

The Future of Online Video: An Economic and Policy Perspective¹

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Abstract

We explore the economics of the online video entertainment industry to provide a foundation for understanding its economic future and how regulation may affect it. We first document recent development of online video, including market structure, prevailing programming windows, and content aggregation patterns. In spite of its remarkable efficiencies, we identify four potential obstacles to online video's future growth: competition from increasingly efficient MVPDs, including advantages they have in large scale aggregation of online content via "TV Everywhere" (TVE) services; limited availability of high quality content, especially windowed programming; limited development of successful online business models, especially advertising; and ISP pricing strategies that may raise effective consumer prices of video consumption. In support of our analysis of TVE, we report original research on the "authentication" (of an MVPD subscription) policies of major cable and broadcast programming networks. In conclusion, we discuss the role that FCC regulation or other government policies can play to ensure future competition and open entry in the online video industry.

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I. Introduction

Over the past decade, as both broadband adoption by consumers and Internet bandwidth capacity have rapidly grown, the online distribution of television, movies, and other video programming has emerged as a viable industry. The high proportion of Internet traffic now accounted for by online video streaming signals the importance of online video entertainment to the future of the Internet and its regulation. Netflix and YouTube together accounted for 45% of total peak North American fixed Internet traffic in the second half of 2013 (Sandvine, 2013, p. 6). Nielsen reports online video to have a monthly reach of over 150 million Americans (Nielsen, 2014b, p. 11), and there has been a great proliferation of reception devices. Especially in an environment where leading ISPs and multi-channel video distributors (MVPDs) have substantial national market shares and ownership of content supply, the online video market highlights the importance of FCC policies that promote competition and robust entry.

In this paper, we explore the economics of the online video entertainment industry, with an objective of understanding its economic prospects and how regulation may affect them. Our main focus is on professionally-produced television, movies, and similar forms of video entertainment, or what is widely regarded as the “over-the-top” video industry.⁵ Finally, our geographic focus is the United States, although we recognize that Internet technology fells international boundaries, and that similar changes to those in the U.S. are occurring in many other countries (Simon, 2012). Our answers to the questions posed will necessarily be incomplete or speculative, and we stop short of policy prescription. The basic premise of our paper is that the path to good policy is paved with a sound economic understanding of industry incentives and outcomes.

In the first part (Sections I-III), we document recent development of online video, including market structure of its major segments, prevailing programming windows, and content aggregation patterns through both portals and devices.

The online video entertainment industry has great promise, but also faces some imposing obstacles to its economic future. In the second part (Section IV), we explore four of these factors that will affect the industry’s future.

1. *Competition from MVPDs (including IP-based delivery) and the potential development of large scale online aggregation of over-the-top suppliers: Can the slow development of over-the top delivery of individual cable networks without MVPD subscription “authentication” be attributed to straightforward economic incentives? Why have attempts to aggregate over-the-top delivery been slow to develop?*

⁵ “Over-the-top” video usually refers to the delivery of video over the internet without involvement of multiple cable system operators (“MSO”s) in the control or distribution of the content. After the entry of these MSOs into online video via their TV Everywhere programs and their potential to control the transmission of video after *Verizon Comm. Inc. v. FCC*, 740 F.3d 623 (D.C. Cir. 2014) in January, the term’s meaning has become ambiguous, no longer drawing a clear line between different market participants. Thus, we will generally favor the term “online video”, and use “over-the-top” sparingly.

2. *The willingness of program suppliers to grant online distribution rights (in effect, the development of programming windows and programming exclusivity):* What factors have influenced the relationship between online windows and the windows of other delivery methods?
3. *Development of effective online business models, especially video advertising.* How is the evolution of online video industry segments likely to depend on business models, as well as window development?
4. *ISPs and online video prices.* How will bandwidth-sensitive ISP pricing influence the effective price to consumers of online video services? How will “last mile” access or other payments made by video content providers to ISPs, and their potential regulation, affect video prices?

In the conclusion (Section V), we summarize and briefly discuss the role that FCC regulation or other government policies can play to ensure competition and open entry in the online video industry’s future.

II. A brief literature review

Among earlier scholarly works involving the economics of online video media are Owen (1999), Shapiro & Varian (1999), HBS (2000), and the authors in several edited books, including Kahin & Varian (eds., 2000), Noam, Groebel & Gerbarg (eds., 2004), Gerbarg (ed., 2008), and Noam (ed., 2008).⁶ For a number of years, the Federal Communications Commission’s “Annual Assessment[s] in the Market for the Delivery of Video Programming” (1994-2013) have provided valuable data and insights into the economic development of the video industries, including online video in later years.

Among more recent works are several from a European perspective. Fontaine, Le Borgne-Bachschmidt & Leiba (2010) study alternative scenarios for the European television transition. Evens (2013) reviews the online video industry as a newly evolving value chain of platforms controlled by incumbents from offline video and new online players. Baccarne, Evens & Shuurman (2013) assess the evolution of online video services in Flanders, an analysis with useful parallels to the present study due to high cable penetration in that region. Donders & Evens (2011) focus on the transition of broadcasting in Europe. Simon (2012) reports on an extensive IPTS study about the digital transition of media industries in the 27 countries of the European Union.

Among some other policy-specific recent works involving online video, Minne (2012) portrays ISP data caps as devices for stunting the growth of online video. A series of recent reports by the New America Foundation (Hussain, Kehl, Lennett & Lucey, 2012; Hussain, Kehl, Lennett & Li & Lucey, 2012; and Hussain, H., Kehl, Lucey & Russo, 2013) present extensive data on ISP employment of data caps worldwide, with commentary on their effects. Lyons (2013) interprets “soft” data caps (tiered pricing) as generally welfare increasing price

⁶ A more detailed literature review up to 2012 is available in Sherman & Waterman (2014a & 2014b) and Waterman, Sherman & Ji (2013).

discrimination by ISPs, and discusses video issues. Brenner and Maxwell (2013), Frieden (2013), and Nooren, Leuridijk, & van Ejjik (2012) analyze network neutrality issues with applications to video distribution. Waterman, Sherman & Ji (2013) offer economic and policy analysis of the online video industry, focusing on incentives of cable operators and other MVPDs to offer “TV Everywhere” (TVE) services.

We acknowledge that the above citations are but a fraction of the recent works relevant to the work in this paper. There is a large more general literature, for example, on the economics of network neutrality, and on ISP data caps.

III. Development of the online video industry

a. History and current status

Although the online video industry dates to the mid-1990s, few of its pioneers survived the ‘dot.com’ bust of 2000-01. By the mid-2000s, however, broadband household adoption and speeds had become sufficient to usher in a period of vibrant entry and competition that has formed today’s online television industry.

In 2005, iTunes began offering some recent TV series episodes for direct payment. Also in that year, YouTube was created to enable Internet users to upload and distribute videos from their digital video recorders. Full episodes of major network series programs, however, were soon being illegally posted by YouTube users. After an initial period of tolerance, the networks and program suppliers issued “takedown” orders under the Digital Millennium Copyright Act, and lawsuits followed. It was not until 2008 and 2009 that NBC and Fox (later joined by ABC) launched Hulu and CBS started TV.com (later part of CBS Interactive),⁷ primarily as online outlets for some of their regular series programming.

In 2009 and later, entry into online video entertainment has proliferated, with subscription or video on demand (VOD) services developed by Amazon, Sony, and others. Beginning in 2010, several cable operators and other MVPDs also launched “TV Everywhere” video, an umbrella concept for services that give offline subscribers free access to a menu of online programming they already receive with their monthly subscription. YouTube made a move toward the top-down professional production model by financing “channels” of niche programming in late 2011 (Bond & Szalai, 2011), a practice it has continued. Though begun experimentally at an early date, multi-cast streaming of live television programming over the Internet has also become increasingly viable as network capacity has expanded, as evidenced by the ESPN3’s streaming of specialized sports events after 2007, and the first streaming of the Super Bowl by NBC in 2012.

The state of the online video entertainment industry as of early 2014 is summarized in Table 1. The list of providers is not comprehensive. Rather, it is a snapshot in Internet time

⁷ CBS Interactive is the umbrella company for CBS.com, which primarily distributes long form TV programming, and TV.com, which distributes short form content and also recent episodes of major broadcast network series.

intended to illustrate the variety of business and content models offered by leading industry players.

Table 1: Some major online suppliers of professionally-produced programming as of mid-2014

Service	Primary Content	Primary Business Model(s)
iTunes	Broadcast & cable programs; movies	Pay to download/rent
Amazon	Broadcast and cable programs; movies	Subscription; pay to download/rent
Netflix	Broadcast and cable programs; movies	Subscriptions
Hulu	NBC, ABC, & Fox TV series; some cable network content/web-only video	Advertising; subscription (Hulu Plus)
CBS Interactive	CBS broadcast programs	Advertising
Viacom Digital	Viacom cable networks (MTV, Comedy Central, BET, Nickelodeon, etc.)	Advertising or MVPD authentication, depending on individual programming
Crackle	Sony-owned movie and TV content	Advertising
YouTube	User-generated content; funded professionally created ‘channels’, other professional content	Advertising
Comcast Xfinity (and other major cable operators)	Broadcast and cable programs; movies;	MVPD authentication;
Verizon FiOS (and other telcos)	Broadcast and cable programs; movies	MVPD authentication
HBO-Go	HBO exclusive series and licensed movies	Authentication of HBO subscription
TNT	TNT television programs	MVPD authentication
USA	USA television programming	Advertising or MVPD authentication, depending on individual programming

Source: authors’ compilation, 2014

No significant players in the current market were present before 2005. The industry’s novelty is also reflected by sobering comparisons between the usage and the economic resources of online video and offline television. According to Nielsen (2014b), the average adult in 2014 watched more than 40 hours of traditional or time-shifted television per week, compared to 60 minutes of “watching video on the Internet,” and 8 minutes “watching video on a mobile

phone.”⁸ Worth noting, however, the average amount of time spent watching video on the internet has doubled in the three years since 2011.

Online video entertainment revenues are also low, but growing. A research firm reported that all online video advertising was 2.35% of the total sum of offline TV and online video advertising in 2010, a ratio which increased to 3.2% in 2011 and 4.3% in 2012 (eMarketer, 2013). In 2013, digital video advertising has increased to 8% of total advertising, with Nielsen predicting more rapid growth and the share to increase to 17.6% by 2016 (Nielsen, 2014a, p. 10). Though still dwarfed by theaters, DVD/Blu-ray, and license fees from offline television, revenue from online distribution of movies has grown steadily since the mid-2000’s, reportedly accounting for over 7% of studio domestic market revenues in 2011 (SNL Kagan Research, Sept. 26, 2012, p.2).

Table 1 also highlights the development of 5 basic online video business models: VOD (video on demand, which refers to a la carte rentals and purchases), subscription, ad-supported professional content, ad-supported user-generated content, and verification-dependent, bundled content.

At least in the first four of these segments, a leading or dominant firm has emerged. With 63% of the total online movie downloads in the first half of 2011 (Screen Digest, 2011a, p.294), iTunes is the leader in the VOD category. In the subscription category, Netflix dominates with its mix of mostly TV programs and movies. The bandwidth demands of its 25 million subscribers as of July of 2012 were 18 times greater than those of Amazon, its main direct competitor, which reportedly had about 10 million subscribers (Sandvine, 2012, p.20-21; Sharma and Bensinger, 2013). In 2013, the 12 million unique Netflix monthly viewers watched an average of over 11 hours of content per month (Nielsen, 2014a).

In the ad-supported professional content category, Hulu.com has achieved the highest number of ads per viewer, with 81.5 ads watched per month (comScore, 2014). Their 13 million unique monthly viewers watch an average of nearly 7 hours of content per month (Nielsen, 2014a). In the ad-supported user-generated segment, YouTube has notoriously dominated since its launch, with its viewers watching an average of nearly 5 hours of content per month,⁹ accounting for 27.6% of all video “minutes per viewer” recorded by comScore in March, 2014. YouTube’s closest competitors (*e.g.*, Vimeo and Dailymotion) have struggled to achieve even consumer awareness.

Finally, in the authentication-dependent TV Everywhere (TVE) segment, competition is at the local level, so the mix of MVPD competitors (except for DBS-based services) varies

⁸ Online viewing is relatively concentrated among a small group, but offline TV viewing is pervasive among a broad majority of the population. Nielsen reported that the top 10% of US adults watched an average of 2 hours and 34 minutes of streaming online video per week, but this group also watched roughly 11 times as much offline TV per week (28 hours and 10 minutes), nearly as much as the average U.S. individual. (Nielsen, 2014b, p. 14). See also Liebowitz & Zentner (2012), who found the impact of Internet use more generally on television viewing to be relatively low, but higher among younger Americans

⁹ Nielsen reported that in 2013, YouTube’s 129 million monthly users watched only about 3.5 hours of content a month (Nielsen, 2014a).

market by market. Nearly all of the largest MVPDs offer TVE of some sort, while many of the smaller firms have used an intermediary, Synacor, to create their TVE platforms. So far, TVE services are available for free, but only with “authentication” that the user is a paid monthly subscriber of an MVPD’s offline services. Thus, TVE is bundled with offline MVPD services, obfuscating its contribution to revenues of their parent companies. Generally these portals provide online access to a portion of the content that the subscriber already has access to with their MVPD subscription. For example, Comcast’s TVE service, Xfinity, offers programming from TNT and other Turner Broadcasting System ad-supported channels to all Comcast subscribers whose subscriptions include those channels. In some cases, users access TVE programming through the specific channels’ web pages. A prominent example is HBO-Go.com, a website that mostly offers the same movies and TV programming that the familiar HBO monthly subscription channel provides. HBO-Go is available only to users who also subscribe to HBO via participating offline MVPD services.

In terms of content diversity, TVE systems of larger MVPDs tend to offer the most programming, but even the largest MVPDs offer only a subset of the programming available with the subscribers’ MVPD packages. A likely reason for these contrasts is that MVPDs have reportedly encountered a snare of contracting problems that limit their online program distribution rights.

While the 5 segments we identify have distinct features, they are not mutually exclusive. For example, Hulu offers both a free, ad-based service and a premium subscription service with an expanded selection of content. Amazon offers a streaming service comparable to Netflix but also a la carte VOD sales.

Of course, the providers in all five of these industry segments compete with each other, and they often differentiate themselves with their programming content, including a growing number of Internet-original programs. The great majority of these original programs, along with obscure foreign movies and TV shows, are surely part of the long tail of programs too narrow in appeal or too low in quality to be profitably supported offline. Netflix, Amazon, and other subscription services, however, have recently announced relatively expensive exclusive programming deals in a heated battle to differentiate themselves for competitive advantage, such as Netflix’ \$100 million investment for two seasons of its exclusive the “House of Cards” series. Most economically viable television content offered by online video services, however, is “windowed” programming that has already appeared, or that appears at about the same time, on offline media.

In the movie case, the online VOD “rental” window is generally simultaneous with the MVPD VOD window, usually a few months after theatrical release, though online sales (downloads) are often closer to theatrical release. In the TV program case, the windowing model is in flux, but most programs on ad-supported Internet services such as Hulu, CBS, and Viacom Digital appear with a delay of one day to a few weeks, with more complex windowing strategies occasionally used. For online VOD (and the advertiser and subscription supported Hulu Plus), delays are often shorter. Live streaming of major broadcast and cable network programming is also emerging. For most subscription services such as Netflix and Amazon, however, windows are generally several months after initial distribution for both TV programs and movies,

comparable to the movie release windows of monthly subscription cable networks like HBO and Showtime. Windows and their relationship to MVPD authentication requirements are further discussed below.

b. Content aggregation and disaggregation

At least for the leading online providers, aggregation of commercial television and other programming from multiple creators or copyright owners appears to be a dominant business model. For example, Hulu aggregates mainly programs from the three major broadcast networks that co-own the site, but also from many other “content partners,” now including major broadcasters CW and Univision, selected shows from several cable networks, and a variety of online-only niche programming. Netflix’s subscription service offers a large menu of TV programs and movies that come from many different owners. iTunes and Amazon offer comprehensive menus of TV programming from numerous broadcast and cable networks, as well as theatrical movies distributors. At the other end of the spectrum, a number of online video businesses are essentially standalone networks, such as HBO-GO, ESPN3, and several individual basic cable TV networks, although they often also have elements of content aggregation. In addition to HBO-Go’s significant back catalog of exclusive programming,¹⁰ for example, that service also offers subscribers access to a large selection of recent and older movies. Viacom Digital, CBS, and Disney are intermediate cases; they offer numerous broadcast or cable programs, although mainly those produced or distributed by the website’s corporate owner.

In some cases, there are also agreements between the aggregators, with some programming being distributed at additional, downstream portals. In addition to CBS content, for example, CBS Interactive’s TV.com has at times been a content distribution partner of Hulu. That relationship has allowed TV.com to redistribute a subset of Hulu content or embed a Hulu video player within TV.com’s portal, presumably increasing Hulu’s in-video advertising revenue as well as TV.com’s banner ad views. Similarly, Viacom’s Comedy Central has used Hulu as a distribution partner for some of its more time-sensitive programming (*e.g.*, “The Daily Show” and “Cobert Report”), which is also available through Comedy Central’s own website but until recently had been unavailable to devices without the Hulu Plus subscription.

The efficiencies of online content or product aggregation have been studied by several authors, notably Bakos & Brynjolfsson (1999, 2000). They showed that the extremely low marginal carriage or capacity costs of Internet distribution allow content aggregators to average consumers’ demands over a great many different products at once, enabling more accurate pricing to extract consumer surplus.¹¹ Bakos & Brynjolfsson’s model, however, appears to presume a collection of products sold at one price, such as AOL and other ISPs offered in early days of the Internet. While that model applies to subscription services discussed above, a more

¹⁰ While its programs have been available through Amazon’s VOD menu for some time, HBO has recently licensed many of its original programs to Amazon’s Prime streaming service (Spangler, 2014). Notably, HBO has saved some of its recent programming (*e.g.*, “Game of Thrones” and recent seasons of “True Blood”) and a few classic hits (*e.g.*, “Sex and the City”) for its own service (Spangler, 2014).

¹¹ Conceptually, their model is similar to the empirically-based explanations by Crawford and Cullen (2007) and Crawford and Yurukoglu (2012) for why cable TV systems bundle programming into various packages for different prices.

apparent source of economic efficiencies of online aggregation is analogous to well-established reasons that brick and mortar department stores exist. Consumers have a one stop shop, minimizing search costs. Other authors, notably Shapiro & Varian (1999) and Harvard Business School (2000), have recognized that Internet architecture offers unusual efficiencies of aggregation; links to a virtually unlimited amount of programming content can be offered by a single seller at extremely low marginal costs.

On the other hand, the Internet also makes *disaggregation* of content more efficient. As we discuss further below, for example, individual networks can potentially bypass -- and thus potentially “unbundle” -- MVPDs simply by making themselves available online as standalone services.

Whether content aggregation or disaggregation by online video providers eventually dominates is simply an empirical question. An evident advantage of online aggregators is a strong brand identity among a vast number of competing websites, clearly one objective of providers such as iTunes and Hulu (Yao, Queiro & Rozovsky, 2010). A look at online video suppliers at the other end of the range, such as early entrants HBO-Go and ESPN3, suggests that suppliers which already have well-established names are prominent among successful content disaggregators.

Online content aggregation also can be seen downstream in the devices used to display videos. As a definitively open platform, the PC web browser offers easy access to the web pages of great numbers of online video distributors. The more restrictive operating systems of many devices, however, have given rise to a different pattern. Generally, only the more successful content aggregators have developed polished apps for the variety of set-top boxes (*e.g.*, Roku, Apple TV, various gaming consoles) and mobile device operating systems. Most of these offer apps for Google’s Android and Apple’s iOS platforms, but many have been slow to provide support for devices having smaller user bases. Netflix’s early app development for Microsoft’s X-box 360, Sony’s PlayStation 3, and Nintendo’s Wii led to a significant portion of Netflix streaming through these game consoles. Overall, online streaming and VOD services now comprise more than 1/5th of these consoles’ usage time (Nielsen, 2013, p. 21). This device platform competition extends to a battle between set-top online app devices, smart TVs, and Blu-ray players, powered by the device manufacturers’ competing operating systems. Hulu, Netflix, and YouTube are available on nearly all devices, but the number of apps supported on each device appears to be generally proportional to the number of adopters of the device’s operating system. This relationship suggests another advantage of content aggregation: sufficient scale to provide support and access through device platforms having relatively low adoption bases.

These observations leads us to the role that TVE, at least potentially, may play in the aggregation of online video content. As we noted above, most TVE systems currently accomplish only limited levels of aggregation, but they can be viewed as nascent attempts to achieve large scale, MVPD-like levels of online content aggregation. MVPDs are aggregators not only of a great variety of programming but also of business models, including advertiser and fee support, monthly subscriptions, and VOD. In that respect, TVE can be seen as a potentially comparable large-scale aggregation of the still-developing online TV components of subscription (*e.g.*, Netflix), advertiser-support (*e.g.*, Hulu), and VOD services (*e.g.*, iTunes). Also, the largest

MVPDs' TVE systems have tended to develop the most widespread device support and authentication opportunities with networks' online portals.

Whether MVPD-level aggregation will prove in the long term to be a sufficiently differentiated or valuable option for consumers is uncertain, but the history of the television industry indicates that to be a plausible outcome. We discuss this issue further in Section IV.1. b. below.

IV. Some questions and tentative answers about the future of online video

The technological marvels and vibrant entry into online video entertainment may seem in sharp contrast to its small audiences and revenues compared to standard television. One possible explanation for these contrasts is that at this moment, offline MVPD television is simply more convenient and familiar to the great majority of households. It offers a large selection of content with relatively low search costs, with on-screen program information grouped by familiar channels on a single device specifically designed to be plugged into any TV or home entertainment system. In contrast, online video often requires additional devices, like a Roku or a game console, to be displayed on a home entertainment system. Many have not adopted these devices, and many adopters may be unwilling to switch between different programs across different devices on any regular basis. For most people, changing the cable channel is simply easier than switching from Hulu through a game console to an iTunes video library on a personal computer. The very range of different online services available on different devices can lead to a confusing and time-consuming search process that may discourage all but the most price-sensitive or tech-savvy from regular use.

As the speed and quality of online video transmission continues to rise, as broadband diffusion grows, as more efficient and portable media players continue to proliferate, and as the interaction between consumers and video content providers becomes more seamless, the economic viability of the online video entertainment industry seems bound to improve.

The transition from offline to online video entertainment cannot, however, be viewed simply in terms of some presumed rate of viewer migration from offline to online. Even as technological constraints of online video fall away, and as inevitable demographic shifts occur, the online video entertainment industry faces major constraints and uncertainties. We now turn to discussion of the four obstacles, and accompanying questions, that we set out in the introduction.

1. Competition from MVPDs and the potential development of large scale aggregation of online video entertainment suppliers.

Beyond their familiarity and ease of use, MVPDs have some important technological and economic advantages over online video entertainment providers. Just as technological advances have driven rapid growth of the online video market, MVPDs are themselves becoming more cost-efficient and robust competitors. Large scale online video entertainment aggregation is also

plausible, but MVPDs have strategic advantages in accomplishing that aggregation themselves in the form of TVE.

a. MVPD competition

Multi-channel providers, including not only cable operators, but DBS, telcos, and most recently Google Fiber, are very efficient systems for the downstream, water pipe delivery of television programming to consumers. This includes IP-delivery, which is the basis for telco TVs and Google Fiber's entry into Kansas City and some other U.S. markets. Cable systems are converting to more efficient IP delivery as well. While online video delivery is improving rapidly, MVPDs also continue to be better suited to simultaneous real time delivery of television programming, such as sports. Note that Google's Kansas City prototype offers download and upload speeds of one GB/second, which allows most HD movies to be downloaded in less than a minute as well as rapid subscriber-to-subscriber video transfer.

MVPDs have also been able to improve their technology within the home to compete with some of the most valuable features of online video. These include distribution of live television signals to digital devices over home Wi-Fi systems and more efficient and convenient DVRs that are linked to information-dense programming information. In some instances, MVPDs have also integrated novel technologies, like Dish TV's "Slingbox," which enables users to watch programming stored on their DVRs away from the home, creating what some have dubbed 'do-it-yourself' TV Everywhere. A related innovation is the recent set-top box carriage deal between Netflix and three MVPDs (Fung, 2014). In effect, Netflix or other online video services can be added to MVPD's set-top box programming menus, avoiding the hassle of switching between different devices.

We referred above to the efficiency of large scale MVPD program packaging and pricing. Their dedicated video systems bring together hundreds of networks, often thousands of VOD programs, many in HD, and deliver them to a majority of the U.S. population, leading to considerable economies of scale. Since ad-supported networks generally desire to have the widest possible reach, they compete to be aggregated onto the most popular basic tiers of MVPD services. Advertisers thus gain access to the most consumers, along with a fairly clear understanding of how ratings and viewer demographics influence the value of commercial slots.

MVPD programming is bundled into various packages or tiers for extra charges, which effectively serve as price discrimination devices (Crawford and Cullen, 2007). Although a constant source of complaint on the margin, consumers as a whole generally desire and benefit from these systems of aggregation. In general, most consumers prefer to have large packages of communications goods or services for predictable prices per month (Fishburn, Odlyzko & Siders, 2000). Overall, though sometimes dismissed in the popular press as fading dinosaurs, it would be a mistake to discount the long term competitive potential of MVPD technology.

b. Potential large scale aggregation of online video delivery

The evident appeal to business and consumers of large scale aggregation by MVPDs leads to this question: Would similar aggregation improve the competitive prospects of online

video entertainment? As our discussion above indicated, however, apart from some device-based online aggregation, the largest aggregators of video content online in the U.S., notably of high demand broadcast and cable network programming, are currently the TVE services of MVPDs themselves. Although the great majority of this programming is also made available through the networks' own websites, online access to it mostly requires authentication of an MVPD subscription.

Appendix Tables 1A-B show preliminary results of an ongoing investigation of authentication policies of the largest basic and premium cable networks in the U.S. as of August, 2014. Table 1A indicates that 20 of the 30 largest basic (advertising plus per-subscriber fee supported) cable networks require authentication for access to some or all of their programming.¹² All of the 6 major monthly subscription premium networks we investigated require authentication (Table 1B).

Our investigation also found that the policies of the 4 major broadcast networks vary. Fox and ABC require authentication to access programming within 8 days of original airing, while CBS and NBC generally do not, with the exception of some major live sports events, notably NBC's exhibition of the 2014 Winter Olympics.

These strategy choices introduce a second question: Can the prevalence to date of authentication requirements for online delivery of cable and broadcast programming be attributed to straightforward economic incentives of individual networks?

Consider first the cable network case. An individual basic or premium network has a unilateral incentive to distribute its content online without authentication if it expects that the sum total of its offline plus online revenues will increase as a result. While the effects are complex, and the market is in flux, the general tradeoffs are in large part a matter of substitution effects. If substitution effects are large—that is, if online viewers (or premium network subscribers) are mostly potential offline viewers (or subscribers) as well, economic incentives for early (or any) online distribution are lessened if the revenues per viewer (or subscriber) are *lower* for online viewing (or subscription) than for offline. If the substitution effects are small—that is, if online and offline viewers are essentially different groups, then the network faces low impediments to online distribution as long as online revenues at least cover marginal costs.

The current pattern of market behavior thus suggests that there are significant substitution effects (or that networks believe that there are); that is, online viewing *reduces* offline viewing and thus offline revenues at least to some extent. In that case, authentication is likely to be more profitable for an individual cable network to the extent that an online viewing without authentication makes the network *less valuable* to the MVPD—thus tending to reduce per subscriber fees (or premium revenue shares) that MVPDs are willing to pay the network.

Consider the case of HBO-GO, for example, the most popular online premium network that requires authentication. If HBO-GO did not require authentication, it could earn additional

¹² Of the top 30 cable networks, 8 networks, including MTV, Lifetime, and BET, provide a significant portion of their programming for free without any authentication opportunities whatsoever, while 7 networks, including Comedy Central, Nickelodeon, and provide a mixture of full episodes with and without authentication.

revenues from online monthly subscribers who would otherwise not subscribe to HBO offline, and depending on substitution effects, some of HBO's subscribers might drop their MVPD subscription to that network to move to HBO-GO. Thus, those who substitute HBO-GO for an offline HBO subscription directly reduce HBO's revenues from those offline subscribers (which are usually split with cable operators). However, there is another loss to the MVPD: the reduced incentive of an HBO subscriber to buy a basic MVPD package necessary in order to get access to HBO (and to buy other programming packages). In effect, carriage of HBO or other premium networks has a positive externality effect on the overall value of the programming packages that the MVPD markets to subscribers. Authentication tends to preserve that value.

With an advertiser-supported basic cable network, say TBS, the calculus is similar but involves a dual revenue stream of advertising plus per subscriber fees from MVPDs. These potential revenues are weighed against the combined advertising and VOD revenues that could be earned online without authentication. As we discuss further, online advertising revenues per hour appear to be generally *lower* than offline advertising revenues per hour, thus encouraging authentication in order to move overall viewing of the network to its more lucrative offline exhibition. Although perhaps less important than in the premium network case, MVPD carriage of basic cable networks not requiring authentication also become less lucrative to those MVPDs. On the margin, some of those people who can now access MTV or BET online, for example, will no longer find it worthwhile to subscribe to the MVPD's service (along with its other tiers) at all. A final but potentially important factor in the longer term, is that the MVPD's aggregations of basic networks on their websites, at least some of which are live streamed, presumably benefit from an enhanced ability to sell advertising as part of a bundle of similar ad supported networks.

In the case of the major broadcast networks, decisions by some to forgo authentication might be explained by the relatively small proportion of their total revenues that are earned by retransmission payments vs. advertising, and by their advertising business model that depends on maximum audience reach.

More generally, a variety of factors are likely to affect a network's decision to require authentication, notably including audience demographics. In some of the cable network cases in which authentication is not required, like Comedy Central's satire news programs, quick erosion of programming value, the publicity gained from broader, immediate reach, and the age distributions and technology use patterns of viewers, may also be factors.

An interesting feature of our ongoing analysis of authentication practices is that in the case of basic cable networks, Table 1A shows all 15 of the networks that permit live streaming of their programming, either through their own websites or the TVE systems of MVPDs, require authentication. This finding also strongly suggests significant offline-online viewer substitution effects. Online-offline viewing substitution is also suggested by the policies of Fox and ABC, which usually delay any online exhibition by one day, but require a Hulu Plus subscription or MVPD authentication only up to the 8th day of delay, when their programming is made available for free (with ads) on Hulu. These policies also suggests that authentication is related to programming windows, which we consider further in Section IV.2.a, below.

In sum, a programming network's choice to require authentication purely on its own is an empirical question. It is quite plausible that this strategy is a profitable unilateral decision by the individual cable network. Some other factors, however, also tilt the balance toward the TVE authentication model.

First, MVPDs have a strategic advantage over other potential online video aggregators because they can employ free TVE as a price discrimination device to reduce the incentive for lower value (and tech-savvy) offline subscribers to disconnect their MVPD service (Waterman, Sherman & Ji, 2013). These authors also find that that this price discrimination strategy can hinder the entry of standalone competing non-MVPD online aggregators.

In addition, although its practical significance is uncertain, some authors have claimed that TVE is an anticompetitive device intended to pressure networks to require authentication in order to prevent their offline business from unraveling, or possibly to facilitate their own entry into the online video market (Cooper, 2010; Singer, 2010).

As online video usage continues to increase, and thus becomes a relatively more valuable market compared to offline media, MVPD incentives to give away TVE for free should diminish, encouraging the prospect of successful entry and competition among unaffiliated standalone online aggregators. Such providers, for example, may be able to offer market aggregations of cable and broadcast networks, as well as various “over-the-top” online video services, in single large packages. At least in the shorter term, however, MVPDs have a natural economic advantage in aggregating online content via “free with authentication” TVE, and anticompetitive motives are at least plausibly involved.

2. The willingness of program suppliers to grant online distribution rights: windows and programming exclusivity

The availability of attractive programming is a major driver of viewer migration from offline to online, and thus the economic development of online video. Because economically viable online entertainment content is dominated by windowed programming—TV programs or movies that have already appeared, or appear at the same time, on offline media—how windows evolve is critical to the online industry's future. We have also mentioned a rapid recent growth of high quality original online video content, virtually all of which is exclusively licensed by Netflix, Amazon, or other online video subscription services. Thus, the volume of exclusively licensed original content should also influence online video industry growth.

a. Windows

What are the prospects that typical online TV or movie windows will advance—that is, that program supplier will make high quality programming available sooner? In the case of major TV programs, could the window, for example, be simultaneous with (and without an authentication requirement) or even in advance of offline broadcast or cable network exhibition? Or in the case of monthly subscription services (such as Netflix), could windows be in advance

of monthly subscription cable networks such as HBO or Showtime—or perhaps even in advance of VOD?

Before online video began to influence the pattern, a typical major film would be released in theaters, then after a delay, released to paid MVPD VOD and retail-based Blu-ray/DVD, then to premium subscription networks, then basic cable or broadcast network exhibition. This movie windowing model has been widely recognized as a method of inter-temporal price discrimination by which high and low value consumers are segmented by waiting time and transmission quality of the medium (Waterman, 1985; Owen & Wildman, 1992; Wildman, 2008). Though still in flux, the various online video revenue models (a la carte, ad-support, and monthly subscription) have now become integrated into this model, presumably driven by the same general price discrimination calculus.¹³ In this context, several factors appear to drive online window placement and pricing, notably these: potential revenue per viewer, the number of potential viewers, how readily consumers are willing to substitute between the media, and shelf life of the programming.

Bundled services, such as the monthly subscription premium cable networks or Netflix and its online competitors, are generally less efficient for extracting money from high value consumers with intense demand for particular programs, and thus usually have assigned time slots months after paid VOD release, or in the case of TV series, months after standard TV or initial online exhibition. As online video usage increases, the online video subscription window for TV and movies is likely to move toward a position simultaneous with, or perhaps in advance of HBO, Showtime, and other premium cable networks. It is difficult, however, to compare a major determinant of those window outcomes: program supplier revenue potential of online vs. offline subscription services.¹⁴ In any case, although online subscription services are proving to be highly popular, their bundled nature suggests they have limited potential to attract movies or TV programs that are close to offline VOD exhibition windows.

While it is difficult to predict how the offline to online broadcast and cable network series programming window may evolve, a likely explanation for the current delays of one day or more, or an authentication requirement for live-streamed basic cable programming, is simply the reportedly higher net revenues per viewer for standard television audiences, combined with significant substitution effects between online and offline viewing. With variations to account for program shelf life (*e.g.*, news vs. drama), demographic, and other factors, the various networks

¹³ Online video's very low marginal costs of carrying additional programming has apparently given online subscription services new ways to extract value from the windowing model. Hulu's freemium model, for example, gives paying subscribers access to a larger catalog of older content, thereby extracting higher value from users. Prior to online technologies, individuals with these longer-term demands either had to buy their desired shows and movies from retail or, if the programming was out of circulation, could not have their demands met at all outside of the resale market. Netflix gives consumers access to a library of older or niche content not otherwise available on subscription basis. Similarly, other services like HBO Go provide subscribers with a catalog of older movies and their award-winning series.

¹⁴ Even with their larger libraries of content, monthly prices for online subscription services such as Netflix and Hulu Plus are generally lower than those of HBO and other premium cable TV networks, and the gateway price of broadband Internet access is lower than that of a basic MVPD subscription usually required for access to premium services. Online distribution, however, is probably cheaper.

presumably choose an array of delay times that maximize total combined revenues from these interdependent media.

Working in favor of a disappearance or a flipping of offline to online TV and movie delays will be the relative growth of broadband subscriptions and quality of the online video experience, including device proliferation. Of great importance, however, will be the viability of online revenue models, especially online advertising, which we consider further in Section IV.3, below.

b. Programming exclusivity

High quality, Internet-original, exclusively licensed video programming offered by Netflix or other subscription services in their intense battles to gain competitive advantage is likely to accelerate the migration of viewers to online video. What is the longer term potential of online video subscription services as providers of high quality, original programming?

The still small, but growing quantities of original, high quality programming offered by online subscription services brings to mind remarkable parallels with the early development of monthly subscription cable movie services in the 1970s and 1980s. HBO was the first monthly subscription pay cable network to enter the market in 1972, followed by its satellite debut in 1975. Its main rival to be, Showtime, was launched in 1976. These and some other pay networks that entered later, including Cinemax and The Movie Channel (“companion” networks to HBO and Showtime respectively), specialized in movies, primarily theatrical films released about a year after their premiere, and also “made-for-pay” movies they produced. The battles for exclusive rights to theatrical features were intense, and spawned a private antitrust suit against HBO’s parent company by the parent company of Showtime networks, claiming that HBO excessively used exclusive film rights in an attempt to drive Showtime out of business. (The suit was settled in 1992).¹⁵

The history of premium cable network competition suggests how exclusive rights can be used as a competitive weapon, especially by a first mover, to enhance its competitive advantage. The larger a service’s subscriber base, the cheaper are exclusive rights on a per subscriber basis. If the majority of online users are willing to subscribe to only one competing service, the largest network—in the online market, Netflix—has a major competitive advantage and can potentially entrench its dominant position. Economic welfare may be reduced to the extent that competing networks all pursue exclusive rights and subscribers have to pay for two or more networks to get a full menu of available programming. It seems likely, however, that the competitive forces driving the exclusive programming wars among online video subscription services will enhance viewer migration to online.

Anecdotal evidence appears to support these expectations. With “House of Cards,” Netflix has developed an exclusive award-winning drama, and has also focused on underserved niches, like anime and low budget horror films. In limited competition with HBO, Netflix has also acquired a few key theatrical movies in about the same window as HBO’s. Hulu has funded

¹⁵ The history of premium movie competition during this period is discussed in Chapter 5 of Waterman and Weiss (1997).

its own original programming and, similar to Hulu, has acquired US exclusive licenses to several British shows, advertising each heavily in its service. While YouTube is already the leading destination for amateur content, it has funded its own professionally produced programming. Amazon has begun to develop its own exclusive series, and has acquired exclusive streaming rights to a few series originally shown or scheduled to show on PBS and other broadcast and cable networks.

3. The development of effective online business models, especially video advertising.

The economic future of online video entertainment depends on development of successful business models, especially to support Internet-original programming, or comparably, to induce content suppliers to grant earlier windows for high quality programs that have appeared on other media. Especially at issue, as suggested in our commentary on windows above, is the effectiveness of online advertising.

To the advantage of television content suppliers, the within-program video ad model transfers directly to online. Moreover, CPM rates for video entertainment on Hulu and other sites are reportedly above those of prime-time broadcast TV. The number of commercials sold, however, has to date reportedly been much lower, resulting in relatively low advertising income per program online. The viability of video advertising is apparently increasing, but the rate of improvement will have an important effect on window decisions, given that about two-fifths of total television industry revenues come from advertising.

A similar issue involves potential direct payment revenues online vs. offline. Whether HBO-Go, for example, could charge high enough prices online to compensate for lost revenues from MVPD subscriptions if authentication were forgone, is uncertain but likely to discourage that network from taking this risk. Similarly, basic cable and broadcast networks make money from online VOD sales. In all of these cases, however, online revenue per viewer potential would appear to be increasing relative to offline.

4. ISPs, regulation, and online video prices

How will might bandwidth-sensitive ISP pricing influence the effective price to consumers of online video services? Is it likely that online video prices will in the long run reflect its disproportionate contribution to Internet traffic? How will “last mile” access or other payments made by video content providers to ISPs affect video prices to consumers? It is especially hard to answer these questions because of regulatory as well as demand and technological uncertainties. Assuming that the voracious video appetites of users continue to rise, however, it seems likely that marketplace outcomes will put upward pressure on effective video entertainment prices.

Over the past decade, some ISPs (*e.g.*, Comcast in 2008) began charging “hard caps” to heavy bandwidth (*i.e.*, heavy video) users (Hussain, Kehl, Lennett & Lucey, 2012; Hussain,

Kehl, Lennett & Li & Lucey, 2012). In this regime, users are prohibited from greater data usage, usually over a month, than the cap; degraded service or disconnection can result. Industry reports indicate a recent trend toward “soft caps,” a regime in which heavy users are charged a higher monthly rate (*See* Hussain, Kehl, Lennett & Lucey, 2012; Hussain, Kehl, Lennett, Li & Lucey, 2012; and Hussain, Kehl, Lucey & Russo, 2013). Soft caps can be explained as an attempt to move toward ISP price discrimination, with heavy online video users often likely to be higher value consumers with a higher willingness to pay for ISP services.¹⁶ This is analogous to the higher willingness to pay of heavy television users for MVPD services; MVPD price discrimination takes place because these high value users choose more expensive programming packages (Crawford & Yurukoglu, 2012).

By employing soft data caps, MVPDs effectively raise the total price that heavy-use video consumers pay for video services. On the one hand, higher ISP prices for heavy video usage tend to limit the “over-the-top” price levels that the online video providers can themselves charge to consumers. Online video prices are unlikely, however, to fall as much as the soft caps increase ISP charges to heavy users. Such ISP price discrimination could also encourage video content providers to adopt multi-tiered, usage-based pricing themselves.

Bargaining between ISPs and online video services over “last mile” access to consumers is also a route by which ISPs can extract value indirectly from online video subscribers, which could in turn result in increased effective video prices. To the extent that Netflix, for example, is forced to pay ISPs for high quality downstream access to consumers (*e.g.*, for co-location of servers, faster speeds, etc.)¹⁷, the additional cost to Netflix will tend to induce that network to raise their over-the-top consumer prices and potentially reduce their licensed catalog of content. The extent to which ISPs can extract payments from online video distributors more generally depends in part on what network neutrality rules or regulatory regime that the FCC eventually adopts. A strong regime in which no payments from video input suppliers could take place, for example, would thus constrain any upward pressure on over-the-top video prices, while rules which allow for individualized bargains could have differential effects on video prices. Bargaining outcomes, however, are in any case uncertain. They depend principally on whether a given ISP needs a particular video supplier more than that video supplier needs the ISP. Upward video consumer pricing pressure by this route thus depends on an assumption, which seems to us reasonable, that at least the larger ISPs generally have more bargaining power.¹⁸

On an empirical level, industry reports indicate that thus far, data caps, hard or soft, affect relatively small percentages of ISP customers.¹⁹ That could, of course, change if soft caps turn out to be effective revenue generators for ISPs.

¹⁶ ISPs already price discriminate among consumers by charging them for different data transfer rates, which serve to set their own theoretical data caps if consumer bandwidth utilization remains high. However, the use of soft and hard caps ignore utilization issues in favor of more direct quantification of consumers’ Internet demands.

¹⁷ The peering agreement that Netflix reached with Comcast and other major ISPs in early 2014 is only one route by which such payments can be made.

¹⁸ This assumption is suggested by early 2104 Netflix peering agreements, by which Netflix agreed to pay the four largest ISPs an undisclosed sum. Bargaining outcomes in the cases of smaller ISPs and smaller video providers are more difficult to predict.

¹⁹ A 2013 Sandvine report stated: “In North America, the top 1% of subscribers who make the heaviest use of the network’s upstream resources account for 39.8% of total upstream traffic. At the opposite end of the usage

The Dec. 2012 New American Foundation report also claims that hard or soft data caps are anticompetitive devices by which ISPs who are also MVPDs (*e.g.*, Comcast/NBC Universal) discourage online video usage and thus help preserve their offline MVPD businesses. The NAF report also alleges that data caps serve to limit over-the-top video competition and entry.

Whether or not this potential antitrust concern has practical impact, ISPs generally have strong incentives to figure out ways to extract value both from online video providers and from the consumers who use them heavily. Success with either group of consumers will tend to increase user prices to consume video.

Finally in qualification, however, if the incredible technological advances that have been steadily reducing costs of online video delivery continue, downward pressure on consumer video prices may result. In addition, some have argued that the ISPs' inability to date to charge higher prices to online video content providers has restricted the expansion of broadband infrastructure and required over-the-top providers to build out their own delivery systems. In that case, the creation of a market for preferential treatment of content distribution companies may improve the quality of service.²⁰ The net long term path of effective video prices could thus be negative in spite of the upward pressure of economic forces that we have identified.

v. Conclusion and Policy Highlights

In the past decade, the online video entertainment industry has rapidly blossomed. Entry and competition has apparently been robust; online content providers using a variety of different business models have proliferated. The leading suppliers aggregate great quantities of programming content, much more than offline suppliers can offer. The most economically viable content is generally windowed movies and TV programming that has already appeared or appears at about the same time, on other media. High quality original programming, however, especially exclusively licensed dramas offered by online subscription services, has been expanding.

The online video entertainment industry has remarkable technological and economic advantages over its offline counterparts: low delivery costs, virtually unlimited content capacity, targeted advertising and efficient direct payment business models, and perhaps most remarkably, computer and other device functionality and interactivity. These advantages offer tremendous future potential, although at this writing, the online video industry remains small, both in

spectrum, the network's lightest 50% of users account for only 6.8% of total monthly traffic" (Sandvine, 2013, p. 6). With median and mean North American home internet usage at 17.6 and 44.5 GB, respectively (Sandvine, 2013, p. 5), the average user falls well short of the 250-300 GB data caps in use by some of the ISPs.

²⁰ For example, the University of Chicago --- Booth Graduate School of Business's "Initiative on Global Markets" Economists' Panel-- considered the question of whether it is a "good idea to let companies that send video or other content to consumers pay more to Internet service providers for the right to send that traffic using faster or higher quality service" (IMG Forum, May 6, 2014). Few disagreed with the statement, with roughly a third expressing general uncertainty. Those who did believe it was a good idea generally claimed that the creation of this additional market for Internet resources would improve overall allocative efficiency.

viewing and revenue terms relative to its offline counterparts, standard television and movie exhibition.

We identified four obstacles or uncertainties potentially limiting online video's future growth: competition from increasingly efficient MVPDs, including their strategic advantages in large scale online content aggregation; limited availability of high quality content, especially windowed programming; limited development of successful online business models, especially advertising; and ISP pricing strategies in the consumer or input markets that may raise effective consumer prices of video consumption. Overcoming at least the first three of these obstacles will be facilitated by continuing migration of viewers from offline to online video media. Yet it is these constraints themselves that act to slow the rate of that migration—rendering the outcome uncertain.

A major goal of FCC and other communications policies has been to encourage robust entry of online video suppliers in order to compete with established MVPDs. Industry history suggests that a key determinant of successful competition with MVPDs over the long term is likely to be large scale aggregation of online content. To date, however, MVPDs appear to have a competitive advantage in online aggregation, in part because they can use “free with an MVPD subscription” authentication as a price discrimination device to prevent offline disconnections. As online audiences grow relative to offline, incentives for MVPDs to unbundle TVE and for standalone providers to enter the large scale online aggregation market will increase. Nevertheless, monitoring the behavior of large MVPDs, which also have plausible incentives to preserve their offline video businesses as well as to gain advantage over other entrants in the online video market, is clearly advisable.

It is notable also that since the online and offline video supply markets are national in scope, policy actions, such as merger reviews which can potentially limit national market shares of either MVPDs or ISPs, serve to limit the potentially negative competitive impacts on video content supply of virtually any MVPD or ISP action. In the ISP case, network neutrality rules may also limit negative effects on video content suppliers of actions that ISPs may take. As we also discussed in Section IV, network neutrality rules could also limit effective consumer video prices, although we stopped short of welfare analysis in that case.

Finally, we acknowledge the speculative nature of some of our analysis in this paper. For example, understanding the profit-maximizing tradeoffs between cable network incentives to require or not require MVPD subscription authentication calls for more rigorous analysis. Similarly, the effects of ISP pricing on effective consumer video prices should be studied empirically. More generally, further analysis of the properties of this complex, multi-sided market would improve the positive impact of regulatory decision-making. These important topics for further research will help to inform the actions of both business strategists and the policy experts who help to shape the future of online video.

Appendix

Table 1-A: Authentication patterns of the top 30 Basic cable networks

Rank	Cable Network	Parent Company	Authentication?	Network Portal?	Live TV?	Authentication # w Top 25 MVPDs?
1	ESPN	Disney/ABC	Yes*	Yes	Yes	11
2	TNT	Time Warner	Yes	Yes	Yes	21
3	Nick	Viacom	Some	Yes	No	17
4	USA	Comcast/NBCU	Some	Yes	Yes	20
5	Fox News	Fox	Yes*	Yes	Yes	20
6	TBS	Time Warner	Yes	Yes	Yes	21
7	MTV	Viacom	No	Yes	No	N/A
8	Disney	Disney/ABC	Yes	Yes	Yes	8
9	CNN	Time Warner	Yes*	Yes	Yes	21
10	Discovery	Discovery	No	minimal	No	N/A
11	FX Network	Fox	Yes	Yes	No	14
12	ESPN2	Disney/ABC	Yes*	Yes	Yes	11
13	Lifetime	Disney&Hearst	No	Yes	No	N/A
14	A&E	Disney&Hearst	Some	Yes	Yes	16
15	Food Network	Scripps	No	Yes	No	N/A
16	History	Disney&Hearst	Some	Yes	Yes	16
17	HGTV	Scripps	Yes	Yes	No	8
18	Comedy Central	Viacom	Some	Yes	No	17
19	Cartoon	Time Warner	Some	Yes	Yes	21
20	CNBC	Comcast/NBCU	Yes*	Yes	Yes	20
21	Syfy	Comcast/NBCU	Yes	Yes	Yes	20
22	ABC Family	Disney/ABC	Yes	Yes	Yes	9
23	NFL Network	NFL	No**	Yes	No	N/A
24	AMC	AMC Network	Yes	Yes	No	12
25	Spike TV	Viacom	No	Yes	No	N/A
26	Bravo	Comcast/NBCU	Some	Yes	Yes	20
27	BET	Viacom	No	Yes	No	N/A
28	TLC	Discovery	No	Yes	No	N/A
29	VH1	Viacom	No	Yes	No	N/A
30	E!	Comcast/NBCU	No	No	No	N/A

Sources: websites of the largest basic cable networks (Accessed Aug. 2014).

Table 1-B: Authentication patterns of the premium cable networks

Premium Network	Parent Company	Authentication?	Network Portal?	Live TV?	Authentication # w Top 25 MVPDs?
HBO	Time Warner	Yes	Yes	No	23
Cinemax	Time Warner	Yes	Yes	No	23
Encore	Liberty Media	Yes	Yes	No	12
Starz	Liberty Media	Yes	Yes	No	12
Movieplex	Liberty Media	Yes	Yes	No	5
Showtime	CBS	Yes	Yes	Yes	14
The Movie Channel	CBS	Yes	Yes	Yes	14

Sources: websites of the premium cable networks (Accessed Aug. 2014).

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