Cable Television:
Does Cable Need to be Regulated Any More? *

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1 Introduction

Now is a quiet time in the on-again, off-again regulation of the cable television industry. Since the 1996 Telecommunications Act eliminated rate regulation for the majority of cable service bundles on March 31, 1999, cable systems have been free to charge whatever they like for the services chosen by the vast majority of subscribers. That was a watershed year, as the Satellite Home Viewer Improvement Act of 1999 also relaxed regulatory restrictions limiting the ability of direct-broadcast satellite (DBS) systems to provide local television signals into major television markets. Since then, satellite providers have added 13 million more subscribers than cable, giving them over 25% of the multi-channel video distributor (MVPD) marketplace and providing two credible competitors to incumbent cable systems in most markets (FCC (2001b), FCC (2005b)).

On the other hand, the last 10 years has seen continued consolidation in distribution, with the top 8 firms increasing their share of MVPD subscribers from 68.6% in 1997 to 80.1% in 2004 (FCC (1998a), FCC (2005b)). This has raised concerns about concentration and integration in the market for program supply. Horizontal concentration and channel occupancy limits promulgated after the 1992 Cable Act were struck down in 2001 and remain to be reinstated (FCC (2005c)). As cable prices continue to rise, lawmakers wonder about the feasibility of à-la-carte services to reduce cable prices (FCC (2004)).

In light of these developments, this chapter asks "Does the cable television industry need to be regulated any more?" I address this question in three parts. In the first part, I survey past and present cable regulations and assess their effects. The majority of this portion surveys the reasons for and effects of the four major periods of regulation and deregulation of cable rates (1972-1984, 1984-1992, 1992-1996, 1996-current). The evidence for regulation is discouraging: unregulated periods are characterized by rapidly increasing quality and penetration (and prices), but regulated periods only briefly lowered prices and likely lowered offered quality. Consumer welfare estimated, while few, suggest consumers prefer unregulated cable services. This highlights the difficulty regulating prices in an industry (like cable) where service quality can easily be altered.

I then review the empirical record on the consequences of competition in cable markets with a focus on the recent rise of satellite competition. Evidence from duopoly ("overbuilt") cable markets is consistent: an additional wireline competitor lowers cable rates, with estimates ranging from 8% to 34%. Evidence of the effect of satellite competition is less compelling: surveyed rates are often only marginally lower and sometimes higher. In an important recent study, Goolsbee and Petrin (2004) suggest the importance of controlling for the (unobserved) quality of cable and satellite offerings and find when doing so that DBS competition reduces cable rates by an estimated 15%. Despite satellite competition, however, significant market power remains.

Finally, I address three open issues in cable markets: horizontal concentration and vertical integration and its consequences in the programming market, bundling in both the distribu-

tion and programming markets, and entry barriers in the distribution market. Conclusions in these area are harder to come by. While horizontal concentration has clearly increased in the programming market, theoretical models have ambiguous predictions of its effects and empirical work is hampered by a dearth of price information. The evidence on vertical integration is more substantial: integrated systems clearly favor affiliated programming, but whether for reasons of efficiency or foreclosure remains unclear. Finally, bundling is seen to impact market outcomes in both the distribution and programming markets. In distribution, while it clearly enables systems to better capture surplus and offer high-quality and diverse programming, it likely does so at significant cost to consumers. Worse, in both program supply and distribution, it may enhance market power and serve as an effective barrier to entry. Empirical estimates of these effects are critically needed.

Note that the focus of this chapter is almost exclusively on the cable television market in the United States. I do this for several reasons. First, the evolution of the MVPD industry and the regulations that have applied to it differ considerably across countries. This has led to dramatic differences in the market reach of cable systems, their market share among households passed, and the relative importance of cable versus satellite in the retail and programming markets (cf. Hazlett (2004, Table 1)). Second, this is a decidedly empirical survey, and by virtue of a series of FCC reports both on cable industry prices and on competition in the market for video programming (e.g. FCC (2005a), FCC (2005b)) and a private data collection industry (led by Kagan World Media and Warren Publishing), there is surprisingly good information about cable systems in the United States, both in the aggregate and for individual systems. Adequately analyzing the experience in other countries would require a chapter in itself, a worthwhile undertaking but beyond the scope of this effort. Finally, beyond a brief description of the current regulatory treatment, I do not consider the economic and regulatory features of the market for broadband Internet access. In part, the economic issues are different and more suitable to a chapter on telecommunications, but in the main for the same reasons as above. This is a deep and substantive policy issue whose treatment would quickly exhaust my space. See CITES for further analysis of this issue.

[Conclusions remain to be written]

2 Cable Regulation and Its Effects

2.1 A Brief History of Cable Regulation

2.1.1 The Early History, 1950-1984

The cable television industry began in the 1950s to transmit broadcast television signals to areas that couldn't receive them due to interference from natural features of the local terrain.[1] In order to provide cable service, cable systems needed to reach "franchise agreements" with

[1] See Foster (1982, Chapter 5) and Noll, Peck, and McGowan (1973, pp.3-5) for a concise summary of the history of broadcast television and its regulation.

the appropriate regulatory body (usually local municipalities). These agreements typically included agreements on a timetable for infrastructure deployment, a franchise fee (typically a small percentage of gross revenue), channel set-asides for public interest uses (e.g. community programming), and maximum rates for each class of offered cable service in return for an exclusive franchise to use municipal rights-of-way to install the system's infrastructure (coaxial cable).

Cable grew quickly until 1966, when the Federal Communications Commission (FCC) asserted its authority over cable operators and forbid the importation of broadcast signals into the top 100 television markets unless it was satisfied that such carriage "would be consistent with the public interest, and particularly with the establishment and healthy maintenance of UHF television broadcast service."[2] It also instituted content restrictions that prevented the distribution of movies less than 10 years old or sporting events broadcast within the previous 5 years. In 1972, the FCC provided a comprehensive set of cable rules. First, it sought to balance broadcasting and cable television interests by permitting limited importation of distant broadcast signals. It also, however, imposed a host of other requirements, including Must-Carry, franchise standards, network program nonduplication, and cross-ownership rules (FCC (2000b)).[3]

The next decade saw a gradual reversal of the 1972 regulations and a period of significant programming and subscriber growth. First, rules originally established in 1969 were affirmed in 1975 that franchise rate regulation must be confined to services that included broadcast television stations (GAO (1989)). As a result, premium or pay-TV stations were not nor ever have been subject to rate regulation. Second, in 1972 Time introduced Home Box Office (HBO) for the purpose of providing original content on an advertising-free, fee-supported cable network. In 1975, it demonstrated the ability to distribute programming via satellite and, in 1977, fought and won in court against the FCC's content restrictions, allowing HBO and a generation of subsequent cable networks to provide whatever programming they desired.[4] Since the production of programming is a public good, the advent of low-cost satellite technology with sizeable economies of scale revolutionized the distribution of programming for cable systems. WTBS, CNN, and ESPN began national distribution of general-interest, news, and sports programming, respectively, in 1979 and 1980. In all, no less than 13 of the 15 most widely available advertising-supported programming networks, and all of the top 5 most widely available fee-supported programming networks, were launched between 1977 and 1984. Cable systems grew at double-digit rates.

2.1.2 Price Regulation Since 1984

While the scope of federal regulations had diminished by 1979, state and local regulations remained. By 1984, however, the price terms of these contracts came under attack as the

[2] 2 FCC 2d at 782 as cited in Besen and Crandall (1981, p.90).

[3] Must-Carry rules require systems to carry all local broadcast signals available in their franchise area. These rules were amended by the 1992 Cable Act.

[4] See HBO v. FCC, 567 Fd 2nd 9 (1977).

"deregulation revolution" swept through Congress.[5] Convinced that three or more over-the-air broadcast television signals provided a sufficient competitive alternative to cable television service, Congress passed the 1984 Cable Act to free the vast majority of cable systems from all price regulations.[6]

By 1991, cable systems had dramatically expanded their offered services. The average system offered a Basic Service including a bundle of 35 channels as well as 4-6 Premium Services (GAO (1991)). Basic Services included all over-the-air broadcast channels available in the market as well as a large number of so-called "cable networks" (CNN, ESPN, etc.) and public, educational, and government (PEG) channels. Premium Services were sold à-la-carte and included the major advertising-free movie networks (HBO, Showtime, etc.). An estimated 42% of systems elected to split Basic Service into multiple tiers of Expanded Basic Services (GAO (1991). Prices also increased, however, rising 56% in nominal and 24% in real terms between November 1986 and April 1991.

Concerned that high and rising prices reflected market power by monopoly cable systems, Congress reversed course and passed the 1992 Cable Act to "provide increased consumer protection in cable television markets". Regulation differed by tiers of cable service and only applied if a system was not subject to "effective competition".[7] Basic tiers were regulated (if desired) by the local franchise authority, which was required to certify with the FCC. Cable programming (Expanded Basic) service tiers were regulated by the FCC.[8] Both followed rules set by the FCC, reducing rates to "benchmarks" based on rates charged by systems facing effective competition. In April 1993 the FCC capped per-channel cable prices systems could charge for most types of cable service. The FCC soon found, however, that not only had these gains failed to materialize, but that for nearly one-third of cable subscribers, the average cable bill had increased. Many systems had introduced new, unregulated services and moved popular programming networks to those services; others had re-allocated their portfolio of programming across all services (FCC (1994), Hazlett and Spitzer (1997), Crawford (2000)). In February 1994 the FCC therefore imposed an additional 7% rate reduction.

Responding to political pressure from cable systems, the FCC almost immediately began relaxing rate controls (Hazlett and Spitzer (1997, p. 67)). First, the "Going Forward" rules were established in November, 1994. As discussed by Paul Joskow in his chapter analyzing incentive regulation in electricity transmission markets, an important feature of incentive (price-cap) regulation are the rules governing the maximum price over time. This was particularly important in cable markets, where both the number and cost of programming networks regularly increased over time. However, instead of allowing systems to increase rates by a planned "cost + 7.5%" for each added network, the Going Forward rules permitted increases of up to $1.50 per month

[5] See Kahn (1991, pp. xv-xxiii) for a discussion of the dergulatory movement in the U.S. in the 1980s.

[6] Other terms of franchise agreements remained in effect. See GAO (1989).

[7] There are four separate tests for effective competition: (i) a cable market share under 30%, (ii) there are at least two unaffiliated MVPDs serving 50% of the cable market and achieving a combined share of 15%, (iii) the franchising authority is itself a MVPD serving 50% of the cable market, and (iv) the local exchange carrier offers comparable video programming services (FCC (2000b)).

[8] In what follows I use Expanded Basic tier to refer to the FCC designation Cable Programming tier.

over 2 years if up to six channels were added, regardless of cost (CITE). Rates were further relaxed by the adoption of "Social Contracts" with major cable providers in late 1995 and early 1996. These contracts allowed systems to increase their rates for Expanded Basic tiers on an annual basis in return for a promise to upgrade their infrastructure.[9] The deregulatory process culminated with the passage of the 1996 Telecommunications Act. This eliminated all regulation of rates for Expanded Basic tiers after March 31, 1999. Regulation of Basic Service rates remains the only source of rate regulation in the cable television industry.

While not a cable regulation, one last piece of legislation has significantly impacted prices in cable markets. That is the passage on November 28, 1999 of the Satellite Home Viewer Improvement Act (SHVIA). This permitted direct-broadcast satellite providers to distribute local broadcast signals within local television markets.[10] This put satellite systems on equal footing with incumbent cable operators and hastened the growth of DBS as a viable competitor to cable.

2.1.3 Vertical Programming Regulations

While the primary historical focus of cable regulations has been on controlling prices charged by local monopoly cable providers, there has been recent interest in the organization and operation of the programming (input) market. In this market, networks collect programming and sell the rights to transmit that programming to cable and satellite operators (MVPDs). Most network production costs are fixed.[11] Rights sales generate both transfer payments ("affiliate fees") from MVPDs, typically in the form of a payment per subscriber per month, and advertising revenue. The relative importance of each varies by network, but across networks 50% of industry revenue comes from each source (CITE). Programming is *non-rivalrous*: sales of programming to one MVPD does not reduce the supply available to others.

Carriage agreements are negotiated on a bilateral basis between network (or network groups) and an individual system or system groups, also known as Multiple System Operators (MSOs). Comcast is the largest MSO in the United States with 21.2 million subscribers, or 23.4% of the MVPD marketplace. Many MVPD operators either own or have ownership interests in programming networks as do major broadcast programming operators. Furthermore, all of the top 20 (non-CSPAN) cable networks by subscriber reach and all of the top 15 by ratings are owned by one of these 8 firms,[12] raising concerns about diversity in the media marketplace (CITE).

The 1992 Cable Act introduced two important regulations regarding competition in the pro-

[9] See, e.g., FCC (1998b, p.6) describing the FCC's social contract with Time Warner. In it, Time Warner was permitted to increase its Expanded Basic rates by $1/year for 5 years in return for agreeing to invest $4 billion to upgrade its system. It also dismissed over 900 (!) rate complaints and provided small refunds to subscribers.

[10] Prior to SHVIA, households could only get local broadcast signals if they weren't otherwise available over the air.

[11] See Wildman and Owen (1985) for a detailed description of the market for the supply of programming.

[12] Comcast, Time Warner, Cox, and Cablevision among cable MSOs; News Corp/Fox, Disney/ABC, Viacom/CBS, and GE/NBC among broadcasters.

gramming market. First, it directed the FCC to establish reasonable limits on the number of subscribers a cable operator may serve (the horizontal, or subscriber, limit) as well as the number of channels a cable operator may devote to affiliated program networks (the vertical, or channel occupancy, limit) (FCC (2005c)). These were set in 1993 at 30% of cable subscribers for the Horizontal Limit and 40% of channel capacity (up to capacities of 75) for the Vertical Limit.[13] In the *Time Warner II* decision in 2001, the U.S. Court of Appeals for the D.C. Circuit reversed and remanded these rules, finding the FCC had not provided a sufficient rationale for their implementation. This remains an unsettled issue, although the commission has recently begun a rulemaking proceeding on the issue (FCC (2005c)). The 1992 Cable Act also introduced program access and carriage rules. These forbid affiliated MVPDs and networks from discriminating against unaffiliated rivals in either the programming or distribution markets and forbid exclusive agreements between the affiliated parties. These rules are enforced through a complaint process at the FCC, but complaints have been relatively rare, particularly in the recent 5 years. Notably these rules also apply only to *satellite-delivered* programming. This exception has become an issue in some regional markets (e.g. Philadelphia) as some regional networks distributed via microwave have reached exclusive agreements with their affiliated MSO, excluding rival MVPDs from access to critical content (CITE).

2.1.4 Other Cable Regulations

Cable systems are subject to a myriad of additional regulations (FCC (2000b)). Several have competitive consequences in either the distribution or programming markets and are briefly discussed here.

Must-Carry/Retransmission Consent The 1972 Cable Rules required cable systems to carry all local broadcast signals available in their franchise area. These Must-Carry rules were amended by the 1992 Cable Act to give local broadcast stations the option either to demand carriage on local cable systems (Must-Carry) or negotiate with those systems for compensation for carriage (Retransmission Consent). These agreements are negotiated on repeating three-year intervals and have been a point of contention between some MVPDs and programmers. Smaller stations uniformly select Must-Carry, but larger (esp. broadcast network) stations have used Retransmission Consent negotiations as a way to obtain carriage for affiliated, non-broadcast cable networks. For example, Fox used retransmission consent to facilitate its launch of the FX network.[14] For satellite providers, the rules governing signal carriage are somewhat different. Under SHVIA, satellite providers that distribute local signals must follow a "carry-one, carry-all" approach (FCC (2005b)).

Broadband Access Regulation The market for high-speed (broadband) Internet access has grown considerably in the last 5 years and is now an important source of revenue for most major

[13] The 30% limit was changed in 1999 to 30% of MVPD subscribers.

[14] [Include other examples].

cable systems. It has also caused a regulatory fight between cable systems, Internet Service Providers (ISPs), and local telephone providers ("telco's") over the appropriate regulatory treatment of broadband access. As low-speed ("dial-up") access only required access to a local telephone line, ISPs like AOL and Earthlink grew in the late 1990s without regulatory oversight. As broadband access became viable, however, telephone companies were required to share access to their broadband (Digital Subscriber Line, or DSL) network with unaffiliated rivals.

In FCC (2000c), the FCC ruled that cable broadband service was an "information service" and not a "telecommunications service" subject to common carrier (i.e. access) regulation. In June of 2005, the Supreme Court upheld this decision (Schatz, Drucker, and Searcy (2005)). A similar regulatory structure is likely to be soon put into place for telephone (DSL) providers.

Cable/Telco Cross-Ownership The 1984 Cable Act forbid telephone companies from providing cable service within their telephone service areas. The 1996 Act relaxed this restriction, providing a number of methods under which telephone companies could provide video service, including common carrier transport, wireless cable, and open video systems (FCC (2000b, p.17)). While these did not yield significant telephone company entry, all of the four major local telephone companies now offer MVPD in some form. Three (Bellsouth, Verizon, and Qwest) currently resell satellite services bundled with various telephone services. Verizon, however, is planning on entering as a conventional cable system employing "fiber-to-the-home", while SBC is intending to launch a television service over broadband later in 2005 (Latour (2004), Latour (2005)).

2.2 The Consequences of Cable Regulation and Deregulation

The cable industry has seen several recent periods of regulation and deregulation. This has provided an ample record from which one can evaluate the consequences of cable regulations.

2.2.1 An Economic Framework for Understanding Price and Quality Choice under Regulation

[Discuss Incentive Regulation and Consequences for Quality Choice based on Besanko, Donnenfeld, and White (1987) and Besanko, Donnenfeld, and White (1988)]

Basic features:

- Consider a monopolist selling two goods (e.g. Basic and Expanded Basic)
- Present simple two-type Mussa-Rosen model of optimal quality choice.
  - Get quality degradation for low type.
- Consider impact of price cap regulations, with $p_L < \bar{p} < p_H$.

- Quality rises for low type. So too do prices.
  - Intuition: With a price-cap, firms can't extract as much surplus from high types. Raise quality and thus prices to low types.
- Quality falls for high types. So too do prices.
  - Intuition: With a price-cap, firms can't extract as much surplus from high types. Lower their quality and so too their price
- Welfare effects positive for small price caps. Potentially very negative for large price caps (total surplus falls, so too can consumers surplus)
- Note: if not profitable to offer low-quality good, then things unambiguously bad: price and quality simply fall.

2.2.2 The Facts to be Explained

Prices Figure 1 reports price indices from the Consumer Price Index (CPI) from December, 1983 until July, 2005. Reported are series for (i) cable and satellite and radio and (ii) consumer non-durables.[15] Three distinct periods are clear in the figure and are described in the table below.

Insert Figure 1 Here

Table 1: Growth Rates in Cable Prices by Period

Period	Cable CPI	Nondurable CPI	Difference
12/86 - 4/93	8.99	4.38	4.61
4/93 - 11/94	-2.34	1.11	-3.45
11/94 - 7/05	5.03	2.48	2.55

The first period describes price increases following the passage of the 1984 Cable Act. Price relief from the '84 Act begins in December, 1986 and continues to their peak in April, 1993. This second period continues until the passage of the "Going Forward" rules in November, 1994 and the third continues to the present.

From these price series, it certainly appears that regulation limited cable price increases and deregulation encouraged them. Prices in the period preceding the 1992 Cable Act increased at an annual growth rate of 4.61% greater than that for other consumer non-durables. Similar, prices after the relaxation of the '92 regulation have increased at a rate 2.55% greater than that of other consumer non-durables, while prices during the (short) regulatory period actually fell 3.45% relative to consumer non-durables.

[15] The cable series began including satellite and radio in (???).

Subscriptions Did these lower prices lead to more subscriptions? Figure 2 reports aggregate subscribers to cable and satellite services by year between 1983 and 2004. Unfortunately, this data is only at the annual level, making precise predictions of the impacts of short regulatory periods difficult. Nonetheless, I duplicate the table on growth rates both for cable subscribers and all MVPD subscribers below.

Insert Figure 2 Here

Table 2: Growth Rates in MVPD Subscribers by Period

Period	Cable Subs	Cable + Satellite Subs
1987 - 1993	5.03	5.06
1993 - 1995	4.20	5.93
1995 - 2004	0.70	3.72

First notice that subscriber growth is positive throughout the period. To reconcile this against the concomitant price increase, it must be the case that the quality of cable services is increasing throughout this period. That is surely true; we measure it to the extent possible in what follows.

The results of this simple investigation are not encouraging. Despite the apparent price decline in 1993 and 1994, cable subscriber growth was no faster than in the deregulatory period. Two explanations are possible. First is that growth in offered quality must also have declined relative to the 1987-1993 period, a point we evaluate in what follows. Second is that satellite competition mitigated cable subscriber growth. That is surely possible: Table 5 to come shows that between 1993 and 1995 satellite grew from nothing to 2 million subscribers. While including these shows the growth rate of total MVPD subscribers did increase in the deregulatory period, it is unlikely this had an constraining effect on cable subscribership.[16] On balance, the raw data suggest cable quality may have suffered from the imposition of price regulation.

[Discuss Hazlett and Spitzer (1997) analysis on slightly more disaggregate subscriber data?]

Quality Measuring the quality of cable services is a very challenging undertaking. Various approaches have been taken in the economic literature, from using simple network counts (Rubinovitz (1993), Crandall and Furchtgott-Roth (1996), Emmons and Prager (1997)) to a mix of indicators for specific networks (e.g. ESPN, CNN, MTV) and network counts (Crawford (2000)) to imputing it from observed prices and market shares under the assumption of optimal quality choice (Crawford and Shum (2005)).

Figures 3 and 4 provide two crude measures of cable service quality over time. The first, Figure 3 reports the total number of satellite networks available to systems as well as (from

[16]Recall satellite service before 1999 did not include the local broadcast channels unless those could not be received over the air. As such, early satellite adopters tended to live in rural areas where there was no cable service or where satellite service included broadcast channels.

1996) the average number provided by systems. The number of offered satellite channels has increased considerably over time. This is particularly true in the periods 1978-1988 and 1992-current. These are likely supply-side phenomena, the former driven by the relaxation of FCC content restrictions and the feasibility of low-cost satellite distribution and the latter driven by significant upgrades in cable infrastructure and the (possibly anticipated) rollout of digital programming packages.[17]

Insert Figure 3 Here

Figure 4 provides a number of measures of the cost to cable systems of program networks. The first two, given by the top-most lines in the figure, report the total per-subscriber cost for networks charging affiliate fees according to Kagan World Media (Kagan World Media (1998), Kagan World Media (2004)). The left half of this series is a list ("top-of-rate-card") price, while the right half is an average (across systems) price. As this series accounts both for increases in the number of networks as well as the cost of existing networks, the next two lines give the same information conditioning on the networks charging positive fees in 1989. Together, these series show that prices to cable systems have been increasing over time due both to increased prices for existing networks as well as increases in the number of offered networks. The final (short) series shows the increase in actual average spending per subscriber between 1989 and 1993 (Hazlett and Spitzer (1997, Table 5-10)). This tracks closely the earlier series, suggesting actual costs follow the pattern suggested by networks' prices.

[Get updated cost data]

Insert Figure 4 Here

Unfortunately, neither figure provides a definitive analysis of the consequences of cable regulation on offered cable quality. [Discuss Hazlett and Spitzer (1997) analysis on slightly more disaggregate subscriber data?]

Choice One final consequence of regulation and deregulation in cable markets has been its impact on consumer choices. As discussed later, the least-cost method of providing cable services is as a single bundle. Offering multiple tiers or à-la-carte networks requires excluding households who have not purchased the service. Regulation, on the other hand, has historically introduced a cost to bundling: local and state rate regulations (prior to 1984) and federal regulations (after 1994) often applied only to the lowest bundle of networks offered by the system. This introduced incentives to offer Expanded Basic tiers to avoid rate controls. Indeed, this was widely cited reason that the '92 Cable Act's initial (April 1993) rate controls yielded so little impact to prices: some systems evaded the regulations by offering new, unregulated tiers of service (Hazlett and Spitzer (1997, pp. 138-143), Crawford (2000)).

[17] By using digital compression technology, 4-12 digital networks can be supplied in the space required by one analog network (CITE).

The following table provides information about the choices available to consumers between 1986 and 1993.

Table 3: Choice in Cable Markets

Year	Expanded Basic Subscribers (millions)	Percent Systems Offering Only One Basic Tier
1986	6.6	74.3
1989	3.5	83.4
1990	7.1	
1991		38.6
1992	13.8	
1993	24.6	

Notice the non-monotonicity in both patterns. Prior to 1986, systems were subject to local franchise regulation. In response, some began to offer Expanded Basic tiers. This became unnecessary with the passage of the 1984 Cable Act, and both expanded basic subscribers and tiers came down. By the late 1990s, however, it was (rightly) thought that new cable regulations would differ by tier, inducing systems to begin tiering again.

Driven by the cost advantages of addressable converters, contemporary cable systems offer a large number of tiers, particularly digital tiers. Access to this programming is electronically controlled from the centralized cable headend, giving systems considerable freedom to offer more sophisticated packages, at least to those consumers that elect to use a set-top box.

[Get more recent data on tiering]

2.2.3 Econometric Studies

The challenge in interpreting the trends in the cable data presented above are two. First, how much of increased cable prices are due to increases in cable market power and how much are due to increases in the quality of cable services? And to what extent has regulation limited the exercise of cable market power or distorted the incentives to offer quality? Second, even if systems charge monopoly prices, if this gives rise to the right incentives to increase product quality over time, consumers may benefit despite welfare losses from short-run market power. How have consumers valued changes in the portfolio of cable services? How has regulation influenced these choices?

Measuring Market Power and the Effect of Regulation If, as noted by Borenstein and Rose in their chapter on airline deregulation, the fundamental question in Industrial Organization is to assess the degree to which markets achieve efficient production and allocation of outputs, then a primary job of the IO economist is to measure the market power facing firms. In a static setting, the greater a firm's market power, the more by which prices exceed marginal

costs, with the associated allocative efficiency. The more too is consumers surplus transferred to firms in opposition of regulatory mandate.

Empirical economists have been measuring market power since Bresnahan (1987). Following Bresnahan (1989), I briefly describe the empirical methods used. More detail, including a discussion of the critically important issue of identification, is included in the Empirical Appendix.

Consider a cross-section of markets each occupied by a single firm selling a single product of fixed quality. As each firm is a single-product monopolist, optimal prices in market n are given by:

$$p_n = c_n - \frac{q_n}{\partial q_n / \partial p_n} \tag{1}$$

where p_n is the price, c_n is the marginal cost, and q_n is the quantity sold in market n. This equation shows that prices in market n equal marginal costs plus a markup. Rearranging terms yields the familiar Lerner Index, $(p_n - c_n)/p_n = 1/|\epsilon_n^D|$ where ϵ_n^D is the price-elasticity of demand in market n. The Lerner Index shows that price-cost margins (equivalently, markups) are higher the lower the absolute value of the elasticity of demand facing the firm.

Suppose now that the firm in market n is regulated. The extent to which this constrains its pricing can be parameterized as follows.

$$p_n = c_n - \theta \frac{q_n}{\partial q_n / \partial p_n} \tag{2}$$

Here θ measures the extent to which prices exceed marginal costs in market n. Suppose demand is known or can be estimated using available data.[18] Further suppose that marginal costs are known. If firms and products are homogenous across markets, or differences can be controlled for using econometric techniques, one can use (exogenous) variation in demand to estimate θ by examining how much prices exceed marginal costs across markets with differing elasticities of demand.

In cable markets, this framework can easily be extended to evaluate the first set of questions above. Letting marginal cost and demand each vary with offered quality, one can separate the influence of cost and markups on observed cable prices (or price changes). Furthermore, θ varies between 0 and 1 depending on the extent to which regulation constrains prices. Estimates of θ allow the researcher to form statistical tests of hypotheses about the effects of regulation.

A number of difficulties arise in practice. First, demand must be estimated so that $\partial q_n / \partial p_n$ does not introduce further parameters. Second, and more important, marginal costs are typically not observed and must be estimated along with θ. This introduces difficult identification issues if there is any possibility of economies of scale, as then both costs and markups vary with quantity. These and related issues are discussed in detail in the Empirical Appendix.

[18] The last 15 years has seen an explosion in the estimation of differentiated product demand systems in Industrial Organization. See, inter alia, Berry (1994), Berry, Levinsohn, and Pakes (1995), Nevo (2001), and Petrin (2003) for recent applications. Crandall and Furchtgott-Roth (1996), Crawford (2000), and Goolsbee and Petrin (2004), inter alia, apply these tools in the cable industry.

Measuring the Effects of Regulation Cable Markets Several papers apply the framework above to measure the impact of regulation on pricing in cable markets. Mayo and Otsuka (1991) estimate demand and pricing for Basic and Premium services using data from a cross-section of over 1,200 cable markets in 1982. Regulation at this time was determined by terms of local (municipal or state) franchise agreements and varied across the markets in the study. Across all systems (regulated or not), θ is estimated at 0.097 (0.021). While significantly different from 0 (and 1), this suggests regulation significantly constrained system pricing. Tariff regulation had an even greater effect on prices, although state-level deregulation is not estimated to influence markups at all.[19]

In a widely cited study, Rubinovitz (1993) estimates demand, pricing, and quality (number of channels) equations for Basic cable services using data from a panel of over 250 cable systems in 1984 and 1990. This data is nice as it includes observations for both regulated and deregulated periods. In his raw data, prices are 42% higher in the latter period, but satellite channels have more than doubled and subscribers are more than 50% greater. For reasons of idiosyncratic model specification, the absolute level of θ cannot be identified in each period, but differences in θ can. This he finds to be 0.18 (0.08), implying that, controlling for increased costs due to expanded channel offerings, the increased exercise of market power increased prices by 18%. This is .18/.42 = 43% of the observed price change.

Neither of these papers account for the direct impact of regulation on quality as well as price changes. In a recent paper, Crawford and Shum (2005) estimate a version of the Besanko, Donnenfeld, and White (1988) model described above to infer the impact of regulation on quality and price changes. Using data from a cross-section of 1,042 cable markets in 1995, they estimate preferences and costs and use those estimates to infer the level of offered quality in each cable market. They then relate these quality measures to indicators of whether the cable market had certified with the FCC to regulate Basic Service under the terms of the 1992 Cable Act. They find prices are slightly higher and quality/price ratios slightly lower for high-quality cable products, but both are significantly higher for lower-quality cable products. These are consistent with the effects of Minimum Quality Standards.[20]

[Include mention of other relevant papers, e.g. franchise bidding studies, event studies]

Measuring the Consumer Benefits of Regulation The previous studies focus on the impact to cable prices and qualities of cable price regulation. This relies on a static view of cable markets and focuses on the short-run losses from cable market power. A long-run view must acknowledge that monopoly profits provide strong incentives for systems to invest in service quality if that enhances consumer willingness-to-pay for cable services. Several recent studies estimate consumer demand for cable services and ask about the welfare effects of periods

[19]The latter result is fairly surprising and raises identification concerns which we discuss in the empirical appendix.

[20]These results assume that the regulatory status of a market is regulated. They argue that any bias will yield conservative conclusions and further address this issue using Instrumental Variables estimation. Here they find even larger, though statistically insignificant, effects of the effects of regulation.

of cable price regulation.

In this setting, welfare effects are measured by either the compensating or equivalent variation. The compensating and equivalent variation are measures of the amount of money required to make households in a market indifferent between facing a cable choice set (e.g. set of services, prices and qualities for those services) before and after a change in the economic environment.[21]

A difficulty with this approach for measuring the impact of changes in regulation is that it is based on changes in cable choice sets over time. While this is clearly influenced by regulation, any other changes in the economic environment will also influence the measures. These must therefore either be controlled for directly or the conclusions must be conditional on the assumption that regulation is the only source of time-series variation in firms' offerings.

Crandall and Furchtgott-Roth (1996, Chapter 3) examine the welfare effects of changes arising from the 1984 Cable Act. They estimate a multinonmial logit demand model on 441 households from 1992 and augment that with information about the cable service available to 279 of them in 1983. Despite the substantial increase in prices in this period (cf. Figure 1), they estimate that households would be have had to be compensated by $5.47 per month in 1992 to face the the choices available to them in 1983. In fact, this is likely an underestimate of the true welfare loss, as their quality measure is based on the number of offered broadcast and satellite channels and the latter increased significantly in quality over the period.

Crawford (2000) examines the welfare effects of the 1992 Cable Act. He estimates a multinomial logit demand system on 344 cable systems from 1992 and 1995. Rather than use network counts to control for offered service quality, he uses a mix of indicators for specific networks (e.g. ESPN, CNN, MTV) and network counts. This is important in his context as many systems were alleged to have moved their most popular programming to unregulated tiers of service. He finds a welfare gain of at most $0.03 per subscriber per month. The lack of effect is not due to quality reductions in response to price caps, but a simple lack of reduction in cable prices.

2.2.4 Conclusions

The accumulated evidence is not encouraging for proponents of regulation in cable markets. Theoretical models of price and quality choice in the presence of regulation caution against setting price limits without associated quality controls, and that is infeasible on First Amendment grounds. The aggregate price series suggest that while prices briefly declined after the 1992 Cable Act, the lack of a quantity response suggest declines in associated product quality. Detailed econometric studies based on disaggregate datasets provide mixed evidence. Some find that regulation lowers cable prices from monopoly levels, while others find negligible effects. Evidence on quality distortion is, if anything, positive, although this is based on a small sample and further research is necessary. Furthermore, evidence on consumer welfare effects of changes

[21] The compensating variation asks how much money is required to make someone indifferent to their initial position; the equivalent variation asks how much money is required to make someone indifferent to their final position.

in cable choice sets is, if anything, in favor of deregulation.

3 The Rise of Competition in Cable and Its Effects

The rise of competition from DBS providers has dramatically changed the cable marketplace. Whereas for 40 years the vast majority of households faced a local cable monopolist, there are now often three or more MVPD providers to choose from. This section addresses the impact on cable services of competition in the distribution market.

3.1 Duopoly ("Overbuilt") Cable Markets

There is considerable evidence that cable prices are lower when there are two wireline competitors in a market. Hazlett and Spitzer (1997, Table 3-3), summarizes the findings of a number of studies in the 1980s and early 1990s. Across a variety of datasets and estimation methods, duopoly cable markets are associated with prices 8%-34% lower than monoply cable markets.

[Discuss Emmons and Prager (1997)?]

With a few exceptions, more recent data confirms this pattern. Table 4 reports the average price, number of channels, and price/channel for cable systems defined by the FCC as noncompetitive, facing a wireline competitor, and facing DBS competition.[22] These data are from the five most recent FCC reports on cable industry prices.[23] Despite an odd lull in the period 1998-2002, prices for cable systems facing a wireline competitor mirror the results of the earlier period.

The newer data also permit analyzing the impact of wireline competition on cable service quality as measured by the number of Basic and Expanded Basic channels as well as the price per channel, a useful competitive benchmark. The channel data are mixed until the latter period, but in the most recent data cable systems facing competitive also offer greater numbers of Basic and Expanded Basic channels and a lower price per channel.

3.2 Competition between Cable and DBS

The problem with duopoly cable markets is they are rare, accounting for only 1-2% of all cable markets (FCC (2005b, Footnote 627)). From a policy perspective, it is much more important therefore to assess the impact of DBS competition on cable prices.

Table 5 reports the trend in cable and satellite subscribers, their respective share of the MVPD market, and their share of new MVPD subscribers since 1993. Satellite subscriptions grew very quickly, even before 1999 when SHVIA allowed satellite providers to distribute local broadcast channels, satellite subscribers. Since then, however, cable subscriptions have been flat as almost every (net) new MVPD subscriber has gone to satellite.

[22] "Price" here equals price for Basic and Expanded Basic Services, plus equipment.
[23] FCC (2000a), FCC (2001a), FCC (2002), FCC (2003), FCC (2005a).

Table 4 provides some preliminary evidence on the effect of DBS competition on prices and service quality. Turning to the third set of columns in each group, the table reports average prices, number of channels, and price per channel for cable systems facing at least two DBS competitors whose total market share exceeds 15% of the MVPD market. The table demonstrates both a selection effect and a competitive effect. The experience of the early years demonstrates that DBS succeeded earliest in those cable markets that had high prices, few channels, and high prices per channel. After 1999, however, satellite began to draw customers away from cable and this had a competitive effect. Systems that were most affected began adding channels, lowering prices, or both, so that by the end of the sample, such systems offered more channels than their noncompetitive counterparts at slightly (2-4%) lower prices.

Given the keen interest in the role of DBS competition, Congress has also commissed the General Accounting Office to conduct several studies of its impact on cable prices and product offerings (GAO (2000), GAO (2003)). The early study, using 1998 data, found a positive and significant impact of increased DBS market share on a cable incumbent's prices, while the latter study, using 2001 data, found a negative and significant (though economically small) impact.

So where is the benefit of satellite competition? A fundamental problem in such studies (or in Table 4) is that a regression of price on DBS market share suffers from a problem of correlated unobservables. If tastes for video programming differ across markets, both DBS market shares and cable prices will higher in markets with higher tastes, causing an upward bias on the effect of DBS shares on cable prices. Similarly, if offered cable qualities are (unobservably) higher in markets with high DBS shares, as for example if cable systems improve service quality in the face of DBS competition, a similar effect will arise. One solution is to instrument for DBS market shares in the cable price equation, but that can be difficult if instruments are hard to find.[24]

In a widely cited study, Goolsbee and Petrin (2004) provide a solution to this problem. First, they estimate a multinomial probit demand system for Expanded Basic, Premium, and DBS services from a sample of almost 30,000 households in 317 television markets in early 2001. Using a system's franchise fee as their primary price instrument, they find own-price elasticities of -1.5 for Expanded Basic, -3.2 for Premium, and -2.4 for DBS along with quite plausible (and large) cross-price elasticities.

As in previous studies, they regress cable prices on (a nonlinear transformation) of DBS market shares.[25] Unlike previous studies, however, they also include estimates of unobserved characteristics and tastes for Expanded Basic and Premium cable services. By including composite measures of cable service quality, this approach "takes the correlated unobservable out of the error" and allows a consistent estimate of the impact of DBS share on cable prices.

They find the effect to be both statistically and economically significant. Reducing DBS pene-

[24]The GAO studies appear to use homes passed and system age as instruments for DBS share, but it's hard to see how these would be effective instruments.

[25]Strictly speaking, they regress cable prices on the mean utility for DBS service. For our purposes, this can be thought of as a measure of the DBS market share.

tration to the minimum observed in the data is associated with a $4.15 (15%) increase in the price of cable services. They also find it is associated with a slight increase in the observed quality of cable services.

3.3 Conclusions

The results of the previous paragraph are in some sense a small victory. While there is some convincing evidence of an impact of DBS competition on cable prices, the estimated cable price elasticities suggest cable systems still exert considerable market power. Furthermore, the flexibility of cable quality choice argue against regulatory solutions.

The obvious solution is to promote increased competition in MVPD distribution. But are there barriers to entry? Market experience suggests it's a possibility. Wireline competitors have had difficulty competing against incumbent cable operators, possibly for reasons of (a lack of) economies of scale. Recent efforts by Cablevision to launch Voom, a third satellite provider, have failed (Grant (2005)). And telco entry is just getting started. [More on this point. Here? Or later after discuss bundling?]

[Open issue: dynamics of competition between cable and satellite]

4 Open Issues in MVPD Markets

4.1 The Programming Market

Since the *Time Warner II* decision rescinded the FCC's horizontal subscriber and vertical channel occupancy limits in 2001, the regulatory treatment of the programming market has been unsettled. In this section, we discuss potential market failures in the programming market and survey the economic literature analyzing these issues.[26]

The primary economic issue in the programming market is that of market power. Cable systems have evolved from small locally-owned operations into major national corporations. Table 6, drawn from FCC reports on the status of competition in the programming market, reports concentration measures for the industry for several of the past 15 years.[27]

As can be seen in the table, concentration has slowly increased over time.[28] While the sum of the market shares for the top 4 MVPD providers (as well as the HHI) has held steady over time, the share accruing to the top 8 and top 25 have increased.[29] Now that the two major satellite providers are among the top 4, it is likely to grow even more concentrated in the future.

[26] A brief description of the economics of the industry is provided in Section 2.1.

[27] FCC (1997), FCC (1998a), FCC (2001b), FCC (2005b).

[28] Furthermore, Comcast and Time Warner have announced plans to purchase Adelphia's cable systems (Grant and Angwin (2005).

[29] The Herfindahl-Hirschman Index (HHI) is sometimes used as a summary measure of concentration in a market. It is given by the sum of the squares of the market shares for all the firms in the market.

There are both pro- and anti-competitive effects possible from increased concentration. Increased firm size may yield economies of scale, greater facility developing and launching new program networks, and lower costs for investing in and deploying new services (like digital cable and broadband Internet access). It may also, however, increase market power in the programming market.

There has unfortunately been little agreement over the appropriate analytical framework for analyzing market outcomes in the programming market. The FCC's original horizontal subscriber limits were based on an "Open Field" analysis which determined the minimum viable scale for a programming network and then set limits such that no two maximal-size MVPD providers could jointly exclude the network from the market (FCC (2005c, Par 72)). The same report proposes a monopsony framework.

Given the institutional nature of the programming market, a bargaining approach seems most appropriate.[30] The conventional wisdom is that increased concentration in the MVPD market improves the bargaining power of cable systems, reducing fees to program suppliers (CITE?). Some bargaining models, however, yield predictions contrary to the conventional wisdom.

For example, Chipty and Snyder (1999) find that increased concentration can actually reduce a MVPDs bargaining power. They find that the size of the surplus to be split between a cable system and a programming network depends on the shape of network's gross surplus function. If this function is convex, marginal systems provide more surplus than inframarginal systems (with the opposite result for concave gross surplus functions). If the rule governing the split of surplus is invariant to merger, an important assumption, a convex gross surplus function yields disincentives to merge as the sum of the surplus being negotiated is larger for two separate versus one merged firm.

Using data on advertising revenues from 27 networks for up to 9 years in the 1980s and early 1990s, they estimate the shape of networks gross surplus function (net of affiliate fees). While intuition might suggest it is convex early and concave late,[31] they find the opposite. For networks of larger size, the authors conclude that systems have disincentives to merge for bargaining power and that efficiency considerations must be driving system consolidation.

In another widely cited study, Raskovich (2003) builds a bargaining model with a *pivotal* buyer, i.e. one with whom an agreement is necessary for a seller's viability. In his model, being pivotal is *disadvantageous* as if an agreement is not reached the seller will not trade and it is only the pivotal buyer who can guarantee this outcome. As such, gains to the pivotal buyer are equal to its private gains less the shortfall required to ensure viability of the supplier. This can reduce the incentives to merge if merging would make a buyer pivotal.

Assessing the consequences of increased system size on network surplus in programming markets is conceptually simple, but lack of data on transaction prices has prevented much empirical

[30] A brief description of the workings of the programming market are provided provided in Section 2.1.

[31] In FCC (2005c, Footnote 311), cable networks claim that Nielsen ratings data do not become useful until a network has access to between 40 and 60 million subscribers. This limits its ability to obtain advertising revenue before that point. After a point, intuition suggests there are decreasing returns to scale in subscribers.

work. Ford and Jackson (1997) exploit rarely available programming cost data reported as part of the 1992 Cable Act regulations to assess (in part) the impact of buyer size and vertical integration on programming costs. Using data from a cross-section of 283 cable systems in 1993, they find important effects of MSO size and vertical affiliation on costs: the average/smallest MSO is estimated to pay 11%/52% more than the largest MSO and vertically affiliated systems are estimated to pay 12-13% less per subscriber per month. Chipty (1995) takes a different strategy: she infers the impact of system size on bargaining power from its influence on retail prices. She also finds support for the conventional wisdom that increased buyer size reduces systems' programming costs. [Double-check these conclusions]

Vertical Integration Many MVPD operators either own or have ownership interests in programming networks as do major broadcast programming providers. This has also drawn considerable attention from regulators in MVPD markets. FCC (2005b) documents the status of vertical integration in current MVPD markets. In brief, of 388 national programming networks and 96 regional programming networks in 2004, 89 (24), or 23% (25%), were affiliated with a major cable operator.[32] An additional 103 (22), or 27% (23%) were affiliated with a broadcast programming providers.[33] Furthermore, all of the top 20 networks by subscribers (save C-SPAN) and top 15 by ratings are owned by either a cable operator or broadcast programming provider.

As in most cases of vertical integration, there are both efficiency and strategic reasons MVPDs and program networks may want to integrate. For example, vertical integration eliminates double marginalization, improving productive efficiency. Similarly, it minimizes transactions costs and reduces the risk of new program development. It may also internalize important externalities between systems and networks in the areas of product choice, service quality, and brand development. Alternatively, integration may permit cable systems to discriminate against (or raise the costs of) rival MVPDs or allow program networks to discriminate against (or raise the costs of) rival networks.

Existing empirical research has universally found that vertically integrated MVPDs are more likely to carry their affiliated program networks, but whether this is pro- or anti-competitive remains an open issue. Waterman and Weiss (1996) examine the impact of vertical relationships between pay networks and cable operators in 1989. They find that affiliated MSOs are more likely to carry their own and less likely to carry rival networks. Subscribership follows the same pattern, though they find no estimated effect on prices.[34] Chipty (2001) addresses similar questions, including whether integration influences MVPD carriage of Basic cable networks. Using 1991 data, she finds integration with premium networks is associated with fewer premium nets, fewer basic movie networks (AMC), *higher* premium prices, and higher premium

[32]These are Comcast with 10 affiliated national networks and 12 affiliated regional networks, Time Warner with 29 (12), Cox with 16 (5), and Cablevision with 5 (16).

[33]These are News Corp/Fox with 12 affiliated national networks and 22 affiliated regional networks, Disney/ABC with 20 (0), Viacom/CBS with 39 (0), and GE/NBC with 17 (0).

[34]See also Waterman and Weiss (1997) for the impact of integration on carriage of basic cable networks. [I believe they find similar patterns]

subscriptions. On balance she finds households in integrated markets have higher welfare than those in unintegrated markets, although the effects are not statistically significant. As in the studies analyzing the impact of regulation, however, it is difficult to assess if differences across cable systems in product offerings and prices are driven exclusively by integration or by other features of integrated systems (e.g. size, marketing, etc.).

Conclusions The analysis of competition in the programming market is unfortunately inconclusive. Whether considering the influence of horizontal concentration or vertical integration, theory provides no sharp predictions and empirical work, while informative, is too limited to draw strong conclusions. If this is a market of interest to policymakers, there is a clear mandate for improved data collection and analysis prior to any formal rule-making.

4.2 Bundling

MVPD providers choose a portfolio of television networks and bundle them into services for sale to consumers. As complaints about high and rising cable bills continue, recent regulatory and legislative focus has turned to the consequences of bundling in cable and satellite markets (GAO (2003), FCC (2004)).[35] Is bundling a market failure in MVPD markets?

While bundling is endemic across product markets, the majority of the time bundling is efficiency-enhancing. A variety of industries emphasize the benefits of bundling in simplifying consumer choice (as in telecommunications and financial services) or reducing costs from consolidated production of complementary products (as in health care and manufacturing). In either case, bundling promotes efficiency by reducing consumer search costs, reducing product or marketing costs, or both.

Bundling can also, however, reduce consumer (and total) welfare in product markets. An influential theoretical literature suggests bundling may arise in many contexts to sort consumers in a manner similar to 2nd-degree price discrimination (Stigler (1968), Adams and Yellen (1976)). When consumers have heterogeneous tastes for several products, a monopolist may bundle to reduce that heterogeneity, earning greater profit than would be possible with component (unbundled) prices. Bundling - like price discrimination - allows firms to design product lines to extract maximum consumers surplus. While firms clearly benefit in this case, consumer welfare falls, often because bundling requires consumers to purchase products in which they have little interest (Bakos and Brynjolfsson (1999), Armstrong (1996)).

More recently, focus has centered on bundling to extend market power or deter entry (e.g. Whinston (1990), Nalebuff (2004), Bakos and Brynjolfsson (2000)).[36] In this context, bundling reduces the market for potential entrants by implicitly providing a discount on "competitive" products for all consumers with high tastes for "noncompetitive" products. We consider the implications of each of these theories for the MVPD market in what follows.

[35] Much of this section borrows from Crawford (2004).

[36] e.g. antitrust challenges to Microsoft's bundling of software applications (e.g. its Internet browser, media player) with its dominant Windows operating system (Mitchener and Kanter (2004)).

Bundling to Price Discriminate Most of the discriminatory bundling literature has focused on the incentives to bundle two goods. Adams and Yellen (1976) formalize the seminal work of Stigler (1963) and present examples where bundling is more or less profitable than component (unbundled) sales. A simple example, adapted from Adams and Yellen (1976) demonstrates the incentives to bundle.

Insert Figure 5 Here

There are two goods and four consumers, whose willingness-to-pay (WTP) for each good is represented by a point in the top panel of Figure 5. The bottom three panels show the demand for each good (if offered separately) and demand for the bundle of both goods implied by these reservation values. Unbundled sales yield profits of \$140 while bundled sales yield profits of \$200. In this example, bundling permits the monopolist to extract *all* available consumers surplus.

The reduction in preference heterogeneity in the example (and associated surplus extraction) generalizes and is the primary benefit of bundling. It is not sufficient, however. In a more general setting, when bundled sales are preferred to component sales depends on three critical features of preferences and costs. First is the extent of heterogeneity reduction possible from bundling. This increases with the negative correlation in preferences for bundle components, a point made clear by the example.[37] Second is the level of marginal costs for components. Since bundling requires consumers purchase all goods, some below-cost sales of components can result (e.g. consumers A and D in the example), reducing the gains from bundling. This becomes more likely the higher are marginal costs relative to the mass of consumer preferences. Third is that bundling requires firms charge a single price. When consumer tastes for components differ considerably (e.g. multiply WTP for one of the example goods by 100), bundling is less attractive than component sales as it permits fewer instruments (prices) to capture consumers' surplus.[38]

Recent papers by Bakos and Brynjolfsson (1999) and Armstrong (1999) extend the analysis of bundling to consider multiple goods and find similar results. Figure 6 from Bakos and Brynjolfsson (1999) demonstrates the intuition.

Insert Figure 6 Here

For the case of uniformly distributed tastes (i.e. linear demand for components), the figure presents the demand per good for a bundle of size 1, 2, and 20. As bundle size increases,

[37] Negative correlation, however, is not necessary for bundling to be profitable (McAfee, McMillan, and Whinston (1989)).

[38] McAfee, McMillan, and Whinston (1989) extend the analysis of Adams and Yellen (1976) to consider mixed bundling, the offering of *both* component and bundled sales, and show it always yields (weakly) greater profits than pure bundling. The reason for this is clear: it maintains the benefits of bundling (if any) and strictly increases the number of prices available to capture surplus. Despite this fact, mixed bundling is relatively uncommon, perhaps due to the added administrative costs associated with offering both bundled and component goods.

there are fewer extreme tastes, corresponding to an increasingly flat demand curve and greater consumer surplus extraction. Figure 5 exhibited a similar effect for just 2 goods.

Does the monopolist benefit from this reduction in heterogeneity? As in the two-good case, it does when costs are low (discouraging below-cost sales of components) and when tastes aren't too extreme (which favors pricing components separately).

Bundling to Enhance Market Power and Deter Entry Two very nice recent papers by Nalebuff (2004) and Bakos and Brynjolfsson (2000) demonstrate the advantage of bundling as a means to extend market power or deter entry. To understand this argument, consider an example provided by Nalebuff (2004).

Suppose a monopolist providing two goods (A & B) is facing a potential entrant in either component (but not both). Suppose consumers value only one unit of each good, that their willingness-to-pay (WTP) for the goods is uniformly distributed on the unit square, and that there is no complementarity or substitutability in demand (so their WTP for a bundle is just the sum of the component WTP). Marginal and fixed/entry costs are zero. To fix ideas, suppose the monopolist must pre-commit both to a method of sale (bundling or components) as well as a price/prices.

If the monopolist sells each good separately, the entrant will enter one market (e.g. market B), just undercut the monopolist's price, and earn all the sales in that market. What happens if he bundles? The intuition is captured by the following figure.

Insert Figure 7 Here

In this figure, the monopolist bundles goods A & B. Again the entrant will enter, but this time with a much smaller effect. All consumers that value good B at greater than its price will buy it. This is given by the shaded area in the southeast of the figure. All remaining consumers that value the two goods at greater than the bundle price will buy it. This is given by the shaded area at the top of the figure.

Note the effect bundling has on the *potential* market for the entrant. Because all consumers with high willingness-to-pay for good A will tend to prefer the bundle, the entrant is able to only compete for half the market, i.e. those with low WTP for good A. In effect, bundling A with B allows the monopolist to provide an implicit discount on good B to all consumers with high WTP for good A. The entrant cannot match that discount and is effectively foreclosed from that that portion of the market.

If the entrant faces fixed entry costs, bundling in this setting can foreclose the market from potential entry. Furthermore, even if the entrant does enter, his profits will be lower than if the monopolist did not bundle.

Bundling in MVPD Markets Each of the aforementioned motivations to bundle - cost and demand complementarities, discrimination, and market power - can be justified in the cable industry.

Because all television networks are transmitted to every customers home in a cable system, the least cost method of providing any cable service is to bundle all the programming; it is *un-bundling* networks that is costly, requiring methods to prevent consumption by non-subscribers. While the rise of addressable converters (set-top boxes) is lowering this cost, by some counts, as many as X% of cable subscribers do not currently use them.[39] Furthermore, bundling simplifies consumer choice, reducing administrative and marketing costs. And it guarantees widespread availability, a feature viewed as essential for networks seeking advertising revenue (FCC (2004)).

It is also widely believed that systems bundle to price discriminate in cable markets. Cable systems and program networks both argue that bundling allows them to capture surplus from the (possibly many) low-value consumers that would likely not choose to purchase a channel on a stand-alone basis (FCC (2004)). Even consumers who would not pay a penny for a network can add value if they are worth something to advertisers.

Furthermore, there is some empirical support for the discriminatory incentives to bundle in cable markets. Crawford (2004) tests the reduced-form implications of bundling highlighted by Figure 6 above. Adding networks to cable service bundles should (i) shift out and (ii) flatten the cable demand curve, increasing (in absolute value) its elasticity. He tests that theory using data from a cross-section of 1,159 cable markets in 1995 and finds support for the theory: adding nine of the top fifteen cable television networks to program bundles significantly increases the elasticity of cable demand (and never significantly reduces it). He also quantifies the profit and welfare implications of these results, finding that bundling an average top-15 cable networks is estimated to increase profits and reduce consumer welfare, with an average effect of 6.0% (5.5%). On balance, total welfare *increases*, with an average effect of 2.5%.

Does bundling *always* improve efficiency? Existing studies of bundling to discriminate typically assume low (or zero) marginal costs, no fixed costs, and exogenous product quality. While the first isn't far from the truth in MVPD (and media) markets, the latter two should be relaxed. If so, some contrary results can emerge.[40] In particular, with fixed costs, firms will add networks to the bundle as long as the incremental profits from sales of the bundle exceed those costs. Because, however, some of those profits come from surplus created by other products, it is possible to construct examples where systems have the incentive to add products even when their fixed costs exceed the total surplus created by the product. Similarly, with endogenous product quality, systems may have the incentive to increase the quality of a product even when the incremental (fixed) costs of doing so exceed the incremental (total) surplus created by the quality change.[41] Thus, while bundling clearly helps equate private and social benefits to offer and improve products, it can do so "too well" and overshoot the mark.

[39] By contrast, all satellite subscribers must have a (digital) receiver.

[40] The comments in this paragraph represent work in progress. Please contact the author for further details.

[41] This may be one argument against including high-cost sports networks in widely available product bundles.

As for bundling to deter entry, this claim has been made in both the MVPD and programming markets. In the MVPD market, wireline competitors to incumbent cable systems have articulated versions of the market power argument when objecting to (i) the terrestrial exception to the program access and carriage rules and (ii) the "clustering" of cable systems within localized (e.g. MSA) markets(FCC (2005b, Paragraphs 154-158)). In each case, rival MVPDs may be at a significant competitive disadvantage, even if the foreclosed network is the only network by which rival bundles differ. In the programming market, MVPD buyers have complained about the bundling of affiliated program networks, both when negotiating rights to broadcast networks under retransmission consent as well as critical non-broadcast networks (FCC (2005b, Paragraphs 162), FCC (2005c, Footnote 232)). In this case, program networks that compete with those bundled with high-value networks may have difficulty obtaining carriage agreements, particularly if they appeal to similar niche tastes. Unfortunately, there is little empirical evidence of entry deterrence in either the MVPD or programming markets. Empirical studies of these topics would be very useful.

Conclusions So is bundling a market failure in cable markets? While no firm conclusions can be drawn, several areas are of concern and are worthy of further study. Regarding the discriminatory effects of bundling, while it is likely that bundling does better than à-la-carte sales of providing incentives for program carriage and quality improvement (and surely lowers per-channel prices), it may do so at considerable (welfare) cost to consumers. More research is necessary before firm conclusions can be reached, but if so, then trading off gains in total welfare against losses to consumers should be discussed when considering appropriate policy towards bundling.

Stronger conclusions may be drawn regarding bundling for market power. While the existing theoretical research does not draw explicit welfare conclusions, it is clear that the combination of *bundling* with *exclusive (or critical) content* is dangerous to competition in MVPD markets.

4.3 Entry Barriers in MVPD Markets

[This section remains to be written]

5 Conclusion

[This section remains to be written]

A Empirical Appendix

[This section remains to be written]

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Table 4: Noncompetitive and Competitive Cable Systems

Year	Prices			Basic & Exp. Basic Channels			Price per Channel		
	Noncomp. Systems	Facing Wireline Comp.	Facing DBS Comp.	Noncomp. Systems	Facing Wireline Comp.	Facing DBS Comp.	Noncomp. Systems	Facing Wireline Comp.	Facing DBS Comp.
	Levels								
1998	29.97	29.46	31.40	48.8	49.9	31.9	0.61	0.59	0.98
1999	31.70	30.82	31.73	51.1	50.6	35.1	0.62	0.61	0.90
2000	34.11	33.74	33.23	54.8	56.5	38.6	0.62	0.60	0.86
2001	37.13	34.03	37.13	59.3	56.0	53.3	0.63	0.61	0.70
2002	40.26	37.61	37.05	62.7	60.9	53.9	0.64	0.62	0.69
2003	43.14	37.14	42.32	67.3	71.5	67.7	0.64	0.52	0.63
2004	45.56	38.67	43.95	70.1	75.3	70.5	0.65	0.51	0.62
	Relative to Noncompetitive Systems								
1998		-1.7	4.8		2.3	-34.6		-3.9	60.3
1999		-2.8	0.1		-1.0	-31.3		-1.8	45.7
2000		-1.1	-2.6		3.1	-29.6		-4.1	38.3
2001		-8.3	0.0		-5.6	-10.1		-3.0	11.3
2002		-6.6	-8.0		-2.9	-14.0		-3.8	7.1
2003		-13.9	-1.9		6.2	0.6		-19.0	-2.5
2004		-15.1	-3.5		7.4	0.6		-21.0	-4.1

Table 5: Cable and Satellite Statistics

	Subscribers		Share of MVPD Subscribers		Share of New MVPD Subscribers	
Year	Cable	Satellite	Cable	Satellite	Cable	Satellite
1993	57.2	0.1	99.8	0.2	—	—
1994	59.7	0.6	99.0	1.0	83.3	16.7
1995	62.1	2.2	96.6	3.4	60.0	40.0
1996	63.5	4.3	93.7	6.3	40.0	60.0
1997	64.2	5.0	92.8	7.2	50.0	50.0
1998	65.4	7.2	90.1	9.9	35.3	64.7
1999	66.7	10.1	86.8	13.2	31.0	69.0
2000	66.3	13.0	83.6	16.4	-18.4	118.4
2001	66.7	16.1	80.6	19.4	12.7	87.3
2002	66.5	18.2	78.5	21.5	-10.5	110.5
2003	66.1	20.4	76.4	23.6	-25.7	125.7
2004	66.1	23.2	74.0	26.0	1.8	98.2

Table 6: Concentration in the MVPD Market

	1992		1997		2000		2004	
Rank	Company	Market Share	Company	Market Share	Company	Market Share	Company	Market Share
1	TCI	27.31	TCI	25.54	AT&T	19.07	Comcast	23.37
2	TimeWarner	15.28	TimeWarner	15.97	TimeWarner	14.92	DirecTV	12.10
3	Continental	7.53	MediaOne	6.95	DirecTV	10.28	TimeWarner	11.87
4	Comcast	7.12	Comcast	5.84	Comcast	8.43	EchoStar	10.63
5	Cox	4.74	Cox	4.44	Charter	7.36	Cox	6.92
6	Cablevision	3.48	Cablevision	3.92	Cox	7.27	Charter	6.73
7	TimesMirror	3.26	DirecTV	3.58	Adelphia	5.94	Adelphia	5.88
8	Viacom	3.09	Primestar	2.40	EchoStar	5.11	Cablevision	3.19
9	Century	2.48	Jones	2.00	Cablevision	4.29	Bright	2.37
10	Cablevision	2.48	Century	1.62	Insight	1.23	Mediacom	1.66
	Top 4	57.24	Top 4	54.30	Top 4	52.70	Top 4	57.97
	Top 8	71.81	Top 8	68.64	Top 8	78.38	Top 8	80.69
	Top 25	—-	Top 25	84.94	Top 25	89.75	Top 25	90.41
	HHI	—-	HHI	1166	HHI	954	HHI	1097

Figure 1: Cable and Satellite Prices, 1983-2005
December 1983 = 100

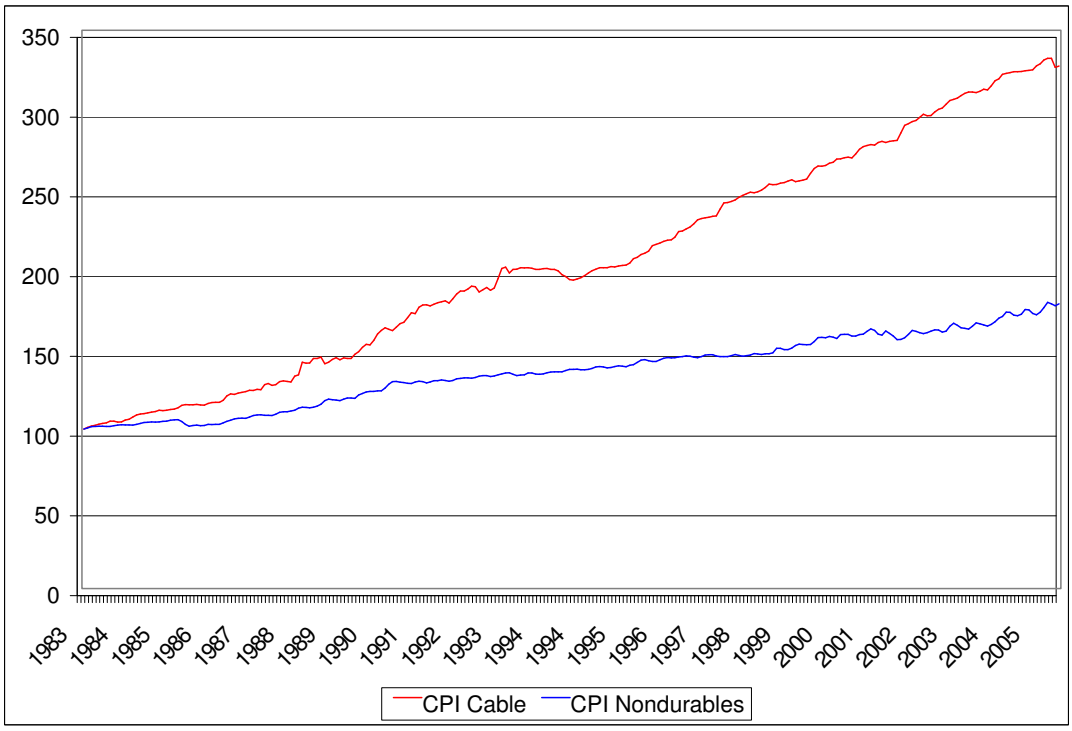


Figure 2: Cable and Satellite Subscribers, 1983-2004

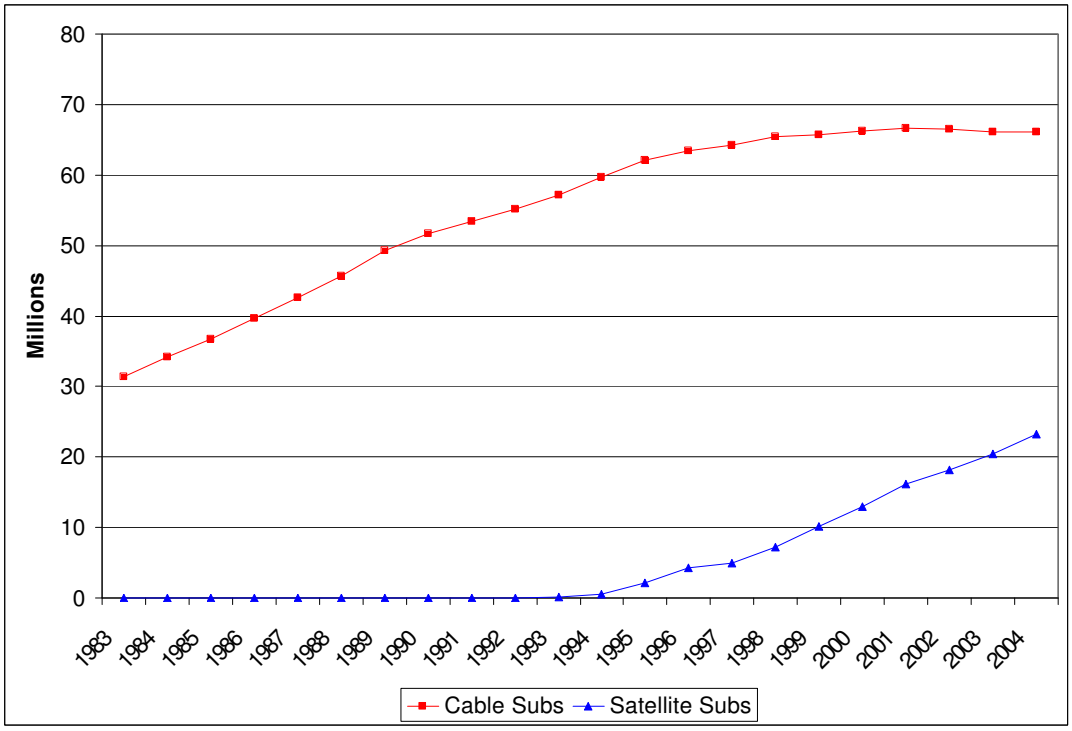


Figure 3: Total and Average Satellite Networks, 1975-2004

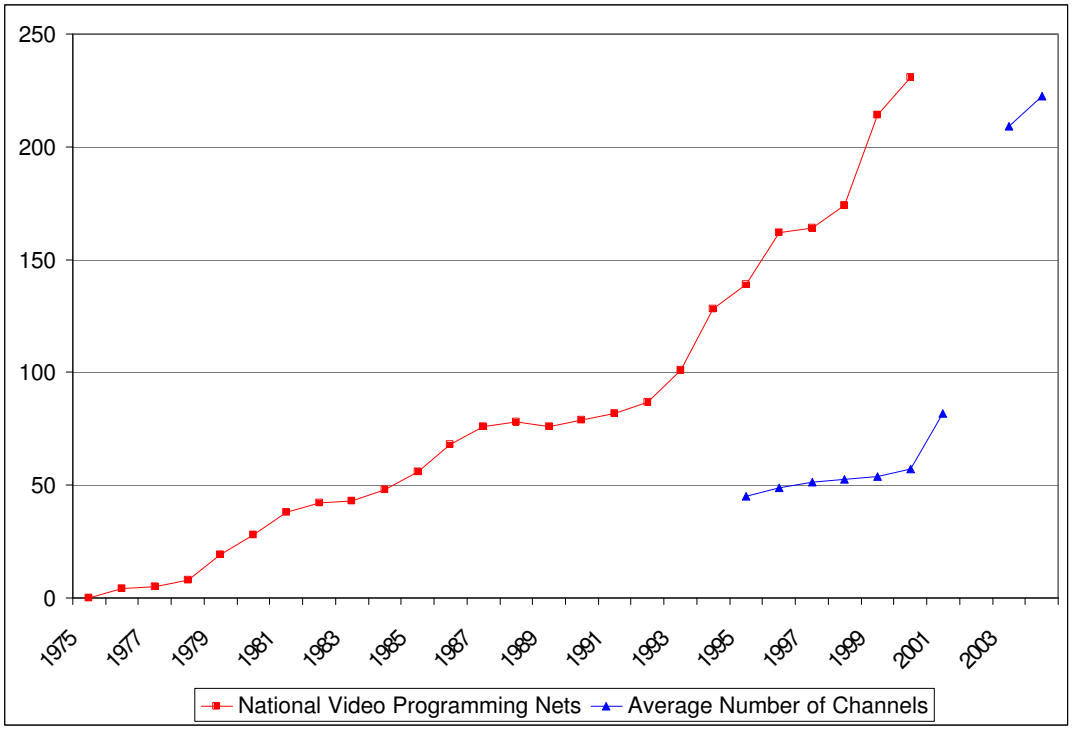


Figure 4: Satellite Cost, 1989-2003

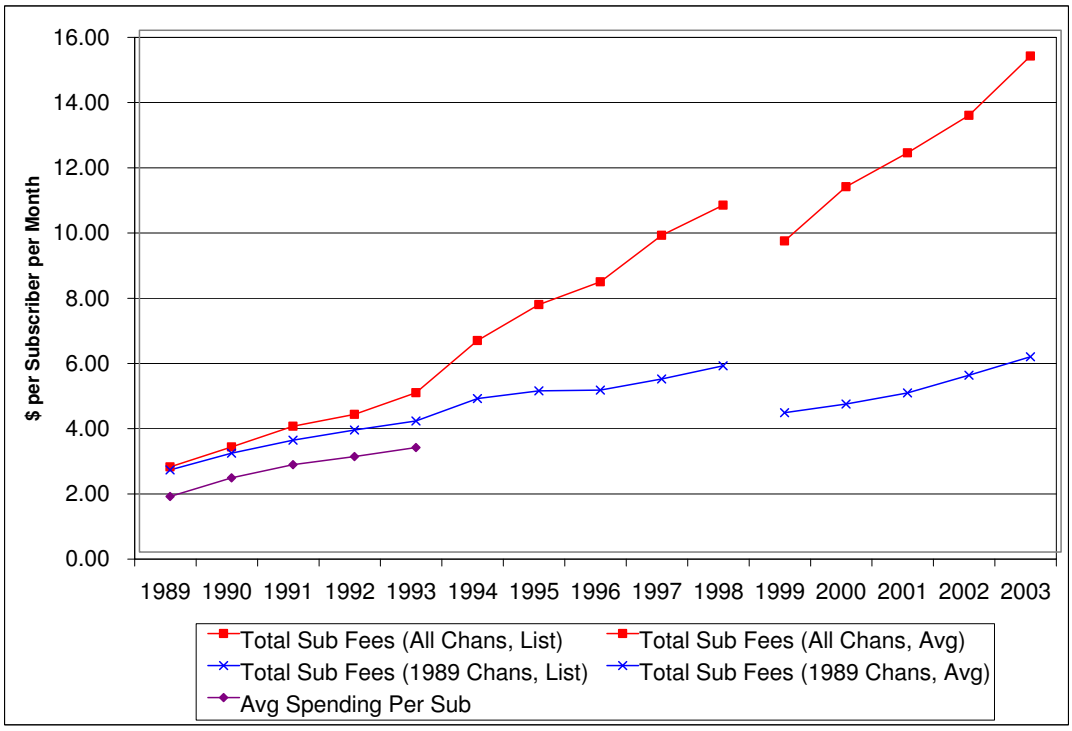
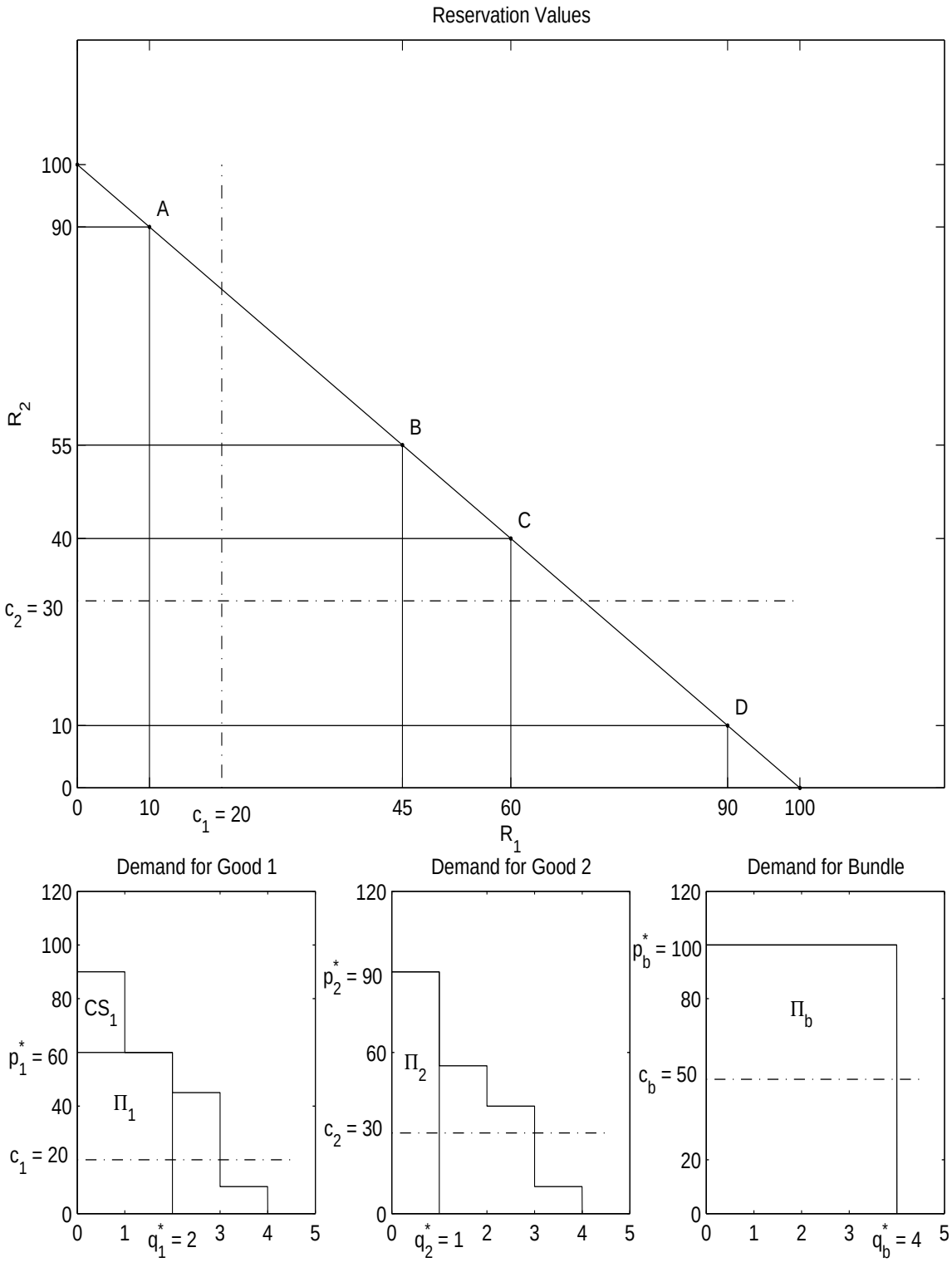
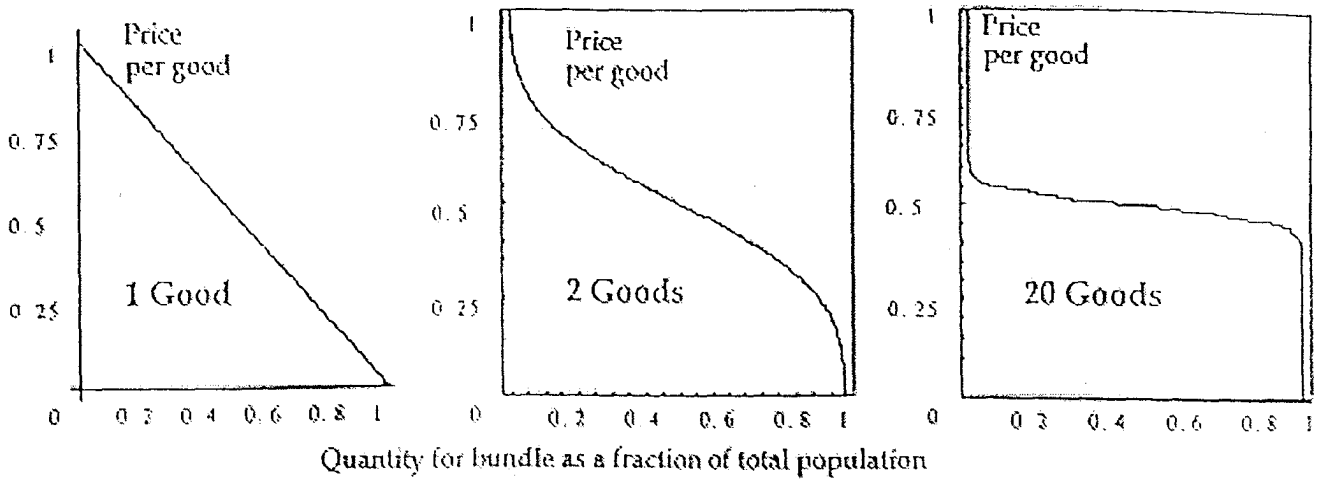


Figure 5: Bundling versus Component Sales: An Example



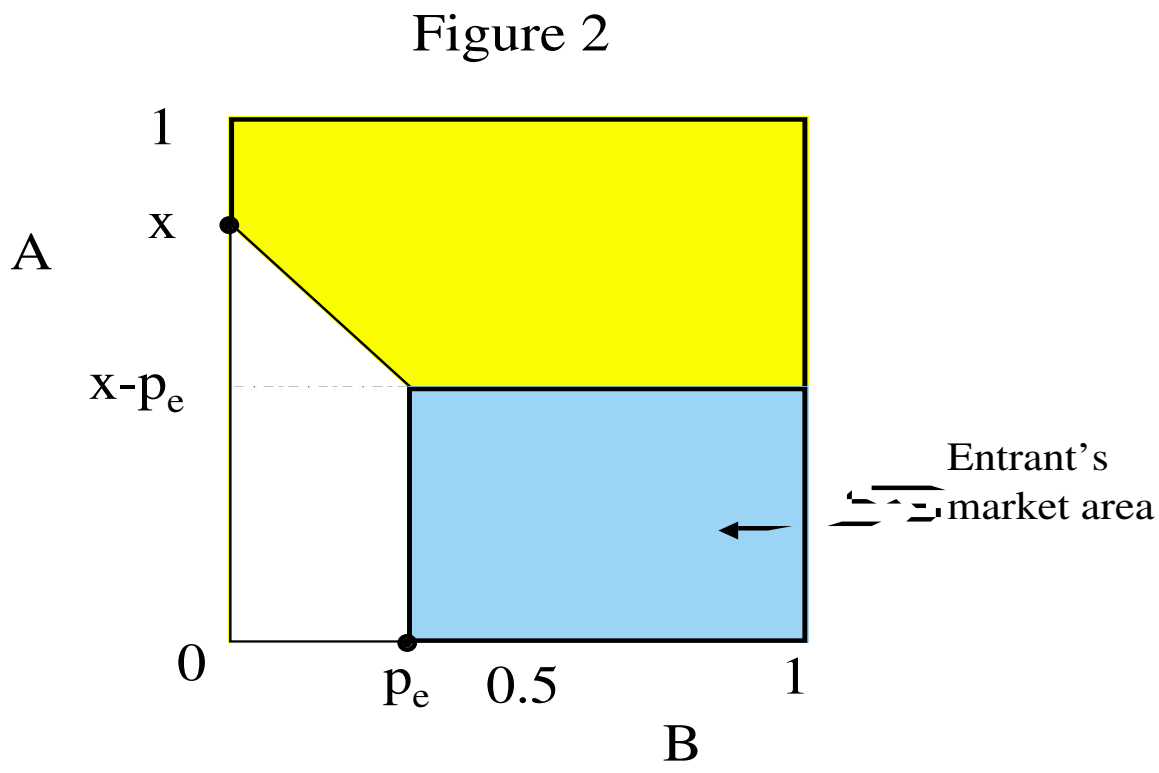
Source: Adapted from Adams and Yellen (1976).

Figure 6: Bundling With Multiple Goods



Source: Bakos and Brynjolfsson (1999).

Figure 7: Bundling to Deter Entry



Source: Nalebuff (2004).