

Research on the United States Multichannel Video Industry at the Federal Communications Commission

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Abstract

Presence of consumer lock-in due to high switching costs make competitive analysis of multichannel video distribution market in the United States a difficult task. This paper introduces the reader to the multichannel video industry in the United States, explains generally its regulation, and relates an active theme of research at the Federal Communications Commission, the effect of switching costs on competition between cable television and Direct Broadcast Satellite providers.

Keywords: switching costs, satellite transmission, multichannel video competition, cable television, direct broadcast television

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The views and conclusions expressed in this article are those of the authors and do not necessarily reflect the views of the FCC or any of its Commissioners, or other staff. Special thanks to Jerry Duvall and Irene Wu who reviewed earlier versions of this draft. Of course, all remaining errors are ours.

I. Introduction

This paper introduces the reader to the multichannel video distribution market in the United States, explains generally its regulation and nature of competition in video distribution market. The paper summarizes findings from our recent study (Wise and Duwadi, 2005) on competition between cable and Direct Broadcast Satellite (DBS) services, the two prominent platforms competing in the video distribution market in the United States. We conclude with a brief discussion on policy implications of the presence or lack of substitution between cable and DBS. The results from our study indicate that when prices for cable services increased substantially, subscribers switched from cable to DBS, presumably at the point at which the price change was larger than the cost of switching. Overall, the results indicate that competition between cable and DBS is consumer welfare enhancing since DBS can act a constraint on cable prices and competition between these two platforms generally leads to improved quality of services.

II. Background and Previous Research

U.S. government policy toward cable rates reflects evolving views about the nature of the multichannel video industry and the proper role of public policy. In recent memory, cable prices had been deregulated (1984), re-regulated (1992), and then deregulated again (1996). In a market that is viewed as potentially competitive in the traditional sense, deregulation and the entry of competitors should result in decreasing prices over time. This anticipated result has not occurred, despite various forms of entry and a growing market. Deregulation of cable rates had always occurred in response to, or in reference to, some form of competition, either local broadcast channels (1984) or other multichannel competitors (1996). The persistence of rapid price increases, however, indicates that the mere presence of additional competitors has not increased the intensity of price competition.

A. Nature of the Multichannel Video Industry

The process of creating and distributing programming to households in the United States involves three distinct activities: (1) the production of programming; (2) the packaging of programming into programming networks; and (3) the distribution of programming to consumers, either by free over-the-air broadcast signals or by subscription via cable, wireless, or satellite. Some entities participate in two or more of these activities or markets (i.e., exhibit vertical integration), while other entities participate in a single market. This paper describes research concerned chiefly with the third activity i.e., the multichannel subscription market for programming distribution, but also provides background on the packaging of programming into networks since it creates the critical input for the distribution market.

B. Multichannel Video Programming Distribution

The multichannel video distribution market consists of firms ranging in size from single-system cable operators with only a few dozen subscribers to multiple system operators ("MSOs") that own many systems and serve millions of subscribers. Business plans vary among large MSOs. For example, Cablevision's cable systems are all located within a single market area (New York City), while the cable systems of other large MSOs are distributed across many markets. In this market, both switching costs (by discouraging consumers from switching between providers) and sunk costs (by discouraging fierce price competition) play roles.

Multichannel video programming distributors bundle programming networks into groups of channels or "tiers" and sell this programming to consumers, deriving revenues from subscription fees and the sale of advertising time. Cable systems consist of a central distribution headquarters, or "headend," in each local market that receives local or distant signals and then transmits them via cable television networks to individual households. By law, the supply of cable services is provided through "local franchises," i.e., local service areas licensed by the local or state government. The market, therefore, for multichannel video distribution service is local. Cable system operators are awarded the right to offer service to a given area based on

determinations made by local or state governments. These areas typically were established many years ago. Adjacent communities often receive service from different cable systems at different prices, depending upon which cable systems serve those areas.

By contrast, contemporary DBS, which began service in 1993, is a service offered to almost the entire nation. Each DBS firm offers essentially the same terms and prices to consumers across the country regardless of where they live. DBS operators transmit signals from ground stations to geostationary satellites in the southern sky, which, in turn transmit signals to millions of subscribers. This system architecture of “few to many” (i.e., from a few satellites to many millions of subscribers) differentiates DBS technically from cable service. DBS is inherently limited in the spectrum available based on the number of satellite channels available, although compression technologies can and have alleviated this constraint. Additionally, it is more technically difficult for DBS operators to transmit signals to limited groups of subscribers (such as local-into-local broadcast signals to the communities from which they originate) than for cable operators that have a presence in each local community. Until recently, DBS operators’ capacity was sufficient to offer more and higher-quality service than cable operators, by using an all-digital transmission system. More recently, however, cable operators have upgraded most systems with digital technology, thus increasing the number and quality of their video services, and have also begun offering ancillary services that are difficult for DBS operators to match, such as high-speed Internet access and telephone service. Whether this dynamic becomes increasingly important in competition between cable and DBS remains to be seen, but the analysis of this paper implies that it may, since quality of overall service appears more important than price to consumers.

C. Programming Network Market

In the programming network, or upstream, market, producers of programming use a mixture of highly specialized and non-specialized inputs to create programs. Programming networks produce their own programming and/or acquire programming produced by others. The

programming network market consists of a wide variety of firms, ranging from entities that own one programming network and largely acquire their programming from unaffiliated program producers (e.g., the Outdoor Channel), to large corporations such as Discovery, which owns many programming networks and whose package of programs includes programming that is produced in-house, to Time Warner, which produces many of its own programs, owns many programming networks, and owns its own video distribution system.

The programming network business involves high program production costs. The traditional view of the upstream video market is that it involves high sunk costs, but near-zero marginal costs of production and, indeed, the incremental cost of showing an existing program to one additional viewer is nearly zero. This is somewhat oversimplified, however, because it gives the impression that once a programming network has the basic equipment and personnel to produce programming, it can produce all the programming it wants at no additional cost. This is clearly not true. Some fixed and/or sunk costs for producing programming are spent once, or only as equipment must be replaced, but others recur. Rather, marginal cost is near zero to transmit any program already produced, but marginal costs for additional programs may be quite high even after fixed and/or sunk costs are spent. Additionally, some fixed costs are on-going and repeated, beyond the sense faced by any industry such as for the replacement of worn-out or obsolete equipment. Examples of on-going fixed and/or sunk costs are the renewal of sports rights, renewal of contracts for on-air personalities, and new technology required for the production of new, original programming.

The implication of this description is that there is considerable risk involved in running a programming network, because there is an initial set of sunk costs before any revenue is generated, and then ongoing decisions about spending on new sunk costs. Spend on the wrong sunk costs, then popularity drops, advertising revenues drop, and perhaps even carriage on cable systems drops. Fail to spend on the right sunk costs, and perhaps some other network acquires

the programming, and then popularity and revenues shift to that other network. Management of this risk is critical in the business.

Clearly, cable and DBS operators have the option of assuming all the risk themselves by producing their own programming and not making it available to competitors. Over time, however, all types of vertical integration between cable operators and programming networks have decreased. Even when vertical integration was much higher in the industry, however, no national networks were owned and carried exclusively on the owner's cable systems, at least in part due to U.S. regulations limiting the ability of cable operators to foreclose carriage of vertically integrated networks by competitors. Cable operators still shared the risk of wholly-owned cable networks by offering them for carriage by other cable operators and with DBS operators. Moreover, given the drop in the level of vertical integration over the past ten years, it appears that cable operators have decided that, in many cases, the best way to deal with this risk is through buying programming rather than making programming.

Assumption of this risk is spread between programmers and multichannel video distributors based on the terms of carriage agreements. Programmers bear the risk of any costs not covered by license fees, in that they must sell enough advertising to make up the difference. Multichannel video distributors bear the share of the risk resulting from the fees they pay and from devoting the channel space to the network, channel space that might carry other networks. When one multichannel video distributor does not cover costs, other multichannel video distributors must cover the difference or the programmer will be forced to reduce expenditures or exit the market. Thus, one way to view the market is a strategic effort to shift risk onto other parties. This is a vast oversimplification, however, because there is a clear interdependence between cable operators and programmers.

A more nuanced interpretation would be a cooperative game in which parties, explicitly or implicitly, work together to share the costs in the most efficient way possible. Programmers realize that they must have carriage to survive. Cable operators realize they must have quality

programming to survive. The existence of “most favored nation” clauses (“MFNs”) and horizontal and vertical integration indicate that some level of at least implicit cooperation exists in the industry. MFNs provide a means of indirect communication so that all parties know what they are paying (or what risks they are assuming), and what others are paying/assuming.

Horizontal cross-ownership (passive or active) and vertical integration (often involving several cable operators holding interest in the same network) provides a punishment regime, since cable operators with cross-ownership in other cable operators internalize some of the programming costs they push onto other operators through tough negotiation with programmers. But because incremental costs of transmission are near-zero, and because viewers place some positive value on receiving programming, programming networks attempt to distribute their services to as many households as possible. Moreover, wider distribution leads to higher advertising revenue for the programming network.

D. Prior Research

Prior to 1996, little research on the effect of DBS on cable industry existed. Since then, however, several researchers have attempted to analyze the competitive effects of DBS on cable. For example, Hausman (1999) in comments on the relationship between cable prices and DBS concluded that DBS is not a substitute for cable because cable prices only respond in the presence of another cable competitor, not to the universal presence of DBS. Hausman attributed this fact to product differences between cable and DBS, such as the inability to provide broadcast signals, and high DBS start-up costs. Recent work by the Federal Communications Commission and General Accounting Office agreed with Hausman’s conclusion, finding significant cable price decreases where cable overbuild competition exists, but cable price increases everywhere else (GAO, 1999; FCC, 1999-2003). Karikari, Brown, and Abramowitz (2003) found that cable regulation prior to 1999 may have increased DBS penetration in some areas, while lower rates from overbuild competition, and higher cable quality from system upgrades, suppressed DBS penetration. Goolsbee and Petrin (2004) found that premium cable is a closer substitute for DBS

than the equivalent of most popular services, but also that all cable subscribers enjoy substantial welfare gains from the entry of DBS. Savage and Wirth (2002) found that overbuild entry is more likely in monopoly cable markets with high population density, income, and household growth, and that cable operators in these markets offered more channels with a lower price per channel for basic service, but without examining the effects of DBS competition. GAO (2002) found that the ability of DBS operators to offer local broadcast channels to a local community raised penetration in that community, but did not affect cable prices.

Other researchers in the past have examined the cable industry and its own price elasticity.¹ Rubinovitz (1993) examined cable rate increases between 1983 and 1989, a period of increasing deregulation for the cable industry, finding that the elimination of price regulation conferred market power to cable operators that they used to charge higher prices to subscribers. Ford and Jackson (1997) employed the same model, slightly modified, to examine the effects of horizontal concentration (i.e., one company owning multiple cable systems) and vertical integration (i.e., one company owning both cable systems and cable programming networks) in the cable industry. The authors concluded that horizontal concentration resulted in substantial programming cost savings for cable operators. Some of this was passed on to cable subscribers, resulting in a net consumer welfare gain. Vertical integration also led to cost savings for cable operators, but resulted in a net consumer loss due to an increase in producer surplus. Mayo and Otsuka (1991) employed a model to study the elasticity of demand for different types of cable services in different areas in 1982. Mayo and Otsuka found demand for basic cable services was inelastic in rural areas, but elastic in urban areas, and that while regulation did not lead to economically efficient prices, it did hold prices below monopoly levels. Chipty, in a series of papers, studied different aspects of the organization of the cable industry. Two papers studied the

¹ Older research on substitution between cable and other products does exist, but it is of limited value because the industry has changed so drastically in the interim. (See, e.g., Webbink, 1986; Bykowski and Sloan, 1990).

effect of cable operator ownership of programming networks (Chipty, 1994 and 2001), finding that vertically integrated cable operators do tend to exclude rivals to owned programming networks, but that they offer higher-quality services overall to consumers. A third studied whether national size had an effect on bargaining power and pricing (Chipty, 1995); Chipty demonstrated that larger operators supply more channels and subscriptions at all prices.

Beil, et al. (1993) and Otsuka (1993) examined the welfare effects of Local Franchise Authority regulation of the cable industry. The two articles reach opposite conclusions: Beil, et al., assumed that franchising was the main barrier to competitive entry in the cable industry between 1984 and 1990 because franchising authorities were only interested in maximizing their franchise fees and calculated that franchising resulted in \$3.6 billion per year in national welfare loss. Otsuka looked at 1982 data, a period of rate regulation, and found welfare gains from franchise regulation. He found that rate regulation constrained rates below monopoly profit maximizing levels, and that franchise regulated areas also had higher quality service (in terms of number of non-local channels offered). Emmons and Prager (1997) examined, for 1983 and 1989, the effects of competition and type of ownership (i.e., privately owned versus municipal- or subscriber-owned) on prices and service offered. The authors found that quality, in terms of number of basic service channels offered, was generally similar in competitive and non-competitive systems, and in privately owned and non-privately-owned systems. Crawford (2000) studied the consumer welfare effects of the 1992 Cable Act, finding that, rather than reducing rates, cable operators responded strategically to rate regulation, moving services and changing product offerings, and that there was no net consumer welfare gain from the 1992 Cable Act.

III. Switching Costs

In this section we summarize findings from our recent research that examined substitution between cable television and DBS multichannel services, particularly for the basic cable services to which the vast majority of cable customers subscribe, and other industry

characteristics that may affect substitution.² Previous examinations of whether cable television prices are constrained by competition have produced inconsistent results. Using different methods and different data sets, economists have examined whether the presence of different competitors can restrain incumbent cable operators from charging supracompetitive prices. This issue is highlighted by persistent increases in inflation-adjusted cable prices, even in the face of what appears to be expanding competition from DBS, and obscured by new service offerings. Difficulties in acquiring comparable data between cable and its competitors, particularly DBS, have made rigorous examination of substitution between cable and its alternatives even more complicated. We had access to comparable data at the local level, which assisted our examination of cable-DBS substitution.

Both cable operators and DBS operators offer a variety of service packages. Cable operators offer a basic package, or *tier*, which by law must include local broadcast channels but often does not include much else.³ Usually, cable operators offer one or more additional packages of satellite channels in addition to the basic tier, sometimes called “Cable Programming Service Tiers” (“CPSTs”). We followed FCC (2003) in combining the first two packages (i.e., the basic tier and first CPST) of cable service as the “most popular” service. “Most popular” is an apt term, because more than 90% of cable subscribers take these two tiers together before adding any additional services. Together, these two tiers of service form the basis for the cable rates we study, including any per channel rates. Cable operators may also offer other CPSTs and packages of channels transmitted digitally, but these packages tend to have much lower penetration rates. Additionally, cable operators generally offer, for an additional charge,

² Discussions in this and subsequent sections draw heavily from Wise and Duwadi (2005).

³ Cable operators are allowed to offer all of their channels on one large package, but almost never do this. At a minimum, premium movie services are generally offered separately. Cable operators rarely will, however, offer a large number of satellite channels on the lowest tier of service. Cable operators typically offer a small basic tier with little more than local broadcast signals (required to be carried on the basic tier by law) and any channels required by the franchise agreement, plus one or more large packages of channels (CPSTs) consisting exclusively or principally of satellite channels.

premium movie channels (termed “premium services” below), such as HBO and Showtime, either a la carte or in packages, and some cable operators offer pay-per-view movies and events, high-speed Internet access, and local telephone service. DBS operators offer various large packages of satellite channels, roughly comparable to cable operator CPSTs, but, due to demand conditions and satellite capacity, can only offer local broadcast stations in some communities, generally in a package by themselves for a few dollars a month. DBS operators, like cable operators, offer premium services for an additional fee.

One study (Goolsbee and Petrin, 2004) found that cable premium services are a closer substitute for DBS than the equivalent of cable’s most popular services. We focused on the question of whether DBS competition constrains cable pricing for the most popular service and how the presence of switching costs affects substitution between non-premium cable services and DBS services.⁴ We hypothesized that cable’s most popular service is a substitute for similar DBS service, and vice versa, but that the presence of switching costs limits substitution for small price changes.

We examined substitution between DBS and cable services using a two-stage process.⁵ First, we examined the cross-price elasticity for cable’s most popular service for the entire industry by regressing the DBS penetration variable against cable price, firm-specific cable variables, and demographic variables. The resulting cross-price elasticity was less than unity, suggesting that there is only a limited amount of substitution based on price. Additionally, the coefficient of cable price was not significant. Some measures of cable quality, such as the number of premium movie channels offered (consistent with Goolsbee and Petrin, 2004), and demographic variables that affect the availability of DBS, also had an effect on DBS penetration.

⁴ In 2002, the FCC analyzed the proposed merger of DBS providers DirecTV and EchoStar and concluded that the two firms’ products were closer substitutes for each other than either product was for cable service. Like Goolsby and Petrin (2004), our data set does not distinguish between the two DBS providers, and consequently cannot provide any evidence of cross-price elasticities of demand between the two DBS products.

⁵ For a detail discussion of the model, please see Wise and Duwadi (2005).

An inelastic cross-price elasticity can mean that significant switching costs exist for homogenous products or that the two products are differentiated. Therefore, in the second step, we examined the reactions of consumers facing different levels of cable price changes. This revealed that consumers faced with large changes in cable price for the most popular service will substitute between cable and DBS services, depending upon the magnitude and direction of the price change. Economic theory dealing with consumer switching costs predicts this type of behavior where consumers are reluctant to switch to a competing product due to explicit or implicit switching costs.⁶ The fact that consumers switch services in the face of large price changes, but not in response to small price changes, constitutes strong evidence of significant switching costs in the U.S. multichannel video industry.

Presence of switching costs leads to situations where consumers are essentially “locked-in” meaning that the DBS operators are unable to offer consumer a sufficiently low price to make them switch from cable to DBS. Consumer “lock-in” may lead to less competition in video distribution market but this condition is not necessarily permanent. Our research shows any large cable price increase would push cable subscribers over to the DBS provider. In addition, our study shows that in cases where both perceived and real switching cost is less than the cable price increase, DBS does become a viable substitute for cable and help to constraint rise in cable prices.

IV. Summary and Conclusions

Our research on switching costs generates interesting results and validates some of the findings from earlier research on cable-DBS competition. Although cable and DBS may not be always be substitutes for each other due to real and perceived cost of switching, consumers view DBS as a substitute for cable in terms of higher quality of services offered like premium channels.

⁶ See Klemperer (1995) for a survey of the literature on switching cost theory. For further detail, see Klemperer (1987a), (1987b), (1992), Beggs and Klemperer (1992), and Klemperer and Padilla (1997).

One possible way of looking at the multichannel video market, supported by the results in this paper, is in the context of the theory of switching costs. In the multichannel video market, the incumbent cable operator commands a large market share, and cable subscribers may consider switching from cable to DBS as including a perceived or real switching cost. In a situation where price discrimination between new customers and repeat customers is not possible, and where the consumer switching cost is high, the incumbent would charge supra-competitive rates to existing subscribers and not compete for new subscribers. The new entrant would compete only on the fringe of the market and serve new subscribers. The incumbent may also provide a whole array of services (e.g. cable operators providing high-speed Internet services), thus making the cost of switching to other multichannel services higher than before for its current subscribers. Our results point to this possibility, since it appears that consumers switch multichannel video providers only in response to relatively large price changes, not small ones.

Our research of switching costs and competition between cable and DBS indicates that nature of competition in the U.S. multichannel video market is very complicated. The dynamics in the industry, and the nature of competition, will not be understood by reference to simple factors, such as the presence or extent of rivals. Pursuing greater understanding of the role of switching costs in this industry will allow observers from countries with emerging video distribution markets to comprehend competition as it actually exists, not as simple theory would predict.

References

- Beggs, A. and P. Klemperer. 1992. Multi-period competition with switching costs. *Econometrica*. 60:651-666.
- Beil, R. O., P. T. Dazzio, R. P. Ekelund, and J. D. Jackson. 1993. Competition and the price of municipal cable television services: an empirical study. *Journal of Regulatory Economics*. 6:401-415.
- Bykowsky, M. M. and T. Sloan. 1990. Competitive effects of broadcast signals on the price of basic service. *National Telecommunications and Information Administration Staff Paper*.
- Chen, Pei-Yu (Sharon) and L. M. Hitt. 2002. Measuring switching costs and their determinants in internet-based business. *Leonard N. Stern School of Business, New York University Information Systems Research Seminar Series*.
- Chipty, T. 1994. Vertical integration and market foreclosure: evidence from the cable television industry.
- _____. 1995. Horizontal integration for bargaining power: evidence from the cable television industry. *Journal of Economics & Management Strategy*. 4:375-397.
- _____. 2001. Vertical integration, market foreclosure, and consumer welfare in the cable television industry. *The American Economic Review*. 91:428-453.
- Crawford, G. S. 2000. The impact of the 1992 cable act on consumer demand and welfare. *Rand Journal of Economics*. 31:422-449.
- Emmons, W. M. and R. A. Prager. 1997. The effects of market structure and ownership on prices and service offerings in the U. S. cable television industry. *RAND Journal of Economics*. 28:732-750.
- Federal Communications Commission, *Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992: Rate Regulation, Sixth Order on Reconsideration, Fifth Report and Order, and Seventh Notice of Proposed Rulemaking*, FCC 94-286, Nov. 1994.
- , *Annual Review of Cable Industry Prices, 1998-2002*, MM Docket No. 92-266. This refers to five separate reports, released annually.
- , *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, Jan. 2004.
- Ford, G. S. and J. D. Jackson. 1997. Horizontal concentration and vertical integration in the cable industry. *Review of Industrial Organization*. 12:501-518.
- General Accounting Office. 1991. *Telecommunications: 1991 survey of cable television rates and services*.
- _____. 1999. *The changing status of competition to cable television*.
- _____. 2000. *Telecommunications: the effect of competition from satellite providers on cable rates*.
- _____. 2002. *Telecommunications: issues in providing cable and satellite television services*.

- _____. 2003. *Issues related to competition and subscriber rates in the cable television industry.*
- Goolsbee, A. and A. Petrin. 2004. The consumer gains from direct broadcast satellites and the competition with cable tv. *Econometrica*. 72:351-381.
- Hausman, J. 1999. *Declaration of professor Jerry A. Hausman, Appendix A to petition of SBC Communications to deny application in the matter of applications for consent to the transfer of control of licenses of MediaOne Group, Inc., transferor to AT&T Corp., transferee*, Federal Communications Commission, CS Docket No. 99-251.
- Hoheb, M. 2004. Stunner: cable and dish tastes similar. *Media Life*. (Available at http://69.20.6.242/news2004/june04/jun21/2_tues/news4tuesday.html.)
- Karikari, J. A., S. M. Brown, and A. D. Abramowitz. 2003. Subscriptions for direct broadcast satellite and cable television in the US: an empirical analysis. *Information Economics and Policy*. 15:1-15.
- Klemperer, P. 1987. Entry deterrence in markets with consumer switching costs. *The Economic Journal*. 97:99-117.
- _____. 1987. Markets with consumer switching costs. *Quarterly Journal of Economics*. 102:375-394.
- _____. 1987. The competitiveness of markets with switching costs. *RAND Journal of Economics*. 18:138-150.
- _____. 1992. Equilibrium product lines: competing head-to-head may be less competitive. *American Economic Review*. 82:740-775.
- _____. 1995. Competition when consumers have switching costs: an overview with applications to industrial organization, macroeconomics, and international trade. *Review of Economic Studies*. 62:515-539.
- Klemperer, P. and A. J. Padilla. 1997. Do firms' product lines include too many varieties? *RAND Journal of Economic*. 28:472-488.
- Knittel, C. R. 1997. Interstate long distance rates: search costs, switching costs, and market power. *Review of Industrial Organization*. 12:519-536.
- Mayo, J. W. and Y. Otsuka. 1991. Demand, pricing, and regulation: evidence from the cable tv industry. *RAND Journal of Economics*. 22:396-410.
- Otsuka, Y. 1993. A welfare analysis of local franchise and other types of regulation: evidence from the cable industry. *Journal of Regulatory Economics*. 11:157-180.
- Owen, Bruce and Steven Wildman. 1992. *Video Economics*. Cambridge, Mass.: Harvard University Press.
- Rubinovitz, R. N. 1993. Market power and price increases for basic cable service since deregulation. *RAND Journal of Economics*. 24:1-18.

- Savage, S. J. and M. Wirth. 2005. Price, programming and potential competition in US cable television markets. *Journal of Regulatory Economics*. 27 (1): 25-46.
- Singer, H. J. 2003. Does clustering by incumbent cable MSOs deter entry by overbuilders?. Working Paper.
- Wise, Andrew S. and Duwadi, Kiran, "Competition between Cable Television and Direct Broadcast Satellite: The Importance of Switching Costs and Regional Sports Networks," *The Journal of Competition Law and Economics*, Vol 1, pp. 679-705, Dec. 2005.