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Abstract

Much like the music and movies industries before, the comic book industry has entered the digital markets and faces the unfair competition of unauthorized sources. I conduct a survey of comic book readers to infer whether the unpaid channels harm the sales of comic books from the top American publishers. My data allows me to construct a time panel of comics readers and calculate the substitution rate between the paid and unpaid channels of comics acquisition. Moreover, I show that the digital comics – both paid and unpaid – are typically considered as inferior by the readers. With the price of digitally released new comics set at the same level as their print versions, this suggests that readers who do not want to pay the full price for print copies are more likely to use pirate sources than to switch to legal digital channels. Indeed, among the surveyed sample, lowering the price of digital comics could help convert some of the unpaid acquisitions into paid digital ones.

Keywords: comic books, media, digital formats, piracy, file-sharing.

JEL: C83, K42, O34, Z11

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1. Introduction

Just like other creative industries, comic books have entered the digital age and faced the full array of challenges associated with digitalisation. First, comic books themselves became digitised, meaning that their production costs became lower, creative process more decentralised, and distribution more efficient. Second, online retail shops emerged, facilitating a much larger access to titles. Third, digital intermediaries entered the market with the sole focus on facilitating easy distribution channels for licensed content. These digital services introduced their own mobile apps that allowed easy access and user-tailored experience of reading. Fourth, with the introduction of digital formats, high-quality piracy of comic books became effortless. Comic books are easily accessible directly through internet browsers or in downloadable formats.

Previous literature on digital formats in creative industries focused mainly on the music and audiovisual sectors, largely omitting other types of content. A few other studies considered books, but all these types of content remain different to American comic books. The American comic book market is dominated by two large publishers, who focus on long-running series of cheap and relatively short stories. On the one hand, the serial nature of comic books is similar to TV series. On the other, their short format and the ease of travelling while consuming is more akin of songs, while the format itself most closely resembles traditional books. Finally, contrary to most creative sectors, the American comic book market experienced growth in both traditional and digital formats. Thus, the current literature does not answer how digital formats affect the comics market.

Significant shares of comics readers admit to having read pirate copies, but whether this reduced the paid consumption remains unclear. Access to digital comic books is extremely easy with issues shared at public websites. However, no research has been conducted on the effects for the American comic books sales.

This study provides the first evidence on the role of both paid and unpaid digital formats in the American comic book market. To do so, I conducted a unique panel survey study among comic book readers. The data allowed me to perform econometric analysis of the relationship between the unpaid and paid consumption as well as to learn about preferences regarding digital comics among the readers. Basing on methods applied for studies of piracy of other types of content, I run panel regressions with fixed effects to estimate the displacement rate between unauthorized consumption and authorised consumption of comic books. The serial nature of comic books allows me to look at these effects in the context of multiple connected goods or – in a sense – at a single good experienced over time. I thus also reverse the perspective to see whether comic book series sales are affected by scale of unauthorised consumption. Finally, I exploit information about the willingness to pay for digital copies of comic book titles to explore the relationship between digital formats, sales and prices.

I find that the unpaid consumption displaces some of the print sales, though I find no significant effects for digital sales. This finding might be explained by the perceived inferiority of digital copies among the majority of readers. As the prices of digital copies mirror those of print copies, readers with low (but positive) valuation of comics are more likely to acquire unpaid digital copies rather than those fully priced. Finally, my results suggest that a reduction in prices of digital comic books could increase the amount of money paid for comic books among my sample of responders. My findings contribute to the current understanding on the effects of digitalisation in the context of a relatively niche industry. They also help understand how the effects of piracy might differ depending on factors such as the price and value of the legal alternative.

In Section 1 I provide a more detailed look at the characteristics of the US comic book market and how it evolved in the XXI century. In Section 2 I describe my survey design and provide an overview of the results and responder characteristics. In Section 3 I overview the related empirical literature on the effects of piracy on other types of media and describe my methodology in further detail. I then present my analysis of the effects of piracy on paid consumption and provide a more in-depth look at consumption choices among my responders. Finally, I discuss the results and provide conclusions in the last section.

2. Recent trends in the American comic book market

Despite the attention to comic books driven by comics-based media (mainly cinema movies and TV shows), the US comic book market remains a fairly niche one. This section provides a brief overview of the shape of the market and its most recent changes.

2.1. Comic book formats

The comic book market is highly diversified in terms of formats. Two formats with longer traditions are the short-form comic book issues and the long-form graphic novels (which can be further described by several categories). As digitalisation progressed, both of these formats gained direct digital counterparts.

Print formats

Comic book issues dominate the North American market in terms of units sold. This format constitutes app. 24-page issues typically released in regular intervals (e.g. weekly or biweekly). These short episodes usually form larger series following a plot unfolding over more than one episode. Within this format, one can discern between popular ongoing series (e.g. “Action Comics” series by DC had its 1011th issue released in May 2019) or mini-series that might comprise of several issues and are sometimes tie-ins to larger series.

Graphic novels dominate the North American market in terms of revenues. Graphic novel is an umbrella term for book-length formats – often in hardcover – filled with comics strip. The graphic novels themselves also tend to vary in their type. They include standalone stories, episodic long-format stories, as well as comics issue collections, whereas comic book publishers tend to release a ‘volume’ once every six issues or so, comprising the most recent several issues of a series. Some graphic novels comprise collections of comics stories from several series, typically on some larger related topic (e.g. ‘essential’ or ‘classic’ stories on one character).

Digital formats

Digital formats of comic books have been around from late 1990s, but entered a larger scale of distribution only in 2007. The growth of digital formats has been largely driven by the entrance of Marvel Digital Comics Unlimited and ComiXology stores.¹ The former constitutes a publisher-owned offering of its catalogue, while the latter started as a digital reseller of comics from various participating publishers – later extended to include self-publishing and ComiXology Originals.

Digital formats typically offer the same content as print issues and print graphic novels, but also provide additional reading facilities. The new, digital format had the advantage of no costs of ink and paper and of direct to consumer distribution. From a consumer perspective, the new format also meant that no shelf space was needed to collect full stories. Many digital comics sellers provide their own reader apps that manage comics sales and user libraries as well as facilitate reading. For the latter, apps often allow for customization of the experience and include features such as Guided View. Guided View allows to read comics frame by frame, with the app specifically tailoring the frame to the screen size. As comic book frames tend to come in irregular formats, the Guided View typically shows both specific fragments of a frame (e.g. with text balloons), as well as the whole frames and whole pages. Users are allowed to configure options such as whether reading a page should begin/finish with the view of the whole page or whether the frames not currently displayed should be blacked out or shown at the margins of the screen. On the downside, the need to code what exactly should be

¹ Coincidentally, 2007 was also the year when smartphones became popular with the introduction of the first iPhone – providing the readers with a new, mobile device for consumption of digital comic books.

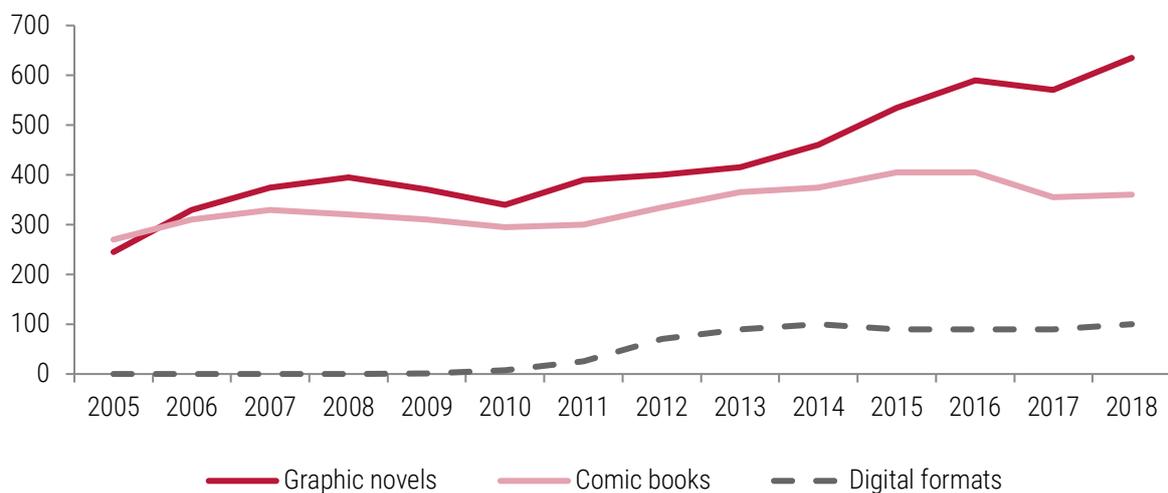
considered a frame instils additional production costs, especially if the frames come in irregular shapes. However, these costs are incurred only once per any comic book. As digital formats allow for different approaches to design, some creators began to experiment with interactive (see Screendiver) or partially animated comics (or 'motion comics') as well.

Most comic book issues are simultaneously released in both print and digital formats. Moreover, most digital comic books are initially priced on par with their print counterparts. This setting might seem surprising as publishers often distribute digital copies as a bonus to print. However, it is of note that digital sales through ComiXology entail an additional fee that goes to the distributor. Moreover, up until 2014, any purchases made in-app on mobile devices with the Android or iOS systems implied an additional cut for Google or Apple, respectively. In 2014, ComiXology discontinued its support for in-app purchases, requiring purchasing directly through the web service (Rosenblatt 2014). The exact profit that a publisher gets on a sale might thus depend on the way the digital copy is sold.

Changes

Unlike the music industry, the comic book market has experienced almost continuous growth in the XXI century. According to the combined estimates of Comichron and ICv2², the revenues from comic books doubled from 2005, reaching more than one billion for the first time in 2015 (see Figure 1). This growth was driven mainly by the increase of revenues from graphic novels, with print issues revenues having increased to a somewhat smaller extent. Moreover, the 2010s saw the quick growth of digital formats to app. 90 million USD of revenues. However, after the two-year growth digital revenues have remained stable for years 2012-2018. On average in 2018, per capita expenditures on comic books in the USA equalled \$3.35 (incl. \$1.94 for graphic novels).

Figure 1. The growth of comic book revenues in the US (millions of \$), between 2005 and 2018



Source: ICv2 and Comichron data (<https://icv2.com/articles/markets/view/43106/comics-graphic-novel-sales-hit-new-high-2018>).

² Comichron collects data from reports shared by Diamond Comic Distributors, who are responsible for the vast majority of distribution of American comic books across the comic book specialty stores. Among others, they hold exclusive rights for distribution to comic book stores for the two largest American publishers – DC and Marvel. ICv2 is a website providing comic book market insight, often based on data collected and received from Nielsen NPD BookScan. These data cover the bookstore and chain store market. Comichron and ICv2 release regular joint reports on the state of the comic book market in total. The digital sales are the best industry estimates and do not include subscription services.

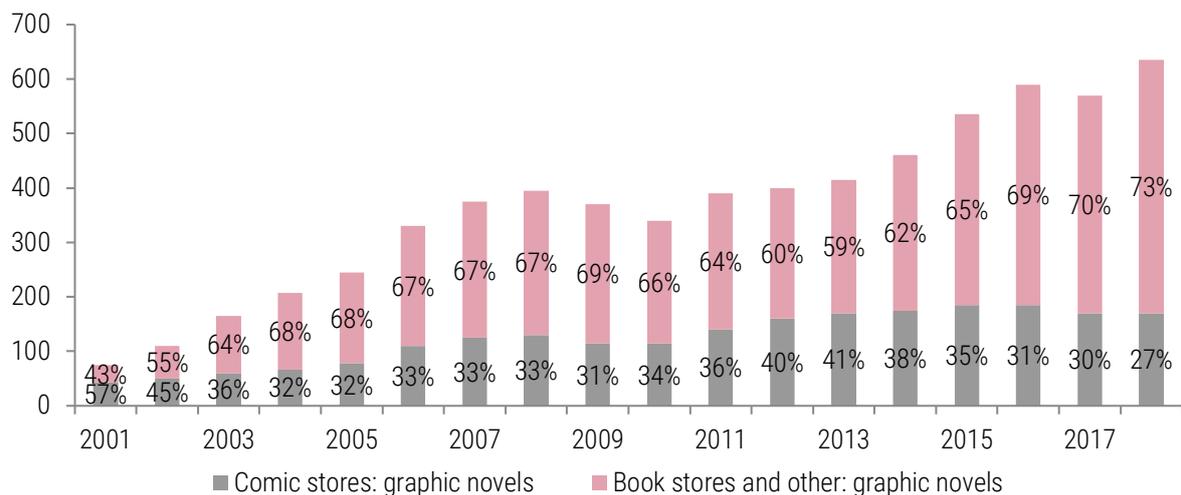
Notably, the digital sales figures represent estimates of industry experts. This is because the major digital format resellers (such as ComiXology) do not report sales figures. Moreover, the digital figures do not include subscriptions. As such, the estimates of the size of the digital market represent a lower bound.

2.2. Comic book distribution

The comic book issues and graphic novels differ in terms of distribution channels. Besides online distribution, comic book issues are typically distributed through comic bookstores and in small part through newsstands. In contrast, graphic novels are primarily distributed through regular bookstores and secondarily through comic bookstores. At the beginning of 2000s the graphic novels were in similar part distributed through comic and regular bookstores (in 2001, 57% of the revenues from graphic novels came from comic bookstores). However, in 2002 the traditional bookstore channels became dominant and by 2018 were responsible for 73% of the revenues (see Figure 2). This marks a shift from a niche, consumer-specific market to a more general one.

Still, the number of comic book stores seems to have been slowly increasing in the 2010s. Heidi MacDonald (2013a) of the Comicsbeat suggested that the number was as high as 8,000 in the late 80s and early 90s, but that this was reduced to fewer than 2,000 during the “Distribution Wars of the 90s”. This drop would be in line with a second market disruption named by Milton Griep (MacDonald and Reid 2016) – the shift to online retailers. However, in 2013, Diamond Comic Distributors (MacDonald 2013b) announced that the number of comic book shops they distributed to reached 2,638 – marking a 4% increase over 2012. In 2016, ComicsPRO (Johnston 2016) announced 2015 to be another year of growth, relative to 2014 (by 3.8%) and Griep (2016) reported further growth in 2016, relative to 2015 (by 2.7%). The several years of growth puts the estimated number in 2016 around 3,000 – more than by half more than at the end of the “Distribution Wars of the 90s”. In contrast, over a similar period, the number of bookstores has been reportedly declining (IBISWorld 2018).

Figure 2. The shift of graphic novels sales from comic stores to bookstores and chain stores (millions of \$), between 2011 and 2018



Source: ICv2 and Comichron data (<https://icv2.com/articles/markets/view/43106/comics-graphic-novel-sales-hit-new-high-2018>).

The primary channel for digital distribution, cooperating with both larger and smaller publishers, is the ComiXology store. It was launched in 2007, initially focusing on complementing and supporting the consumption and distribution of physical comic books. In 2009, ComiXology released its app and store, allowing

for purchase of digital comics to smartphones and tablets and by 2012 it has reached an estimated 76% share of the digital market (Alverson 2012). In 2014, ComiXology was acquired by Amazon. ComiXology hosts a vast selection of titles, collecting issues from all the major publishers, many independents and also allowing for self-publishing of comic book titles. The service might be thus considered an e-commerce business with platform options for smaller artists. ComiXology does not seem to suffer from the same competition issues as its movie and TV show counterparts (e.g. Netflix), where the major distributors struggle to become independent from the service. Instead, many of the larger publishers created their own digital distribution as complementary to distribution through ComiXology and not instead of it. Still, the ComiXology subscription service offers only a limited selection from the Marvel comics and offers none of the DC comics – the two publishers instead offer their own digital subscription services.

Both the print and digital distribution channels offer subscription services. Traditional readers may subscribe to print formats (e.g. to specific series), with new issues sent to the readers (or local comic stores) as soon as possible (though the process of delivery may take up to a few weeks within US alone). Similarly, they can often subscribe to a particular digital series to get the digital issue as soon as it becomes available. Moreover, some digital stores also offer general subscriptions for their content, more in line with the streaming services subscription models. For example, ComiXology offers a subscription that for a monthly fee of \$5.99 (as of October 2018) allows to read a large part of their catalogue, though as some users point out – mostly focused on first volumes of some comic series, and not necessarily the newest ones. On the other hand, Marvel Unlimited costs \$9.99 monthly and offers all of its content with the caveat that it becomes available in six months after the initial release. DC has also launched its own subscription service (DC Universe) at \$7.99 monthly, offering not only some of its digital comics collection but also other related media (e.g. DC animated and live-action TV shows and movies). The service thus aggregates several complementary types of content in a unique bid to bundle comics and film entertainment.

2.3. Publishers and market shares

The comics market, like music or movie industries, is characterized by few majors responsible for the bulk of the industry revenue as well as large numbers of smaller publishers, independents and self-publishers. The two majors in this case are DC (founded in 1934, known e.g. for Batman, Flash, Superman, Wonder Woman or Justice League) and Marvel (founded in 1939, known e.g. for Avengers, Fantastic Four, Guardians of the Galaxy, Spider-man, X-Men as well as Star Wars comic books). According to the Diamond Comic Distributors reports, for the past 20 years these two publishers were each responsible for 30-35% of industry revenues³, with Marvel taking the top spot through most (but not all) months. These two are followed by a small group of publishers with meaningful but much smaller shares, including Image Comics (e.g. Kick-Ass, The Walking Dead) whose share equals app. 5-10% as well as Dark Horse (e.g. Hellboy, Sin City and up until 2015 Star Wars) and IDW (e.g. Duck Tales, G.I. Joe, Transformers).

2.4. Comic book piracy

Comic book piracy did not reach large scale until first digitisation technologies and hardware made their way to the mass markets. Just like in the case of books, home copying comic books was not possible until the popularisation of photocopying machines. Still, the photocopying machines typically induced some sort of quality loss if not total colour loss. While these issues might seem manageable for books consisting only of text, they would invalidate any attempts at copying comics. Thus, comic book piracy only sped up with the

³ See: <http://www.comichron.com/vitalstatistics/marketshares.html> (accessed: 2018-10-05).

appearance and proliferation of high-quality digital scanners that allowed to scan whole comics and save them as close-to-perfect digital files.

The popularisation of scanners gave rise to a scanner culture in the comic book community, with various scanner groups putting effort into comics digitisation. In a similar vein to hacker or warez groups working on unauthorised games or music releases, the scanner groups typically consisted of groups working on individual titles. These teams would comprise scanners (who did the page-by-page scanning of new comics), editors (who adjusted the scans, straightened the pages, etc.) and distributors (responsible for sharing the files online). A single release could take up to six hours of work according to Delwiche (2014), though a retired scanner veteran Archangel has said that with practice the time could go down to 30-40 minutes (Johnston 2012).⁴

The scanner groups are not motivated by personal gain but rather by the goal of comics preservation. Essentially, the scanner groups put much worktime with no monetary reward for their work. Instead, many scanner groups cited preservation as their main goal. To this end, they have often put additional effort to correct the colours or flaws of the original (Delwiche 2014). According to Delwiche (2014), three groups might be responsible for most of comics scans available on torrent networks. Tellingly, the largest and most prominent of these named itself *Digital Comics Preservation*. Brill (2005) emphasises that pirate distribution was the only channel to acquire some of the out-of-print titles that were priced in thousands of dollars in online markets.

A second motivation of the scanner groups is the recognition among the reader and scanner communities. For this purpose, they tagged their releases with graphics, typically including both the crew name and those of specific contributors. The graphics themselves ranged from crude alterations of existing art to professional modifications or entirely new art. Delwiche (2014) also describes that some scanner tags paid homage or memorised members of the community who passed away. They have also often stated that the reader should buy the comics if they like it.

The scanned issues have been typically distributed over several channels but are not especially convenient for reading. Brill (2005) names BitTorrent networks as some of the most popular ways for comics circulation, whereas comics could get bundled into large archives of full series or connected titles. Still, comics were also distributed through other channels, such as file-hosting services, chat channels or other P2P networks (e.g. DC++). Despite the variety of sources, some of them evidenced technical sources, and some of the items tended to be of low quality. As Brill (2005) points out, they also often required specific comics reading software (e.g. CDisplay), which often provided a crude experience when comic book pages strayed from a standard format.

Piracy of comic books took of further, as digital formats started being officially published. This dramatically lowered the costs of acquiring a digital copy and made much of the scanners' digital preservation efforts redundant – especially, with top publishers digitising their back catalogues. A series of interviews indicated that some, but not all, scanners abandoned scanning: a scanner named *Noah Vale* claims to know some scanners who have stopped scanning the new titles due to digital sales (Mroczkowski 2011a); another nicknamed *Scanbug* states that they do not believe digital sales will affect scanner groups as the sold formats are typically

⁴ A similar scanner culture emerged in Japan around the beginning of the 2000s, where it gained the nickname of 'scanlation' (scanning + translation). Scanlation included additional steps in the process of preparing digital copies as it aims mainly at delivering the comics to other parts of the world. As such, beyond the steps taken by the scanner group, scanlation involves translation of all the text into other languages (typically English), and careful input of the translated text into the speech and text balloons (including the use of special fonts for, e.g. shouting). Therefore, scanlation involves more work with the altruistic aim of sharing manga comics with those with no access to the books or with no knowledge of Japanese language. Additional incentives might, include providing copies that are closer to the original: Howell (2001) found that US and French translations of Japanese comic books often make the language closer culturally to the readers instead of retaining original aspects, while Matsui (2009) wrote about censorship of some manga titles in their US editions.

web-based or with DRM (while scans can be downloaded and saved; Mroczkowski 2011a); the sentiment regarding DRM-ed comics is shared by another interviewed scanner (Mroczkowski 2011b) who claims to have quit due to digital sales but believes that scanning would cease if publishers switch to DRM-free formats.

In recent years, websites offering full comic books readership through browsers emerged. These websites differ in three aspects from the comics piracy of the prior decade. First, the websites themselves may include advertisements, making them profit-oriented. Second, they do not require downloading and instead allow for easy access directly from the website. Third, the format does not require any additional software for reading, unlike the previously distributed files that required additional software. Still, many of the uploaded comic books are high quality scans and not digital copies; and continue to include scanner tags.

These websites gained huge popularity among readers in very little time. Harper (2016) showed the rapid growth in the number of visitors to three unnamed websites with free comics, to the total level of app. 8 million monthly visits by April 2016. Harper (2016) dated the emergence of the first of these sites at early 2015. Presently (2019-03-21), the online traffic tracking service SimilarWeb reports almost 20 million monthly visits to the comics sharing website readcomiconline.to, with the average visit duration of 14 minutes and 28 seconds, and approximately 54% of the traffic coming from mobile devices. By comparison, SimilarWeb reports 2.8 million monthly visits to Comixology.com, with a further 337 thousand to Comixology.eu and 376 thousand to Comixology.co.uk – jointly constituting less than 20% of the visits to readcomiconline.to. Notably, the pirate website is only one of many. Another of the top Google search results – readcomiconline.ru – boasts 1.6 million monthly visits (with the average of 10 minutes 45 seconds visits).

3. Relevant literature

3.1. Effects of piracy

Empirical research on online 'piracy' mostly finds negative effects for the authorised distribution. In his review Waldfogel (2012) concludes that the evidence points towards negative effects for both music and films. Similarly, Novos and Waldman (2013) summarise the available literature and conclude that piracy does reduce sales. Koh et al. (2014) looks at literature on music piracy up until 2011 and shows that the negative relationship of piracy and sales was more evident when using data from before 2003 (the year when iTunes and other legal digital alternatives were introduced). In a more recent review, Danaher, Smith and Telang (2014) look at the studies for both music and movie industries and conclude that almost all of the peer-reviewed studies indicate a negative effect on sales. Liebowitz (2016) evaluated the literature on music file-sharing and derived metrics for comparison of the results. He concludes that most studies attribute the whole of the decline in the music industry revenues to file-sharing, with the few reporting a smaller contribution based on data from after 2005.⁵

Notably, however, the literature is largely limited to the audio-visual and music sectors. Indeed, only few studies have considered other sectors, and the number goes further down when looking only at studies published in peer-reviewed journals. So far, only few studies exist on the effects of piracy on book sales. In their working paper, Hardy et al. (2014) find no significant effects on print sales. Reimers (2016) concludes in the same vein, while also suggesting that negative effects might exist for digital books. Books have been also considered in two reports of Ende et al. (2015, 2018), with both finding negative effects on print sales (but not digital).

⁵ Notably, some reviews conclude that when considering various limitations of the literature, the relationship might not be as certain – e.g. Dejean (2009), Grassmuck (2010), Oberholzer-Gee and Strumpf (2010), Handke (2012). Notably, these reviews are typically at least few years old, with many new studies having been published since.

To my best knowledge only one study considered comic books, though it focused on the Japanese manga market. Tanaka (2016) looked at a natural experiment, whereas the Ministry of Economy, Trade, and Industry funded a large project aimed at removing pirate copies of manga comics from the web via notice-and-takedown mechanisms. He controlled for the unauthorised availability to analyse how the reduced unauthorised availability of some of the comics affected their sales (relative to a subsample of titles not covered by the protection). Interestingly, Tanaka (2016) found two different effects, dependent on the type of the manga series considered – a negative effect for ongoing series, but a positive for series that have ended. This suggests that unauthorised distribution might carry promotional effects for older titles.

It is, however, unclear to what extent the findings of Tanaka (2016) can be applied to the American comic book market, as the Japanese manga market is starkly different. According to Tanaka (2016), the share of digital revenues in graphic novel sales in Japan went from app. 1% in 2005 to 35% in 2015. Notably, the trends for this period were slightly decreasing for print versions and dynamically increasing for the digital. As Tanaka (2016) also notes, the share of comic book market within the whole book market in Japan equals app. 36%, but only app. 3% in the USA. For Japan, this magnitude of consumption translates into average yearly per capita expenditure on all comic books in Japan of app. 31.8 USD (22.4 USD attributable to 'graphic novels'). As such, the Japanese manga comic market is highly popular and mainstream in Japan, as opposed to the more niche comic book market in the USA. Importantly, the Japanese manga market shows that the comics in general can become a good highly consumed from digital channels – i.e. that there is no inherent format-related barrier that prevents comic books from growing digitally.

Moreover, other entertainment markets in the USA showed higher proneness to digitization of the revenue streams. According to the Association of American Publishers (2017), electronic book formats (audiobooks and e-books) amounted to 23% of book revenues in 2017 – marking a decline from close to 30% in 2014. In the music market, the digital revenues became the majority share channel in the USA as early as in 2011, having reached 52% of total market sales, whereas globally the share equalled 33% at the same time, and 24% in Japan (IFPI 2014). Clearly, the developments for the comic book market do not reflect an overall low digital consumption of cultural products.

3.2. Empirical methods

Estimation of the causal effects of unauthorised distribution has been tackled by numerous different approaches based on different sets of data. These attempts can be broadly categorised as survey or industry/country data based. The industry/country data-based approaches often rely on quasi-experimental methods, whereas a specific event affected only one country, region or subsample of goods. Such events typically reflect, e.g., law changes (e.g. Danaher et al. 2014), pirate sources blocks (e.g. Danaher et al. 2018), or active unauthorised distribution monitoring and takedown requests (e.g. Reimers 2016). On the other hand, survey-based approaches mostly follow two different methodological approaches. First is the use of instrumental variables that might be linked to the pirate consumption but not directly to purchase decisions (e.g. Ende et al. 2018). Second is the use of time dimension of panel surveys, whereas consumption decisions can be observed over periods of time.

The panel survey approaches have been primarily exploited in studies of Joel Waldfogel (Rob and Waldfogel 2006, 2007; Waldfogel 2009, 2010; Bai and Waldfogel 2012) – hence jointly referred to as the “Waldfogel studies”. Rob and Waldfogel (2006) asked U.S. college students to provide information on purchase and downloading of music albums (including 261 hit albums) over the years 1999-2003. Rob and Waldfogel (2007) asked University of Pennsylvania students in two waves to provide information on viewership of top 50 movies in each of the previous three years. The modes of viewing included theater, television, rental, purchase, download or a burned DVD copy. Waldfogel (2009) asked University of Pennsylvania students about their

viewership and its frequency of TV shows in two preceding seasons (2005-06 and 2006-07). Waldfogel (2010) asked Wharton students in two years about their listening of top songs on iTunes, including songs from half a year earlier. Finally, Bai and Waldfogel (2012) replicated the Rob and Waldfogel (2007) study on a sample of Chinese students and a sample of Chinese internet users. Each of the mentioned studies considered a cross-sectional approach but concluded with a panel regression with fixed effects, by utilizing the time dimension included in the data. The longitudinal approach with consumer fixed effects allows to eliminate responder-specific determinants of consumption, such as general propensity to consume specific type of content.

Similar approaches have been also used in studies of other authors. An early study of Hennig-Thurau et al. (2007) collected data from more than 1,000 German consumers representative of the movie consumer population in Germany. The responders took part in three survey waves over 8 months and received €10 (as well as some additional prizes) for completing all three. In the first survey the responders reported their viewing intentions regarding upcoming movies. In the second survey, they reported whether and how they have viewed them and reported intentions regarding their future viewership of those movies. The third survey asked about their viewership choices once most of the movies were made available on DVD. The authors then modelled legal viewership decisions while controlling for unauthorized consumption and previously reported intentions of viewership. Herz and Kiljański (2018)⁶ largely followed the framework of Rob and Waldfogel (2007) and Bai and Waldfogel (2012), asking responders about the viewership of top box office movies from recent years (2011, 2012 and 2013). However, their sample included almost 30,000 individuals from six European countries, and the data was weighted to represent the internet using population. This approach was replicated again in the Ende et al. (2018) report, for films released in years 2015, 2016 and 2017, on a sample from 13 countries. In each case, the authors also found a displacement rate for the top films.

4. Methods and data

Previous literature does not provide answers on how piracy might have affected the American comic book industry. Moreover, with the dynamic changes in the market (e.g. promotional effects with frequent comics-based movies) and lack of events that could serve as quasi-experimental treatments, it is difficult to find such answers with the available data. I thus follow the approach of the Waldfogel studies, by collecting new data in the form of a panel survey of comic book readers.

Table 1. Responders of the three surveys

Responders	1 st round		2 nd round	3 rd round	In all three rounds
	All	With e-mail	All	All	
Facebook groups	5	4	3	2	1
Reddit	420	341	195	181	155
CBR Forum	7	4	3	1	1
Total	432	349	201*	184	157
Date	15-18 Feb 2018		16-25 Mar 2018	14-30 Apr 2018	-

*Note: *There were 202 full answers in the 2nd wave, but one of the provided e-mail addresses was not matchable with the other surveys.*

Source: own calculations on the survey data.

The data comes from an online survey conducted among comics readers in three monthly waves, between February and April 2018. For the February wave, invitations to the survey were posted on several public forums

⁶ The study was first released as part of the Ende et al. (2015) report.

and community groups on comics. The forums included Facebook groups, 66 Reddit subreddit groups and the Comic Book Resources forum (see Appendix A for the list of the Facebook and subreddit groups). The invitations contained information about the topic of the survey (digital readership of comics), the time necessary for its completion (approximately 5-10 minutes) and about the chance for prizes in the form of digital comics worth up to €10. This yielded 432 responders who finished the survey, around 97% of whom were enlisted on Reddit. 349 responders left an e-mail address as means of contact about the prizes and further survey rounds.

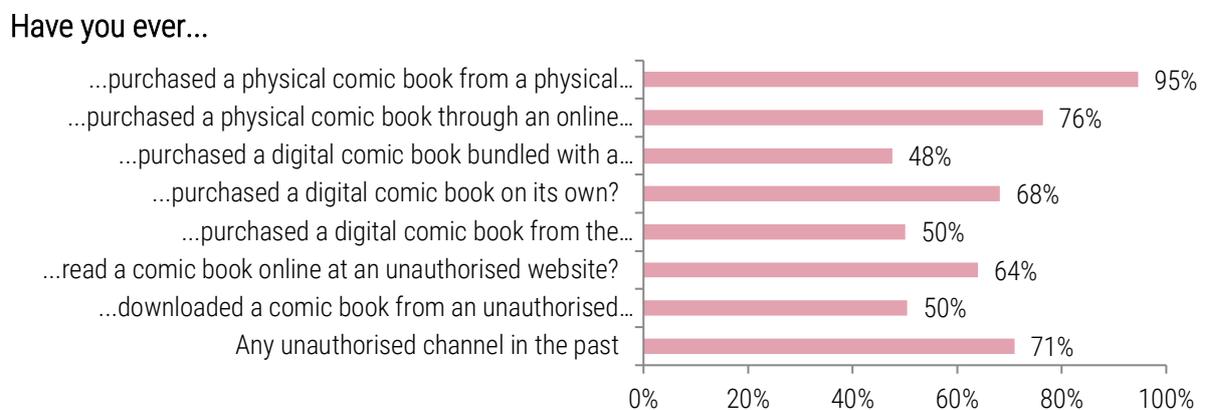
A month after the first survey, an invitation e-mail was sent to all of the responders who provided an e-mail address to participate in a second – follow-up – survey, with higher chances of rewards. 201 of the first-wave responders filled out the second survey. Finally, another month later another invitation e-mail was sent to the 1st wave responders, asking them to fill the third survey, with yet again higher chances for rewards. 184 responders participated in the final survey, of which 157 also filled the second survey. Table 1 summarises the numbers of responders and recurring responders.

The first survey was open for 4 days, the second for 10 days and the third for 17 days. Immediately after each of the surveys finished, I have drawn the winners and sent e-mails about the rewards. The winners were asked to choose digital comics at the ComiXology store and to send their choice in an e-mail, for which they had two days. After that, each of the winners received a gift in the form of the indicated comics in the ComiXology shop.

4.1. Questionnaire design and sample description

Each of the surveys contained questions about the reading habits or interests of the surveyed sample. The responders were also asked to provide basic demographic information. Most of the responders were heavy comics readers who tried various formats and channels of acquisition of comic books (see Figure 3). Only 13% of the responders indicated reading fewer than one comic book issue per month, with 23% reading 1-3 per month, 11% reading 1 per week and about a half reading more than one comic book issue per week. 46% of the responders indicated being very interested in comic books and 36% being extremely interested. 95% of the responders have purchased physical comic books in a physical store and 76% have purchased physical comic books online. 68% have in the past purchased a digital comic book, but fewer of all responders - 50% - have done so at the ComiXology store. Finally, 71% of the responders have previously downloaded an unauthorised copy of a comic book from the internet or read an unauthorised copy online. This last statistic differs from self-reported readership in other surveys, where only 25% (ComiXology users; ComiXology 2013) or 9% (metropolitan comic bookstore patrons; Stevens and Bell 2015) admitted to having read from unpaid sources.

Figure 3. Previous sources for acquiring comic books among the surveyed responders



Source: own elaboration based on collected survey data.

The responders in my sample were typically male, aged between 18 and 34 and from USA (see Table 2). Only about 10% of the surveyed readers in my sample were female. This puts the share of female readers in my sample lower than in most other surveys of comics readers that report levels of around 20-30% (e.g. Alverson 2014). In terms of gender balance, my sample thus seems heavily skewed towards men, at the levels comparable to the sample of early ComiXology customers (ComiXology reported app. 5% of new users were female in 2009, which increased to app. 20% by 2013 - Kraft 2013) or in-store surveyed readers of the DC New 52 line of comics (DC found that only app. 7% of the in-store responders were female, but the share equaled 23% for their online responders - ICv2 2012). Importantly, my research design might have contributed to this sample bias as the top-selling comics are typically of the super-hero genre, which is more often read by men (e.g. Alverson 2014; Fantom Comics 2017; Schenker 2013, 2014). Four persons identified themselves as neither men nor women. However, this number was too small to include them as separate groups in the analysis. The age structure of my responders seems more comparable with those found in the cited reports, with 25-34-year-olds and 18-24-year olds constituting the two largest groups – 37% and 32% of the responders, respectively. Finally, majority of my responders were stationed in the US (69%) with app. a fifth from other English-speaking countries and only 14% from Asia, Europe (without UK) or Latin America.

Table 2. Characteristics of the responders

	All	Repeat responders
Responders	433	228
Demographics		
Age:		
- Under 18	31 (7%)	15 (7%)
- 18-24	137 (32%)	68 (30%)
- 25-34	159 (37%)	90 (39%)
- 35-44	84 (19%)	44 (19%)
- 45-54	15 (3%)	8 (4%)
- 55 or older	7 (2%)	3 (1%)
Female	45 (10%)	17 (7%)
Country (grouped)		
USA	295 (69%)	154 (68%)
Canada	33 (8%)	18 (8%)
United Kingdom	33 (8%)	18 (8%)
Europe (without UK)	28 (7%)	15 (7%)
Asia (incl. Russia)	20 (5%)	8 (4%)
Australia and New Zealand	11 (3%)	8 (4%)
Latin America	10 (2%)	6 (3%)
Correlation between the purchases of the top 50 comics in the sample and the overall sales		
Survey round 1	0.77	0.65
Survey round 2	0.70	0.76
Survey round 3	0.63	0.55

Source: Own elaboration based on survey and Comichron data.

As a recurring part in each survey, the responders were asked to indicate which of the 50 popular comic books from the prior month they have read. The top-selling comic books were identified at the Comichron website⁷. In the first survey, the list included the top 50 best-selling comics issues from January. In the second survey, priority was given to comics issues that constituted follow ups to the issues in the previous survey. This was done to allow tracking series readership over consecutive issues. However, only follow ups that made it to the

⁷ <http://www.comichron.com/monthlycomicssales.html> (accessed: 2019-02-08).

top 100 were picked, and the rest of the comics were chosen from the top 50. These mostly included new series. The same was repeated for the third survey, with priority given to comics series that were included in the first two surveys. In total 150 titles were shown, many of which belonged to series included in more than one round. Additionally, some of the series had more than one issue in a round (i.e. were released with a higher than monthly frequency). Importantly, all of the chosen comics issues were new releases (released in the month they appeared in the top-selling list). Table 3 summarises the characteristics of the included titles and series.

Table 3. Characteristics of the comic book sample

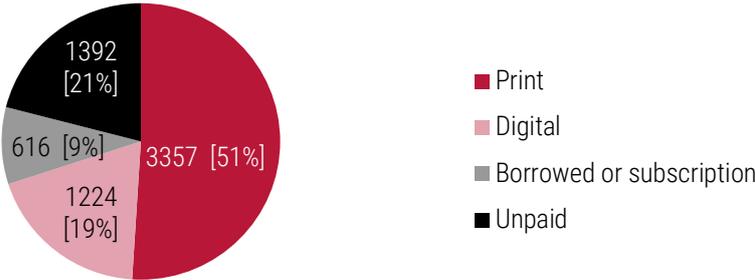
Variable	Number or Share			
Number of comics issues	150			
Number of unique comics series: Total	46			
- With issues in one round only	9			
- With issues in any two rounds	14			
- With issues in all three rounds	23			
Publishers				
- Marvel	51%			
- DC	42%			
- Image	7%			
Statistics	Median	Std. dev.	Min	Max
Issue number	38.5	328	1	999
Number of issues in a series (observed in total)	3	2.2	1	12
Number of issues in a series (per round)	1	0.7	1	4
Number of issues in a series (planned)*	5.5	3.7	1	12
Price	\$3.99	0.66	\$2.99	\$5.99
Sales	44,482	26,187.62	187,583	18,514

*Note: *The statistics refer only to the series with a planned finite number of issues. However, 30 out of 46 series in the sample were ongoing, without a set number of issues.*

Source: own calculations on the survey data.

For each of the marked comics the responders were then asked to indicate how they acquired them. The options included: “purchased physical copy”, “purchased digital copy”, “access through subscription”, “unpaid digital copy (e.g. downloaded from the internet or read online)”, “borrowed physical copy (including from a library)”. Table A1 in Appendix A shows the statistics for the comics acquisition of the 150 titles. Most of the responders acquired at least 5 comic books from the top 50 in each of the studied rounds. About half of the acquired titles were in print format. About a fifth were purchased digital copies and another fifth comprised unpaid (unauthorised) digital copies. Fewer than a tenth were acquired through borrowing or a subscription (Figure 4).

Figure 4. Acquired titles by type of acquisition channel



Source: own elaboration based on collected survey data.

While many of the responders have used unpaid sources for the titles in the sample, the share is actually much lower than the total share of responders who have indicated having used an unauthorised source in the past (21% vs 71%). This shows that most of the readers in my sample are familiar with at least some unpaid sources, but do not usually use them for their reading needs.

Despite some differences in the demographics and unauthorised readership, the purchasing patterns among my sample were well correlated with the industry-wide sales. The correlation between the numbers of print comics acquisitions by the responders of my survey, and the sales reported by Comichron for the relevant months ranged from 63% (for March numbers) to 77% (for January numbers). While my sample might be more representative of the passionate Reddit communities, it does reflect market-level consumption choices at the top of the distribution of sales.

4.2. Methods

My approach is built upon the methods applied in the Waldfogel studies, with three noteworthy differences. First, my survey considered comic book readers directly and thus comprises relatively diverse responders (e.g. not restricted to region, age or university). My sample is too small to be made representative of the internet population. However, comic books constitute a much smaller market than movies – a (very) rough back of the envelope calculation by Drum (2014) put the share of comics-reading millennials (in a year) at 2%. As such, it seems more adequate to look directly at the readers and not the general population.

Second, my retrospective questions relate to only one month prior to the survey. Long periods might cause some of the responders to not fully recall whether and how they consumed a specific item. This is especially true with comic books, where comic book readers tend to consume large numbers of issues in a small time (as proved by the results of the survey). As such, my design might help alleviate this problem by referring only to the most recent acquisitions.

Third, I exploit the serial nature of the comic books to focus both on responders observed over three periods and comics series observed over several issues. Typically, studies of this type focus on a limited selection of top titles as it would be unfeasible to ask responders for a full list of consumed titles. As such, only looking at the numbers of acquired comic books within the top 50 titles could bias the estimates of displacement rates by omission of information on slightly less popular titles that were bought (or downloaded) by the consumers in the same period. For example, a responder might be susceptible both to a budget constraint (allowing to buy only two comic book issues per week) and a time constraint (allowing to read only three issues per week). With such constraints it is possible for the reader in week A to buy two issues from the top 50 and pirate one issue ranked between 51 and 100; but then to do the opposite in week B – pirate one issue from the top 50 and buy two issues ranked between 51 and 100. In such a case there is no actual displacement, as in both cases the consumer used all of their budget to buy two comic book issues. However, observing only the readership of titles ranked 1-50 would suggest that the pirate consumption in week B replaced the paid consumption. Thus I focus on series of titles rather than on individual ones, with issues published in weekly or biweekly intervals. As such, I observe titles consumed over several months rather than instead of unrelated products. This presents an advantage over applying such analysis to non-serialised goods, as readers are more likely to restrict their reading patterns to the same set of series over time. In a sense, a comics series can be thus viewed as a single item consumed over several weeks or months, with repeating decisions regarding how to acquire it.

5. Results

5.1. Displacement effects of piracy

Three separate econometric approaches are followed to estimate the effects of unpaid acquisitions on purchases. In the first, the data are treated as cross-sectional to study the relationship between the authorised and unauthorised consumption over the full sample of three months of observations. However, previous research showed that this approach suffers from omitted variable problems, as, for example, responders more interested in comics might read more from both the authorised and unauthorised sources (see Waldfogel studies). When applying this approach, information from each survey about the individual readership of top-selling comics is used, with the additional inclusion of control variables on the general readership behaviour of the responders (self-described interest in comic books and frequency of readership). For the second approach, a panel dataset is constructed with each responder observed over time. This approach allows for regressions with fixed effects to eliminate any potential effects of individual characteristics of the responders. Such approach was often applied in previous literature as superior to the cross-sectional one, even when individual characteristics were observed (see the Waldfogel and Waldfogel-based studies). In the third, the top-selling comics series are instead treated as units of observation. In this case, the dataset is transformed to reflect sales of specific comics series, over the subsequent issues, among the survey responders. In other words, a longitudinal approach is applied, and comics-series fixed effects included.

Approach I. OLS with control variables for individual interests

Columns (1) and (2) of Table 4 report the results of the OLS regressions calculated on the full sample of responders from all three rounds. This base approach controls for the individual interest in comic books and reading frequency as an attempt to erase the potential effects of the individual characteristics affecting both the paid and unpaid consumption. The results suggest a negative relationship between the unauthorised consumption and the sales of physical comics, but no grounds to rule out null effects for the digital comics.

As only a subsample of the responders ever reads digital comics it is possible that those who do pay for digital comic books are also more likely to acquire them from unauthorized sources. In columns (3) and (4) the sample is restricted to responders who have in any round acquired a digital comic book (paid or unpaid). This shows a negative relationship of digital purchases and unpaid readership. The relationship with print purchases is also significant but becomes smaller than in columns (1) and (2). This suggests a decreasing displacement rate of print purchases with subsequent unpaid acquisitions or that consumers reading digital comics generally read fewer print comics.

Finally, in columns (5)-(8) the sample is restricted to include only the comics series with issues recurring over all three rounds and responders who participated in all rounds. This robustness check allows me to limit the potential biases stemming from changing populations in each round as well as from the unobserved consumption of titles not in the sample (those that did not make it to the top-selling lists). In principle, in columns (5)-(8) a fixed sample is observed over three periods and their consumption of a fixed set of series. The results are consistent with those for the whole sample, though the estimated effects are slightly larger.

Approach II. Panel OLS with responder fixed effects

Following the previous literature, a panel OLS regression is also run with responder-level fixed effects to control for other potential unobserved individual characteristics that could affect the results. Table 5 contains the results, following analogous specifications to those in Table 4. Notably, the negative relationship with physical purchases now becomes even more negative, while the relationship with digital purchases becomes statistically

insignificant, even for the digital readers. However, it might be more accurate to say that the 95% confidence intervals indicate an effect on digital purchases ranging from -36% to 6%.

Table 4. OLS regressions of the number of purchased comics on the number of unpaid comics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Comics	Print	Digital	Print	Digital	Print	Digital	Print	Digital
Reader types	All	All	Digital	Digital	All	All	Digital	Digital
Sample	Whole	Whole	Whole	Whole	Recurring	Recurring	Recurring	Recurring
Number of unpaid comics	-0.25*** (0.04)	-0.04 (0.03)	-0.16*** (0.04)	-0.20*** (0.05)	-0.32*** (0.06)	-0.03 (0.05)	-0.23*** (0.07)	-0.23** (0.10)
How often reads comics:	(base level: fewer than one per month)							
1-3 per month	0.22 (0.63)	-0.11 (0.31)	-0.50 (0.76)	-0.64 (1.00)	-0.45 (0.74)	0.42 (0.52)	-0.85 (1.37)	0.96 (1.97)
1 per week	1.08 (0.79)	0.65 (0.52)	0.29 (0.87)	1.18 (1.22)	0.63 (0.92)	1.66** (0.78)	-0.03 (1.21)	2.92 (1.93)
>1 per week	3.47*** (0.67)	1.42*** (0.44)	0.94 (0.70)	2.98** (1.20)	2.52*** (0.83)	2.00*** (0.68)	0.47 (1.18)	4.65** (2.11)
How much interested in comics:	(base level: not at all interested)							
Slightly	1.63** (0.74)	-0.21 (0.44)	-	-	-	-	-	-
Moderately	1.39 (0.96)	-0.24 (0.47)	-0.07 (0.85)	-1.10 (1.12)	-	-	-	-
Very	1.86*** (0.71)	0.37 (0.46)	0.31 (0.72)	-0.17 (1.07)	0.22 (0.57)	0.47 (0.52)	-0.04 (0.84)	0.52 (1.13)
Extremely	4.79*** (0.92)	0.37 (0.57)	2.52** (1.03)	0.23 (1.48)	2.79*** (0.85)	0.61 (0.88)	1.37 (1.02)	1.56 (1.85)
Observations	808	808	377	377	468	468	216	216
Responders	425	425	180	180	156	156	72	72
R-squared	0.21	0.05	0.17	0.14	0.24	0.07	0.24	0.18

Note: standard errors clustered at responder-level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

All regressions include dummy controls for gender, age groups and survey rounds.

The Comics row describes the channel of acquisition (i.e. print purchases or digital purchases). The Reader types row describes whether all types of readers are included or whether the regression only considers those who at any point acquired a digital comic book (paid or unpaid). The Sample row describes whether the regression considers the whole sample of readers and comic book series or only those that appeared in all three rounds of the survey (both comics series and readers).

Source: own calculations on the survey data.

Approach III. Panel OLS with comics series fixed effects

As a last robustness check, the unit of analysis is switched within the dataset to observe comics series and the consumption of their subsequent issues. A panel OLS regression with fixed effects is conducted to estimate the relationship between the physical and digital sales and the unpaid consumption. All the series with more than one issue in the sample (37 comics series) are included but the acquisition numbers are calculated only for the responders who provided answers in each round. Columns (1)-(2) include cross-sectional OLS regressions, finding a positive but statistically insignificant relationship between the unpaid and paid acquisitions. Adding comics-series fixed effects makes the effect for print large and negative and the effect for digital close to 0. The results corroborate the results from Table 5, with a similar magnitude of the substitution rate for print comics (-0.31 – see Table 6). There is no statistically significant displacement for the digital sales.

Table 5. Panel regression with reader fixed effects of the number of purchased comics on the number of unpaid comics and control variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Comics	Print	Digital	Print	Digital	Print	Digital	Print	Digital
Reader types	All	All	Digital	Digital	All	All	Digital	Digital
Sample	Whole	Whole	Whole	Whole	Recurring	Recurring	Recurring	Recurring
Number of unpaid comics	-0.34*** (0.11)	-0.11 (0.08)	-0.34*** (0.11)	-0.11 (0.08)	-0.40*** (0.14)	-0.15 (0.10)	-0.40*** (0.13)	-0.15 (0.11)
Observations	610	610	312	312	468	468	216	216
Responders	227	227	115	115	156	156	72	72
R-squared	0.14	0.02	0.24	0.02	0.20	0.02	0.32	0.03

Note: robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

All regressions include dummy controls for survey rounds.

The Comics row describes the channel of acquisition (i.e. print purchases or digital purchases). The Reader types row describes whether all types of readers are included or whether the regression only considers those who at any point acquired a digital comic book (paid or unpaid). The Sample row describes whether the regression considers the whole sample of readers and comic book series or only those that appeared in all three rounds of the survey (both comics series and readers).

Source: own calculations on the survey data.

All in all, my results suggest that the unpaid readership in my sample displaces part of print readership. Assuming a 30-40% rate of displacement, approximately 6-8% of comics read by the responders were read from an unpaid source instead from a paid print one. From the perspective of sales, this means that the unpaid sources might displace app. 11-14% of print sales. On the other hand, the relationship with digital sales is less clear. My results do not allow me to rule out no effects, though the coefficients in most specifications are negative.

Table 6. Panel regression with fixed effects of the issue purchases on the number of unpaid issue reads and control variables

	Cross-sectional OLS		Panel OLS with series FE	
	(1) Print	(2) Digital	(3) Print	(4) Digital
Number of unpaid reads	0.50 (0.36)	0.29 (0.18)	-0.31** (0.15)	-0.00 (0.10)
Series year of start	1.04*** (0.13)	0.27** (0.10)		
Issue number	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Survey round:	(base level: survey round 1)			
2	-2.55*** (0.83)	-0.02 (0.43)	-2.95*** (0.41)	-0.03 (0.27)
3	-1.78 (1.06)	-0.27 (0.49)	-2.17*** (0.43)	-0.05 (0.28)
Sales (in logarithms)	14.77*** (2.22)	3.67*** (0.78)	3.33*** (0.98)	0.95 (0.65)
Price	-3.79*** (1.22)	-1.43*** (0.45)	-1.14** (0.57)	-0.25 (0.38)
Observations	142	142	142	142
Comics series	37	37	37	37
R-squared	0.65	0.42	0.43	0.07

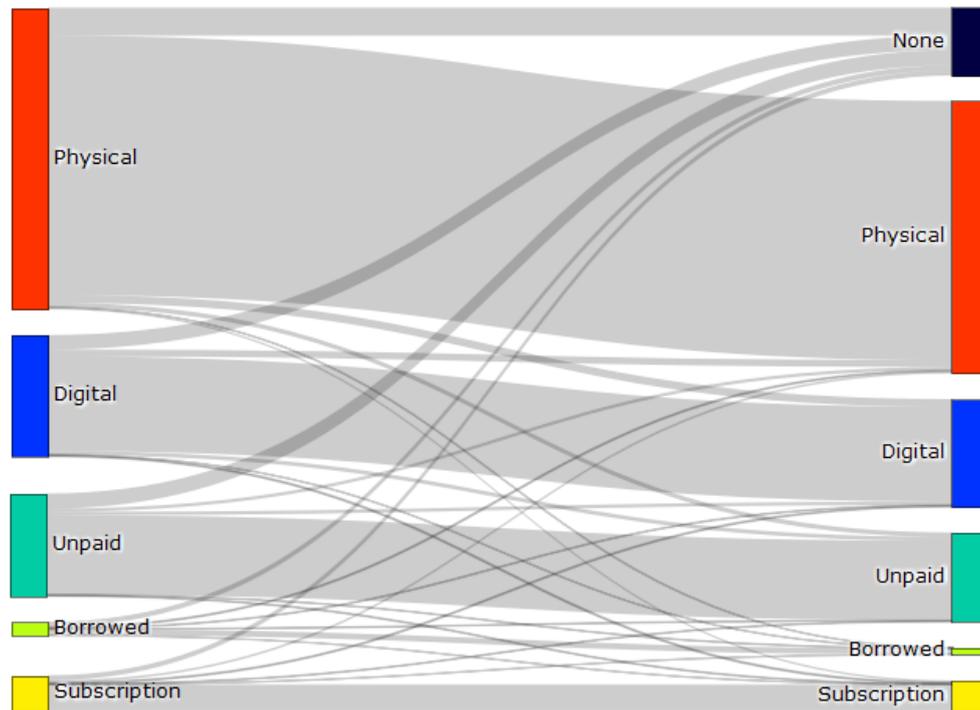
Note: robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: own calculations on the survey data.

5.2. Format switching

To better understand the choices of consumers and the substitution of print and unpaid digital comic books, I look at the willingness to pay for digital formats and switching between formats. It is plausible that much of the switching to unpaid sources occurs due to high prices of digital comic books, effectively making the responders choose unpaid sources whenever they do not feel like paying the full price for a print copy.

Figure 5. Within-series flows between formats of subsequent issues



Note: The graph does not include the inflows from the 'none' category as this does not really inform on format changes among readers.

Source: Own elaboration based on the survey data. Graph created with the 'plotly' package in R.

Once consumers start reading a series in a specific format, they are unlikely to switch the formats midway. Figure 5 shows the within-series flows between different sources of the comic books. In general, print comics readers change the mode of consumption of a comics series to digital (paid or unpaid) only in app. 4% of the cases. Paid digital comics readers change the mode of consumption midseries to physical only in app. 6% cases and to unpaid digital only in app. 3% of the cases. Non-paying readers switch to any paid channels mid-series only in app. 7% of the cases. All three kinds of readers are more likely to stop reading a series than to switch channels of acquisition – print buyers stopped reading a series in 9% of cases, the digital buyers stopped in 12% of cases and the non-paying readers stopped reading a series in 15% of cases. Importantly, the low within-series mobility between issues was only partially reflected in the overall source differentiation among the consumers. Around 31% of the responders did not buy any of the comics in the sample in a print form and around 39% of the responders only bought the print forms. However, the remaining 30% on average acquired 20% of their comics in a paid digital format and 17% in an unpaid digital format.

5.3. Willingness to pay for digital formats

The low mobility between formats might be explained by low willingness to pay for digital formats by the print readers. In the 2nd round of the survey, the responders were asked about how much they would be willing to pay for the digital issues of 20 recent titles from the top-selling lists (half of the readers were asked about a set of 10 comics and the other half about a different set of 10 comics). The titles were selected to include a variety of series from all three publishers, with various issue numbers (see the marked titles in Table B1). This information is used to check how the consumer decisions were related to the perceived valuation of the digital versions of the issues. A rational consumer would only buy a comic book if they perceived its value as higher

than its price. However, as some of the responders have already acquired and read the comics on the list, it is likely that they have re-evaluated the content after reading it. Indeed, 38% of those who bought the comics in a digital form rated their perceived value as lower than its price (see Table 7).

Table 7. Valuations of the digital comic books, by actual source of acquisition

	Value		Value to price		Value > Price	N
	Mean	Median	Mean	Median		
Not acquired	2.5	2	0.65	0.58	21%	1701
All acquired	3.2	3	0.82	0.75	38%	289
Physical	2.8	3	0.71	0.75	25%	159
Digital	4	4	1	1	62%	68
Unpaid	2.7	2.3	0.67	0.6	27%	41
Borrowed	5	5	1.3	1.3	57%	7
Subscription	4.1	4	1	1	74%	23

Note: the Value columns show mean and median valuations of digital copies of comic books, depending on how a specific item was actually acquired. The Value to price column shows mean and median value to price ratios, while the Value > Price column shows the percentage of cases where indicated value was higher than the price.

Source: own calculations on the survey data.

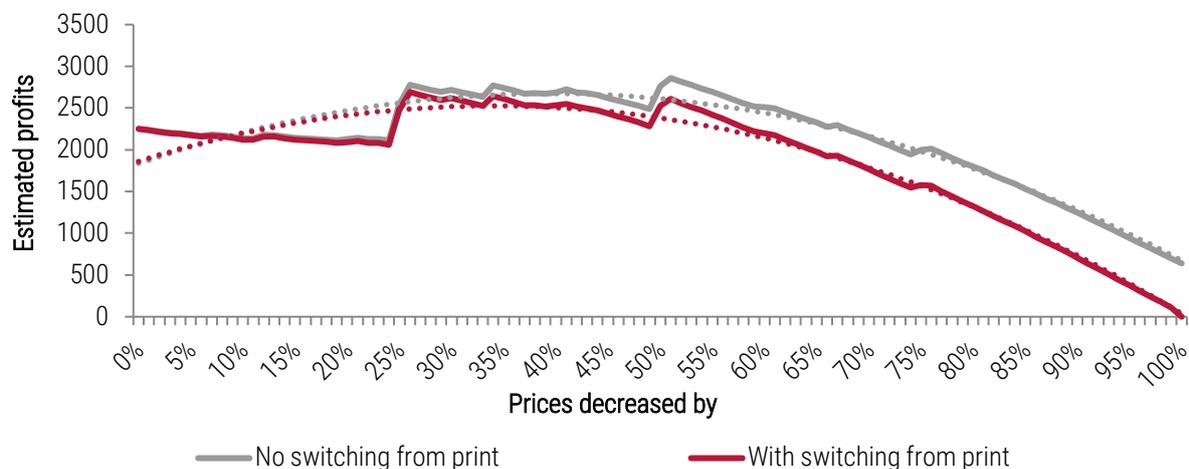
As expected, those who read the comics in a purchased digital format (bought copy or subscription) gave the highest valuations for the digital issues. Those who read the issues in print formats gave much lower valuations, and only 25% of them indicated perceived values of digital issues as higher than their prices. Note that the prices of digital comics issues are the same as the prices for the print comics, suggesting that a large majority of comics readers considers the digital formats as inferior. Finally, those who read the issues without paying for them indicated valuations only slightly higher than the valuations of those who did not read the issues at all. Only 27% of them indicated that they perceived the values as higher than the prices. Notably, this is a magnitude of the similar size as the substitution rate estimated in the previous section.

If taken at face value, these results indicate that among the responders of my survey, the comics publishers could achieve higher profits if they decreased the prices of the digital comic books. Indeed, the lack of mobility to digital formats could be partially explained by the readers' preference to stop reading a series rather than to pay the full price for a format perceived as inferior. A back of the envelope calculation suggests that a lower price for digital copies could incentivize enough non-consumers and pirates to purchase the digital copy that it would offset the losses due to lower prices. I make several assumptions to arrive at this conclusion. First, only the consumption and valuation of the 20 titles from the 2nd round of the survey is considered. This yields 10 valuations per each of the 199 of the 2nd round responders⁸ – a total of 1,990 observations. Also, the observations where a comic book has been acquired only through borrowing or subscription are removed. This reduces the number of observations to 1,963. Second, the price for print copies is assumed to remain fixed at its original level and only the prices of the digital alternatives are manipulated. The changes in consumer decisions induced by lowering the prices of the digital copies by specific percentages are then considered. For all participants, it is assumed that if the valuation exceeded the price, they would have acquired the comic – even if they have not yet at the time of the survey. Moreover, it is further assumed that a fixed share of pirate acquisitions occurs even if the valuation exceeds the price, with the share equal to the one reported in Figure 4. Thus, for those who have already acquired an issue through an unpaid channel, even though they had a valuation higher than the price, it is assumed that they would not purchase the issue regardless of its price.

⁸ An error in the survey tool caused two of the responders not to see the list of titles for evaluation.

Similarly, for those whose valuation becomes larger than the price when the price is lower, it is assumed that 27% of the profits would still be lost – i.e. that for this share of acquisition choices the readers would still choose the unpaid channel.⁹ These pirate choices constitute the previously reported displacement.

Figure 6. Estimated profits for the 20 titles evaluated in the 2nd survey, after price reduction.



Source: own calculations based on responders self-reported behaviour and valuations.

Thus, lowering the price will convert some of the pirates and non-consumers into digital readers, at the cost of the lower price charged for the purchased comics. Regarding those who acquired the titles in a print form, two scenarios are possible – an optimistic and a pessimistic one. In the optimistic scenario, those who bought a print version would never purchase a digital copy – no matter its price. In this scenario, lowering the price of the digital copy would not cannibalise the higher priced physical sales. In the pessimistic scenario, whenever the valuation of a digital copy is larger than its price, the consumer will switch to the paid digital channel. In such case, lowering the price of the digital copies will partially cannibalise the sales of the print comics. Thus, the two scenarios provide a lower and an upper bound to the effects of a price reduction of the digital copies.

Figure 6 shows the results of this exercise. In principle, the results indicate that a decrease in the price of the digital comics from app. 25% to app. 60% could increase the publishers' profits – at least among the sample of my responders.

6. Conclusions

The US comic book market has been changed by several large developments of the XXI century, with digitalisation driving most of them. However, at the same time, the market retained its strong link to physical formats, which have grown in sales to a larger extent than the digital copies. The comic book market has grown in terms of the top titles sales and the long tail. Simultaneously, it also expanded to other outlets, including online and chain stores. Digital sales, however, increased to a share of app. 10% and did not grow further.

Among these developments, it is difficult to predict how the rise of online piracy might have affect these trends. To the best of my knowledge this is the first study to contribute to understanding how piracy affected the

⁹ This assumption likely biases the estimated profits from lowering the price downwards. It implies that a fixed share of people will choose a pirate channel instead of a paid one, even if they think the price is lower than the value. In the real world it is likely that they would be more willing to pay if the price was significantly below the valuation (e.g. close to 0).

American comic book market. To achieve this, I have used and extended an established methodological framework, and collected new unique panel survey data from heavy comic book readers.

My results suggest a displacement rate between the unpaid readership of comic book issues and their paid print versions. Surprisingly, I find no robust evidence of a displacement rate with the digital comics purchases, despite the digital copies being a closer substitute for the unauthorised ones. One possible explanation comes from the fact that the comic book market is dominated by physical comic books, with many readers treating the digital comics as inferior versions. As such, the physical comics readers might be less willing to spend money on the digital versions, while they might be willing to view them without paying if they do not feel like purchasing the print versions.

My main calculations indicate a displacement rate with print comics ranges from app. 30% to app. 40%. Moreover, I ran an additional analysis with a comics series as my unit of observation and the issue numbers being the time variable. The result indicated a displacement rate of app. 32%, which is a magnitude comparable with the results of the main calculations. Finally, my analysis of the perceived value of digital comics suggests that the unauthorised readers in 27% cases perceived the comics they read as having a value exceeding the price. This, again, supports the existence of a displacement rate, whereas a person would be willing to buy something, but piracy is more attractive. The 30-40% range of displacement suggests that approximately 6-8% of the comics acquired by the responders were unpaid comics displacing paid ones. From the perspective of the print purchases in the sample, it means that app. 11-14% more print comics issues could have been bought if not for illegal availability. These results suggest that despite the overall growth of the US comic book market, piracy does displace some of the potential revenues. However, the market growth driven by developments such as comic book popularization, so far has outpaced these losses.

The findings of my survey indicate that the current pricing scheme for new digital releases remains problematic. Only a small group of my responders purchased any digital copies from the presented titles. On average, these responders attributed a value equal to the price of the digital issues to these titles. However, those who read print versions, or the unpaid versions considered the digital copies as of significantly lower value than the price. This contrasts with the equal price of print and digital issues – implying that the readers were willing to pay significantly less for the digital formats than for the print ones. The surveyed readers were also very unlikely to switch between formats once they started reading a comic book series in a specific format. These results emphasise that the current prices for digital comics are too high for traditional readers to consider purchase. A group of comics enthusiasts at the Comic Vine forums discussed the potential advantages of digital comic books, with two key themes emerging: a lower collector value of digital formats and prices that were too high for print readers. Admittedly, some of the participants acknowledged the potential of digital comic books but waited for the prices to go down (thecomicscove 2012).

The high prices for digital formats contribute to a relatively high engagement in unpaid consumption. Only 27% of the surveyed readers have never read a comic book issue from an unauthorised source. Moreover, most of the readers who acquired a comic book without payment had a positive willingness to pay for the digital copy of the title, but lower than its price. This showed a simple relationship: most comic book readers were either willing to purchase a print copy or – if they had lower valuation than the full price – turned to piracy instead. My results suggest that at least among my reader sample, a reduction in digital prices could have incentivised some of the readers to purchase digital formats instead – potentially increasing the overall volume of money spent on comics across the surveyed group.

In result, unpaid consumption displaced some of the print sales but was not enough to push the industry toward digital formats. This is mostly because the digital formats are treated as a substitute for print experience only for a relatively small number of cases when the comic book valuation is below the price of a print copy. Additionally, the official app-powered digital comics target an audience whose specific intent is not to own a

print version instead of readers in general. As such, most of the readers choose between high-valued print formats and low-valued but free formats. Because of their lower value but high price, the official digital formats cannot serve as a middle option, despite their perceived inferior nature.

Still, the high volume of pirate consumption suggests a large audience with no intention to pay for any of the formats available at the official market. More research is needed to establish the exact relationship of this consumption with the digital sales of comic books and to analyse whether lower prices could introduce these readers to a legal market.

Finally, for those publishers who cling to DRM solutions, the downloadable pirate formats might actually be considered of higher value by some in the community. As mentioned by members of both the scanner community and readers themselves (e.g. thecomicscove 2012 or Lawson 2013) the DRM-using digital services do not offer any guarantee that the content that was paid for remains available over time. Thus, despite the easy and instant access to legal digital copies, their value is additionally deteriorated as they are offered as a service and not actual item. It is unclear whether digital comics can carry any collector value to the buyers, but if yes, DRM would eliminate it. Steirer (2014) highlights DRM as one of the reasons that a collector value for digital comics is absent.

On a final note, the results of my study are limited to comic book issues and do not take into account other formats common for the comic book market. It is unclear whether the same results would hold for graphic novels or trade paperback collections (both print and digital). It is also unclear how subscriptions are affected by piracy. The subscriptions, e.g. at ComiXology, only allow to read comics from the top publishers that have been initially released a few months earlier. There is no public data indicating whether subscriptions constitute an important channel for acquiring comic books and it would be difficult to fully analyse the impact of illegal distribution on this channel in this framework. As such it is possible, that the effects of piracy are more pronounced in the case of digital subscriptions. These shortcomings highlight a further need to study the comic book market and its development in times of digital transformation.

References

- Alverson, B. (2012). At last a digital comics number: ComiXology's sales were \$19M in '11. CBR.com. <https://www.cbr.com/at-last-a-digital-comics-number-comixologys-sales-were-19m-in-11/>. Accessed 2019-04-16.
- Association of American Publishers. (2017). Book Publisher Sales Were \$5.72 Billion in the First Half of 2017. AAP. <http://newsroom.publishers.org/book-publisher-sales-were-572-billion-in-the-first-half-of-2017/>. Accessed 2018-12-18.
- Bai, J. and Waldfogel, J. (2012). Movie piracy and sales displacement in two samples of Chinese consumers. *Information Economics and Policy*, 24 (3-4), 187–196.
- Brill, I. (2005). The Rise of Comics Piracy. *Comics Journal*, 269.
- ComiXology. (2013). Survey conducted by ComiXology. Infographics by Harris, S. <https://www.behance.net/gallery/14579787/Comics-Infographic-for-Comixology>. Accessed 2019-02-11.
- Danaher, B., Smith, M.D. and Telang, R. (2014). Piracy and copyright enforcement mechanisms. *Innovation Policy and the Economy*, 14, 25-61.
- Danaher, B., Smith, M.D. and Telang, R. (2018). *The effect of piracy website blocking on consumer behavior*. SSRN working paper, no. 2612063.
- Danaher, B., Smith, M.D., Telang, R. and Chen, S. (2014). The effect of graduated response anti-piracy laws on music sales: evidence from an event study in France. *Journal of Industrial Economics*, 62 (3), 541-553.
- Dejean, S. (2009). *What can we learn from empirical studies about piracy?* CESifo Economic Studies, 55 (2), 326-352.
- Delwiche, A. (2014). Scanner tags, comic book piracy and participatory culture. *First Monday*, 19 (5).
- Drum, K. (2014). Millennials and comic books: chill out, haters. Mother Jones. <https://www.motherjones.com/kevin-drum/2014/12/millennials-and-comic-books-chill-out-haters/>. Accessed 2018-10-15.
- Ende, M. van der, Hageraats, M., Poort, J., Quintais, J. and Yagafarova, A. (2018). *Global online piracy study*. IViR (Institute for Information Law), University of Amsterdam.
- Ende, M. van der, Poort, J., Haffner, R., de Bas, P., Yagafarova, A., Rohlf, S. and van Til, H. (2015). *Estimating displacement rates of copyrighted content in the EU*. Ecorys, Rotterdam.
- Fantom Comics. (2017). 2016 In Review – A comic book shop talks comic book sales trends. Fantom Comics. <http://www.fantomcomics.com/blog/2017/02/13/2016-review-comic-book-shop-talks-comic-book-sales-trends/>. Accessed through Wayback Archive on 2018-10-09.
- Grassmuck, V.R. (2010). *Academic studies on the effect of file-sharing on the recorded music industry: a literature review*. SSRN working paper, no. 1749579.
- Griep, M. (2016). Number of comic stores up in 2016. According to Diamond. ICv2. <https://icv2.com/articles/markets/view/35123/number-comic-stores-up-2016>. Accessed 2019-02-05.
- Handke, C. (2012). A taxonomy of empirical research on copyright - how do we inform policy? *Review of Economic Research on Copyright Issues*, 9 (1), 47-92.
- Hardy, W., Krawczyk, M. and Tyrowicz, J. (2014). *Internet piracy and book sales: a field experiment*. WNE Working Papers, 23/2014 (140).
- Harper, D. (2016). Money for Nothing: A Look at the Popularity and Questionable Legality of Free Comic Sites. SKTCHD. <https://sktchd.com/longform/money-for-nothing-a-look-at-the-popularity-and-questionable-legality-of-free-comic-sites/>. Accessed 2019-03-21.
- Hennig-Thurau, T., Henning, V. and Sattler, H. (2007). Consumer file sharing of motion pictures. *Journal of Marketing*, 71(4), 1-18.
- Herz, B. and Kiljański, K. (2018). Movie piracy and displaced sales in Europe: evidence from six countries. *Information Economics and Policy*, 43, 12-22.
- Howell, P. (2001). *Strategy and Style in English and French Translations of Japanese Comic Books*. Edinburgh Working Papers in Applied Linguistics, 11, 59-66.
- IBISWorld. (2018). *Book Stores Industry in the US*. Industry Market Research Report. IBISWorld.

- ICv2. (2012). 'New 52' Appealed to avid fans & lapsed readers. DC says digital sales are 'additive'. ICv2. <https://icv2.com/articles/comics/view/22113/new-52-appealed-avid-fans-lapsed-readers>. Accessed 2018-10-09.
- International Federation of the Phonographic Industry (IFPI). (2014). *Recording Industry in Numbers*. IFPI.
- Johnston, R. (2012). An interview with a comic book pirate. Bleeding Cool. <https://www.bleedingcool.com/2012/04/12/pirate/>. Accessed 2019-03-22.
- Johnston, R. (2016). There Are 3.8% More Comic Stores In 2016 Than There Were At The Beginning Of 2015. Bleeding Cool. <https://www.bleedingcool.com/2016/02/26/there-are-3-8-more-comic-stores-in-2016-than-there-were-at-the-beginning-of-2015/>. Accessed 2019-02-05.
- Koh, B., Murthi, B.P.S. and Raghunathan, S. (2014). Shifting demand: online music piracy, physical music sales, and digital music sales. *Journal of Organizational Computing and Electronic Commerce*, 24 (4), 366-387.
- Kraft, A. (2013). Comixology: The changing face of comic book readers. Geek Mom: <https://geekmom.com/2013/10/comixology-comic-book-readers/> Accessed 2018-10-09.
- Lawson, A. (2013). Why DRM-free comic books are a big deal, even if you don't read comics. Ars Technica. <https://arstechnica.com/staff/2013/07/why-drm-free-comic-books-are-a-big-deal-even-if-you-dont-read-comics/>. Accessed 2019-03-29.
- Liebowitz, S.J. (2016). How much of the decline in sound recording sales is due to file-sharing? *Journal of Cultural Economics*, 40 (1), 13-28.
- MacDonald, H. (2013a). How many comics shops are there? Diamond had 2,638 accounts in September 2013. Comicsbeat. <https://www.comicsbeat.com/how-many-comics-shops-are-there-diamond-had-2638-accounts-in-september-2013/>. Accessed 2019-02-05.
- MacDonald, H. (2013b). Diamond Reports Number of Comics Shops Up 4% in 2013. Publishers Weekly. <https://www.publishersweekly.com/pw/by-topic/industry-news/comics/article/59513-diamond-reports-number-of-comics-shops-up-4-in-2013.html>. Accessed 2019-02-05.
- MacDonald, H. and Reid, C. (2016). New York Comic Con: 2016 Sales Creep Up, ICv2 Surveys Retail Disruption. Publishers Weekly. <https://www.publishersweekly.com/pw/by-topic/industry-news/comics/article/71690-new-york-comic-con-2016-sales-creep-up-icv2-surveys-retail-disruption.html>. Accessed 2018-11-27.
- Matsui, T. (2009). The Diffusion of Foreign Cultural Products: The Case Analysis of Japanese Comics (Manga) Market in the US. Princeton University, Center for Arts and Cultural Policy Studies Working Paper, 37.
- Mroczkowski, J. (2011a). The comic book pirate interviews, part II. iFanboy. <https://ifanboy.com/articles/the-comic-book-pirate-interviews-part-ii>. Accessed 2019-03-29.
- Mroczkowski, J. (2011b). The comic book pirate interviews, part I. iFanboy. <https://ifanboy.com/articles/the-pirate-interviews-part-i>. Accessed 2019-03-29.
- Novos, I.E. and Waldman, E. (2013). Piracy of intellectual property: past, present and future. *Review of Economic Research on Copyright Issues*, 10 (2), 1-26.
- Oberholzer-Gee, F. and Strumpf, K. (2007). The effect of file sharing on record sales: an empirical analysis. *Journal of Political Economy*, 115 (1), 1-42.
- Reimers, I. (2016). Can private copyright protection be effective? Evidence from book publishing. *Journal of Law and Economics*, 59 (2), 411-440.
- Rob, R. and Waldfogel, J. (2006). Piracy on the high C's: music downloading, sales displacement, and social welfare in a sample of college students. *Journal of Law and Economics*, 49 (1), 29-62.
- Rob, R. and Waldfogel, J. (2007). Piracy on the silver screen. *Journal of Industrial Economics*, 55 (3), 379-395.
- Rosenblatt, S. (2014). Comixology cuts Apple, Google out of digital-comics kickback. CNET.com. <https://www.cnet.com/news/comixology-cuts-apple-google-out-of-digital-comics-kickback/>. Accessed 2019-03-19.
- Schenker, B. (2013). Demographics: comics readers almost 45% women now and how publishers stack up. Comicsbeat. <https://www.comicsbeat.com/demographics-comic-readers-almost-45-women-now-and-how-publishers-stack-up/>. Accessed 2019-02-06.
- Schenker, B. (2014). Market research says 46.67% of comic fans are female. Comicsbeat. <https://www.comicsbeat.com/market-research-says-46-female-comic-fans/>. Accessed 2019-02-06.

- Steirer, G. (2014). No more bags and boards: collecting culture and the digital comics marketplace. *Journal of Graphic Novels and Comics*, 5 (4), 455-469.
- Stevens, J.R. and Bell, C.E. (2015). (Re)examining the attitudes of comic book store patrons. *Transformative Works and Cultures*, 20.
- Tanaka, T. (2016). *The effects of internet book piracy: the case of Japanese comics*. Keio-IES Discussion Paper Series, DP2016-027.
- Thecomicscove. (2012). Perspectives on Digital Comics: Print vs. Digital. Comic Vine forum. <https://comicvine.gamespot.com/forums/off-topic-5/perspectives-on-digital-comics-print-vs-digital-657645/>. Accessed 2019-03-29.
- Waldfoegel, J. (2009). Lost on the web: does web distribution stimulate or depress television viewing? *Information Economics and Policy*, 21 (2), 158-168.
- Waldfoegel, J. (2010). Music file sharing and sales displacement in the iTunes era. *Information Economics and Policy*, 22 (4), 306-314.
- Waldfoegel, J. (2012). Digital piracy: empirics. In *The Oxford Handbook of the Digital Economy* (Eds. Peitz, M. and Waldfoegel, J.), Oxford University Press.

Appendix

List of Facebook groups where invitations for the first survey were placed:

Fans of DC Comics; DC & Marvel Legends; Marvel & DC Fans Unite; DC & Marvel: The Ultimate Facebook Community; Marvel Universe Rocks My World.

List of subreddits where invitations for the first survey were placed:

All Things Green Arrow (*GreenArrow*); Ant-Man (*antman*); Art from the Marvel universe (*ImaginaryMarvel*); Bane (*Bane*); Aquaman (*Aquaman*); Batgirl (*batgirl*); Batman Comics (*batman_comics*); Better than Superman! (*Supergirl*); Black Panther (*theblackpanther*); Blackwidow (*Blackwidow*); By the Hoary Hosts! (*DoctorStrange*); Captain Marvel (*Captain_Marvel*); Carnage. A more sinister symbiote (*OfficialCarnage*); The Carol Corps: Fan of Carol Denvers (*carolcorps*); The Catwoman Subreddit (*Catwoman*); comicbooks (*comicbooks*); Comic Book Suggestions (*comicbooksuggest*); ComicPorn (*ComicPorn*); comic reviews (*ComicReviews*); comiXology (*Comixology*); Content about comics (*TrueComicBooks*); Cyclops (Scott Summers) (*Cyclopswasright*); Daredevil: The Man Without Fear (*Daredevil*); Deathstroke (*Deathstroke*); Earth's Mightiest Heroes (*Avengers*); Fantastic Four (*FantasticFour*); Fights between superheroes and villains (*superfight*); The First Avenger (*CaptainAmerica*); For all Harley Quinn lovers! (*HarleyQuinn*); For All Things Suicide Squad (*SuicideSquad*); Gosh, I love Hawkeye. (*HAWKEYE*); Green Lantern – Beware my power, Green Lantern's Light! (*Greenlantern*); Guardians of the Galaxy (*GotG*); Image Comics (*ImageComics*); The Immortal Iron Fist (*ironfist*); The Incredible Subreddit (*hulk*); The Inhumans Subreddit (*Inhumans*); The Invincible Iron Man (*invincibleironman*); The Iron Avenger (*ironman*); Jason Todd: AKA Red Hood (*RedHood*); Luke Cage (*lukecage*); Marvel Comics (*Marvel*); marvel comics wallpaper (*marvelcomics*); Marvel's Runaways: Try not to die (*Runaways*); The Marvelous Kamala Khan (*KamalaKhan*); Mr. Wade Winston Wilson (*deadpool*); Nerd Comics (*nerdcomics*); Nightwing – Crimefighting with a smile since 1984 (*Nightwing*); The Norse God of Thunder (*Thor*); Power Girl (*PowerGirl*); The Punisher (*thepunisher*); Share your favorite covers. (*ComicBookCovers*); Spider-man (*Spiderman*); Spider-Gwen (*SpiderGwen*); Spirit of Vengeance (*GhostRider*); Star Wars Comics (*starwarscomics*); Superheroes and Comic Books (*superheroes*); Thanos (*Thanos*); The Venom Site (*thevenomsite*); The Walking Dead Comics (*thewalkingdeadcomic*); Wolverine (*Wolverine*); Women of Marvel Comics (*womenofmarvel*); Wonder Woman: Champion (*WonderWoman*); World's Greatest Heroes! (*justiceleague*); X-Men (*xmen*); /r/DCcomics: A friendly community dedicated to the Greatest Superheroes in the World (*DCcomics*).

Table A1. Characteristics of the 150 comics and acquisitions in the sample.

Full title	Acquisition				Sales	Price (\$)	Released
	Print	Digital	Borrowed or subscription	Unpaid			
DC comics							
Action Comics (2016) #995	27	8	6	16	41987	2.99	01.10.2018
Action Comics (2016) #996	30	8	6	17	41331	2.99	01.24.2018
Action Comics (2016) #997	21	7	4	7	43509	2.99	02.14.2018
Action Comics (2016) #998 ^A	20	7	4	5	43810	2.99	02.28.2018
Action Comics (2016) #999	21	7	2	7	51534	2.99	03.14.2018
Batman (2016) #38	88	24	9	29	98440	2.99	01.03.2018
Batman (2016) #39	88	24	8	27	94325	2.99	01.17.2018
Batman (2016) #40	38	18	4	8	95541	2.99	02.07.2018
Batman (2016) #41	42	16	5	9	93889	2.99	02.21.2018
Batman (2016) #42	43	12	4	8	93825	2.99	03.07.2018
Batman (2016) #43	42	12	4	9	91649	2.99	03.21.2018
Batman and the Signal (2017) #1	36	10	7	11	62394	3.99	01.03.2018
Batman and the Signal (2017) #2 ^B	20	4	3	4	37758	3.99	02.21.2018
Batman White Knight (2017) #4	46	12	8	17	73043	3.99	01.03.2018
Batman White Knight (2017) #5 ^B	32	9	5	6	77373	3.99	02.07.2018
Batman White Knight (2017) #6	25	7	6	8	75396	3.99	03.07.2018
Brave & The Bold Batman & Wonder Woman (2018) #1 ^A	16	3	2	2	42087	3.99	02.21.2018
Brave & The Bold Batman & Wonder Woman (2018) #2	12	1	1	4	31831	3.99	03.21.2018
Damage (2017) #1	17	4	4	12	37001	2.99	01.17.2018
Dark Knights Rising The Wild Hunt (2017) #1	33	9	2	6	101373	4.99	02.14.2018
Dark Nights Metal (2017) #5	76	17	9	24	149076	3.99	01.31.2018
Dark Nights Metal (2017) #6	41	10	3	9	187583	4.99	03.28.2018
Detective Comics (2016) #972	43	14	7	18	51694	2.99	01.10.2018
Detective Comics (2016) #973	45	13	6	18	53024	2.99	01.24.2018
Detective Comics (2016) #974	27	7	6	8	51189	2.99	02.14.2018
Detective Comics (2016) #975	27	8	6	8	51856	3.99	02.28.2018
Detective Comics (2016) #976	24	7	2	8	51341	2.99	03.14.2018
Detective Comics (2016) #977	24	6	2	8	50556	2.99	03.28.2018
Detective Comics Annual (2016) #1	40	12	6	12	44882	4.99	01.31.2018
Doomsday Clock (2017) #3	86	15	9	27	157714	4.99	01.24.2018
Doomsday Clock (2017) #4	40	14	2	9	149581	4.99	03.28.2018
Flash (2016) #38	42	17	6	16	48279	2.99	01.10.2018
Flash (2016) #39	40	18	7	18	49595	2.99	01.24.2018
Flash (2016) #40	17	14	5	10	46149	2.99	02.14.2018
Flash (2016) #41	20	12	5	7	46040	2.99	02.28.2018
Flash (2016) #42	18	10	3	8	46170	2.99	03.14.2018
Flash (2016) #43	18	10	3	7	45616	2.99	03.28.2018
Flash Annual (2016) #1	34	16	6	16	44946	4.99	01.31.2018
Justice League (2016) #36	39	14	3	12	46043	2.99	01.03.2018
Justice League (2016) #37	39	14	3	12	45313	2.99	01.17.2018
Justice League (2016) #38	20	7	6	6	45314	2.99	02.07.2018
Justice League (2016) #39 ^A	18	6	6	5	44148	2.99	02.21.2018
Justice League (2016) #40	16	7	2	6	44562	2.99	03.07.2018
Justice League (2016) #41	13	7	2	7	43675	2.99	03.21.2018
Mister Miracle (2017) #6	45	12	2	15	38655	3.99	01.10.2018
Mister Miracle (2017) #7	26	6	1	8	40337	3.99	03.14.2018
Super Sons (2017) #12	25	10	3	17	35068	3.99	01.17.2018
Super Sons (2017) #13	16	8	3	4	29625	3.99	02.21.2018
Super Sons (2017) #14	14	5	2	6	28999	3.99	03.21.2018
Superman (2016) #38	38	10	5	15	47261	2.99	01.03.2018
Superman (2016) #39	36	9	5	15	44402	2.99	01.17.2018
Superman (2016) #40	20	8	5	5	43776	2.99	02.07.2018
Superman (2016) #41	19	7	5	4	42694	2.99	02.21.2018
Superman (2016) #42	17	5	3	5	43799	2.99	03.07.2018
Superman (2016) #43	17	5	3	5	42291	2.99	03.21.2018

Table A1. Characteristics of the 150 comics and acquisitions in the sample. (continued)

Full title	Acquisition				Sales	Price (\$)	Released
	Print	Digital	Borrowed or subscription	Unpaid			
Terrifics (2018) #1 ^A	25	6	2	3	45493	2.99	02.28.2018
Terrifics (2018) #2	21	7	1	6	34525	2.99	03.28.2018
Wonder Woman (2016) #38	22	10	3	8	36828	2.99	01.10.2018
Wonder Woman (2016) #39	24	9	3	7	36269	2.99	01.24.2018
Wonder Woman (2016) #40	10	5	5	2	36464	2.99	02.14.2018
Wonder Woman (2016) #41	10	5	4	2	35572	2.99	02.28.2018
Wonder Woman (2016) #42	8	5	2	2	35358	2.99	03.14.2018
Wonder Woman (2016) #43	8	4	2	2	35043	2.99	03.28.2018
Image comics							
Hit-Girl (2018) #1	7	3	2	0	39709	3.99	02.21.2018
Hit-Girl (2018) #2	4	2	1	3	21185	3.99	03.28.2018
Kick-Ass (2018) #1 ^B	8	2	2	4	50030	3.99	02.14.2018
Kick-Ass (2018) #2	4	4	2	5	25156	3.99	03.21.2018
Oblivion Song By Kirkman & De Felici (2018) #1	16	5	0	3	80287	3.99	03.07.2018
Saga (2018) #49 ^A	18	11	2	4	38734	2.99	02.28.2018
Saga (2018) #50	20	11	2	6	45546	2.99	03.28.2018
Walking Dead #175	23	3	7	10	82361	3.99	01.03.2018
Walking Dead #176 ^B	8	3	2	4	77407	3.99	02.07.2018
Walking Dead #177	11	4	0	3	74828	3.99	03.07.2018
Marvel comics							
Amazing Spider-Man (2015) #794	43	12	14	20	51412	3.99	01.24.2018
Amazing Spider-Man (2015) #795	18	10	6	5	52844	3.99	02.07.2018
Amazing Spider-Man (2015) #796 ^B	18	10	5	5	55138	3.99	02.21.2018
Amazing Spider-Man (2015) #797	20	9	2	7	128189	3.99	03.07.2018
Amazing Spider-Man Annual (2018) #42	11	9	3	7	43935	4.99	02.14.2018
Amazing Spider-Man Venom Inc Omega (2018) #1	34	9	6	11	63322	4.99	01.17.2018
Astonishing X-Men (2017) #7	25	8	5	15	50772	3.99	01.03.2018
Astonishing X-Men (2017) #8 ^A	8	8	2	2	31786	3.99	02.21.2018
Astonishing X-Men (2017) #9	12	8	2	6	31577	3.99	03.14.2018
Avengers (2016) #675	31	9	10	22	79946	4.99	01.10.2018
Avengers (2016) #676	29	9	10	24	39094	3.99	01.17.2018
Avengers (2016) #677	27	8	10	23	38481	3.99	01.24.2018
Avengers (2016) #678	27	8	8	23	37403	3.99	01.31.2018
Avengers (2016) #679	11	6	4	6	39046	3.99	02.07.2018
Avengers (2016) #680	10	6	5	6	38437	3.99	02.14.2018
Avengers (2016) #681	10	5	6	6	39345	3.99	02.21.2018
Avengers (2016) #682	10	5	6	6	39486	3.99	02.28.2018
Avengers (2016) #683	7	5	1	8	44651	3.99	03.07.2018
Avengers (2016) #684	7	5	1	8	54061	4.99	03.14.2018
Avengers (2016) #685	7	4	2	8	46037	3.99	03.21.2018
Avengers (2016) #686	7	4	2	8	44596	3.99	03.28.2018
Captain America (2017) #697	38	14	7	21	37030	3.99	01.03.2018
Captain America (2017) #698	14	7	6	7	36297	3.99	02.14.2018
Captain America (2017) #699	11	4	1	7	35112	3.99	03.07.2018
Doctor Strange Damnation (2018) #1	11	6	2	4	41564	4.99	02.21.2018
Doctor Strange Damnation (2018) #2	9	6	1	7	32900	3.99	03.07.2018
Guardians of the Galaxy (2017) #150	24	8	3	12	42521	4.99	01.03.2018
Infinity Countdown (2018) #1	15	6	1	6	93029	4.99	03.07.2018
Infinity Countdown Prime (2018) #1	14	6	3	4	55260	4.99	02.21.2018
Mighty Thor (2015) #703	28	9	9	13	42116	3.99	01.17.2018
Mighty Thor (2015) #704 ^B	8	8	2	6	41533	3.99	02.21.2018
Mighty Thor (2015) #705	11	10	3	5	93082	3.99	03.21.2018
Old Man Hawkeye (2018) #1	24	8	7	17	57454	3.99	01.10.2018
Old Man Hawkeye (2018) #2 ^A	13	8	1	3	33365	3.99	02.14.2018
Old Man Hawkeye (2018) #3	7	5	2	7	31339	3.99	03.28.2018
Old Man Logan (2016) #33	31	10	11	18	35468	3.99	01.10.2018

Table A1. Characteristics of the 150 comics and acquisitions in the sample. (continued)

Full title	Acquisition				Sales	Price (\$)	Released
	Print	Digital	Borrowed or subscription	Unpaid			
Peter Parker Spectacular Spider-Man (2017) #300 ^A	18	6	3	7	77094	5.99	02.28.2018
Peter Parker Spectacular Spider-Man (2017) #301	15	6	0	10	31014	3.99	03.14.2018
Peter Parker Spectacular Spider-Man (2017) #302	15	6	0	10	28155	3.99	03.28.2018
Phoenix Resurrection Return Jean Grey (2017) #2	26	13	8	22	51318	3.99	01.03.2018
Phoenix Resurrection Return Jean Grey (2017) #3	23	13	8	21	49261	3.99	01.10.2018
Phoenix Resurrection Return Jean Grey (2017) #4	22	12	7	22	46517	3.99	01.24.2018
Phoenix Resurrection Return Jean Grey (2017) #5	24	12	7	21	46689	4.99	01.31.2018
Rise of Black Panther (2018) #1	20	14	7	9	40897	3.99	01.03.2018
Rogue & Gambit (2018) #1	23	7	9	19	38657	3.99	01.03.2018
Rogue & Gambit (2018) #2 ^B	9	4	2	2	22201	3.99	02.07.2018
Rogue & Gambit (2018) #3	11	5	2	3	18514	3.99	03.07.2018
Star Wars (2015) #41	28	3	7	11	56545	3.99	01.03.2018
Star Wars (2015) #42	26	3	6	11	53710	3.99	01.17.2018
Star Wars (2015) #43 ^B	17	6	4	3	56045	3.99	02.07.2018
Star Wars (2015) #44	17	7	2	8	55650	3.99	03.07.2018
Star Wars (2015) #45	17	7	2	7	52408	3.99	03.21.2018
Star Wars Darth Vader (2017) #10	27	7	11	14	53420	3.99	01.10.2018
Star Wars Darth Vader (2017) #11	15	5	4	7	53275	3.99	02.14.2018
Star Wars Darth Vader (2017) #12 ^A	14	5	3	7	49134	3.99	02.28.2018
Star Wars Darth Vader (2017) #13	15	4	2	10	52372	3.99	03.14.2018
Star Wars Last Jedi DJ (2018) #1	13	3	4	8	42427	4.99	01.31.2018
Star Wars Thrawn (2018) #1 ^B	12	5	1	4	52295	4.99	02.14.2018
Star Wars Thrawn (2018) #2	10	4	1	11	37304	3.99	03.14.2018
Venom (2016) #160	25	13	7	10	37487	3.99	01.10.2018
Venom (2016) #161	8	3	3	3	31864	3.99	02.07.2018
Venom (2016) #162	9	4	2	2	34211	3.99	02.21.2018
Venom (2016) #163	8	4	2	5	28593	3.99	03.07.2018
Weapon H (2018) #1	4	4	0	5	98651	4.99	03.21.2018
X-Men Blue (2017) #21	15	9	2	4	39030	3.99	02.14.2018
X-Men Blue (2017) #22	15	9	2	3	35062	3.99	02.28.2018
X-Men Blue (2017) #23	12	6	2	7	36166	3.99	03.14.2018
X-Men Blue (2017) #24	12	6	2	7	32045	3.99	03.28.2018
X-Men Blue Annual (2017) #1	29	11	9	17	38522	4.99	01.24.2018
X-Men Gold (2017) #19	30	10	7	12	36915	3.99	01.03.2018
X-Men Gold (2017) #20	28	10	7	13	36471	3.99	01.17.2018
X-Men Gold (2017) #21	12	9	3	2	39379	3.99	02.07.2018
X-Men Gold (2017) #22 ^B	12	9	3	2	35420	3.99	02.21.2018
X-Men Gold (2017) #23	11	6	2	7	38531	3.99	03.07.2018
X-Men Gold (2017) #24	11	6	2	7	35008	3.99	03.21.2018
X-Men Red (2018) #1 ^A	23	9	1	5	98468	4.99	02.07.2018
X-Men Red (2018) #2	22	6	3	7	49084	3.99	03.07.2018
Summary	Totals				Averages		-
DC comics	1905	613	268	622	58014	3.40	-
Image comics	119	48	20	42	53524	3.79	-
Marvel comics	1333	563	328	728	46798	4.20	-
All comics	3357	1224	616	1392	51957	3.84	-
All comics (%)	51%	19%	9%	21%	-	-	-

Note: A First half of the twenty titles evaluated in the 2nd survey. B Second half of the twenty titles evaluated in the 2nd survey.

Source: Own elaboration based on survey data and Comichron data.



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