**

116. Based on this economic analysis, we do not find it plausible that Fox's partial ownership interest in DIRECTV likely would lead to anticompetitive harm to consumers from vertical foreclosure. The commenters did not carry out a complete theoretical economic analysis and they failed to provide convincing quantitative evidence. Our numerical analysis of profitability and the empirical evidence fail to support the view that NC would attempt an anticompetitive foreclosure strategy. In our opinion, the transaction should be permitted.

### Appendix A: Illustrative Arithmetic Example

117. In this Appendix, we provide an illustrative example of the incentives of a vertical integrated programmer to reduce programming prices to its affiliated distributor.
118. Consider the firm (identified as “Programmer”) that supplies programming to a single downstream distributor (identified as “Distributor”). Assume that substantial fixed costs are needed to create programming, but that Programmer incurs no incremental costs as the number of subscribers to its programming grows.
119. We could easily incorporate advertising revenues into this example. However, to keep the example simple, we focus solely on affiliate fees. Prior to the vertical transaction in question, suppose that Programmer charges Distributor a price of \$2 per month for every subscriber who receives programming. Let us suppose that Distributor has 10 million subscribers in total, 80% of whom receive the programming. Therefore, Programmer is earning revenues of \$16,000,000 per month from Distributor for programming -- \$2 per month for each of 8,000,000 subscribers.
120. As discussed above, we may presume that the pre-transaction price of the programming is set by Programmer to maximize its profits from the programming. Therefore, Programmer would make less than \$16,000,000 per month if it raised or lowered its price of \$2 per month. Why would a higher price, say \$2.20, not generate more profits for Programmer? The explanation is that fewer subscribers would receive the programming, either because Distributor might drop the programming altogether, because Distributor might move the programming to a higher tier that has

fewer subscribers, or because Distributor might raise its own retail price and lose subscribers that way. Whatever the cause, call  $S$  the number of subscribers that Programmer expects to receive programming if it charges \$2.20.<sup>73</sup> The revenues Programmer must have expected to earn from a price of \$2.20 are  $\$2.20 \times S$ . Since these are less than \$16,000,000, we know that  $S$  is less than  $16,000,000 \div 2.20$ , which equals roughly 7,273,000. In other words, Programmer must have expected to lose at least 727,000 subscribers if it were to raise its price from \$2.00 to \$2.20.

121. While this logic is straightforward, some of the critics of this transaction appear to have neglected to bear in mind that Fox cannot simply raise its price without suffering a costly loss of subscribers. Sound economic analysis *must* start from the presumption that the firms involved are maximizing their profits prior to the proposed transaction, unless there is some reason to think that NC is not an effective profit-maximizing firm. Thus, prior to the acquisition, NC and Fox must believe that they would lose significant numbers of subscribers were they to attempt to impose a significant increase in the uniform affiliate fees paid by all the MVPDs, including DIRECTV. The Commission should be highly skeptical of any commenters who assert – either explicitly or implicitly – that NC can raise the price of Fox programming without risking a costly loss of subscribers.

122. A very similar logic can be applied to a *lower* price for the programming. Were Programmer to lower the price of programming by 10% to \$1.80 and get  $Y$

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<sup>73</sup> If Programmer thinks that Distributor would drop the programming with a 20% chance, and just pay the \$2.20 and make no other adjustments with an 80% chance, then the expected number of subscribers would be 6,400,000: an 80% chance of 8,000,000 subscribers and a 20% chance of no subscribers.  $S$  could be interpreted in this fashion.

subscribers, its monthly revenues would be  $\$1.80 \times Y$ . Since Programmer's profit-maximizing price is \$2.00, not \$1.80, these revenues must be less than \$16,000,000, so we know that  $Y \leq 16,000,000 \div 1.8$ , which equals roughly 8,889,000. In other words, Programmer must have expected that dropping its fee to \$1.80 per month would add fewer than 889,000 subscribers for the programming. For purposes of illustration (our point is not sensitive to the particular numbers used), let us suppose that Programmer had expected to gain 800,000 subscribers if it were to lower its price to \$1.80. Therefore, from Programmer's perspective, a price of \$1.80 would generate revenues of  $\$1.80 \times 8,800,000$  or \$15,840,000 per month, less than the \$16,000,000 earned at the \$2.00 programming price. In this case, Programmer would expect to lose \$160,000 per month by dropping its price to \$1.80.

123. Now suppose that Programmer acquires a 30% financial stake in Distributor. We assume that Distributor is still operated to maximize its own profits, as the other 70% owners of Distributor would expect and require. We can illustrate why Programmer would gain an economic incentive to *lower* the price of programming after Programmer acquires a financial stake in Distributor.

124. Consider first whether Programmer would now find it profitable to raise the uniform price of programming from \$2.00 to \$2.20 after Programmer acquires the 30% financial stake in Distributor. The answer is certainly that it would not. We have already explained that Programmer's profits would fall from this uniform price increase. The uniform price increase also would reduce the profits of Distributor (and cost Programmer 30% of these losses), who would now have higher costs and would

lose sales if it raised its retail price. Thus, the vertical merger would create an even greater disincentive to raise the uniform price.

125. Consider next whether Programmer would find it profitable to *lower* the price of programming from \$2.00 to \$1.80 after Programmer acquires the 30% financial stake in Distributor. The precise impact on profits depends upon just how Distributor's profits are affected by the price of the programming, which depends in turn on how Distributor responds to changes in the price of the programming. But we know for sure that Distributor's profits must rise by *at least* 20 cents per subscriber because Distributor could have responded passively and simply pocketed the lower cost of programming in the form of a 20-cent higher profit margin. Of course, the Distributor would choose to reduce price somewhat.<sup>74</sup> Thus, its total profits must rise by at least 20 cents times 8,000,000 subscribers, or \$1,600,000 per month. This means that Programmer, through its ownership of 30% of Distributor, will gain at least \$480,000 per month from the price reduction that it would not have taken into account prior to taking a financial stake in Distributor. In our example, this \$480,000 exceeds the \$160,000 loss in programming revenues associated with the price reduction, making that price reduction profitable directly and solely as a result of Programmer's financial stake in Distributor. Thus, in this example, the Programmer would have the incentive to reduce its program prices after the transaction.

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<sup>74</sup> Presumably, a more active response, which also would benefit consumers, would be even better for Distributor. Such an active response by Distributor is implicit in the assumption made above that Programmer would gain 800,000 new subscribers as a result of dropping its price to \$1.80.

126. Our general point – that a vertically integrated program supplier has greater incentives to reduce the price of its programming to its affiliated distributor – is not dependent upon the particular numbers used in our example. Nor does it depend upon the particular way in which the distributor chooses to respond to decreases in programming costs. Instead, the numbers affect only the magnitude of the profit-maximizing price decrease. Where it applies, this incentive to reduce price is a pro-competitive efficiency benefit of vertical integration.

## Appendix B: Vertical Integration with Price Discrimination

127. In this Appendix we present a simple model with linear demand that shows the incentive to lower the input price (programming) after the input provider vertically integrates with a downstream firm even when the provider of this input has the ability to price discriminate amongst the downstream rivals.

### Pre-Merger Equilibrium

128. Consider the following two-stage game with three players: an upstream supplier (U) and two downstream distributors (D1 and D2).<sup>75</sup> In stage 1, U sets the upstream prices,  $W_1$  and  $W_2$ , that it will charge to D1 and D2, respectively. In stage 2, given  $W_1$  and  $W_2$ , D1 and D2 simultaneously set the downstream prices,  $P_1$  and  $P_2$ , respectively. The downstream firms face the following demand functions:

$$Q_1 = 100 - 15P_1 + 5P_2 \quad \text{and} \quad Q_2 = 100 - 15P_2 + 5P_1. \quad (1)$$

129. Note that, given the downstream price  $P_2$  charged by D2, the demand faced by D1 is equal to zero if D1's downstream price,  $P_1$ , is greater than or equal to  $(100 + 5P_2)/15$ . For example, given  $P_2 = 7$ , D1 makes no sales if  $P_1 \geq 9$ . In other words, the "choke price" of D1 is equal to 9 (given  $P_2 = 7$ ). Graphically, given  $P_2 = 7$ , the demand faced by D1 is a straight line that starts on the vertical axis at  $P_1 = 9$ . If instead  $P_2$  is greater (smaller) than 7, then the choke price of D1 is greater (smaller)

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<sup>75</sup> We assume that U is a monopolist or that U's competitors maintain constant prices. This is the assumption made by the commenters.

than 9, and the demand curve faced by D1 shifts up (down) accordingly. To be precise, the demand equations in (1) apply only in the range where the quantities demanded are positive. Outside this range, quantity demanded is zero.

130. We assume that U can supply the product at zero marginal cost, and that the marginal costs of D1 and D2 are equal to  $W_1$  and  $W_2$ , respectively. Our results would be unchanged if we were to assume a positive but constant marginal cost for U, or additional marginal costs for D1 and D2.

131. We use the specific parameters in equation (1) merely for simplicity of exposition. The results reported here are quite general and do not depend upon these parameter choices. For the standard case with linear demand and constant marginal costs, the results presented here hold in all cases if the demand functions are symmetric. Even if the demand functions are asymmetric, the results still hold in most cases. That is, for foreclosure to become profitable, it has to be the case that the demand facing the affiliated downstream firm is very elastic with respect to changes in the downstream price of the unaffiliated downstream firm and, at the same time, that the demand facing the unaffiliated downstream firm is very inelastic with respect to changes in the downstream price of the affiliated downstream firm. Such a strong and particular pattern of asymmetry would seem to be highly unlikely.

132. In stage 2, given  $(W_1, W_2, P_2)$ , D1 chooses  $P_1$  to maximize its profit,

$$\Pi_1 = (P_1 - W_1)Q_1. \text{ The first-order condition is } 100 + 15W_1 - 30P_1 + 5P_2 = 0.$$

Similarly, the first-order condition for  $P_2$  is  $100 + 15W_2 - 30P_2 + 5P_1 = 0$ . Solving these two equations gives the Nash equilibrium of the stage-2 (sub)game:

$P_1 = (140 + 18W_1 + 3W_2)/35$  and  $P_2 = (140 + 18W_2 + 3W_1)/35$ . Substituting into equation (1) leads to the following upstream demand functions:

$$Q_1 = 60 - (51/7)W_1 + (9/7)W_2 \text{ and } Q_2 = 60 - (51/7)W_2 + (9/7)W_1.$$

133. In stage 1, U chooses  $(W_1, W_2)$  to maximize its profit,  $\Pi_U = W_1Q_1 + W_2Q_2$  (anticipating that in stage 2 the downstream firms will respond by playing the Nash equilibrium described above). Solving the first-order conditions gives the (perfect) equilibrium upstream prices, and substituting the latter into the above downstream price functions and upstream demand functions gives the equilibrium outcome prior to any vertical integration:  $W_1^{pre} = W_2^{pre} = 5$ ,  $P_1^{pre} = P_2^{pre} = 7$  and  $Q_1^{pre} = Q_2^{pre} = 30$ . For later use, we note that the pre-merger profits of U and D1 are equal to  $\Pi_U^{pre} = 300$  and  $\Pi_{D1}^{pre} = 60$  respectively.

## Post-Merger Equilibrium

### *Denial of Access to the Input is Not Profitable*

134. We first show that the merged company (U/D1) has no incentive to totally foreclose D2 (by either refusing to supply the product to D2 or raising  $W_2$  to a prohibitive level).
135. If U/D1 were to totally foreclose D2, then the demand for D1 would increase to:
- $$Q_1^{tot} = (4/3)(100 - 10P_1). \tag{2}$$
136. Intuitively, the demand curve faced by D1 when D2 is totally foreclosed is the same as the demand curve that D1 would face if D2 was not foreclosed but, for some reason, charged a downstream price  $P_2$  equal to the choke price of D2. Formally,

equation (2) is derived from equation (1) by first solving  $Q_2 = 0$  for the choke price,  $P_2^{choke} = (20 + P_1)/3$ , and then evaluating  $Q_1$  at  $P_2 = P_2^{choke}$ . The merged firm would then charge  $P_1^{tot} = 5$  (to maximize  $P_1 Q_1^{tot}$ ).

137. This price is lower than the pre-merger price charged by D1 because of the elimination of the double markup between U and D1. More importantly, if U/D1 totally forecloses D2, then the total profits of U and D1 are lower than pre-merger. Indeed, at the price of  $P_1^{tot}$ , the demand for D1 is equal to  $Q_1^{tot} = 200/3$ , and hence the total profit of U/D1 is equal to  $\Pi_{UD1}^{tot} = 1000/3$ , which is less than 360 (the sum of the pre-merger profits of U and D1).

138. To summarize, if U/D1 were to totally foreclose D2, then the total profits of U and D1 would be smaller than pre-merger. Since U/D1 can make at least the same amount of profits as pre-merger (e.g., by supplying D2 at the same upstream price as pre-merger), U/D1 has no incentive to totally foreclose D2.

***Discriminatory Input Price Increase Is Not Profitable***

139. We now show that U/D1 has no incentive to raise the upstream price  $W_2$  that it charges to D2. In stage 2, given  $(W_2, P_2)$ , U/D1 sets  $P_1$  to maximize the total profits of U and D1, i.e.:

$$\Pi_{UD1} = P_1 Q_1 + W_2 Q_2. \tag{3}$$

140. Note that U/D1 sets the downstream price  $P_1$  based on the true marginal cost (which is assumed to be zero for simplicity) and based on the total profits of U and D1. This leads to the following first-order condition:  $100 + 5W_2 - 30P_1 + 5P_2 = 0$ .

Given  $(W_2, P_1)$ , D2 behaves as pre-merger, and therefore its first-order condition is:

$100 + 15W_2 - 30P_2 + 5P_1 = 0$ . It follows that the post-merger Nash equilibrium

downstream prices (as functions of the upstream price  $W_2$  charged to D2) are equal to:

$P_1 = (140 + 9W_2)/35$  and  $P_2 = (140 + 19W_2)/35$ . Substituting into equation (1) leads

to the following upstream demand functions:  $Q_1 = 60 - (8/7)W_2$  and

$Q_2 = 60 - (48/7)W_2$ .

141. In stage 1, U/D1 chooses  $W_2$  to maximize its profit,  $\Pi_{UD1} = P_1Q_1 + W_2Q_2$

(anticipating that the stage 2 outcome will be the Nash equilibrium described above).

Solving the first-order condition gives the (perfect) equilibrium upstream price

charged to D2, and substituting the latter into the above downstream price functions

gives the equilibrium downstream prices:  $W_2^{post} = 1085/219 \cong 4.95$ ,

$P_1^{post} = 385/73 \cong 5.27$  and  $P_2^{post} = 1465/219 \cong 6.69$ .

142. Thus, the vertical merger leads to a reduction in all prices. Intuitively, after the

merger, D1 faces the true marginal cost and thus D1 lowers its downstream price.

This is the standard effect of vertical integration that arises from eliminating the

double markup. Since D1 is competing with D2, the reduction in the downstream

price of D1 tends to reduce the volume of sales of D2. This gives D2 the incentive to

lower its downstream price as well, although not as much as D1 (holding the

upstream price faced by D2 constant). It follows that, post-merger, D2's upstream

demand for the product falls if D2 must pay the same upstream price as pre-merger.

Ignoring for the moment the fact that U has merged with D1, the reduction in D2's

upstream demand gives U the incentive to lower the upstream price to D2. This second effect works in the same direction as the elimination of the double markup, and tends to further reduce downstream prices. There is also a third effect, the standard “raising rival’s cost” effect. However, as shown above, the net effect is pro-competitive.

143. Finally, the total profits of U/D1 are equal to about 416, which is greater than the pre-merger total profits of U and D1 of 360. Thus, in this model, vertical integration is profitable as well as beneficial to consumers.

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Advisory Committee, FTC Hearings on Global and Innovation-Based Competition (1996).

Associate Editor (Industrial Organization), *Journal of Economic Perspectives* (1987-1993).

ABA Antitrust Task Force on Second Requests (1990).

Advisory Board, Georgetown Project on Treble Damages (1986-1987).

Associate Editor, *Journal of Industrial Economics* (1983-1988).

Associate Editor, *International Journal of Industrial Organization* (1984-1989).

Secretary, Antitrust Section, American Association of Law Schools (1983-1984).

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“Parables of Information Transmission in Markets.” In *The Effect of Information on Consumer and Market Behavior*, edited by Mitchell, (1978).

“The Noisy Monopolist: Information, Price Dispersion and Price Discrimination.” *Review of Economic Studies* (October 1977).

“Bargains and Ripoffs: A Model of Monopolistically Competitive Price Dispersion.” With Joseph Stiglitz. *Review of Economic Studies* (October 1977).

“Self-Selection and Turnover in the Labor Market.” With Joanne Salop. *Quarterly Journal of Economics* (November 1976).

“Information and Monopolistic Competition.” *American Economic Review*, Papers and Proceedings (May 1976).

“Wage Differentials in a Dynamic Theory of the Firm.” *Journal of Economic Theory* (August 1973).

“Systematic Job Search and Unemployment.” *Review of Economic Studies* (April 1973).

### **Reviews/Comments/Congressional Testimony**

“Slap Their Wrists? Tie Their Hands? Slice Them Into Pieces? Alternative Remedies for Monopolization in the Microsoft Case,” *Antitrust*, 1999

“Efficiencies in Dynamic Merger Analysis.” Testimony at FTC Hearings on Global and Innovation-Based Competition (November 1995). A slightly revised version has been published as “Efficiencies in Dynamic Merger Analysis: Summary.” With Gary Roberts. *World Competition* (June 1996).

“Exclusionary Access Rules in Standards and Network Joint Ventures.” Testimony at FTC Hearings on Global and Innovation-Based Competition (December 1995).

“More Value for the Legal Dollar: A New Look at Attorney-Client Fees and Relationships.” With Robert Litan. *Judicature* (1994).

“Kodak as Post-Chicago Law and Economics,” *CRA Perspectives*, April 1993. Reprinted in Texas Bar Association, *Antitrust and Business Litigation Bulletin* (November 1993).

“Antitrust Goes to College.” With Lawrence White. *Journal of Economic Perspectives* (Summer 1991).

“Analysis of Entry in the New Merger Guidelines.” Brookings Papers on Economic Activity (1991).

“Mergers and Antitrust.” *Journal of Economic Perspectives* (1987).

“Comment on Golbe and White, ‘Time Series Analysis of Mergers.’” In A. Auerbach et al., *Mergers and Acquisitions*, NBER.

“Policy Implications of Conference Papers.” In Auerbach et al., *Mergers and Acquisitions*, NBER.

“Evaluating Uncertain Evidence with Sir Thomas Bayes.” *Journal of Economic Perspectives* (Summer 1987).

“Implications of the Georgetown Project for Treble Damages Reform.” Senate Judiciary Committee, March 21, 1986.

“Policing Deceptive Advertising.” Serial No. 97-134, 97th Congress.

“Entry Barriers, Consumer Welfare and Antitrust Reform.” In B. Bock et al., *Antitrust and New Views of Microeconomics*. Conference Board, 1986.

“Buy American, Save Your Job?” In J. Tobin et al., *Macroeconomics, Prices and Quantities*. Brookings Institution, 1983.

“Selling Consumer Information.” With Howard Beales. In J. Olson et al., *Advances in Consumer Research*, Vol. VII. 1980.

“Comment on Schmalensee, ‘On the Use of Economic Models in Antitrust.’” In O. Williamson et al., *Antitrust Law and Economics*, 1980.

“Review of K. Lancaster, ‘Variety, Equity and Efficiency,’” *Journal of Economic Literature*, 1980.

## UNPUBLISHED PAPERS AND TEACHING MATERIALS

“Economic Reasoning and the Law: Cases and Materials.”

“Ricardian Equilibrium with Stochastic Free Entry,” With Serge Moresi.

“Efficiency Benefits in Dynamic Merger Analysis.” With Gary Roberts.

“The Economic Consequences of Informality.” With Peter Reuter.

January 2003

# CARL SHAPIRO

## Curriculum Vitae

Haas School of Business  
University of California  
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### Professional Positions

#### TRANSAMERICA PROFESSOR OF BUSINESS STRATEGY

Walter A. Haas School of Business  
University of California at Berkeley, 1994 - present.

#### DIRECTOR

Institute of Business and Economic Research  
University of California at Berkeley, 1998 - present.

#### PROFESSOR OF BUSINESS AND ECONOMICS

Walter A. Haas School of Business and Department of Economics  
University of California at Berkeley, 1990 - present.

#### DEPUTY ASSISTANT ATTORNEY GENERAL FOR ECONOMICS

Antitrust Division, U.S. Department of Justice  
U.S. Department of Justice, 1995 - 1996

#### CHAIRMAN, ECONOMIC ANALYSIS AND POLICY GROUP

Walter A. Haas School of Business  
University of California at Berkeley, 1991 - 1993.

#### PROFESSOR OF ECONOMICS AND PUBLIC AFFAIRS

Woodrow Wilson School of Public and International Affairs and  
Department of Economics, Princeton University, 1987 - 1990.

RESEARCH FELLOW

Center for Advanced Study in the Behavioral Sciences  
Stanford University, 1989 - 1990.

VISITING SCHOLAR

Stanford Law School, Stanford University, 1989 - 1990.

ASSISTANT PROFESSOR OF ECONOMICS AND PUBLIC AFFAIRS

Woodrow Wilson School of Public and International Affairs and  
Department of Economics, Princeton University, 1980 - 1987.

VISITING FELLOW

Institute for International Economic Studies, University of Stockholm, 1986.

VISITING ASSISTANT PROFESSOR OF ECONOMICS AND PUBLIC POLICY

Graduate School of Business, Stanford University, 1982 - 1983.

ECONOMIST, BUREAU OF ECONOMICS, FEDERAL TRADE COMMISSION

Summer 1980.

**Other Professional Activities**

Member, Market Surveillance Committee, California Independent System  
Operator, 1997-2000, see <http://www.caiso.com/>.

Member, Advisory Board, *Journal of Economic Perspectives*, 1999-present.

Member, Advisory Board, *Antitrust and Regulation Abstracts*, 1998-present.

Member, Advisory Board, *Journal of Network Industries*, 1999-2001.

Vice-Chair, Economics Committee, Antitrust Section, American Bar Association,  
1995 - 1998.

Editor, *Journal of Economic Perspectives*, 1993 - 1995.

President, Industrial Organization Society, 1995 - 1996.

Member, Defense Science Board Task Force on Antitrust Aspects of Defense  
Industry Consolidation, U.S. Department of Defense, 1993 - 1994.

Co-Editor, *Journal of Economic Perspectives*, 1986 - 1993.

Associate Editor, *Quarterly Journal of Economics*, 1984 - 1987.

Associate Editor *Rand Journal of Economics*, 1984 - 1986.

Research Associate, National Bureau of Economic Research, 1985 - present.

Director, John M. Olin Program for the Study of Economic Organization and Public Policy, Princeton University, 1988 - 1989

Associate Director, John M. Olin Program for the Study of Economic Organization and Public Policy, Princeton University, 1987 - 1988.

### **Affiliations**

American Economic Association  
American Bar Association

### **Education**

Ph.D. Economics, M.I.T., 1981.  
M.A. Mathematics, University of California at Berkeley, 1977.  
B.S. Economics, M.I.T., 1976.  
B.S. Mathematics, M.I.T., 1976.

### **Honors, Fellowships, and Research Grants**

Runner-Up, Teaching Prize, MBA Program, Haas School of Business, U.C. Berkeley, 1999-2000.

National Science Foundation Research Grant #SES-9209509, "Technology Transitions with Network Externalities," 1992-1994, (with Joseph Farrell).

National Science Foundation Research Grant #SES-8821529, "The Evolution of Network Industries," 1989-1991, (with Joseph Farrell).

Center for Advanced Study in the Behavioral Sciences, Stanford California, Research Fellowship, 1989-1990.

National Science Foundation Research Grant #SES-8606336, "Issues of Industrial Organization in International Trade," 1986-1988, (with Gene M. Grossman).

Alfred P. Sloan Foundation Research Fellowship, 1985-1987.

National Science Foundation Research Grant #SES-8408622, "Technological Competition and International Trade," 1984-1986, (with Gene M. Grossman).

National Science Foundation Research Grant #SES-8207337, "Signals of Product Quality," 1982-1984.

National Science Foundation Graduate Fellowship, 1977-1980.

University of California Fellowship, 1976-1977.

Phi Beta Kappa and Sigma Xi, M.I.T., 1976.

### **Publications**

"Antitrust Limits to Patent Settlements," *Rand Journal of Economics*, forthcoming.

"The FTC's Challenge to Intel's Licensing Practices," in *The Antitrust Revolution, 4<sup>th</sup> Edition*, John E. Kwoka, Jr. and Lawrence J. White, eds., forthcoming.

"The British Petroleum/ARCO Merger: Alaskan Crude Oil," with Jeremy Bulow, in *The Antitrust Revolution, 4<sup>th</sup> Edition*, John E. Kwoka, Jr. and Lawrence J. White, eds., forthcoming.

"Trans-Atlantic Divergence in *GE/Honeywell*: Causes and Lessons," with Donna E. Patterson, *Antitrust Magazine*, Fall 2001.

"Antitrust Policy in the Clinton Administration," with Robert E. Litan, in *American Economic Policy in the 1990s*, Jeffrey Frankel and Peter Orszag, eds., Center for Business and Government, John F. Kennedy School of Government, Harvard University.

"Scale Economies and Synergies in Horizontal Merger Analysis," with Joseph Farrell, *Antitrust Law Journal*, vol. 68, no. 3, 2001.

"Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard Setting," in *Innovation Policy and the Economy*, Adam Jaffe, Joshua Lerner, and Scott Stern, eds., National Bureau of Economics, 2001.

"Simulating Partial Asset Divestitures to 'Fix' Mergers," with Jith Jayaratne, *International Journal of the Economics of Business*, 2000.

"Competition Policy: A Century of Economic and Legal Thinking," with William Kovacic, *Journal of Economic Perspectives*, Winter 2000.

- “Setting Compatibility Standards: Cooperation or Collusion?,” in *Expanding the Bounds of Intellectual Property*, Rochelle Dreyfuss, Diane Zimmerman, and Harry First, eds., 2001, Oxford University Press.
- “Competition Policy in the Information Economy,” in *Competition Policy Analysis*, Einar Hope, ed., 2000, Routledge Studies in the Modern World Economy.
- Information Rules: A Strategic Guide to the Network Economy*, with Hal R. Varian, Harvard Business School Press, 1999, see <http://www.inforules.com/>.
- “Exclusivity in Network Industries,” *George Mason Law Review*, Spring 1999.
- “The Art of Standards Wars,” with Hal R. Varian, *California Management Review*, Winter 1999.
- “Antitrust in Software Markets,” with Michael L. Katz, in *Competition, Convergence, and the Microsoft Monopoly*, 1999, Kluwer.
- “Versioning: The Smart Way to Sell Information,” with Hal R. Varian, *Harvard Business Review*, November-December 1998.
- “Unilateral Refusals to License Intellectual Property and International Competition Policy,” with Richard J. Gilbert, in *Competition and Trade Policies*, Einar Hope and Per Maeleng, eds., 1998, Routledge.
- “Antitrust Issues in the Licensing of Intellectual Property: The Nine No-No’s Meet the Nineties,” with Richard J. Gilbert, *Brookings Papers on Economics: Microeconomics*, 1997.
- “Crown-Jewel Provisions in Merger Consent Decrees,” with Michael Sohn, *Antitrust Magazine*, 1997.
- “Privacy, Self-Regulation, and Antitrust,” with Joseph Kattan, in *Privacy and Self-Regulation in the Information Age*, National Telecommunications and Information Administration, U.S. Department of Commerce, 1997.
- “Antitrust Policy: Towards a Post-Chicago Synthesis,” *Jobs & Capital*, Winter 1997.
- “An Economic Analysis of Unilateral Refusals to License Intellectual Property,” with Richard J. Gilbert, *Proceedings of the National Academy of Sciences*, November 12, 1996.
- “Re-Examining Dominance and Unlawful Exclusion Rules,” *Antitrust Conference Report*, The Conference Board, 1996.

- "Antitrust in Network Industries," Antitrust Division, U.S. Department of Justice, March 1996, see [usdoj.gov/atr/public/speeches/shapir.mar](http://usdoj.gov/atr/public/speeches/shapir.mar).
- "Mergers with Differentiated Products," *Antitrust*, Spring 1996. See also [usdoj.gov/atr/public/speeches/shapiro.spc](http://usdoj.gov/atr/public/speeches/shapiro.spc).
- "Aftermarkets and Consumer Welfare: Making Sense of *Kodak*," *Antitrust Law Journal*, Spring 1995.
- "Systems Competition and Network Effects," with Michael L. Katz, *Journal of Economic Perspectives*, Spring 1994.
- "Systems Competition and Aftermarkets: An Economic Analysis of *Kodak*," with David J. Teece, *Antitrust Bulletin*, Spring 1994.
- "The Dynamics of Bandwagons," with Joseph Farrell, in *Problems of Coordination in Economic Activity*, James W. Friedman, ed., Kluwer Press, 1993.
- "Standard Setting in High Definition Television," with Joseph Farrell, *Brookings Papers on Economic Activity: Microeconomics*, 1992.
- "Product Introduction with Network Externalities," with Michael L. Katz, *Journal of Industrial Economics*, March 1992.
- "Horizontal Mergers: Reply," with Joseph Farrell, *American Economic Review*, September 1991.
- "Introduction to Liability Symposium," *Journal of Economic Perspectives*, Summer 1991.
- "Economic Rationales for the Scope of Privatization," with Robert D. Willig, in *The Political Economy of Public Sector Reform and Privatization*, Ezra N. Suleiman and John Waterbury, eds., Westview Press, San Francisco, CA, 1990.
- "On the Antitrust Treatment of Production Joint Ventures," with Robert D. Willig, *Journal of Economic Perspectives*, Summer 1990.
- "Asset Ownership and Market Structure in Oligopoly," with Joseph Farrell, *Rand Journal of Economics*, Summer 1990.
- "Optimal Patent Length and Breadth," with Richard Gilbert, *Rand Journal of Economics*, Spring 1990.
- "Horizontal Mergers: An Equilibrium Analysis," with Joseph Farrell, *American Economic Review*, March 1990.

- "Theories of Oligopoly Behavior," in *The Handbook of Industrial Organization*, R. Schmalensee and R.D. Willig (eds.), 1989.
- "Market Power and Mergers in Durable Goods Industries: Comment," *Journal of Law and Economics*, 1989
- "The Theory of Business Strategy," *Rand Journal of Economics*, Spring 1989.
- "Optimal Contracts with Lock-In," with Joseph Farrell, *American Economic Review*, March 1989.
- "Dynamic Competition with Switching Costs," with Joseph Farrell, *Rand Journal of Economics*, Spring 1988.
- "Counterfeit-Product Trade," with Gene. M. Grossman, *American Economic Review*, March 1988.
- "Foreign Counterfeiting of Status Goods," with Gene. M. Grossman, *Quarterly Journal of Economics*, February 1988.
- "Dynamic R&D Competition", with Gene M. Grossman, *Economic Journal*, June 1987.
- "R&D Rivalry with Licensing or Imitation," with Michael L. Katz, *American Economic Review*, June 1987.
- "Optimal Dynamic R&D Programs," with Gene M. Grossman, *Rand Journal of Economics*, Winter 1986.
- "Product Compatibility Choice in a Market with Technological Progress," with Michael L. Katz, *Oxford Economic Papers*, Special Issue on the New Industrial Economics, November 1986.
- "Investment, Moral Hazard, and Occupational Licensing," *Review of Economic Studies*, October 1986.
- "How to License Intangible Property," with Michael L. Katz, *Quarterly Journal of Economics*, August 1986.
- "Research Joint Ventures: An Antitrust Analysis," with Gene M. Grossman, *Journal of Law Economics and Organization*, Fall 1986.
- "Consumer Shopping Behavior in the Retail Coffee Market," with Michael L. Katz, in *Empirical Approaches to Consumer Protection*, Pauline M. Ippolito and David T. Scheffman, eds., Federal Trade Commission, 1986.

- "Technology Adoption in the Presence of Network Externalities," with Michael L. Katz, *Journal of Political Economy*, August 1986.
- "Entry Dynamics with Mixed Strategies," with Avinash K. Dixit, in *The Economics of Strategic Planning*, L.G. Thomas, ed., Lexington Press, 1986.
- "Exchange of Cost Information in Oligopoly," *Review of Economic Studies*, July 1986.
- "InterLATA Capacity Growth and Market Competition," with Robert D. Willig, in *Telecommunications and Equity: Policy Research Issues*, Proceedings of the Thirteenth Annual Telecommunications Policy Research Conference, James Miller, ed., North Holland, 1986.
- "Can Unemployment be Involuntary? Reply," with Joseph E. Stiglitz, *American Economic Review*, December 1985.
- "On the Licensing of Innovations," with Michael L. Katz, *Rand Journal of Economics*, Winter 1985.
- "Normative Issues Raised by International Trade in Technology Services", with Gene M. Grossman, in *Trade and Investment in Service: Canada/U.S. Perspectives*, R.M. Stern (ed.), Ontario Economic Council, 1985.
- "Equilibrium Unemployment as a Worker Discipline Device: Reply," with Joseph E. Stiglitz, *American Economic Review*, September 1985.
- "Advances in Supervision Technology and Economic Welfare: A General Equilibrium Analysis," with Janusz Ordover, *Journal of Public Economics*, December 1984.
- "The General Motors-Toyota Joint Venture: An Economic Assessment," with Janusz A. Ordover, *Wayne Law Journal*, Summer 1985.
- "Network Externalities, Competition, and Compatibility," with Michael L. Katz, *American Economic Review*, June 1985.
- "Patent Licensing and R&D Rivalry," *American Economic Review Papers and Proceedings*, May 1985.
- "Equilibrium Unemployment as a Worker Discipline Device," with Joseph E. Stiglitz, *American Economic Review*, June 1984.
- "Informative Advertising with Differentiated Products," with Gene M. Grossman, *Review of Economic Studies*, January 1984.
- "Premiums for High Quality Products as Returns to Reputation," *Quarterly Journal of Economics*, November 1983.

"Consumer Protection in the United States," *Zeitschrift für die gesamte Staatswissenschaft, Journal of Institutional and Theoretical Economics*, October 1983.

"A Theory of Factor Mobility," with Gene M. Grossman, *Journal of Political Economy*, October 1982.

"Optimal Pricing of Experience Goods," *Bell Journal of Economics*, Autumn 1983.

"Consumer Information, Product Quality, and Seller Reputation," *Bell Journal of Economics*, Spring 1982.

"Advertising and Welfare: Comment," *Bell Journal of Economics*, Autumn 1980.

**Working Papers, Research Memoranda, Work in Progress, etc.**

"Competition Policy and Innovation," Prepared for the Directorate for Scientific, Technology, and Industry, OECD, STI Working Paper No. 2002/11, April 2002, [www.oecd.org/sti](http://www.oecd.org/sti).

"Market Definition in Crude Oil: Estimating the Effects of the BP/ARCO Merger," with John Hayes and Robert Town, July 2001.

"U.S. Government Information Policy," with Hal R. Varian, prepared for the Office of the Assistant Secretary of Defense (Command, Control, Communications and Intelligence), U.S. Department of Defense, August 1997.

*Economic Models of Counterfeiting*, with Gene M. Grossman, Report to the U.S. Department of Labor, International Labor Affairs Bureau, January 1988.

"Strategic Behavior and R&D Competition," Prepared for the National Bureau of Economic Research, March 1984.

"Advertising as a Barrier to Entry?," Federal Trade Commission, Bureau of Economics Working Paper #74, July 1982.

"Product Differentiation and Imperfect Competition: Policy Perspectives," Federal Trade Commission, Bureau of Economics Working Paper #70, July 1982.

**Book Reviews**

*Will E-Commerce Erode Liberty?* Review of *Code and Other Laws of Cyberspace*, by Lawrence Lessig. Review in the *Harvard Business Review*, May/June 2000.

*Controlling Industrial Pollution: The Economics and Politics of Clean Air*, by Robert W. Crandall. Review in the *Journal of Economic Literature*, June 1984, pp. 625-627.

*Sunk Costs and Market Structure: Price Competition, Advertising, and the Evolution of Concentration*, by John Sutton. Review in the *Journal of Economic Literature*, 1993.

### **Consulting Activities**

Senior Consultant, Charles River Associates, 1998 – present.

Principal and Co-Founder, The Tilden Group, LLC, 1996 - 1998.

Extensive experience working with private parties and government agencies on matters involving antitrust, regulation, intellectual property, measurement of damages, and general business litigation. Additional information and references available upon request.

### **Personal Information**

Place and Date of Birth: Austin, Texas, March 20, 1955.

Citizenship: United States of America.

Hobbies: Ultimate frisbee, squash, wilderness hiking and canoeing, cycling, basketball, chess, flute.

**DAVID W. MAJERUS—Vice President**

Abd. Economics, Johns Hopkins University (1992)  
 M.A. Economics, Johns Hopkins University (1990)  
 B.A. Chemistry, Carleton College (1982)

**Awards**

1987–1990 The John Hopkins University Fellowship  
 1987 Patricia and Eugenia Castillo Award in Economics  
 1985–1986 T. Rowe Price Fellowship  
 1982 Graduated with honors in chemistry and cum laude

**Professional Experience**

2001–present *Vice President*, Charles River Associates  
 Economic analysis to support antitrust litigation.

1998–2001 *Principal*, Charles River Associates  
 Economic analysis to support antitrust litigation. Industries analyzed include wireless telecommunications services, computer equipment, beer distribution, pharmaceuticals, and health care.

1998 *Senior Economist*, The Tilden Group  
 Economic analysis to support antitrust litigation in high technology and communications industries. Particular industries analyzed include both wireless and wireline telecommunications services, computer equipment, beer distribution, and health care. Provided economic expert services in a hospital merger investigation for the State of California.

1990–1997 *Economist*, Department of Justice, Economic Analysis Group  
 Performed competitive analysis of proposed mergers as well as economic analysis of various economic arrangements that come before the antitrust division. Industries studied include the health care industry (including two litigated hospital merger cases), telecommunications (including the first two RBOC mergers), computer software, transportation, and several durable goods industries. Prepared to testify in several merger cases, none of which went to trial. Assisted in the preparation of the economic experts in two litigated hospital merger trials and one computer industry merger trial. Assisted in the lawyer’s presentation of the government’s case in three litigated merger cases, one civil price fixing case, and one criminal price fixing case. Also, prepared an affidavit as an economic expert in determining the appropriate methodology for calculating damages in a criminal price fixing case.

1982–1984 *Research Assistant, Foster Associates*  
 Assisted in collecting and managing several small databases of natural gas and oil production and used statistics on IBM PC's.

## Publications

### Testimony and White Papers

Katz, Michael L. and Majerus, David W. "An Assessment of ILEC Market Power in CPP Billing and Collection," Declaration on behalf of Vodafone AirTouch plc, In the matter of Calling Party Pays Service Offering in the Commercial Mobile Radio Services, WT Docket No. 97-207, filed at the FCC on September 17, 1999.

Testified in deposition and before the arbitration panel "In the Matter of an Arbitration Under the Rules of Arbitration of the International Chamber of Commerce" between Marconi Communications, Inc. and Vidar-SMS Co., Ltd. ICC Case No. 11035/ESR/TE.

### Research papers

Majerus, David W. "Durable Goods Monopoly with a Finite But Uncertain Number of Consumers," Economic Analysis Group Discussion Paper 92-3, 1992.

Majerus, David W. "Price vs. Quantity Competition in Oligopoly Supergames," *Economic Letters*, Vol 27, 1988, pp. 293-297.

Tollefsen, D. M., Majerus, D. W. and Blank, M. K. "Heprin Cofactor-II Purification and Properties of a Heprin-Dependent Inhibitor of Thrombin in Human Plasma," *Journal of Biological Chemistry*, Vol 257, 1982, pp. 2162-9.

Miletich, J. P., Majerus, D. W. and Majerus, P. W. "Patients with Congenital Factor V Deficiency Have Decreased Factor X-a Binding Sites on Their Platelets," *Journal of Clinical Investigation*, Vol 62, 1978, pp. 824-31.

**SERGE MORESI—Principal, Charles River Associates**

Ph.D. Economics, Massachusetts Institute of Technology (1991)  
 M.A. Economics, Université de Lausanne (Switzerland) (1986)  
 B.A. Economics, Université de Lausanne (Switzerland) (1983)

Dr. Moresi is an expert in the theory of industrial organization and specializes in game theory, auction theory and bargaining theory. He has developed theoretical models and simulation programs to address a variety of issues involving strategic pricing and bidding behavior. He also has provided litigation support and economic consulting services in many antitrust and merger cases. He has contributed to several staff filings before federal agencies, which spanned a variety of industries. His research interests include several topics in the economics of information and uncertainty.

**PRIOR PROFESSIONAL EXPERIENCE**

*The Brattle Group*, Washington, DC. Spring/Summer 1997.

Electricity industry restructuring projects:

- Development of a simulation method to calculate Ramsey prices.
- Review of the theoretical and empirical research on bidding in the UK power pool.
- Report on the UK experience and potential competitive problems.
- Design of an auction procedure for bidding out Standard Offer Service obligation.
- Analysis of the structure of the California power exchange.

Other projects:

- Antitrust case involving alleged price-fixing in the gasoline industry.
- Regulatory treatment of market power in international satellite services.
- Regulatory filing for alleged discrimination by a gas pipeline in favor of its affiliate.

*Georgetown University*, Washington, DC. 1991-1998.

Assistant Professor.

- Ph.D. courses: general equilibrium theory, game theory, contract theory.
- B.A. courses: microeconomic theory, applied game theory.

*Université de Lausanne*, Switzerland. Spring 1995.

Invited Professor.

- Graduate lectures on the microstructure of financial markets.

*University of Maryland*, College Park, MD. Fall 1994.

Visiting Researcher.

- Research on the competitiveness of decentralized markets.

*World Bank*, Industry and Energy Division, Washington, DC. Summer 1994.  
Economic Consultant.

Analysis of the international competitiveness of Morocco.

*State of Ticino*, Switzerland. Summer 1989.

Economic Consultant.

Econometric analysis of the housing rental market of the city of Bellinzona.

## SELECTED CONSULTING EXPERIENCE

*In the context of the proposed GE/Honeywell merger:*

Development of theoretical economic models of mixed bundling strategies.

*In the context of the proposed Heinz/Beechnut merger:*

Development of a merger simulation model that accounts for (a) potential price effects at both the manufacturing level and the retailing level, and (b) potential efficiencies in the form of cost savings and quality increases.

*In the context of the CBS/Viacom merger:*

Development of a theoretical economic model of the entry investment process in the programming industry.

## CONSULTING REPORTS

Submitted a co-authored report to the U.S. Department of Justice on behalf of Procter & Gamble re its acquisition of Clairol, 2001.

Submitted a co-authored report to the EC on behalf of a luxury goods producer on an acquisition, 2001.

“An Economic Analysis of the Effects of the AT&T-MediaOne Merger on Competition in the Supply and Distribution of Video Program Services: Response to the Critics.” With Stanley M. Besen and John R. Woodbury. To the Federal Communications Commission on behalf of Sprint Communications Company, L.P., 1999.

“An Economic Analysis of the Effects of Partial Ownership Interests in Cable Systems.” With Stanley M. Besen, Daniel P. O’Brien, and John R. Woodbury. To the Federal Communications Commission on behalf of Tele-Communications, Inc., 1998.

## PUBLICATIONS

“A Few Righteous Men: Imperfect Information, Quit-for-Tat and Critical Mass in the Dynamics of Cooperation.” With Steven C. Salop. Festschrift in Honor of Joseph E. Stiglitz (forthcoming 2003).

“Information Acquisition and Research Differentiation Prior to an Open-Bid Auction.” *International Journal of Industrial Organization* (2000).

“Uncertain Lifetime, Risk Aversion and Intertemporal Substitution.” *Economics Letters* (1999).

“Front-Running by Mutual Fund Managers: A Mixed Bag.” With Jean-Pierre Danthine. *European Finance Review* (1998).

“Optimal Taxation and Firm Formation: A Model of Asymmetric Information.” *European Economic Review* (1998).

“Pure and Utilitarian Prisoner’s Dilemmas.” With Steven Kuhn. *Economics and Philosophy* (1995).

“Volatility, Information, and Noise Trading.” With Jean-Pierre Danthine. *European Economic Review* (1993).

## UNPUBLISHED ARTICLES

“Decentralized Trading and the Walrasian Outcome: On the Importance of Search Costs.” Mimeo, 1997.

“Optimal Consumption When Mortality Rates Are Not Constant: Time Consistency and the Role of Life Insurance Markets.” With John Cuddington. Working Paper No. 95-06, Georgetown University, 1995.

“Insider Trading: Fundamentals-Information versus Trade-Information.” With Jean-Pierre Danthine. Working Paper No. 94-01, Georgetown University, 1994.

“Intermediation in Markets with Sequential Bargaining and Heterogeneous Buyers and Sellers.” Ph.D. Thesis: Essay 1. MIT, 1991.

“Enchères et Contrats Linéaires Optimaux.” M.A. Thesis: No. 12. DEEP, Université de Lausanne, Switzerland, 1986.

**WORK IN PROGRESS**

“Ricardian Equilibrium with Stochastic Free Entry.” With Steven C. Salop.

“Exclusive Dealing and Rent Extraction.” With Marius Schwartz and Francis O’Toole.

“Auctioning Short-Term and Long-Term Contracts.” With Ian Gale.

**REFEREE REPORTS**

*American Economic Review*  
*Economic Theory*  
*European Economic Review*  
*International Economic Review*  
*Journal of Economic Theory*  
*Journal of Economics*  
*RAND Journal of Economics*

## **E. JANE MURDOCH—Vice President**

### **EDUCATION**

Ph.D. Economics, University of California, Los Angeles (1991)  
M.A. Economics, University of California, Los Angeles  
B. Comm. (Honours) Queen's University, Canada (1984)

### **PROFESSIONAL EXPERIENCE**

2000–present *Vice President*, Charles River Associates.  
1996–2000 *Principal*, Charles River Associates.  
1990–1996 *Senior Associate*, Charles River Associates.  
1989 *Instructor*, Pepperdine University.  
1988 *Intern*, ICF Consulting Associates.  
1988, 1985–86 *Research Assistant*, University of California, Los Angeles.  
1985–1989 *Teaching Assistant*, University of California, Los Angeles.

### **HONORS AND AWARDS**

Earhart Foundation Fellowship, 1986–1987 and 1987–1988.  
Mefferd Fellowship, 1988–1989.

### **SELECTED CONSULTING PROJECTS**

#### **Intellectual Property**

- Provided expert witness testimony in the Copyright Arbitration Review Panel proceeding to determine reasonable license fees for music performed by nonsubscription digital audio services on the Internet.
- Supported expert witness testimony in the first Copyright Arbitration Review Panel proceeding to determine reasonable license fees for music performed on subscription digital audio services.
- Provided deposition testimony regarding work on behalf of cable television program services in an ongoing matter to determine reasonable license fees to be paid to the American Society of Composers, Authors and Publishers for the performance of music in cable television programming since 1989.

### **Vertical Merger Analysis**

- Analyzed changes in competitive incentives as a result of the proposed merger of a major Internet service provider and a company with interests in cable systems, cable television programming, and sound recordings.
- Calculated the vertical incentives for competition in cable and direct broadcast service (DBS) arising from the proposed acquisition of a license to operate a high-power satellite slot by a major DBS provider with related cable system and programming interests.
- Evaluated the likelihood of post-merger exclusionary behavior after the acquisition of a large cable programmer by another large, vertically integrated cable system operator and programmer.
- Analyzed the potential anticompetitive effects of a merger of two leading providers of telecommunications services, one of which also sold network equipment to customers that had high switching costs.

### **Horizontal Merger Analysis**

- Conducted detailed entry analysis in a horizontal merger of two computer software firms, each supplying most of the needs of separate but related product markets.
- Analyzed the changes in competitive incentives arising from the proposed merger of two regional Bell operating companies.
- Measured changes in the competitive structure of local radio markets affected by the proposed merger of two major radio station groups.
- Prepared a white paper outlining the likely competitive effects of a merger of medical device manufacturers, with particular emphasis on product line competition.

### **Telecommunications Regulation**

- Conducted economic analysis of proposed rate regulations covering calls terminating on mobile networks in a “calling party pays” environment. The analysis included an examination of whether the unregulated pricing patterns observed among the mobile carriers were consistent with competitive behavior.
- Provided comments to the Federal Communications Commission on the likely impact on cable operators and programmers of the Commission’s cable leased access proposal.

- Provided comments to the Federal Communications Commission on whether a need existed for the State of California to continue to regulate intrastate cellular telephone service rates.

### **Antitrust and Economic Litigation**

- Evaluated various aspects of economic competition within professional sports leagues, including estimation of the role of program exclusivity for both broadcast and cable television; measurement of market size and market power in advertising; and analysis of competitive rationales for the assignment of exclusive distribution rights.
- Evaluated the business relation between a major cellular provider and a distributor in an assessment of damages relating to an alleged breach of contract.

### **Business Consulting**

- Compared the expected costs of treating epilepsy with existing therapies and with a new anti-epileptic drug, and evaluated the potential market size for the new therapy.
- Assessed the potential impact of Medical Practice Guidelines and Outcomes Studies by the Agency of Healthcare Policy and Research on a pharmaceutical client's product.

### **SELECTED PUBLICATIONS AND PAPERS**

“Cable System Access Rulings in the United States,” filed on behalf of FOXTEL Pty Limited before the Australian Competition and Consumer Commission in the Matter of *Access Dispute Between C7 Pty Limited and Telstra Multimedia Pty Limited and FOXTEL Pty Limited, Notified under subs 152CM(1) and 152CM(2) of the Trade Practices Act 1974 (Cth) on 31 August 2000 and 1 September 2000*. March 2002.

“Deriving a Reasonable License Fee for the Performance Right in Sound Recordings of Music Performed on Public Radio Websites,” with John R. Woodbury; filed on behalf of the Corporation for Public Broadcasting and National Public Radio before the Copyright Arbitration Royalty Panel in the Matter of *Rate Setting for Digital Performance Right in Sound Recordings and Ephemeral Recordings*. April 2001.

“Rebuttal Testimony of E. Jane Murdoch and John R. Woodbury,” filed on behalf of the Corporation for Public Broadcasting and National Public Radio before the Copyright Arbitration Royalty Panel in the Matter of *Rate Setting for Digital Performance Right in Sound Recordings and Ephemeral Recordings*. October 2001.

“Vertical and Horizontal Ownership in Cable TV: Time Warner-Turner (1996),” with Stanley M. Besen, Daniel P. O’Brien, Steven C. Salop, and John R. Woodbury, in J.E.

Kwoka and L.J. White, eds., *The Antitrust Revolution: Economics, Competition, and Policy*, 3<sup>rd</sup> ed. (Oxford, UK: Oxford University Press, 1999).

“Rate Setting for Compulsory Licenses of Digital Sound Recordings,” *CRA Insights*, Charles River Associates, 1999.

“A Further Analysis of the Effects of Cable Diversion, Premium Service Buy Rates, and Volume Discounts on PRIMESTAR’s Competitive Incentives: A Response to Dr. Rosston,” with Steven C. Salop, Stanley M. Besen, and John R. Woodbury; filed on behalf of PRIMESTAR Partners, LLP and PRIMESTAR, Inc. before the Federal Communications Commission in re *Applications of TCI Satellite Entertainment, Inc. and PRIMESTAR Inc. For Transfer of Control of Tempo Satellite, Inc. and MCI Telecommunications Corporation and PRIMESTAR LHC, Inc. For Consent to Assignment of Direct Broadcast Satellite Authorization, File Nos. 91-SAT-TC-97 and 106-SAT-AL-97, respectively*. May 1998.

“A Comparison of PRIMESTAR’s Costs with Those of a Standalone Entrant,” with Steven C. Salop, Stanley M. Besen, and John R. Woodbury; filed on behalf of PRIMESTAR Partners, LLP and PRIMESTAR, Inc. before the Federal Communications Commission in re *Applications of TCI Satellite Entertainment, Inc. and PRIMESTAR Inc. For Transfer of Control of Tempo Satellite, Inc. and MCI Telecommunications Corporation and PRIMESTAR LHC, Inc. For Consent to Assignment of Direct Broadcast Satellite Authorization, File Nos. 91-SAT-TC-97 and 106-SAT-AL-97, respectively*. March 1998.

“An Economic Analysis of PRIMESTAR’s Competitive Behavior and Incentives,” with Steven C. Salop, Stanley M. Besen, and John R. Woodbury; filed on behalf of PRIMESTAR Partners, LLP and PRIMESTAR, Inc. before the Federal Communications Commission in re *Applications of TCI Satellite Entertainment, Inc. and PRIMESTAR Inc. For Transfer of Control of Tempo Satellite, Inc. and MCI Telecommunications Corporation and PRIMESTAR LHC, Inc. For Consent to Assignment of Direct Broadcast Satellite Authorization, File Nos. 91-SAT-TC-97 and 106-SAT-AL-97, respectively*. January 1998.

“The Impact of the FCC’s Leased Access Proposal on Cable Television Program Services,” with Stanley M. Besen; filed on behalf of Turner Broadcasting System, Inc., before the Federal Communications Commission in the Matter of *Implementation of Sections of the Cable Television and Consumer Protection and Competition Act of 1992: Rate Regulation, Leased Commercial Access; Order on Reconsideration of the First Report and Order and Further Notice of Proposed Rulemaking*, MM Docket No. 92-266, CS Docket No. 96-60. May 1996.

“An Economic Analysis of the FCC’s Cable Leased Access Proposal,” with Stanley M. Besen; filed on behalf of Tele-Communications, Inc., before the Federal Communications Commission in the Matter of *Implementation of Sections of the Cable Television and Consumer Protection and Competition Act of 1992: Rate Regulation, Leased Commercial*

*Access; Order on Reconsideration of the First Report and Order and Further Notice of Proposed Rulemaking*, MM Docket No. 92-266, CS Docket No. 96-60. May 1996.

“Report of Charles River Associates on the Petition of the People of the State of California and the Public Utilities Commission of the State of California to Retain State Regulatory Authority over Intrastate Cellular Service Rates,” with Stanley M. Besen and Robert J. Lerner; filed on behalf of the Cellular Carriers Association of California before the Federal Communications Commission in the Matter of *Petition of the People of the State of California and the Public Utilities Commission of the State of California to Retain State Regulatory Authority Over Intrastate Cellular Service Rates*. September 1994. Followed by an affidavit in February 1995.

“The Cellular Service Industry: Performance and Competition,” with Stanley M. Besen and Robert J. Lerner; filed on behalf of the Cellular Telecommunications Industry Association before the Federal Communications Commission in the Matter of *Amendment of the Commission’s Rules to Establish New Personal Communications Services*, GEN Docket No. 90-314, ET Docket No. 92-100. November 1992.

“An Economic Analysis of Entry by Cellular Operators Into Personal Communication Services,” with Stanley M. Besen and Robert J. Lerner; filed on behalf of the Cellular Telecommunications Industry Association before the Federal Communications Commission in the Matter of *Amendment of the Commission’s Rules to Establish New Personal Communications Services*, GEN Docket No. 90-314, ET Docket No. 92-100. November 1992.

## DISSERTATION

“Executive Compensation and Firm Performance: The Relationship Between Monitoring Difficulty and the Use of Incentive Contracts,” Department of Economics, University of California, Los Angeles, 1991.