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Batman forever?
The economics of overlapping rights

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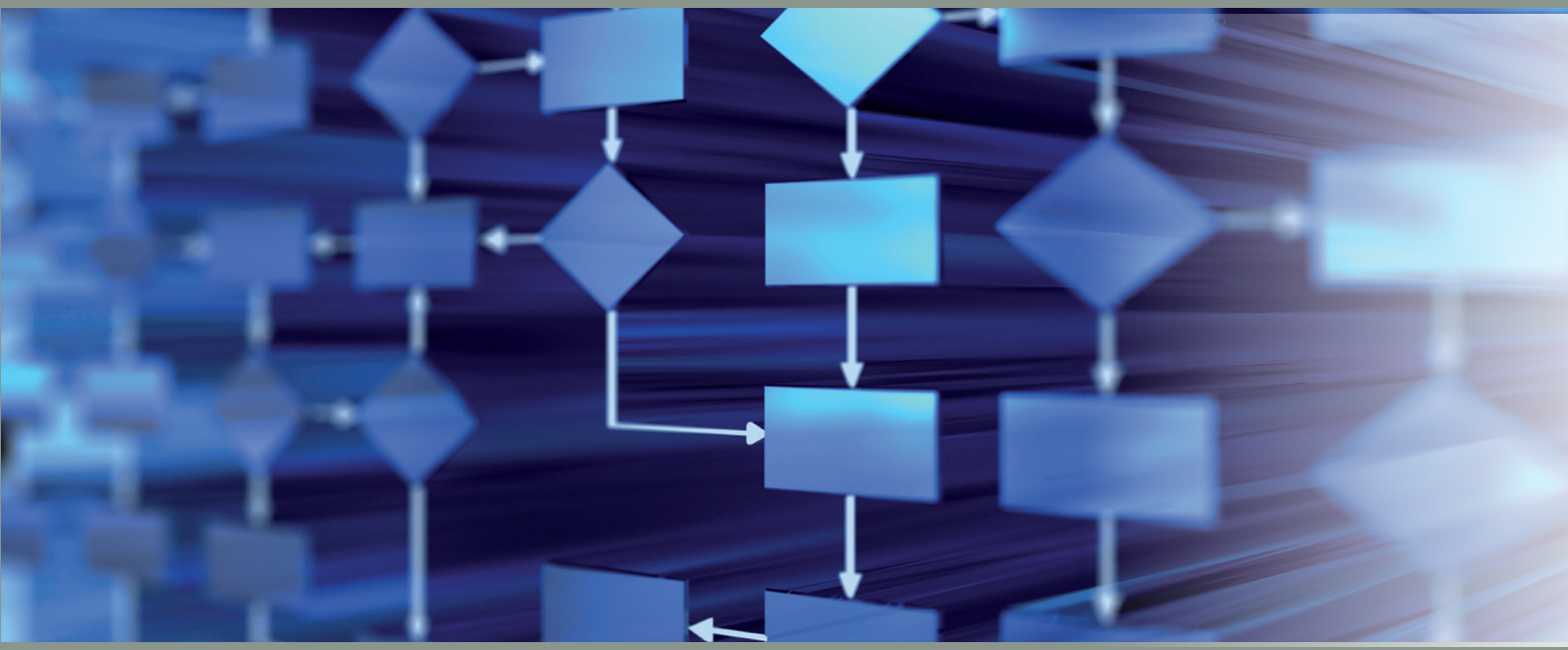

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Abstract

When copyrighted comic characters are also protected under trademark laws, intellectual property (IP) rights can be overlapping. Arguably, registering a trademark can increase transaction costs for cross-media uses of characters, or it can help advertise across multiple sales channels. In an application to book, movie and video game publishing industries, we thus ask how creative reuse (innovation in uses) is affected in situations of overlapping rights, and whether 'fuzzy boundaries' of right frameworks are in fact enhancing or decreasing content sales.

Keywords: copyright, fictional characters, trademark, reuse, comic books

JEL Codes: O31, O34, Z11

1 Motivation

Intellectual property rights differ in purpose and function. Trademarks allow consumers to better distinguish products and services on markets. Once their initial term of protection

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elapses - usually after a period of ten years and on payment of a fee - they can be renewed indefinitely. Copyright, in turn, protects new works of creators ('original expressions') only for a single term of protection - usually for the life of the author plus of 50 years, the Berne Convention minimum. On a temporary basis, copyright incentivizes the commercialization of works and helps to recover investment around works [24].[1] However, it also involves a cost for society as it restricts uses by any other party (other than the right holder) throughout the term of protection, any such use requiring the licensing of rights. Once copyright expires, works transition to the public domain and uses typically become less restrictive.[2] Many jurisdictions allow (fictional) characters from original expressions in stories to be copyright-protected and, at the same time, characters being branded when registered as a trademark.

When new works build on previous ones, productive (re)uses of the original work are considered follow-on innovation. Reusing works typically bear lower commercial risk than content not previously tested in markets. This also applies to movies and video games industries where cross-media 'franchises' or 'tie-ins' of characters that originate from comic book publishing are a common phenomenon. A prominent example is the Avengers blockbuster and video game series from the billion-dollar-worth 'Marvel Cinematic Universe', with superheroes such as Ant-man or She-Hulk first appearing in comic books published by Marvel. At the same time, being 'recognized' as a reuse still matters, that is being sufficiently close to the original (popular) character without bluntly copying.[3] Generally, what is perceived as the original work by audiences in a series of reuses can change over time and with each new interpretations of the work. Further, this perception sometimes differs from the legal

[1]This includes related or 'subsidiary' rights income for a movie sequel based on a book, i.e. 'indirect' revenues generated by derivative uses of the original work.

[2]Certain jurisdictions also grant 'perpetual' moral rights to original creators and their works, preserving the 'integrity' of the work over the term of protection and beyond.

[3]The 2019 film Joker, for example, tells the backstory of the famous comic character who has been fighting Batman in DC comic series since 1940. Even if Batman does not appear in the movie and there are no superpowers or any science fiction effects, the affiliation of the movie with the underlying comic series is obvious. Hence, reusing the popular DC comic content resulted in a revenue of over one billion U.S. dollars by worldwide box office sales.

perspective. Notably, complex negotiations around intellectual property (IP) play an important role when it comes to composing new 'crossover' film and video game tie-ins around (multiple) comic characters and when multiple right holders and IP rights are involved as anecdotal evidence suggests.[4]

Rights 'confusion' and overlapping rights can complicate issues as some commentators argue. They can impose legal uncertainty on parties willing to reuse copyrighted characters once also registered as trademarks. This is due to higher expected litigation costs from trademark infringement and accidental 'shoulder rubbing', similar to the costs imposed by 'submarine' trademarks, trademark 'squatters' [19, 20], or 'probabilistic' patents in the wider IP systems [35]. Moreover, overlapping rights can deter creative and commercial uses of characters as they may increase transaction costs due to 'royalty stacking' (when there are no substitutes) that is the additional financial burden of transferring or licensing multiple rights at excess royalties [16, 23]. As a consequence follow-on innovation and character uptake by other parties can slow down.

Other commentators argue that - whether or not a work is protected under copyright – a well-functioning market and effective advertising and branding of a character will always require trademark protection.[5] Non-eligibility of fictional characters or invalidation of trademarks in some jurisdictions might thus lower expected returns from reuse and commercialization as it worsens general appropriability conditions around reuses of content. Whatever perspective holds true, ultimately, this is an empirical question we want to address in this paper.

[4]See, for example, discussion in the media and links here or there.

[5]From an economic perspective, trademarks are an important vehicle for building brand reputation and essential for the merchandising around the character. Merchandising is a major source of income in many creative economy sectors and often by far outsizes income generated directly from original work sales. For example, merchandising around Marvel and Star Wars movie sequels, around Pokémon characters from Nintendo's original game (Nintendo being the sole owner of the trademark, outside Japan), or around Harry Potter characters from JK Rowling's books (trademarked already in 1999, only after the first three books were published and well before the first movies were released) generate substantially higher revenue than box office, video game or book sales. In this way, licensing deals related to merchandising and 'ancillary' products around a character also have become an important source of ex ante financing of new content production, in particular in the movie industry [15, 30].

Main contributions of the paper are the following. First, comic publishing is a fast-growing, multi-billion dollar enterprise within the creative economy and there is relatively little economic evidence on the convergence with other types of media content and the role of intellectual property for convergence.[6] Moreover, comic books are much closer to audiovisuals or video games than other literary works because of the pictorial elements they contain. And, income from IP transfer and character licensing around tie-ins and media franchises is an important source of income for larger publishers such as Marvel Entertainment (Marvel), Detective Comics (DC), or Dark Horse Comics.

Second, our research also speaks to the extensive legal and international debate on how to best resolve the issues around overlapping rights and rights 'resurrection' via the registration of a trademark after characters entered the public domain [14, 46],[7] ranging from an "unconditional exclusion in trademark laws for signs of cultural significance" [47], to a "mandatory protection of the public domain in international laws" [51]. There are various prominent examples of trademarked characters, in and out of court.[8] However, as many legal IP frameworks are set up today, the boundaries between different types of rights are often very fuzzy, and this not only applies to copyright and trademarks but also in other cases such as copyright and design rights [12].

[6]In 2015, it generated total revenues of more than a billion Dollars in the U.S. alone, increasingly capitalizing on top titles [29]. Comics are often simultaneously released in print and digital formats. New digital services such as ComiXology and Marvel Digital Comics seem to help grow digital channels, at least in the U.S. However, overall digital consumption is still relatively low compared to other sectors such as music and other countries such as Japan [50, 32].

[7]'Perpetual' renewal of trademarks around comic (fictional) characters can expand protection to previously copyrighted works thought to be in the public domain. In this way, the 'resurrection of rights' brings them back to the rear of formal protection and it thus can change the delicate balance between incentive-provisioning and access to works.

[8]Prominent examples are reuses of characters from the Popeye comic series whose copyright expired, at least in some non-U.S. jurisdictions, and thus trademarks were registered and renewed. These comic characters then appeared in 'mash-up' films and 'tie-ins' such as the Lego Movie, which includes multiple characters in and out of copyright [30]. An example of a recent legal case is the Vigeland decision of the Court of Justice of the European Free Trade Association States (EFTA) Court [48] where trademark registration of public domain artworks made by the famous Norwegian sculptor Gustav Vigeland was refused based on freedom of the arts grounds.

Third, quantitative findings suggest that overlapping trademark rights do impact on media convergence and follow-on innovation around copyrighted works: While there is a significant positive effect on the reprinting/reuse of comic characters in book publishing (i.e. tm overlaps in the Nice class associated with print and publishing), there is a dettering, negative effect on franchises and character reuses in other media (i.e. tm overlaps in the Nice class associated with games and movies). However, for the latter category of reuses, once comic characters overcome initial barriers to first franchises, the relative intensity of reuses increases with trademark registration. Findings support the notion expressed in the literature that the economic effect of laws on reuse varies from one channel to the other and that trademarks still function well in terms of advertising and branding around reuses. Hence, fixing the sometimes fuzzy legal boundaries between different IP rights frameworks can limit transaction costs and encourage follow-on innovation.

The paper structures as follows. Section 2 provides legal background on overlapping rights and trademark registration, section 3 reviews the economic literature on copyright, trademarks and reuse. Sections 4 outlines data processing and descriptives. Section 5 presents the empirical framework and main results. Sections 6 and 7 discuss limitations and conclude.

2 Legal background

In principle, different type of rights such as copyright and trademarks try to remedy different types of market failures and thus they differ in purpose. In the case of copyright, rights can provide the incentives to invest that help overcome underinvestment in markets due to the public good nature of creative expressions. While a work might be easy to copy and share at close to zero costs, it is costly to create in the first place. In the case of trademarks, rights help consumers to better distinguish product quality and hence they can lower search costs

for consumers [41]. Because consumers are enabled to distinguish quality, sellers have an incentive to also provide products of high-quality in markets [2]. However, it seems less clear what the boundaries of protection are for each of the two rights, which can involve certain economic trade-offs.

Overlapping rights where different IPRs pile up or apply to the same subject matter are relatively little regulated on an international level and most national legal frameworks generally allow for an overlap of copyright and trademark [12], [13]. Famous examples of court cases include the Philishave and Lego brick cases.[9] Oftentimes, specific rules regulating this type of overlap do not exist as regards ownership, dealings, rights, infringement, and exceptions, and so, oftentimes the stricter legal regime will prevail over the other.[10] Furthermore, legal scholars sometimes distinguish "objective" overlaps where the rights involved belong to a single person from "subjective" overlaps where these rights belong to different persons or entities which might create hold-up problems. When ownership is split, some have argued that one IPR and implied licenses could be waived.

Even though overlap is not much regulated to date/in general, many legal commentators see overlapping rights as a problem which needs urgent fixing because of potential legal regime clashes (for example, rules applying to the several IPRs provide different, irreconcilable, outcomes), inviting right holders to forum-shop "the best of both worlds" or by overprotecting the subject matter (for example, raising competitive concerns, reducing the public domain or limiting the freedom of expression). More specifically, various legal sys-

[9]Case C-299/99 Koninklijke Philips Electronics v Remington Consumer Products[2002] ECR I-05475; Case T-270/06 Lego Juris A/S v OHIM[2008] ECR II-3117.

[10]For example, according to Derclaye [12], *"because basic criteria for infringement are the similar due to international conventions and basic principles in the two types of rights, copyright will override the limitations of trademark law (e.g. principle of specialty, use in the course of trade and requirement of confusion in some cases) and trademark law will override the limitations of copyright law (requirement of copying) in many countries. In a similar vein, trademark law allows private use of trademarks whereas copyright law does not always (the UK does not allow private copying unlike many other countries where there is an exception available)."*

tems, including the U.S. and the EU, in principle, do not allow copyright on single words.[11] Accordingly, this material lies only in the realm of trademark laws. However, copyright does frequently allow for the protection of fictional characters in certain jurisdictions including the U.S. one.[12] There, courts recently allowed for more rights overlap across legal frameworks, following a number of court cases and abandoning the so-called "election theory".[13]

A different aspect is that trademark systems have set up different procedural requirements around registration and renewal [54]. One important requirement in our context are the mandatory 'use requirements' when it comes to the renewal of registered trademarks, and again jurisdictions differ in the way these are formally set up and implemented in practice [26]. In the U.S. for example, only if the comic character is still under use (reprints of the comic continue to be published by the right holder or licensee of the work), they are eligible for renewal, with the burden of proof on the side of the current right holder or licensee of the trademark. (Legal) use requirements bear economic implications for the amount of reuse we will see in certain jurisdictions.[14]

Moreover, jurisdictions also differ in as far they have agreed with one or the other view and have implemented different rules around trademarks and public domain works accordingly [12]. For example, the U.S. system seems more willing to accept and make comic

[11] See, for example, [53].

[12] See, for example, discussion on this legal blog.

[13] For example, Mazer v Stein (copyright and design patents), Inre application of Mogen David Wine Corp. (design patent and trademark),and Kewanee Oil Co v Bicron (trade secrets and patents), according to [12].

[14] In general, this means that the trademark has to be in use or the applicant has to intend to use the trademark within a special period of time in order to register it. However, unregistered trademarks are also protected if they are actively used as a distinctive mark in commercial activities. Nevertheless, a trademark registration with the United States Patent and Trademark Office (USPTO) grants a nationwide right to the owner of the trademark. After filing a trademark application, the USPTO substantively examines whether all registration requirements are met (mainly verifying that the mark is not confusingly similar to an existing trademark and sufficiently distinctive). As soon as the registration has been granted opponents are given a 30-day period to oppose the mark. After a five-year period from the date of registration, the trademark owner may obtain a declaration of incontestability that limits the risk of invalidation of the mark for the rest of its lifetime [19].

characters eligible for protection in their trademark systems [45]. This is less the case in European jurisdictions where trademarks around characters have been refused or invalidated at later stages in several cases in national courts or in appeals to the EU Intellectual Property Office (EUIPO), formerly known as OHIM [38].

3 A brief review of the literature

In the field of copyright economics, an increasing number of empirical contributions looks at the reuse of works in a variety of industries and the longer term cost of the copyright system to innovation by 'users' of works [28]. These include reuses in popular music [37], book publishing [31], and reuse on Wikipedia [39]. Typically, once copyright expires, reuse and availability of works increases, while prices decline because of the drop in licensing cost, generic entry, and greater competition [43].

More specifically, [37] show that, with the expiry of recording copyrights in music, status effects on reuse differ across distribution channels as they also depend on promotional and 'strategic' considerations of users and right holders, for example, whether or not to include a song to a concert set-list that is still on sale. Other research investigates reuse and cumulative creativity, suggesting that derivative works exhibit positive advertising effects on the upstream market of the original works, limiting downstream competition ex post [52].
Based on these papers, advertising seems to be a moderating factor for the effects of copyright on reuse, including cross-media advertising on multiple channels. In this way, registering trademark may be an important means to advertising and branding, also in follow-on innovation. However, many 'strategic' reuses will require coordination across industries at considerable transaction costs, or, alternatively, they might induce (vertical) integration of entities across the various channels such as in the prominent 2009 Walt Disney and Mar-

vel merger case and the parent-subsidiary ties established between Time Warner, DC, and Warner Bros.[15] And, in other instances, some 'innovative' reuses might be impossible to contract in the first place [5], and thus reuses might not always lend themselves to strategizing.

Second, there is a relevant literature on the economics of trademarks [10, 55] which deals with strategic filing of trademarks, trademarks prolonging other IP rights as well as motives to trademark in the creative and cultural industries when not relying on ('automatically' registered) copyright alone [9].

On the one hand, trademarks can be considered assets themselves, helping firms to differentiate their products and demand premium prices [36]. Moreover, trademarks secure incumbent market positions by avoiding imitation and deterring entry [3, 21]. Trademarks as a means of building one's own reputation for high quality works might be of particular importance in creative and cultural industries because of the built-in uncertainty around content of ex ante unknown value [11]. Moreover, they might be of value for building an umbrella brand as a service or provider of high-quality content [27].

On the other hand, trademark licensing generates substantial income, with older trademarks and those owned by larger firms being more frequently licensed, and, for example, Walt Disney being the top licensor in 2017 [17]. Also, in certain situations, transactions such as licensing might lead to more entrepreneurial opportunities [34].

Finally, trademarks can also be filed strategically to prolong exlusive rights around creative works after copyright has expired [8]. This, however, might put at risk societal benefits of trademarks such as lower search and transaction costs [33] as well as an increase in avail-

[15]In the last couple of years, the industry has witnessed several cases of vertical integration of comics publishers, movie and video games producers, and online distributors in value chains, some of which raised 'pre-empting' competition and 'vertical foreclosure' antitrust concerns around (future) reuses of original characters by other parties than the right holders' [45]. In this context, [32] show that the U.S. comic book market is already highly concentrated. Between 2005 and 2017, 68 percent of the total revenue share has been maintained by Marvel and DC. However, market competition increases with the profitability of the industry.

ability of new products [6].

Third, there is yet another stream in the literature discussing the efficiency of markets for IP, the licensing when multiple rights are involved, and the legal uncertainty emerging from certain strategic uses of the IP system, mainly with a focus on patent rights.
Royalty stacking is in fact an application of the Cournot model effect to industries where many companies own IP rights (patents) that refer to the same product. This, in turn, can magnify hold-up problems in markets. As [49] argues in his theoretical research, when many monopoly input suppliers upstream post a linear price non-cooperatively, they will charge downstream users more than a single monopolist for the same bundle of inputs, with potentially stiffling effects on innovation. Moreover, selection of copyrighted and trademark-protected characters also seems less likely in reuses as rights in some parts of the trademark system might be associated with higher legal uncertainty and litigation costs [20, 19].
Still, a well-functioning and efficient market for licensing and transfer of franchise and tie-in rights might be able to overcome hurdles to reuse described above, at least partially. Research on 'markets for technology' mostly focuses on the transfer of technical inventions and patent rights which only to some degree will generalize to creative expressions and transfer markets for copyrighted work [4]. This line of research, however, studies the standard trade-off between additional revenue from licensing and rent-dissipation effects as licensing can also help grow competitors. And, it also investigates institutional factors such as the IP right framework which can be a facilitator of trade and licensing in these markets. More so, more rights (trademarks) available around a character might provide firms with additional leverage to ex ante finance around new reuses via security loans and similar funding instruments, in particular in audiovisual industries [15, 30].

4 Data and descriptive analysis

4.1 Data sources and matching

We gather data on fictional characters in comics and reuses from four main sources, namely the Grand Comics Database, Giantbomb, Comic Vine and the Lambiek Studio store. Based on the publishing data from the Grand Comics Database, we approximate copyright status of individual works (and characters within comics) via information on the publisher's country of origin (or the country of birth of the creator) and the date of the first publication of the comic (or the death date of the last living creator), depending on the specific jurisdiction in which the trademark was registered. Information on trademark registration, renewal as well as (legal and procedural) status comes from the tm link database hosted by the Australian IP office. Further, we include data from the U.S. trademark assignment database hosted by the United States Patent and Trademark Office (USPTO) to include licensing deals and transfer of rights around comic characters in our analysis.

In order to get a clean data set of unique comic characters, we first reduce the tm link data to Nice class 16, which reflects paper goods and printed matter [18], and then merge it with the publishing data on comic series including millions of characters created and first published between 1783 and 2019.[16] The matching of characters and trademarks follows a related, but more advanced and automated approach than the one exemplified in Adams [1] and it limits matches to characters with at least one US trademark registration. As identifiers merging the two data sets, we use the trademark description text on the one hand, and the name of the character in the published comic series on the other hand. To clearly identify comic characters and exclude false positive matches with textual trademarks, we apply different techniques. The fuzzy matching approach developed by [42], allows for

[16] According to WIPO's global brands database definition, this class contains "books; publications; magazines; stationery; adhesives for stationery or household use; paint brushes; playing cards; posters; decals; printed matter; artists materials in class 16; cards; modelling materials; paper knives".

a fuzzy similarity between two text strings and thus helps improve techniques to combine databases of different origin. We use this method to compare the names of the trademark applicants (several times more then one) to the name of the publisher. If these names are highly similar (i.e. the similarity score is at least 60 per cent), we assume that the registered trademark is related to a comic character. Additionally, we identify the 100 most frequent trademark applicants in the data and inspect manually whether they are tied to comic or related industries. If there is no clear connection to comics or related industries, we exclude matches. Our final set of applicants includes, for example, DC, Warner Bros Entertainment, Marvel, Mattel, Archie Comic Publications, The Hearst Corporation, Konami Corporation, and Universal City Studios. Next, we include observations from the initial tm link database that have the same family group ID but for which a trademark application was filed in Nice class number 9 [18].[17][18][19]

In a second step, we collect and complement information on 'cross-media', 'tie-in' and 'franchise' reuses of original and trademarked comic characters in movies and games. We extract the relevant information from Giantbomb (movies), and Comicvine (games), and further validate information via various Wikipedia lists including 'derivative' movies and games by character. We match reprinted and trademarked characters to reuse in movies and games via their names as recorded in the publishing and the franchise databases. Finally, we reduce the panel to U.S. trademark registrations in order to match it with the U.S. trademark assignment data. To further improve the validity of our estimates for movie and

[17]WIPO's global brands database defines Nice class 9 as "computer game discs; computer game software; interactive multimedia computer game program; interactive video game programs; video game discs; video game software; downloadable electronic publications in the nature of computer game instruction manuals, rule books for playing games, and magazines and journals on the subject of war games, skirmish games, role playing games, battle games, and fantasy/science fiction games".

[18]Previous research [1] shows that trademarked characters from the Marvel and DC Comics universes are mostly registered in Nice classes 9 and 16.

[19]All trademarks within one family group ID belong to the same comic character. Hence, if a trademark application was filed in several IP offices, the family group ID indicates that the applications are linked to the same character. The authors of the tm link database group 'families' of trademarks via machine learning, so not all types of marks are included (e.g. figurative marks).

game reuses we reduce the whole panel to reuses between 1980 and 2019 as the production of movies and games experienced a large rise over the last decades. Hence, this results in a final matched sample of 1,831 single characters with 43,620 observations, whereas several comic characters appear across several years. So, we end up with a total of 216 (381), a share of 11.8 (20.8) percent of unique characters being reused in movies (games), including 93 characters that were reused in movies and games.

In a third step, we gather sales data for movies and video games around each character from various online sources.[20] First, movie sales are based on movies' lifetime grosses for domestic U.S. sales (in US-Dollars) as originally sourced from Box Office Mojo. Sales records are matched via the more than 15,000 movie titles and first release years and previous list of franchise titles assembled from the Giantbomb data. Here, we run the approximation that the bulk of the lifetime gross is accumulated in its release year. Second, records of sales for more than 16,500 video game titles in North America originate from Vgchartz and cover all releases of games selling more than 100,000 copies across platforms in this market.

4.2 Data descriptives

4.2.1 Dependent variables

There are three main outcome variables in our analysis. These allow to track content developed around the individual comic character on a yearly basis: (1) the total number of reprints of a comic character, (2) the total number of movies and video game franchises, and (3) total sales value around these franchises. The following section describes each of the variables in greater detail.

Based on the publishing data, the average number of annual reprints a comic character

[20]The data was last accessed on August 1st, 2020, and data on games (movie) sales can be accessed https://www.kaggle.com/gregorut/videogamesales or https://www.kaggle.com/eliasdabbas/boxofficemojo-alltime-domestic-data.

receives in new or existing stories and series stands at 3.9 reprints per character (the median is 1.5). The average number rises to 4.5 reprints once the focus is on more recent reprints, i.e. those published since the year 2000, accounting for one third of the total publishing records. Looking at different cohorts of works, characters first published in the 1940s to 60s have an impressive reprinting mean of 8.4, followed by more recent cohorts originating from the 1960s and the 1970s (6.0), the 1980s and 1990s (4.3), and the 2000s and 2010s (2.5). So, older cohorts of characters seem to outperform newer ones in the case of comics. And, at first sight, this contrasts with previous research on book publishing (however, not focused on comics), suggesting that commercial activity is mainly focused on recent titles [31]. However, as more successful works also survive longer, older cohorts will, on average, be more successful in terms of reprinting. Next to a peak before the turn of the century, older cohorts of (successful) characters from the 1940s, i.e. those closer to changing copyright status in certain jurisdictions and more in line with 'resurrection of rights' argument, seem to be more frequently trademarked in matches (see Figure 4 in the Annex). Major publishers during the first peak were Quality Comics, Archie, and Dell, whereas between 1990 and 2000 the dominating publishing firms changed to Malibu as well as Image Comics. At all times, Marvel and DC were among the most important comic publishing enterprises.

Most comic characters recorded in the publishing data are not in the public domain and will be protected by copyright for many years to come. Copyright status in this specific area is oftentimes determined by the term of protection set out by work-for-hire rules.[21] The mean year of first publication in our baseline publishing data is 1978, so it is quite recent. Only about 10 percent of all characters were first published before 1950, even though the post World War II period seems to reach peaks in productivity as concerns the creation of

[21]So, for example, in the U.S. system, employers (rather than the original creators of the comic) are granted exclusive rights for a period of 95 years after first publication. Alternatively, when rights are not transferred via labour contracts, many jurisdictions protect creators and their characters for a period of life plus 50 or more years, based on the last living author for joint creations which are quite common in comics (writer, penciler, inker, colorist etc.).

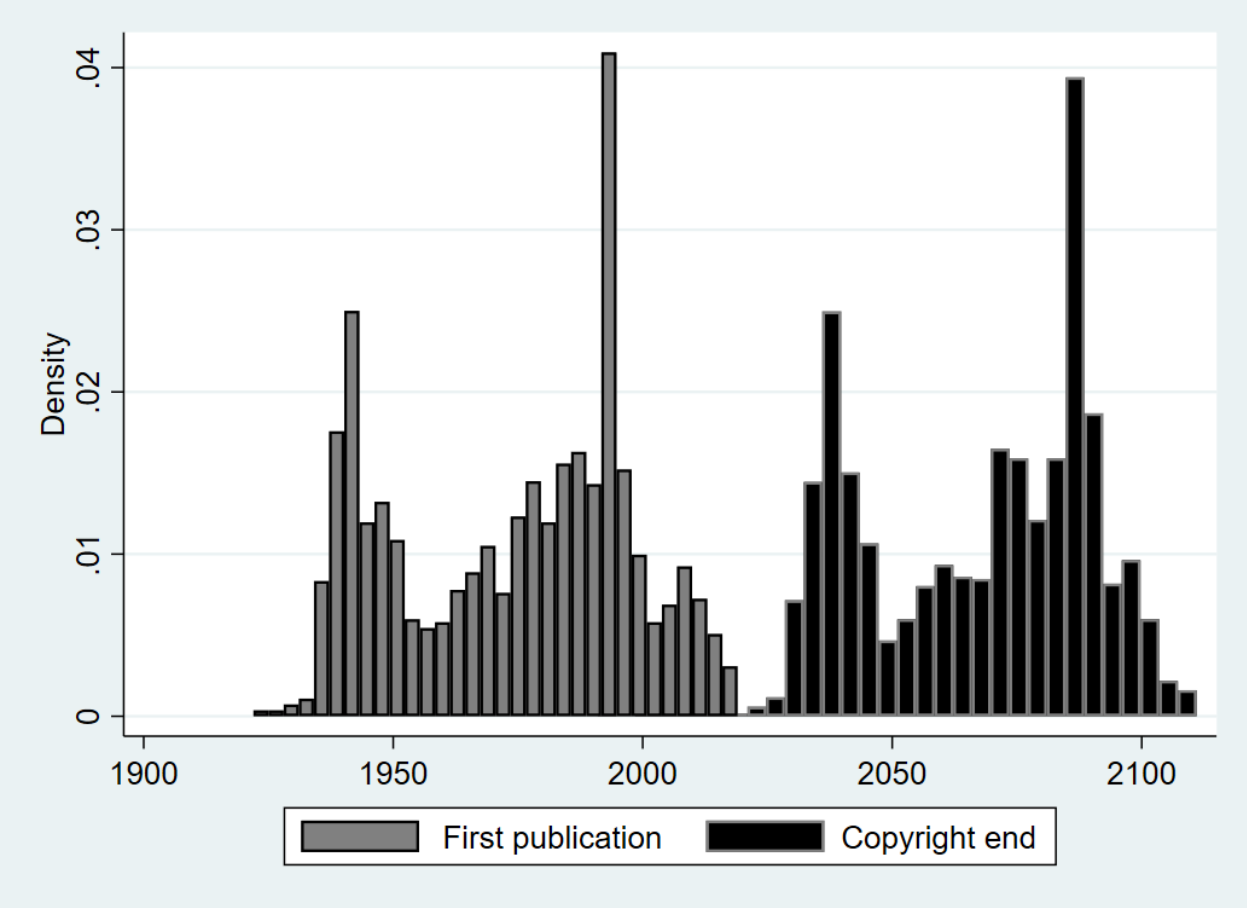

Figure 1: Distributions of first publishing dates and expected ends of the copyright term, matched data including 1,831 comic characters (1980-2019). In order to calculcate the copyright term, we assume U.S. work-for-hire rules for works in which characters first appear, granting them exclusive rights for a period of 95 years after first publication.

new characters (see Figure 4 in the Annex).[22] With trademark matches, this share grows to 24 percent and the average year of first publication (1974) suggests that these older titles and characters become more relevant in our final data sample (see Figure 1).

Only 28 percent of all characters in our panel enter franchise reuse, either in movies or in games, or both. If a character is reused in a game at least once, on average 14.8 games are published including this specific character. When it comes to characters reused in movies, the average number of movies per character is only 2.1 (excluding those characters that were never used in film productions). The comic character, which has by far been reused the most, is Batman, which was reprinted 41,534 times. Until 2019, the character had been reused in movies and games 388 times.[23] Other very successful comic characters are Wolverine, Avengers, Aquaman, Dracula, and Iron Man. Moreover, we can match 303 observations (216 comic characters) to our movie sales data and 1,447 observations (318 comic figures) to the game sales data. Our panel includes 29 comic characters that show movie and games sales at least once in the same year.[24] However, across characters, yearly movie sales are even more unequally distributed than game sales. For all 1,447 games in the panel the median amount of sales gained from a game is USD 1,170,000 with the most successfull game amounting to USD 33,200,000. In comparison, median movie sales for the 303 movies included in our panel range at USD 33,800,000 with the most successfull movie (The Avengers- Endgame) earning USD 857,000,000. In sum, few characters make it into movie franchises, but the sales these characters generate are much higher than for those entering game franchises.

[22]For an in-depth analysis of the modern American comic book market, see, for example, [32].

[23]The first trademark for Batman was registered in Canada in 1947 for Nice class 16, whereas the trademark for Nice class 9 was only registered in 1981.

[24]In this category, Spider-Man is among the most successful characters, accounting for four years where movie and game sales data is available with game and movie sales data available, namely 2002, 2004, 2007, and 2012.

4.2.2 Treatment variable

In our analysis, we want to extract the effect of a trademark registration on the reuse of a comic character, which is in general already protected by copyright. Because we limit matches to characters with at least one trademark registration at the USPTO, the majority of trademarks are first registered in the U.S. (96 percent). Still, the matched sample also includes characters that were registered with other IP offices, namely Australia, Canada, Europe, and New Zealand. In addition, 93 percent of the applicants reside in the United States. The second most frequent applicant country in offices recored in tm link is Japan (5 percent), even though the data does not cover domestic filings at the Japanese IP office. Due to our data processing, matches of unique comic characters and trademarks mostly include applications from Nice class 16 (79.4 percent), whereas 27.7 percent of all characters have a trademark registration for Nice class 9, so that 203 characters are registered in both Nice classes.

On average, trademark applications are filed 39 years after the first publication of the comic (series), i.e. the date of first appearance of a character.[25]. And, in general, the number of years between the first publication and a trademark registration decreased stongly over the last century. Since the year 2000, interestingly, trademarks in class 16 are registered, on average, before the first publication of the character. However, there are cases where the trademark is registered before a character is first published in a comic (series). 5 percent of our application data reflect such 'pre-publication' cases where sometimes characters do not 'originate' from comic books but other media, or they pre-date first publication for various other reasons. This is, for example, the case for Star Wars, Harry Potter, She Hulk, Marvel Boy, etc. In 2 percent of all matches, the trademark is registered in the same year the comic

[25]Further, there can be differences in the filing date and the registration date of a trademark. Across all five offices, on average, a trademark is registered 2 years after the application was filed. In the U.S. and in New Zealand this time lag is shorter, hence most trademarks are filed and registered within the same year. Applications in Europe, Australia, and Canada, are registered within five years after their initial filing. This is due to procedural and juridical differences across the international IP offices.

is published for the first time.

We are able to match the first trademark registration dates for each Nice class (16 if available) per character with the corresponding yearly reprints and reuses of the comic figure. Hence, in our analysis we exploit the yearly difference between the first trademark registration and the reprints and reuses before and after the event. Concerning the effect on reprints, Figure 2 indicates an increase in average yearly reprints of a comic figure before and after a trademark registration for Nice class number 16. When looking at the average yearly reuse of comic characters in movies and/or games five years before and after the first trademark registration in Nice class 9, Figure 3 indicates increasing reuses in the years before the trademark registration, and if anything, a weak decline after registration.

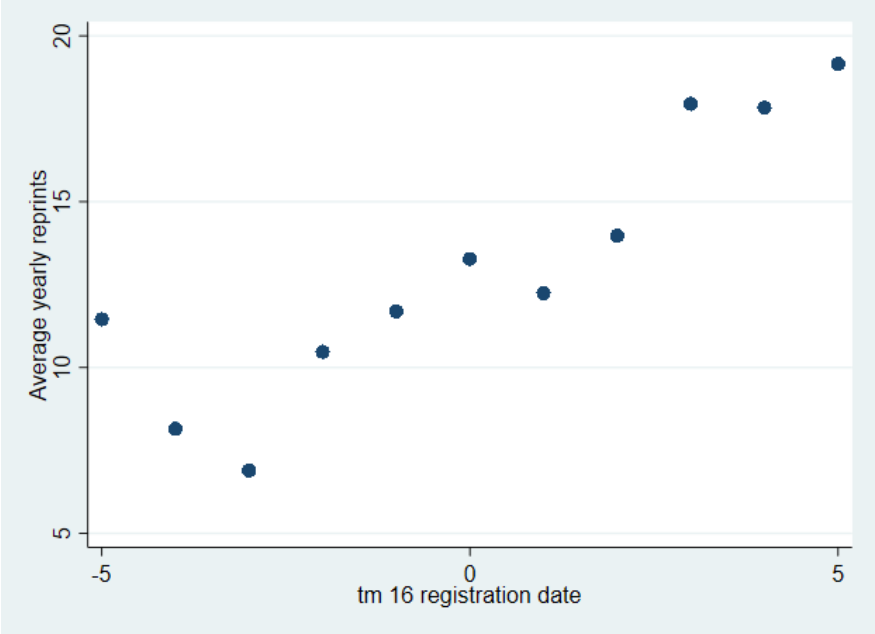

Figure 2: Average yearly reprints of comic characters five years before and after a trademark registration in Nice class 16, matched data balanced panel of 628 single characters (1980-2019)

In the matched panel, we find a huge difference between those characters reused in movies and/or games, which were reprinted on average 28.1 times per year in their lifetime (on aver-

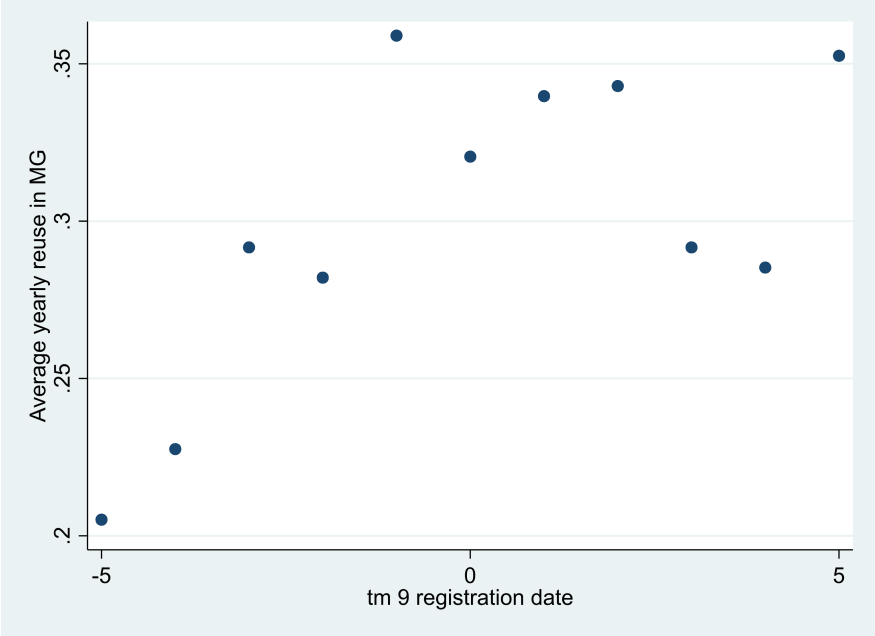

Figure 3: Average yearly reuse of comic characters in movies and/or games five years before and after the first trademark registration in Nice class 9, matched data balanced panel of 312 single characters (1980-2019)

age 1528 total reprints), and other characters that were only reprinted 4.3 times per year on average (on average 199 total reprints). Thus, our data includes two groups of trademarked comic characters: First, characters that were reprinted and reused in movies and/or games at least once in their lifetime. Second, comic characters that have not (yet) been reused in a movie or game and have thus just been reprinted. This difference can also be seen when comparing the yearly reprints of both groups in Figure 5 in the Annex. The figure shows that if a trademark for Nice class 9 is registered and the character is later reused in a movie and/or a game, yearly reprints around the first trademark registration in class 9 for the same character are much higher compared to those characters who are never reused in franchise media.[26] E.g. average reprints two years after a tm registration in Nice class 9 for a character that is reused in movies or games is 22.4, whereas it is only 3.7 for a character who does not make it into franchise reuse in the end.

[26]In Figures 3 and 5 we use a balanced panel of comic characters for whom observations five years before and after the first tm registration in Nice class 9 are available.

4.2.3 Control variables

The U.S. trademark assignment data also yields an interesting perspective on markets for licensing and transfer of rights around individual characters. For half of the unique characters trademarked at the USPTO, we can also identify one or multiple records for each application in the U.S. assignment data.[27] More specifically, there is an 'assignment' or transfer of a single right in 2 percent of all cases. 8.1 percent involve a simultaneous transfer of multiple rights, for example, a transfer of a bundle of rights in the case of a 'merger' of two entities. For another 20.6 percent of the cases, trademarks are licensed to another entity and recorded in the assignment data. Finally, for only about 1 percent of our data registered trademarks also serve as a financing instrument, i.e. a security interest or IP-based loan. Most assignments in our data can be traced back to the main publishing firms, such as Marvel (29 percent), DC (21 percent), Dell, Image Comics, Quality Comics, Archie, Fiction House, and Malibu. They were included in activities around licensing deals in 69 percent of all cases in our data.

In addition, based on the legal status of the trademark (as recorded in the tm link data) we want to control for the popularity of a comic character. We argue that it is more probable for a popular comic figure to face a trademark appeal than for a regular or "no-name" character. Therefore, we extract all cases related to an appeal, opposition, or refusal of the trademarks included in our final matched sample.[28] 4.5 percent of our data has faced an appeal.

[27] As there is no obligation to report all new assignments or transfer of USPTO trademarks, the data might be incomplete to a certain degree and in some places. However, it may nevertheless be useful as an approximation. In any case, it is limited to applications directed to the USPTO, i.e. a total of 16,079 applications among all matches.

[28] The exact trademark status descriptions we chose to identify whether a trademark was opposed are: "Abandoned after ex parte appeal", "abandoned after inter partes decision", "abandoned after petition decision", "abandoned defective statement of use", "abandoned express", "abandoned express after pub", "abandoned file backfile", "abandoned petition to revive denied", "application opposed", "report completed suspension check case still suspended", "application refused", and "refused".

4.2.4 Instrumental variable

In order to address potential endgeneity and omitted variable bias concerning our treatment variables, we undertake an instrumental variable (IV) model approach using a prominent U.S. court decision as a quasi-natural experiment that gives rise to random variation.

In 2003, with Dastar Corp. v. Twentieth Century Fox Film Corp., the Supreme Court took an incomparable decision, ruling that overlapping IP rights, copyright and trademark, can, in principle, co-exist. This decision followed a long period of legal uncertainty for right holders whether the same subject matter would be eligible for protection under both type of rights, and it made "overlapping rights seem a fait accompli in trademark practice, at least with respect to signs used to identify products offered for sale."[8] As a consequence, "the perceived judicial support has contributed to further overlapping protection and, in turn, an increase in trademark claims" in the U.S. jurisdiction, and "turning to trademark rights as a complement to copyright protection has become routine among practitioners, particularly for characters, titles, songs, and video clips."[8] This already can give an indication that the instrument might be relevant and sufficiently associated with the trademark registration treatment. Moreover, it seems that, by no means, the decision eliminated all legal uncertainty in markets, in particular for parties (other than right holders) interested in licensing overlapping rights legal uncertainty continues to hold as they might still shy away from costly litigation around unclear trademark defenses, making them settle their disputes outside courts or consider to not reuse the specific work or character.[29]

In addition, in the very same decision, the U.S. Supreme Court ruled out the possiblity of a 'ressurection of rights' via trademark protection after the end of the copyright term[44],

[29]For example, there is legal uncertainty because "whether the unauthorized use of "trademarked" creative works falls under an existing trademark defense (such as a defendant's descriptive or nominative fair use," parodic or artistic expression,) or the aesthetic functionality of the plaintiff's mark) continues to be a matter of judicial discretion."[8]

warning "that this protection cannot extend to "the author of any idea, concept, or communication embodied in those foods" or else trademark protection would morph into mutant copyright", [...] capable of distorting the copyright equilibrium."[8] In this way, the decision also could have downgraded expectations on 'perpetual' rights after the end of the copyright term and future, post-term royalties, at least for some stakeholders.

So, in sum, this decision encouraged in particular those parts of the total population of potential applicants that, in the presence of greater legal uncertainty around the complementary use of rights, would not have registered a trademark. This is typically the case for smaller entities with lower financial resources to cover possible litigation costs. At the same time, those parts of the total population that mainly considered registration as a bet on perpetual rights beyond the copright term might have increasingly dismissed registration plans after the verdict. This could be, for example, major publishers and production houses that already own very popular characters and that want to extend content lifecycles. Taken these local subpopulations together, this should bring us fairly close to the average behavior and mindset present in the total population.

Based on this exogenous policy-change we construct a dummy variable that takes the value of one from the years 2003 onwards, and zero in sample pre-periods. As the decision of the Supreme Court followed a whole series of other, often diverging court decisions with Fox first sueing in 1998 and, based on these, it was impossible for stakeholders to anticipate the timing and direction of the Supreme Court decision and adjust their behavior accordingly, we are convinced that this instrument is not correlated with the outcome apart from the possible indirect effect running through the registration treatment alone. We instrument our treatment, the yearly difference between the first trademark registration in Nice class 9 or 16 and the corresponding year of reuse, by this exogenous policy-change dummy. In this way, we can isolate variation in the treatment that is exogenous to our model and, hence, obtain

unbiased estimates of the causal effect of a trademark registration in one of the two classes on reuse outcomes.

5 Empirical framework and results

5.1 Baseline specification and identification strategy

Our treatment is the years (count) after trademark registration modelling the treatment as a continuous impact function and with a linear event time variable. We expect the probability of a trademark registration to be higher for more popular comic characters which should receive more reprints in the first place. There is evidence that successful trademarks are also being renewed more often, partially because their renewal is costly ([40]). Similarly, as discussed before, formalities around trademark renewal hinge upon (past) reuses of works, in particular those linked to the right holder. Accordingly, we address selection bias and endogeneity concerns around trademark registration, renewal, and the probability of reuse in the empirical strategy.

Formally, we set up a model including time and character-fixed effects, where y_{it} is equal the (log) yearly comic reprints, movies and/or games for comic character i in a given year t. Our treatment variable T_{it} is a count variable, which takes the value one in the year a trademark is registered for the character in the corresponding Nice class (either 9 or 16), and it increases by one unit in each consecutive year where the registration continues to be valid. Moreover, we include a set of control variables X_{it} that are specific for each comic character and year of observation.

$$y_{it} = \alpha + \beta T_{it} + \gamma X_{it} + \epsilon_{it}$$

Hence, the coefficient β captures the causal, continuous-impact effect of a trademark

registration for a comic character on subsequent reuses of the character in different media channels. As popular comic characters reused in other-than-print media are typically reprinted more frequently and, because of their commercial value, they are also more prone to face trademark appeals as the evidence from the previous literature suggests ([25], [7]). We thus control for the yearly, franchise reuse of a character in movies and games ("yearly reuse") in the reprinting panel, while, at the second stage of the analysis, we also include ("yearly reprints") as a control in the franchise panel. Also, we add a binary variable ("after appeal") which equals 1 if a trademark registration for a comic character is opposed, 0 otherwise. "Yearly assignments" in markets for trademark rights take into account and makes observable right transfers and licensing around a specific comic character in a given year. We further include a control for character "age". This indicates the difference in years between the specific year of reprinting and the first publication year. As the level of reuses of (older) characters might change when approaching the end of the copyright term and so might their popularity, age at the time of the reprint is likely an important determinant. Moreover, we add controls for major publishers and trademark applicants as well as a dummy varibale indicating whether the comic is a U.S. original, and a variable indicating the age of the comic character.

In order to account for the count nature of our outcome variables, we further perform conditional FE Poisson regressions in our analysis. We base our model on the theory presented in [56]. Additionally, we estimate a random-effects GLS model including yearly dummies in order to control for heterogeneity in our data.

More importantly, we use an IV regression to erase possible endogeneity concerns concerning our treatment variable. We assume/chose our instrument I_t to be correlated with the treatment T_{it}, but uncorrelated with u_{it}, where

$$\epsilon_{it} = e_{it} + u_{it}.$$

We therefore apply standard Two-Stage Least Squares (2SLS) regression analysis, instrumenting the treatment of the first trademark registration with the year of the U.S. Supreme Court decision in 2003 I_t.[30] In the first stage we use the instrumental variable to find a consistent estimate for the coefficient of our treatment variable:

$$\hat{T_{it}} = \lambda_0 + \hat{\lambda_1} I_t + \hat{\lambda_2} X_{it}$$

In the second stagt we estimate the new coefficient for our treatment varibale including the first-stage OLS regression results:

$$y_{it} = \alpha + \beta \hat{T_{it}} + \gamma X_{it} + e_{it}$$

Using this IV approach we want to extract the causal effect of a trademark registration on the reuse of a comic character in printing, movies, as well as games.

5.2 Reprinting panel: Reuses in the same media

In the following we want to extract the causal effect of a trademark registration in Nice calss 16 on yearly reprints of the same comic character. Table 1 reports the regression results.[31] The summary statistics (Table 4) and the correlation Table 5 of all variables included in the different models can be found in the Annex. We estimate log-linear models to address the significant right skewness of the dependent variable yearly reprints. The time period is limited to reprints published between 1980 and 2019, which accounts for the increase in the production of derivative games and movies that significantly affect yearly reprints of comic figures. We include year-fixed effects to adjust for time trends in the data.

[30] We add a variable to control for year specific effects in the IV estimations.

[31] It is important to note that the dependent variable measuring yearly reprints does not distinguish between an appearance of a comic character in an entirely new story (original work first published) and an appearance in a re-edition or reprint of an existing story (same work previously published).

Table 1

Reprinting panel (1980-2019)

	(1) RE GLS b/se	(2) FE OLS b/se	(3) FE Pois b/se	(4) IV 2SLS b/se	(5) IV FE Pois b/se
main					
tm 16 count	-0.004*	-0.011***	-0.002	0.015*	0.043*
	(0.00)	(0.00)	(0.00)	(0.01)	(0.02)
Yearly reuse MG	0.189***	0.164***	0.090***	0.160***	0.099***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Yearly assignments	0.035*	0.036*	0.031***	0.019	0.013
	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)
After appeal	-0.061	-0.045	0.205	-0.067*	0.228
	(0.05)	(0.05)	(0.24)	(0.03)	(0.25)
Age	0.007***	-0.017*	0.015	-0.014**	0.021
	(0.00)	(0.01)	(0.02)	(0.00)	(0.02)
N	43620.000	43620.000	43455.000	43548.000	43455.000
vce	robust	cluster	robust	robust	robust
r2		0.062		0.027	
aic	.	104953.916	487699.529	106392.841	524779.033
bic	.	105344.663	488090.106	106453.613	524857.148

* p<0.05, ** p<0.01, *** p<0.001

In Models (1), (2), and (4), the dependent variable is the logarithm of the count of yearly reprints per character. In regressions (2) to (5) the controls for major publisher and U.S. origin were dropped due to collinearity or being constant in the sample. Further, we perform underidentification and weak identification test for our IV regression results as in [22]. The first-stage estimations are reported in the Annex in Tables 6 and 7.

In the first column, we estimate a random-effects GLS model (1) with robust standard errors to address possible serial correlation and heteroscedasticity in our data. Again, our treatment is the years (count) after trademark registration in Nice class 16 ("tm registration 16") which represents paper goods and printed matters. The dependent variable is the logarithm of the count of yearly reprints per character.[32] In the FE OLS and conditional FE Poisson models (2 and 3), clustered standard errors for each of the 1,212 single characters are included. By the inclusion of character-fixed effects we want to account for (time-invariant) parts of the differences in popularity across the comic figures. To address the issue of a possible sample selection of a character into the group of trademarked characters we further instrument our potentially endogenous treatment via the exogenous policy-change dummy variable in the FE OLS and conditional FE Poisson models (4 and 5).

Registering a character as a trademark in Nice class 16 has a weak negative and significant effect on yearly reprints in models (1) to (3). However, once models account for the endogeneity of the regressor and treatment selection (4 and 5), the direction of the registration effect changes from negative to overall positive. In both IV models, this effect is consistent and significant at the 5 percent level. Hence, every additional year after registration in Nice class 16 is estimated to weakly increase expected yearly reprints by up to 2 percent in model (4) and up to 4 percent in model (5).

Furthermore, estimates show a consistent and positive correlation between yearly reuses in movies and games and yearly reprints of a character across all models. For example, model (5) indicates that a one-unit increase in the yearly reuse in movies and games increases yearly reprints by around 10 percent. Arguably, this not only reflects that more popular characters with more reprints are also more likely to enter franchise reuses at a certain point in time, but

[32]We use the count of yearly reprints as the dependent variable when estimating conditional fixed-effects Poisson models (3 and 5). The Poisson regression models the log of the expected count of yearly reprints as a function of the explanatory variables.

also involves the possibility that these characters see advertising on multiple sales channels.

Additionally, in models (1) to (3), we find a positive correlation of yearly assignments with the dependent variable. This, however, does not extend to IV models where coefficients render insignificant. Accordingly, we argue that there seems to be room for improving the efficiency of markets for the licensing of trademarks for reuses in the same media. Moreover, the negative direction of the after-appeal coefficient - which, however, is only significant at the 1 per cent level in one of our models - indicates that legal uncertainty around trademarked characters might increase with appeals and, as a consequence, lower the number of reprints. Again, in model (4), expected annual reprints decrease by more than 6 percent once characters see one or more appeals of their trademark in a given year.

5.3 Franchise panel: Reuses in other media

In the second stage, we estimate similar models using the logarithm of yearly reuses in movies and games as the dependent variable and the years after trademark registration in Nice class 9 for audiovisuals and video games as a treatment.[33] Correspondingly, we control for the count of yearly reprints of the comic character in a certain year. Additionally, we deploy yearly reuses in movies and yearly reuses in games as dependent variables and run separate regressions to measure the effect of registration on either of them. These estimation results are reported in separate tables in the Annex (Tables 10, 12) and they largely reiterate our main results.

Table 2 reports regression results of estimating the correlation between trademark registration in Nice class 9 yearly franchise reuses in movies and games of a certain comic character. Again, we start by estimating a random-effects GLS model (1) with robust standard

[33]For the conditional fixed-effects Poisson regressions, the dependent variable is the count of yearly franchise reuses of a comic character in movies and games.

Table 2

Movie & game reuse (1980-2019)

	(1) RE GLS b/se	(2) FE OLS b/se	(3) FE Pois b/se	(4) IV 2SLS b/se	(5) IV FE Pois b/se
main					
tm count 9	0.002	0.001	-0.036***	-0.021***	-0.332***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.03)
Yearly reprints	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Yearly assignments	0.006	0.004	0.007	0.008	0.083***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
After appeal	-0.001	-0.002	0.097	0.071***	1.104***
	(0.02)	(0.02)	(0.18)	(0.02)	(0.21)
Age	0.001***	0.000	-0.010	-0.000	-0.012
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
N	43620.000	43620.000	19520.000	43548.000	19520.000
vce	robust	cluster	robust	robust	robust
r2		0.057		-0.023	
aic	.	-11017.099	18582.239	-7446.048	18709.121
bic	.	-10626.352	18936.803	-7385.277	18780.034

* p<0.05, ** p<0.01, *** p<0.001

In Models (1), (2), and (4), the dependent variable is the logarithm of the count of yearly movie and game reuses. In regressions (2) to (5) the controls for major publisher and U.S. origin were dropped due to collinearity or being constant in the sample. The corresponding first-stage IV regression results can be found in the Annex. Further, we perform underidentification and weak identification test for our IV regression results as in [22]. The first-stage estimations are reported in the Annex in Tables 8 and 9.

errors such as time-fixed effects which we then compare to the estimates of the fixed-effects OLS model with clustered standard errors (2). The conditional fixed-effects Poisson model (3) and the two IV fixed-effect approaches (4 and 5) show that an additional year of trademark protection in Nice class 9 is negatively correlated with the logarithm of yearly reuse of comic characters in movies and games. The effect equates a strong decrease of up to 28 percent in annual reuses of the comic figure in movies and games once IV models eliminate some of the treatment selection bias in samples.

Separate regressions for movies and games suggest that most of the negative effect is due to fewer franchises in games with every additional year the character is also protected under overlapping trademark rights. More precisely, estimates imply a decrease in expected yearly games reuses of up to 35 percent there. For movies, however, IV models indicate a positive effect on reuses which equals an increase of close to 15 percent in model (5). So, notably, treatment effects differ by type of media.

We also find a positive, however, very small effect of the count of yearly reprints on the logarithm of yearly reuses in movies and games. The effect is consistent across models. This again supports the notion that franchise characters are advertised on multiple channels including print media. Further, we find a significant positive effect of yearly assignments in the instrumented, fixed-effect Poisson model (5), which, however, is not consistent across models and thus yields cautious interpretation. Here, an one-unit increase in yearly assignments drive up yearly franchises by almost 9 percent. On the one hand, more licensing and transfers of rights could simply mean that more popular characters at a given point in time are involved. On the other hand, this might indicate that markets for trademark rights operate fairly efficient as they encourage more franchises and help develop branding around characters. Different to the previous section, the after-appeal dummy shows a positive sign in models (4 and 5) which seems to contradict the notion of higher legal uncertainty following a trademark appeal. Nevertheless, these effects might also pick up on some of the

(time-variant) popularity of characters beyond what character-fixed effects in our models can control for.

Further robustness checks consider (1) technological changes after the turn of the century in the advances of production technology and computer-generated special effects becoming more widely available for movies and games. Arguably, these might have enabled producers for the first time to credibly bring and translate comic characters and their (super) powers to life on cinema screens and they may have encouraged additional franchise reuses. And, checks address (2) legal concerns that trademarks might only be eligible for fictional characters above a certain popularity treshold under U.S. law.[34] Accordingly, we run separate regressions for (1) the restricted observation period 2000-2020 to address unobserved technological trends in our franchise reuse data beyond what year-fixed effects control for, and (2) rerun regressions on subsamples of more and less popular characters (i.e. more or less reprinted). Main results continue to hold for any of these specifications (results not reported).

5.4 Franchise panel: Effect on sales

In this section, we focus on the welfare implications from overlapping rights and franchise reuses, in particular the impact on cross-media sales. Our starting hypothesis is that, arguably, a decline in supply (i.e. the number of franchise reuses) is accompanied by an increase in sales because fewer movies and games sell off at higher prices and there is less cannibalization of sales among alternative reuses. We therefore regress the logarithm of total annual sales in movies and games of a comic figure on the years following tm registration for Nice class 9. These regression results are reported in Table 3.

It shows a consistent positive correlation between years with overlapping trademark rights and the logarithm of the sum of movie and game sales per character and year. Additional

[34]See for example, the debate in this legal blog.

Table 3

Movie & game sales (1980-2019)

	(1) RE GLS b/se	(2) FE OLS b/se	(3) IV 2SLS b/se
tm count 9	0.020*	0.014	0.540***
	(0.01)	(0.01)	(0.08)
Yearly reprints	0.004***	0.004***	0.003**
	(0.00)	(0.00)	(0.00)
Yearly assignments	0.094	0.073	0.074
	(0.07)	(0.07)	(0.07)
After appeal	0.120	0.137	-1.473***
	(0.14)	(0.15)	(0.29)
Age	0.003*	-0.021*	-0.020
	(0.00)	(0.01)	(0.02)
N	43620.000	43620.000	43548.000
vce	robust	cluster	robust
r2		0.038	-0.350
aic	.	204526.440	218941.667
bic	.	204917.187	219002.438

* p<0.05, ** p<0.01, *** p<0.001

The dependent variable is the logarithm of total movie and game sales per character and year. In regressions (2) and (3) the controls for major publisher and U.S. origin were dropped due to collinearity or being constant in the sample. Further, we perform underidentification and weak identification test for our IV regression result as in [22]. The first-stage estimation is reported in the Annex in Table 14.

years of trademark protection in Nice class 9 equate an impressive 72 percent increase in movie and game sales value based on the IV 2SLS regression model (3).

However, when we treat each media category separately as a dependent variable in regressions, sales effects differ again. For movies, the effect renders insignificant, but consistently show a positive sign across models. Tables (15, 17) in the Annex report estimation results.[35] For videogames, even though they see fewer reuses (as shown in the previous section), there is a strong increase in franchise sales once characters are also registered as trademarks and do not rely on copyright alone. Arguably, this could also mean that franchise sellers charge higher prizes and thus are able to better monopolize sales over fewer available reuses. Given that the average (median) sales value is at 97,900,000 (33,800,000) US-Dollars for a franchise movie (video game), changes in sales are quite sizable.

6 Policy discussion and limitations of the approach

From a policy perspective, first of all, overlapping rights around comic characters can encourage more reuses in U.S. comic publishing and movie franchise markets. Based on our analysis, when characters protected under copyright are also registered as trademarks, they see more comic reprints and enter more franchise movies in follow-on periods. One of the reasons can be that trademarked characters (as compared to those only protected under copyright) may benefit from more effective branding and merchandising on markets as well as they may have better access to finance and loans in the first place increasing the intensity of reuse. For franchise reuses in games, we can, moreover, document a substantial increase in sales value after trademarks have been registered.

Second, tm registration and additional licensing seems to also operate as a barrier to entry in other franchise markets, namely video games. This result lends support to the idea

[35]The corresponding first-stage estimations are reported in the Annex in Tables 16 and 18.

of higher negotiation and licensing costs when multiple rights must be transacted. Moreover, it implies that there is an impact on the selection of comic characters into franchise markets, in particular for video games. Overlapping rights might limit the variety of reused characters there, even when they help generate greater franchise sales via monopolization.

Third, efficient markets for the licensing and transacting of rights (trademarks) can further encourage reuses. In the case of comic reprints, reuses are positively correlated with additional trademark assignments and licensing in some of our models. On the opposite side, trademark oppositions can increase legal uncertainty and lower the number of reuses. There is also a discussion in the wider industry how to best redesign and make markets for trading these rights more transparent for everyone involved in franchises. This is because inter- and cross-industry opportunities to source content and negotiate rights are often considered too rare and limited to specialized local fairs and events such as the Frankfurt book fair, the Electronic Entertainment Expo, the Cannes Film Festival, or Comic-Con events.

Fourth, this research is limited as we cannot analyze the effects from a 'resurrection' of rights at this point in time because most comic characters in our sample (w/o registered tm) will only enter the public domain after the end of the copyright term, i.e. in the next 10 to 20 years time. In this way, the issue is left for future investigation. In a similar vein, our sample does not fully account for the variety of characters originating from Asia and other world regions, for example, Japan's well-established manga and anime culture. Once better global data becomes available to also cover these publishing and franchise markets, new research might also want to study the international dimension when it comes to (franchise) reuses, rights transfer and licensing.

From a methodological perspective, because we limit the current analysis to changes in creative reuses and sales we cannot fully assess dynamic welfare effects because this would

also require an estimation of demand and assessment of surplus changes once trademarks are registered as exemplified in Reimers [43], even when her approach is focused on the assessment of static welfare effects. Second, we do not take full account of plausible competition and market power/bargaining issues in the current analysis frame. These might also affect the number of reuses and access to inputs when overlapping rights are split between different holders. For example, asymmetric market power and vertical (input) foreclosure can give rise to market inefficiencies around the transactioning of mutiple rights and, in turn, lower reuses. We leave this interesting area to future research.

7 Concluding remarks

This research finds that intellectual property rights and overlapping rights frameworks positively affect creative reuses and convergence of media content. At large, when comic characters are copyright protected and they are also registered as U.S. trademarks, they are more often reprinted and enter more franchise movie productions. This might be due to more effective branding and merchandising around the character which the registration of a trademark can support and this also corrobarates the idea that different type of rights support different functions in markets. The increase in reuses we observe also translates in an increase of sales value once trademarks are registered.

However, the impact of overlapping rights on reuses varies by the type of franchise. As overlapping rights might also raise transaction and licensing costs for interested stakeholders, they also generate barriers to franchise entry in video games markets once characters are also registered as trademarks and need additional clearance. This, in turn, might limit the variety of characters we will observe in these franchise markets. At present, markets for transacting and licensing trademarks seem to have a limited ability to overcome these barriers.

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8 Annex

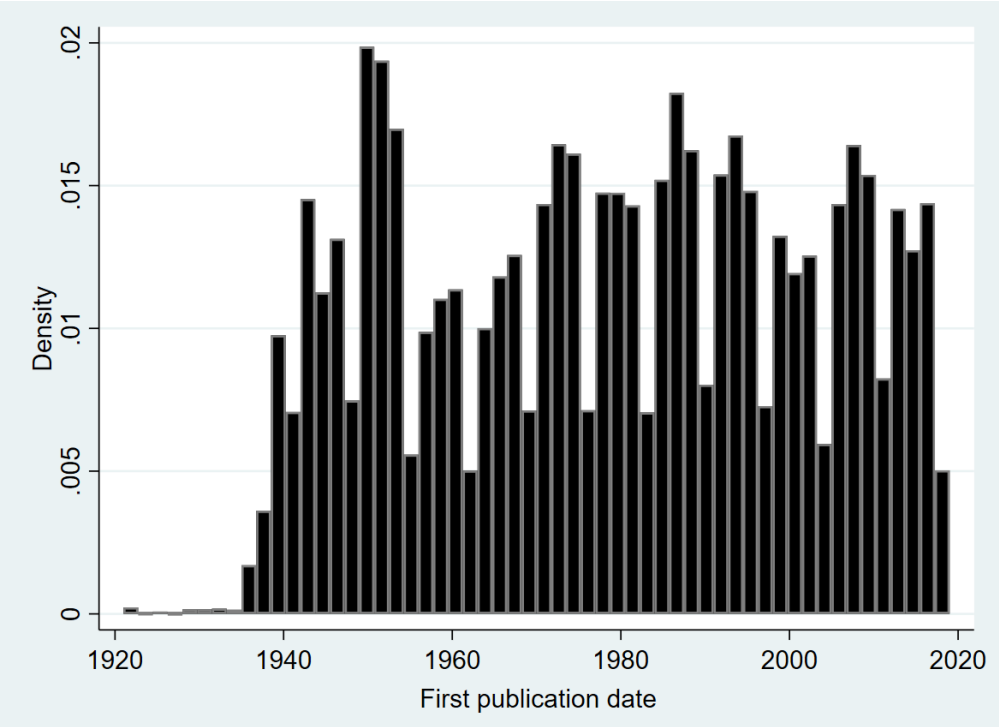

Figure 4: Distribution of first publication dates of comic characters, total publishing data

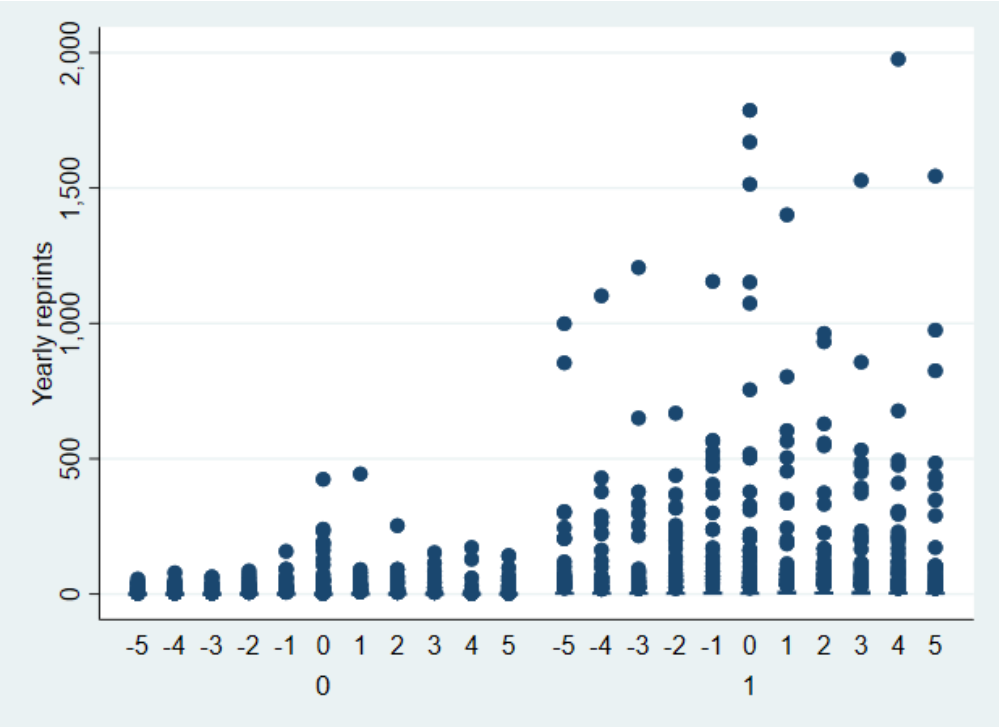

Figure 5: Yearly reprints of comic characters five years before and after the first trademark registration in Nice class 9, depending on whether the comic characters were at least once (1) or never (0) reused in movies and/or games, matched data balanced panel of 312 single characters (1980-2019)

Table 4: Summary statistics of all variables included in the regression models (1980-2019)

Variable	Obs	Mean	Std. Dev.	Min	Max
yearly_reuse	43,620	.139867	.5632402	0	14
reprints	43,620	14.94253	85.25421	0	3804
tm_reuse16	43,620	8.145254	12.91775	0	103
tm_reuse9	43,620	1.670105	5.383023	0	91
yearly_ass~t	43,620	.0342962	.3740442	0	19
after_appeal	43,620	.0548831	.2277545	0	1
major_publ~r	43,620	.5572444	.496718	0	1
major_appl~t	43,620	.0330353	.1787308	0	1
US_comic	43,620	.8832875	.3210811	0	1
movie_sales	43,620	679872.6	1.42e+07	0	8.57e+08
game_sales	43,620	81372.08	781425.6	0	3.32e+07
age	43,620	34.96492	23.78068	0	233

Table 5: Correlation table of all variables included in the regression models (1980-2019)

	yearly~e	reprints	tm_re~16	tm_reu~9	yearly~t	after_~l	major_~r	major_~t	US_comic	movie~es	game_s~s	age
yearly_reuse	1.0000											
reprints	0.2943	1.0000										
tm_reuse16	0.1165	0.1363	1.0000									
tm_reuse9	0.1645	0.0968	0.1959	1.0000								
yearly_ass~t	0.0496	0.0682	0.0643	0.0462	1.0000							
after_appeal	0.0377	0.0002	0.0564	0.1909	-0.0008	1.0000						
major_publ~r	0.0026	0.0571	0.0453	-0.0289	-0.0077	0.0075	1.0000					
major_appl~t	0.0122	0.0363	-0.0459	0.0004	0.1562	0.0366	0.0170	1.0000				
US_comic	-0.0118	0.0366	0.0552	-0.0219	0.0078	0.0309	0.3676	0.0077	1.0000			
movie_sales	0.1373	0.1298	0.0422	0.0587	0.0116	0.0325	0.0015	0.0117	0.0002	1.0000		
game_sales	0.3932	0.1537	0.0504	0.0609	0.0467	0.0188	-0.0029	0.0076	-0.0021	0.0956	1.0000	
age	0.1383	0.1282	0.2914	0.1771	-0.0010	0.0394	0.0148	-0.0576	0.0003	0.0286	0.0385	1.0000

Table 6: First-stage IV regression results for reprints (model (4) in Table 1)

tm_reuse16	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	2.247703	.0592503	37.94	0.000	2.131571	2.363835
yearly_reuse	.0989791	.0515123	1.92	0.055	-.0019861	.1999443
yearly_assignment	.2649984	.0478823	5.53	0.000	.1711481	.3588488
after_appeal	-.1561447	.1255024	-1.24	0.213	-.402132	.0898426
major_publisher	0	(omitted)				
major_applicant	-3.101756	.111618	-27.79	0.000	-3.32053	-2.882983
US_comic	0	(omitted)				
age	-.158515	.0211899	-7.48	0.000	-.2000476	-.1169825
years	.5985022	.0212934	28.11	0.000	.5567667	.6402377

Table 7: First-stage IV Poisson regression results for reprints (model (5) in Table 1)

tm_reuse16	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	27.77305	.7112013	39.05	0.000	26.37908	29.16702
yearly_reuse	.1026006	.0404581	2.54	0.011	.0233019	.1818994
yearly_assignment	.4272734	.0522376	8.18	0.000	.3248866	.5296603
after_appeal	.0004903	.1347247	0.00	0.997	-.2635728	.2645535
major_publisher	0	(omitted)				
major_applicant	-2.910084	.1176732	-24.73	0.000	-3.140726	-2.679442
US_comic	0	(omitted)				
age	-.1595645	.0168521	-9.47	0.000	-.192595	-.1265341

Table 8: First-stage IV regression results for movie and game reuse (model (4) in Table 2)

tm_reuse9	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	.7262609	.039384	18.44	0.000	.6490675	.8034543
reprints	.0018304	.0006401	2.86	0.004	.0005758	.0030851
yearly_assignment	.112513	.0587401	1.92	0.055	-.0026189	.2276448
after_appeal	3.265186	.1306568	24.99	0.000	3.009096	3.521276
major_publisher	0	(omitted)				
major_applicant	-1.045652	.1000009	-10.46	0.000	-1.241656	-.8496484
US_comic	0	(omitted)				
age	-.0038883	.0149126	-0.26	0.794	-.0331172	.0253407
years	.1190343	.0150009	7.94	0.000	.0896322	.1484363

Table 9: First-stage IV Poisson regression results for franchise reuses

tm_reuse9	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	6.795257	.5303668	12.81	0.000	5.755727	7.834787
reprints	.001068	.0002828	3.78	0.000	.0005137	.0016224
yearly_assignment	.2161849	.0389869	5.55	0.000	.1397697	.2926
after_appeal	3.413194	.1004644	33.97	0.000	3.216282	3.610107
major_publisher	0	(omitted)				
major_applicant	-.9490332	.0878192	-10.81	0.000	-1.121161	-.7769058
US_comic	0	(omitted)				
age	-.004086	.0125656	-0.33	0.745	-.0287148	.0205428

First-stage IV fixed-effects regression results for model (5) in Table 2, Table 10, and Table 12.

Table 10

Movie reuse (1980-2019)

	(1) RE GLS b/se	(2) FE OLS b/se	(3) FE Pois b/se	(4) IV 2SLS b/se	(5) IV FE Pois b/se
main					
tm count 9	0.001	0.000	-0.043**	0.007**	0.139*
	(0.00)	(0.00)	(0.02)	(0.00)	(0.06)
Yearly reprints	0.000***	0.000***	0.001**	0.000***	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Yearly assignments	0.003	0.001	0.065**	-0.001	-0.024
	(0.00)	(0.00)	(0.02)	(0.00)	(0.02)
After appeal	-0.004	-0.002	0.353	-0.024**	-0.225
	(0.01)	(0.01)	(0.49)	(0.01)	(0.55)
Age	0.000	0.000	-0.015	0.000	-0.003
	(0.00)	(0.00)	(0.03)	(0.00)	(0.03)
N	43620.000	43620.000	9959.000	43548.000	9959.000
vce	robust	cluster	robust	robust	robust
r2		0.064		0.025	
aic	.	-77358.541	4636.708	-75442.162	4726.545
bic	.	-76967.794	4960.988	-75381.390	4791.402

* p<0.05, ** p<0.01, *** p<0.001

In Models (1), (2), and (4), the dependent variable is the logarithm of the count of yearly movie reuses. In regressions (2) to (5) the controls for major publisher and U.S. origin were dropped due to collinearity or being constant in the sample.

Table 11: First-stage IV regression results for movie reuse (model (4) in Table 10)

tm_reuse9	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	.7262609	.039384	18.44	0.000	.6490675	.8034543
reprints	.0018304	.0006401	2.86	0.004	.0005758	.0030851
yearly_assignment	.112513	.0587401	1.92	0.055	-.0026189	.2276448
after_appeal	3.265186	.1306568	24.99	0.000	3.009096	3.521276
major_publisher	0	(omitted)				
major_applicant	-1.045652	.1000009	-10.46	0.000	-1.241656	-.8496484
US_comic	0	(omitted)				
age	-.0038883	.0149126	-0.26	0.794	-.0331172	.0253407
years	.1190343	.0150009	7.94	0.000	.0896322	.1484363

Table 12

Game reuse (1980-2019)

	(1) RE GLS b/se	(2) FE OLS b/se	(3) FE Pois b/se	(4) IV 2SLS b/se	(5) IV FE Pois b/se
main					
tm count 9	0.002*	0.001	-0.033***	-0.028***	-0.439***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.03)
Yearly reprints	0.000***	0.000***	0.001***	0.000***	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Yearly assignments	0.007	0.005	0.006	0.011**	0.113***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
After appeal	0.001	-0.002	0.051	0.094***	1.423***
	(0.01)	(0.01)	(0.17)	(0.02)	(0.20)
Age	0.001***	-0.000	-0.008	-0.000	-0.010
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
N	43620.000	43620.000	17660.000	43548.000	17660.000
vce	robust	cluster	robust	robust	robust
r2		0.043		-0.121	
aic	.	-18374.230	15971.986	-11461.732	16182.744
bic	.	-17983.483	16322.043	-11400.960	16252.755

* p<0.05, ** p<0.01, *** p<0.001

In Models (1), (2), and (4), the dependent variable is the logarithm of the count of yearly game reuses. In regressions (2) to (5) the controls for major publisher and U.S. origin were dropped due to collinearity or being constant in the sample.

Table 13: First-stage IV regression results for game reuse (model (4) in Table 12)

tm_reuse9	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	.7262609	.039384	18.44	0.000	.6490675	.8034543
reprints	.0018304	.0006401	2.86	0.004	.0005758	.0030851
yearly_assignment	.112513	.0587401	1.92	0.055	-.0026189	.2276448
after_appeal	3.265186	.1306568	24.99	0.000	3.009096	3.521276
major_publisher	0	(omitted)				
major_applicant	-1.045652	.1000009	-10.46	0.000	-1.241656	-.8496484
US_comic	0	(omitted)				
age	-.0038883	.0149126	-0.26	0.794	-.0331172	.0253407
years	.1190343	.0150009	7.94	0.000	.0896322	.1484363

Table 14: First-stage IV regression results for movie and game sales (model (3) in Table 3)

tm_reuse9	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	.7262609	.039384	18.44	0.000	.6490675	.8034543
reprints	.0018304	.0006401	2.86	0.004	.0005758	.0030851
yearly_assignment	.112513	.0587401	1.92	0.055	-.0026189	.2276448
after_appeal	3.265186	.1306568	24.99	0.000	3.009096	3.521276
major_publisher	0	(omitted)				
major_applicant	-1.045652	.1000009	-10.46	0.000	-1.241656	-.8496484
US_comic	0	(omitted)				
age	-.0038883	.0149126	-0.26	0.794	-.0331172	.0253407
years	.1190343	.0150009	7.94	0.000	.0896322	.1484363

Table 15

Movie sales (1980-2019)

	(1) RE GLS b/se	(2) FE OLS b/se	(3) IV 2SLS b/se
tm count 9	0.005	0.005	0.012
	(0.00)	(0.01)	(0.03)
Yearly reprints	0.002**	0.002*	0.002***
	(0.00)	(0.00)	(0.00)
Yearly assignments	-0.016	-0.020	-0.014
	(0.03)	(0.03)	(0.04)
After appeal	0.098	0.115	0.089
	(0.06)	(0.07)	(0.13)
Age	-0.000	-0.010	-0.010
	(0.00)	(0.01)	(0.01)
N	43620.000	43620.000	43548.000
vce	robust	cluster	robust
r2		0.009	0.008
aic	.	148524.989	148338.924
bic	.	148915.736	148399.695

* p<0.05, ** p<0.01, *** p<0.001

The dependent variable is the logarithm of total movie sales per character and year. In regressions (2) and (3) the controls for major publisher and U.S. origin were dropped due to collinearity or being constant in the sample.

Table 16: First-stage IV regression results for movie sales (model (3) in Table 15)

tm_reuse9	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	.7262609	.039384	18.44	0.000	.6490675	.8034543
reprints	.0018304	.0006401	2.86	0.004	.0005758	.0030851
yearly_assignment	.112513	.0587401	1.92	0.055	-.0026189	.2276448
after_appeal	3.265186	.1306568	24.99	0.000	3.009096	3.521276
major_publisher	0	(omitted)				
major_applicant	-1.045652	.1000009	-10.46	0.000	-1.241656	-.8496484
US_comic	0	(omitted)				
age	-.0038883	.0149126	-0.26	0.794	-.0331172	.0253407
years	.1190343	.0150009	7.94	0.000	.0896322	.1484363

Table 17

Game sales (1980-2019)

	(1) RE GLS b/se	(2) FE OLS b/se	(3) IV 2SLS b/se
tm count 9	0.016*	0.011	0.564***
	(0.01)	(0.01)	(0.07)
Yearly reprints	0.003***	0.003***	0.002
	(0.00)	(0.00)	(0.00)
Yearly assignments	0.137*	0.118	0.113
	(0.07)	(0.07)	(0.07)
After appeal	0.027	0.014	-1.678***
	(0.13)	(0.14)	(0.27)
Age	0.003**	-0.013	-0.011
	(0.00)	(0.01)	(0.02)
N	43620.000	43620.000	43548.000
vce	robust	cluster	robust
r2		0.045	-0.507
aic	.	193367.340	212931.392
bic	.	193758.087	212992.163

* p<0.05, ** p<0.01, *** p<0.001

The dependent variable is the logarithm of total game sales per character and year. In regressions (2) and (3) the controls for major publisher and U.S. origin were dropped due to collinearity or being constant in the sample.

Table 18: First-stage IV regression results for game sales (model (3) in Table 17)

tm_reuse9	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
iv	.7262609	.039384	18.44	0.000	.6490675	.8034543
reprints	.0018304	.0006401	2.86	0.004	.0005758	.0030851
yearly_assignment	.112513	.0587401	1.92	0.055	-.0026189	.2276448
after_appeal	3.265186	.1306568	24.99	0.000	3.009096	3.521276
major_publisher	0	(omitted)				
major_applicant	-1.045652	.1000009	-10.46	0.000	-1.241656	-.8496484
US_comic	0	(omitted)				
age	-.0038883	.0149126	-0.26	0.794	-.0331172	.0253407
years	.1190343	.0150009	7.94	0.000	.0896322	.1484363