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An Economic Analysis of the FCC's Set-Top Box NPRM

April 2016

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Table of Contents

Executive Summary 2
Introduction 3
Competition, Competition, Competition: Defining the Markets 4
Competition in the Video Delivery Market 4
Competition in the Set-Top Box Market 8
CableCARD and Set-Top Boxes that can Access MVPD Video 9
Set-Top Box Lease Prices 14
OTT Set-Top Boxes 20
An Economic Framework for Evaluating the MVPD-STB Connections 21
ICE: Internalizing Complementary Efficiencies 22
Price Discrimination 24
Existing Contractual Arrangements 24
Conclusion 26

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Executive Summary

- The FCC's Notice of Proposed Rulemaking (NPRM) should explain why the Commission believes the video delivery and/or the set-top box markets are not competitive and, if not, why regulatory intervention is necessary. Unfortunately, the NPRM provides no economic model of the marketplace, no evidence of consumer harm, and no evidence that consumers would be better off under its proposed rules.

- Despite the FCC's assumptions, competition in video delivery is robust, with 99 percent of households having access to at least three MVPDs and strong growth in over-the-top video options like Netflix, Hulu, Amazon, iTunes, and even services like Sling TV and PlayStation VUE that replicate the traditional MVPD experience, but over broadband.

- Contrary to the FCC's claims, competition in the set-top-box market is also robust. OTT set-top-boxes are available from Roku, Amazon, Google, Apple, and others. This competition is stimulating innovation even in traditional set-top boxes, such as Comcast's X1, and creating incentives for new collaborations, like Time Warner Cable's initiative with Roku that eliminates the traditional set-top box entirely.

- Even if the FCC believes MVPDs hold significant market power in the video delivery market, it would have to explain why the type of integration between MVPDs and set-top boxes is not an efficient vertical relationship. Indeed, theory alone suggests it is a textbook example of an efficient integration, with that theory corroborated globally—25 of 26 providers I surveyed in 11 OECD countries, including relatively new entrants, also are the sole providers of set-top boxes to their customers.

- The FCC relies on set-top box price data provided in a press release from Senator Edward Markey's office that show a wide range of prices on set-top boxes, including some providers offering a first box for $0 per month. If the FCC believes the average price is too high, then it must believe there is some "correct" price, yet economic theory does not tell us what that would be. The FCC's own data on set-top box prices show that set-top box capabilities have increased dramatically since the 1990s, making a simple comparison between the price of a set-top box in 1994 and 2015 as meaningless as comparing the sales price of televisions or computers in 1994 and 2015.

- Despite the FCC's assurances, given the many details involved in negotiations between programmers and MVPDs it is unlikely that existing contracts could survive the new rules. The new rules would change incentives facing both programmers and MVPDs with uncertain consequences. At a minimum, the FCC should take those concerns seriously and consider the potential effects of its proposed rules.

Introduction

The Federal Communication Commission's (FCC) recent Notice of Proposed Rulemaking (NPRM), "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," aims, in its words, to "assure a commercial market for devices that can access multichannel video programming and other services offered over multichannel video programming systems."[1] The FCC's primary argument supporting the need for its proposal appears to be the estimate from Senator Edward Markey's office that "approximately 99 percent of customers rent[] [sic] their set-top box directly from their pay-TV provider, [and] the set-top box rental market may be worth more than $19.5 billion per year, with the average American household spending more than $231 per year on set-top box rental fees."[2]

The NPRM, however, fails to offer any economic rationale as to why Sen Markey's estimates necessarily imply that the market is not efficient. The FCC's sole argument appears to be the assertion—incorrect, as the discussion below demonstrates—that "almost all consumers have one source for access to the multichannel video programming to which they subscribe: the leased set-top box, or the MVPD-provided application. Therefore, we tentatively conclude that the market for navigation devices is not competitive, and that we should adopt new regulations…."[3] That "tentative conclusion," however, relies on at least two assumptions that there is no reason, a priori, to think are true.

The first implicit assumption is that vertical integration between MVPDs and set-top box provision is inherently inefficient and reduces consumer welfare. Vertical integration, however, is often efficient; the FCC offers no reason why it would not be in the case of set-top boxes. MVPDs around the world—25 of 26 providers across 11 OECD countries surveyed here—also solely provide boxes to their customers, suggesting that perhaps such an arrangement is not inefficient.

The second assumption is that the "multichannel video programming to which [consumers] subscribe" is its own distinct market for which there are no substitutes, even imperfect. The video distribution market, however, is increasingly competitive. Indeed, a major reason the FCC provided for denying the Comcast-Time Warner Cable merger was a desire to foster the growing competition in video delivery. Similarly and relatedly, the set-top box market itself is changing rapidly. Devices that serve similar functions are available from Roku, Google, Amazon, Apple, and others, and MVPDs working with traditional set-top box manufacturers to upgrade their offerings, like Comcast's X1 system. Other initiatives, like Time Warner Cable's collaboration with Roku, eliminate the MVPD set-top box altogether.[4].

If the FCC were wanted to propose an economic theory to justify its proposal, it would need to illustrate that MVPDs could extend any remaining market power in video distribution into set-top box markets. To make that argument, it would have to demonstrate that MVPDs are not

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[1] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," NPRM, (February 18, 2016), para. 1.
[2] Sen Markey's press release, quoted in ibid., para. 13.
[3] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," para. 13.
[4] http://www.timewarnercable.com/en/enjoy/roku.html (last access April 14, 2016)

"internalizing complementary efficiencies."[5] The available evidence, however, suggests that the integration between set-top box provision and MVPDs does not fail the theoretical test, meaning that the arrangement is likely efficient.

This paper reviews the FCC's proposal, examines the details concerning the relevant markets, and discusses how economic theory might evaluate this market. It also considers how the FCC's proposed changes might affect incentives facing MVPDs and programmers if the final rules effectively nullify the complicated agreements between the parties.

Competition, Competition, Competition: Defining the Markets

Because models of anticompetitive behavior typically assume a firm is a monopolist (or at least has significant market power) and then question whether that firm can extend its market power into a downstream or complementary market, the first step should be to evaluate the relevant markets. The NPRM defines the market extremely narrowly: "access to the multichannel video programming to which [consumers] subscribe…"[6] In other words, the NPRM defines the relevant market as only set top boxes that can access the MVPD feed. It does not entertain the possibility of broader set-top box or video markets.

While there remains debate about the extent to which over-the-top (OTT) video can substitute for traditional linear video delivery, we know that people engage in such substitution, and that the phenomenon is growing.[7] Given that this substitution often involves a different kind of set-top box and different video services, it unlikely that access to the MVPD stream is a market solely unto itself. It is more likely that the relevant primary (video) market includes, at a minimum, the growing number of OTT alternatives, ranging from free to subscription to a-la-carte options.

This section evaluates competition in the video delivery and set-top box markets, noting the extensive and growing competition in each.

Competition in the Video Delivery Market

The FCC identifies three broad types of video delivery systems: MVPDs, broadcast television, and over-the-top, which the FCC calls "online video distributors."[8] Even before considering the extent to which the different types of delivery compete against each other, the FCC notes that

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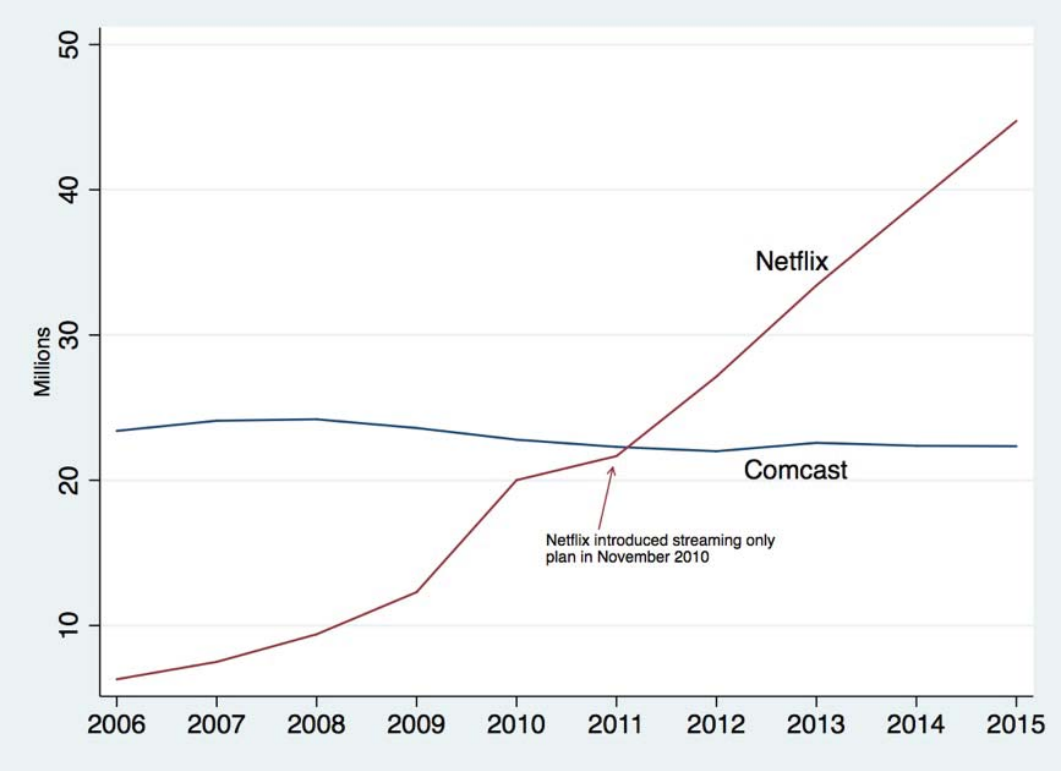
[5] As formally introduced by Farrell and Weiser (2003) and discussed in detail below. Joseph Farrell and Phil Weiser, "Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age," *Harvard Journal of Law and Technology* 17, no. 1 (Fall 2003): 85–134, doi:10.2139/ssrn.452220.
[6] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," para. 13.
[7] Horrigan and Duggan (2015), for example, found that 15 percent of American households once had a pay TV subscription but no longer do. John B. Horrigan and Maeve Duggan, "Home Broadband 2015: The Share of Americans with Broadband at Home Has Plateaued, and More Rely Only on Their Smartphones for Online Access" (Pew Internet and American Life Project, December 21, 2015), http://www.pewinternet.org/2015/12/21/home-broadband-2015/.
[8] Federal Communications Commission, "Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming: Sixteenth Report," March 31, 2015, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-41A1.pdf.

MVPDs face significant competition from each other. The FCC estimates that 99 percent of households can choose among at least three MVPDs and nearly a third can choose among four.[9]

Online video, of course, is the newest form of video distribution (from a consumer perspective, at least) and, as the FCC notes, generally comes in two flavors: "all-you-can-eat" service like Netflix (subscription) or YouTube (free), and a-la-carte pay-per-show (or series) like iTunes.[10] It is also offered as a mix of the two, as with Amazon Prime and Amazon video. Netflix, Hulu, and Amazon are not perfect substitutes for an MVPD subscription, but products need not be perfect substitutes to be considered part of the same market. Moreover, the relative advantages of MVPDs in the video delivery market are decreasing as OTT providers offer their own original and exclusive content. Netflix has already produced nearly 50 series (like *House of Cards*), 18 documentaries, and four films and has more than 50 new series planned for 2016 and beyond.[11] With nearly 45 million paying subscribers in the U.S.,[12] Netflix has more than twice as many subscribers as the largest MVPD, Comcast (Figure 1).[13] Netflix is not the only OTT provider investing in its own content: Amazon and Hulu also produce original content.

[9] Ibid., para. 31.
[10] Federal Communications Commission, "Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming: Sixteenth Report," para. 217.
[11] https://en.wikipedia.org/wiki/List_of_original_programs_distributed_by_Netflix
[12] http://ir.netflix.com/common/download/download.cfm?companyid=NFLX&fileid=870688&filekey=CF849AA1-C03F-418C-90F7-A75F89946696&filename=Q4_15_Website_FS.xlsx
[13] Federal Communications Commission, "Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming: Sixteenth Report," para. 133.

Figure 1: Netflix Streaming and Comcast Video Subscribers, 2006-2015

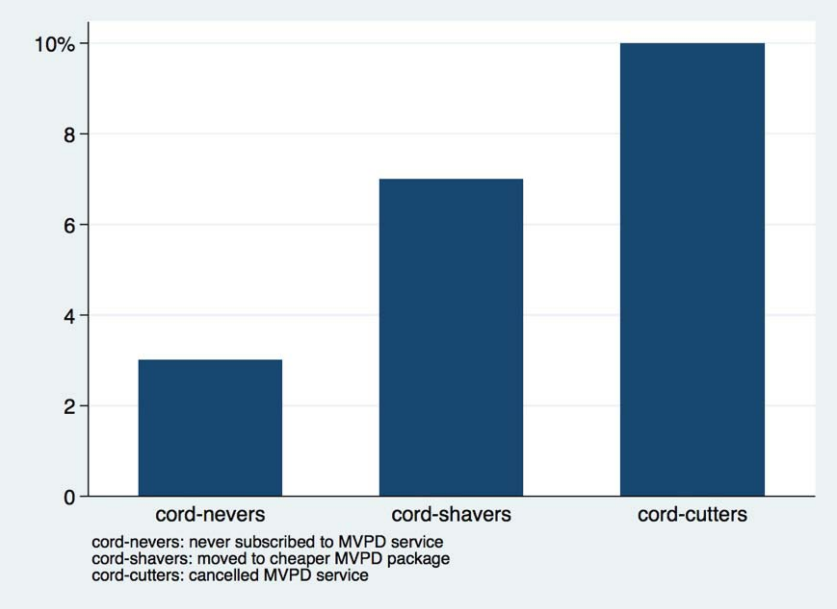


Source: Netflix and Comcast quarterly reports.

Netflix and other OTT providers are not perfect substitutes for MVPDs, but increasing substitutability is driving cord-cutting. As the FCC has noted, "[t]he decline in television penetration since the 2010-2011 season, when it was 99 percent of all households, is attributed to "cord-cutters" or viewers of Internet video only (i.e., Netflix)."[14] One estimate finds that ten percent of U.S. TV households are cord-cutters (Figure 2).

[14] Ibid., para. 192.

Figure 2: Share of U.S. TV Households That Are Cord-Nevers, -Shavers, or -Cutters



Source: IDATE (2016).[15]

As early as 2011, the FCC concluded that online video distributors (OVDs) provided competition to MVPDs. In its order approving Comcast's purchase of NBCU, the Commission argued:

> [W]e find no merit in the Applicants' argument that OVDs cannot replace Comcast's MVPD service (and thus Comcast has no incentive to discriminate against them) because the Internet lacks the capacity to deliver popular sports and other heavily watched programming. The evidence is to the contrary. In fact, Comcast's own documents belie its assertions. Three of the major U.S. professional sports leagues already offer access to out-of-market games over the Internet. [REDACTED]. Cablevision is starting to use its all-digital network to provide virtual DVR service to all of its customers: the recorded programs are stored at the cable head-end, not on the equipment in the customer's home. Comcast uses the same type of digital platform. We conclude that if a cable system has the capacity to handle the playback of stored video by all its subscribers, it has the capacity to handle the streaming of a popular sports program. And if it does not, the cable system can be easily and inexpensively expanded.[16]

Other changes in online video can only increase the competitive pressure on MVPDs. For example, it is increasingly possible to purchase access to networks without a cable subscription, including HBO, Showtime, Starz, MLB TV, NFL Game Pass, and others.

Additionally, at least two online video delivery systems are trying to replicate the traditional MVPD experience online. For $20 per month, Sling TV offers access to 23 feeds traditionally viewed on pay TV, like AMC, the Food Network, ESPN, TBS, and the Cartoon Network.[17]

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[15] IDATE. *Share of cord-shutters, cord-shavers and cord-nevers in the United States as of November 2015*. http://www.statista.com/statistics/495693/cord-cut-penetration-usa/ (accessed April 13, 2016).
[16] Federal Communications Commission, "In the Matter of Applications of Comcast Corporation, General Electric Company and NBC Universal, Inc. For Consent to Assign Licenses and Transfer Control of Licensees," January 18, 2011, para. 83, https://transition.fcc.gov/FCC-11-4.pdf.
[17] https://www.sling.com/package

Subscribers can add a wide range of sports, movie, and foreign channels for additional fees.[18] For $40 per month PlayStation Vue offers access to more than 60 channels, and access to more than 100 for $55 per month.[19]

The FCC cited this growing competition as a major reason for denying the Comcast-TWC merger in 2015. The FCC's General Counsel, Jonathan Sallet, discussed this competition in a speech at the 2015 Telecommunications Policy Research Conference:

> The portrait of OVD business models changed markedly during the pendency of the applications and these changes sharpened the focus on potential harms to the basic building blocks of OVD services. What must have seemed publicly as a series of high-profile conflicts between Netflix and large broadband providers in the winter and spring of 2014 gave way in the fall of that year and the early months of 2015 to a new phenomenon – the emergence of a variety of business models offering different flavors of OVD services. For example, DISH's Sling service offered so-called linear programming of the same kind offered by Pay TV systems, including ESPN. Sony announced its plan to link the supply of programming to its popular gaming console. Owners of programming, including HBO and CBS, launched standalone online services.
>
> The potential for increased consumer welfare as a result of these market developments was obvious – greater competition and potential competition leading to lower prices, greater output and new innovation. In other words, for the first time, multiple OVD services were launching or planning to launch services to provide consumers the ability to stream live, linear programming, including sports, as part of packages that threatened revenue streams derived from traditional Pay TV packages. In general, these new offerings may allow consumers to purchase smaller bundles or view current programming without the need for a contract with a cable company containing the traditional bundle or a traditional set-top box.[20]

As the FCC has itself acknowledged, the market for video deliver is evolving rapidly. Consumers face multiple choices not just among traditional MVPDs, but also among new OTT options. The next section discusses competition in the set-top box market.

Competition in the Set-Top Box Market

Set-top box manufacturers compete with each other for sales, primarily to MVPDs. In 2015, manufacturers shipped nearly 113 million units, of which 16.1 million went to North America.[21] In 2013, manufacturers sold about $20 billion worth of traditional set-top boxes.[22] At the same time, in 2014, companies shipped nearly 27 million OTT set-top boxes.[23] By at least one estimate, in 2015, 21 percent of U.S. households had an OTT streaming device—37 percent of those had a Roku device, 19 percent had Google Chromecast, 17 percent had AppleTV, and 14 percent an Amazon Fire device.[24] Those estimates do not include other hardware with streaming

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[18] https://www.sling.com/package
[19] https://www.playstation.com/en-us/network/vue/?prices#1
[20] Jonathan Sallet, "Lessons of Recent Merger Reviews," 2015, https://www.fcc.gov/document/speech-general-counsel-jon-sallet-lessons-recent-merger-reviews.
[21] IDATE. *TV set-top boxes shipments worldwide by region from 2012 to 2018 (in million units).* http://www.statista.com/statistics/461527/tv-stb-shipments-worldwide-by-region/ (accessed April 12, 2016).
[22] http://www.latimes.com/business/technology/la-fi-tn-set-top-box-sales-20140716-story.html
[23] https://technology.ihs.com/526497/set-top-box-intelligence-market-monitor-stb-q1-2015
[24] http://www.ooyala.com/videomind/blog/ott-set-top-box-sales-accelerate-roku-was-best-seller

capabilities, such as PlayStation and Xbox. If set-top boxes constitute a market, it does not appear to be the case that MVPDs have managed to block entry into it.

CableCARD and Set-Top Boxes that can Access MVPD Video

The FCC suggests the presence of market power by MVPDs by claiming "almost all consumers have one source for access to the multichannel video programming to which they subscribe: the leased set-top box, or the MVPD-provided application."[25] While it is true that only a small fraction of MVPD subscribers do not lease their set-top boxes from an MVPD,[26] the NPRM's phrasing is misleading. Nearly all consumers have multiple choices for set-top boxes even after they have chosen their MVPD.

Rather than leasing a box from the MVPD, consumers can purchase devices (and additional services) from TiVo or Silcondust using a CableCARD. As a working group of the Downloadable Security Technology Advisory Committee (DSTAC), a Committee whose analysis informed the NPRM,[27] explained, "CableCARD technology works across all US cable systems and FiOS. There is a competitive multi-vendor set-top box market for MVPD-purchased devices in the US, including TiVo as a supplier of set-top boxes to cable operators that depends on CableCARD."[28] While TiVo is a decidedly high-end product, with the BOLT costing from between $300 and $400 plus a monthly service fee,[29] the Silicondust HDHomeRun Connect is available for about $90.[30]

Thus, it is not the case that "almost all consumers have one source" for their boxes, but that almost all consumers choose to lease their boxes from their MVPD. The distinction is important because the NPRM implies that some anticompetitive behavior prevents consumers from adopting alternative set-top boxes. However, evidence suggests that consumers themselves largely reject the alternative model.

The NPRM offers two reasons for the unenthusiastic response to CableCARD (despite elsewhere crediting CableCARD with stimulating innovation). One is the inability of these CableCARD-enabled boxes to access video on demand services.[31] But as a DSTAC working group noted, "[t]hrough bilateral negotiated agreements between the cable operator and the CableCARD device manufacturer, like the one between TiVo and several cable operators, the TiVo 'one-way' CableCARD device has access to two-way cable services such as VOD, PPV, CallerID,

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[25] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," 13.
[26] NCTA itself notes that only about 623,000 CableCARDs are in use in "retail CableCARD-enabled devices." https://www.ncta.com/platform/public-policy/50-million-reasons-to-end-the-integration-ban/
[27] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," NPRM, (February 18, 2016), paras. 9–10.
[28] DSTAC, "Report of Working Group 2 to DSTAC," 4.
[29] https://www.tivo.com/shop/bolt#/bolt
[30] http://www.amazon.com/SiliconDust-HDHomeRun-CONNECT-broadcast-2-Tuner/dp/B00GY0UB54/ref=sr_1_2?ie=UTF8&qid=1460232190&sr=8-2&keywords=silicondust accessed April 16, 2016.
[31] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," para. 7.

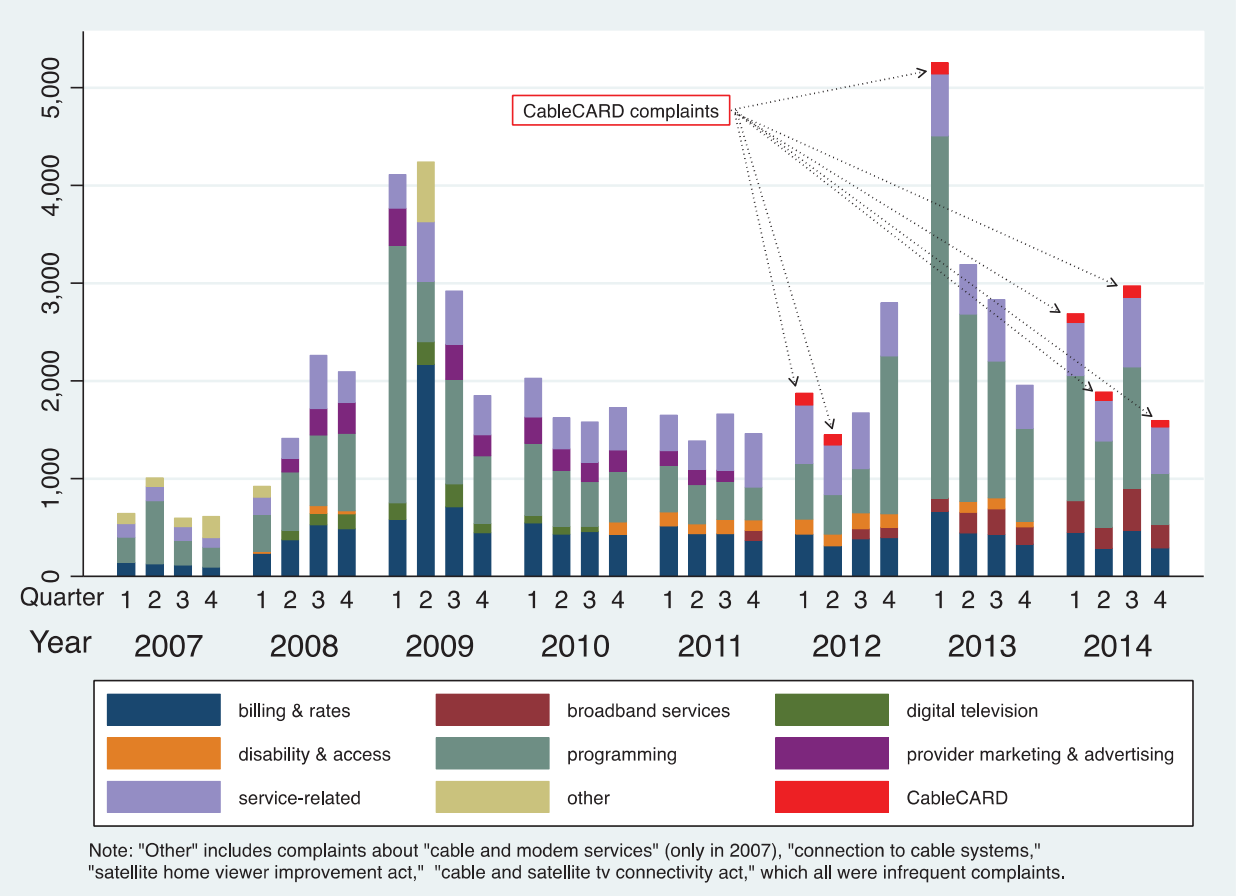
Switched Digital Video, Catchup, StartOver and more." [32] In other words, third-party boxes can access video on demand services, despite the FCC's claims.

The FCC also contends that CableCARD adoption has been slow due at least in part because "cable operators generally offered poor CableCARD support."[33] While plausible, the NPRM's support for that assertion is a footnote citing the experience of one person in 2006 and another in 2010,[34] which hardly proves a wide-spread lack of support. Even if we grant the assertion that MVPDs did not eagerly support CableCARD, other evidence suggests that consumers, not MVPDs, have largely rejected (or have been slow to adopt) CableCARD-enabled devices.

First, consider complaints to the FCC. One might imagine that if consumers were finding their efforts to acquire CableCARDs being rebuffed by their MVPDs, they might complain. Figure 3 shows complaints filed with the FCC about cable and satellite services. From 2007 through 2014 the FCC published data quarterly showing the top five complaint topics, including the number of complaints per topic. The figure shows that complaints about CableCARD rarely make the top five, and when they do the numbers are miniscule compared to other topics.

[32] DSTAC, "Report of Working Group 2 to DSTAC," 17.
[33] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," para. 7.
[34] Ibid., n. 28.

Figure 3: Complaints about Cable and Satellite Services by Quarter-Year



Source: FCC Quarterly Reports – Consumer Inquiries and Complaints[35]

One rejoinder to the small number of CableCARD complaints might be that we should expect a small number given the small number of CableCARDs in use. But if large numbers of people were trying, unsuccessfully, to get CableCARDs we should expect to see a larger number of complaints. Instead, however, it seems that CableCARD-enabled devices are inherently unpopular.

Second, Hazlett and Gigorova-Minchev (2011) explain how direct-broadcast satellite (DBS) entry into the MVPD business revealed the efficiency of, and consumer preference for, set-top boxes bundled as part of the service offering.[36] As they explain, when DBS first started competing with cable as MVPD providers, it required new subscribers to buy set-top boxes in retail stores—the model the FCC would apparently prefer to see today.

> Yet, over time, bundled bargains offered by satellite providers began appearing and independent sales of DBS boxes declined and then vanished. It is not plausible that market power explains the migration in market structure, for the simple reason that neither DirecTV nor EchoStar possessed such power. Moreover, the DBS-wide migration, observed simultaneously for both

[35] https://www.fcc.gov/general/quarterly-reports-consumer-inquiries-and-complaints

[36] Ralitza A. Grigorova-Minchev and Hazlett, Thomas W., "Policy-Induced Competition: The Case of Cable TV Set-Top Boxes," *Minnesota Journal of Law, Science & Technology* 12, no. 1 (2011): 279–311.

> standards, is consistent with only an efficiency explanation: DBS providers bundled boxes to increase market share against cable operators.[37]

In other words, while selling boxes through retailers provided an avenue for entry by a direct competitor to cable, it turned out that consumers tended to prefer a set-top box bundled with the video service.

Additionally, the United States does not appear to be unique. MVPDs around the world are also the sole suppliers of boxes to their customers. For example, customers of every provider except one in a sample of 26 providers across 11 OECD countries must obtain a set-top box from the MVPD (Table 1). The one exception is FreeSat in the UK, which is a free satellite service offered by BBC and ITV.[38]

[37] Ibid., 303.
[38] http://www.freesat.co.uk/about-freesat/freesat-board

Table 1: STB Provision Across Providers in Select OECD Countries

Country	Company	How does customer obtain box?	Monthly lease	Purchase price	Source
Austria	UPC	rent from UPC	EUR 0		[1]
	Liwest	buy from Liwest		79 Euro	[2]
Australia	Foxtel	rent from Foxtel	AUD 15-25		[3]
	Optus	rent from Optus	AUD 15		[4]
Canada	Rogers	Rent or buy from Rogers	CAD 12.95-24.95	CAD 319.99-499.99	[5]
	Bell	rent to own from Bell	CAD 8	CAD 499	[6]
	Bell	rent to own or buy from Bell	CAD 15	CAD 499	[7]
France	Numericable	rent from Numericable	EUR 3		[8]
	Vialis	rent from Vialis	EUR 0	additional box EUR 146.30	[9]
Germany	Vodafone	buy from Vodafone	EUR 0 or one-time EUR 50 for box with more storage for the first box; EUR 6.99 - EUR 18.99 each additional box		[10]
	Unity Media	rent from Unity Media	EUR 0		[11]
Israel	Hot	rent from Hot	ILS 79.32		[12]
Japan	SkyPerfecTV	rent from SkyPerfecTV	648-972 Yen		[13]
	J:Com	rent from J:Com	800-1200 Yen		[14]
	StarCat	rent from StarCat	3000-7300 Yen		[15]
Netherlands	Vodafone	buy from Vodafone	EUR 0-5 first box; EUR 5-10 for additional	0-5 Euro	[16]
	Ziggo	rent from Ziggo	EUR 4		[17]
	XS4All	rent from XS4All	EUR 4		[18]
	KPN	rent from KPN	EUR 4		[19]
Sweden	Boxer	buy from Boxer		0-3995 SEK (Kroner)	[20]
Switzerland	Naxoo	buy or rent from Naxoo	CHF 29	CHF 99 for Digicard	[21]
	Quickline	buy from Quickline		149 CHF for cablebox, 99 CHF for Digicard	[22]
UK	Virgin Media	lease or included from Virgin	GBP 0 for first box; additional boxes per month: GBP 6.50 for box plus GBP 5 TiVo subscription		[23]
	Sky	lease from Sky	GBP 20-44		[24]
	BT	rent from BT	GBP 0 for first box; 2nd box requires plan upgrade starting at GBP 10 per month		[25]
	FreeSat	FreeSat or third parties		GBP 44 - GBP 219.95	[26]

Note: Sources in footnote [39].

[39] [1] http://www.upc.at/fernsehen/digital-tv/upc-tv-plus/; [2] https://www.liwest.at/produkte/fernsehen-radio/empfangsgeraete.html; [3] https://www.foxtel.com.au/get/select-customise.html; [4] http://www.optus.com.au/shop/entertainment/tv-movies/fetch-tv/buy; [5] http://www.rogers.com/consumer/tv/hardware; [6] http://www.bell.ca/Bell_TV/HD-Receivers-and-HD-PVR [7] http://www.bell.ca/Fibe-TV/HD-PVR-Receivers; [8] http://offres.numericable.fr/tripleplay; [9] http://www.vialis.tm.fr/particulier/cable/television/nouveau-decodeur;

Experiences in similar markets suggest that consumers often choose to obtain equipment from the provider rather than obtain it from third parties. In particular, on a recent investors' conference call, Time Warner Cable revealed that about 86 percent of its broadband subscribers lease modems from the company rather than purchasing and using their own.[40] Choosing to use one's own modem while subscribing for service seems to be no more complicated than choosing to lease a modem, and the equipment itself requires no plugin like a CableCARD. Yet even under those circumstances subscribers by and large choose to lease.

To be clear, the evidence in this section does not speak to consumer preferences with respect to leasing or buying equipment. It does, however, suggest that consumers generally prefer to obtain their equipment from their MVPD.

Set-Top Box Lease Prices

To some extent, line-items on consumers' bills for set top boxes are not particularly meaningful since they are part of the video service bundle. Because the total service price will always be above marginal cost given the high fixed costs of the infrastructure, charges for specific components of the bundle are necessarily somewhat arbitrary.[41] Nevertheless, because the NPRM and the Commission's advocacy surrounding the proposal focus on that line item,[42] it is worth reviewing available information on set-top box prices.

The FCC's primary talking point on prices—and its primary argument for the rules it proposes—comes from a press release issued by Senator Markey's office. As the Chairman's "fact sheet"

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http://www.vialis.tm.fr/sites/default/files/pdf/cable/tarif_prestations_cable.pdf ; [10] https://zuhauseplus.vodafone.de/digital-fernsehen/kabel/tv-komfort-hd.html; https://zuhauseplus.vodafone.de/digital-fernsehen/kabel/; [11] https://www.unitymedia.de/privatkunden/fernsehen/tv-pakete/; [12] http://www.hot.net.il/heb/TV/priceTV/ [13] http://www.skyperfectv.co.jp/eng/service/; [14] https://www.jcom.co.jp/english/pdf/sapporo_tohoku_kanto.pdf [15] http://www.starcat.co.jp.e.lh.hp.transer.com/first/step2/tv/plan/digital-max/index.html; [16] https://www.vodafone.nl/shop/vodafone-thuis/interactieve-tv/; [17] https://www.ziggo.nl/televisie/play-start/ [18] https://www.xs4all.nl/televisie/; [19] https://bestellen.kpn.com/; [20] https://www.boxer.se/tv/hardvara/ [21] http://www.naxoo.ch/television/digicard-classic; [22] https://www.quickline.ch/tvradio/empfangsgeraete-gebuehren/; [23] http://store.virginmedia.com/digital-tv/set-top-boxes/compare-boxes-old.html; http://store.virginmedia.com/digital-tv/set-top-boxes/multiroom-old.html; [24] http://www.sky.com/shop/tv/boxes/; [25] https://www.productsandservices.bt.com/products/tv-packages/; http://www.productsandservices.bt.com/products/manage-tv/#get-an-extra-box; [26] http://www.freesat.co.uk/get-freesat/all-boxes

[40] Investors' conference call January 28, 2016. Also mentioned in Amy Young and Andrew DeGasperi, "BYOB: Not a Big Deal" (Macquarie Research, January 29, 2016).

[41] Chaplin, et al of New Street Research argue that "STB revenue is just video revenue in disguise; if required, the industry would simply reclassify revenue, as the Wireless industry did during a similar transition in 2012." Jonathan Chaplin, Spencer Kurn, and Vivek Stalam, "4Q15 Cable Trends Review: Cable Keeps Beating, But Long-Term Estimates Aren't Going Up," Industry Note, (March 9, 2016). Similarly, in a February 2016 Bloomberg interview, Craig Moffett noted that MVPDs could shift fees from boxes to video. http://www.bloomberg.com/news/videos/2016-02-18/fcc-s-plan-to-disrupt-cable-and-satellite-set-top-boxes.

[42] See, for example, Federal Communications Commission, "FCC Chairman Proposal to Unlock the Set-Top Box: Creating Choice and Innovation," Fact Sheet, (January 27, 2016), https://www.fcc.gov/document/fcc-proposal-unlock-set-top-box.

notes, Senator Markey estimates that consumers spend $231 annually—about $20 billion total—leasing set-top boxes from MVPDs and that this amount has increased 185 percent since 1994.[43] Senator Markey's press release, however, provides few details on how his staff arrived at those numbers.[44]

Senator Markey requested information regarding set-top box lease arrangements from the major U.S. MVPDs. The press release notes the responses yielded an average of $7.43 per month per box, though the release does not explain how the MVPDs' responses yield that average.[45] Nevertheless, the average seems plausible if it includes payments for DVRs as well as standard set-top boxes.[46] The average, however, hides significant variation in prices across MVPDs and even within MVPDs.

Figure 4 shows MVPD responses to the questionnaire Senator Markey's office sent them. The figure shows little regularity across MVPDs. Some MVPDs, including AT&T and Dish, charge nothing for the first STB. Comcast provides digital adapters for free, Cox offers a "minibox" for $1.99 per month, and Brighthouse offers a "limited service box" for $1.00 per month. Time Warner Cable provided the full range of set-top box prices it offers: $7.00 - $11.25 per month. Given this price variation even within MVPDs, while the average monthly lease price per set-top box may very well be $7.43 given the provided data, Senator Markey's data cannot tell us whether that implies a typical household pays $231 per year or the the range of prices a consumer faces.

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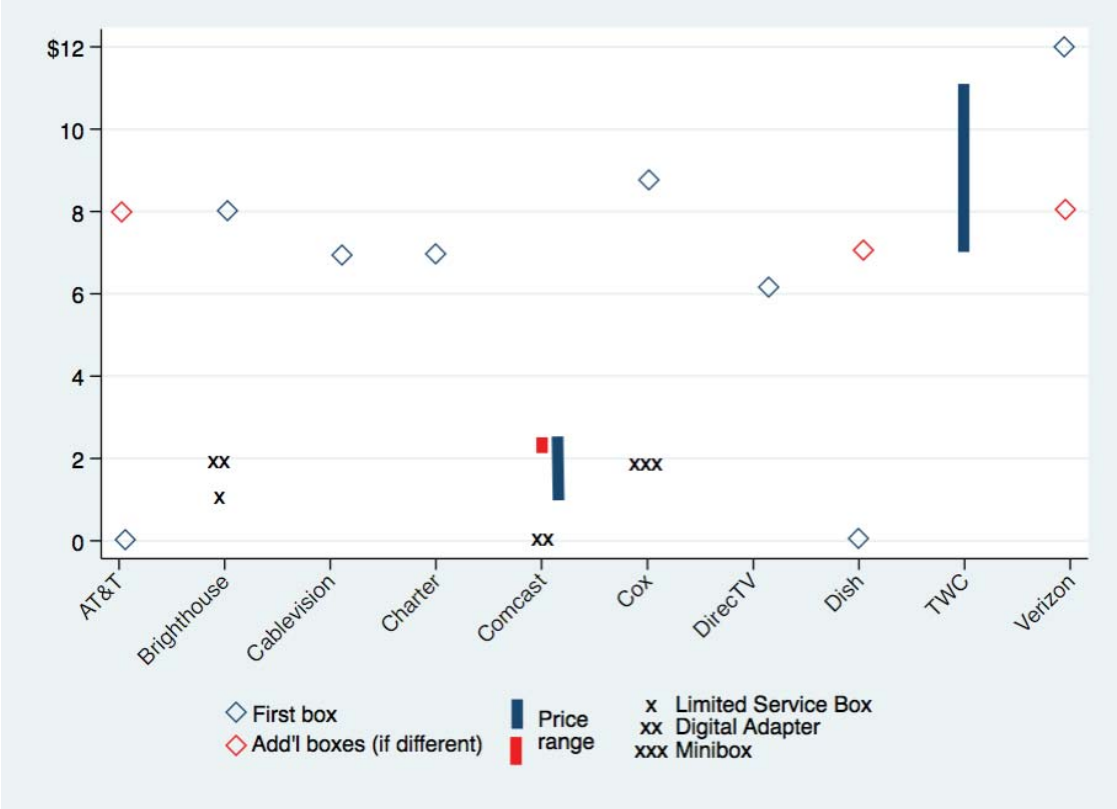
[43] See, for example, Ibid.

[44] http://www.markey.senate.gov/news/press-releases/markey-blumenthal-decry-lack-of-choice-competition-in-pay-tv-video-box-marketplace

[45] Sen Markey derives $231 annually as follows: ($7.43/month)*2.6*12 = $231.82, where 2.6 is, according to the press release, the average number of STBs in American homes. 2.6 may be a high estimate, since some of the answers provided by the MVPDs note 2.5 as the correct number, and ARRIS (2016) states that the average is 2.2 (http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9NjEzOTg0fENoaWxkSUQ9MzI3OTE1fFR5cGU9MQ==&t=1, p.68)

[46] At least one analyst report concludes these numbers must include STBs and DVRs Inder M. Singh and Kevin Manning, "STBs: Another Development to Watch" (SunTrust Robinson Humphrey, February 18, 2016).

Figure 4: STB Lease Prices as Stated by MVPDs in Response to Sen Markey's Questionnaire



Source: Derived from data provided to Sen Markey.[47]

Before considering other sources of data on prices and price increases, and discounting the fact that allocating prices across different components of the video delivery package is necessarily a bit arbitrary, consider, as a rhetorical matter, the FCC's belief that STB prices are too high. If prices are too high, the FCC must therefore believe that some price level is right even though economic theory could not tell us what that price should be in this industry. Second, and relatedly, the FCC presumably believes that sufficiently low prices would indicate a healthy market. As explained above, several MVPDs offer boxes for less than that average,[48] or even for free. The presence of such prices should, at a minimum, assuage the FCC's concerns.

Sources other than Senator Markey shed additional light on price levels and how they have changed over time. Time Warner Cable, for example, provides some data to investors on set-top box revenues. In particular, in 2015 TWC noted revenues of $1.432 billion for "video equipment rental and installation charges" and another $609 million for "DVR service."[49] With 10.8 million

[47] http://www.markey.senate.gov/news/press-releases/markey-blumenthal-decry-lack-of-choice-competition-in-pay-tv-video-box-marketplace

[48] I recognize that unless all prices are the same, it is a bit tautological to note that some prices will be less than the average. In fact, I would be willing to bet that half are less than the median price.

[49] 2015 10-K Annual Report, p.49 http://d1lge852tjjqow.cloudfront.net/CIK-0001377013/8b96bb26-7d43-4ce2-8fb8-a9cb5ca5fa5f.pdf. .

video subscribers,[50] these revenues imply an annual average of about $189 per household, or about 20 percent less than Markey's estimate.

Even taking Sen Markey's press release at face value in the sense that the amount subscribers pay per set-top box has increased by a large amount, Chairman Wheeler's comparison to other products makes no sense. In his fact sheet, the Chairman argued that "the cost of cable set-top boxes has risen 185 percent while the cost of computers, televisions and mobile phones has dropped by 90 percent."[51] Those two numbers, however, are not comparable. The set-top box number is based on an estimate of how much subscribers spend on their devices annually. And although the Chairman provides no source for his numbers, the 90 percent price drop to which he refers surely reflects quality-adjusted price indices,[52] not actual price.

For example, a color television in the early 1990s cost between $200-$1000,[53] while today the median price on Amazon ranges from around $200 for a 24-inch basic television to many thousands of dollars for very large, feature-rich sets.[54] Prices, apparently, have not fallen 90 percent. Of course, we know intuitively that a television purchased in 1994 is barely comparable to one purchased in 2015. Hence, we use price indices to make quality adjustments. Figure 5 shows expenditures and price indices from the Bureau of Economic Analysis for the three consumer electronics goods the Chairman cited in his Fact Sheet.

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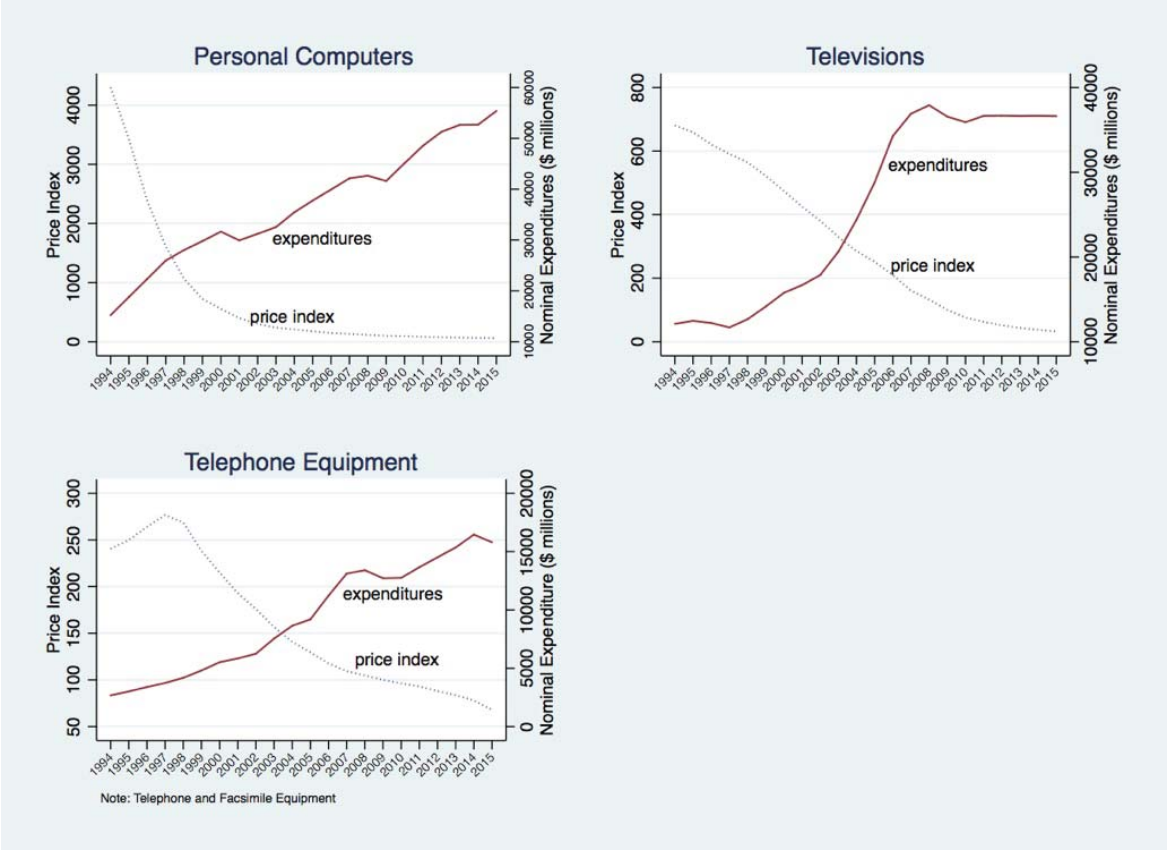
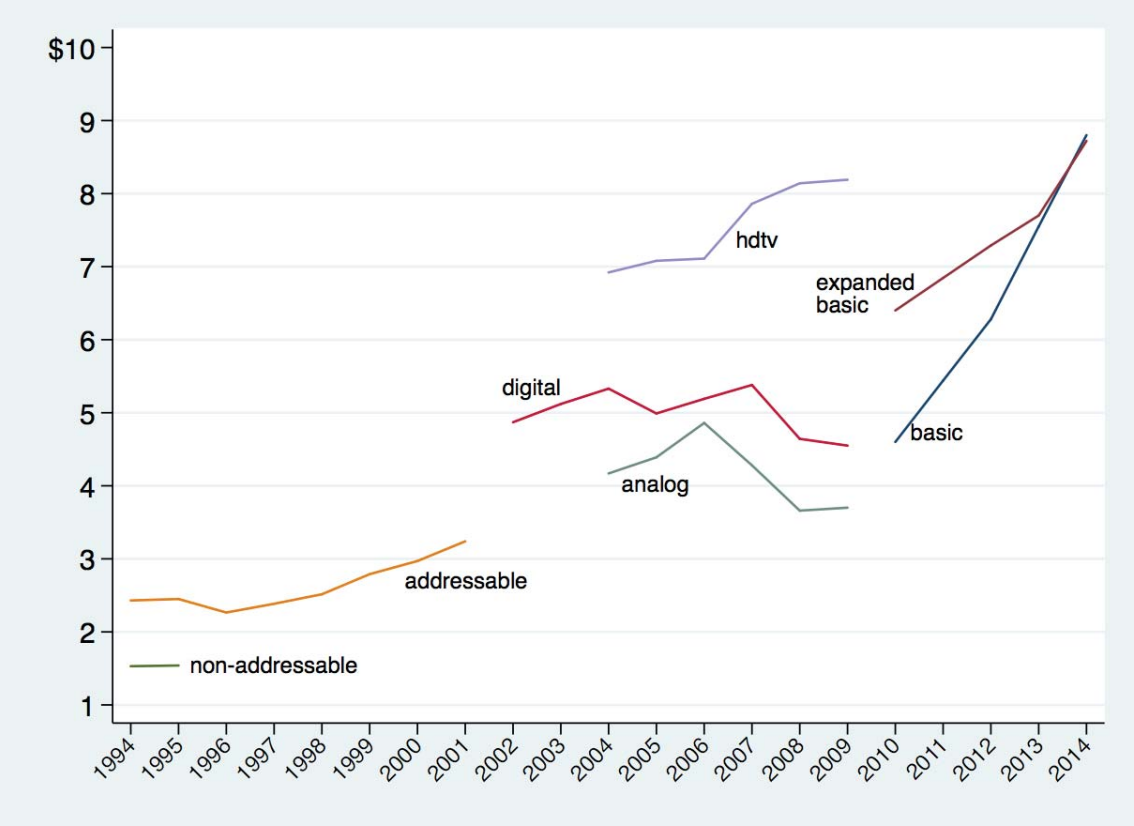
[50] 2015 10-K Annual Report, p.3 http://d1lge852tjjqow.cloudfront.net/CIK-0001377013/8b96bb26-7d43-4ce2-8fb8-a9cb5ca5fa5f.pdf.
[51] Federal Communications Commission, "Fact Sheet: FCC Mobile Spectrum Holdings Rules," May 15, 2014.
[52] See, for example, David Byrne and Eugenio Pinto, "The Recent Slowdown in High-Tech Equipment Price Declines and Some Implications for Business Investment and Labor Productivity," *FEDS Notes*, March 26, 2015, https://www.federalreserve.gov/econresdata/notes/feds-notes/2015/recent-slowdown-in-high-tech-equipment-price-declines-some-implications-for-business-investment-labor-productivity-20150326.html.
[53] http://www.tvhistory.tv/tv-prices.htm, http://www.thepeoplehistory.com/90selectrical.html
[54] TPI research associate Brandon Silberstein undertook a painstaking review of TV prices on Amazon. Contact him for information on great deals as of April 13, 2016.

Figure 5: Expenditures and Price Indices for TVs, PCs, and Telephones 1994-2015



To properly compare the change in price of set-top boxes with other goods requires creating a similar price index, rather than simply noting how much consumers spent in 1994 and in 2014. I do not have sufficient information to construct an accurate price index for set-top boxes, but data from the FCC sheds some light on the issue. Figure 6 shows data on set-top box prices collected by the FCC from 1994 – 2014.

Figure 6: Average Monthly Lease Prices for STBs, as Reported by the FCC



Source: FCC Cable Price Reports.[55]

The figure illustrates that features provided by set-top boxes have changed over time. In 1994, they did little more than deliver standard-definition analog video from the coaxial cable to the subscriber's television. In 1994 the FCC provided prices for non-addressable and addressable converter boxes and their remote controls.[56] Beginning in 2010, the FCC provided information on the most commonly leased equipment due to the wide variety of STBs. In 2014, 56 percent of the most-commonly leased equipment ("basic" in the figure) included an interactive programming guide, 48 percent included HD video capability, and 14 percent included DVR capabilities.[57]

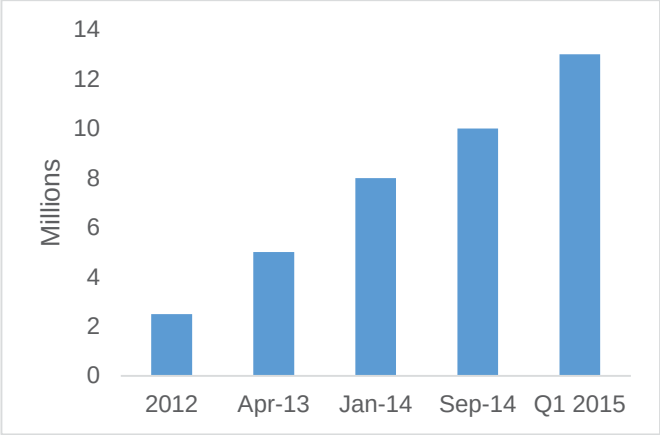
Thus, while prices of STBs have increased, it is likely that a price index would not show as steep an increase as the Chairman and the NPRM suggest.

[55] Where possible the figure shows the price of the box plus the remote. Beginning in 2010, the FCC reported an average price for the most commonly-leased equipment (called "basic") and the next-most-commonly-leased equipment (called "expanded basic").
[56] Wikipedia notes that an "addressable" set-top box "is one that can be controlled by the local cable company," while a "non-addressable" set-top box cannot. https://en.wikipedia.org/wiki/Cable_converter_box
[57] https://apps.fcc.gov/edocs_public/attachmatch/DA-14-1829A1.pdf, para 23

OTT Set-Top Boxes

Non-MVPD set-top boxes have grown in popularity quickly. None of the major companies reveal detailed sales data, but it is possible to piece together information from press releases and analysts' reports. Data on Roku devices shows Americans' rapid adoption of OTT set-top boxes (Figure 7).

Figure 7: Cumulative U.S. Sales of Roku Boxes and Sticks



Various sources.[58]

As one DSTAC working group observed,

> Retail devices are clearly succeeding under this apps model. As noted above, Roku has sold over 5 million units, relying entirely on apps (including a cable-operator supplied guide), outselling TiVo (with its "third party" TiVo guide) ten-to-one. No evidence has been presented to the DSTAC to indicate that retail devices needs to interfere with the retail relationship between an MVPD and its customers to distinguish themselves.[59]

Without providing any supporting evidence, the NPRM generously attributes nearly all of the innovation in the video and set-top box markets to the FCC's CableCARD rules, claiming,

> These rules drove innovations that consumers value greatly today: high-definition digital video recording, competitive user interfaces that provided more program information to viewers, the ability to set recordings remotely, the incorporation of Internet content with cable content, and automatic commercial skipping on cable content.[60]

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[58] 2012: http://wwwimg.roku.com/static/oldlib/press_releases/roku_breaks_the_smart_tv_mold.pdf?download=true; April 2013, January 2014, September 2014: http://www.multichannel.com/news/tv-apps/roku-surpasses-10m-players-sold-us/383877; Q1 2015: https://www.strategyanalytics.com/strategy-analytics/news/strategy-analytics-press-releases/strategy-analytics-press-release/2015/06/05/amazon-fires-to-the-top-of-the-us-digital-media-streamer-market-says-strategy-analytics#.VXcbh89VhBchttps://www.strategyanalytics.com/access-services/devices/connected-home/consumer-electronics/market-data/report-detail/usa-connected-tv-device-tracker-q1-2015 (eyeballed from chart).

[59] DSTAC, "Report of Working Group 3 to DSTAC" (Federal Communications Commission, April 21, 2015), 170, https://transition.fcc.gov/dstac/dstac-report-final-08282015.pdf.

[60] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices;

This is hardly a unanimous view, even among those affiliated with the FCC. As a DSTAC working group noted, while some believe the CableCARD rules stimulated innovation, others believe it hindered innovation:

> Some members stated that CableCARD has supported innovation by cable operators. The presence of CableCARD has enabled TiVo Series 3+, SiliconDust and Hauppauge devices, but most others members believe that CableCARD has impeded innovation by cable operators and FiOS. The requirement to use CableCARDs in leased devices delayed cable operators' ability to use the DTAs [digital television adapters] essential for their transition to all-digital. The need to create a custom solution for UDCPs [unidirectional cable-ready product, like TiVo] delayed cable's use of switched digital video to expand channel capacity.[61]

In fact, the FCC argued in its 16th Annual Video Competition Report that the growth in OTT set-top boxes (as opposed to CableCARD) has helped spur innovation among MVPD set-top boxes. Because of OTT set-top boxes, the FCC states,

> MVPDs therefore continue to develop and refine their leased CPE offerings to improve the consumer experience, lay the groundwork for future technological changes in network technologies, and provide value to the operator in other contexts.
>
> Inside the home, MVPDs are refining and expanding the technology ecosystem that leased set-top boxes operate in. Refinements to DISH Network's Hopper and DIRECTV's Genie lines of set-top boxes include offering with the ability to transmit programming wirelessly from a primary set-top box to other set-top boxes in the home and to configure parental controls and other settings via smartphone or tablet applications. Additionally, DIRECTV's customers can now connect their HDDVR to the Internet and get instant access to all of DIRECTV's On Demand programming.[62]

The FCC has failed to identify a competitive issue in the MVPD set-top box market while simultaneously noting the rapid innovation across set-top boxes. Given that the market power of the MVPDs themselves in their primary market—video distribution—is, at a minimum, steadily decreasing and practically nil in the market for set-top boxes, it is difficult to conceive of an antitrust theory that would support such radical intervention in these markets.

An Economic Framework for Evaluating the MVPD-STB Connections

The discussion above illustrates competitiveness in the relevant markets. However, even if the FCC were to conclude that MVPDs had sufficient market power to behave anticompetitively with respect to set-top boxes, it would still need a theory to explain why the current market is anticompetitive. A useful framework would take into account issues of efficiency and vertical integration between MVPDs and set-top boxes.

Set-top boxes are part of a bundle of goods and services MVPDs provide. Simply because some MVPDs charge a separate line-item fee for the set-top boxes does not necessarily mean that the

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Commercial Availability of Navigation Devices," para. 7.

[61] DSTAC, "Report of Working Group 2 to DSTAC," 19.

[62] Federal Communications Commission, "Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming: Sixteenth Report," paras. 324–325.

set-top box is a separate economic product from the rest of the video service. At a basic level the FCC's proposal ignores questions regarding the efficient organization of firms raised by Ronald Coase and Oliver Williamson. Coase's key observation is that the boundaries of a firm are not fixed. Firms will make decisions about what activities to do in-house, divest, or contract for in the market based on the transactions costs of those different decisions.[63] Williamson extends this work to discuss how the transactions costs related to handling the many relationships in a production chain can affect vertical integration decisions.[64]

This foundational work makes no normative statements about the relative societal benefits and costs of vertical integration. Yet, generally research has found that the benefits of vertical integration tend to outweigh the costs. Lafontaine and Slade conclude in a comprehensive 2007 review of the literature,

> We are…somewhat surprised at what the weight of the evidence is telling us. It says that, under most circumstances, profit maximizing vertical-integration decisions are efficient, not just from the firms' but also from the consumers' points of view. Although there are isolated studies that contradict this claim, the vast majority support it.[65]

In the case of set-top boxes, MVPDs do not own the box manufacturers, but instead contract with them and lease the boxes to subscribers. There is no inherent reason to believe this arrangement is inefficient. This has been a stable equilibrium for decades, but over-the-top video providers may lead to changes; consumers can now buy devices that serve similar functions as pay TV STBs from companies like Roku, Amazon, Google, Apple and others. If the FCC intends to impose costs by upending this aspect of the industry, it should offer some economic theory and supporting evidence as to why the current arrangement requires regulatory intervention.

ICE: Internalizing Complementary Efficiencies

A useful framework for considering the relationship between MVPDs and manufacturers is whether set-top boxes and pay TV have complementary efficiencies, and whether vertical integration would be efficient. Specifically, the question is whether MVPDs are internalizing complementary efficiencies (ICE), a theory comprehensively discussed by Farrell and Weiser (2003).[66] As they explain, ICE is a:

> Chicago School-style argument…[that] claims that even a monopolist has incentives to provide access to its platform when it is efficient to do so, and to deny such access only when access is inefficient. ICE is often a persuasive argument, yet its logic admits several cogent exceptions. Unfortunately, regulators and commentators seldom do justice to the nuances of this principle: some ignore ICE, while others embrace it and underestimate its exceptions. Only by addressing

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[63] See, generally, R. H. Coase, "The Nature of the Firm," *Economica*, New Series, 4, no. 16 (November 1, 1937): 386–405.
[64] Oliver E. Williamson, "The Vertical Integration of Production: Market Failure Considerations," *The American Economic Review* 61, no. 2 (1971): 112–23; Oliver E. Williamson, "Transaction-Cost Economics: The Governance of Contractual Relations," *Journal of Law and Economics* 22, no. 2 (October 1, 1979): 233–61.
[65] Lafontaine and Slade "Vertical Integration and Firm Boundaries: The Evidence," *Journal of Economic Literature* 45, no. 3 (September 2007): 608.
[66] Farrell and Weiser, "Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age."

> both ICE and its exceptions can regulators make full use of economics in analyzing open access requirements.[67]

The question of when ICE holds matters because, again, as Farrell and Weiser put it, "[t]he question for regulators therefore is not whether modularity is good — it very often is — but whether modularity is likely to be good even *when* it will not emerge (or survive) spontaneously, as it often will when it is most valuable to consumers."[68] [emphasis in original]

ICE provides a useful framework because of the particular type of modularity that exists among MVPDs: set-top boxes are—for the moment—one part of the service, manufactured by companies other than MVPDs but distributed by MVPDs. Intriguingly, Farrell and Weiser argue that "[i]n an ideal world, a firm could obtain the benefits of vertical integration while still employing some degree of modularity to spur independent innovation."[69] This "ideal world" sounds remarkably like the current MVPD-set-top box setup.

The question for regulators is whether ICE holds in a given situation and, if it does not, whether potential anticompetitive harms outweigh the benefits of the integration. ICE can fail in several ways.[70] The first, known as "the Bell Doctrine" or "Baxter's Law," holds that a monopolist could extend its market power into a potentially competitive downstream market if it is price regulated in the primary market.[71] Cable prices, however, are largely unregulated, so this condition does not apply.[72]

The second set of conditions involve blocking access to the secondary market: The platform operator might inefficiently integrate with the secondary market if dominating the secondary market can thwart potential competition in the primary market, if bargaining difficulties with the platform operator make entering the secondary market too costly, or if the secondary market could be profitable without the primary market. MVPDs do not manufacture STBs and appear to have no power to exclude others from the market, suggesting these conditions also do not apply.

The third set of ways in which ICE may not hold has to do with the firm's potential future business and regulatory strategies. In particular, it may not want to open its platform if it believes that even if that would be efficient now, perhaps someday a closed platform will be more sensible. Similarly, the firm may fear that opening its platform may beget additional regulatory rules. These reasons likely partly explain MVPD opposition. However, in this case, the FCC would need to prove not only that MVPDs hold sufficient market power in their primary market

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[67] Ibid., 89.
[68] Ibid., 97.
[69] Ibid., 100.
[70] Ibid., 105.
[71] William F. Baxter, "Conditions Creating Antitrust Concerns with Vertical Integration by Regulated Industries--'For Whom the Bell Doctrine Tolls,'" *Antitrust Law Journal* 52, no. 2 (August 1983): 243–47; Paul L. Joskow and Roger G. Noll, "The Bell Doctrine: Applications in Telecommunications, Electricity, and Other Network Industries," *Stanford Law Review* 51, no. 5 (May 1999): 1249, doi:10.2307/1229409.
[72] One might argue that cable faces price regulation in the downstream (STB) market, if there is one. Section 629, Part (a) states MVPDs may offer "converter boxes, interactive communications equipment, and other equipment used by consumers to access multichannel video programming and other services offered over multichannel video programming systems, to consumers, *if the system operator's charges to consumers for such devices and equipment are separately stated and not subsidized by charges for any such service*" [emphasis added].

to make this concern relevant, but also that the costs imposed by these concerns outweigh the benefits of the integration. Thus far, the FCC has failed to do this.

The final way ICE may not hold is when the firm uses the secondary market for price discrimination. MVPDs do use set-top boxes as a part of price discrimination, so this condition requires a more detailed discussion, below.

Price Discrimination

If the firm uses the secondary market to enhance price discrimination, then it is possible for the extra profits from that price discrimination to make inefficient integration profitable. However, price discrimination itself is not inherently bad, but can be beneficial or harmful under different circumstances. The FCC ignores this nuance in its NPRM.

In any industry with high fixed costs and low marginal cost of use, price discrimination will be a crucial tool for covering costs. Because providers must recover fixed and marginal costs, average prices must exceed marginal costs to yield a viable business.[73] The efficient way to recover those fixed costs is to charge different types of consumers different prices. In principle, that means charging higher prices to consumers with stronger demand for video, even though the marginal cost of delivering the service is practically identical. One way MVPDs differentiate pricing based on use is by including more channels and more premium channels in higher-priced packages. Another way to charge more to those with stronger demand for video is by charging for set-top boxes. It may well be that households with more televisions connected to the MVPD place a higher value on video so that charging for each box would be an effective tool for charging those consumers more and covering the total network costs efficiently. Charging per set-top boxes may therefore be beneficial to consumers who are price conscious and do not place as high a value on the content provided by the MVPD compared to those who lease multiple boxes.

Existing Contractual Arrangements

In the existing video ecosystem, video distributors generally pay programmers for content to distribute.[74] The FCC explicitly expects parties to negotiate arrangements for program carriage.[75] The Wall Street Journal estimated in 2014 that MVPDs pay, on average, about $45 per month to

[73] Prices commonly differ from marginal costs, even in highly competitive markets. See, for example, Baumol "Optimal Departures From Marginal Cost Pricing," *The American Economic Review* 60, no. 3 (June 1970): 265–83; *Regulation Misled by Misread Theory: Perfect Competition and Competition-Imposed Price Discrimination (9780844713908): William J. Baumol: Books* (AEI Press, 2006), http://www.amazon.com/gp/product/0844713902?tag=openlibr-20..

[74] Although many distributors, including MVPDs, also produce their own content.

[75] See, for example, Federal Communications Commission, "Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming: Sixteenth Report," para. 46.

"top networks" per subscriber.[76] In 2015, that totaled more than $50 billion in programming fees.[77]

The NPRM states that its "goal is to preserve the contractual arrangements between programmers and MVPDs…"[78] Similarly, the Chairman argued that "the Commission will not interfere with the business relationships between MVPDs and their content providers or between MVPDs and their customers."[79] Despite these reassurances, it is unclear how the proposal would allow MVPDs and programmers to maintain these agreements. MVPDs and programmers negotiate not just over the price, but also over a number of other attributes, as a DSTAC working group described:

> All video distributors assemble a collection of licensed commercial content through individually-negotiated copyright licenses with content owners and licensors (for example, for the right to carry ESPN) and retransmission consent agreements for terrestrial broadcasts (for example, for the right to carry FOX broadcasting affiliates in particular local markets). All are bound separately by the varying terms of these bilateral agreements.
>
> Content providers segment the market through licenses. For example, they impose geographic and mobility restrictions on distribution, such as distinguishing the right to distribute content in-home versus out-of-home, or licensing on some devices or DRM systems but not others....[80]

Another factor subject to negotiations is where a network will appear in the user interface. The issue of "neighborhooding"—grouping like networks in adjacent or nearby channels—is frequently a matter of contention between distributors and programmers and was the subject of special attention in the FCC's order regarding the Comcast-NBCU transaction.[81] As another DSTAC working group notes:

> Content licenses define channel position, tier placement, acceptable advertising, scope of distribution permitted, security requirements and consistent presentation of branded content. Content distribution rights have grown far beyond the simple states defined by the CCI bits sent to CableCARDs. Content providers may specify which devices are trusted and permitted to receive content. Some content is not available to devices unless they support a HW root of trust. Content providers may limit distribution rights to the home, or may place limitations on out of home uses. Content may be permitted only for defined periods of time, and then erased. Some MVPD distribution networks distribute all content to set-top boxes, and then rely on the set-top box to limit use to only permitted geographic areas. License conditions on the devices that receive programming are required to assure that security and a chain of trust will limit the distribution and use of the content to consumers and devices that are entitled to receive the

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[76] Rani Molla, "How Much Cable Subscribers Pay Per Channel," *The Wall Street Journal*, August 5, 2014, http://blogs.wsj.com/numbers/how-much-cable-subscribers-pay-per-channel-1626/.
[77] Media Bureau, "Overview of the Video Marketplace" (Video Marketplace Workshop, Federal Communications Commission, March 21, 2016), 7, https://www.fcc.gov/bureaus/mb/policy/video_marketplace/presentation_WLake_2016.pptx.
[78] Federal Communications Commission, "In the Matter of Expanding Consumers' Video Navigation Choices; Commercial Availability of Navigation Devices," para. 16.
[79] Federal Communications Commission, "FCC Chairman Proposal to Unlock the Set-Top Box: Creating Choice and Innovation."
[80] DSTAC, "Report of Working Group 2 to DSTAC," 6.
[81] See, generally, Federal Communications Commission, "In the Matter of Applications of Comcast Corporation, General Electric Company and NBC Universal, Inc. For Consent to Assign Licenses and Transfer Control of Licensees."

> programming. Applications permit MVPDs to enforce these complex and variable arrangements.[82]

It stands to reason, however, that as the number of third-party STBs that can access MVPD video content grows, so, too, will the potential ways in which the interfaces can violate existing contracts.

The economic effects of nullifying parts of these existing contracts is unclear. Today, when negotiating carriage rights the programmer and the distributor are the relevant parties. But what happens to those negotiations when the distributor can no longer guarantee that agreements on issues like channel neighborhoods, advertising, and promotional information will be honored? Such a change is likely to change the incentives facing both programmers and distributors.

Consider one possible outcome. If MVPDs can no longer realize the existing financial returns on programming content, they may not be willing to pay as much for programming as they do today. If other companies, instead, earn those revenues without paying the content creators and owners, then programmer revenues would decrease. This is the possibility that has led some minority programmers to oppose the NPRM.[83]

That is not necessarily the outcome that would play out. But it is more likely that changing the nature of the relationships between programmers and distributors will lead to other changes in the market than it is that the new rules would "not change a company's ability to package and price its programming to its subscribers."[84]

Given the potential large and varied economic effects, it would seem incumbent on the FCC to at least address the question of how economic incentives would change and how payments within the video ecosystem might change as part of the proposal. Thus far, the Commission has avoided addressing this question.

Conclusion

The FCC's NPRM makes no economic argument to support its proposed rules regarding set-top boxes and MVPD video streams. An average price by itself, like the one from Senator Edward Markey's press release that the FCC cites, is not meaningful when devoid of context or theory. The NPRM does not evaluate—or even define—the relevant markets and therefore fails to explain the ways in which it believes the markets to be anticompetitive and therefore require intervention.

In contrast, in other proceedings the FCC has acknowledged the growing competitiveness of the video delivery market. With 99 percent of households having access to three MVPDs and a growing number of over-the-top video options, including some trying to replicate the MVPD network-focused experience, the market appears to be competitive. Meanwhile, the set-top box is

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[82] DSTAC, "Report of Working Group 3 to DSTAC," 169.
[83] See, for example, NPR: http://www.npr.org/sections/alltechconsidered/2016/02/18/466986959/fcc-wants-to-force-cable-companies-and-their-set-top-boxes-to-adapt
[84] Federal Communications Commission, "FCC Chairman Proposal to Unlock the Set-Top Box: Creating Choice and Innovation."

also seeing more competition. In addition to traditional set-top boxes, which MVPDs do not manufacture, OTT set-top boxes from Roku, Amazon, Google, Apple, and others are proliferating. Additionally, the distinction between a traditional set-top box and an OTT box is beginning to blur. Both Time Warner Cable and Charter are cooperating with Roku to move the MVPD service to the Roku box and eliminate the traditional set-top box.

And, of course, it is already possible for consumers to buy a set-top box from TiVo and others to access their MVPD stream. Through bilateral agreements, TiVo also offers access to providers' video-on-demand, negating the concern about CableCARD's one-way technology. While CableCARD has not been popular, it is not necessarily the case that MVPDs have hindered it — instead, consumers seem to be rejecting it. CableCARD, for example, only occasionally appears in the top five complaints about cable and satellite systems at the FCC.

Finally, MVPDs globally typically also supply set-top boxes to their customers. It is unlikely that providers around the world—including relatively new entrants—all have sufficient market power to enforce an inefficient industry structure.

Even if the FCC believes that some relevant market is not competitive, it should develop a theory as to why some perceived market power is being used anticompetitively. The Commission's proposal, however, fails to acknowlege basic economic theories regarding the organization of firms and, specifically, the potential efficiencies of veritical integration. Transactions costs will help determine what a firm produces in-house or acquires from outside. Any particular integration is not inherently a competition concern. Should the FCC prove market power it should then explain why it believes the type of integration we observe in the industry is the result of anticompetitive behavior.

Relatedly, if the FCC believes prices for boxes are too high than it follows that sufficiently low prices would indicate a healthy market. As several MVPDs offer boxes for less than that average, or even for free, the Commission cannot possibly use prices as a justification for extensive regulation.

Because cost allocation is, by necessity, somewhat arbitrary in an industry with large fixed costs to cover, changing the price MVPDs charge customers for set-top boxes may ultimately have little effect on the final price of the video service. The proposed rules will, however, change incentives facing programmers and MVPDs and are likely to make it impossible for existing contracts to remain intact. The FCC should explain why those changed incentives will not create more costs than benefits.

The Commission should take a step back, examine its rationale for intervention and consider the effects on the video marketplace. If it is serious about its proposal it should take the economics seriously, study data from sources other than a congressman's press release, and provide a coherent explanation of why it believes the status quo results from anticompetitive behavior and how its proposal would fix the problem.