Cable Regulation in the Internet Era

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Abstract

The market for multi-channel video programming has undergone considerable change in the last 15 years. Direct-Broadcast Satellite service, spurred by 1999 legislation that leveled the playing field with cable television systems, has grown from 3% to 33% of the U.S. MVPD (cable, satellite, and telco video) market. Telephone operators have entered in some parts of the US and online video distributors are a growing source of television viewing. This chapter considers the merits of cable television regulation in light of these developments. It surveys the dismal empirical record on the effects of price regulation in cable and the more encouraging but incomplete evidence on the benefits of satellite and telco competition. It concludes with a consideration of four open issues in cable markets: horizontal concentration and vertical integration in the programming market, bundling by both cable systems and programmers, online video distribution, and temporary programming blackouts from failed carriage negotiations for both broadcast and cable programming. While the distribution market is clearly now more competitive, concerns in each of these areas remain.
JEL: L50, L43, L41, L42

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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 price caps 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 23 million more subscribers than cable, giving them over a third of the multi-channel video programming distribution (MVPD) marketplace and providing two credible competitors to incumbent cable systems in most markets (FCC (2001c), FCC (2005b)). More recently, local telephone operators Verizon and AT&T have invested billions to provide video in their local service areas and, by 2010, had earned another 7% of the market and online video distribution is a growing source of television viewing.

On the other hand, while concentration has fallen in video distribution, the last 15 years has also seen continued national consolidation, with the top 8 firms increasing their national share of MVPD subscribers from 68.6% in 1997 to 84.0% in 2010 (FCC (1998c), FCC (2012c)). Programming markets have also become more concentrated over this period. This has raised concerns about competition and integration in the wholesale (programming) market. Horizontal concentration and channel occupancy limits enacted after the 1992 Cable Act were struck down in 2001, reinstated in 2007, and struck down again in 2009 (Make (2009)). As cable prices continue to rise, lawmakers wonder about the feasibility of à-la-carte services to reduce cable prices (Hohmann (2012)).

This chapter considers the merits of regulation in cable television markets in light of these developments. I do so in three parts. In the first part, I survey past and present cable regulations and assess their effects. I begin by surveying the reasons for and effects of the four major periods of regulation and deregulation of cable prices (1972-1984, 1984-1992, 1992-1996, 1996-present). The evidence for regulation is discouraging: unregulated periods exhibit rapid increases in quality and penetration (and prices), while regulated periods exhibit slight decreases in prices and possibly lower quality. Consumer welfare estimates, while few, suggest consumers prefer *unregulated* cable services. This highlights the difficulty regulating prices in an industry, like cable, where service quality cannot be regulated and is easily changed.

I then review the empirical record on the consequences of competition in cable markets. Evidence from duopoly ("overbuilt") cable markets is robust: an additional wireline competitor lowers cable prices, 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. Empirical studies trying to measure satellite competition's effects accounting for quality changes find prices

may be (somewhat) lower, that most of the consumer benefits from such competition accrues to satellite and not cable subscribers, and that significant market power remains. While telco entry has clearly been important to consumers in those markets where it has come, I know of no evidence of its effects on cable prices or quality.

Finally, I address four open issues in cable markets where conclusions are harder to come by. First, while horizontal concentration has clearly increased in the programming market, theoretical models have ambiguous predictions of its effects and empirical work is hampered by insufficient data on affiliate fees (prices). The evidence on vertical integration is more substantial: integrated systems clearly favor affiliated programming, but whether for reasons of efficiency or foreclosure remain unclear. Second, bundling impacts market outcomes in both the distribution and programming markets. In distribution, it clearly enables systems to better capture consumer surplus and offer high-quality and diverse programming, but it may do so at significant cost to consumers. Recent research by Crawford and Yurukoglu (2012) finds consumers would *not* be better off under à la carte. Worse, theoretical models suggest bundling in the wholesale market may enhance market power and serve as an effective barrier to entry. Empirical evidence of this effect is critically needed. Finally, industry participants and regulators alike are keenly interested in the likely effects of growing online video consumption and what can be done about increasingly frequent bargaining breakdowns between content providers and distributors that leave consumers "in the dark."

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 video programming industry and the regulations that apply 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 versus telco operators in the retail and programming markets (cf. OECD (2001, Table 2)). Second, this is a mostly 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 (2012b), FCC (2012c)) and a private data collection industry, 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 Jerry Hausman and Greg Sidak's chapter on Telecommunications markets for further analysis of this issue.

On the whole, the future looks bright for the organization of the cable television industry. Satellite and telco competition has largely replaced price regulation as the constraining force on cable pricing

quality choice. Furthermore, consumer demand for online and mobile video is driving innovation in video delivery. Several important areas of uncertainty remain, however. Issues of horizontal concentration both up- and down-stream, vertical integration, bargaining breakdowns, and the potential for foreclosure in both the traditional and online video programming markets are real and significant. While there is no clear evidence of harm, more research is needed. Until then, academics and regulators would do well to analyze these issues closely in the coming years.

2 A Cable Television Lexicon

The essential features of cable television systems have changed little in the industry's 50 years of existence. Then as now, cable systems choose a portfolio of television networks, bundle them into services, and offer these services to consumers in local, geographically separate, cable markets.

Cable systems purchase the rights to distribute program networks in the *Programming Market*. Since the mid-1990s, cable systems in the U.S. have had to compete for customers with Direct Broadcast Satellite (DBS) providers. Since the mid-2000s, both have had to compete with telephone operators offering video service in their local services areas. Together, cable, satellite, and telephone company (telco) operators are said to compete in the Multi-channel Video Programming Distribution (MVPD) market. This is sometimes just called the *Distribution Market*.

As in many media markets, the video programming industry earns most of its revenue from one of two sources: monthly fees charged by cable systems to consumers for access to programming and advertising fees charged (mostly) by networks to advertisers for access to audiences. Figure 1 demonstrates that advertising revenue has grown in importance to the industry and now comprises over 30% of cable's $97.6 billion in 2011 revenue (NCTA (2013a),NCTA (2013b)). Figure 2 provides a graphical representation of the multi-channel video programming industry.

Insert Figure 1 Here

Insert Figure 2 Here

Cable systems today offer four main types of program networks. *Broadcast networks* are television signals broadcast over the air in the local cable market by television stations and then collected and retransmitted by cable systems. Examples include the major, national broadcast networks – ABC, CBS, NBC, and FOX – as well as public and independent television stations. *Cable programming networks* are fee- and advertising-supported general and special-interest networks distributed nationally to MVPDs via satellite. Examples include some of the most recognizable networks associated with pay television, including MTV, CNN, and ESPN.[1] *Premium programming*

networks are advertising-free entertainment networks, typically offering full-length feature films. Examples include equally familiar networks like HBO and Showtime. *Pay-Per-View Networks* are specialty channels devoted to on-demand viewing of high-value programming, typically offering the most recent theatrical releases and specialty sporting events.

Systems exhibit moderate differences in how they bundle networks into services. Historically, broadcast and cable programming networks were bundled and offered as *Basic Service* while premium programming networks were unbundled and sold as *Premium Services*.[2] In the last 20 years, systems have diversified their offerings, often slimming down Basic Service to (largely) broadcast networks and offering many of the most popular cable networks in multiple bundles called *Expanded Basic Services*. They have also taken advantage of digital compression technology to dramatically increase their effective channel capacity and offer hundreds of smaller cable networks. These networks are typically also bundled and offered as *Digital Services*. For Basic, Expanded Basic, or Digital Services, consumers are not permitted to buy access to the individual networks offered in bundles; they must instead purchase the entire bundle.

Migration to digital technologies also allowed cable systems to offer high-speed (broadband) access to the Internet. This required significant investments in physical infrastructure, notably to accommodate digital data and allow upstream communication (cf. Figure 3), but has proven to be a successful undertaking: despite being deployed several years after telephone systems' Digital Subscriber Line (DSL) technology, cable systems in 2005 commanded over 63% of the broadband market, earning revenues of $6.7 billion in 2003, over 12% of cable systems' total revenue and growing fast (FCC (2005b)).[3]

Insert Figure 3 Here

MVPDs continue to innovate in delivering video programming to households. Almost all MVPDs now lease or sell Digital Video Recorders (DVRs) with hundreds of hours of recording time.[4] Many also now offer video on demand with libraries of movies and previously aired episodes of popular television series. In June 2009, Comcast and Time Warner introduced TV Everywhere to allow authenticated cable subscribers to watch video online, on tablet computers like the iPad, or on their mobile phones.[5] While takeup has been slow due to the challenges of contracting with content providers over rights through these new distribution channels, it is only a matter of time before households will be able to consume the "four anys": any programming, on any device, in any place, and at any time.

MVPDs are not alone in these goals. It is now commonplace for consumers to rely on "over-the-top" (OTT) delivery of video programming over the Internet. According to Nielsen (via the FCC), "approximately 48% of Americans now watch video online, and 10% watch mobile video" (FCC

(2012c, p111)). That being said, in 2011 Nielsen also estimates the average American watched 27 minutes/week of video on the Internet (and 7 min/week on a mobile phone) versus over 5 hours of traditional and time-shifted television. Similarly, Screen Digest estimates that online video distributor (OVDs) revenue was no more than $407 million in 2010, just 0.3% of the $143 billion spent by households and advertisers on traditional television. I discuss the likely effects of further growth in online video distribution in Section 7.3 below.

3 A Brief History of Cable Regulation

3.1 1950-1984: The Early History

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.[6] In order to provide cable service, cable systems needed to reach "franchise agreements" with 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 prices 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.

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."[7] 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)).[8]

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 price 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 price 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.[9] 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.

3.2 1984-Present: Back and Forth

While the scope of federal regulations had diminished by 1979, state and local regulations remained. By the mid-1980s, however, the price terms of these contracts came under attack as cable joined the "deregulation revolution" sweeping through Congress (Kahn (1991)). 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.[10]

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)). 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."[11] Basic tiers were regulated, if desired, by the local franchise authority, which was required to certify with the FCC. Cable programming (Expanded Basic) tiers were regulated by the FCC.[12] Both followed rules set by the FCC, reducing prices to "benchmarks" based on prices 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 did cable bills fail to decline, but that for nearly one-third of cable subscribers, they 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 services (FCC (1994), Hazlett and Spitzer (1997), Crawford (2000)). In February 1994 the FCC imposed an additional 7% price reduction.

Responding to political pressure from cable systems, the FCC almost immediately began relaxing price controls. First, "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 is particularly important in cable markets, where both the number and cost of programming networks regularly increase over time. Instead of allowing systems to increase prices by a planned "cost + 7.5%" for each added network, the Going Forward rules permitted increases of up to $1.50 per month over 2 years if up to six channels were added, regardless of cost (Hazlett and Spitzer (1997)). Prices controls were further relaxed by the adoption of "Social Contracts" with major cable providers in late 1995 and early 1996. These allowed systems to increase their rates for Expanded Basic tiers on an annual basis in return for a promise to upgrade their infrastructure.[13] The deregulatory about-face culminated with the passage of the 1996 Telecommunications Act. This eliminated all price regulation for Expanded Basic tiers after March 31, 1999. Regulation of Basic Service rates remains the only source of price regulation in the US cable television industry.

3.3 Must-Carry/Retransmission Consent

In addition to imposing price caps, the 1992 Cable Act introduced another set of regulations whose effects are still being felt: Must-Carry and Retransmission Consent. Since 1972, cable systems were subject to Must-Carry: they were required to carry all local broadcast signals available in their franchise area. Systems fought Must-Carry, however, arguing it interfered with their choice of content, and succeeded in having it struck down on First Amendment grounds in 1988. The 1992 Cable Act, however, not only restored it but gave 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 rules were upheld by the Supreme Court in 1997.

Retransmission Consent has remained a point of contention between broadcast networks and cable systems ever since. Agreements are often negotiated on repeating three-year intervals. Smaller (esp. UHF) stations commonly select Must-Carry, but larger stations and station groups, particularly those affiliated with the major broadcast networks, have aggressively used Retransmission Consent to obtain compensation from cable systems. Systems initially refused to pay stations directly for carriage rights, a position that has only changed in the last few years. Instead, they signed carriage agreements for broadcaster-affiliated cable networks. ESPN2 (ABC), America's Talking (NBC), and FX (Fox) all were launched on systems this way.[14] More recently, Disney (ABC) has used Retransmission Consent to obtain expanded carriage agreements for SoapNet and the Disney Channel and NBC to charge higher affiliate fees for CNBC and MSNBC (Schiesel (2001)). Indeed, the power of retransmission consent to obtain carriage agreements was one stated motivation for the purchase of CBS by Viacom in 1999.

Disagreements between broadcast television stations (and their affiliated networks) and MVPDs over retransmission consent fees have become a hot-button policy issue in the last 5 years. Several high-profile negotiations have resulted in broadcast stations being blacked out in major media markets and one pro-MVPD lobbying group estimates there were broadcast-station blackouts in 40 television markets in 2011 and 91 in 2012.[15] At root have been new and growing demands by broadcasters for cash compensation for retransmission rights. An innovation as recently as 2007-08, such demands are now the norm. I discuss the implications of what might be done to mitigate welfare losses from temporary blackouts in Section 7.4 below.

3.4 Programming Market Regulations

While the focus of cable regulations has historically been on controlling prices charged by cable providers, there has been recent interest in the organization and operation of the programming (input) market. The basic features of this market are as follows.[16] Most network production costs are fixed. 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 cable programming networks 40% of revenue comes from advertising (NCTA (2005a)). 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 a 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 22.8 million subscribers, or 22.6% of the MVPD market (Table 6). Many of the largest MVPD operators either own or have ownership interests in programming networks as do major broadcast networks. Indeed, 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 8 firms, raising concerns about diversity in the media marketplace.[17]

The 1992 Cable Act introduced two important regulations regarding competition in the programming 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 (2005d)). 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.[18] 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. A subsequent 2007 rule that reinstated the limits was dismissed in 2009 as "arbitrary and capricious."

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 also ruled out exclusive agreements between cable operators and their affiliated networks. These rules were enforced through a complaint process at the FCC, but complaints had been relatively rare, particularly in the recent 10 years.

The program access rules were required in the '92 Cable Act to be evaluated on a rolling 5-year basis. In October of 2012, the FCC permitted them to lapse, replacing them with rules giving the Commission the right to review any programming agreement for anti-competitive effects on a case-by-case basis. Until 2010, the program access rules also only applied to *satellite-delivered* programming (the so-called "terrestrial loophole"). This was important, as for a few regional markets, including Philadelphia, San Diego, and parts of the Southeast US, some regional networks distributed via microwave, including Regional Sports Networks (RSNs), reached exclusive agreements with their affiliated MSO, excluding rival MVPDs from access to "critical" content (FCC (2005d)). The new case-by-case rules include a (rebuttable) presumption that exclusive deals with RSNs are unfair.

3.5 Merger Review

Under the 1934 Communications Act, the FCC's mandate is to ensure that the organization of communications and media markets serves the "public interest, convenience, and necessity". This mandate has been interpreted by the FCC to give it the power to approve or deny mergers among communications or media firms whenever it involves a transfer of licenses. Since the licenses involved are necessary to offer the firms' services,[19] in practice this gives the commission the power to approve all media or communications merger.[20] Prior to the passage of the 1996 Telecommunications Act, this power wasn't exercised as existing regulations on ownership (e.g. ownership limits, cross-ownership restrictions) foreclosed large communications and media mergers. Since then, however, the commission has taken an ever stronger role in approving communications and media mergers, often imposing conditions on the merged entity.

Merger conditions, while not explicit regulations, have the same effect on firms. Recent examples of conditions placed on merging parties cover a variety of alleged harms. In the Comcast-AT&T merger completed in November of 2002, the commission ordered the merged firm to divest itself of its interests in Time Warner Cable.[21] In the News Corp-DirecTV and Adelphia-Time Warner-Comcast mergers completed in December of 2003 and July of 2006, respectively, the commission imposed a number of conditions, backed by a binding arbitration process, designed to ensure non-discriminatory access to the combined firms regional sports and broadcast programming networks (Kirkpatrick (2003)). Finally, in the recent Comcast-NBC/Universal merger approved in January, 2011, the Commission imposed a number of conditions over a 7-year period, including program

access-like rules for newly integrated content, a non-discrimination condition in online video (and the removal of management rights in Hulu, an OVD), and a "neighborhooding" condition for channel placement of news programming.

3.6 Other Cable Regulations

Cable systems are subject to a myriad of additional regulations (FCC (2000b)). A few of these are briefly discussed here.

Broadband Access Regulation The market for high-speed (broadband) Internet access has grown considerably in the last 10 years and is now an important source of revenue for most major cable systems. It has also caused a regulatory fight between cable systems, Internet Service Providers (ISPs), and local telephone providers 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)). In August of 2005, a similar set of rules was put in place for DSL providers (Schatz (2005)). Going forward, DSL and cable will compete on near-equal terms and neither will be required to share access with unaffiliated rivals. This policy is in marked contrast to wholesale broadband access policies implemented in many other developed countries.

Cable/Telco Cross-Ownership and Telephone Company Entry The 1984 Cable Act forbid Local Exchange Carriers (LECs) from providing cable service within their telephone service areas. The 1996 Telecommunications Act relaxed this restriction, providing a number of methods under which telephone companies could provide video service, including building a wireline cable system (FCC (2000b, p.17)).[22] Early efforts at video entry were small in scale and often unprofitable. The largest effort was put forth by Ameritech (now owned by AT&T), which purchased and built cable systems that passed almost two million homes. They were only able to attract 225,000 subscribers, however, and exited the business in 1998 (FCC (2004b)).

Each of the three extant LECs (AT&T, CenturyLink, and Verizon) now offer video programming in some form. CenturyLink largely resells DirecTV satellite services bundled with their own telephone and broadband services. Verizon and AT&T, instead, invested billions upgrading their networks to

provide television service in direct competition with cable and satellite companies.[23] Table 6 shows both have been successful: they are now the 7th and 9th largest MVPDs with a total national market share of 6.5%.

An important determinant of the success of LEC entry is the ease with which they can obtain agreements to provide video service with local franchise authorities (LFAs). LECs have complained that the franchising process is an important barrier to entry in cable markets. For example, Verizon estimated it would have to obtain agreements with almost 10,000 municipalities if it wished to provide video programming throughout its service area and that LFAs (backed by incumbent cable operators) took too long and required too many concessions (FCC (2005c)).[24] In September 2005, Texas passed a law introducing a simplified statewide franchising process, something CenturyLink is encouraging in a number of other states. In 2007, the FCC also adopted rules that limited cities' abilities to regulate or slow telco entry, a decision upheld by the courts in 2008.

3.7 Satellite Regulations

Federal regulation of the satellite television industry has also influenced the cable television industry. While satellite distribution of programming was initially intended for retransmission by cable systems, a small consumer market also developed. By the mid-1980s, approximately 3 million households had purchased C-Band (12-foot) satellite dishes, mostly in rural areas without access to cable service.

It wasn't until the mid-1990s, however, that direct satellite service to households thrived. Fueled by the complementary developments of improved compression technology, more powerful satellites, and smaller (18-inch) satellite dishes, Hughes introduced DirecTV in 1993. Subscriptions grew quickly, particularly among the estimated 20 million households without access to cable service. Wider adoption was hindered, however, by a regulatory hurdle: in an effort to protect local television stations, satellite systems were only permitted to provide broadcast network programming if the household could not receive the local broadcast signal over-the-air. This hurdle was removed, however, with 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. Within a year, satellite providers were doing so in the top 50-60 television markets. Satellite systems now provide a set of services comparable to those offered by cable systems for the vast majority of U.S. households.[25]

Unlike cable systems, satellite providers have never been subject to price regulations. Most other rules described above for cable service apply equally to satellite providers, however. For example, since January 1, 2002, satellite providers that distribute local signals must follow a "carry-one, carry-all" approach similar to Must-Carry and must negotiate carriage agreements with local tele-

vision stations under Retransmission Consent (FCC (2005b)). Furthermore, under the conditions put in place in the News Corp-DirecTV merger, the combined firm is subject to the same rules governing competition in the programming market.[26]

4 The Consequences of Cable Regulation and Deregulation

The cable industry has undergone several recent periods of regulation and deregulation. This has provided an ample record to evaluate the consequences of cable regulations. In this section I present broad trends in economic outcomes in the industry. In the next section I evaluate the theoretical and empirical evidence of the consequence of regulation on those outcomes.

4.1 The Facts to be Explained

Prices Figure 4 reports price indices from the Consumer Price Index (CPI) from December, 1983 until November, 2012. Reported are series for (i) MVPD (i.e. cable + satellite) services and (ii) consumer non-durables.[27]

Insert Figure 4 Here

Four distinct periods are clear in the figure and are described in Table 1 below. Reported in the table is the compound annual growth rate for each price index corresponding to periods of cable regulation and deregulation (1st three periods) and telco entry into the video market (last period). The first period describes price increases following the passage of the 1984 Cable Act. Price deregulation from the 1984 Act begins in December 1986 and continues until April 1993, when the first price caps from the 1992 Cable Act were implemented. The second period begins at that point and continues until the passage of the "Going Forward" rules relaxing price caps in November 1994. The third period starts at that point and continues to the end of 2005, the (effective) time of telco entry into video markets. The last period begins then and continues to the present.

Insert Table 1 Here

From these price series, regulation (deregulation) is associated with positive (negative) relative cable price growth . 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. Similarly, prices after the relaxation of the '92 regulation have increased at a rate 2.57% greater than that of non-durables, while prices

during the (short) regulatory period fell 3.45% relative to non-durables. Telco competition also appears to matter: prices in the last period are slightly less than those for non-durables over the period.

Subscriptions Did lower prices lead to more subscriptions? Figure 5 reports aggregate subscribers to MVPD (cable, satellite, and telco) services by year between 1983 and 2010. 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 for prices both for cable subscribers and all MVPD subscribers and report these in Table 2.

Insert Figure 5 Here

There are three interesting features of the data in Table 2. First, cable subscriber growth is positive throughout all periods but the last, including periods when prices were rising. While many features of the economic environment are also changing over this period, one plausible explanation for this relationship is that the quality of cable services has been increasing over time. I provide some rough measures of cable quality in what follows. Second, despite lower prices between 1993 and 1995, cable subscriber growth is *lower* than during the previous, deregulatory, period. This suggests regulation may itself have had an impact on cable quality. Third, note the dramatic reduction in cable subscriber growth after 1995. While a normal feature of a market that is reaching saturation, this also reflects the growth in satellite and telco operators as viable competitors to cable systems: total MVPD subscriber growth, while not at pre-1995 levels, is still substantial, despite reaching aggregate penetration rates almost 90% of U.S. households by 2010.

Insert Table 2 Here

Quality Both the price and subscription data suggest that accounting for the quality of cable service is important for understanding outcomes in cable markets. Measuring the quality of cable services can, however, be very challenging. 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 (2007)). Since channels are clearly very different in their value to consumers, it is perhaps best to enumerate them if the data allow it. Crawford and Yurukoglu (2012) do this for over 50 individual cable networks in their recent work analyzing the welfare effects of à la carte policies.

Figures 6 and 7 provide two rough measures of cable service quality over time. The first, Figure 6, reports the number of programming networks available for carriage on cable systems as well as (from 1996) the average number of Basic, Expanded Basic, and Digital Tier networks actually offered to households. Both the number of networks available to systems and those actually offered by systems has increased considerably over time. This is particularly true in the periods 1978-1988 and 1994-present.[28]

Insert Figure 6 Here

The number of cable networks is, however, an incomplete measure of cable service quality. The value of programming on ESPN today is significantly greater than it was in 1985. This increase in the value in programming can partially be measured by the *cost* to cable systems for that programming. Figure 7 describes the average cost to cable systems of program networks from 1989-2003(as well as duplicating the average number of networks on Basic and Digital Tiers from Figure 6). The top-most, solid, lines in the figure use the left-hand axis and 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. One can compare the pattern of these prices with the average number networks over the same period, represented by the dashed line and using the right-hand axis. The trend in total costs roughly matches the trend in number of networks. This might be expected if network costs were constant over time. They are not, however. The bottom, dotted, lines report the total per-subscriber cost for networks charging affiliate fees *conditioning* on the networks charging positive fees in 1989. This isolates the increase in cost to cable systems from increased quality for a given set of programming networks.[29] Together, these series show that costs to cable systems have been increasing over time due both to increased costs for existing networks as well as increases in the number of offered networks.

Insert Figure 7 Here

Services A final feature of cable service that has evolved considerably over the last 20 years is the number of services from which households can choose. Cable television technology is such that all signals are transmitted to every household served by a system. As such, the least cost method of providing any cable service is to *bundle* all the programming. Early cable systems did just that. The development of Premium networks in the early 1980s, however, necessitated excluding households that chose not to subscribe. This was costly, requiring a service technician go to each household and physically block programming with an electromechanical "trap". The development of scrambling (encryption) technology in the 1980s and 1990s solved that problem but instead

required households interested in such programming to have an "addressable converter" (set-top box) to unscramble the video signal. Subscribers and subscriptions to Premium Networks grew (cf. Figure 8).[30]

Insert Figure 8 Here

Addressable converters also allowed cable systems to unbundle some of their Basic networks. As discussed earlier, these were called Expanded Basic Services (or Tiers). There was some concern in the late 1980s and early 1990s that cable systems were introducing tiers in order to evade rate regulation in the pre-1986 and post-1992 periods.[31] These concerns have waned since the passage of the 1996 Telecommunications Act. Where offered, the vast majority of households choose at least one Expanded Basic service, a digital service, broadband (cable modem) access to the Internet, and/or telephone service from their cable operator. Table 3 describes the recent evolution of these advanced service offerings.

Insert Table 3 Here

The growing popularity of digital tiers (and associated digital converters) has led some consumer advocates to call for cable systems to *unbundle* some or all networks and offer them to consumers on an à la carte basis (Consumers Union (2003)). I discuss this important policy issue in Section 7.2.

5 The Consequences of Cable Regulation

The challenge in interpreting these trends in the cable data are two. First, how much of the increase in cable prices is due to increases in cable market power and how much is 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 have market power, if this gives rise to the incentives to increase product quality over time, consumers may benefit despite the welfare losses from that power. How have consumers valued changes in the portfolio of cable services? How has regulation influenced these choices? I evaluate the theoretical and empirical evidence on these questions in what follows.

5.1 Theoretical Models of Price and Quality Choice under Regulation

Most theory of optimal regulation focuses on products of a given quality or qualities (Breautigam (1989), Armstrong and Sappington (2007)). While there are difficult implementation issues in

this case, including how best to accommodate informational asymmetries between the firm and regulator and how best to accommodate changes in the economic environment facing the regulated firm over time, the conclusions of the theory are straightforward: regulation can limit the exercise of market power by limiting the prices firms can charge.

The problem is more challenging, however, when firms can also choose product qualities. In what follows, I briefly survey the theoretical literature on price and quality choice with and without regulation for single- and multi-product monopolists. Focusing on monopoly is in part for convenience, as that is the focus of much of the economic literature, but it is also largely appropriate for the cable television industry.[32] That being said, I provide insights from oligopoly models where possible.

Price, quality, and regulation for single-product monopolists Assessing the influence of regulation on price and quality choice is relatively straightforward for single-product monopolists. An unregulated single-product monopolist may under- or over-provide quality depending on the nature of consumer preferences and firm costs (Spence (1975)). The key factors are two: whether households that highly value quality value more highly or lowly increments to quality and the extent of quantity reduction (relative to a social planner) due to market power over price. These depend on the specific features of the market under study and empirical estimates of their relative importance are few.[33]. A single-product monopolist facing price-cap regulation, however, will generally under-provide quality as it must bear the costs of any quality improvements and may not be able to increase price to recoup those costs (Brennan (1989)). It is the norm, therefore, to accompany price-cap regulation with mechanisms that monitor and penalize firms for adverse product quality (Armstrong and Sappington (2007)).

Price, quality, and regulation for multi-product monopolists Assessing the influence of regulation on price and quality choice is more complicated for the more realistic case of multi-product monopolists. The seminal paper on price and quality choice without regulation is Mussa and Rosen (1978) (MR). They show that products offered by unregulated multi-product monopolists are, under reasonable conditions, subject to *quality degradation*: offered qualities are below the efficient level for all consumers except those with the highest tastes for quality.

The intuition for multiproduct monopoly quality degradation can be understood in a simple example with two types of consumers and a monopolist offering two goods. Let the consumer that values more highly product quality be called the high type. The monopolist would like to sell products to each consumer type at a quality and price that maximizes his profits. Since there are only two consumers, he only needs two products. In a perfect world, he would choose the quality for the high-type product at just that point where the additional revenue he could get from the high type

to pay for a slightly higher quality would equal the additional cost he would have to pay to produce that slightly higher quality (and similarly for the low type). Consumers would be left with nothing (as each would be paying their maximum willingness-to-pay) and the monopolist would earn all the surplus that was available in the market.

Unfortunately, the monopolist's first-best price-quality portfolio isn't incentive-compatible: consumers won't go along. Under reasonable assumptions on preferences and costs, the high type would earn some surplus consuming the low-quality product (and paying less). The monopolist realizes this in advance, however, and therefore chooses a second-best pair of prices and qualities. This second best sweetens the deal for the high type in two ways. First, it keeps her quality the same, but lowers its price, making the high-quality product more attractive to the high type. Second, it degrades the quality of the low-quality product (also lowering its price), making the low-quality product less attractive to the high type. Quality degradation is costly, however: lowering quality lowers what the low type is willing to pay by more than the reduction in cost to the monopolist. Quality degradation therefore continues until the monopolist's profit losses on low types exactly matches their profit gain on high types (driven by the higher price it can charge them without causing them to switch to the low-quality product).[34]

In a pair of papers, Besanko, Donnenfeld, and White (1987, 1988) (BDW) extend the Mussa-Rosen model to consider a monopolist's quality choice problem in the presence of regulation. They consider three forms of regulation – Minimum Quality Standards (MQS), Maximum Price (Price-Cap) Regulation, and Rate of Return Regulation – the second of which is most relevant in cable markets. They show that setting a price cap has an important effect on the monopolist's offered qualities. Relative to the quality offered by an unregulated firm, the presence of a price-cap lowers quality for the high-quality good. The intuition is straightforward: with a price cap, the firm cannot charge as much as it would like for a good of the efficient quality. Since it can't raise prices, it simply reduces quality until the price cap is the optimal price to charge.[35] Do consumers benefit? Besanko, Donnenfeld, and White (1988) show that they can for small reductions in prices, but both consumer and total welfare can fall if caps are set too low.

Implications for Cable Television Markets Are these results likely to apply in cable television markets? I argue they are, at least for Basic and Expanded Basic Services.[36] Cable price regulations before 1984 were governed by agreements negotiated between cable systems and the local franchise authority. While the theory may apply in those settings, it would depend on the specific terms of those agreements. Generalizing about the many and heterogeneous forms of local price regulation in place at that time is therefore difficult.

Price regulations implemented after the 1992 Act, however, map fairly well to the theory; only a few features of the actual regulations differed from the assumptions described above. In particular,

while the theory assumes only the high-quality good is subject to price caps, prices for *all* Basic and Expanded Basic (so-called Cable Programming) Services were subject to regulation under the '92 Act. That being said, most systems in the mid-1990s either offered a single Basic Service or, if offering multiple Expanded Basic Services, earned the majority of their Basic Revenue from the highest-quality service(s), making the effect of the regulations on those services the practically most relevant ones.[37] Furthermore, while the theory describes price caps in levels, prices in cable markets were regulated on a per-channel basis. If anything, however, this made it easier for systems to adjust their (per-channel) product quality by allowing them to add relatively low-value networks rather than dropping networks as would have been necessary to come under a fixed cap.

Why then didn't regulators also regulate product quality, as in telecommunications, electricity, and other regulated product markets? In cable markets they cannot. The primary components of product quality for cable television services are the television networks included on those services.[38] By the First Amendment, cable systems have freedom of expression and regulators cannot therefore mandate what networks to carry (or not).

What then can one conclude from the theory as applied to cable television markets? While the specifics of regulatory interventions matter, the theory strongly advises against the use of price caps in markets, like cable, where quality cannot be regulated and is easily changed by firms. While prices may fall, so too will quality. Furthermore, market power may be unaffected: the regulated price is likely to move toward the optimal monopoly price for the (now-lower) quality. Worse, unless caps are set well across markets and time - and how can regulators know? - consumers and firms can *both* be worse off.

5.2 Econometric Studies of the Effects of Regulation

Does empirical research confirm these findings? How much of the increase in cable prices is due to the exercise of cable market power and how much is due to increases in the quality of cable services? And what effect has regulation had?

5.2.1 Research Using Time Series Data

A number of studies have broached these questions using time series data. Jaffe and Kanter (1990) and Prager (1992) analyze the impact of the 1984 Cable Act on outcomes in financial markets to infer it's effects on cable system market power.[39] Jaffe and Kanter (1990) analyze the impact of the 1984 Cable Act on the sales price of cable franchises exchanged between 1982 and 1987 and find important compositional effects: while sales prices appear unchanged in the top 100 television markets (where competition between cable and broadcast markets was stronger), they find large and

significantly positive effects outside of these markets. This suggests that, with the relaxation of price regulations, cable systems were expected to be able to exercise market power where competition was weak and that this expectation translated into higher sales prices for franchises. Prager (1992) analyzes the impact of news events associated with the 1984 Cable Act on stock prices for 10 publicly traded cable television companies between 1981 and 1988. She finds no evidence of an increase in stock prices at the time the Act was passed, but does find that cable stocks outperformed the market ex post, i.e. in the years after the rate deregulation was actually implemented. Such unanticipated changes are consistent either with widespread uncertainty about the likely effects of deregulation or with an actual increase in market power due to increased quality of and demand for cable services (possibly themselves influenced by deregulation).

Hazlett and Spitzer (1997) use aggregate time-series data to analyze the impacts of both the 1984 and 1992 Cable Acts. In addition to surveying the economic literature at that time, they analyze a host of outcome measures, including prices, penetration (subscriptions), cash flows, tiering, and quality (as measured by the number of networks, their expenditure on programming, and their viewing shares), and reach three main conclusions. First, price increases after the 1984 Cable Act and price decreases after the 1992 Cable Act were associated with similar changes in cable service quality. Second, (monthly) subscription data suggest that price deregulation did not decrease subscriptions and price regulation did not increase them. Finally, systems appeared to evade price regulation by introducing new Expanded Basic tiers and moving popular programming to those tiers.[40] Similar patterns are apparent in the aggregate data presented in the last section.

There are several difficulties drawing firm conclusions about the impact of regulation using aggregate time series data, however. First, it is often difficult to control for all changes in the economic environment *other than* the change in regulation (e.g. aggregate sectoral, demographic, and/or macroeconomic trends). Furthermore, a lack of observations often limits the ability to draw strong statistical inferences. The majority of studies analyzing questions of cable market power and the impact of regulation have therefore used disaggregate cross-section data.

5.2.2 Research Using Disaggregate Cross-Section Data

Reduced Form Approaches Early empirical work using cross-section data tested the joint hypothesis that cable systems had market power and that regulation reduced their ability to exercise that power. Most authors used a reduced-form approach, regressing cable prices (or other outcome variables) across markets on indicators of the presence and strength of regulatory control. The evidence from these papers is generally mixed. For example, Zupan (1989a) analyzes data on a cross-section of 66 cable systems in 1984 and finds prices are $3.82 per month lower in regulated markets. Prager (1990), however, analyzes a sample of 221 communities in 1984 finds the opposite

result: rate regulation is associated with both more frequent and larger rate increases. Similarly, Beutel (1990) analyzes the franchise award process in 27 cities between 1979 and 1981 and finds that franchises were generally awarded to systems that promised to charge *higher* prices per channel.[41]

Possible reasons for this literature's lack of consistent results include an inability to (accurately) account for cable service quality when evaluating price effects and the likely endogeneity of the regulation decision within local cable markets. The decision to regulate prices for local cable service (when permitted) likely depends on observed and unobserved features of the cable system, market, and household tastes for cable service and regulation. Ideally one would instrument for the decision to regulate, but finding factors that influence the presence or strength of regulation but don't influence prices can be quite challenging.[42]

A Framework for Measuring Market Power More recent empirical research has taken a different approach to measuring cable market power and the impact of regulation. Following Bresnahan (1987), an empirical literature within the field of Industrial Organization has developed that provides a set of empirical tools to measure market power using explicit models of firm behavior and observations on firms' prices and quantities (or market shares).[43] Furthermore, this framework can also measure changes in quality and the impact of regulation on firm behavior. I briefly introduce this framework and then survey existing research applying it in cable television markets.

Consider a cross-section of markets each occupied by a single firm selling a single product of fixed quality.[44] Let aggregate demand in each market be given by $Q_n = D(p_n, y_n)$, where Q_n is quantity demanded in market n, p_n is price of the good in market n, and y_n are variables that shift demand across markets (e.g. income, other household characteristics, etc.). As each firm is a single-product monopolist, optimal prices in market n are given by:

$$p_n = c_n - \frac{Q_n}{\partial D(p_n, y_n)/\partial p_n} \tag{1}$$

where c_n is the marginal cost of the good 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 (absolute value of 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.

If we could observe marginal costs, c_n, and demand, $D(p_n, y_n)$, we could simply calculate the markup in each market. Firms facing more inelastic demand would have greater markups and thus more market power. In practice, however, we don't observe either. To infer market power, we must estimate them.

Assuming the data provides sufficient variation and good instruments for prices, estimating demand

is a straightforward proposition.[45] Estimating marginal costs is more difficult. Rather than obtain hard-to-find cost data, the typical solution is to make an assumption about how marginal costs vary with observables (e.g. cost factors, quantity) and estimate them based on their influence on observed prices in (1).[46] If these issues can be overcome, it is possible to estimate the market power facing firms across markets and/or time.

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

$$p_n = c_n - \theta \frac{Q_n}{\partial D(p_n, y_n)/\partial p_n} \tag{2}$$

Here θ measures the extent to which prices exceed marginal costs in market n. If demand and marginal costs can be estimated, 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.[47] If regulation is constraining firm behavior, prices will be close to marginal costs even if demand is inelastic (i.e. $\theta \approx 0$). If not, prices will be close to the monopoly markup (i.e. $\theta \approx 1$).

Quality change is also easy to accommodate, at least in principle. Let q_n measure the quality of the product in market n. If we now parameterize demand by $Q_n = D(p_n, y_n, q_n)$, prices are given by

$$p_n = c_n - \theta \frac{Q_n}{\partial D(p_n, y_n, q_n)/\partial p_n} \tag{3}$$

If quality is higher in some market (or time period), demand will increase and/or become more inelastic, increasing prices. Separating the influence of quality change and market power is simply then a matter of assessing the relative strength of q_n and θ on prices.[48]

Measuring Market Power and the Effects of Regulation in Cable Markets Two papers apply the framework above to measure the impact of regulation on pricing in cable markets.[49] First, Mayo and Otsuka (1991) estimate demand and pricing equations 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, the relatively small value suggests regulation significantly constrained system pricing.[50]

Second, 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 both a regulated period (1984) and an unregulated period (1990). In the raw data, prices are 42% higher in the latter period, but satellite channels have more than doubled and subscriptions 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%, or .18/.42 = 43% of the observed price change. He concludes both increased quality and increased market power were responsible for deregulated price increases.

Almost all the studies surveyed to date focus on the impact of regulation on *prices*. But what of quality? The aggregate data in Section 4.1 suggest understanding regulation's impact on quality is critical to understanding outcomes in cable markets. In a recent paper, Crawford and Shum (2007) extend the market power framework to assess the impact of regulation on both prices and quality in cable markets. Rather than use observed measures of service quality (e.g. number of offered networks), they use data from a cross-section of 1,042 cable markets in 1995 to estimate preferences and costs and then use the implication of the optimal price and quality choice to *infer* the level of offered quality in each cable market. An example provides the intuition for their procedure. Suppose the cable systems in two markets had identical market shares for each of two offered services, but the price of the high-quality service was higher in the first market. The higher price in the first market suggests households are willing to pay more for cable service quality in that market (perhaps because mean household age or household size is larger in that market).[51] By making high types more profitable, this tightens the incentive compatibility constraint for those types, increasing the incentive to degrade quality for low types. Thus even if prices are similar in the two markets, offered quality (under the theory) must be lower in the first.

After inferring the quality of each offered service in each cable market, the authors 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 that quality for high-quality goods is somewhat higher, that quality for low- and medium-quality goods is substantially higher, and that quality per dollar for all goods is higher in regulated markets (despite higher prices). Interestingly, these effects are consistent with BDW's theoretical predictions of minimum quality standards and not price-cap regulation.[52]

Measuring the Consumer Benefits of Regulation The previous studies focus on the impact of regulation on cable prices and quality. 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. Two studies estimate consumer demand for cable services and ask about the welfare effects of (i.e. benefits to consumers from) cable price regulation.[53]

Crandall and Furchtgott-Roth (1996, Chapter 3) examine the welfare effects of changes arising from the 1984 Cable Act. They estimate a multinomial 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 4), they estimate that households would be have had to be compensated by $5.47 per month in 1992 to face the choices available to them in 1983.[54]

Crawford (2000) examines the welfare effects of changes arising from the 1992 Cable Act. He also estimates a multinomial logit demand system on 344 cable systems from 1992 and 1995.[55] Furthermore, he introduces a new approach for measuring service quality. Rather than simply counting the number of networks offered by systems, he controls for the actual identities (among the top-20 cable networks) of those networks (e.g. ESPN, CNN, and MTV). This turns out to be important not only for accurate estimation of cable demand, but in valuing household welfare from the Cable Act.[56] 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 the simple fact that, in his data, prices increased despite the regulations.

5.2.3 Conclusions

The accumulated evidence is not encouraging for proponents of regulation in cable markets. Research based on time-series data suggest that while prices briefly declined after the 1992 Cable Act, so too may have product quality. Detailed econometric studies based on disaggregate cross-section data provide mixed evidence. Some find that regulation lowers cable prices from monopoly levels, while others find negligible effects. Evidence of the impact of regulation on quality is positive, although further research is necessary, and evidence on consumer welfare effects of changes in cable choice sets is, if anything, in favor of deregulation.

6 The Rise of Competition in Cable Markets and Its Effects

The rise of competition from satellite and telephone company providers has dramatically changed the cable marketplace. Whereas for 40 years the vast majority of households faced a local cable monopolist, most households now have the option of three or more MVPD providers. This section addresses the impact on cable prices and services of competition in the distribution market.

6.1 Duopoly ("Overbuilt") Cable Markets

There is considerable evidence that cable prices are lower when there are two wireline competitors in a market. Hazlett (1986a) finds that cable prices are $1.82 lower in duopoly relative to monopoly cable markets. Levin and Meisel (1991) analyze a cross-section of 47 cable systems in 1990 and find

that, controlling for the number of programming networks offered, cable prices are between $2.94 and $3.33 per month less in competitive relative to non-competitive cable markets. Emmons and Prager (1997), using data on a cross-section of 319 cable markets in 1983 and 1989, obtain similar results: prices for incumbents that face competition from another cable system are an estimated 20.1% lower in 1983 and 20.5% lower in 1989.[57]

More recent data suggests a similar pattern. Using data from the ten most recent FCC reports on cable industry prices, Table 4 reports the average price, number of channels, and price per channel for cable systems defined by the FCC as noncompetitive, facing a wireline competitor, and facing satellite competition.[58] The upper panel of the table presents the raw data, while the lower panel presents the percentage difference between noncompetitive systems and systems facing either a wireline or satellite competitor.

Insert Table 4 Here

The last row in the first set of columns in the table shows that, on average between 2001 and 2011, prices for systems facing wireline competition were 7.8% lower than for non-competitive systems. Definitive conclusions about causality are difficult, however, due to selection problems. Entry by a competitor is not exogenous to the price charged by an incumbent cable system or the characteristics of the entertainment market. If new firms entered into markets where incumbent cable systems charged high prices, the table likely under-estimates the true effect of wireline competition on prices. Similarly, as most wireline competition occurred in large urban markets and these have more substitutes to cable, the table may over-estimate the true effect. Accurately controlling for differences in economic conditions across markets and the endogeneity of entry is required in order to make stronger conclusions from such data.

The last row in Table 4 also reports the correlation between wireline competition and 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. Keeping in mind the same concerns about selection, the data demonstrates that, on average between 2001 and 2011, wireline competitors offered 6.2% more Basic and Expanded Basic channels and charged 12.9% less on a per-channel basis. Further analysis of recent price and quality data that both analyzed the effects of recent telco entry and controlled for the potential endogeneity of this entry would be welcome.

6.2 Competition between Cable and Satellite

The problem with duopoly cable markets is that they are rare, accounting for only 1-2% of all cable markets before the entry of telco operators (FCC (2005b, Footnote 627)). From a policy

perspective, it is much more important therefore to assess the impact of *satellite* competition on cable prices and quality.

Table 5 reports trends in cable, satellite, and telco subscribers and their respective share of the MVPD market. Satellite subscriptions grew very quickly, even before 1999 when SHVIA allowed satellite providers to distribute local broadcast channels. So too have telco subscriptions since their entry into the market in 2006. The net effects of satellite and telco subscriber growth has been to first slow and then reverse cable industry subscriber growth. Cable systems in 2010 had fewer subscribers than at any time since 1995.

Insert Table 5 Here

Table 4 also provides some evidence on the correlation between satellite competition and cable 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 who have been granted a finding of effective competition due to facing at least two satellite competitors whose total market share exceeds 15% of the MVPD market.[59] The last line demonstrates that, on average between 2001 and 2011, cable markets facing DBS competition (as defined by the FCC) paid approximately the same prices, were offered approximately the same quality, and therefore had approximately the same price per channel.

Given the keen interest in the role of satellite competition, Congress commissioned the General Accounting Office to conduct several studies of satellite's 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 satellite 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 (as in Table 4) is that the correlation between cable prices on satellite market shares may not be driven by a causal relationship, but by correlated unobservables. If tastes for video programming differ across markets, both satellite market shares and cable prices will be higher in markets with greater tastes for programming, causing an upward bias on the effect of satellite shares on cable prices. Similarly, if offered cable qualities are (unobservably) higher in markets with high satellite shares, as for example if cable systems improve service quality in the face of satellite competition, a similar effect will arise. One solution is to instrument for satellite market shares in a regression of cable prices on satellite shares, but that can be difficult if instruments are hard to find.[60]

In a widely cited study, Goolsbee and Petrin (2004) suggest a solution to this problem. First, they estimate a multinomial probit demand system for Expanded Basic, Premium, and satellite services from a sample of roughly 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 satellite along with quite plausible (and large) cross-price elasticities.

As in previous studies, they regress cable prices on (a nonlinear transformation) of satellite market shares.[61] 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 satellite share on cable prices.[62]

They find the effect to be both statistically and economically significant. Reducing satellite penetration 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.

In a recent paper, Chu (2010) digs more deeply into the effects of satellite competition, explicitly modeling both price and quality competition and examining the heterogeneity in cable system responses to satellite rivals. He finds that different cable operators respond differently to satellite entry. Most systems lower prices and raise quality, but in some markets they increase both (and in some markets decrease both). The total effect is consistent with widespread patterns in the industry and similar to the effects of regulation found in Crawford and Shum (2007): prices are slightly lower (and indeed higher in some markets), but quality is substantially higher.

So, has satellite competition "worked"? On this, the evidence is mixed. Chu shows that if one does not permit cable and satellite operators to compete on quality, prices after satellite entry would indeed have been lower for both. On the other hand, estimated cable system markups and profits are only slightly (9%) less after satellite entry, and the consumer welfare benefits are concentrated: while estimated consumers surplus increases by 32% on average, most of these benefits go to the 5% of the market that are satellite customers. Cable customers only benefit slightly.

6.3 Conclusions

Are (most) cable markets competitive? The evidence for wireline competition is encouraging, but its narrow scope (pre-telco entry) has limited measured benefits to a small fraction of cable households and lack of data (post-telco entry) renders conclusions impossible. While there is some evidence of a positive impact of satellite competition on cable prices, the estimated cable price elasticities suggest cable systems still exert considerable market power.[63]

Despite this, more large-scale entry appears unlikely. Further wireline entry means paying substantial fixed costs and facing entrenched competitors.[64] Wireless broadband entry may be a solution

in the long-run, but would require both major increases in electromagnetic spectrum and strong competition from other, higher-value, uses of (potentially) mobile broadband.

How then to increase consumer welfare in cable markets? I hope my survey of the theoretical and empirical literatures in the last section convincingly rules out price regulation as an option. Some have proposed mandatory à la carte cable packages and/or competition from online video providers as mechanisms to help consumers. I discuss the likely consequences of each of these, as well as other open issues in MVPD markets, in the next section.

7 Open Issues in MVPD Markets

In this section, I consider four open issues in cable and satellite markets: horizontal concentration and vertical integration in programming markets, bundling, online video distribution, and bargaining breakdowns.

7.1 The Programming Market

7.1.1 Horizontal Concentration and Market Power

An important 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 20 years.[65]

Insert Table 6 Here

As can be seen in the table, the sum of the market shares for the top 4, top 8, and top 25 MVPD providers have all increased over time, with the top 4 MVPDs serving 68% of the market and the top 8 serving 84% in 2010.

There are both pro- and anti-competitive effects that could arise from this 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, broadband Internet access, telephone service, and online video services. It may also, however, increase market power in the programming market.

There have unfortunately been a number of false starts regarding the appropriate analytical framework for analyzing 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 (2005d, Par 72)). The *Time Warner II* decision, however, criticized this approach as lacking a connection between the horizontal limit and the ability to exercise market power. The 2007 rules dismissed by the courts used a monopsony model as an alternative framework, but that too doesn't appear useful as networks are differentiated and terms between programmers and cable operators are negotiated on a bilateral basis, so that if a cable operator with market power were to reduce its purchases of programming at the margin, it would have no obvious effect on the prices it pays on inframarginal programming.

A Bargaining Approach Given the well-documented behavior of programmers and MVPDs in the programming market, a bargaining framework clearly seems most appropriate for analyzing outcomes. Unfortunately, bargaining models are known for their wealth of predictions, often depending on subtle features of the rules of the game that are hard to verify in practice. What can bargaining theory tell us about market power and the consequences of horizontal concentration in programming markets?

The conventional wisdom is that increased concentration in the MVPD market improves the bargaining outcomes of cable systems, reducing affiliate fees to program suppliers. In a standard bargaining approach, increased size for an individual cable system reduces the viability of a program network if an agreement is not reached between the two parties. This necessarily lowers the networks "threat point," increasing the expected surplus to the cable system (with specifics determined by the particular model). These mechanisms are at play in the Nash Bargaining Framework used by Crawford and Yurukoglu (2012) in their analysis of the industry.[66]

What does empirical work suggest about horizontal concentration and outcomes in the programming market? Assessing the consequences of increased system size on network surplus in programming markets is conceptually simple, but a lack of data on transaction prices (affiliate fees) has prevented much empirical 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. Finally, Crawford and Yurukoglu (2012) estimate the relative bargaining power of channel conglomerates like ABC Disney and Viacom relative to cable operators

and satellite systems. While not the focus of their study, they find that MVPDs generally have higher bargaining power than channels for small channel conglomerates, but that the situation is reversed for large channel conglomerates, and that, among distributors, small cable operators and satellite providers have slightly less estimated bargaining power than large cable operators. While feasible, they don't estimate the effect of up- and downstream mergers within their sample on estimated bargaining power, an interesting potential avenue to directly explore the relationship between concentration and bargaining outcomes.

7.1.2 Vertical Integration and Foreclosure

Many MVPD operators either own or have ownership interests in programming networks. So do major broadcast networks. This has drawn considerable attention from regulators in MVPD markets. FCC (2005b) documents the status of vertical integration in MVPD markets as of 2004. 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.[67] An additional 103 (22), or 27% (23%) were affiliated with a broadcast programming provider.[68] Furthermore, in 2006 all of the top 20 networks by subscribers (save C-SPAN) and top 15 by ratings were owned by either a cable operator or broadcast network.[69]

As in most cases of vertical integration, there are both efficiency and strategic reasons MVPDs and program networks may want to integrate. Regarding efficiency, vertical integration could eliminate double marginalization, improving productive efficiency. Similarly, it could minimize transactions costs and reduce the risk of new program development. It could also internalize important externalities between systems and networks in the areas of product choice, service quality, and brand development. Or it could eliminate inefficiencies in the bargaining process.

Unfortunately, vertical integration may also provide the integrated firm incentives to foreclose unaffiliated rivals (Rey and Tirole (2007)). For example, an integrated programmer-distributor could deny access to its affiliated programming to downstream rivals or raise the costs they pay relative to that of its integrated downstream division. Similarly, the integrated programmer-distributor could deny carriage on its affiliated distributor to upstream rivals or reduce the revenue they receive relative to its integrated upstream division. Downstream foreclosure was the primary motivator underlying the exclusivity prohibition for affiliated content in the program access rules as well as the reason for several merger conditions required by the FCC in its approval of the 2011 Comcast-NBC/Universal merger. Similarly, concerns about upstream foreclosure drove the news neighborhooding condition in that merger due to concerns about the incipient integration of MSNBC, the dominant network for business news, with Comcast, the largest MVPD and one with important footprints in several very large markets for business news. The latter case is instructive, as the

concern addressed by the merger condition was not (necessarily) one of complete foreclosure, i.e. that Comcast would no longer carry rival business news networks, but that it would disadvantage them in terms of channel placement, reducing viewership and thus rivals' advertising revenue. This highlights the subtle ways in which an integrated firm with market power in one market can disadvantage rivals in vertically-related markets.

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.[70] 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 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.). Crawford, Lee, Whinston, and Yurukoglu (2012) have begun to analyze this issue in markets for Regional Sports Networks, but as yet have no firm conclusions.

7.1.3 Conclusions

The analysis of competition in the programming market is unfortunately inconclusive. Horizontal concentration in both programming and distribution markets has clearly increased over time, but the consequences for efficiency and welfare are unclear. More research both measuring the effects of increased concentration and the appropriate public policy responses to it would be welcome.

Of more concern is the potential this increased market power provides incentives via vertical relationships to foreclose unaffiliated rivals. While the theory clearly supports this as a possibility, so too are efficiency benefits reasonable. More empirical work is needed to assess potential foreclosure effects and to test the alternative motivations to integrate.

7.2 Bundling

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 at both the wholesale and

retail level. At the wholesale level, cable operators have long complained about the programmers tying less-value programming to the ability to get high-value programming. In 2008, the FCC explored a rule-making on the matter, but nothing was ever circulated or voted (Make (2008). At the retail level, both the General Accounting Office and the Federal Communications Commission have analyzed the likely effects of bundling in cable markets, finding mixed but generally negative (and extremely uncertain) effects for consumers (GAO (2003), FCC (2004a)). In 2006, the FCC, under a new chairman, published a follow-up study that repudiated many of its earlier conclusions and found that unbundling could actually improve consumer welfare (FCC (2006b)).

Is then bundling a market failure in cable markets? Might not à la carte sales at either the wholesale or retail level improve consumer welfare? I survey the existing theoretical and empirical evidence in what follows.

7.2.1 Theoretical Motivations to Bundle

In many product markets, bundling enhances economic efficiency. 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. Moreover, if profitable, bundling can enhance incentives to offer products by increasing the share of total surplus appropriable by firms (Crawford and Cullen (2007)).

Two literatures in economics suggest that bundling can instead reduce consumer welfare in product markets. First, a longstanding and 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 may fall, often because bundling requires consumers to purchase products in which they have little interest (Bakos and Brynjolfsson (1999), Armstrong (1996)).

Insert Figure 9 Here

Figure 9, from Crawford and Yurukoglu (2012), demonstrates the intuition of this line of argument in a simple example of a monopolist selling two goods with zero costs. In the figure, the demand curve for each good is given by the dashed lines. It is clear that if the monopolist sold the two

goods à la carte, at whatever price it chose for each there would be consumers that valued each good at greater than its price who would purchase it (earning consumer surplus) as well as consumers that valued each at less than its price (but more than its cost) who would not purchase it (causing deadweight loss). Compare that to the case if the monopolist were to bundle given by the solid line in the figure. As long as valuations for the two goods are not perfectly correlated, consumers valuation of the bundle will be less dispersed than those for the components, allowing the firm to capture more of the combined surplus with a single price. While I chose valuations that are highly negatively correlated in the figure to emphasize this point, it is quite general: à la carte regulations can unlock surplus and improve consumer welfare for given input costs.

Another recent literature analyzes how bundling can also be used to extend market power or deter entry (e.g. Whinston (1990), Nalebuff (2004), Bakos and Brynjolfsson (2000)). 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. Figure 10, from Nalebuff (2004), demonstrates the intuition of this line of argument in another simple example, this time of a monopolist providing two goods (A & B) facing a potential entrant in the market for B. Shown in the figure are consumers' willingness-to-pay for each product, assumed to be distributed uniformly over a range of $[0, 1]$ for each product. As above, assume away any costs and that the monopolist must commit both to a method of sale (à la carte or bundling) as well as prices.

Insert Figure 10 Here

If the monopolist sells each good separately, the entrant will enter market B, just undercut the monopolist's price, and earn all the sales in that market. The figure demonstrates what happens if he instead chooses to bundle. If the entrant enters, 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 portion of the market. If the entrant faces fixed entry costs, bundling in this setting can foreclose the market from potential entry. Even if the entrant does enter, his profits will be lower than if the monopolist did not bundle. This can influence welfare in dynamic environments if, for example, firms have to make investment decisions based on the expected profitability of their operations.

7.2.2 Bundling in Cable Markets

The literature surveyed above demonstrates that there are many possible motives for bundling. Which are likely to apply cable markets? And what are the implications for consumer and total welfare?

It is easy to motivate that bundling reduces costs to cable systems. As described in Section 4, and it is *unbundling* 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, many (esp. small companies') cable subscribers still do not use them.[71] 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 (2004a)).

It is also widely believed, however, 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 (2004a)).

Recent empirical work in the economics literature bears out these discriminatory effects. Using data from a cross-section of 1,159 cable markets in 1995, Crawford (2008) tests the implications of the discriminatory theory and finds qualified support for it. He estimates the profit and welfare implications of his results, finding that bundling an average top-15 *special-interest* cable networks is estimated to increase profits and reduce consumer welfare, with an average effect of 4.7% (4.0%). On balance, total welfare *increases*, with an average effect of 2.0%. In a simulation study, Crawford and Cullen (2007) confirm these effects and also find that bundling enhances industry incentives to provide networks than would à la carte sales, but may do so at significant cost to consumers. Recent work by Rennhoff and Serfes (2008), under somewhat restrictive assumptions, reaches similar conclusions about welfare effects of à la carte, while Byzalov (2010) finds the opposite result.

There is an important weakness in all of these papers, however: they treat the affiliate fees paid by cable systems to programmers as given. This is contrary to both the nature of programming contracts (which typically require systems to pay sometimes much higher fees if channels are offered à la carte) as well as bargaining incentives in an à la carte world (Crawford and Yurukoglu (2012, Sec.2)). In an important recent paper, Crawford and Yurukoglu (2012) evaluate the welfare effects of à la carte allowing for renegotiation between programmers and distributors in an à la carte environment. They confirm the results of the previous paragraph, that consumer surplus would rise under à la carte if programming costs to distributors were fixed, but instead estimate that renegotiation would cause these costs to rise by more than 100%, raising à la carte prices to households and lowering both consumer surplus and firm profits. On average, they find consumers would be no better off under à la carte (and strictly worse off under themed tiers), and that any

implementation or marketing costs would likely make them worse off.[72]

Claims of bundling's potential to deter entry or enhance market power have been made in both the distribution and programming markets. In the distribution market, wireline competitors to incumbent cable systems have articulated versions of the entry deterrence argument when objecting to (i) the terrestrial exception to the program access 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 (2005d, 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. Responding to these concerns, the FCC in late 2007 announced a new proceeding to investigate the issue, but no formal rulemaking appears to have come from it (Cauley (2007)). While theoretically plausible, I know of no empirical evidence of entry deterrence in either the distribution or programming markets. Empirical studies of these topics would be welcome.

7.2.3 Conclusions

Is bundling a market failure in the cable industry? While it would appear so at existing cable system costs, those would be sure to change in an à la carte world, casting very strong doubts about the potential welfare benefits of mandated à la carte. Regulators would be wise to stay away from this superficially-appealing policy option.

More uncertainty surrounds the issue of bundling for market power or entry deterrence. While existing theoretical research does not draw explicit welfare conclusions, it is clear that bundling can have important competitive effects, particularly if, as seems to be the norm in programming markets, it is partnered with vertical integration and horizontal concentration. This could represent a substantial barrier to entry for diverse independent programming in cable markets. It is worthy of further study.

7.3 Online Video

In Section 2, I described recent developments in the market for online distribution of video programming. In this section, I briefly discuss two implications of these developments.

The first is to address whether online video distribution (OVD) is a substitute or complement

for existing pay-tv programming and whether it can plausibly provide a substantive competitive alternative to existing pay-tv bundles. Comments in the most recent FCC report on video market competition found support for both substitution and complementarity of OVD, and some mentioned that they thought it did provide a competitive threat (FCC (2012c)). Before analyzing these claims, it is important to distinguish between types of video content. While there is a large amount of short-form and web-only video that will likely serve as a weak substitute for programming provided on pay-television platforms, like the FCC I will focus my analysis on video content that is similar to that professionally-produced and exhibited by broadcast and cable networks and created using professional-grade equipment and talent.

While there is not yet empirical evidence on this point, economic theory suggests the effects of professionally-produced online video in both the short- and long-run will largely be complementary. The reason is that the only entities that have the expertise and scale to produce content like that currently produced by broadcast and cable networks are those networks. While many such networks have been aggressive in exploring online video distribution, they have uniformly been doing so in ways that protect their existing revenue streams from traditional MVPDs (e.g. authentication methods like those used by TV Everywhere and/or delays in making available programming online that is also distributed via traditional channels). In practice, online-video distribution serves as a form of third-party "mixed bundling": content providers sell via a MVPD bundle to the majority of their viewers, but offer online viewing either (for free) as a way to enhance the value of the traditional bundle (TV Everywhere) or (for pay) on an à la carte basis to those few viewers who value highly online consumption and/or do not purchase an MVPD bundle. Of course, some OVDs (e.g. Netflix) are seeking to disrupt this business model by licensing *original content* in direct competition with traditional programmers, but this strategy is in its infancy and it is very uncertain if it will be successful.

The ability of OVDs to compete directly with traditional MVPDs is further complicated by foreclosure concerns. Online video distributors must necessarily rely on a high-speed broadband connection to households in order to deliver their programming, the vast majority of which are also owned by existing cable or telco MVPDs. There are legitimate concerns that MVPDs will somehow manipulate their broadband networks in ways that disadvantage rival OVDs, perhaps by offering differential download speeds for rival online content, imposing data caps that lower the value of an Internet-delivered video service, or setting usage-based prices with similar effects. Furthermore, it is hard to determine if such strategies are anti-competitive, as they can also help MVPDs efficiently manage their network traffic. Netflix has complained that AT&T, Comcast, and Time Warner have pursued strategies that disadvantage OVDs and lawmakers are concerned about this issue.

The market for online video distribution is in its infancy, so appropriate policies are difficult to determine. More empirical research establishing some basic facts about the nature of traditional

and online television substitutability, measuring the incentives to foreclosure, and distinguishing between efficient and foreclosing MVPD management practices would be welcome.

7.4 Bargaining breakdowns

A final topic of growing interest among policymakers is the growing number of bargaining breakdowns that result in channel blackouts on affected MVPDs. Section 3.3 documented blackouts arising from retransmission consent negotiations, but similar disagreements also arise for cable programming networks. Why do breakdowns happen? What are the welfare costs? Is this a market failure? And is there an appropriate public policy response? I briefly discuss each of these points in this section.

Standard bargaining theory assumes each side of a negotiation has complete information about the gains from trade and each party's threat position. In practice, of course, there can be uncertainty about these matters and this uncertainty can influence each party's demands and willingness to accede to the other party's demands. This is particularly relevant when there is a shift in the market from historical patterns of contracting, as when broadcasters began demanding cash payments for retransmission consent in the late 2000s.

It is uncertain what are the welfare costs from such breakdowns. Most are short-lived, e.g. measured in days, and there is are no good measures of the welfare costs of such temporary interruptions. It is also uncertain if this is a market failure. Parties on both sides of carriage negotiations have market power (hence the use of a bargaining framework) and the high costs of both developing programming and distributing that programming on a scale comparable to existing MVPDs suggest there is little policymakers can do about that market power.

Policy proposals advocated in the trade press largely focus on a binding arbitration procedure. This could work for national programming as an independent arbitrator could likely obtain access to contracts reached in settings comparable to the one being disputed. It would work less well for local or regional (broadcast and/or RSN) programming due to the lack of directly comparable settings, but is something that could be considered. Before any such policy is adopted, however, further research is needed about whether the situation demands a regulatory response and, if so, what would be the optimal such response.

8 Conclusion

This chapter surveys the consequences of economic regulation in the cable television industry and evaluates the impact of competition from satellite and telephone company providers on potential

market failures in the industry. Prospects for efficient outcomes in the distribution market look better than ever. Satellite and telco competition has largely replaced price regulation as the constraining force on cable pricing and driving force for innovative services, a welcome outcome given the empirical record on regulation's effects in cable markets. While prices continue to rise, so too does quality and it may be that (most) consumers are better off. Mandatory à la carte, while superficially appealing, is not likely to improve average consumer welfare and could significantly decrease it.

If price and "choice" regulation is not likely to be effective at improving consumer welfare in video markets, what then should policymakers do? This is a difficult question. Owners of valuable content (sports leagues, movie studios) necessarily have market power. The media conglomerates that program that content and the cable systems that distribute it do as well. The immense time and expense required to enter any of these markets is a significant barrier to entry, as are consumer switching costs in distribution (Shcherbakov (2010)).

That being said, some basic principles can help guide policymaking in video markets. Legislative and regulatory efforts should focus on lowering barriers to entry throughout the video supply chain. For example, the combination of national franchising standards and widespread low-cost access to public rights-of-way would lower the cost of additional wireline entry in distribution. Similarly, additional electromagnetic spectrum for fixed or mobile broadband would facilitate wireless entry and increase the capacity available for online video distribution. Standardized set-top boxes, if technically feasible, would lower consumer switching costs and increase market competitiveness. Policy initiatives in these directions would be useful.

At the same time, the competition regulators should keep a close eye on the potential anti-competitive effects of tying and bundling in the programming market as well as the risks associated with vertical integration and foreclosure in programming and both traditional and online video distribution. No one knows what the video market will look like 15 years from now. It is important that those with the most to lose do not leverage their influence to distort that evolution.

Notes

[1]So-called cable networks earned their name by having originally been available only on cable.

[2]In the last 10 years, premium networks have begun "multiplexing" their programming, i.e. offering multiple channels under a single network/brand (e.g. HBO, HBO 2, HBO Family, etc.).

[3]In 2010, non-video services, largely Internet and telephone services, contributed 37.1% of cable operators revenue (FCC (2012c)).

[4]A Digital Video Recorder is a device that allows households to record video to a hard drive-based digital storage medium.

[5]As this chapter goes to press, Dish has introduced an "app" to rave reviews that allows access to all of their content on mobile devices (Roettgers (2013)).

[6]See Foster (1982, Chapter 5) and Noll, Peck, and McGowan (1973) for a survey of the history of broadcast television and its regulation.

[7]2 FCC 2d at 782 as cited in Besen and Crandall (1981, p.90).

[8]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.

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

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

[11]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 (47 CFR 76.905).

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

[13]See, e.g., FCC (1998d, p.6) describing the FCC's social contract with Time Warner. In it, Time Warner was permitted to increase its Expanded Basic prices 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.

[14]America's Talking became MSNBC in 1996. CBS lacked any affiliated networks in the initial Retransmission Consent negotiations but used them to launch Eye on People in 1996.

[15]See `http://www.americantelevisionalliance.org/blog/` for details.

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

[17]Comcast, Time Warner, Cox, and Cablevision among cable MSOs; News Corp/Fox, Disney/ABC, Viacom/CBS, and GE/NBC among broadcasters. In 2011, Comcast purchased GE/NBC, further consolidating the market.

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

[19]In the case of cable systems, the licenses to be transferred are the cable television relay service license that "are essential to the operation of the [firm]" (FCC (2001b)).

[20]Note that the FCC's merger review process is in addition to that required by competition law: any merger between firms of a given size (roughly sales or assets of $50 million) must be approved by the federal antitrust authorities, the Department of Justice or the Federal Trade Commission, under the Clayton Act.

[21]This condition had been agreed to in advance by the companies (Feder (2002)).

[22]Many early cable franchise agreements were exclusive within a given municipality. The 1992 Cable Act forbid exclusivity.

[23]This was viewed in part as a defensive response to cable entry into local telephone service.

[24]They particularly objected to build-out requirements, especially if they don't overlap with their service area.

[25]In 2006, EchoStar (Dish Network) provided broadcast programming in about 160 television markets and DirecTV about 145.

[26]At this time, EchoStar does not own significant programming interests and is not subject to programming rules.

[27]The cable series began including satellite services in the late 1990s. In principle, it has also included satellite radio since 2003, although as of October 2005 no satellite radio data had been sampled.

[28]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 tiers of service.

[29]Consistent with conventional wisdom, this suggests new networks charge lower average prices than established networks. Indeed, new networks often pay systems (i.e. charge negative prices) for a period of years before becoming established and negotiating positive fees.

[30]Subscribers to Premium Networks are often called "Pay Households". Total subscriptions to Premium Networks are often called "Pay Units".

[31]This concern was driven by differential regulatory treatment of different tiers in the various regulatory periods. The 1992 Act in particular introduced a split regulatory structure, with local franchise authorities given authority to regulate rates of Basic service and the FCC given authority to regulate rates of Expanded Basic services. Some estimates of total subscribers to Expanded Basic Services fell after the 1984 Cable Act and increased again after the 1992 Act (GAO (1989), GAO (1991), Hazlett and Spitzer (1997)).

[32]Previous to 1999, the vast majority of cable systems did not face competition in their local service areas. Even after satellite entry in 1999, because satellite systems choose price and quality on a national basis, existing cable systems can be modeled as monopolists on the "residual demand" given by demand in their local market less those subscribers attracted (at each cable price and quality) to national satellite providers (Crawford, Shcherbakov, and Shum (2011)).

[33]Crawford, Shcherbakov, and Shum (2011) attempt to estimate the relative importance of market power over quality and market power over price in cable television markets.

[34]With more types and products, there is a marginal/inframarginal tradeoff in optimal price and quality choice:

marginal profit losses from degrading quality for any product against inframarginal profit gains on higher prices for *all* higher qualities.

[35]The effect on low types is the opposite. The firm cannot extract as much surplus from high types with a price cap. This relaxes the incentive compatibility constraint for high types, reducing the incentive to degrade quality to low types. As such, quality and prices actually rise for low-quality goods.

[36]Recall that prices for Premium Services may not and have never been regulated (cf. Section 3.1).

[37]For example, see the sample statistics for 1995 data in Crawford and Shum (2007). Furthermore, Basic Services are the most important offered by cable systems, providing five times the revenue of (unregulated) Premium Services (NCTA (2005d))

[38]Other dimensions that matter, albeit less, include customer service, signal reliability, and advanced service offerings.

[39]Such "event study" techniques were first applied to analyze the impact of regulation by Schwert (1981), Binder (1985), and Rose (1985).

[40]This is not surprising given the nature of the cable regulation over time. Local and state price regulations (prior to 1984) and federal price 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 price controls. Corts (1995) and Crawford (2000) provide further theoretical and empirical support for this view.

[41]Some authors have attributed such findings to evidence of rent-seeking by local franchise authorities (Hazlett (1986b), Zupan (1989b)).

[42]See Crawford and Shum (2007) for a representative discussion of this issue.

[43]See the citations in Bresnahan (1989) for an extensive bibliography. Berry and Pakes (1993) and Nevo (2000) are more recent applications.

[44]Much of the presentation in this section follows Bresnahan (1989).

[45]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) apply these tools in the cable industry.

[46]This can introduce difficult identification issues as it may be hard to differentiate between price increases due to diseconomies of scale and those due to increased exercise of market power. Bresnahan (1989) discusses this issue in detail.

[47]A similar approach underlies the method of Conjectural Variations. Despite lacking a sound theoretical foundation, the approach has been used to measure market power in oligopoly settings. See Bresnahan (1989) for more.

[48]Of course, this assumes there are good observable measures of product quality, q_n. This must be evaluated on a case-by-case basis.

[49]While conceptually simple, implementing the framework described above can be quite difficult in practice. Difficult identification issues arise in each of the papers surveyed below, casting at least some doubt on their conclusions. Where possible, I note these concerns.

[50]Unfortunately, the paper lacks a clear discussion of identification. Estimation is "by two-stage least squares", but the motivation for the exclusion restrictions that identify the key parameters is missing.

[51]In reduced form regressions, the level and shape of the distribution of household income, age, and size were important determinants of cable prices and quality.

[52]The 1992 Cable Act, in addition to regulating prices, required systems to offer a Basic Service containing all offered broadcast and public, educational, and government channels. Many systems introduced "bare-bones" Limited Basic Services as a consequence of those terms. The authors' results suggest this and not price caps had a greater effect on offered service quality in cable markets.

[53]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. 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.

[54]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.

[55]Care should be taken relying on welfare measures from logit demand systems, particularly when evaluating the introduction of new products (Petrin (2003)). Crawford (2000) argues that this concern is moderated in his case because of the popularity of the newly introduced services.

[56]For example, that the average number of networks increased by approximately 2 from 1992 to 1995 suggests limited welfare gains to households; that on average 1.5 of those 2 were top-20 networks suggests the opposite conclusion. Furthermore, many systems were alleged to have moved their most popular programming to unregulated tiers of service in response to the Act and he can measure that effect.

[57]Hazlett and Spitzer (1997, Table 3-3) summarize the findings of these and a number of other studies in the 1980s and early 1990s. Across a variety of datasets, duopoly cable markets are associated with prices 8%-34% lower than monopoly cable markets.

[58]"Price" here equals price for Basic Service, Expanded Basic Service, and equipment.

[59]Because of this definition, some care should be taken interpreting the results in this table too broadly. While, for example, the national satellite market share has been above 15% since 2001, the share of subscribers in the 2004 price survey served by cable systems that have been granted a finding of effective competition due to satellite competition was only 2.35% (FCC (2005a, Attachment 1)).

[60]The GAO studies appear to use homes passed and system age as instruments for satellite share, but it's hard to see how these would be appropriate instruments. If correlated with satellite share due to differences across markets in offered cable service quality, they should also be correlated with cable prices and belong in the cable price regression.

[61]Strictly speaking, they regress cable prices on the mean utility for satellite service. This can be considered a measure of the satellite market share.

[62]This approach, while promising, relies heavily on the assumed functional forms for demand and pricing equations.

[63]For example, an own-price elasticity of -1.5 would imply a markup of 67% in the case of a single-product monopolist.

[64]An exception perhaps being incumbent telco entry in their service areas not currently being provided video service.

[65]Note such and measures are most relevant than the programming market. Incumbent cable systems do not strictly he each other.

[66]Some bargaining models yield predictions contrary to this conventional wisdom. For example, Chipty and Snyder (1999) conclude that increased concentration can actually reduce a MVPDs bargaining power, as they estimate the size of the surplus to be split between a cable system and a programming network depends on the shape of the network's gross surplus function. They estimate this on 136 data points in the 1980s and early 1990s and find it is convex, implying it is better to act as two small operators than one big one. This convexity seems at odds both with the institutional relationship between network size and advertising revenue (which limits the ability of networks to obtain advertising revenue at low subscriber levels) as well as claims made by industry participants and observers of the benefits of increased size. Similarly, Raskovich (2003) builds a bargaining model with a pivotal buyer, one with whom an agreement is necessary for a seller's viability, and finds that 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. This can reduce the incentives to merge if merging would make a buyer pivotal. While interesting and potentially relevant in some settings, this doesn't seem to accurately describe the nature of most negotiations between networks and MVPDs.

[67]These were 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).

[68]These were 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).

[69]These values have only increased since then due to the merger of Comcast with NBC/Universal in 2011.

[70]See also Waterman and Weiss (1997) for the impact of integration on carriage of basic cable networks.

[71]In 2004, Insight Communications estimates 2/3 of its 1 million customers did not use a converter (FCC (2004a, p. 39)). By contrast, all satellite subscribers must have a digital receiver/converter. Many larger cable systems are migrating towards all-digital systems, particularly in large markets, but the process is ongoing.

[72]Furthermore, no paper in the literature accounts for the influence bundling may have on the quality of programming chosen by networks. It is possible to articulate scenarios where bundling encourages firms to offer program quality closer to what a social planner would offer than would be the case under à la carte and that moving to an à la carte world could have important welfare effects due to reductions in the resulting quality of programming.

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Table 1: Growth Rates in Cable and Satellite Prices by Period

Period	Cable and Satellite CPI	Nondurable CPI	Difference
12/86 - 4/93	8.99	4.38	4.61
5/93 - 11/94	-2.34	1.11	-3.45
12/94 - 12/05	5.07	2.50	2.57
1/06 - 11/12	2.42	3.09	-0.67

Source: Bureau of Labor Statistics

Table 2: Growth Rates in MVPD Subscribers by Period

Period	Cable Subscriber CAGR	Satellite Subscriber CAGR	Telco Subscriber CAGR	Total Total Industry CAGR
1987-1993	5.0			5.1
1994-1995	4.2			5.9
1996-2005	0.5	29.0		3.8
2006-2010	-1.7	3.5	87.2	1.3

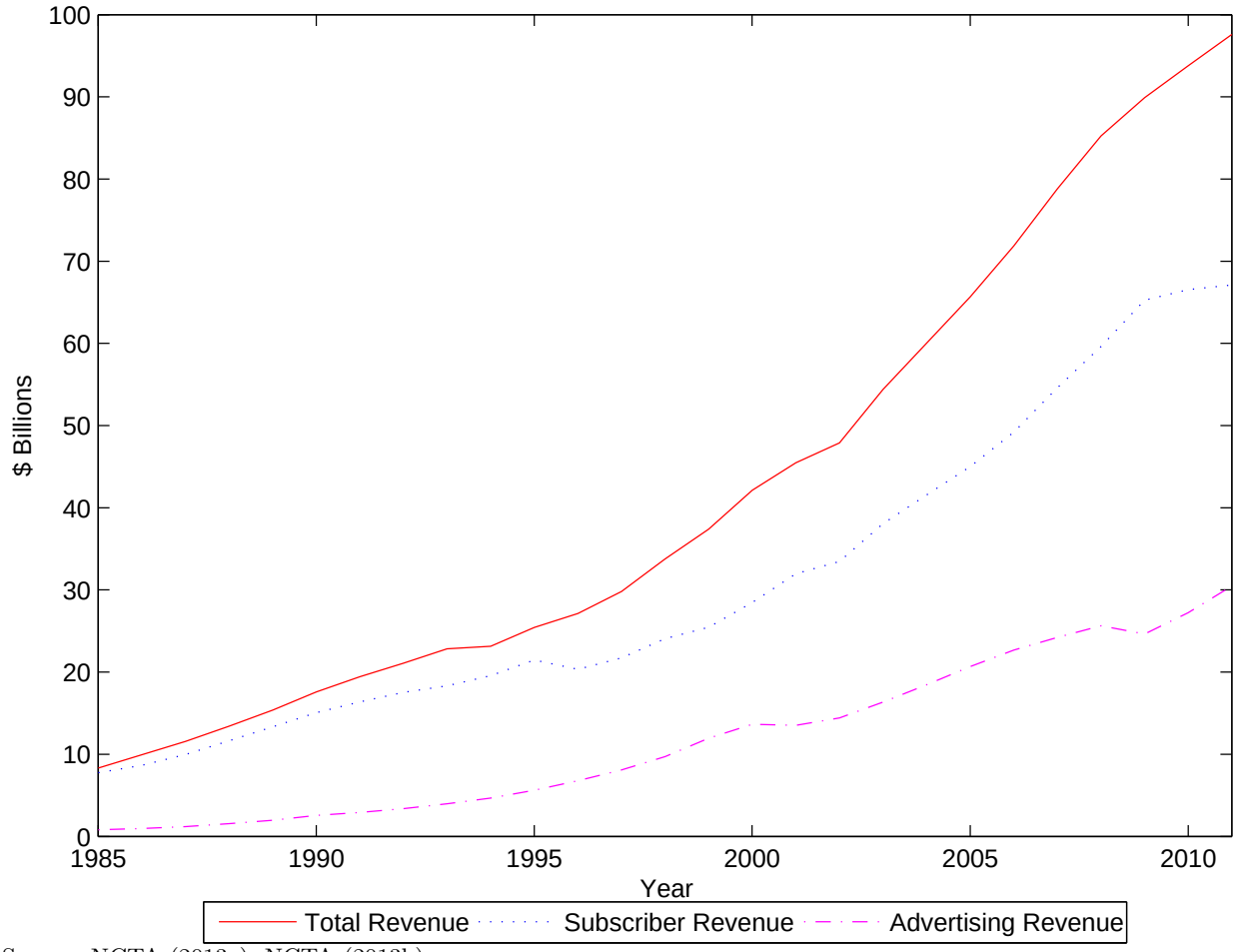
Source: FCC (2001c), FCC (2002b), FCC (2002c), FCC (2004b), FCC (2005b), FCC (2006c), FCC (2009b), FCC (2012c)

Table 3: Advanced Cable Services

	Digital Programming		Broadband Access		Telephone Service	
Year	Percent Offered	Percent Subscribed	Percent Offered	Percent Subscribed	Percent Offered	Percent Subscribed
1998	16.8	2.1	19.3	0.8		0.2
1999	30.0	7.3	26.6	2.2		0.4
2000	58.1	12.8	45.4	6.0		1.5
2001	77.6	21.7	70.8	10.9		2.2
2002	88.3	29.0	69.8	17.4		3.8
2003		34.1		25.0		4.5
2004	97.3	38.4	94.8	31.8		5.7
2005		43.6		38.8		9.0
2006		49.9		44.3		14.5
2007		57.2		55.0		23.0
2008		63.4		61.7		30.8
2009		68.6		67.3		35.7
2010		74.7		74.2		40.0

Source: FCC (1999), FCC (2000a), FCC (2001a), FCC (2002a), FCC (2003), FCC (2005a), NCTA (2005b), FCC (2006a), FCC (2009a), FCC (2011), FCC (2012a), FCC (2012b).

Figure 1: Cable Industry Revenue, 1985-2011



Source: NCTA (2013a), NCTA (2013b).

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
2005	$47.71	$40.23	$47.76	70.3	73.9	70.2	0.68	0.54	0.68
2006	$50.29	$42.91	$51.37	70.6	74.9	73.9	0.71	0.57	0.70
2007	$51.66	$47.19	$52.11	72.5	75.5	72.3	0.71	0.63	0.72
2008	$53.72	$49.40	$53.36	72.8	76.1	72.4	0.74	0.65	0.74
2009	$55.55	$56.85	$57.43	77.7	85.8	77.4	0.71	0.66	0.74
2010	$57.59	$58.54	$59.29	111.6	138.0	125.4	0.52	0.42	0.47
2011	$60.47	$61.17	$63.97	120.4	130.7	129.9	0.50	0.47	0.49
	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
2005		-15.7	0.1		5.1	-0.1		-19.8	0.2
2006		-14.7	2.1		6.1	4.7		-19.6	-2.4
2007		-8.7	0.9		4.1	-0.3		-12.3	1.2
2008		-8.0	-0.7		4.5	-0.5		-12.0	-0.1
2009		2.3	3.4		10.4	-0.4		-7.3	3.8
2010		1.6	3.0		23.7	12.4		-17.8	-8.4
2011		1.2	5.8		8.6	7.9		-6.8	-1.9
2001-2011 Average		-7.8	0.1		6.2	0.1		-12.9	0.4

Source: FCC (2000a), FCC (2001a), FCC (2002a), FCC (2003), FCC (2005a), FCC (2006a), FCC (2009a), FCC (2011), FCC (2012a), FCC (2012b)

Table 5: MVPD Subscribers

	Subscribers (millions)				Share of MVPD Subscribers		
Year	Cable	Satellite	Telco	Total MVPD	Cable	Satellite	Telco
1993	57.2	0.1		57.3	99.8	0.2	
1994	59.7	0.6		60.3	99.0	1.0	
1995	62.1	2.2		64.3	96.6	3.4	
1996	63.5	4.3		67.8	93.7	6.3	
1997	64.2	5.0		69.2	92.8	7.2	
1998	65.4	7.2		72.6	90.1	9.9	
1999	66.7	10.1		76.8	86.8	13.2	
2000	66.3	13.0		79.3	83.6	16.4	
2001	66.7	16.1		82.8	80.6	19.4	
2002	66.5	18.2		84.7	78.5	21.5	
2003	66.1	20.4		86.5	76.4	23.6	
2004	66.1	23.2		89.3	74.0	26.0	
2005	65.4	26.1		91.5	71.5	28.5	
2006	65.3	28.0	0.3	93.6	69.8	29.9	0.3
2007	64.9	30.6	1.3	96.8	67.0	31.6	1.3
2008	63.7	31.3	3.1	98.1	64.9	31.9	3.2
2009	62.1	32.6	5.1	99.8	62.2	32.7	5.1
2010	59.8	33.3	6.9	100.0	59.8	33.3	6.9

Source: FCC (2001c), FCC (2002b), FCC (2002c), FCC (2004b), FCC (2005b), FCC (2006c), FCC (2009b), FCC (2012c)

Table 6: Concentration in the MVPD Market

	1992		1997		2000	
Rank	Company	Market Share	Company	Market Share	Company	Market Share
1	TCI	27.3	TCI	25.5	AT&T	19.1
2	TimeWarner	15.3	TimeWarner	16.0	TimeWarner	14.9
3	Continental	7.5	MediaOne	7.0	DirecTV	10.3
4	Comcast	7.1	Comcast	5.8	Comcast	8.4
5	Cox	4.7	Cox	4.4	Charter	7.4
6	Cablevision	3.5	Cablevision	3.9	Cox	7.3
7	TimesMirror	3.3	DirecTV	3.6	Adelphia	5.9
8	Viacom	3.1	Primestar	2.4	EchoStar (Dish)	5.1
9	Century	2.5	Jones	2.0	Cablevision	4.3
10	Cablevision	2.5	Century	1.6	Insight	1.2
	Top 4	57.2	Top 4	54.3	Top 4	52.7
	Top 8	71.8	Top 8	68.6	Top 8	78.4
	Top 25	—-	Top 25	84.9	Top 25	89.8

	2004		2007		2010	
Rank	Company	Market Share	Company	Market Share	Company	Market Share
1	Comcast	23.4	Comcast	24.7	Comcast	22.6
2	DirecTV	12.1	DirecTV	17.2	DirecTV	19.0
3	TimeWarner	11.9	EchoStar (Dish)	14.1	EchoStar (Dish)	14.0
4	EchoStar (Dish)	10.6	TimeWarner	13.6	TimeWarner	12.3
5	Cox	6.9	Cox	5.5	Cox	4.9
6	Charter	6.7	Charter	5.3	Charter	4.5
7	Adelphia	5.9	Cablevision	3.2	Verizon FiOS	3.5
8	Cablevision	3.2	Bright	2.4	Cablevision	3.3
9	Bright	2.4	Suddenlink	1.3	AT&T Uverse	3.0
10	Mediacom	1.7	Mediacom	1.3	Bright	2.2
	Top 4	58.0	Top4	69.6	Top4	68.0
	Top 8	80.7	Top8	86.0	Top8	84.0
	Top 25	90.4	Top 25	—-	Top 25	—-

Source: FCC (1997), FCC (1998c), FCC (2001c), FCC (2005b), FCC (2012c)

Figure 2: The Multichannel Video Programming Industry

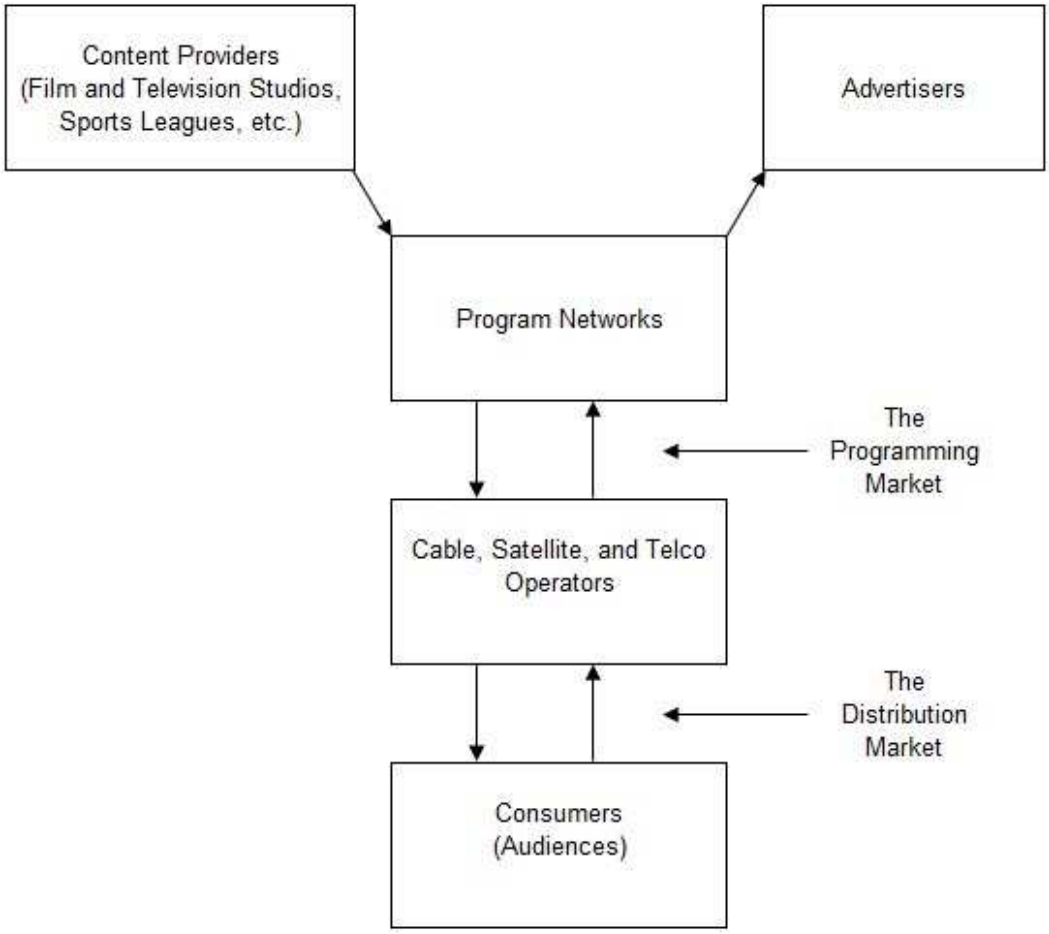
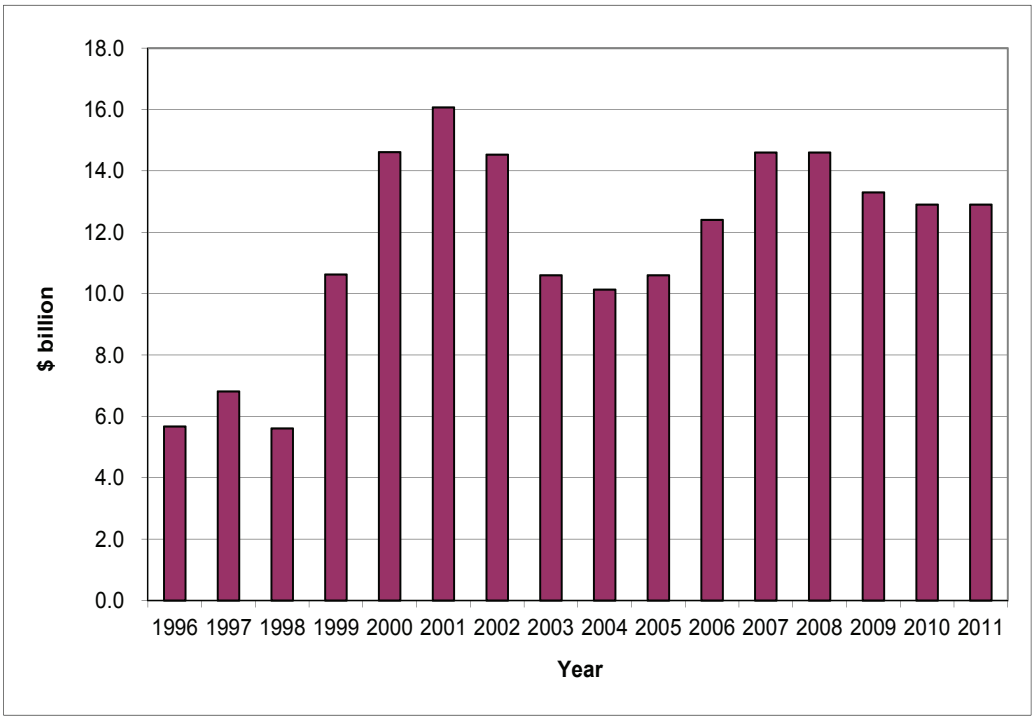
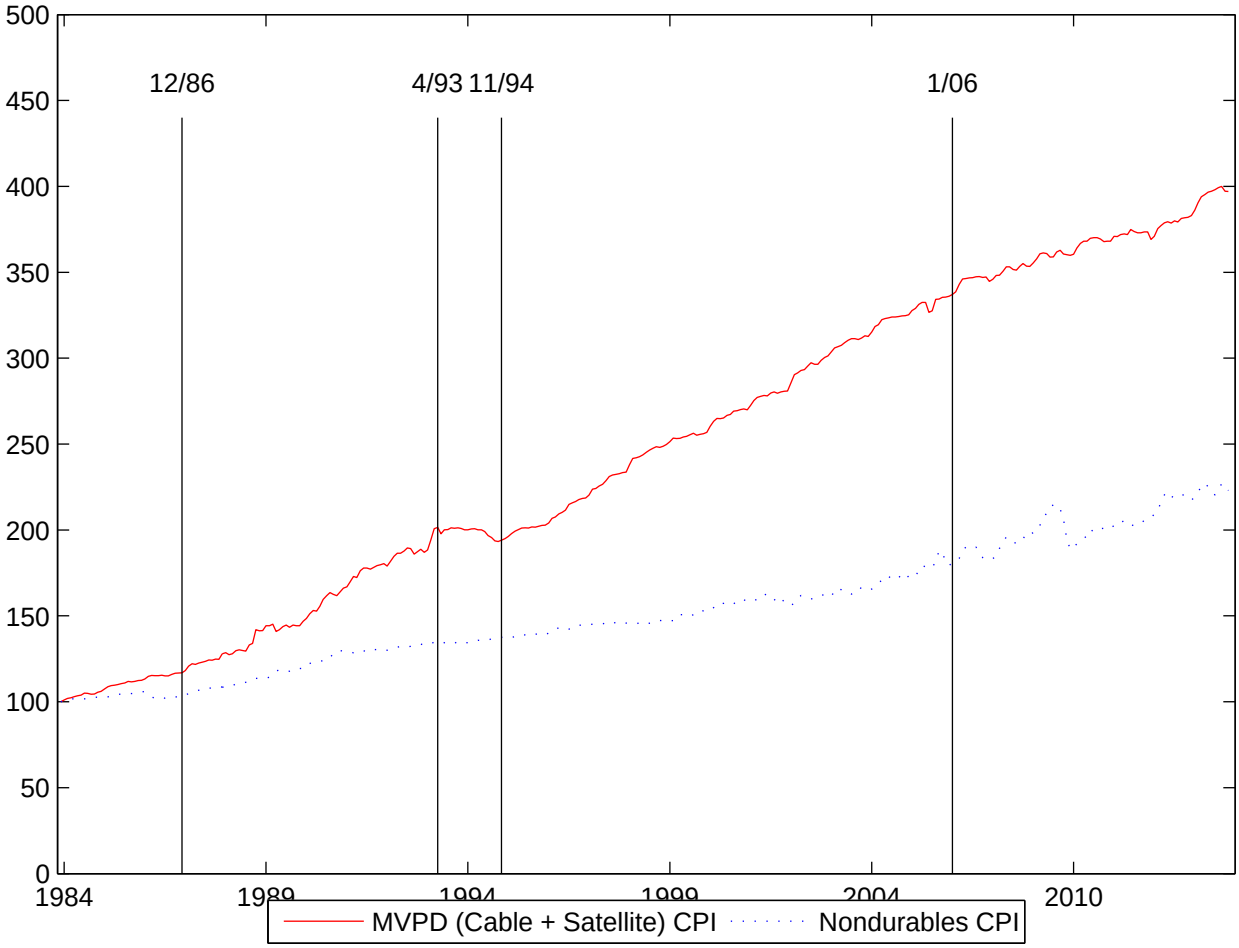


Figure 3: Cable Industry Infrastructure Investment, 1996-2011



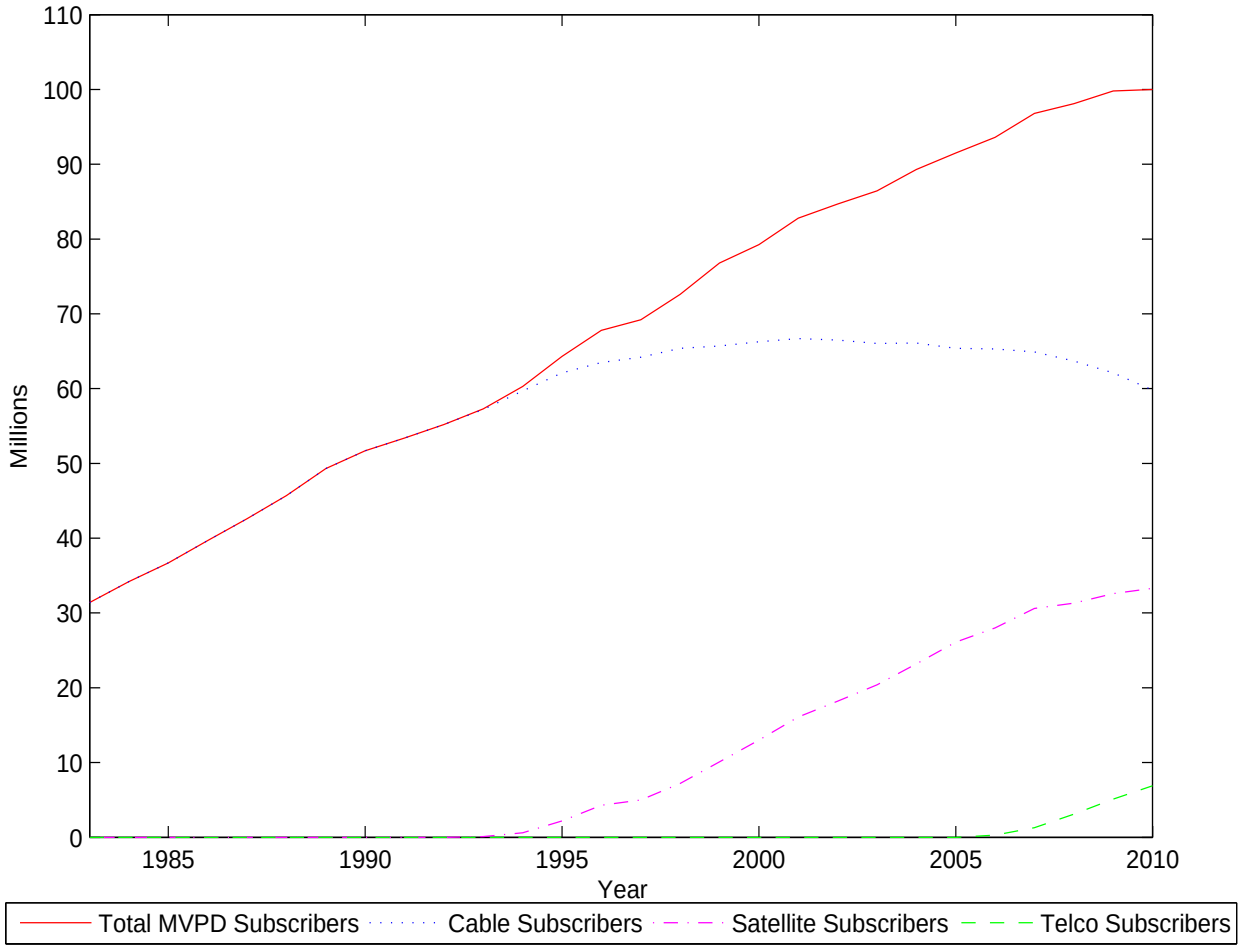
Source: NCTA (2013c).

Figure 4: MVPD (Cable + Satellite) Prices, 1983-2012
December 1983 = 100



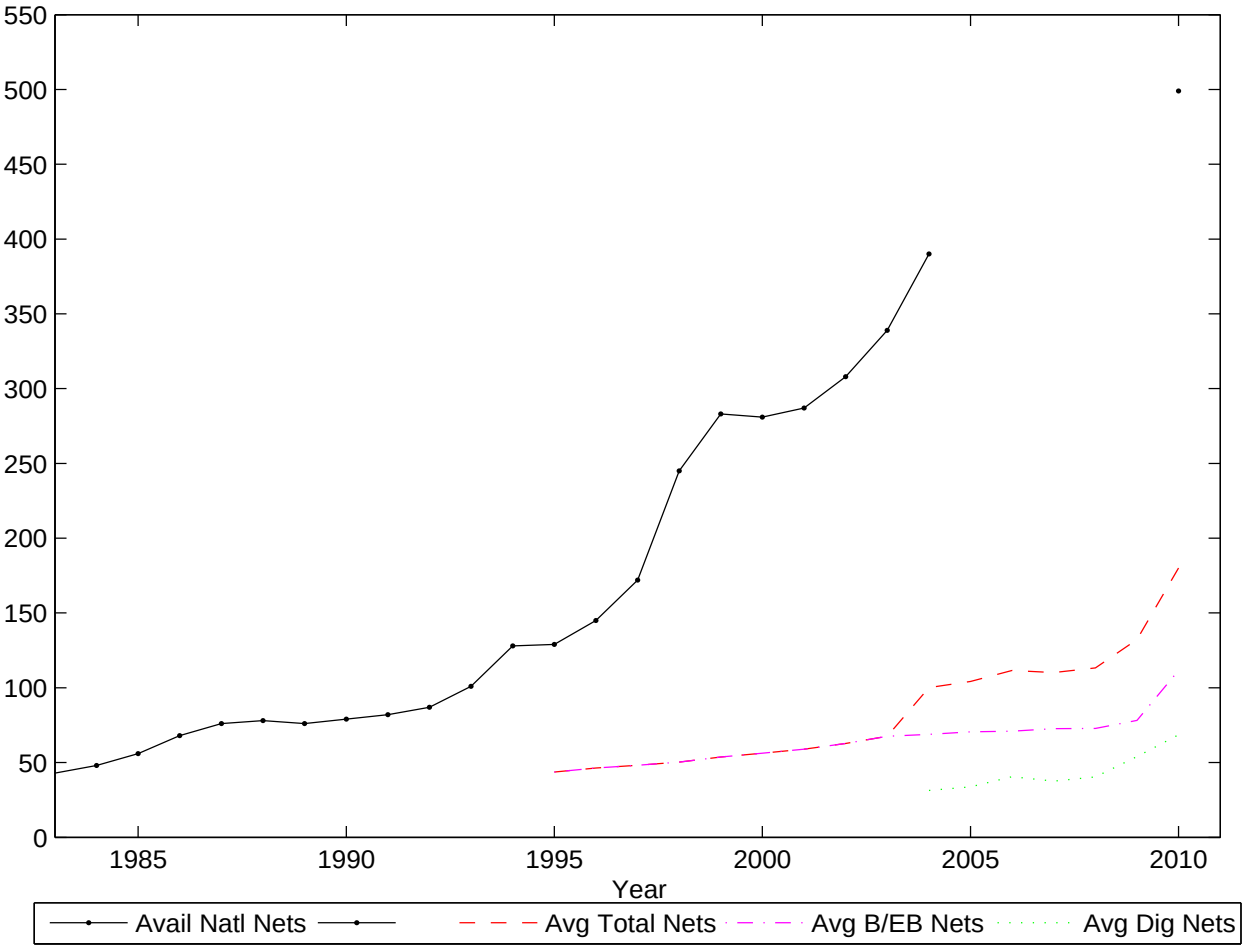
Source: Bureau of Labor Statistics.

Figure 5: MVPD Subscribers, 1983-2010



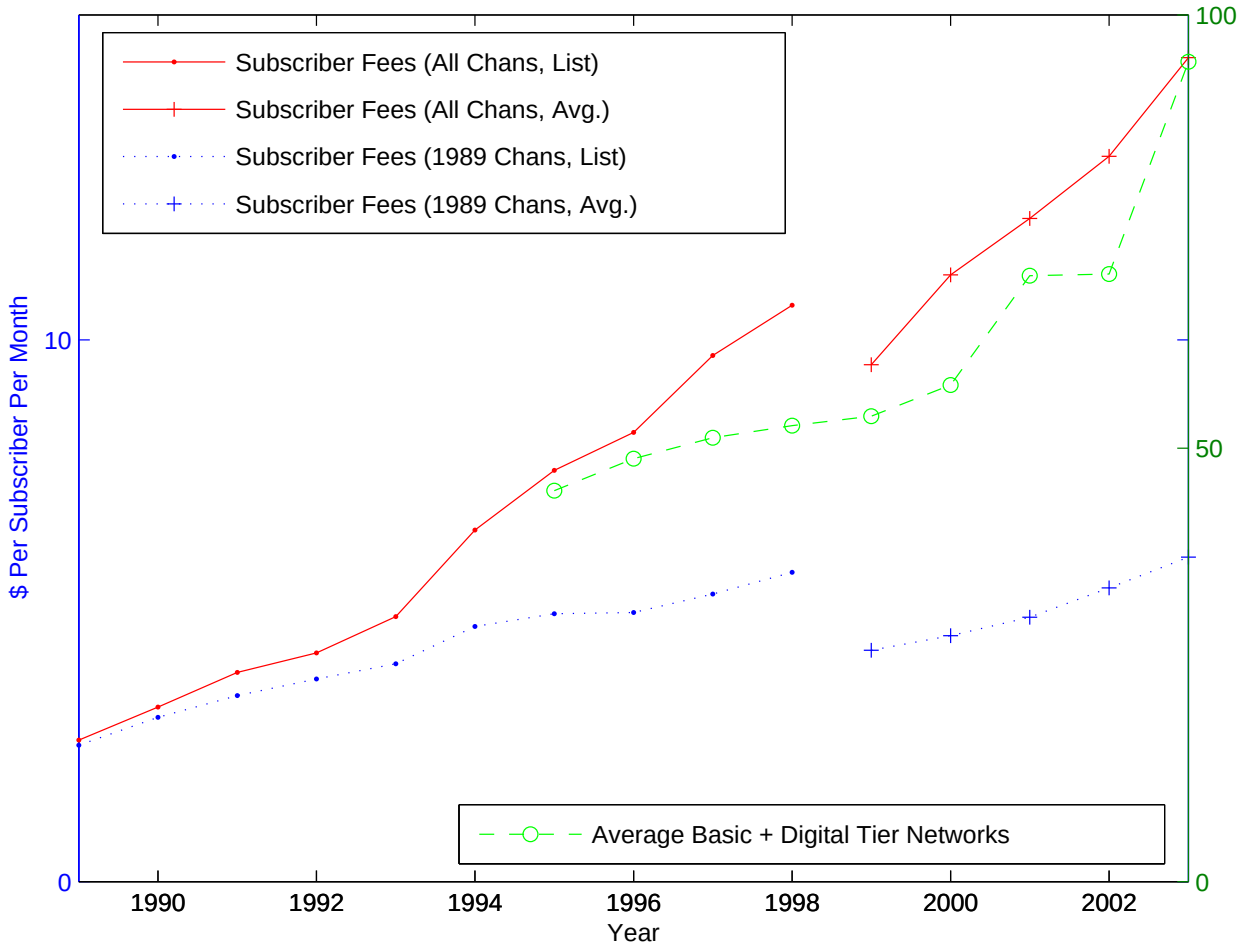
Source: Hazlett and Spitzer (1997), FCC (2001c), FCC (2004b), FCC (2005b), FCC (2006c), FCC (2009b), FCC (2012c)

Figure 6: Cable Programming Network Availability and Carriage, 1975-2004



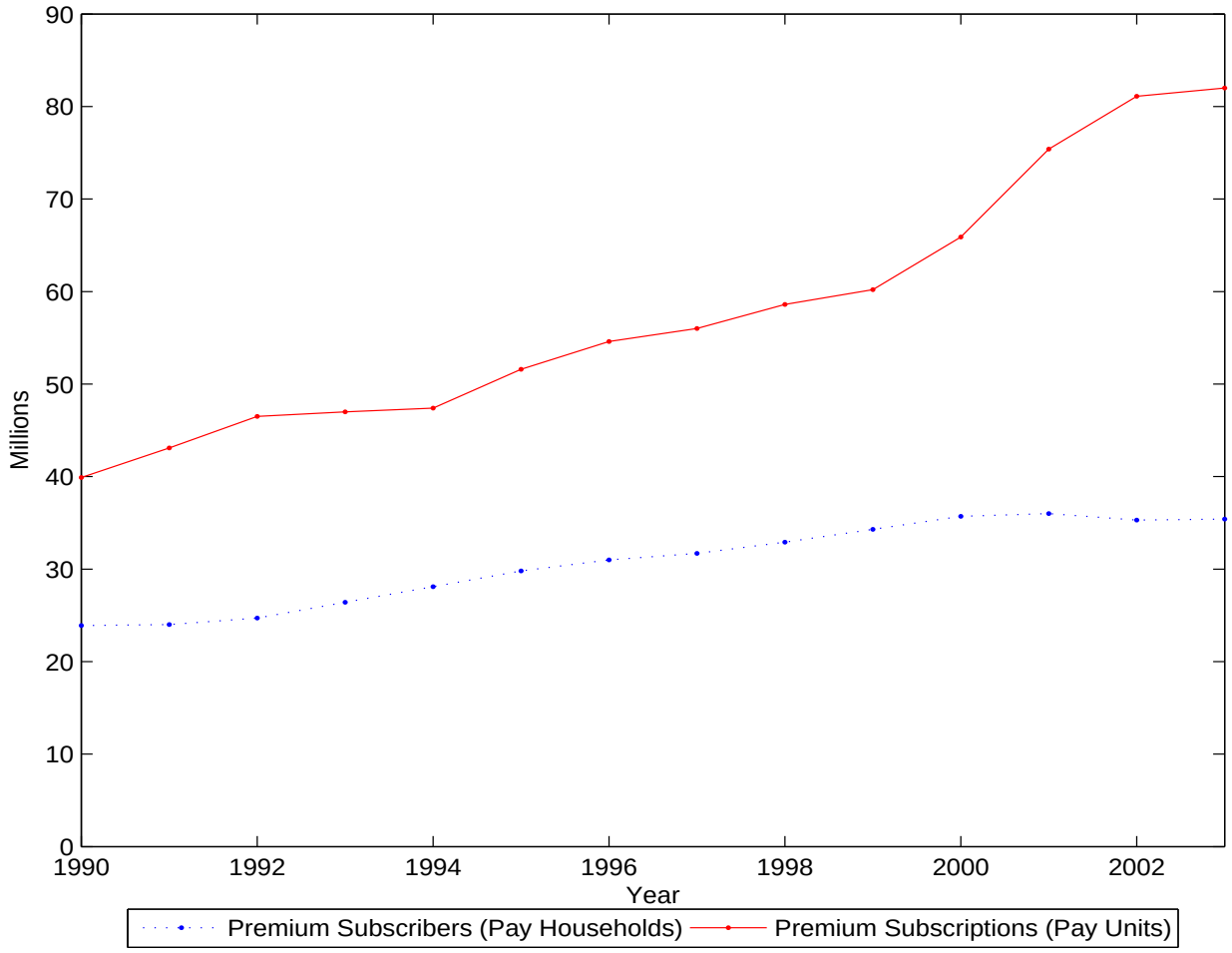
Source: Hazlett and Spitzer (1997, p.96), FCC (1998a), FCC (1999), FCC (2000a), FCC (2001a), FCC (2002a), FCC (2003), FCC (2005a), NCTA (2005c)

Figure 7: Cable Programming Network Cost, 1989-2003



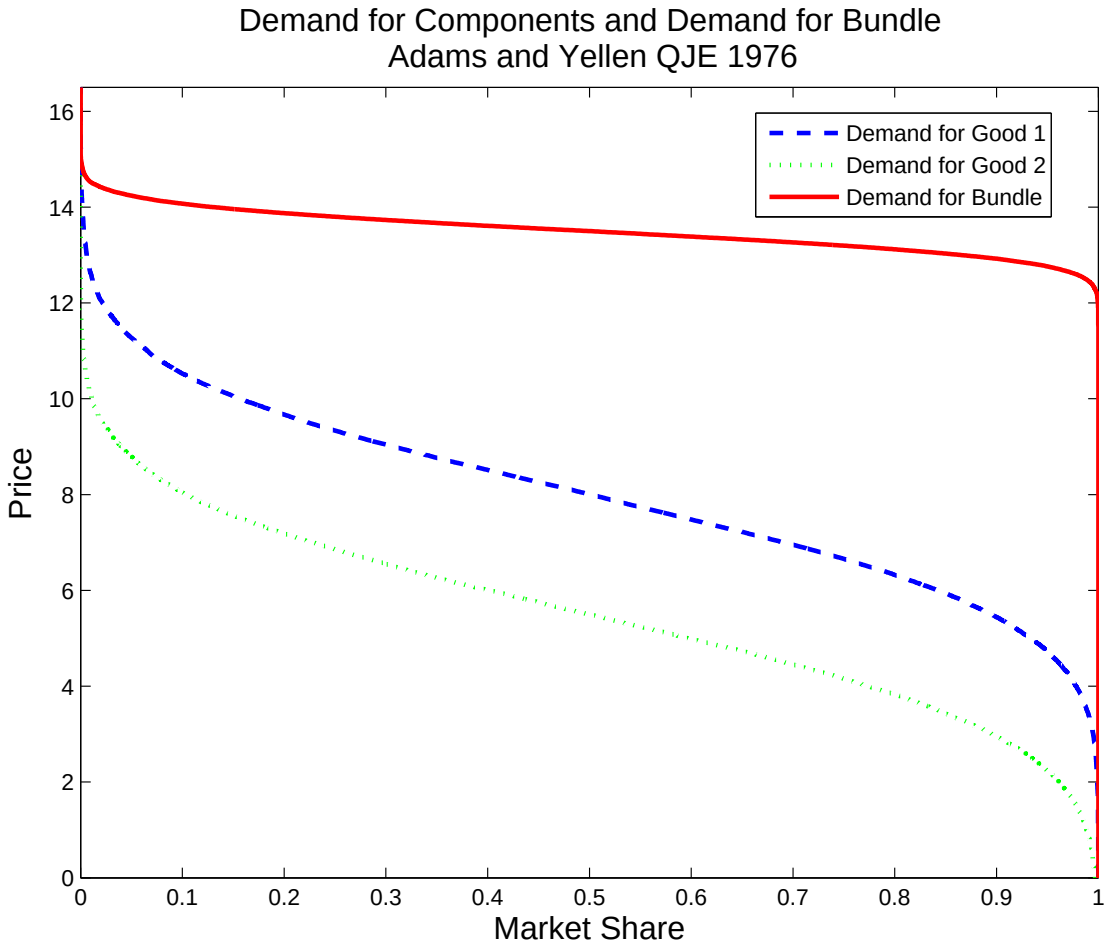
Source: Kagan World Media (1998), Kagan World Media (2004), Hazlett and Spitzer (1997)

Figure 8: Premium Subscribers and Subscriptions, 1990-2003



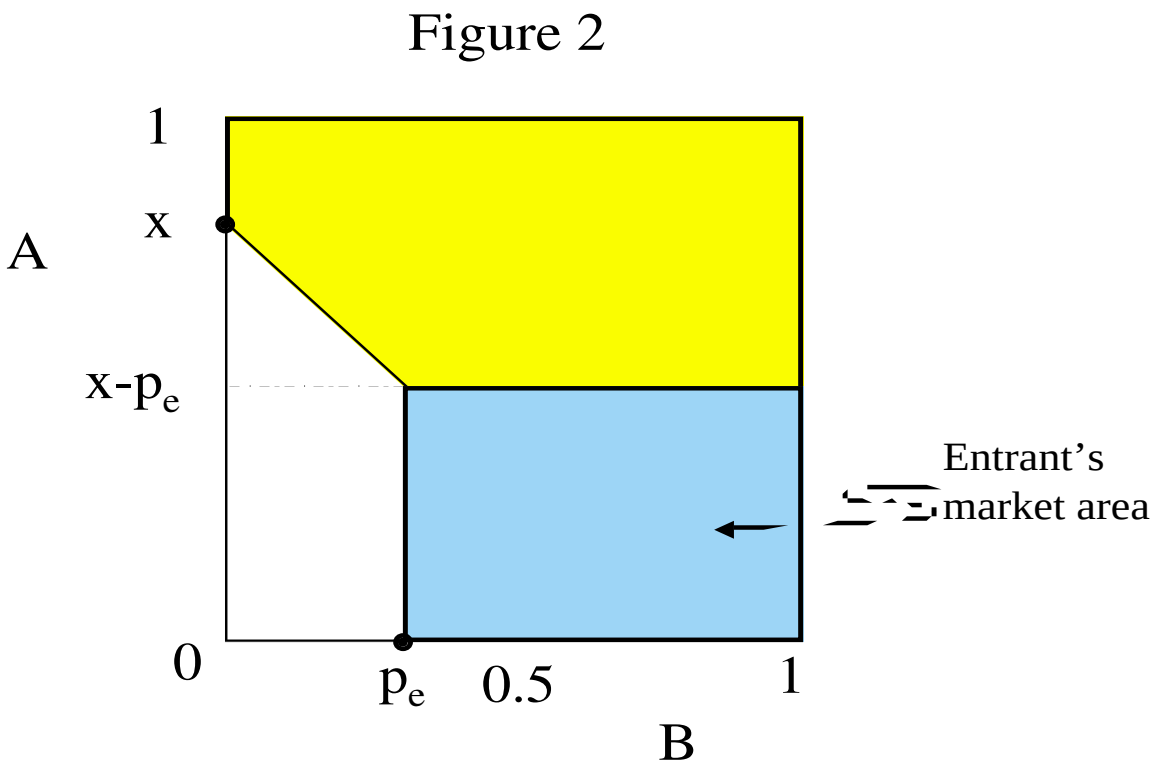
Source: FCC (1998b), FCC (2004b), FCC (2005b)

Figure 9: Bundling versus Component Sales: An Example



Source: Adapted from Adams and Yellen (1976).

Figure 10: Bundling to Deter Entry



Source: Nalebuff (2004).