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OFFICE OF PLANS AND POLICY AND MEDIA BUREAU RELEASE REVISED DATA SET INVOLVING EXPERIMENTAL ECONOMICS STUDY EXAMINING HORIZONTAL CONCENTRATION IN THE CABLE INDUSTRY

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The Federal Communications Commission's Office of Plans and Policy recently released OPP Working Paper No. 35, "Horizontal Concentration in the Cable Television Industry: An Experimental Analysis" ("Working Paper"), which utilized the methodology of experimental economics to consider the effects that different levels of horizontal concentration among multichannel video programming distributors ("MVPDs") might have on the flow of video programming to consumers. The Media Bureau solicited comment on the Working Paper in connection with the above-captioned proceedings.[1] Follow-up analysis conducted by the authors revealed that the "Most Favored Nation" ("MFN) treatment data contained several computational errors. The Media Bureau is issuing this Public Notice to briefly describe such errors and to release a corrected version of the data and a slightly revised version of the Working Paper.

Under the experiments, the revenue obtained by each seller includes both revenue received from the sale of national advertising time and revenue received from the MVPD (i.e., buyer) for its package of programming. However, the way in which the revenue from the MVPD was reported differed under the MFN and the "Non-MFN" treatments. In the MFN treatment, affiliate revenue was reported in terms of cents per subscriber, whereas in the Non-MFN treatment, affiliate revenue was reported in terms of dollars per transaction. Because of a computational error, this difference resulted in an underestimation of affiliate revenue in the MFN treatment. An additional computational error occurred when revenue of less than 0.5 cents per subscriber was rounded to zero, causing certain transactions to be dropped inadvertently.

The computational errors have been corrected. The corrected data set and the revised Working Paper can be found at www.fcc.gov/opp or www.fcc.gov/mb. The computational errors led to some modest changes in the study results. The following is a list of all substantive changes:

- (Table 7 and Result 3) The MFN and the No MFN treatments generate similar efficiency levels when the market includes either a single "large" cable operator (i.e., 51% market

[1] ***See Media Bureau Seeks Comment on Experimental Economics Study Examining Horizontal Concentration in the Cable Industry,*** Public Notice, DA 02-1304 (June 3, 2002).

share) or two "major" cable operators (i.e., market shares of **44%** and **39%).** Previously, the MFN treatment generated lower efficiency levels in these market concentration environments.

- (Figures **3-5** and Result **5)** Values for the average buyer's bargaining power under the MFN treatments are adjusted slightly.
- (Tables **8,** 10, 11 and **12)** Values for the average buyer's bargaining power, DBS operator's bargaining power, average buyers' surplus, and the DBS operator's surplus under the MFN treatment are adjusted downward.
- (Table **13** and Result **14)** The percentage of sellers with trading period losses and average loss are adjusted under the MFN treatments. Seller losses are not more common under the MFN treatment than under the No MFN treatment. Previously, data indicated that seller losses were significantly more likely in a market that includes two major cable operators under the MFN treatment.
- (Table 15) The percentage of trading periods in which a given seller incurs a loss and average loss under the MFN treatment are adjusted downward. Results **15** and **16** continue to hold as originally stated.
- (Result **17)** Sellers #1 and #2 are more likely to lose money in the MFN treatment than in the No MFN treatment for all concentration treatments. Previously, this result was found to hold for all four sellers.
- (Table **17** and analysis on pages **44-45) A** regression model shows that the most popular programming network receives a significantly lower affiliate fee, expressed on a price per subscriber basis, in a market that includes a single large cable operator and several substantially smaller buyers than in a market that includes two "moderately-sized" cable operators (i.e., markets shares of **27%** and **24%)** and several smaller buyers. The same model shows that there is no statistically significant difference in the affiliate fee obtained by the same popular programming network between a market that includes two "moderately-sized" cable operators and several smaller buyers and a market that includes two major cable operators and a single DBS operator. Previous results showed that this same popular seller received a significantly lower affiliate fee in a market that includes two major cable operators and a single DBS operator than in a market that includes two "moderately-sized" cable operators and several smaller buyers. Previous results also showed there was no difference in the affiliate fee obtained by the same seller in a market that includes a single large cable operator and several substantially smaller buyers than in a market that includes two "moderately-sized" cable operators and several smaller buyers.
- (Table **17** and analysis on page **43) A** regression of price per subscriber on buyer size under the MFN treatment shows different coefficients.
- (Tables **18-21** and analysis on pages **45-48) A** regression model shows that Seller #3 earns the least amount of profits in a market that includes a single large cable operator and several substantially smaller buyers compared with the other two market environments considered. Previously, Seller #3 only earned a profit in a market that includes two "moderately-sized" cable operators and several smaller buyers. Coefficients for regressions relating to sellers #1, #2 and #4 are also adjusted.

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OPP Working Paper Series

35 Horizontal Concentration in the Cable Television Industry: An Experimental Analysis

June 2002 (Revised July 2002)

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Horizontal Concentration in the Cable Television Industry: An Experimental Analysis

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Executive Summary

The Federal Communications Commission ("FCC") recently initiated a rulemaking proceeding to examine, among other things, the subscriber (horizontal ownership) limits that apply to cable operators.' This study employs economic theory and experimental economics to shed light on the effect of changes in horizontal concentration among cable operators on the flow of programming to consumers.' The study was designed to complement the information and analyses provided in the comments filed in the FCC's rulemaking proceeding.

Experimental economics involves the study of the interactions among market participants in a controlled laboratory setting. Conducting an economic experiment requires a set of agents (e.g., buyers, sellers), an environment in which they must make individual decisions (e.g., complete a trade), and a method of assessing the results of the decisions made by these economic agents. The experimental study began with the creation of a "market" that parallels the market in which buyers (i.e., Multichannel Video Programming Distributors ("MVPDs") and sellers (i.e., programming networks) negotiate affiliate fees.[3] To this end, buyers were assigned valuations for the programming networks and a set of costs. Valuations reflected the additional subscriber and local advertising revenue buyers would earn from carrying the programming networks. Sellers were assigned a set of costs and a schedule that shows the revenue they would receive if they conducted a trade with a particular buyer. This financial payment

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[1] *Implementation of Section 11 of the Cable Television ojthe Cable Television Consumer Protection and Competition Act of 1992, Implementation of Cable Act Reform Provisions of the Telecommunications Act of 1996, The Commission's Cable Horizontal and Vertical Ownership Limits and Attribution Rules, Review of the Commission's Regulations Governing Attribution of Broadcast and Cable/MDS Interests, Review of the Commission's Regulations and Policies Affecting Investment in fhe Broadcast Industry, Reexamination of the Commission's Cross-Interest Policy,* CS Docket Nos. **98-82,** 96-85, MM Docket Nos. **92-264, 94-150, 92-51, 87-154,** Further Notice of Proposed Rulemaking, 16 FCC Rcd **17312 (2001)** ***("Further Notice").***

[2] Congress directed the Commission to take into account, "among other public interest objectives," seven public interest factors. **47** U.S.C. §§ 533(2)(A)-(G). One of the factors specifically directs the Commission to "ensure that no cable operator or group of cable operators can unfairly impede, either because of the size of any individual operator or because ofjoint actions by a group of operators of sufficient size, the flow of programming from the video programmer to the consumer." **47** U.S.C. § 533(2)(A). In testing the effects of concentration in the cable television industry, this study has addressed and focused upon Factor **A.**

[1] The term "affiliate fee" refers to the payment made by an **MVPD** (e.g., cable operator or a direct broadcast satellite service provider ("DBS")) to a programming network in exchange for the right to cany the programming assembled by the network. For purposes of this study the term "programming network" is synonymous with the term "cable network."

represented the revenue the programming network would earn from selling national advertising time if a given MVPD carried it.[4]

In the naturally occurring market, buyers and sellers conduct trades through a sequential, multi-lateral bargaining process. Using a set of networked computers and computer software, buyers and sellers were given the opportunity to employ this process to negotiate mutually acceptable affiliate fees. Negotiations consisted of buyers submitting one or more bids to buy to sellers, and sellers submitting one or more offers to sell to buyers. **A** buyer's bid represented the maximum amount the buyer would pay a seller for the right to cany a programming network. **A** seller's offer represented the minimum amount for which the seller would grant the buyer the right to cany its programming network. The bids to buy and offers to sell were only disclosed to the parties to which they were directed. Participants were permitted to negotiate simultaneously with multiple parties and were permitted to conduct a trade at any time within a given trading period.

As in the actual marketplace, buyers and sellers earned revenue and generated profits based upon the decisions they made. Buyers earned revenue by negotiating affiliate fees that were less than their assigned willingness to pay for the programming networks. Sellers earned revenue by inducing buyers to pay them for the right to cany their network.' Sellers' affiliate revenue was augmented by a payment that represented the national advertising revenue they earn from completing trades with buyers. Buyers and sellers earned profits if the total revenue they earned from their trades exceeded their costs.

Experiments were conducted in a variety of horizontal concentration environments. In one environment the market consisted of two major cable operators (i.e., market shares of **44%** and 39%) and one DBS operator. In another environment the market consisted of a single "large" cable operator (i.e., market share 51%) and several substantially smaller buyers. In yet another environment, the market consisted of two "moderately-sized" cable operators (i.e., market shares of **27%** and **24%)** and several

[4] In the naturally occurring market, in addition to affiliate fees, cable operators and programming networks negotiate over the number of "avails" which are assigned to the cable operator. In the current analysis parties only negotiate affiliate fees.

smaller buyers. These market environments were selected in order to test whether the relative and absolute size of a buyer, as measured by the number of MVPD customers served, has an impact on the affiliate fees negotiated by buyers and sellers. The largest buyer in each of these market environments served between 27% and 51% of the MVPD market.

An attempt was made to include in the experimental market those features of the actual market that have an important impact on the affiliate agreements negotiated between programming networks and MVPDs. However, the experimental market did not and could not display all the complex characteristics of the actual market. For example, the experimental market included far fewer programming networks and MVPDs than there are in the actual market.[6] The experimental market also did not take into account the possibility that some large cable operators have attributable interests in programming networks. In addition, the experimental market did not include advertisers as experimental subjects, nor did it *take* into account that a programming network's bargaining power in an upcoming affiliate agreement negotiation may be enhanced if it is currently carried by an MVPD. These and other abstractions from features of the actual marketplace, and the relevance of some of these abstractions to the study's results, are discussed in more detail in Section 5.0, below. The absence of some of these characteristics may have affected the results of the study

The major results of the experimental study are as follows.' First, when the number of programming networks exceeds the cable operator's channel capacity, higher levels of horizontal concentration (holding the number of buyers constant) led to **a** modest reduction in "economic efficiency." Economic efficiency measures the extent to which society makes the best use of its scarce resources.* In the current context, a

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[5] One possible outcome of the negotiation process involves a seller paying a buyer for the right to acquire access to the buyer's attracted MVPD subscribers.

[6] The experimental market included four programming networks and, depending on the experiment, either three or five MVPDs.

[7] The results that immediately follow assume that a large buyer does not have the ability to impose a "Most Favored Nations" provision on sellers. **An** "MFN" guarantees that a large cable operator pays an affiliate fee, expressed on a per subscriber basis, that is no higher than the affiliate fce paid by a smaller cable operator. Results that apply to **an** environment where an MFN provision is imposed upon sellers by large buyers are discussed later in the Executive Summary.

[8] Trades buyers and sellers differed in the amount of surplus they generated. In the presence of limited channel capacity, societies' resources are best used when only those trades that generate the most surplus

reduction in economic efficiency indicates that fewer or socially less desirable trades occurred in the more concentrated market structure than in the less concentrated market structure. By sending the wrong price signals regarding the value society places on particular types of programming offered by programming networks, a reduction in market efficiency could affect both the type and quality of television programming received by viewers. The reduction in market efficiency also indicates that there could be a decline in the benefit society receives from the resources used in creating advertisements.

Second, the experimental results indicate that in the experimental economics setting the bargaining power of a cable operator that serves **27%** of the MVPD market does not differ substantially from the bargaining power of a cable operator that serves 51% of the MVPD market. **A** buyer's bargaining power was measured as the percentage of total surplus (i.e., gains from trade) captured by a buyer when completing a trade with a seller. From the perspective of a programming network, a cable operator that serves **27%** of the MVPD market is as powerful as one that serves 51% of the market.

Third, the experimental results indicate that there is a statistically significant decrease in the DBS operator's bargaining power when two cable operators serve **44%** and 39% of the MVPD market. than when the largest cable operator serves **27%** of the MVPD market. **A** reduction in its bargaining power means that the DBS operator can expect to pay higher affiliate fees following the increase in horizontal concentration.' The increase in affiliate fees paid by the DBS operator could result in an increase in the subscription fee paid by DBS customers.

Fourth, the results indicate that sellers representing the least popular programming networks had difficulty earning a profit (i.e., conducting a series of trades that allowed them to more than cover their costs) in each of the horizontal concentration environments considered. The results indicate that the more popular programming networks were much more likely to earn a profit in each of the horizontal concentration environments.

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are consummated. There is nothing in the bargaining process involving cable programmers and MVPDs that ensures that only thosc trades that generate the most surplus are consummated.

[9] **The analysis assumed that the MVPD market is served by a single DBS service provider whose market share is approximately equal to the sum of the shares possessed by Echostar and DirectTV. This assumption was made for analytical purposes and does not indicate** or **suggest that the** FCC **has made a decision regarding whether lo permit a merger between these** two **entities.**

These results are consistent with the result that shows that a seller's bargaining power is directly related to its popularity.

Additional experiments were conducted to explore the effects of two institutional features of the market environment. One set of experiments relaxed the assumption that buyers have limited channel capacity. In these experiments buyers were allowed to trade with every seller. The results of these experiments differed markedly from experiments where buyers had limited channel capacity. Where a channel capacity constraint did not exist, all sellers were consistently able to conduct a set of trades that enabled them to earn a profit. Consistent with this outcome, sellers' bargaining power increased while buyers' bargaining power declined. Thus, it appears that the bargaining process between MVPDs and programming networks fundamentally changes when the number of programming networks exceeds the MVPD's channel capacity. The resulting increase in the MVPD's bargaining power is due to the desire of programming networks to be carried by as many MVPDs as possible and their willingness to compete for the right to be carried by a given MVPD.[10]

Additional experiments were also conducted to explore the effect of a large cable operator's ability to successfully include a "Most Favored Nation" ("MFN) provision in an affiliate agreement. Under an MFN, a common feature of today's market negotiations involving a large buyer, the programming network guarantees that the large buyer will not pay an affiliate fee that is higher than the affiliate fee (expressed on a per subscriber basis) paid by any smaller buyer. The results of these experiments differed in many respects from experiments where large buyers did not impose an MFN provision on programming networks." For example, the experimental results indicate that the existence of an MFN provision increased the bargaining power possessed by the MFN-endowed buyers." Furthermore, when negotiating with a popular programming network, the largest cable operator is able to negotiate lower affiliate fees (per subscriber) than small buyers (i.e., cable operators and DBS providers). A programming network's ability

[10] An increase in cable operators' bargaining power translates into a reduction in their affiliatefees.

[11] Under the MFN treatment, the rules of the expcriment required that sellers provide the largest buyer the lowest affiliate fee (per subscriber).

[12] See buyer bargaining power data shown in Figures 3 – 5. The MFN-endowed buyers in the Low/High, High/High, High/Low concentration environments are Buyer #4, Buyer #3, and Buyers #1 and #2., respectively.

to negotiate a high affiliate fee with a large buyer depends on the popularity of the programming network. The more popular the programming network, the higher the affiliate fee. These results indicate that both buyers and sellers have an incentive, based solely on the expected changes in negotiated affiliate fees, to grow larger.

In addition to the effect that a buyer's size may have on the negotiated affiliate fee, the degree of concentration among cable operators appears to affect the affiliate fees negotiated by buyers and sellers. For example, buyers appear to be able to negotiate substantially lower affiliate fees in a market that includes a single large cable operator (i.e., market share 51%) and several substantially smaller buyers than in a market that includes two moderately-sized cable operators (i.e., market shares of **27%** and **24%)** and several smaller buyers.

The popularity of the programming network was also found to influence its ability to earn a profit in the different market concentrations examined in this study. According to the experimental data, the least popular programming networks incur losses in every market concentration examined. Among the market concentrations examined, the least popular programming networks incur the greatest losses in a market that includes a single large cable operator (i.e., market share 51%) and several substantially smaller buyers. The least popular programming networks incur the same level of losses in a market that includes two major cable operators (i.e., market shares of **44%** and **39%)** and one DBS operator as in a market that includes two moderately-sized cable operators (i.e., market shares of **27%** and **24%)** and several smaller buyers.

A moderately popular programming network obtains the least amount of profits in a market that includes a single large cable operator (i.e., market share 51%) and several substantially smaller buyers. A moderately popular programming network obtains the same level of profits in a market that includes two major cable operators (i.e., market shares of **44%** and **39%)** and one DBS operator as in a market that includes two moderately-sized cable operators (i.e., market shares of **27%** and **24%)** and several smaller buyers. Very popular programming networks appear to be immune, over the range of horizontal concentrations considered in this study, to an increase in horizontal concentration. According to the experimental data, there is no substantial difference in

the profits earned by the most popular programming networks across the range of horizontal concentrations considered.

In parallel with our experimental analysis, we reviewed existing economic theories that might provide insights into the effect of horizontal concentration on the level of the affiliate fees negotiated by buyers and sellers. Particular attention was paid to several solution concepts found in cooperative game theory. Consistent with the experimental results, cooperative game solutions uniformly show higher payoffs to the buyers (i.e., lower affiliate fees paid to programming networks) when there is a channel capacity constraint versus when no such constraint exists. This and other results are discussed in Appendix A.

1. Introduction

This paper employs economic theory and experimental economics to shed light on the effect of changes in horizontal concentration among cable operators on the flow of programming to consumers. For purposes of the study, the flow of programming to viewers is impeded if a level of horizontal concentration adversely affects the profits earned by programming networks." To this end, the study examines the relationship between different levels of horizontal concentration and the level of the affiliate fees buyers (i.e., cable operators and a DBS service provider) pay programming networks.[14] The paper also evaluates the effect of changes in horizontal concentration on economic efficiency. In the current context, economic efficiency measures the extent to which the gains of trade enjoyed by buyers and sellers are maximized. By sending the wrong price signals regarding the value society places on particular types of programming offered by programming networks, a reduction in market efficiency could, by reducing the rents obtained by programming networks, affect both the type and quality of programming received by television viewers.

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[13] It is natural to emphasize existing programming networks since there is an existing flow of programming to viewers. In addition, there are publicly available cost and other data for existing programming networks.

[14] Thr cable network also generates revenue through the sale of national advertising. Using publicly available data, the analysis will make some assumptions regarding the size of such revenue. These assumptions will remain constant throughout the analysis in order to isolate the affect of horizontal concentration on the flow of programming to viewers.

The study incorporates numerous market features that may be relevant in considering the effects of horizontal concentration on the flow of programming to viewers." First, affiliate agreements are negotiated in a sequential, multi-lateral bargaining environment where programming networks offer to license their assembled programming packages to a collection of MVPDs.[16] MVPDs, in turn, bid for the right to carry these packages of programs. Each side incurs costs that must be covered by earned revenues. Because the outcome of the bargaining process is not known in advance, all parties face financial uncertainty. One important research question involves examining whether the level of horizontal concentration among cable operators affects the ability of programming networks to complete a series of affiliate agreements that, taken together, enable them to recover their costs?

Second, MVPDs have the ability to choose both the type and number of cable networks to carry." Does their ability to exercise such discretion affect the level of the affiliate fees MVPDs pay to programming networks?"

Third, programming networks vary in popularity, programming costs, and the amount of national advertising revenue they eam, and thus may be affected to different degrees by given levels of horizontal concentration among cable operators. Which programming networks will likely be affected most by increased levels of cable concentration?

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[15] **An** "affiliate agreement" specifies the terms and conditions under which cable operators have the authority to carry a cable network. The term "carriage agreement" is sometimes used to describe such an agreement.

[16] The term "sequential" refers to the fact that trades are not all completed at the same time. The term "multi-lateral" means that buyers and sellers typically conduct trades with multiple counterparties.

[17] See 47 U.S.C. § 544(b)(prohibiting local authorities from "establish[ing] requirements for video programming and other information services."); ***see*** also ***Turner Braadcasting System, Inc. v. Federal Communicalions Commission,*** 512 U.S. 622, 636 (1994) (subjecting cable operators' "must carry" requirements to intermediate scrutiny, in recognition of their First Amendment rights generally and editorial discretion in selecting programming particularly); ***Time*** Warner ***Entertainment Co. v. FCC,*** 240 F.3d 1126, 1129 (D.C. Cir. 2001) (remanding cable operators' horizontal and vertical ownership limits under the intermediate scrutiny standard, in recognition of the restraint such limits place on their ability to "reach the number of viewers to whom they can speak" and to "exercise their editorial control over a portion of the content they transmit," respectively.)

[18] For an analysis of some of the economic effects of cable operators' selection of programming networks, see Stanley Besen and Leland Johnson, "An Economic Analysis of Mandatory Leased Channel Access for Cable Television, Rand Corporation Report R-2989-MF (1982).

Fourth, programming networks negotiate affiliate agreements with both cable operators and DBS service providers. Does an increase in horizontal concentration among cable operators affect the affiliate fees paid by DBS service providers?

Fifth, some affiliate agreements may contain provisions that may affect the affiliate fees paid by MVPDs. For instance, an affiliate agreement between a large cable operator and a programming network may include an MFN clause. Do MFN provisions affect the level of the affiliate fees programming networks obtain from MVPDs?

This paper addresses these important questions in considering the implications of horizontal concentration in the MVPD industry. The paper is organized as follows: Section 2 discusses, in greater detail, the methodology of experimental economics and how the study was designed to examine the possible effects of horizontal concentration in the cable television industry. Section 3 presents the experimental design employed, including the set of market parameters used in the experimental design. Section 4 presents the results of the economic experiments. Appendix A analyzes the issue of horizontal concentration using principles from cooperative game theory. These principles are used to generate a set of predictions regarding the outcome of bargaining between buyers and sellers.

2. Methodology - Experimental Economics

Policymakers are sometimes asked to answer "what if" questions. For example, they may be asked to determine the effect of employing "circuit breakers" in equity markets or to determine the effect of a requirement that a camer must file a rate change with a regulator before the rate change *can* become effective.[19] In many cases, the full consequences of a policy or rule may be unknown. As experimental economics involves the study of the economic interactions among market participants in a controlled laboratory setting, it offers policymakers a method by which to analyze potential effects of proposed regulations.

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[19] **See,** R. King, V. Smith, A. Williams, and M. van Boening, " The Robustness of Bubbles and Crashes in Experimental Stock Markets," in *Nonlinear Dynamics and Evolutionary Economics,* (1993) edited by R. Day and P. Chen. Oxford University Press, pp. 183-200 and J. Hong and C. Plott, "Rate Filing Policies For Inland Water Transportation: An Experimental Approach," Bell *Journal of Economics,* vol. 13 (Spring 1982). pp. 1 – 19.

The experimental analysis began with the creation of an experimental market that parallels the market under investigation. In the current context, this market includes a set of human subjects that played the role of buyers and sellers. Sellers in our experimental market represented programming networks, and the buyers in our experimental market represented cable operators and a DBS provider. The trades that took place in this market were intended to represent the affiliate fees MVPDs agree to pay programming networks for the right to carry their programs." The experimental analysis also required assigning sellers characteristics. Table 1 lists a set of characteristics that broadly define the four sellers (i.e., programming networks) included in the experiments." The sellers' costs include monthly operating and programming expenses.

Programming Network	Monthly Costs (mil.)	CPM Prices ($) (30-second spot)	National Avails (Monthly)	Total Day Audience Ratings (%)
#1	1.5	1.00	11,004	10
#2	1.7	1.00	11,001	.12
#3	10.4	2.34	9,092	.90
#4	39.1	6.99	11,782	1.50

Table 1: Seller Characteristics

Table 2 presents the average buyer's willingness to pay for the right to cany a given programming network."

[20] The economic experiments allow sellers the opportunity to pay buyers for their carriage of their assembled programs.

[21] Data are derived, in part, from a sample of cable networks listed in Paul Kagan ("Economics of Basic Cable Networks 2002," Kagan World Media, September 2001). The sample of cable networks for programming network #4 consisted of A&E, CNN, Discovery Channel, Lifetime, MTV, and Nickelodeon. The sample of cable networks for programming network #3 consisted of the Cartoon Network, Court TV, and the Family Channel. The sample of cable networks for programming networks #1 and #2 consisted of the Great America Channel, BBC, Health Channel, Ovation, Outdoor Channel, and the Recovery Channel. In some instances, Paul Kagan did not provide estimates for certain data. In these instances an estimate of the missing data was generated.

[22] A buyer's willingness to pay for a given programming network is based upon an estimate of the additional subscriber and local advertising revenue it would obtain from carrying the programming network. An estimate of the local advertising revenue was based on estimates of the programming network's local audience ratings. CPM prices, and the number of local avails.

Programming Network	Willingness to Pay ($ Subscriber Month)
#1	.090
#2	.094
#3	.393
#4	.647

Table 2: Average Buyer's Willingness to Pay

Buyers were also assigned a set of costs that they had to cover in order to stay in business. Table **3** presents the total monthly costs that were assigned to cable operators and the DBS operator.[23] The analysis assumed that a vast majority of **the** buyer's costs were already covered by an existing flow of revenue. Thus, the costs listed in Table 3 represent the costs the buyer must cover through its trades with the sellers included in the experiments. These costs include salesiadministrative and interest expenses, but excluded programming expenses.[24]

Buyers	Monthly Costs (mil.)
Cable Operators	**20.1**
DBS Operator	3 4

Table 3: Buyer Monthly Expenses

In our experimental market, buyers and sellers were allowed to complete a series of trades with each other. Participants in the experimental market faced incentives similar to those that participants in the naturally occurring market face. We established such incentives for sellers by allowing them to retain the money they obtain from any trade. This money included the fee that buyers paid sellers for the right to carry their network and the revenue the seller would earn from selling national advertising time.

[23] These data are based upon information obtained from IOK reports for Adelphia, Classic, Comcast, Cox, Insight, and Mediacom and from Paul Kagan, "The State of **DBS** 2001."
[24] The analysis assumed that the revenue generated from the services provided by the cable operator already covered the buyer's existing programming expenses.

The level of advertising revenue varied across sellers in the experiments in order to mirror the variation in national advertising revenue earned by different programming networks in practice.[25] The amount of national advertising revenue earned by a seller vaned directly with the number of subscribers served by the buyer. The larger the buyer, the greater the national advertising revenue earned by the seller.

We established incentives for buyers by guaranteeing them a sum of money for each trade they conducted. The guarantee can be viewed as a secondary market in which only buyers can participate.[26] The guaranteed money defines the maximum amount the buyer was willing to pay for the right to cany a particular network. Buyers earned money by acquiring the right to cany a programming network for a price that is less than the sum of money the buyers are guaranteed. The maximum amount the average buyer is willing to pay for each programming network is shown in Table **2.**

In the naturally occurring market, MVPDs and programming networks conduct trades through a sequential, multi-lateral bargaining process. This market environment was simulated, in part, through the use of a data network, a collection of computer terminals, and computer software. In this experimental market, buyers and sellers were able to place bids to buy and offers to sell to each other, respectively." **A** buyer's bid represented the maximum amount the buyer was willing to pay a seller for its set of programs. **A** seller's offer represented the minimum amount the seller was willing to receive in exchange for the buyer's right to carry its programs. Buyers and sellers "negotiated" with each other by sending each other bids to buy or offers to sell, respectively.[28] Buyers and sellers were free to select the entities with whom they negotiated, the manner in which they negotiated (e.g., does a buyer respond to a seller's ask by placing a bid?), and the order in which they negotiated with entities on the opposite side of the market.[29] Importantly, all revised bids and asks had to satisfy a "bid/ask" improvement rule. Under that rule, a revised bid placed by a buyer to a given

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[25] The financial payment the seller received from conducting a trade with a specific cable operator was calculated using the data **shown** in Table I.

[26] In this case, the buyer knew with certainty the value the secondary market places on the "carriage right."

[27] In the naturally occurring market, in addition to affiliate fees, cable operators and cable networks negotiate. among other things, over the number of avails which are assigned to the cable operator and the length of the affiliateagreement.

[28] One method *of* negotiation was simply not to respond to a party's bid or ask until such time as the bid and ask is acceptable.

seller had to be greater than the buyer's initial bid, while a revised ask submitted by a seller to a given buyer had to be less than the seller's initial ask.

Each experiment consisted of several "experimental sessions" in which a particular group of subjects participated. Each experimental session consisted of multiple "trading periods." A "trading period is defined as a period of time in which buyers and sellers had the opportunity to negotiate and conduct a set of trades. A buyer earned a profit in each trading period if the revenue it earned in that trading period exceeded its assigned costs. A seller earned a profit in each trading period if the revenue it earned exceeds its assigned costs.[30] Finally, the experiments varied according to a systematic change in a set of "treatment variables." A "treatment variable" is a variable whose value is established by the experimenter and which is critically related to the economic and policy questions under investigation. One important treatment variable is the level of horizontal concentration among the **MVPDs."** Table 4 shows the number of subscribers and the share of the MVPD market served by each buyer across the different horizontal concentration treatments.

Buyers	MVPD Subscribers (mil.)			Market Share (%)		
	Low/ High	High/ High	High/ Low	Low/ High	High/ High	High /Low
Cable Op. 1	20	11	32	24.4	13.4	39.0
Cable Op. 2	12	9	36	14.6	11.0	43.9
Cable Op. 3	14	42	*	17.1	51.2	*
Cable Op. 4	22	6	*	26.8	7.3	*
DBS Op.	14	14	14	17.1	17.1	17.1

Table 4: Horizontal Concentration Treatments

[29] Buyers are prevented from speaking to sellers, and vice versa. All communications are non-verbal.
[30] The prices at which trades occur are not disclosed to other participants
[31] Another important treatment variable included whether MVPDs are prevented, because of channel capacity constraints, from conducting trades with each programming network.

The term "Low/High" refers to a low level of horizontal concentration and a high number of buyers. The term "High/High" refers to a high level of horizontal concentration and a high number of buyers. And, finally, the term "High/Low" refers to a high level of horizontal concentration and a low number of buyers. One objective in selecting the different concentration levels was to obtain data on the outcome of the bargaining game among buyers and sellers across a variety of different environments. Another objective was to obtain bargaining outcome data involving a wide range of different "sized" buyers.

3. Experimental Design

The analysis of how a given level of horizontal concentration among cable operators may affect the flow of programming to viewers requires a carefully constructed "experimental design." **An** experimental design consists of a set of environments in which the experiments take place. The purpose of the experimental design is to create a set of data that shed light on the hypotheses under investigation. Such data are created in part through the specification of a set of "treatment variables." **A** treatment variable is a characteristic of the environment that is under the control of the experimenter.

3.1 Treatment Variables

A total of 25 experimental sessions were completed involving 200 human subjects.[32] The experimental design consisted of a number of treatment variables leading to what can best be described as a 3 x 3 experimental design. Table 5 depicts the experimental design and the number of sessions (i.e., independent observations) conducted under each treatment condition.

[32] Due to a software error, in one session involving the limited capacity treatment buyers were able to conduct more than three trades. The results of this session are not reponed here.

Treatment Variables			
	Unlimited	Limited Capacity	
Environments	Capacity	No MFN	MFN
Low Concentration/High Numbers	2	5*	2
High Concentration/High Numbers	2	4	2
High Concentration/Low Numbers		5*	2

Table ***5:*** Horizontal Concentration Treatments
(One observation under each of these treatments used a parameter ***97*** slightly modified from the one reported here)[33]

The primary treatment variable was the level of horizontal concentration among buyers, where concentration is measured as a percentage of the total MVPD subscribers served by a particular buyer. Because the number of buyers may affect bargaining outcomes, the number of buyers also varied across some of the treatments. The following three treatment conditions were implemented:

- ***Low*** *Concentration/High* ***Numbers*** (Low/High). There were five (5) buyers and all served between 14.6% and ***26.8%*** of the MVPD subscriber market.
- *High Concentration/High* ***Numbers*** (High/High). There were five ***(5)*** buyers. One buyer served **51.2%** of the MVPD subscriber market. **All** other buyers served between 7.3% and 17.1% MVPD subscriber market.
- *High Concentration/Low* ***Numbers*** (HighiLow). There were three **(3)** buyers. Buyers served 39%, 43.9%, and 17.1% of the MVPD subscriber market.

[33] **Interested parties can observe the complete set of parameters** by **downloading a tile labeled** Parameters.xls **from the following website addresses:** http://www.fcc.gov/mb **and** http://www.fcc.gov/opp.

It is commonly believed that bargaining power increases with the size of the buyer. Based on this, the collective bargaining power of buyers should be the lowest in the Low/High treatment and the highest in the High/Low treatment. In addition, we should observe that large buyers possess greater bargaining power than small buyers. The treatments also permit an evaluation of the conjecture that the size distribution of buyers may affect the flow of programming to viewers. For example, the treatments allow an examination of whether an environment where a single firm that serves 51.256 of the MVPD market is more likely to impede the flow of programming than an environment where the two largest buyers have a MVPD market share of 39.0% and 43.9%, respectively.[34]

An additional treatment variable examined was the inclusion of a capacity constraint on the buyers. In some of the experimental sessions we did not restrict buyer purchases. Thus, they could trade with all four sellers.[35] In most other experimental sessions, buyers were allowed to conduct a trade with only three sellers. This treatment reflects the fact that most cable operators have diminishing marginal utility (i.e., profitability) from signing additional affiliate agreements with cable networks.[36] We denote the sessions without the capacity restriction as UNCAP and those with the restriction as *CAP*.

The final treatment variable was the inclusion of a "Most Favored Nation" ("MFN") clause in the *CAP* sessions. In practice, an MFN guarantees that a large cable operator pays an affiliate fee (per subscriber) that is no higher than the affiliate fee paid by a smaller buyer. In the MFN sessions any buyer with a market share greater than 26.8% was granted a "lowest price guarantee" for all trades she conducted.[37] If, at any time during the trading period, a seller, who had previously conducted a trade with a buyer with MFN status, subsequently traded with another buyer at a lower per subscriber price. then the buyer with the MFN status would be given the lower per subscriber

[34] This analysis involves comparing the results obtained in the High/High and HighiLow environments.
[35] In this case the efficient outcome occurs when buyers trade with all sellers.
[36] See Appendix A for a discussion of this effect. One approach to generating this effect is to prevent buyers from completing trades will all sellers. An alternative approach involves providing buyers with a sel of valuations for individual sellers as well as valuations for combinations of sellers. Our desire to simplify the analysis required the adoption of the former approach.
[37] An MFN may be "assigned" to buyers in a more complex manner in the actual market.

price.[38] We attach the term MFN to any experimental session that includes this requirement.

An MFN restriction may have a substantial effect on the affiliate fees cable networks receive from cable operators. Unfortunately, economic intuition provides very little guidance on what that effect may be. On the one hand, an MFN provision may provide cable networks the ability to credibly resist an attempt by a non-MFN endowed cable operator to obtain a lower affiliate fee.[39] If this effect predominates. an MFN may enhance a cable network's profitability. The extent to which it may enhance profitability would depend upon the number of MVPD subscribers that are served by an MVPD service provider that is not MFN-endowed. The greater this number, the greater the percentage of the MVPD marketplace over which a programming network can credibly resist a demand for a low affiliate fee. On the other hand, by reducing the range of affiliate fees over which the programming network is willing to trade, an MFN provision may reduce the number of affiliate agreements a cable network completes. The revenue the cable network foregoes due to the reduction in the number of affiliate agreements it completes may be greater than the revenue it obtains from inducing some buyers to pay a higher affiliate fee.

3.2 Experiment Institution

Between 7 and 9 subjects participated in each experimental session. The subjects were undergraduates and graduate students from Penn State University. All subjects were paid $7 for showing up on time for the session. Subjects were randomly assigned a role of either a buyer or a seller. Subjects read instructions prior to each session (See Appendix B). They then answered a set of questions designed to test their understanding of the instructions. Once all subjects had successfully answered these questions, a

[38] One difference between the MFN and No MFN treatments is that transaction prices in the No MFN treatment were expressed in experimental dollar units, while transaction prices in the MFN treatment were expressed on a experimental dollar per subscriber basis. The prices can be compared by dividing the non-MFN transaction prices by the number of subscribers served by the particular buyer.

[39] Recently. the YES Network denied Cablevision's dcmand for a lower affiliate fee based on the notion that a lower fee would trigger an MFN provision. All things being equal, the more successful this resistance, the greater the cable operator's incentive to grow. The cable operator's incentive to increase in size is only enhanced by the fact that a large cable operator may be able to impose an MFN provision on all the cable networks it carries.

practice trading period was conducted. A trading period is simply a period of time within which buyers and sellers have the opportunity to conduct a trade. Trades in each trading period were conducted using experimental dollars, which converted at the end of the each experimental session at the rate of ,002 experimental dollars to one U.S. dollar. Unlike in the non-practice trading periods, participants could not earn/incur profits/losses during the practice period. Each experimental session was comprised of eight trading periods. The eight trading periods that comprise an experimental session employ the same subjects, parameters, and trading institution. With the exception of the subject's session earnings, all variables of interest are reset at the beginning of a new trading period. Because the participants incurred unavoidable costs in each trading period, we chose to give each participant "working capital" (i.e., an initial endowment of experimental dollars) to defray potential losses. Subjects were informed that they would be asked to leave the experimental session immediately if they incurred losses that exceeded their working capital.[40] Sellers 1 and 2 were endowed with 4,000 experimental dollars in working capital and the rest of the participants were given 2.000 experimental dollars. Sellers 1 and 2 were given more working capital since they were expected to have a more difficult time earning profits than other sellers. It is worth noting that Sellers 1 and 2 could make the maximum possible losses in every trading period and still not completely deplete their working capital. This allowed us to observe market negotiations and dynamics even in situations where participants might be incumng significant losses.

The trading institution can best be described as a decentralized bargaining market (DBM). In a DBM, buyers and sellers negotiate terms of trade in a pair-wise, private fashion. Participants could only submit a bid to buy or an offer to sell to one individual at a time.[41] Each participant was only aware of the bids to buy and offers to sell to which he or she was personally involved.[42] Each buyer (seller) could begin a negotiation with a particular party, decide not to conduct a trade at some point, negotiate with and complete

[40] Only in one instance did a participant face this situation. In that case, the seller (Seller 4) noted that he made an error and, since it was clear to all parties that he could easily make up the losses, the subject was allowed to continue.

[41] This did not prevent the participant from sending the same bid or ask to multiple entities.

[42] There are instances where participants obtained additional market information. In the CAP treatment, a buyer's standing bids would disappear from a seller's screen when the buyer completed three trades. Thus, a seller could potentially see when a buyer had completed three trades. Also, MFN-endowed buyers