

Should Amazon Be Broken Up?
An Analysis of Valuations and U.S. Antitrust Laws
in the 21st Century Economy

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I. INTRODUCTION

In a recent segment of L2's "Winners and Losers," NYU Stern's Professor Scott Galloway predicted that "by 2020, Amazon will be our first trillion-dollar market cap company."¹ However, his prediction was coupled with a warning:

Don't begin celebrating yet. As soon after, a district attorney will realize that the fastest blue-line path to the governor's mansion will be to go after Amazon and break them up as we begin to connect the dots and realize this amazing company is destroying jobs faster than we can recreate them. 2020, trillion dollars, and the end of Amazon as we know it.²

This forecast reflects the common wisdom that firms that grow too large will exploit their market power to pursue self-interest at the expense of the broader economy. U.S. antitrust laws serve to prevent horizontal monopolies that hinder fair competition, stifle innovation, and damage consumer welfare. Amazon's forays into various industries have already attracted scrutiny from the media and the Federal Trade Commission because of the fear that Amazon's increasing size enables it to engage in anticompetitive behavior.³

However, regulators face the predicament that Amazon's business practices have been largely beneficial for consumers. Lina M. Khan appropriately describes this as an antitrust paradox because Amazon's focus on consumer welfare has cleared its path toward significant growth and consolidation across its business segments.⁴ Khan suggests that the market's high

¹ Galloway, Scott. "Winners and Losers: Amazon Will Be Broken Up." *L2 Inc.*, 13 July 2017, <https://www.l2inc.com/daily-insights/amazon-will-be-broken-up>. Accessed 21 July 2017.

² Ibid.

³ Bartz, Diane. "FTC probing allegations of Amazon's deceptive discounting." *Reuters*, 20 July 2017, <https://www.reuters.com/article/us-whole-foods-m-a-amazon-ftc-idUSKBN1A52R5>. Accessed 24 July 2017.

⁴ Khan, Lina M. "Amazon's Antitrust Paradox." *The Yale Law Journal*, vol. 126, no. 3, 2017, <http://www.yalelawjournal.org/article/amazons-antitrust-paradox>. Accessed 24 July 2017 (hereafter "Khan").

valuation of Amazon, which hinges on growth rather than profits, is a nod to a truth that current antitrust laws cannot acknowledge: Amazon is engaging in anticompetitive behavior.⁵

This paper examines the validity of this claim and whether U.S. antitrust laws need to be revised to reflect the 21st century economy. First, this paper reviews concepts of platform economics, the prevailing analytical framework of the antitrust laws, and criticisms of these prevailing laws. This is followed by an examination of Amazon's aggressive pricing strategies for e-books, to begin to understand how this business practice can produce an effect known as "tipping" toward monopoly in network economics. Finally, this paper presents several event studies focusing on Amazon's acquisitions to determine if there exist statistically significant cumulative abnormal returns that could validate the notion that Amazon is indeed tipping toward monopoly.

The results generally support some popular perceptions of Amazon's activities. However, the results by themselves do not allow a definitive conclusion as to whether the current U.S. antitrust laws are deficient. This is not to say that the questions related to the high concentrations of power in firms such as Amazon are invalid, but definitive conclusions can only be made after pursuing further lines of inquiry that are beyond the scope of this paper. This paper will briefly discuss this topic in the context of other platform-based tech giants such as Facebook and Google.

⁵ Meyer, Robinson. "When Does Amazon Become a Monopoly" *The Atlantic*, 16 June 2017, <https://www.theatlantic.com/technology/archive/2017/06/when-exactly-does-amazon-become-a-monopoly/530616/>. Accessed 24 July 2017.

II. OVERVIEW OF PLATFORM ECONOMICS

In order to properly scrutinize current antitrust laws, it is important to understand how Amazon mediates economic activity and how its business is emblematic of a significant macroeconomic shift. In the industrial era, economic activity took place in markets. Markets are “an idealized site of encounter between buyers and sellers within which the characteristics, quantities, and prices of goods and services [are] regulated autonomically by the laws of supply and demand.”⁶ In addition, the industrial-era economy yielded a linear value chain that moved in one direction from production to the end consumer (see Figure 1).⁷

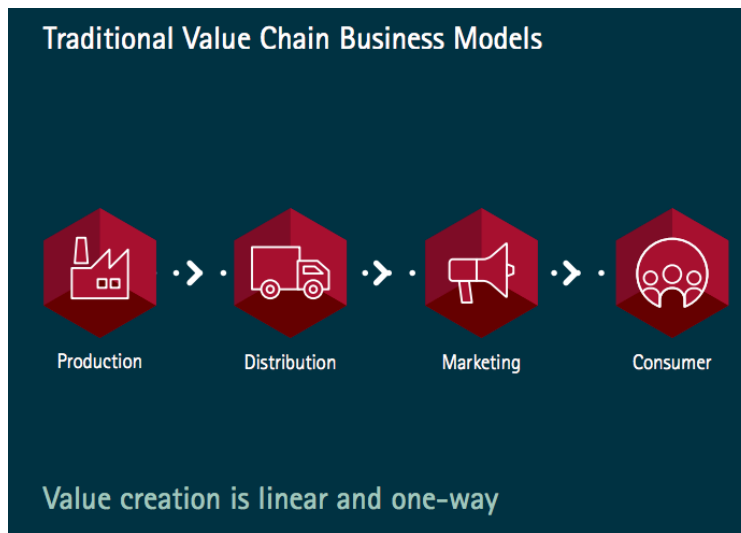


Figure 1 – Traditional Value Chain⁸

This is a supply-side value chain model, so firms create value by optimizing the supply chain and creating significant barriers to entry by way of controlling or owning resources and assets.⁹

⁶ Cohen, Julie E. “Law for the Platform Economy.” *U.C. Davis Law Review*, vol. 51, 2017, p. 136 (hereafter “Cohen”).

⁷ “Trend 3 Platform Economy: Technology-driven business model innovation from the outside in.” *Accenture*, 2016, https://www.accenture.com/fr-fr/_acnmedia/PDF-2/Accenture-Platform-Economy-Technology-Vision-2016-france.pdf. Accessed 16 Nov. 2017 (hereafter “Accenture”).

⁸ Accenture.

⁹ *Ibid.*

Unlike traditional value chain business models, platforms create value through demand-side economies of scale. As seen in Figure 2, value creation is a two-way and continuous process because platforms act as intermediaries in two-sided markets.¹⁰

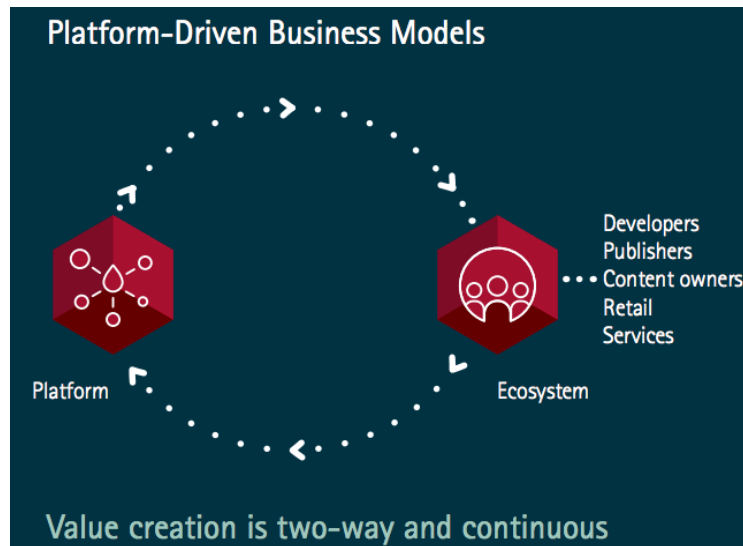


Figure 2 – Platform-Driven Business Models¹¹

Each additional user to the platform “provides more than a proportional increase in its value to consumers.”¹² Therefore, platforms are interested in achieving scale in users, or network effects, to optimize the ecosystem and make it unattractive for users and sellers to switch to another platform.¹³

Platform business models are not new, so it is important to distinguish between a platform business model and the digital platform business models that Amazon, Facebook, and Google are operating. For example, a grocery store could be categorized as a platform business model. Grocery stores act as an intermediary in a two-sided market of customers that want to buy food and brands that want to sell their products. However, a grocery store is significantly

¹⁰ Ibid.

¹¹ Accenture.

¹² Kwoka, Jr., John E. and Lawrence J. White. *The Antitrust Revolution: Economics, Competition, and Policy*. 6th ed., Oxford University Press, 2014, p. 520 (hereafter “Kwoka, Jr. and White”).

¹³ Accenture and Cohen, p. 144.

constrained by the physical space that it owns even if it operates as a chain. The network effects of a grocery store chain are capped by the number of customers that each grocery store can realistically serve.

Digital platforms differ from traditional brick-and-mortar platform businesses because they combine technology and the capabilities of the internet to overcome physical constraints, such as the availability of land, to unlock the potential power of network effects. Additionally, data has become a new factor of production for digital platforms, and the value of this data increases as the user base of these platforms swell. This creates a unique situation in which digital platforms can offer high value to users on one side of the market (often by providing the ability to use the platform for free) in order to cheaply extract data and use it as leverage to set favorable terms for itself when it negotiates with the other side of the market (e.g., advertisers, content creators, or brands).¹⁴ Therefore, technology has expanded the potential in platform business models, and this is what has contributed to a substantial macroeconomic shift that has upended the traditional value chain illustrated in Figure 1.

While it is true that grocery stores and other non-digital platform businesses are investing in collecting data assets, they still run up against several limitations that major digital platforms do not face. For instance, geography can cap access to data if a business does not operate in some regions. Even if a firm has a national footprint with full delivery capabilities like Amazon has, their data collection and learning capabilities might be limited to the scope of goods and services they provide. A company like CVS, which has been lauded for its ability to collect data assets and employ business analytics solutions to improve operations, still cannot hope to compete with a digital platform that has the scale and scope of Amazon.

¹⁴ Cohen, p. 146.

The subsequent sections of this paper will further address the implications of this shift toward digital platforms and how this new paradigm may render current antitrust laws obsolete.

III. A BRIEF OVERVIEW OF PREVAILING ANTITRUST LAWS

The above discussion is meaningless without pairing it with an overview of current antitrust laws. While there is a rich history of how antitrust policy was created and how it has since evolved, a deep dive into this history would be unnecessarily distracting.¹⁵ Instead, this discussion will focus on the Sherman Act, the Federal Trade Commission Act, the Clayton Act, and the interpretations of these laws today.

The Sherman Act of 1890 “outlaws ‘every contract, combination, or conspiracy in restraint of trade,’ and any ‘monopolization, attempted monopolization, or conspiracy or combination to monopolize.’”¹⁶ It is important to note that the Sherman Act does distinguish between legal and illegal monopolies. Intent is extremely important when considering enforcement of the Sherman Act. For example, the Supreme Court presiding over the *Standard Oil* and *United States v. Aluminum Co. of America* (a.k.a. *Alcoa*) cases ruled that merely achieving a monopoly through the normal course of business is different from monopolizing the market.¹⁷ The Supreme Court reemphasized this notion twenty years after *Alcoa* in the *Grinnell* case by stating that it condemned the “willful acquisition or maintenance of [monopoly] power

¹⁵ See Richard A. Posner’s 1978 journal article “The Chicago School of Antitrust Analysis” for a more thorough history of the “Chicago” and “Harvard” schools of antitrust analysis and how these schools of thought have largely converged.

¹⁶ “The Antitrust Laws.” *Federal Trade Commission*, n.d., <https://www.ftc.gov/tips-advice/competition-guidance/guide-antitrust-laws/antitrust-laws>. Accessed 26 Nov. 2017 (hereafter “The Antitrust Laws”).

¹⁷ “Competition and Monopoly: Single-Firm Conduct Under Section 2 of The Sherman Act : Chapter 1.” *The United States Department of Justice*, 25 June 2015, https://www.justice.gov/atr/competition-and-monopoly-single-firm-conduct-under-section-2-sherman-act-chapter-1#N_44_. Accessed 26 Nov. 2017.

as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident.”¹⁸

The Federal Trade Commission Act of 1914 and the Clayton Antitrust Act of 1914 can be viewed as supplements to the Sherman Act. The Federal Trade Commission Act created the Federal Trade Commission, which operates in parallel to the U.S. Department of Justice to monitor anticompetitive behavior. All violations of the Sherman Act are also violations of the FTC Act, but the FTC Act also gives the FTC the power to bring cases against potential anticompetitive behavior that “may not fit neatly into categories of conduct formally prohibited by the Sherman Act.”¹⁹ Similar to the FTC Act, the Clayton Act focuses on practices that are not explicitly addressed in the Sherman Act. Section 7 of the Clayton Act is most notable in that it prohibits mergers and acquisitions that may substantially “lessen competition, or tend to create a monopoly.”²⁰

As with all laws, the enforcement of these antitrust laws is subject to the interpretation and analysis of the courts. There has been significant debate within academia and the legal system as to how to determine when violations of these laws have occurred. As mentioned at the outset of this section, this debate has made interpretation a continuous and evolving process as these laws have been repeatedly held up against an ever-changing economy.

It is therefore no surprise that antitrust laws have been enforced over the past several decades with the traditional value chain business model of the industrial era in mind. Given the singular direction of the value chain, it is also logical that the frameworks for analyzing anticompetitive behavior have been constructed with end consumers as the highest priority. Jay

¹⁸ Ibid.

¹⁹ The Antitrust Laws.

²⁰ Ibid.

Levine and Devan Flahive of Porter Wright Morris & Arthur LLP neatly summarize the objectives of current antitrust analytical frameworks:

Under the analytical framework that has governed antitrust for the past four-plus decades, market power and market concentration are important only insofar as it facilitates the ability to harm consumer welfare. Traditional antitrust analysis is consumer-oriented and focuses on whether the conduct at issue raises prices, reduces output, or reduces quality or innovation.²¹

Consumer welfare should always be a byproduct of antitrust policies, but it need not be the only goal. The subsequent sections of this paper will examine whether this hyper-focus on the end consumer has made regulatory agencies unwittingly blind to the practices of Amazon and other dominant technology platforms that are potentially anticompetitive in their own right.

IV. CRITICISM OF PREVAILING ANTITRUST LAWS

Antitrust policies are constantly reevaluated as the economy develops, but recent criticisms of enforcement policies have intensified as Amazon, Apple, Facebook, and Google have become the disproportionate drivers of the U.S. economy. These four firms represented 0.8% of the S&P 500 stocks in October 2017, yet they accounted for 40% of the gains in the S&P 500 in the same month.²²

Financial markets that are this top heavy are not always bad, but they are cause for concern because of how it may contribute to the rising aggregate concentration in the U.S.

²¹ Levine, Jay and Devan Flahive. "Is it time to change the focus of the antitrust laws? The debate is heating up." *Antitrust Law Source, Porter Wright Morris & Arthur LLP*, 19 Sept. 2017, <https://www.antitrustlawsource.com/2017/09/is-it-time-to-change-the-focus-of-the-antitrust-laws-the-debate-is-heating-up/>. Accessed 26 Nov. 2017.

²² Galloway, Scott. "Full-Throated Capitalist." *No Mercy/No Malice*. Received by Dylan Kellachan, 17 Nov. 2017.

economy. Aggregate concentration is the percentage of economic activity that is accounted for by the largest X firms, which is not to be confused with measurements of seller concentration that are the focus of antitrust investigations.²³ Seller concentration measures whether a firm has achieved market power that enables the firm to maintain prices that are significantly above competitive levels for a sustained period in the relevant market.²⁴ The absolute size of a firm does not matter when measuring seller concentration; only the firm's percentage of sales within narrowly defined markets are what matters to raise antitrust concerns.²⁵

The distinction between aggregate concentration and seller concentration is important because it highlights how antitrust laws are activated based on very narrow terms. Lawrence J. White and Jasper Yang note that “aggregate concentration has little or no relevance for antitrust, since there is no necessary connection to seller concentration in individual markets.”²⁶ Yet there are ramifications for rising aggregate concentration that extend beyond the lens of consumer welfare and price theory. White and Yang consider how an “economy with only 100 giant companies would surely feel more stifling, with no outlets for entrepreneurial spirits, far fewer employment choices, far fewer places where innovative ideas might take root and thrive, etc.”²⁷ This is not a hypothetical consideration. In 2015 and 2016, the top 100 U.S. publicly traded firms accounted for about 51% of the total U.S. market capitalization.²⁸

Therefore, it is worth considering whether these firms are exploiting the narrow scope of current antitrust policies to achieve such a strong influence on the market. Is the prevalence of rising aggregate concentration really unhealthy for the economy; and if so, does it warrant a

²³ White, Lawrence J. and Jasper Yang. “What Has Been Happening to Aggregate Concentration in the U.S. Economy in the 21st Century?” *Working Paper*, 30 March 2017, pp. 2-3 (hereafter “White and Yang”).

²⁴ White and Yang, p. 3.

²⁵ *Ibid.*

²⁶ *Ibid.*

²⁷ White and Yang, p. 4.

²⁸ Salop, Steven C. and Vadim Egoul. “A Note on Aggregate Concentration.” 17 Nov. 2017.

paradigm shift in antitrust policies? Looking at these issues through the context of Amazon will provide more clarity on the issue.

Section III alludes to the objective of current antitrust analytical frameworks to prioritize consumer welfare above all else. This latter notion was born of the Chicago School's framework of viewing the antitrust laws through price theory alone.²⁹ This framework was endorsed by consumer advocate groups and prominent politicians in the 1970s while the U.S. was afflicted with high inflation because of its emphasis on lower prices for consumers.³⁰ Ultimately, these events caused the antitrust enforcement regime to embrace a more narrow definition of consumer welfare, which is based solely on price and output, that has persisted to this day.

Lina M. Khan argues that price and output are not the only factors that comprise consumer welfare, and an undue focus on these two factors actually delays regulatory intervention until a firm has already exercised its monopoly power.³¹ Congress' intent in enacting antitrust legislation was to prevent large concentrations of power within the economy, and this guiding vision was meant to achieve multiple ends "including the preservation of open markets, the protection of producers and consumers from monopoly abuse, and the dispersion of political and economic control."³² Khan's argument is that by focusing on price and output alone, consumer welfare is not maximized because the limited definition ignores other interests that are directly affected by the process and structure of competitive markets. For example, excessive concentration may lead to "enabling firms to squeeze suppliers and producers,

²⁹ Khan, p. 742.

³⁰ Ibid.

³¹ Khan, pp. 737-738.

³² Khan, p. 743.

endangering system stability (for instance, by allowing companies to become too big to fail), or undermining media diversity.”³³

The narrow focus on consumer welfare is evident in how antitrust policy treats predatory pricing. By today’s standards, a firm can only be found guilty of predatory pricing if it fully completes the cycle of selling below cost to force out competition and then charging supra-competitive prices once this competition ceases to exist.³⁴

According to the Chicago School, predatory pricing is a non-issue because it becomes a highly irrational strategy when viewed through the lens of price theory. Consider the following scenario: Firm A decides to engage in predatory pricing to push out Competitor B. Assuming Competitor B cannot afford to outlast Firm A in this price war, Competitor B goes out of business. According to the Chicago School of thought, Firm A will be able to raise prices to a supra-competitive level for only a short time until new entrants enter the market. These new entrants, attracted by the potential profits in this market, will re-inject competition back into the market and force Firm A’s prices back down to a competitive level. The net effect is that Firm A is not able to recoup the losses incurred during the predatory pricing period. Therefore, predatory pricing is hardly ever rational and is unlikely to be seen in practice.

As Richard Posner points out, however, this stylized example ignores strategic considerations.³⁵ Posner uses the example of a multi-market seller that engages in predatory pricing in one market but achieves substantial gains in other markets to recoup the losses

³³ Ibid.

³⁴ Khan, p. 744.

³⁵ Posner, Richard A. “The Chicago School of Antitrust Analysis.” *The University of Pennsylvania Law Review*, vol. 127, 1978, p. 939 (hereafter “Posner”).

incurred due to predatory pricing.³⁶ These strategic considerations are significant to Amazon's business, and the following section will analyze Amazon's "aggressive" pricing strategies.³⁷

V. ANALYSIS OF AMAZON'S AGGRESSIVE PRICING STRATEGY

Amazon is notorious for setting prices that yield razor thin margins, and sometimes these prices are below cost. For example, IHS iSuppli estimated in 2011 that Amazon was selling its Kindle Fire tablet for \$199 despite material and manufacturing costs of \$209.63.³⁸ Furthermore, the e-commerce giant is famous for extending its aggressive pricing from books to e-books to drive sales of its Kindle e-reader device. This strategy enabled Amazon to achieve 90% of the e-book market.³⁹ As Exhibit 1 and Exhibit 2 illustrate, Amazon's low-price strategy enabled it to more than double its unit sales from 2010 to 2015, while there was a significant decline in brick-and-mortar retail book sales over the same period.⁴⁰

Exhibit 1 and Exhibit 2 begin to tell the story of how aggressive pricing is beneficial to a large digital platform such as Amazon. In this case, Amazon uses its book business segment as an entry point for customers to become users within the network. Because Amazon offers aggressively low prices, the value of Kindle e-readers increases, and purchasing this hardware ensures that the customer will continue to purchase e-books on Amazon. The result is more users engage with Amazon's platform, which attracts more publishers to the platform to sell their books. The reverse is also true. Amazon can attract new users as the number of publishers and

³⁶ Posner, p. 940.

³⁷ Despite many critics accusing Amazon of predatory pricing, this paper avoids this label.

³⁸ Savits, Eric. "Amazon Selling Kindle Fire Below Cost, Analyst Contents." *Forbes*, 30 Sept. 2011, <https://www.forbes.com/sites/eric savitz/2011/09/30/amazon-selling-kindle-fire-below-cost-analyst-contents/#4ebd90876534>. Accessed 3 Jan. 2018.

³⁹ LaVecchia, Olivia and Stacy Mitchell. "Amazon's Stranglehold: How the Company's Tightening Grip Is Stifling Competition, Eroding Jobs, and Threatening Communities." *Institute for Local Self-Reliance*, November 2016, p. 15 (hereafter "Amazon's Stranglehold").

⁴⁰ Please see Exhibit 1 and Exhibit 2 for data source citations.

titles on the platform increases. Finally, Amazon can then cross-sell Amazon Prime or any other offerings to existing customers to make the platform even more sticky.

A potential problem is that Amazon has inflicted harm on other parties in the ecosystem that are directly affected by the process and structure of the competitive market of the book industry. Yet the interests of these parties are largely ignored by the current antitrust analytical framework. For instance, brick-and-mortar book retailers have suffered from their inability to compete with Amazon's low prices. In addition to the dwindling number of large retail and smaller independent booksellers, it is notable to consider how this affects employment. As of February 2014, Amazon employed 14 employees for every \$10 million in revenue it generated, while the average brick-and-mortar retailer employed 47 employees for every \$10 million of revenue.⁴¹ This should bring the discussion of aggregate concentration from Section IV to mind. The importance of the largest X number of companies is intensified when each of those firms requires relatively few employees, leaving an economy with very limited employment options.

This issue regarding aggregate concentration is valid, but it is also important to note that it is not a new problem. The bookselling business is not unlike other industries with regard to incumbents facing competition from upstart firms, and Amazon is certainly not the first to challenge the industry. Recall that big box retailers such as Barnes & Noble and Borders exerted pressure on smaller, independent retailers because their national footprint afforded them with the scale to better compete on price. It is true that there may be some social loss associated with the closure of smaller, independent retailers, but the overall market concluded that the benefits derived from the efficiency of a Barnes & Noble or Borders outweighed the benefits provided by

⁴¹ Bercovici, Jeff. "Amazon Vs. Book Publishers, By The Numbers." *Forbes*, 10 Feb. 2014, <https://www.forbes.com/sites/jeffbercovici/2014/02/10/amazon-vs-book-publishers-by-the-numbers/#70f33cfb4ef9>. Accessed 14 Mar. 2018.

smaller, independent retailers. In other words, a critical mass of consumers would rather pay \$14.99 for a new book at Barnes & Noble than pay \$19.99 for that same book at the small local book store even if some characteristics of shopping at the small local store are preferable to shopping at Barnes & Noble.

It can be argued that Amazon is simply the next chapter in the efficiency story, except now Amazon is able to exert pressure on both the big box retailers and the smaller, independent booksellers. Again, the overall market seems to have indicated that Amazon is delivering on key features that make the benefits of shopping for books on their platform more appealing than shopping at a big box retailer or a small, independent book store. Herein lies the difficulty of labeling Amazon's aggressive pricing strategy as potentially anticompetitive. The struggles of brick-and-mortar book retailers and the subsequent effect on employment in the industry is consistent with any firm or industry facing a stage of decline in its life cycle. So, while the concerns related to aggregate concentration are legitimate, this evidence alone is insufficient to conclude that book retailers are being damaged by anything more than an inability to compete with a highly innovative and efficient firm.

Amazon has also leveraged its dominance in e-books to dictate terms that are more unfavorable to publishers and authors than was true prior to Amazon's dominance. The introduction of e-readers was a welcome innovation to publishers because it offered a completely new revenue stream at very little cost, and authors interested in self-publishing were equally enticed by the "prospect of keeping 70% of sales as long as they price their books at or below \$9.99."⁴² However, the symbiotic nature of these relationships quickly changed as Amazon

⁴² Abbruzzese, Jason and Katie Nelson. "How Amazon Brought Publishing to Its Knees — and Why Authors Might Be Next." *Mashable*, 30 July 2014, <https://mashable.com/2014/07/30/amazon-has-killed-publishers-they-just-dont-know-it-yet/#ytFvvRFTBuqh>. Accessed 14 Mar. 2018.

established itself as the market leader by wide margins. By the summer of 2014, Amazon accounted for 41% of all new book purchases across print and digital, 65% of all online sales of books across print and digital, and 67% of all e-book sales.⁴³ With this market power in mind, publishers and authors were suddenly faced with the fact that they were uncomfortably reliant on Amazon. Brent Weeks, a *New York Times* bestselling author that published through Hachette, expressed concern that “Amazon's importance as a discovery place for books” and its ability to block authors and publishers from the platform “means that authors and publishers have to comply with Amazon's wishes or face obscurity.”⁴⁴

At this point, it should be more apparent how the damage done to brick-and-mortar booksellers is fundamentally different than the damage done to authors and publishers. Consumers and the overall market punished big box retailers and small, independent booksellers for their inefficiency, which is consistent with any firm or industry experiencing a period of decline in its life cycle. In the case of authors and publishers, however, Amazon exercised its substantial buyer power knowing that the cost of being excluded from the platform would be too great for authors and publishers. This is a more substantial signal that points to a potential abuse of market power that could also harm end consumers. For instance, the combined effect of Amazon’s importance as a discovery place for books and its ability to bar authors and publishers from the platform may lead to fewer choices in titles for end consumers, which is not the most socially efficient outcome.

Contrary to the other parties in the bookselling industry, Amazon flourished despite lackluster profits because the markets understand that focusing on growth is necessary to achieve the network effects that will create the most long-run value for the firm. Thus, Amazon’s market

⁴³ Ibid.

⁴⁴ Ibid.

capitalization increased steadily from 2010 to 2015 because investors understand that Amazon’s dominant size creates a “self-reinforcing cycle” in which “a larger number of users [attracts] an ever-larger fraction of new users.”⁴⁵ This is known as “tipping” toward monopoly in network economics.⁴⁶ Note that it would be inappropriate to suggest that Amazon’s e-book sales activity was the lone driver of changes in Amazon’s market capitalization. Nevertheless, this example is representative of Amazon’s business practices across many of its segments during the same period, and it is the aggregate effect of these practices that propels Amazon’s market capitalization upward.

The analysis above should at least give some credence to the claim that current antitrust policies are deficient. Tipping leads to inertia in network competition, and this process does not guarantee that “the market winner will produce the socially most efficient network.”⁴⁷

Furthermore, the market might suffer from “path dependence” that causes the market to ignore new and potentially superior network providers because of the inertia of the dominant network structure.⁴⁸ Despite this tipping toward monopoly, this process largely goes unchecked because of the narrow view that consumers are unharmed on a price or output basis. In fact, they benefit from Amazon based on these metrics alone. Even so, this enhancement of “consumer welfare” comes at the expense of the competitive structure of the market.

This sacrifice warrants further investigation into whether antitrust policy should broaden its definition of consumer welfare to consider other interests such as, but not limited to, preventing the squeeze of suppliers and producers.

⁴⁵ Kwoka, Jr. and White, p. 525 and Exhibit 2.

⁴⁶ Kwoka, Jr. and White, p. 525.

⁴⁷ Kwoka, Jr. and White, p. 527.

⁴⁸ Kwoka, Jr. and White, p. 527.

VI. EVENT STUDY: AMAZON ACQUISITIONS

In addition to its aggressive pricing strategy, Amazon is also strategic with its merger and acquisition activity to strengthen its competitive advantage. This activity is relevant to this topic because the market's reactions to Amazon's recent merger and acquisition announcements offer potential evidence of the tipping toward monopoly that was discussed in the previous section. When Amazon announces an acquisition, or a news outlet reports rumors of Amazon's potential acquisition targets, it is now commonplace that the market will reward Amazon with a sudden spike in its market capitalization. This in itself is not uncommon, but what is remarkable is that the market will reward Amazon's stock price at the expense of competitors of the acquisition target in question. Professor Scott Galloway describes this phenomenon cogently:

[F]or the first time in history we have a company that can perform what I call Jedi mind tricks, and that is it can destroy another company by just thinking about it. I think Jeff Bezos could take 10 or 20 percent of the market cap away from any Fortune 500 company tomorrow just by announcing he's going into their business.⁴⁹

This sounds like a market that has failed to check the power of the largest and most influential companies. If what Professor Galloway suggests is true, Amazon now has the ability to attack its competition at its sources of capital and dissuade upstarts from entering an industry in the first place. This would contribute to rising aggregate concentration, which runs counter to Congress' initial intent of establishing antitrust policies to preserve a dispersion of economic and political power.

⁴⁹ Recode Staff. "Full transcript: Author and NYU professor Scott Galloway on Recode Decode." *Recode*, 14 Sept. 2007, <https://www.recode.net/2017/9/14/16303784/transcript-author-nyu-professor-scott-galloway-recode-decode-four-book-google-amazon-facebook-apple>. Accessed 28 Jan. 2018.

This phenomenon has been widely reported in the press as Amazon’s merger and acquisition activity has attracted a lot of fanfare, but it is also worth applying statistical methods to quantify this phenomenon. A commonly applied method known as event studies was used to determine the impact of Amazon’s merger and acquisition activity on its stock price.

Six acquisitions were studied from January 2008 to June 2017 and are outlined in the table below:

Acquisition	Date of Announcement
Audible.om	January 31, 2008
Zappos.com	July 22, 2009
comiXology	April 10, 2014
Twitch	August 25, 2014
SOUQ.com	March 28, 2017
Whole Foods	June 16, 2017

Several event windows for each event were defined for robustness.⁵⁰ The event window ranges that are reported are as follows:

Event Start	Event End
3 days before event	3 days after event
1 day before event	1 day after event

⁵⁰ In addition to the event windows reported in this paper, event studies were also conducted using several other event windows. These event windows include:

- Event Window Start: 5 days before event; Event Window End: 5 days after the event
- Event Window Start: Day of event; Event Window End: 1 days after the event
- Event Window Start: Day of event; Event Window End: 3 days after the event
- Event Window Start: Day of event; Event Window End: 5 days after the event

The results obtained from using these additional event windows are consistent with the results obtained using the event windows reported in this paper.

The purpose of this window is to capture potential information leaks that may have occurred in the days leading up to the event and to account for the lag time in investors responding to the event.

The model for abnormal returns is defined as:

$$AR_t = R_t - ER_t$$

AR represents the abnormal return at time t , and R and ER are the actual return and expected return at time t , respectively. The actual returns were determined using historical stock price data for Amazon (AMZN). The expected returns were determined by first regressing Amazon's daily returns against the daily returns of the S&P 500, which represents the market portfolio, over an estimation window.

This market model regression takes the form:

$$R_{AMZN,t} = \alpha + \beta \times R_{S\&P\ 500,t}$$

The estimated betas and alphas obtained from the regression provide the necessary parameters for predicting the expected returns during the event window. The estimated beta coefficients represent the volatility of returns for Amazon compared to the market as a whole, and therefore serve as the coefficients for the independent variable in the prediction equation. An estimated beta of one indicates that the returns of the security move in proportion to the movement of the market's returns. An estimated beta of more than one indicates that the movement of returns of the security are disproportionately larger than the movement of the market's returns. An estimated beta of less than one indicates that the movement of returns of the security are disproportionately smaller than the movement of the market's returns. The estimated alphas represent the intercept of the prediction equation.

The expected return for Amazon at time t is then calculated from the estimated regression coefficients:

$$\widehat{ER}_{AMZN,t} = \hat{\alpha} + \hat{\beta} \times R_{S\&P\ 500,t}$$

For robustness, the expected return regressions were calculated over three different estimation windows. The end of the estimation window was set to either 30, 20, or 10 days prior to the event date. The start of the estimation window was set to 60 days prior to the event date.⁵¹ The estimation window does not overlap with the event window so that expected normal returns are not biased by information regarding the event of interest.

The abnormal returns are summed across the event window to determine the cumulative abnormal return for the event window:

$$CAR = \sum_{t=\substack{\text{Event} \\ \text{Window} \\ \text{Start}}}^{\substack{\text{Event} \\ \text{Window} \\ \text{End}}} AR_t$$

Exhibit 3 summarizes the results of testing the null hypothesis of no abnormal returns over the event windows in question. The results are mixed for the acquisitions prior to 2017. For example, the acquisitions of Audible.com, Zappos.com, comiXology, and Twitch yielded low or negative cumulative abnormal returns and failed to yield statistically significant results.

Amazon's more recent acquisitions show more consistent positive cumulative abnormal returns, but the results are still not resoundingly conclusive because they are not statistically significant.

The disaggregated results for each iteration of the event study conducted can be found in

Appendix 1.

⁵¹ In addition to the start of the estimation window reported in this paper, event studies were also conducted using estimation window start dates that ranged from 150 days to 40 days prior to the event date. The results obtained from using these additional estimation windows are consistent with the results obtained using the estimation windows reported in this paper.

The 2017 acquisitions of SOUQ.com and Whole Foods are notable because they are the only acquisitions that yielded statistically significant positive cumulative abnormal returns for additional combinations of event windows and estimation windows not reported in Exhibit 3. That being said, only 11 of the 180 iterations of the event study conducted for the Whole Foods acquisition yielded statistically significant results. One would expect roughly 5% of statistically significant results after taking 180 repeated samples and computing 95% confidence intervals for each sample. The acquisitions of Audible.com and Zappos.com also yielded statistically significant results, but the cumulative abnormal returns were negative. For all combinations of event windows and estimation windows, including those not reported in Exhibit 3, only 47 of the 1,080 iterations of this event study yielded statistically significant results. This ratio is important to highlight again because one would expect roughly 5% of statistically significant results after taking 1,080 repeated samples and computing 95% confidence intervals for each sample.

Therefore, the event studies conducted over these several acquisition announcements do not suggest that Amazon has consistently captured cumulative abnormal returns as a result of these announcements. The most recent acquisitions of SOUQ.com and Whole Foods might suggest that the market is more bullish on Amazon's merger activity than it has been in earlier years, but this is all that can be said. Two possible implications arise from this analysis: either the evidence for Amazon benefitting from tipping toward monopoly cannot be found in this type of event study, or Amazon is not benefitting from tipping toward monopoly at all.

VII. EVENT STUDY: AMAZON ACQUISITION OF WHOLE FOODS

Looking specifically at the Whole Foods acquisition, the low incidence of statistically significant results of Amazon's cumulative abnormal returns is interesting when paired with the

changes in market capitalization across firms within the grocery industry. While Amazon added \$11.2 billion and Whole Foods added \$3.1 billion to their market capitalization, Target, Kroger, Costco, and Walmart shed \$1.6 billion, \$2.1 billion, \$5.7 billion, and \$11.1 billion in market capitalization, respectively.⁵² The analysis from the Section VI suggests that Amazon's boost in market capitalization is not overwhelmingly statistically significant, so determining if this market activity is truly meaningful requires an additional application of event studies that focuses on the cumulative abnormal returns of Whole Foods' competitors in the grocery industry.

Eight firms were chosen to study their respective cumulative abnormal returns associated with Amazon's announcement to acquire Whole Foods on June 16, 2017:

- Casey's General Stores Inc.
- Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR
- Costco Wholesale Corp.
- Kroger Co.
- Sprouts Farmers Market Inc.
- Target Corp.
- Walmart Inc.
- Weis Markets Inc.

Costco, Target, and Walmart were included in the study based on media reports regarding changes to their respective market capitalizations after the announcement of the Whole Foods acquisition. Casey's General Stores Inc., Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR, Kroger Co., Sprouts Farmers Market Inc., and Weis Markets Inc. were included in the study because they represent the top five ranked U.S. firms in the grocery industry based on market capitalization.⁵³

⁵² Galloway, Scott. "A Disturbance in the Force." *No Mercy/No Malice*. Received by Dylan Kellachan, 21 July 2017.

⁵³ "All Screeners / Grocery Stores." *Yahoo! Finance*, n.d., https://finance.yahoo.com/screener/predefined/grocery_stores/. Accessed 11 Feb. 2018. The applied filters for the Yahoo! Finance stock screener were that the Price (Intraday) was greater than 5, the Sector is "Services," the Industry is "Grocery Stores," and the Region is "United States." All five firms chosen had a market capitalization over \$1 billion at the time of accessing the source.

Similar to the event study described in Section VI, several event windows were defined for robustness. The event window ranges are as follows:

Event Start	Event End
3 days before event	3 days after event
1 day before event	1 day after event

The models for predicting expected returns and obtaining abnormal returns and cumulative abnormal returns are identical to what was reported in Section VI.

Exhibit 4 summarizes the results of testing the null hypothesis of no abnormal returns over the event windows in question. All firms from the sample except Casey's General Stores Inc. experienced negative cumulative abnormal returns that were statistically significant. These statistically significant cumulative abnormal losses ranged from -5.06% to -27.53%. The disaggregated results for each iteration of the event study conducted can be found in Appendix 2.

For all combinations of event windows and estimation windows, including those not reported in Exhibit 4, 789 of the 1,440 iterations of this event study yielded statistically significant results. Once again, this ratio is worth mentioning because it is considerably higher than the roughly 5% of statistically significant results one would expect after taking over 1,440 repeated samples and computing 95% confidence intervals for each sample. Therefore, the results of these event studies appear to align with the media narrative that Amazon is able to damage industries with an acquisition announcement. While this event study only reflects a sample of the potential firms that would be affected by Amazon's acquisition announcement, the study seems to indicate that Amazon's effect on the grocery industry is more profound than what could be expected to occur as a result of market volatility.

For the sake of completeness, an additional event study was conducted to analyze the mean cumulative abnormal returns of the portfolio of the eight chosen firms within the grocery

industry. The purpose of this analysis is to determine if the negative cumulative abnormal returns were statistically significant across the industry as opposed to analyzing each firm individually.

The methodology of this mean cumulative abnormal return event study is similar to the previous two event studies. Six iterations of the study were conducted using the same combination of event windows and estimation windows described above.⁵⁴ Instead of performing hypothesis tests on each cumulative abnormal return for each firm, hypothesis tests were performed on the mean cumulative abnormal return for each event window-estimation window combination. The model for abnormal returns and cumulative abnormal returns are defined as before:

$$AR_t = R_t - ER_t$$

$$CAR = \sum_{t=Event\ Window\ Start}^{Event\ Window\ End} AR_t$$

The mean cumulative abnormal return is weighted by market capitalization such that the weighted mean cumulative abnormal return is defined as:

$$Weighted\ Mean\ CAR = \sum_{i=Firm\ in\ Sample}^n CAR_i \times Market\ Capitalization\ Weight_i$$

⁵⁴ In addition to the event windows reported in this paper, event studies were also conducted using several other event windows. These event windows include:

- Event Window Start: 5 days before event; Event Window End: 5 days after the event
- Event Window Start: Day of event; Event Window End: 1 days after the event
- Event Window Start: Day of event; Event Window End: 3 days after the event
- Event Window Start: Day of event; Event Window End: 5 days after the event

In addition to the start of the estimation window reported in this paper, event studies were also conducted using estimation window start dates that ranged from 150 days to 40 days prior to the event date. The results obtained from using these additional event windows and estimation windows are consistent with the results obtained using the estimation windows reported in this paper.

Exhibit 5 summarizes the results of testing the null hypothesis of no mean cumulative abnormal returns over the event windows in question. The values for each t -statistic were determined by:

$$t - statistic = \frac{\text{Weighted Mean CAR}}{\sqrt{\frac{\sum_{i=1}^n [(CAR_i - \text{Mean CAR})^2 \times \text{Market Capitalization Weight}_i]}{n - 1}}}$$

Given that $n=8$ for the eight firms in the sample, the t -statistics were compared to the Student's t -distribution at seven degrees of freedom. The results in Exhibit 5 show that every mean cumulative abnormal return is negative and statistically insignificant. This is unsurprising given how many statistically significant results were observed in the previous event study. Even though these event studies are conducted on a subset of the firms that might have been affected by the Whole Foods acquisition announcement, the negative and statistically significant mean cumulative abnormal returns reinforce the conclusion that Amazon influenced the grocery industry beyond what could be expected to occur as a result of market volatility.

VIII. SUMMARY AND CONCLUSIONS

The analyses of this paper leave us with mixed results that pose difficulties for making any conclusions about whether current antitrust laws and policies are deficient in the 21st century economy. Amazon has exhibited business practices like aggressive pricing that may encourage the phenomenon known as “tipping” toward monopoly. This strategy increases the inertia of the network structure and is a potential threat to the competitive structure of the market despite the apparent lack of harm to end consumers. The event studies focusing on Amazon’s acquisition activity, especially the marquee acquisition of Whole Foods, suggest that the market does not

disproportionately reward Amazon for its acquisitions, but it does penalize competitors at a statistically significant level.

A confounding factor is that it is difficult to interpret the results of the event studies. One interpretation is that no single firm should have this much impact on the market capitalizations of an entire industry and that antitrust policies should be more proactive in curbing this market power. Another opposing but compelling interpretation is that this is not an instance of unchecked monopoly power at all. It could be reasonably argued that Amazon's market share of the grocery industry after the Whole Foods acquisition is still relatively small. Furthermore, the negative cumulative abnormal returns experienced across the grocery industry could just be an appropriate response for what has been a long time coming: traditional grocery firms have lagged behind the rise of e-commerce and now a formidable e-commerce player has entered the space. Like brick-and-mortar booksellers, grocery firms are now facing a potentially more efficient firm, and the declines in market capitalization may indicate who is best positioned for the future and who may be a target for additional consolidation. In the absence of knowing Amazon's future behavior and how the competitive structure of the grocery industry will settle, the evidence does not yet support a story of a compromised competitive structure that is deterministically harmful to the economy and society.

Unfortunately, the scope of this analysis does not lend itself to anything more than an inconclusive result regarding Amazon's market power and the implications it may have on the effectiveness of current U.S. antitrust laws and policies. This does not mean that the question about revising the analytical framework of antitrust policies is invalid, however. The reason the ultimate result of this paper is ambiguous is that we are still left with a tension between the apparent health of consumer welfare and the externalities associated with aggregate

concentration in the economy. For evidence of this, look no further than Amazon’s search for its second headquarter location in the United States. Municipalities have bent over backwards to woo the e-commerce giant to choose them by offering land, subsidies, and tax breaks up to \$7 billion.⁵⁵ When part of the original intent of antitrust legislation was to safeguard the dispersion of political and economic control, Amazon’s ability to amass this much influence should raise some concerns.

While Amazon has been the bellwether subject for this paper, these concerns should not be limited to Amazon. Firms like Facebook and Google similarly operate under the strategy of capturing value from the network effects derived from their respective platforms, and these companies also face the unintended consequences of their dominance.

Facebook is the most popular social network worldwide with 2.2 billion active users, and these users are able to enjoy the benefit of the social platform for free.⁵⁶ In turn, Facebook is able to leverage the data it collects to attract advertisers to buy ad space on the platform.

Unfortunately, Facebook has run into problems with verifying the content published on its platform and has been the object of scrutiny after it was discovered that Russian agents were using the platform as part of a campaign to interfere with the 2016 U.S. presidential election.⁵⁷

⁵⁵ Garfield, Leanna. “Amazon just revealed the top cities for HQ2 — here are the ones throwing hundreds of millions to land it.” *Business Insider*, 18 Jan. 2018, <http://www.businessinsider.com/amazon-hq2-cities-developers-economic-tax-incentives-2017-10>. Accessed 4 Mar. 2018.

⁵⁶ “Number of monthly active Facebook users worldwide as of 4th quarter 2017 (in millions).” *Statista*, Jan. 2018, <https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/>. Accessed 4 Mar. 2018.

⁵⁷ Shane, Scott and Vindu Goel. “Fake Russian Facebook Accounts Bought \$100,000 in Political Ads.” *The New York Times*, 6 Sept. 2017, <https://www.nytimes.com/2017/09/06/technology/facebook-russian-political-ads.html>. Accessed 4 Mar. 2018.

Facebook disclosed that Russian troll accounts shared inflammatory posts that reached 126 million users, which stoked fears that fake content was going unchecked across the site.⁵⁸

This is troubling by itself, but an additional concern is Facebook's response that it is a technology platform and not a media company. This implies that Facebook does not have the same burden to fact check and monitor the validity of the information flowing through this platform. The "technology platform" label has become a convenient label for firms to hide behind to protect profits and the stock price. Again, the original intent of antitrust legislation must come to mind when a single firm has become so large that it can be manipulated for the purposes of undermining the political system. Still, the narrow focus of consumer welfare ignores such considerations.

Google is the dominant leader in the search engine market, with 87.1% market share as of December 2017.⁵⁹ Similar to Facebook, Google offers its search platform (and many other services) for free and then turns the data it collects into a selling point for advertisers to buy display ads. What is most interesting about this dynamic is that there is an imbalance in the effect that each side of the platform has on one another. The advertising may be useful, but it is not the feature on which users are basing their decision to use Google.⁶⁰ Advertisers, on the other hand, are significantly affected by Google's search users in the aggregate because the users represent a source of "eyeballs" that the advertisers can more easily target and track for engagement.

Advertisers need an audience, so they find it worthwhile to conduct business with Google because of the search engine's extremely high market share. Unsurprisingly, Google has been

⁵⁸ Isaac, Mike and Daisuke Wakabayashi. "Russian Influence Reached 126 Million Through Facebook Alone." *The New York Times*, 30 Oct. 2017, <https://www.nytimes.com/2017/10/30/technology/facebook-google-russia.html>. Accessed 4 Mar. 2018.

⁵⁹ "Worldwide desktop market share of leading search engines from January 2010 to October 2017." *Statista*, Feb. 2018, <https://www.statista.com/statistics/216573/worldwide-market-share-of-search-engines/>. Accessed 4 Mar. 2018.

⁶⁰ *Ibid.*

accused of abusing that power on more than one occasion. In a letter to the European Commission in May 2017, Spotify's CEO and several other executives accused Google of turning the platform into a gatekeeper, citing examples that range from "restricting access to data or interaction with consumers, biased ranking and search results to lack of clarity, imbalanced terms and conditions and preference of their own vertically integrated services."⁶¹ Despite Google's run-ins with antitrust regulators in the past, the punishments and fines imposed upon them have not been nearly large enough to motivate drastic changes in their business practices.

The purpose of discussing other firms like Facebook and Google is to emphasize that Amazon is not the only firm that is responsible for a very high share of economic activity. As of the summer of 2017, Google and Facebook captured roughly 20% of global advertising revenues, 65% of digital advertising revenues, and 85% of every new dollar spent on advertising.⁶² In the same time period, Amazon, Apple, Facebook, Google, and Microsoft had a combined market capitalization of about \$3.5 trillion.⁶³ The effects of this aggregate concentration, whether positive or negative, are likely to become more complex if this condition persists.

For that reason, it is imperative that antitrust policies do not lag too far behind and work beyond the frameworks of consumer welfare and price theory alone. Otherwise, we may unintentionally invite an economy described by Lawrence J. White and Jasper Yang as "stifling, with no outlets for entrepreneurial spirits, far fewer employment choices, [and] far fewer places where innovative ideas might take root and thrive."⁶⁴

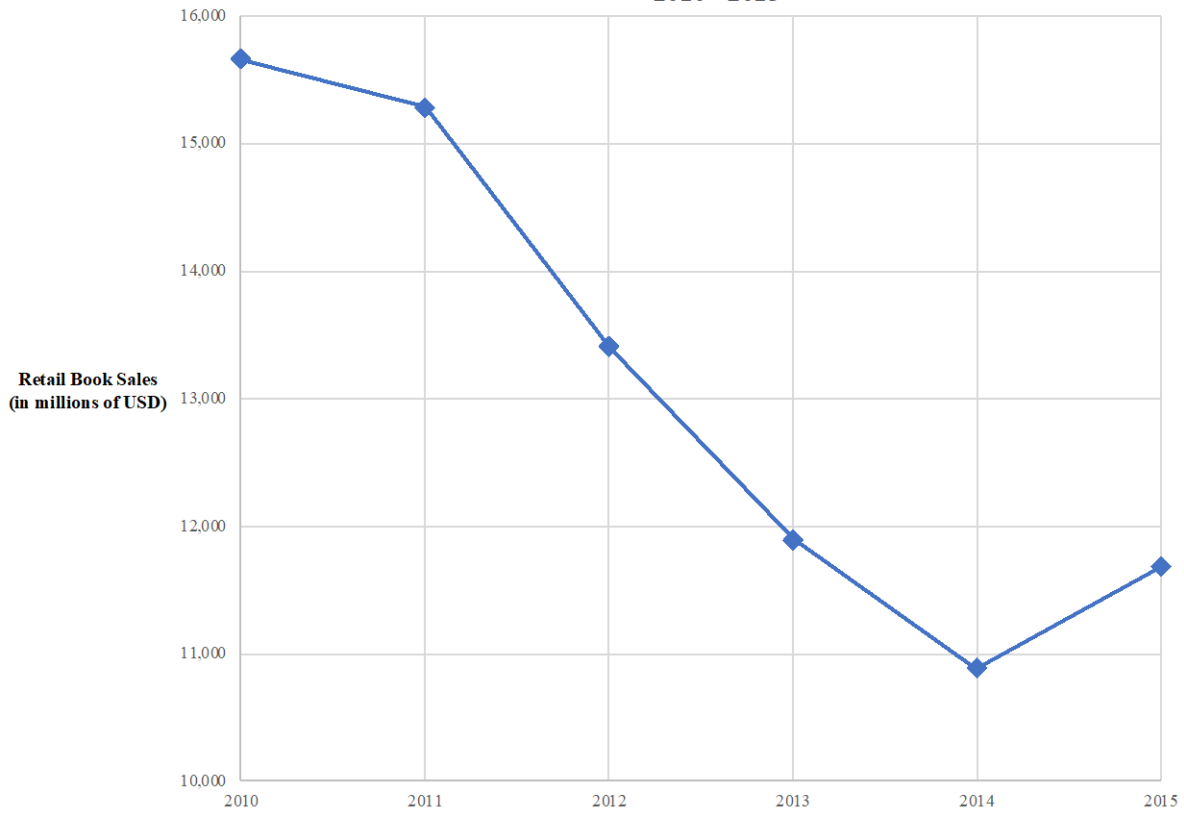
⁶¹ Kharpal, Arjun. "Spotify CEO claims internet giants like Apple and Google 'abuse their privileged position.'" *CNBC*, 8 May 2017, <https://www.cnbc.com/2017/05/08/apple-google-european-commission-spotify.html>. Accessed 4 Mar. 2018.

⁶² Cohen, p. 142.

⁶³ Cohen, p. 142.

⁶⁴ White and Yang, p. 4.

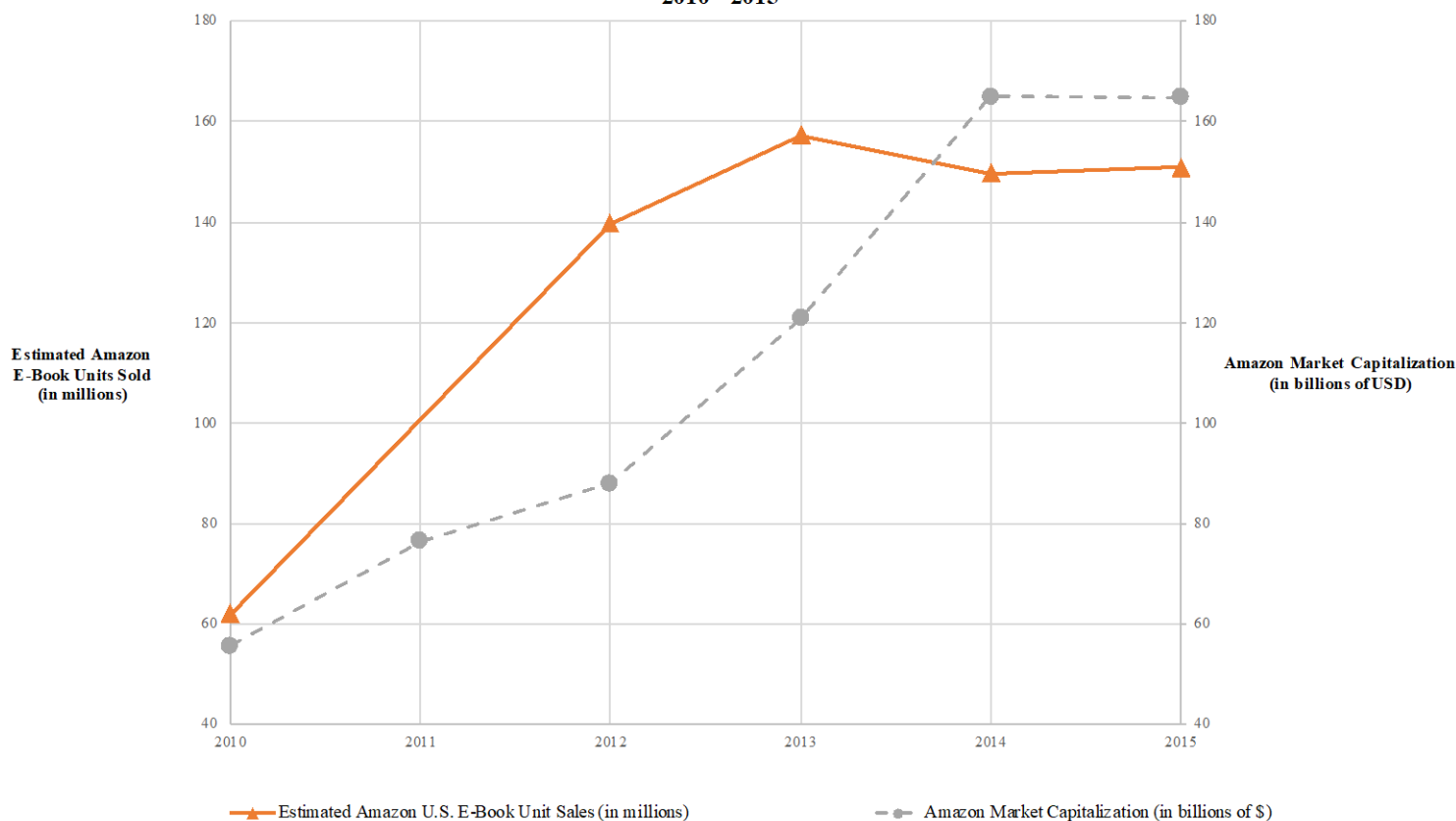
Exhibit 1
U.S. Retail Book Sales
2010 - 2015



Sources:

[1] U.S. Retail Book Sales: Yearly industry statistics published by the American Booksellers Association (<http://www.bookweb.org/btw-topics/industry-statistics>).

Exhibit 2
Estimated Amazon U.S. E-Book Units Sold and Amazon's Market Capitalization
2010 - 2015



Sources:

- [1] U.S. E-Books Sold: "Number of e-books sold in the United States from 2010 to 2016." Statista, 2017, <https://www.statista.com/statistics/426799/e-book-unit-sales-usa/>. Accessed 27 Nov. 2017.
- [2] Amazon Market Capitalization: "Amazon Market Cap History (AMZN)." macro trends, 24 Nov. 2017, <http://www.macrotrends.net/stocks/charts/AMZN/market-cap/amazon-inc-market-cap-history>. Accessed 27 Nov. 2017.
- [3] Estimated Amazon U.S. E-Book Unit Sales calculated using published estimates of Amazon's e-book market shares:
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 - [G] 2015: Hoffelder, Nate. "Amazon Has an Even Bigger Share of the eBook Market Than We Thought – Author Earnings Report." The Digital Reader, 9 Oct. 2015. <https://the-digital-reader.com/2015/10/09/amazon-has-an-even-bigger-share-of-the-ebook-market-than-we-thought-author-earnings-report/>. Accessed 27 Nov. 2017.

Exhibit 3

Summary Table of Hypothesis Testing of Amazon's Abnormal Returns Resulting from Amazon's Acquisition Announcements

Acquisition	Event Date	Number of Event Study Iterations ¹	Average CAR Across Iterations	Number of Significant Results ²
Audible.com	January 31, 2008	6	-5.26%	0
Zappos.com	July 22, 2009	6	0.65%	0
comiXology	April 10, 2014	6	0.95%	0
Twitch	August 25, 2014	6	0.49%	0
SOUQ.com	March 28, 2017	6	2.73%	0
Whole Foods	June 16, 2017	6	1.03%	0

Notes:

[1] The number of iterations is based on the combination of event windows and estimation windows described in Section VI.

[2] Significance levels are defined as: *** when $|t| \geq 3.291$ for the 99.9% confidence level

 ** when $|t| \geq 2.576$ for the 99% confidence level

 * when $|t| \geq 1.960$ for the 95% confidence level

Sources:

[1] 1995 - 2018 Amazon N. America & Int'l Consumer Press Releases.

[2] 1997 - 2018 AMZN US Daily Returns from Bloomberg.

[3] 1997 - 2018 S&P 500 Daily Returns from Bloomberg.

Exhibit 4

Summary Table of Hypothesis Testing of Grocery Firms' Abnormal Returns Resulting from Amazon Acquisition Announcement of Whole Foods

Company	Number of Event Study Iterations ¹	Average CAR Across Iterations	Number of Significant Results ²
Casey's General Stores Inc.	6	-1.64%	0
Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR	6	-8.76%	2
Costco Wholesale Corp.	6	-10.41%	6
Kroger Co.	6	-26.98%	6
Sprouts Farmers Market Inc.	6	-14.10%	6
Target Corp.	6	-12.93%	6
Walmart Inc.	6	-5.92%	6
Weis Markets Inc.	6	-7.71%	3

Notes:

[1] The number of iterations is based on the combination of event windows and estimation windows described in Section VI.

[2] Significance levels are defined as: *** when $|t| \geq 3.291$ for the 99.9% confidence level

 ** when $|t| \geq 2.576$ for the 99% confidence level

 * when $|t| \geq 1.960$ for the 95% confidence level

Sources:

[1] 1995 - 2018 Amazon N. America & Int'l Consumer Press Releases.

[2] 1997 - 2018 US Daily Returns for CASY, CBD, COST, KR, SFM, TGT, WMT, and WMK from Bloomberg.

[3] 1997 - 2018 S&P 500 Daily Returns from Bloomberg.

Exhibit 5
Hypothesis Testing of Portfolio of Eight Grocery Firms'
Mean Cumulative Abnormal Returns Resulting from Amazon Acquisition Announcement of Whole Foods

Event Window ¹	Estimation Window ¹	Weighted Mean CAR	T-Stat	Significance Level ²
(-3, 3)	(-30, -60)	-8.77%	-4.18743250842625	**
(-3, 3)	(-20, -60)	-8.10%	-3.947079684226696	**
(-3, 3)	(-10, -60)	-8.49%	-4.132132033016964	**
(-1, 1)	(-30, -60)	-8.90%	-4.862228508454211	**
(-1, 1)	(-20, -60)	-8.59%	-4.720471652634602	**
(-1, 1)	(-10, -60)	-8.82%	-4.8069830873778	**

Notes:

- [1] Event window and estimation window start and end values represent the number of days before the event date. For example, a value of -30 indicates 30 days before the event date.
- [2] Significance levels are defined as: *** when $|t| \geq 5.408$ for the 99.9% confidence level with seven degrees of freedom
** when $|t| \geq 3.499$ for the 99% confidence level with seven degrees of freedom
* when $|t| \geq 2.365$ for the 95% confidence level with seven degrees of freedom

Sources:

- [1] 1995 - 2018 Amazon N. America & Int'l Consumer Press Releases.
- [2] 1997 - 2018 US Daily Returns for CASY, CBD, COST, KR, SFM, TGT, WMT, and WMK from Bloomberg.
- [3] Market Capitalizations on June 16, 2017 for CASY, CBD, COST, KR, SFM, TGT, WMT, and WMK from Bloomberg.
- [4] 1997 - 2018 S&P 500 Daily Returns from Bloomberg.

Appendix 1
Hypothesis Testing of Amazon's Abnormal Returns Resulting from Amazon's Acquisition Announcements

Acquisition	Event Date	Event Window ¹	Estimation Window ¹	CAR	T-Stat	Significance Level ²
Audible.com	31jan2008	(-3, 3)	(-30, -60)	-8.86%	-1.578836067982845	
Audible.com	31jan2008	(-3, 3)	(-20, -60)	-9.27%	-1.697905742748016	
Audible.com	31jan2008	(-3, 3)	(-10, -60)	-7.86%	-1.322705671773702	
Audible.com	31jan2008	(-1, 1)	(-30, -60)	-1.95%	-.5321562517764525	
Audible.com	31jan2008	(-1, 1)	(-20, -60)	-2.12%	-.5921493474478706	
Audible.com	31jan2008	(-1, 1)	(-10, -60)	-1.48%	-.3814281502892006	
Zappos.com	22july2009	(-3, 3)	(-30, -60)	-4.00%	-.7215607222757143	
Zappos.com	22july2009	(-3, 3)	(-20, -60)	-3.45%	-.6756578611842102	
Zappos.com	22july2009	(-3, 3)	(-10, -60)	-3.45%	-.6830639557064808	
Zappos.com	22july2009	(-1, 1)	(-30, -60)	4.80%	1.322038417990138	
Zappos.com	22july2009	(-1, 1)	(-20, -60)	5.00%	1.49804374152957	
Zappos.com	22july2009	(-1, 1)	(-10, -60)	4.97%	1.504102645836657	
comiXology	10april2014	(-3, 3)	(-30, -60)	2.66%	.4641424262425862	
comiXology	10april2014	(-3, 3)	(-20, -60)	1.72%	.3333382593691548	
comiXology	10april2014	(-3, 3)	(-10, -60)	2.09%	.4258836962591559	
comiXology	10april2014	(-1, 1)	(-30, -60)	0.18%	.0472826343341467	
comiXology	10april2014	(-1, 1)	(-20, -60)	-0.46%	-.1357193785967916	
comiXology	10april2014	(-1, 1)	(-10, -60)	-0.45%	-.1411773881921784	
Twitch	25aug2014	(-3, 3)	(-30, -60)	-1.55%	-.3907697191708969	
Twitch	25aug2014	(-3, 3)	(-20, -60)	0.02%	.0041127608149934	
Twitch	25aug2014	(-3, 3)	(-10, -60)	-0.34%	-.0699484187591151	
Twitch	25aug2014	(-1, 1)	(-30, -60)	1.19%	.4584318918634626	
Twitch	25aug2014	(-1, 1)	(-20, -60)	1.87%	.5569344504135902	
Twitch	25aug2014	(-1, 1)	(-10, -60)	1.76%	.5573330223904486	
SOUQ.com	28mar2017	(-3, 3)	(-30, -60)	2.83%	.8701037654875066	
SOUQ.com	28mar2017	(-3, 3)	(-20, -60)	2.92%	1.004545472237579	
SOUQ.com	28mar2017	(-3, 3)	(-10, -60)	3.09%	1.18368379976716	
SOUQ.com	28mar2017	(-1, 1)	(-30, -60)	2.53%	1.189209623054496	
SOUQ.com	28mar2017	(-1, 1)	(-20, -60)	2.48%	1.306940585671519	
SOUQ.com	28mar2017	(-1, 1)	(-10, -60)	2.52%	1.473857607490124	
Whole Foods	16june2017	(-3, 3)	(-30, -60)	1.45%	.6393979705830404	
Whole Foods	16june2017	(-3, 3)	(-20, -60)	1.67%	.729388372323228	
Whole Foods	16june2017	(-3, 3)	(-10, -60)	1.74%	.8096832988968409	
Whole Foods	16june2017	(-1, 1)	(-30, -60)	0.35%	.2364109071120684	
Whole Foods	16june2017	(-1, 1)	(-20, -60)	0.46%	.307237455894308	
Whole Foods	16june2017	(-1, 1)	(-10, -60)	0.51%	.3648559663888162	

Notes:

- [1] Event window and estimation window start and end values represent the number of days before the event date. For example, a value of -30 indicates 30 days before the event date.
- [2] Significance levels are defined as: *** when $|t| \geq 3.291$ for the 99.9% confidence level
** when $|t| \geq 2.576$ for the 99% confidence level
* when $|t| \geq 1.960$ for the 95% confidence level

Sources:

- [1] 1995 - 2018 Amazon N. America & Int'l Consumer Press Releases.
[2] 1997 - 2018 AMZN US Daily Returns from Bloomberg.
[3] 1997 - 2018 S&P 500 Daily Returns from Bloomberg.

Appendix 2
Hypothesis Testing of Grocery Firms' Abnormal Returns Resulting from Amazon Acquisition Announcement of Whole Foods

Company	Event Window ¹	Estimation Window ¹	CAR	T-Stat	Significance Level ²
Casey's General Stores Inc.	(-3, 3)	(-30, -60)	-1.59%	-7.798242582093778	
Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR	(-3, 3)	(-30, -60)	-13.21%	-2.062342555200176	*
Costco Wholesale Corp.	(-3, 3)	(-30, -60)	-11.00%	-6.945611389080082	***
Kroger Co.	(-3, 3)	(-30, -60)	-27.36%	-9.997415613337207	***
Sprouts Farmers Market Inc.	(-3, 3)	(-30, -60)	-14.90%	-3.679391277245839	***
Target Corp.	(-3, 3)	(-30, -60)	-14.89%	-5.812115045290251	***
Walmart Inc.	(-3, 3)	(-30, -60)	-5.56%	-3.856169442099754	***
Weis Markets Inc.	(-3, 3)	(-30, -60)	-10.03%	-2.140687894429098	*
Casey's General Stores Inc.	(-3, 3)	(-20, -60)	-2.46%	-1.164338167712286	
Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR	(-3, 3)	(-20, -60)	-13.19%	-2.242945448590858	*
Costco Wholesale Corp.	(-3, 3)	(-20, -60)	-9.70%	-3.902973755831898	***
Kroger Co.	(-3, 3)	(-20, -60)	-26.79%	-8.181174696433565	***
Sprouts Farmers Market Inc.	(-3, 3)	(-20, -60)	-15.67%	-3.955706183623671	***
Target Corp.	(-3, 3)	(-20, -60)	-13.95%	-4.537580567866441	***
Walmart Inc.	(-3, 3)	(-20, -60)	-5.06%	-3.139059361103393	**
Weis Markets Inc.	(-3, 3)	(-20, -60)	-8.92%	-1.951979622514086	
Casey's General Stores Inc.	(-3, 3)	(-10, -60)	-2.44%	-1.135103280651107	
Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR	(-3, 3)	(-10, -60)	-10.57%	-1.094558902864486	
Costco Wholesale Corp.	(-3, 3)	(-10, -60)	-10.34%	-4.362691841019473	***
Kroger Co.	(-3, 3)	(-10, -60)	-27.53%	-8.937198234125322	***
Sprouts Farmers Market Inc.	(-3, 3)	(-10, -60)	-15.68%	-4.180180770530258	***
Target Corp.	(-3, 3)	(-10, -60)	-13.88%	-4.689929675247178	***
Walmart Inc.	(-3, 3)	(-10, -60)	-5.48%	-2.82173950894174	**
Weis Markets Inc.	(-3, 3)	(-10, -60)	-9.07%	-1.764836598199182	
Casey's General Stores Inc.	(-1, 1)	(-30, -60)	-0.98%	-7.365351296438236	
Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR	(-1, 1)	(-30, -60)	-5.51%	-1.312898021541216	
Costco Wholesale Corp.	(-1, 1)	(-30, -60)	-10.75%	-10.36943612999484	***
Kroger Co.	(-1, 1)	(-30, -60)	-26.67%	-14.88467348490652	***
Sprouts Farmers Market Inc.	(-1, 1)	(-30, -60)	-12.50%	-4.716369059080662	***
Target Corp.	(-1, 1)	(-30, -60)	-12.06%	-7.191560041193685	***
Walmart Inc.	(-1, 1)	(-30, -60)	-6.53%	-6.918511530561311	***
Weis Markets Inc.	(-1, 1)	(-30, -60)	-6.15%	-2.006504869258595	*
Casey's General Stores Inc.	(-1, 1)	(-20, -60)	-1.22%	-8.823213135098482	
Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR	(-1, 1)	(-20, -60)	-5.75%	-1.494084948629521	
Costco Wholesale Corp.	(-1, 1)	(-20, -60)	-10.19%	-6.262858908483215	***
Kroger Co.	(-1, 1)	(-20, -60)	-26.56%	-12.39043806812449	***
Sprouts Farmers Market Inc.	(-1, 1)	(-20, -60)	-12.90%	-4.975529302216836	***
Target Corp.	(-1, 1)	(-20, -60)	-11.44%	-5.681607208095456	***
Walmart Inc.	(-1, 1)	(-20, -60)	-6.29%	-5.960563089262712	***
Weis Markets Inc.	(-1, 1)	(-20, -60)	-5.91%	-1.977737972781488	*
Casey's General Stores Inc.	(-1, 1)	(-10, -60)	-1.17%	-8.308314264081526	
Companhia Brasileira de Distribuicao Grupo Pao de Acucar ADR	(-1, 1)	(-10, -60)	-4.30%	-6.805206537435881	
Costco Wholesale Corp.	(-1, 1)	(-10, -60)	-10.47%	-6.748001310059407	***
Kroger Co.	(-1, 1)	(-10, -60)	-26.97%	-13.37439552766013	***
Sprouts Farmers Market Inc.	(-1, 1)	(-10, -60)	-12.96%	-5.27972300441524	***
Target Corp.	(-1, 1)	(-10, -60)	-11.38%	-5.877188658960026	***
Walmart Inc.	(-1, 1)	(-10, -60)	-6.57%	-5.165618034161808	***
Weis Markets Inc.	(-1, 1)	(-10, -60)	-6.16%	-1.832470564662168	

- Notes:**
- [1] Event window and estimation window start and end values represent the number of days before the event date. For example, a value of -30 indicates 30 days before the event date.
- [2] Significance levels are defined as: *** when $|t| \geq 3.291$ for the 99.9% confidence level
** when $|t| \geq 2.576$ for the 99% confidence level
* when $|t| \geq 1.960$ for the 95% confidence level

- Sources:**
- [1] 1995 - 2018 Amazon N. America & Int'l Consumer Press Releases.
[2] 1997 - 2018 US Daily Returns for CASY, CBD, COST, KR, SFM, TGT, WMT, and WMK from Bloomberg.
[3] 1997 - 2018 S&P 500 Daily Returns from Bloomberg.

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